RECLAMATION DISTRICT NO. 828
JULY 2017 FINANCIAL REPORT
100% FISCAL YEAR 2016-2017

		BUDGET FY 2016-2017	Expended PTD	Expended YTD	% YTD
EXPENSES					
GENERAL FUND					
	Administrative				
G1	Annual Audit	$3,200.00	$0.00	$3,100.00	97%
G2	Public Communication and Noticing	200.00	$0.00	$150.05	75%
G3	Election Expense	0.00	$0.00	$0.00	0%
G4	Trustee Fees	600.00	$100.00	$550.00	92%
G5	County Assessment Administration	650.00	$0.00	$709.96	109%
	SUBTOTAL	**$4,650.00**	**$100.00**	**$4,510.01**	**97%**
	Consultants				
G14	Engineering				
G14A	General Engineering		$7,979.71	$61,611.70	
G14B	Flood Contingency Map		$0.00	$0.00	
G14C	Levee Subventions		$2,205.50	$2,205.50	
G14D	Levee Maintenance (Engineering)		$3,101.03	$3,101.03	
G15	General Legal	25,000.00	$4,188.30	$19,779.37	79%
	SUBTOTAL	**$25,000.00**	**$17,474.54**	**$86,697.60**	**347%**
	Other				
G18	Insurance	$4,200.00	$0.00	$4,255.00	101%
G19	Reserve Contingency		$0.00	$0.00	0%
G20	Lower San Joaquin River Feasibility Study		$0.00	$0.00	0%
	SUBTOTAL	**$4,200.00**	**$0.00**	**$4,255.00**	**101%**
	TOTAL GENERAL FUND	**$33,850.00**	$17,574.54	**$95,462.61**	**282%**
RECURRING EXPENSES					
R1	**Levee**				
R1A	General Maintenance		$0.00	$0.00	
R1B	Riprap and Levee Repair		$0.00	$0.00	
R1C	Weed Control		$4,250.00	$4,250.00	
R1D	Animal Damage Control		$0.00	$0.00	
	SUBTOTAL	**$0.00**	**$4,250.00**	**$4,250.00**	
	TOTAL RECURRING EXPENSES	**$0.00**	**$4,250.00**	**$4,250.00**	
	TOTAL EXPENSES	**$33,850.00**	**$21,824.54**	**$99,712.61**	

	BUDGET FY 2016-2017	Expended PTD	Expended YTD	% YTD
INCOME				
Assessment - Existing	$48,641.60	$0.00	$64,031.21	132%
Interest	2,000.00	$0.00	$3,604.00	180%
Property Tax	$0.00	$0.00	$0.00	0%
Subvention Reimbursement	$0.00	$0.00	$0.00	0%
TOTAL, GROSS INCOME	**$50,641.60**	**$0.00**	**$67,635.21**	**134%**

TOTALS	Budget Income/(Loss)	PTD Income/(Loss)	YTD Income/(Loss)	
TOTAL, NET INCOME(LOSS)	**$16,791.60**	**($21,824.54)**	**($32,077.40)**	

Fund Balance

Fund Balance as of July 1, 2016	$	494,613.22
Revenues (YTD), as of June 30, 2017		$67,635.21
Expenses (YTD), as of June 30, 2017		$99,712.61
Total Cash as of July 2017	$	**462,585.87**

RECLAMATION DISTRICT NO. 828
JULY 2017 FINANCIAL REPORT
100% FISCAL YEAR 2016-2017

EXPENSES

		BUDGET FY 2016-2017	Expended PTD	Expended YTD	% YTD
GENERAL FUND					
	Administrative				
G1	Annual Audit	$3,200.00	$0.00	$3,100.00	97%
G2	Public Communication and Noticing	200.00	$0.00	$150.05	75%
G3	Election Expense	0.00	$0.00	$0.00	0%
G4	Trustee Fees	600.00	$100.00	$550.00	92%
G5	County Assessment Administration	650.00	$0.00	$709.96	109%
	SUBTOTAL	**$4,650.00**	**$100.00**	**$4,510.01**	**97%**
	Consultants				
G14	Engineering				
G14A	General Engineering		$7,979.71	$61,611.70	
G14B	Flood Contingency Map		$0.00	$0.00	
G14C	Levee Subventions		$2,205.50	$2,205.50	
G14D	Levee Maintenance (Engineering)		$3,101.03	$3,101.03	
G15	General Legal	25,000.00	$4,188.30	$19,779.37	79%
	SUBTOTAL	**$25,000.00**	**$17,474.54**	**$86,697.60**	**347%**
	Other				
G18	Insurance	$4,200.00	$0.00	$4,255.00	101%
G19	Reserve Contingency		$0.00	$0.00	0%
G20	Lower San Joaquin River Feasibility Study		$0.00	$0.00	0%
	SUBTOTAL	**$4,200.00**	**$0.00**	**$4,255.00**	**101%**
	TOTAL GENERAL FUND	**$33,850.00**	$17,574.54	**$95,462.61**	**282%**
RECURRING EXPENSES					
R1	**Levee**				
R1A	General Maintenance		$0.00	$0.00	
R1B	Riprap and Levee Repair		$0.00	$0.00	
R1C	Weed Control		$4,250.00	$4,250.00	
R1D	Animal Damage Control		$0.00	$0.00	
	SUBTOTAL	**$0.00**	**$4,250.00**	**$4,250.00**	
	TOTAL RECURRING EXPENSES	**$0.00**	**$4,250.00**	**$4,250.00**	
	TOTAL EXPENSES	**$33,850.00**	**$21,824.54**	**$99,712.61**	

INCOME

	BUDGET FY 2016-2017	Expended PTD	Expended YTD	% YTD
Assessment - Existing	$48,641.60	$0.00	$64,031.21	132%
Interest	2,000.00	$0.00	$3,604.00	180%
Property Tax	$0.00	$0.00	$0.00	0%
Subvention Reimbursement	$0.00	$0.00	$0.00	0%
TOTAL, GROSS INCOME	**$50,641.60**	**$0.00**	**$67,635.21**	**134%**

TOTALS	Budget Income/(Loss)	PTD Income/(Loss)	YTD Income/(Loss)	
TOTAL, NET INCOME(LOSS)	**$16,791.60**	**($21,824.54)**	**($32,077.40)**	

Fund Balance

Fund Balance as of July 1, 2016	$	494,613.22
Revenues (YTD), as of June 30, 2017		$67,635.21
Expenses (YTD), as of June 30, 2017		$99,712.61
Total Cash as of July 2017	**$**	**462,585.87**

BILL MENDELSON, Chairman
ROBERT G. MERDINGER, Trustee
DEBORAH "DEBY" PROVOST, Trustee

RECLAMATION DISTRICT NO. 828
WEBER TRACT
BOARD OF TRUSTEES MEETING
FRIDAY, JULY 21, 2017
8:30 AM
ENGINEER'S REPORT

DANIEL J. SCHROEDER, Atty. & Sec.
CHRISTOPHER H. NEUDECK, Engineer

I. AB 360 DELTA LEVEE SUBVENTIONS PROGRAM

a. Review status of the chopping and removal of Arundo and pampas grass along the District's levee.

b. There are identified locations of cutouts on the water side slopes that were created by homeless encampments. These areas will be repaired subject to available funds for levee repairs.

c. Review and seek Board authority to approve a DRAFT Operations and Maintenance (O&M) Manual for the District Levees.

EXHIBIT A: Reclamation District No. 828 - Weber Tract Draft Operations and Maintenance Manual and Flood Operations Manual for Smith Canal Levees dated June 20, 2017.

II. PG&E GAS MAIN IMPROVEMENTS PERMIT REQUEST

a. Review PG&E's proposed gas main repairs and discuss status of District Reimbursement Agreement and Permit Agreement.

III. CALTRANS LEVEE EROSION REPAIR BENEATH INTERSTATE 5 BRIDGE

a. Review Caltrans efforts and discuss erosion repairs beneath I-5 Bridge across the District's levee.

IV. CITY OF STOCKTON STORM WATER PUMP STATION

a. The City of Stockton is pursuing a project to replace a compromised portion of pipeline that crosses through the RD 828 levee. The pipeline is fed from a pump at their Buena Vista Pump Station. There is an approximate 6'-0" horizontal section of exposed pipe on the water side from the slope to a point where it transitions diagonal down into the water. The pipe invert is completely corroded in this 6'-0" section and the leakage from pipe extends into the levee as well. I reviewed this pipe when it was reported back in February, while it was in operation and leaking and spraying water on the slope. The pump connected to this pipe has been tagged out of service since February when the leak was noted.

b. KSN Inc. has met with City Staff on site recently to identify the compromised pipe and instructed Jeffrey Telmo (COS Collection Systems Supervisor) to provide a plan for replacement. Although their plan indicates replacement of this 6-0" section of pipe, they do mention replacement of other damaged sections as well which I am sure extends through the levee to where it is exposed on the land side.

c. Please see picture attached as an EXHIBIT below. In that picture you will see two pipes, a bottom pipe (the one being replaced) and the top pipe. Underneath the top pipe is a pipe that is capped off and enters the levee at an angle. When KSN Inc. received the pump station as-builts from Jeffrey Telmo it was determined that this angled pipe is connected below grade to a 30" concrete pipe that is installed very low in and through the levee, below low tide elevation in Smith Canal (one cannot see this pipe from the waterside slope). All indications point to this pipe being open ended in the canal and live / direct conduit through the levee where it terminates at this angled pipe cap and concrete plug at the pump station.

d. KSN Inc recommends that this 30" conduit through the levee be removed given that it most likely does not have any maintenance records or condition assessments since it was abandoned in place in 1997.

e. KSN recommends that the District require the City to remove this buried concrete pipeline completely. The encroachment permit for the leaky pipe could be an acceptable means to have this completed unless otherwise directed.

EXHIBIT B: Request for Emergency Permit – Buena Vista Storm Pump Station (Intersection of Buena Vista Avenue and Shimizu Dr.) from the City of Stockton (COS) dated July 3, 2017.

EXHIBIT C: Photo of abandoned 30" pipe running beneath RD 828's levee

EXHIBIT D: Cover letter to the COS seeking a reimbursement agreement to cover the engineering and legal expense reviewing and processing the requested permit together with the proposed removal of their abandoned pipeline.

V. SJAFCA SMITH CANAL GATE STRUCTURE PROJECT

a. Update on Smith Canal gate closure project.

A

Reclamation District No. 828

Weber Tract

Operations and Maintenance Manual

and

Flood Emergency Operations Manual

for

Smith Canal

DRAFT

Prepared by:

Kjeldsen, Sinnock & Neudeck, Inc.
711 N. Pershing Avenue
Stockton, CA 95203

June 20, 2017

Preface

Reclamation District No. 828 (District) was organized under provisions of the California Water Code for the purpose of providing a means of flood control to the land encompassed by the District. Its main function is to adequately maintain the system of levees and drainage pumps which are the major components of the Flood Control System (FCS). A District Base Map is included in Appendix A. This manual has been prepared as an information guide to aid and assist the District, especially in the case of a flood emergency situation.

The District has officially adopted the Superintendent's Guide to Operation & Maintenance of California's Flood Control Projects, published by the State of California, Department of Water Resources (DWR), Division of Flood Management, (see Appendix E) to supplement District maintenance information. This manual has been prepared by DWR to assist reclamation districts in maintaining an adequate level of flood protection. It is specifically intended for use by the District Superintendent, or District Manager, who has primary responsibility for the operation and maintenance of the FCS. The duties and responsibilities of the Superintendent are defined for routine operations and maintenance of the FCS and in the event of a flood emergency.

This Manual includes information to guide and aid the District in the case of a flood emergency situation. It provides emergency triggers with telephone numbers, levee patrol procedures, instructions for possible hazardous levee conditions, District base map, District emergency supplies, and a list of government agencies along with their function. The District uses Standardized Emergency Management System (SEMS) in responding to emergency situation involving multiple jurisdictions or multiple agencies. To supplement flood emergency information, the District has also adopted the Reclamation District 828, Weber Tract, Emergency Operations Plan (EOP) and Flood Contingency Map (FCM) (see Appendix D). The purpose of this EOP is to ensure the effective performance of Reclamation District 828 responsibilities in a flood emergency in collaboration with other jurisdictions performing emergency functions within and around the District. This plan is to be used in conjunction with the emergency operations plans of the State of California and the San Joaquin Operational Area (SJOA) to facilitate multi-jurisdictional coordination within District boundaries.

A separate Operations and Maintenance Manual has been prepared to assist the Smith Canal Closure Device (SCCD) operator in operating and maintaining the closure device and the Dad's Point levee at the mouth of Smith Canal. The SCCD is a gate structure that opens and closes for navigation, and it provides flood protection to the Smith Canal area from extreme high tides. Within the separate manual, the duties and responsibilities of the SCCD operator are defined for routine operations and maintenance in addition to flood emergency situations. The SCCD Operations and Maintenance Manual is a supplement to the District's manual.

DRAFT

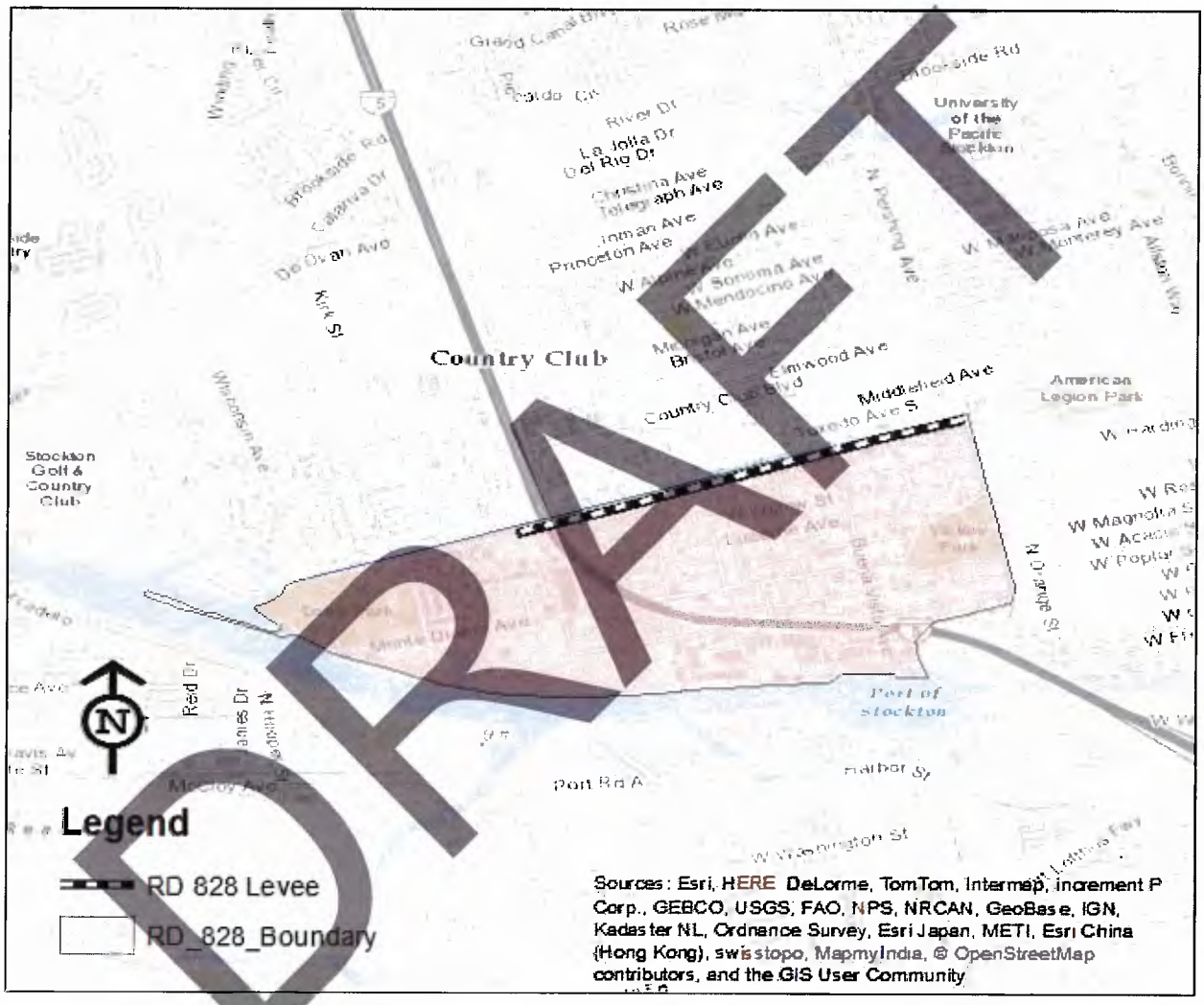
Table of Contents

Appendices

DRAFT

1. Project Description

Reclamation District No. 828 – Weber Tract (District) is located in San Joaquin County within incorporated and unincorporated portions of the City of Stockton. The District encompasses approximately 700 acres and is bounded by Smith Canal to the north, Pershing Avenue to the east, and the Deep Water Channel to the west and south. It is responsible for maintaining the levee system along Smith Canal as indicated below in Figure 1.



DRAFT

Figure 1 - RD 828 Boundary and Levee

2. Routine Inspections and Levee Patrols

Annual Inspections

Thorough inspections shall be made prior to the beginning of the flood season and otherwise at intervals not exceeding one year. Each inspection of the urban portion of levee along Smith Canal shall consist of a "boat" team inspecting the entire length of levee that is otherwise accessible by boat.

An individual assessment on a parcel-by-parcel basis shall be documented by the "boat" team. An inspection form shall be filled out and at least one photograph shall be taken at each parcel. The "boat" team will determine its position using a location map that utilizes Google Earth and a .kmz file on a smartphone or tablet, similar to the representative screenshot as shown below in Figure 2. Observations shall be recorded concerning the extent of recent erosion based on the topography of the levee slope, the presence of existing rock slope protection, the density of vegetation and trees requiring clearing, and the presence of encroachments such as decks, docks, or bulkheads which would require removal or special handling in order for repairs to be performed. A parcel inventory with maps is included in Appendix B, and a copy of the inspection form to be used for each parcel is included in Appendix C.

The data gathered from the field assessment will then be compiled, and a summary of findings and a prioritization of repairs shall be developed. Immediate steps will be taken to correct dangerous conditions disclosed by such inspections. Regular maintenance and repair measures shall be accomplished during the appropriate season.

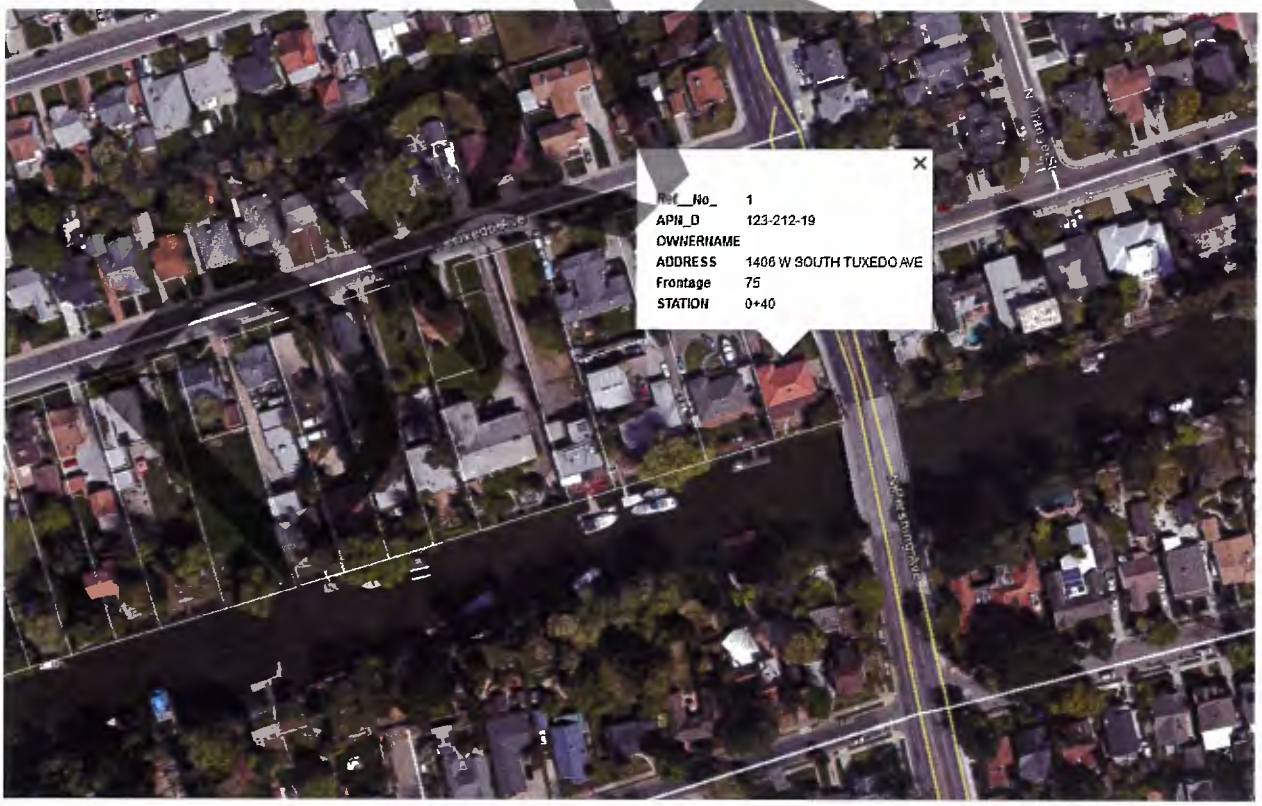


Figure 2 - Example of Smartphone/Tablet Location Map

Routine Monthly Patrols

The District provides routine patrols on a monthly basis or as otherwise may be required to ensure serviceability of the District levees in time of flood. Measures are taken to promote the growth of native grasses, exterminate burrowing animals, and provide for vegetation control of the grass and weeds, removal of wild growth and repair of damage caused by erosion or other forces. Routine monthly patrols shall be performed by the District from the water by boat to ensure that the above maintenance measures are being carried out and further, to evaluate if any of the following is occurring:

- Evaluate unusual settlement, sloughing, or if material loss of grade or levee cross section has taken place;
- Evaluate if slumping has occurred on either the landside or waterside of the levee which might affect the stability of the levee section;
- During flood stages, evaluate if seepage, saturated areas, or sand boils are occurring;
- Evaluate if embankment or riprap has been displaced, washed out, or removed;
- Evaluate that access roads to and on the levee are being properly maintained;
- Evaluate if crown of levee is maintained so as to drain readily and stay well shaped and maintained;
- Evaluate as to whether new encroachments are being made in the levee right-of-way, which might endanger the structure or hinder its proper and efficient functioning during times of emergency.

Special considerations need to be taken into account when performing routine levee patrols along Smith Canal. Because of the residential development adjacent to the levee, there exist many types of encroachments along the levee such as landscaping, decks, docks, patios, etc. As a result, it is much more difficult to visually inspect the condition of the levee within urban areas. Although these encroachments don't allow for a District representative to drive and regularly inspect this portion of levee firsthand, the fact that this portion of levee is within the backyard of a residence translates to frequent observations by home owners. Homeowners will tend to notice certain loss of soil matters in their backyards such as settlement, sloughing, or slumping and should immediately communicate these concerns with the District's Engineer and/or counsel.

Immediate steps will be taken to correct dangerous conditions disclosed by such patrols. Regular maintenance and repair measures shall be accomplished during the appropriate season.

The Superintendent's Guide to Operation & Maintenance of California's Flood Control Projects has been included for additional reference in Appendix E.

DRAFT

3. Levee Maintenance

This section identifies many of the activities that are necessary to maintain flood control works.

Levee Vegetation Management

Planted vegetation on or near levee slopes can significantly enhance the effectiveness and appearance of a levee. When properly managed, vegetation deters surface erosion from rain and runoff.

Levee slopes must allow visibility for regular maintenance inspections and, when necessary, for high water patrolling. Also, landside toes are often used as access points for maintenance. To the extent practicable, trees shall be trimmed five feet above ground level and thinned. Brush and weeds shall be trimmed, thinned, or removed for visibility and access, and groundcovers shall be no more than one foot in height. Levee slopes shall be kept free of large bunched, woody, or clumped vegetation that would interfere with flood fighting or emergency repairs. Agricultural pruning and other debris are special targets for removal because they attract burrowing rodents.

Levee Mowing and Spraying

Portions of the District's levees are covered by sod or some form of turf. These areas are generally mowed by the individual landowners.

Levee Slopes and Right-Of-Ways

Generally, levee slopes shall be free from encroachments or vegetative growth that could interfere with or prevent inspection or hamper flood fighting activities. Although this is currently not always the case along Smith Canal, it should be the ultimate goal. Quarry stone rock slope protection must be kept in good condition, and erosion shall not be occurring.

Gates and Signs

Gates and miscellaneous signs are installed to prohibit or discourage unauthorized personnel and vehicle traffic from using the flood control project facilities.

Rodent Control

The presence of ground squirrels and/or other burrowing rodents on a levee crown, slope or toe always warrants control measures. Because of their high reproductive potential and extensive burrow systems, these animals present a hazard to levees. When material is removed as a result of burrowing, the structural integrity of levees is threatened. Their burrowing loosens the soil, increasing the risk of erosion and sloughing. Also, a burrow can act like a pipe to carry floodwater into and through levee sections. The use of certain "restricted use" materials to control rodents and vegetation on levee slopes requires a permit from the County Agricultural Commissioner in San Joaquin County.

DRAFT

4. Warning System, Emergency Procedures, and Evacuation

Flood Warning System

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

The District will use the Venice Island gauge to monitor tidal conditions and use visual reference as information sources in its monitoring effort. The Mossdale gauge (San Joaquin River) and Benson's Ferry (Mokelumne River) gauges will be used as secondary monitoring sources.

Emergency Procedures

The following actions will be taken when the trigger condition is identified by District personnel. These actions may be taken by District personnel at any time or tidal condition if it is felt that conditions affecting the levees and drainage system warrant such action. A list of triggers and actions is included below in Table 1.

Table 1 - Trigger Conditions

Action	Trigger
Alert the District Board of Trustees and personnel; Issue Delegation of Authority letter appointing District Incident Commander	Official prediction that 8.0' (NAVD 88) tide will be reached at Venice Island Gauge
Activate/hire District personnel and initiate periodic focused levee patrols	El. 8.0' (NAVD 88) tide at Venice Island Gauge
Initiate 24-hour continuous levee patrols	El. 9.0' (NAVD 88) tide at Venice Island Gauge
Contact City of Stockton OES/Fire, San Joaquin County Sheriff, and San Joaquin OES	Potential threat to levee integrity or if District begins patrol
Contact the State-Federal Flood Operations Center	Identified problem on levee

The District does not use "phases" where objective conditions trigger a group of actions. Each action indicated will be taken upon reaching the trigger condition shown or if District personnel feel it is warranted. As noted below, the District Engineer and District personnel are responsible for monitoring objective conditions affecting the District.

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

To supplement flood emergency information, the District has adopted the Reclamation District 828, Weber Tract, Emergency Operations Plan (EOP) and Flood Contingency Map (FCM) as included in Appendix D.

A list of Emergency Contacts is shown below in Table 2.

DRAFT

Table 2 - Emergency Contacts

Contact	Telephone Number
District Engineer:	
Christopher H. Neudeck	office 209-946-0268 mobile 209-481-0316 home 209-948-8479
City of Stockton:	
Fire Department	office 209-937-8801 / 911
San Joaquin County:	
County Office of Emergency Services (OES)	office 209-953-6200
County Sheriff	office 209-468-4400 / 911
State of California:	
Department of Water Resources (DWR)	office 800-952-5530
State-Federal Flood Operations Center	office 916-574-2619
District Counsel:	
Dan Schroeder	office 209-948-8200 mobile 209-993-7130
District Trustees:	
Bill Mendelson	mobile 209-470-8428
Robert Merdinger	mobile 209-401-5536
Deborah Provost	mobile 209-462-2048

Alerting and Warning of the Public

The City of Stockton and San Joaquin County are the jurisdictions responsible for alerting and warning the general public. They have three means of alerting affected residents that there is an emergency and that they would take at least the minimal action of staying tuned to the Emergency Broadcast System (EBS):

- Broadcast over the EBS and other available news media.
- Soundings of sirens where those are located.
- Sweeps of the affected area by law enforcement and other emergency responders using loudspeakers and personal contact

Evacuation

In the event of an evacuation notification, the following District personnel MUST be contacted:

- Christopher H. Neudeck, P.E. — Office: 209-946-0268
  District Engineer — Mobile: 209-481-0316
  Kjeldsen, Sinnock & Neudeck, Inc. — Home: 209-948-8479

Upon being notified, residents should move rapidly to the main roads designated as the most trafficable under adverse weather conditions. The primary evacuation routes are along Interstate 5 as shown below in Figure 3. This evacuation plan can also be found at http:/www.sjmap.org/evacmaps/

DRAFT

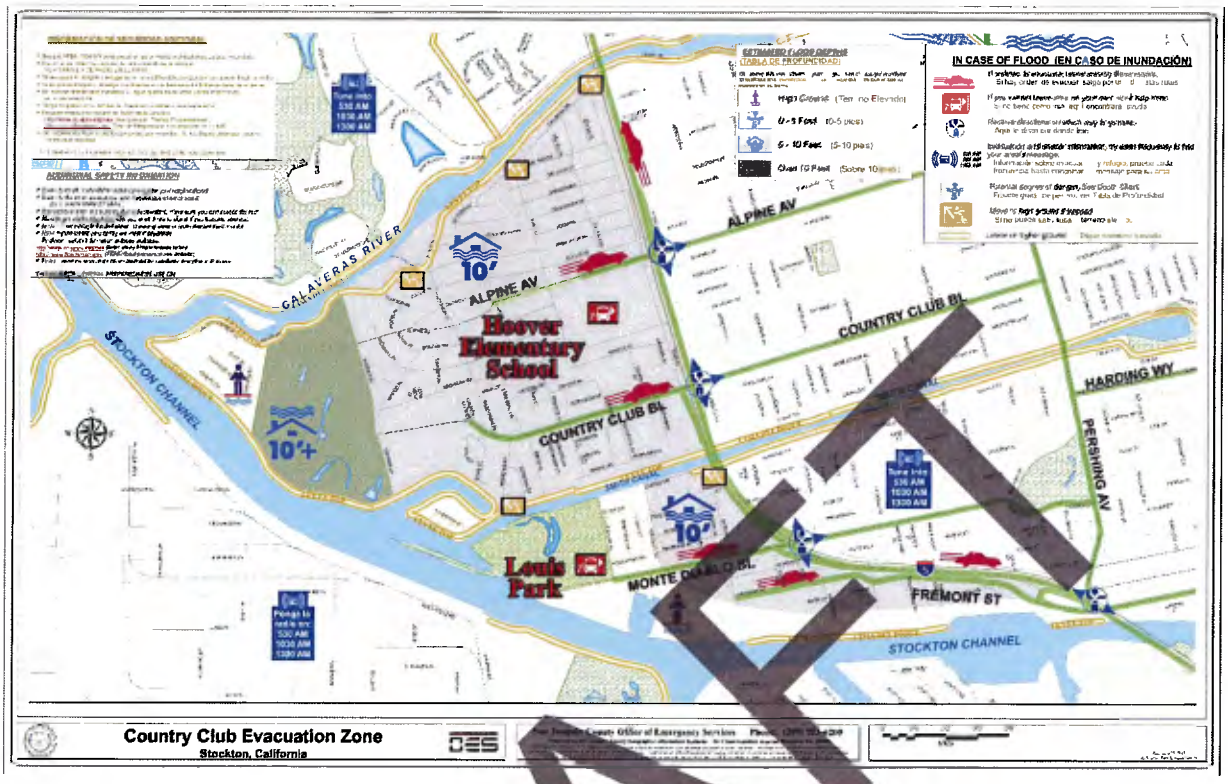


Figure 3 - Evacuation Plan (http:/www.sjmap.org/evacmap/)

DRAFT

5. Assistance from Government Agencies

Local Agencies

SAN JOAQUIN COUNTY OFFICE OF EMERGENCY SERVICES

The San Joaquin County Office of Emergency Services (County OES) is responsible for coordinating County operations during a flood crisis. It maintains control of County flood-fight materials and supervises emergency purchases. It is also responsible for coordinating with State and Federal agencies operating in the County, or providing mutual aid.

209-953-6200

SHERIFF'S DEPARTMENT

The Sheriff's Department is responsible for public safety in unincorporated areas of the delta. This department will assist in rescue activities, evacuations, and will provide general security for impacted areas.

209-468-4400

FIRE DEPARTMENT

The Fire Department will assist in rescue operations and will assist in the protection of property.

209-937-8801

AMERICAN RED CROSS

The American Red Cross provides assistance for food, clothing, shelter and supplemental medical needs to disaster victims. Assistance is in the form of an outright gift and repayment is not required nor requested. The Red Cross provides emergency mass care to congregate groups, and also provides individual/family assistance. Upon the request of government, and resources permitting, the Red Cross may assist with warnings, rescue or evacuations.

800-733-2767

SALVATION ARMY

During an emergency, the Salvation Army may be called upon to provide food, clothing, furniture and housing, emergency communication, mobile canteen services, and spiritual ministry for disaster victims.

209-948-8959

State Agencies

DEPARTMENT OF WATER RESOUCES

The Department of Water Resources provides:

- Flood warnings and information on real and potential flooding
- Coordinates local, state and federal flood fight efforts during a major flood emergency
- Provides experienced personnel to advise and direct flood fight efforts
- Furnishes flood fight crews with experienced personnel to supervise and direct their work.
- Provides flood fight training

800-952-5530

CALIFORNIA OFFICE OF EMERGENCY SERVICES

The California Office of Emergency Services (Cal OES) coordinates State action during emergencies under the California Emergency Services Act and administers the State Natural Disaster Assistance Act by

DRAFT

providing financial assistance to local agencies for repairing and restoring flood damaged facilities.
916-845-8510

CALIFORNIA HIGHWAY PATROL
The Highway Patrol is responsible for traffic control during all emergencies. Direct assistance to State and Federal organizations engaged in flood fighting includes use of Highway Patrol communication facilities.
800-835-5247

CALIFORNIA NATIONAL GUARD
The California National Guard functions as a reserve force for the national armed forces, and is also the State's reserve source of emergency manpower, equipment and transportation during times of local disaster or disorder.
209-982-4621

CALIFORNIA CONSERVATION CORPS
The Flood Operations Center of the Department of Water Resources depends heavily upon the California Conservation Corps (CCC) to provide personnel for flood fighting and levee patrolling during emergency situations. Standby crews are frequently stationed near sites where problems are anticipated due to storm activity, high river stages, high tides or heavy reservoir releases.
209-948-7110

CALIFORNIA DEPARTMENT OF FORESTRY
The California Department of Forestry will provide labor crews to assist in flood fight activities during a flood alert period.
916-845-8680

Federal Agencies

FEDERAL EMERGENCY MANAGEMENT AGENCY
The Federal Emergency Management Agency coordinates the disaster relief functions of all federal agencies during a presidentially declared emergency or major disaster.
800-462-9029

U. S. ARMY CORPS OF ENGINEERS
During a flood alert, the U. S. Army Corps of Engineers gives local authorities the benefit of the Corps' flood fighting experience and answers requests for assistance in flood fighting received through the Department of Water Resources. In addition, the Corps is responsible for operating certain flood control reservoirs and maintaining surveillance over the flood control operations of other reservoirs having federal flood control reservation space.
916-452-1535

U. S. ARMY
Assistance from the U. S. Army may consist of manpower, equipment, and supplies for flood fighting, rescue, and relief work. Such assistance may be sought only when local and State facilities are unable to prevent extensive loss of life or property.
Requests for U. S. Army assistance in flood fighting must be made to the Corps of Engineers through the Department of Water Resources.

DRAFT

NATIONAL WEATHER SERVICE

The National Weather Service disseminates river forecasts, which have been produced at the joint Federal-State River Forecast Center in Sacramento, to its district offices located in Eureka, Reno, San Francisco, Fresno and Redding. The National Weather Service operates on a 24-hour schedule when emergency high water conditions exist or are anticipated.

916-979-3051

www.wrh.noaa.gov/sacramento

DRAFT

6. Flood Fight Supplies

Suggested Flood Fight Supplies

An ample supply of the following tools, materials, and equipment as shown in Table 3 should be readily available in a convenient location. These supplies should be regularly inventoried or restocked.

The inventory should be adjusted according to length of patrol area, number and type of flood control facilities, and experience during other flood events.

Table 3 - Flood Fight Supplies

Item	Quantity (Minimum Required)
Visquine Plastic sheeting, 10 mil, 100 x 20 feet -or- Canvas, 100 x 20 feet	3 rolls
Sandbags	1,000
Twine or baling wire	1 box
Stakes, 2-foot, 2"x4", w/v points	50
Laths, 4-foot	1 bundle
Tie buttons or stones	50
Flagging (fluorescent)	6 rolls
Lineman's pliers	4
Sledge hammers	2
Shovels	5
Life jackets	4
Logbook	1
Tire chains	2
Jumper cables	2
Highway flares	2 bundles
Tow chains	2
Axes	2
Chainsaws	1
Electric lanterns	2
Batteries for lanterns	1 box
Maps	1
Lighting system for night patrol	2
Two-way radios	2

DRAFT

Directory of Materials and Equipment

A directory of materials and equipment suppliers is shown below in Table 4.

Table 4 - Directory of Materials and Equipment Suppliers

Item	Phone Number
Sandbags	
Sacramento Bag Mfg. Co. (Sacramento)	916-441-6121
M. Calosso and Sons (Stockton)	209-466-8994
Lumber and Hardware	
Valley Lumber (Stockton)	209-464-4565
Home Depot (Stockton)	209-474-8285
Canvas and Tarps	
Bonanza Industrial Supply (Oakley)	925-625-1000
Capitol Tarpaulin Co. (Sacramento)	916-451-2801
Construction Equipment	
Teichert Construction (Stockton)	209-983-2300
United Rentals (Stockton)	844-873-4948
Rock, Sand, and Gravel	
Teichert Aggregates (Vernalis)	209-834-8300
FTG Construction Materials (Lodi)	209-334-2112
Dredging and Barge Equipment	
Dutra Dredging (Rio Vista)	707-374-6339

DRAFT

7. Emergency Levee Patrols

Organizing Emergency Patrols

When a flood alert is called, the exterior levee system must be patrolled by boat with increasing frequency as flood conditions worsen. The District Engineer is required to prepare a patrol schedule that assigns specific shifts to individual boat patrol units. Land-based personnel shall be on standby in the event that flood fighting procedures need to be implemented.

Effective levee patrolling is the best defense against levee failure by early detection and remedial repair of weak spots. Patrols should look for wave wash, boils, seepage, cracks, or sloughing. The following will help in organizing personnel:

- Appoint one person to carry the responsibility for the entire operation.
- Provide sufficient number of personnel for two 12-hour shifts.
- Provide each person with a copy of this manual.
- Assign each person a definite length of levee to patrol, usually no more than can be inspected on foot at least once an hour.
- Furnish each person with a shovel, flashlight or lantern, and five to ten sacks with twine.
- Teach each person the correct way to fill and place sandbags, what danger signs to watch for, and how to signal for help.
- Arrange to stockpile sandbags and other tools and equipment at strategic locations along the levee.
- Be prepared to obtain more personnel, tools, and equipment on short notice.
- Advise the officials of the district or agency responsible for emergency assistance in the area of your efforts and, if necessary, request their help.
- Contact the nearest representatives of the Department of Water Resources or the Corps of Engineers for technical advice and assistance

Recommended Supplies for Standby Vehicles

The following are recommended materials and equipment that should be carried in each standby vehicle:

- Powerful electric lanterns and extra batteries
- Round-point shovels (to drain puddle water on the crown roadway)
- Axes or chain saws (for trees and branches that have fallen across the roadway)
- A tow chain (to drag debris from the roadway or assist stuck or trapped flood fight vehicles)
- Highway flares (to warn of dangerous road conditions)
- A set of battery jumper cables
- Tire chains
- Visquine sheeting
- Sandbags
- Stakes
- Rope or twine

DRAFT

8. Main Causes of Levee Failure and How to Control

The main causes of levee failure during high water are:

- Excessive seepage through or under levees is caused by rodent holes, sand lenses, decomposing tree roots, or leaks that result in a boil on the landside slope.
- Levee erosion by currents or wave action.
- Levee overtopping by flood flows that exceed levee height.

Emergency measures used to prevent levee failure from these causes are known as flood fight methods. Appendix F includes flood fight methods prepared by the DWR. These methods have proven effective during many years of use by DWR, USACE, and local agencies during food-related emergencies.

DRAFT

Reclamation District No. 828
Operations & Maintenance Manual

Appendix A

District Base Map

Reclamation District No. 828
Operations & Maintenance Manual

Appendix B

Parcel Inventory and Maps

REF. NO	APN	OWNERNAME	ADDRESS	FRONTAGE	STATION	MAP SHEET
1	135-171-07	WAYNE OSBORN	1701 N PERSHING AVE	79.03	0+00	1
2	135-171-06	CHRISTIAAN & MAYFLOR VANDERSTAAY	1403 W WALNUT ST	75.71	0+90	1
3	135-171-05	BERNIECE L SILVA	1431 W WALNUT ST	75.73	1+60	1
4	135-171-04	DON NICORA	1441 W WALNUT ST	75.73	2+80	1
5	135-171-03	LARRY J & BEVERLY R JOHNSON	1457 W WALNUT ST	60.29	3+10	1
6	135-171-02	DALLAS BRADEN	1459 W WALNUT ST	50.65	3+65	1
7	135-171-01	PAUL R & CYNTHIA M MARSH	1461 W WALNUT ST	55.28	4+10	1
8	135-020-62	CLEVELAND S & DORIS EDWARDS	1505 W WALNUT ST	120.74	5+00	1
9	135-020-61	NEAL H & LYNN L FEARN	1515 W WALNUT ST	60.74	5+95	2
10	135-020-60	BENNIE W & MAY C LIM	1521 W WALNUT ST	60.74	6+50	2
11	135-020-59	RICHARD A HINGLEY	1535 W WALNUT ST	60.74	7+10	2
12	135-020-58	DANIEL S & LINDA L MOORE	1545 W WALNUT ST	60.74	7+75	2
13	135-020-57	PATRICIA F CHAVEZ	1555 W WALNUT ST	60.74	8+35	2
14	135-020-56	KENT A & LISA A SHUBERT	1561 W WALNUT ST	60.74	9+00	2
15	135-020-55	GARY FRISCH	1571 W WALNUT ST	60.74	8+60	2
16	135-020-54	BRANDON V MARINO	1607 W WALNUT ST	60.74	10+20	2
17	135-020-53	FLORENCE T SHIMA	1611 W WALNUT ST	60.74	10+75	2
18	135-020-52	EDWARD J LEE	1625 W WALNUT ST	60.74	11+40	2
19	135-020-51	MARY ELLEN SANCHEZ	1633 W WALNUT ST	60.74	12+00	3
20	135-020-50	RUSSELL & VENIZ RICHENBERG	1641 W WALNUT ST	60.74	12+50	3
21	135-020-49	BEVERLY NANCY GARCIA	1651 W WALNUT ST	60.74	13+20	3
22	135-020-48	WILLIAM C & LYNNE E GOWDY	1661 W WALNUT ST	60.74	13+80	3
23	135-020-47	JOHN JAY & LYNNE MARIE FARRAR	1703 W WALNUT ST	60.74	14+40	3
24	135-020-46	RICHARD D & DIANNE M LANGONE	1711 W WALNUT ST	60.74	15+00	3
25	135-020-45	MICHAEL R & AUDREY DONALDSON	1725 W WALNUT ST	60.74	15+60	3
26	135-020-44	WILLIAM & GINA MARIE BARNEY	1733 W WALNUT ST	60.74	16+20	3
27	135-020-43	DONNA GAIL SAMELSON	1741 W WALNUT ST	60.74	16+80	3
28	135-020-42	ALICE MAE BIRD	1751 W WALNUT ST	60.74	17+40	3
29	135-020-41	TODD & COLETTE MOYSE	1775 W WALNUT ST	60.75	18+00	4
30			**BUENA VISTA AVE**		**18+80**	**4**
31	133-490-13	WAYNE EVERETT & LAURIE A HALLQUIST	1617 BUENA VISTA AVE	63.79	20+00	4
32	133-490-06	JAMES W NICHOLS	1528 ABBEY CT	97	20+90	4
33	133-490-05	WILLIAM F & JEANNIE J FILE	1525 ABBEY CT	133.82	22+00	4
34	133-490-04	SUZETTE RICA	1519 ABBEY CT	10	22+70	4
35	133-460-06	ALLEN MILLER	1852 SHIMIZU DR	60	23+00	4
36	133-460-05	ALLEN & CRISTINA S MILLER	1855 W HARDING WAY	100	23+80	5
37	133-460-60	NEMORIO & IRENE DECASAS	1868 SHIMIZU DR	60	24+60	5
38	133-460-59	ARIE & BEVERLY HOPE	1872 SHIMIZU DR	50	25+15	5
39	133-460-03	JOHN E & PETRA J SCHULTZ	1881 W WALNUT ST	50	25+65	5
40	133-460-02	CHARLES J & WANDA BIGGS	1893 W WALNUT ST	105	26+50	5
41	133-460-01	CHRIS H MARTIN	1530 SAN JUAN AVE	55	27+20	5
42			**SAN JUAN AVE**		**27+80**	**5**
43	133-280-19	PACIFIC GAS &, ELECTRIC CO	1525 SAN JUAN AVE	118.64	28+60	5
44	133-280-17	WARREN MARTIN	1924 SHIMIZU DR	57	29+50	6
45	133-280-15	PAUL ANTHONY FORGACH	1932 SHIMIZU DR	65	30+05	6
46	133-280-50	ALLAN L & LILIA M SANCHEZ	1940 SHIMIZU DR	58.79	30+70	6
47	133-280-13	MARGARET E PRAUS	1947 W HARDING WAY	51.47	31+20	6
48	133-280-12	XAVIER MACIAS	1951 W HARDING WAY	51.47	31+75	6
49	133-280-51	MITSUO H MENDA	1964 SHIMIZU DR	52.71	32+25	6
50	133-280-48	RICHARD G WILSON	1972 SHIMIZU DR	52.5	32+80	6
51	133-280-07	LEO BRATENAS	2006 SHIMIZU DR	66.5	33+40	6
52	133-280-06	SHEREE MAKA	2015 W HARDING WAY	65	34+10	6
53	133-280-05	KEOKI GUTIERREZ	2029 W HARDING WAY	45.78	34+75	6
54	133-280-04	MICHAEL & SANTA MINATRE	2037 W HARDING WAY	55.75	35+40	7
55	133-280-03	WILLIAM L & JANET E MENDELSON	2051 W HARDING WAY	60	36+00	7
56	133-280-02	O TOOLE, T MARK	2053 W HARDING WAY	93	36+80	7
57	133-280-01	EARL & BETTY SCHNEIDER	2077 W HARDING WAY	90.69	37+70	7
58			**CARLTON AVE**		**39+40**	**7**
59	133-250-03	NEIL & MARIA SMYTH	1515 CARLTON AVE	279.5	40+40	8
60	133-250-02	NEMORIO & IRENE DE CASAS	2168 SHIMIZU DR	110.08	42+20	8
61	133-250-01	NEMORIO & IRENE DE CASAS	2170 SHIMIZU DR	110.08	43+30	8
62	133-250-21	CHANNELPORT HOMEOWNERS ASSN	HOLT ST	98.6	44+30	8
63	133-160-12	GERARDO C FELIX	1510 WILSHIRE AVE	102.53	45+40	9
64			**WILSHIRE AVE**		**46+20**	**9**
65	133-160-11	WILLIAM & SHELBY J SULLIVAN	1503 WILSHIRE AVE	55.29	48+65	9
66	133-160-10	WARREN E MORGAN	2309 W HARDING WAY	50.26	47+20	9
67	133-160-09	ANTHONY DAVIS	2317 W HARDING WAY	50.26	47+70	9
68	133-160-08	STEPHEN SOCHACKI	2325 W HARDING WAY	50.26	48+20	9
69	133-160-07	PAUL M & JULIE G PICHARDO	2333 W HARDING WAY	50.26	48+70	9
70	133-160-06	NANCY J MARTIN	2341 W HARDING WAY	50.26	49+20	9
71	133-160-05	ARTURO PAUL & DARLENE T CORONA	2349 W HARDING WAY	50.304	49+70	9
72	133-160-04	KENEDY E & DOLLIE S DEAN	2357 W HARDING WAY	50.33	50+20	9

REF. NO	APN	OWNERNAME	ADDRESS	FRONTAGE	STATION	MAP SHEET
73	133-160-03	DELORES FOSTER	2403 W HARDING WAY	50.4	50+70	9
74	133-160-02	DEBORAH PROVOST	2409 W HARDING WAY	50.47	51+20	10
75	133-160-01	RAYMOND FERRY	2417 W HARDING WAY	50.54	51+75	10
76	133-150-08	MICHEL & DEBORAH HERMANGE	2425 W HARDING WAY	50.62	52+20	10
77	133-150-07	GERARD T HAMMER	2433 W HARDING WAY	50.7	52+70	10
78	133-150-06	GERALD V LUCHA	2441 W HARDING WAY	50.72	53+25	10
79	133-150-05	ROGER NAVARRO	2449 W HARDING WAY	84.94	54+00	10
80	133-150-04	ROBERT JON & B KNUDSEN	2457 W HARDING WAY	71.9	54+70	10
81	133-150-03	ALFONSO & RAWDA VILLALOBOS	1440 DENA CT	128.59	55+70	10
82	133-150-02	ANDREW & V E BELASCO	1441 DENA CT	129.32	57+00	11
83	133-150-35	CESAR & MODESTA HERNANDEZ	2548 SHIMIZU DR	100.32	58+20	11
84			**I-5**		60+25	11

5+50
5+00
4+50
4+00
3+50
3+00
2+50
2+00
1+50
1+00
0+50
0+00

135-020-62
REFERENCE NO. 8
CLEVELAND S & DORIS EDWARDS
1505 W WALNUT ST
FRONTAGE 120.74'
STATION 5+00

135-171-01
REFERENCE NO. 7
PAUL R & CYNTHIA M MARSH
1461 W WALNUT ST
FRONTAGE 55.28'
STATION 4+10

135-171-02
REFERENCE NO. 6
DALLAS BRADEN
1459 W WALNUT ST
FRONTAGE 50.65'
STATION 3+65

135-171-03
REFERENCE NO. 5
LARRY J & BEVERLY R JOHNSON
1457 W WALNUT ST
FRONTAGE 60.29'
STATION 3+10

135-171-04
REFERENCE NO. 4
DON NICORA
1441 W WALNUT ST
FRONTAGE 75.73'
STATION 2+80

135-171-05
REFERENCE NO. 3
BERNIECE L SILVA
1431 W WALNUT ST
FRONTAGE 75.73'
STATION 1+60

135-171-06
REFERENCE NO. 2
CHRISTIAAN & MAYFLOR VANDERSTAAY
1403 W WALNUT ST
FRONTAGE 75.71'
STATION 0+90

135-171-07
REFERENCE NO. 1
WAYNE OSBORN
1701 N PERSHING AVE
FRONTAGE 79.03'
STATION 0+00

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

KSN inc.
KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268

1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900

www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 0+00 - 5+50
PARCEL REFERENCE NUMBERS 1 - 8

EXHIBIT
A

KSN inc.
KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS
711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268
1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900
www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 5+50 - 11+50
PARCEL REFERENCE NUMBERS 9 - 18

EXHIBIT
A

17+50
17+00
16+50
16+00
15+50
15+00
14+50
14+00
13+50
13+00
12+50
12+00
11+50

135-020-42
REFERENCE NO. 28
ALICE MAE BIRD
1751 W WALNUT ST
FRONTAGE 60.74'
STATION 17+40

135-020-43
REFERENCE NO 27
DONNA GAIL SAMELSON
1741 W WALNUT ST
FRONTAGE 60.74'
STATION 16+80

135-020-44
REFERENCE NO 26
WILLIAM & GINA MARIE BARNEY
1733 W WALNUT ST
FRONTAGE 60.74'
STATION 16+20

135-020-45
REFERENCE NO 25
MICHAEL R & AUDREY DONALDSON
1725 W WALNUT ST
FRONTAGE 60.74
STATION 15+60

135-020-46
REFERENCE NO. 24
RICHARD D & DIANNE M LANGONE
1711 W WALNUT ST
FRONTAGE 60.74'
STATION 15+00

135-020-47
REFERENCE NO. 23
JOHN JAY & LYNNE MARIE FARRAR
1703 W WALNUT ST
FRONTAGE 60.74'
STATION 14+40

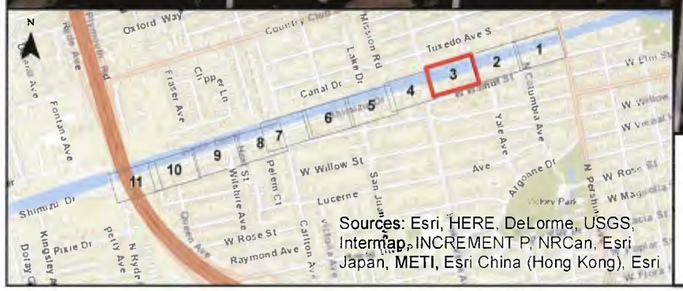
135-020-48
REFERENCE NO. 22
WILLIAM C & LYNNE E GOWDY
1661 W WALNUT ST
FRONTAGE 60.74'
STATION 13+80

135-020-49
REFERENCE NO. 21
BEVERLY NANCY GARCIA
1651 W WALNUT ST
FRONTAGE 60.74'
STATION 13+20

135-020-50
REFERENCE NO. 20
RUSSELL & VENIZ RICHENBERG
1641 W WALNUT ST
FRONTAGE 60.74'
STATION 12+50

135-020-51
REFERENCE NO. 19
MARY ELLEN SANCHEZ
1633 W WALNUT ST
FRONTAGE 60.74'
STATION 12+00

135-0
REFEREN
EDWAR
1625 W W
FRONTA
STATIO



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

KSN inc. KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268

1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900

www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 11+50 - 17+70
PARCEL REFERENCE NUMBERS 19 - 28

EXHIBIT
A

KSN inc.
KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS
711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268
1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900
www.ksninc.com

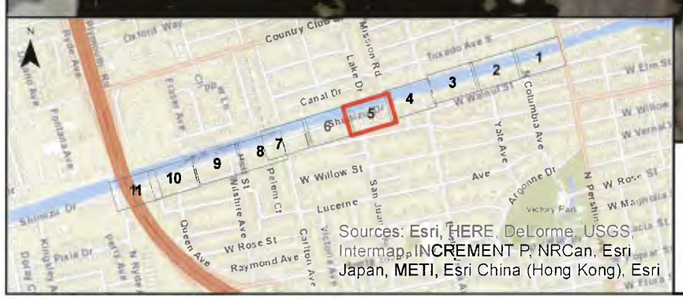
Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 17+70 - 23+50
PARCEL REFERENCE NUMBERS 29 - 35

EXHIBIT
A



KSN inc. KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS
711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268
1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900
www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 23+50 - 29+50
PARCEL REFERENCE NUMBERS 36 - 43

EXHIBIT
A

KSN inc. KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268

1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900

www.ksninc.com

Scale: 1 in = 40 ft

Original Drawing Scale: 0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 29+50 - 35+10
PARCEL REFERENCE NUMBERS 44 - 53

EXHIBIT A

KSN inc. KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268

1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900

www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 35+10 - 39+00
PARCEL REFERENCE NUMBERS 54 - 57

EXHIBIT
A

45+00
44+50
44+00
43+50
43+00
42+50
42+00
41+50
41+00
40+50
40+00
39+50
39+00

133-250-21
REFERENCE NO. 62
CHANNELPORT HOMEOWNERS ASSN
HOLT ST
FRONTAGE 93.60'
STATION 44+30

133-250-01
REFERENCE NO. 61
NEMORIO & IRENE DE CASAS
2170 SHIMIZU DR
FRONTAGE 110.05'
STATION 43+30

133-250-02
REFERENCE NO. 60
NEMORIO & IRENE DE CASAS
2153 SHIMIZU DR
FRONTAGE 110.05'
STATION 42+20

133-250-03
REFERENCE NO. 59
NEIL & MARIA SMYTH
1515 CARLTON AVE
FRONTAGE 279.50'
STATION 40+40

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

KSN inc.
KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268

1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900

www.ksninc.com

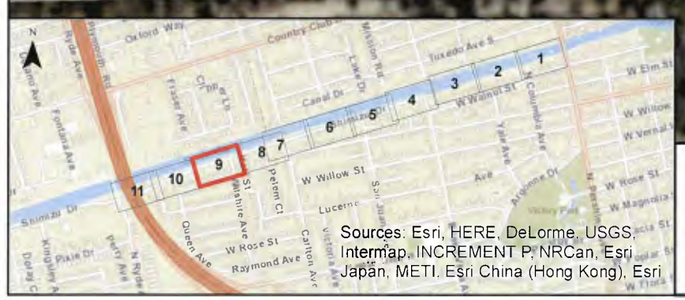
Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 39+00 - 45+00
PARCEL REFERENCE NUMBERS 59 - 62

EXHIBIT
A



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri

KSN inc.
KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS
711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268
1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900
www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 45+00 - 51+00
PARCEL REFERENCE NUMBERS 63 - 73

EXHIBIT
A

57+00
56+50
56+00
55+50
55+00
54+50
54+00
53+50
53+00
52+50
52+00
51+50
51+00

133-150-02
REFERENCE NO. 82
ANDREW & V.E BELASCO
1441 DENA CT
FRONTAGE 129.32'
STATION 57+00

133-150-03
REFERENCE NO. 81
ALFONSO & RAWDA VILLALOBOS
1440 DENA CT
FRONTAGE 128.59'
STATION 55+70

133-150-04
REFERENCE NO. 80
ROBERT JON & B KNUDSEN
2457 W HARDING WAY
FRONTAGE 71.90'
STATION 54+70

133-150-05
REFERENCE NO. 79
ROGER NAVARRO
2449 W HARDING WAY
FRONTAGE 84.94'
STATION 54+00

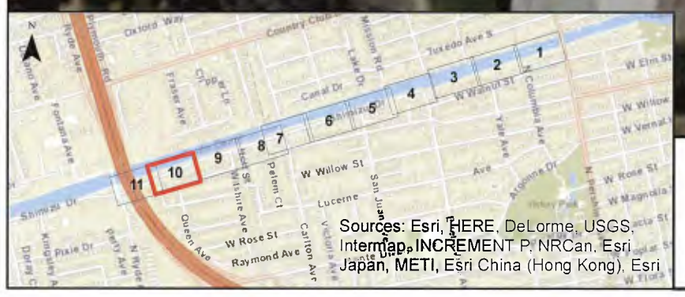
133-150-06
REFERENCE NO. 78
GERALD V LUCHA
2441 W HARDING WAY
FRONTAGE 50.72'
STATION 53+25

133-150-07
REFERENCE NO. 77
GERARD T HAMMER
2433 W HARDING WAY
FRONTAGE 50.70'
STATION 52+70

133-150-08
REFERENCE NO. 76
MICHEL & DEBORAH HERMANGE
2425 W HARDING WAY
FRONTAGE 50.62'
STATION 52+20

133-160-01
REFERENCE NO. 75
RAYMOND FERRY
2417 W HARDING WAY
FRONTAGE 50.54'
STATION 51+75

133-160-02
REFERENCE NO. 74
DEBORAH PROVOST
2409 W HARDING WAY
FRONTAGE 50.47'
STATION 51+20



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

KSN inc.
KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268

1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900

www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 51+00 - 56+50
PARCEL REFERENCE NUMBERS 74 - 81

EXHIBIT
A

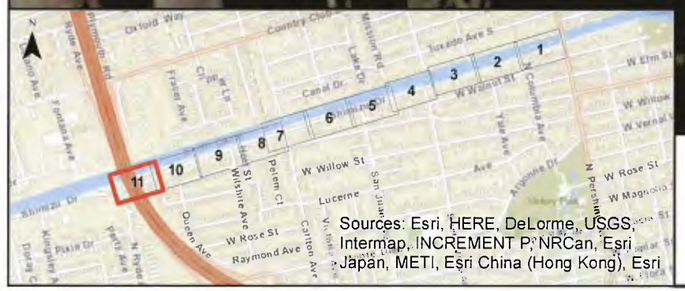
62+50
62+00
61+50
61+00
60+50
60+00
59+50
59+00
58+50
58+00
57+50
57+00
56+50

I-5
REFERENCE NO. 84
STATION 60+25

133-150-35
REFERENCE NO. 83
CESAR & MODESTA HERNANDEZ
2548 SHIMIZU DR
FRONTAGE 100.32'
STATION 58+20

133-150-02
REFERENCE NO. 82
ANDREW & V E BELASCO
1441 DENA CT
FRONTAGE 129.32'
STATION 57+00

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri

KSN inc. KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268

1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900

www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 56+50 - 62+50
PARCEL REFERENCE NUMBERS 82 - 84

EXHIBIT
A

Reclamation District No. 828
Operations & Maintenance Manual

Appendix C

Parcel Annual Inspection Form

Reclamation District No. 828
Weber Tract
Annual Inspection along Smith Canal

Field Survey by:_____ Date:_____
Map Reference No.:_____ APN:_____
Owner:_____
Address:_____
Station:_____ Lot Frontage:_____

Description

Trees:_____

Vegetation:_____

Rock Slope Protection:_____

Bulkhead:_____

Pipes:_____

Decks:_____

Docks:_____

Miscellaneous:_____

Reclamation District No. 828
Weber Tract
Annual Inspection along Smith Canal

Field Survey by:_____ Date:_____
Map Reference No.:_____ APN:_____
Owner:_____
Address:_____
Station:_____ Lot Frontage:_____

Photographs

Reclamation District No. 828
Operations & Maintenance Manual

Appendix D

Reclamation District 828, Weber Tract
Emergency Operations Plan and Flood Contingency Map

Reclamation District 828
Weber Tract

Emergency Operations Plan

(California Water Code Section 9650 Safety Plan)

San Joaquin Operational Area
November 2015

This document was last updated on November 3, 2015.

Prepared by Kjeldsen, Sinnock & Neudeck, Inc. for Reclamation District 828, Weber Tract, with funds awarded under the California Department of Water Resources Flood Emergency Response Grant Program—Delta, Contract No. 4600010754.

This document satisfies the requirements of California Water Code Section 9650.

KJELDSEN SINNOCK NEUDECK
INC.
Civil Engineers and Land Surveyors

Kjeldsen, Sinnock & Neudeck, Inc.
711 N. Pershing Ave
Stockton CA 95203
KSN by Phone:
(209) 946-0268
(916) 403-5900

Plan Promulgation

November 3, 2015

To whom it may concern:

This document and accompanying annex map, having been duly reviewed and approved by the Board of Trustees of Reclamation District 828, Weber Tract (hereinafter Reclamation District 828), is hereby promulgated as the official emergency plan of the District. District personnel are hereby directed to use this plan as the basis for emergency response to flood events. This plan meets the safety plan requirements of Section 9650 of the California Water Code and is compliant with the National Incident Management System and National Response Framework.

The District Secretary/Legal Counsel is hereby directed to distribute this plan to outside agencies in accordance with the Record of Initial Distribution to ensure proper inter-agency coordination during emergency operations. Copies of the plan shall be provided to additional agencies upon request.

The District Secretary/Legal Counsel and District Engineer shall review this plan and accompanying annex annually for needed changes and updates. The District Secretary/Legal Counsel and District Engineer are authorized to make routine updates and changes to the plan required by changes in district operations and personnel and changes to outside agency plans that affect district operations.

The Board of Trustees of Reclamation District 828 shall review this plan once every three years and after any major flood event where the plan was used to guide District response. The District shall maintain a record of Board plan reviews and approval actions in accordance with District documentation procedures and policies.

Sincerely,

Bill Mendelson, President
Board of Trustees
Reclamation District 828

Record of Changes

Revision #	Sections Revised	Date of Distribution	Name of Approving Authority

Record of Initial Distribution

Agency Name	Address	Date Provided
San Joaquin County Office of Emergency Services	2101 E. Earhart Stockton, CA	
City of Stockton Office of Emergency Services	425 N. El Dorado Stockton, CA	
Department of Water Resources Flood Operations Branch	3310 El Camino Ave Sacramento, CA	
California Office of Emergency Services, Inland Region	630 Sequoia Pacific Blvd. Sacramento, CA 95811	
Central Valley Flood Protection Board	3310 El Camino Ave., Rm 151 Sacramento, CA 95821	

Table of Contents

Section 1 - Plan Introduction

1.1 Purpose

The purpose of this Flood Safety Plan is to ensure the effective performance of Reclamation District 828 responsibilities in a flood emergency in collaboration with other jurisdictions performing emergency functions within and around the District. This plan is to be used in conjunction with the emergency operations plans of the State of California and the San Joaquin Operational Area to facilitate multi-jurisdictional coordination within District boundaries. Although this is a public document, specific procedures and information of a sensitive nature as well, as personal information, may be edited out of publicly available versions. The full document is subject to restricted-use handling procedures. This plan meets the requirements of Section 9650 of the California Water Code.

1.2 Scope

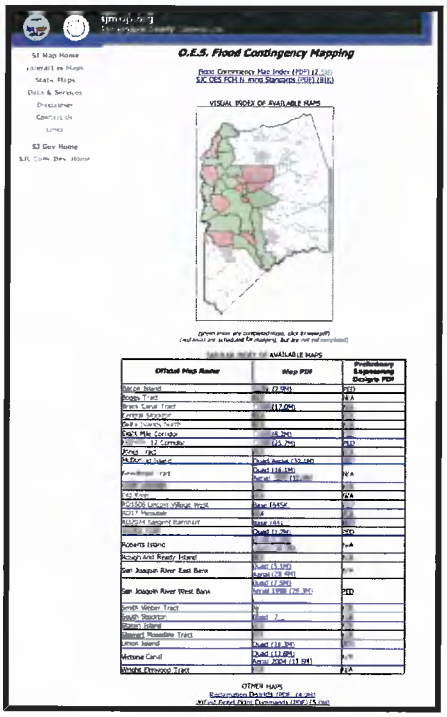
Reclamation District 828 is an independent jurisdiction with responsibility for the operation and maintenance of the levee system within its jurisdictional boundaries. This District emergency operations plan covers only detailed procedures for District responsibilities. Operational plans of other jurisdictions with public safety responsibilities within the District are referenced in this plan.

This plan will cover in detail the following;

- District Flood Preparedness Procedures
- District Levee Patrol Procedures
- District Flood Fight Procedures
- District Flood Water Removal Procedures
- District Recovery and After-Action Procedures

1.3 Plan Structure

This Flood Safety Plan is structured as a traditional functional emergency operations plan in accordance with Comprehensive Preparedness Guide (CPG) 101 v. 2.0 issued by the Federal Emergency Management Agency (FEMA). Consistent with that guidance, and because of the District's limited responsibilities and lack of internal departments, this emergency operations plan consists of this Basic Plan and one hazard-specific annex, Annex A – Flood Contingency Map. The District's existing flood contingency map will constitute this Annex A containing the District's specific flood response procedures. The most current flood contingency map for the district can be accessed at the San Joaquin Operational Area flood contingency map website (Figure 1.1).



www.sjmap.org/oesfcm
Maintained by San Joaquin Operational Area

Figure 1.1

Section 2 - Concept of Operations

2.1 Situation Overview

See the San Joaquin Operational Area Hazard Mitigation Plan for a comprehensive flood risk assessment for the County of San Joaquin. See Annex A for District boundaries, levees, pumping stations, supply depots, historical flooding summary, locations of past breaches and areas of historic seepage or erosion, topography, and characteristics of waterways fronting District levees.

Reclamation District 828, is located along the western edge of the City of Stockton and is South of Reclamation District 1614, Smith Tract and Smith Canal, East of Reclamation District 403, Rough and Ready and the Stockton Deep Water Ship Channel, and North of Reclamation District 404, Boggs Tract and the San Joaquin River. There is little information to provide about this Reclamation District due to it's relatively small area of levee maintaining responsibility. It is estimated that there are approximately Flood system challenges identified for Reclamation District 828 include highly-encroached levees and non-accredited levees along Smith Canal.

Reclamation District 828 is mostly residential structures, with some limited commercial facilities and an elementary school. Reclamation District 828 is a heavily populated area within the city limits of Stockton. The City of Stockton has an estimated population of approximately 295,000 people according to the San Joaquin Area Flood Control Agency.

2.2. General Approach to Seasonal Flood Operations

District personnel will carry out routine preparedness activities at the beginning of flood season as described in below. Annex A of this plan describes the concept of operations for active District flood fight activities. Section 3, Organization and Responsibilities, of this Basic Plan describes authorities and responsibilities for performing routine and emergency activities.

2.2.1 Routine Preparedness and Infrastructure Maintenance

District performs the following routine preparedness actions.

1. Inspect District levees once a week on a routine basis
2. Ongoing and routine baiting and grouting program for ground rodents
3. Ongoing and routine vegetation control program
4. Annual inspection and inventory of District flood fight supplies
5. Semi-annual joint inspection of levees with State inspectors
6. Periodic joint inspection of levees with Federal inspectors
7. Annual inspection and maintenance of access control gates on levees

District does not own or maintain pumping stations for internal drainage control. The City of Stockton is responsible for internal drainage collection, conveyance and terminal drainage. No culverts or through levee pipes exist within District.

2.2.2 *Monitoring and Analysis*

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

The District will use the Venice Island gauge to monitor tidal conditions and use visual reference as information sources in its monitoring effort. The Mossdale gauge (SJ River) and Benson's Ferry (Mokelumne River) gauges will be used as secondary monitoring sources.

2.2.3 *Alerting, Activation, and Initial Response*

The following actions will be taken when the trigger condition is identified by District personnel. These actions may be taken by District personnel at any time or tidal condition if it is felt that conditions affecting the levees and drainage system warrant such action.

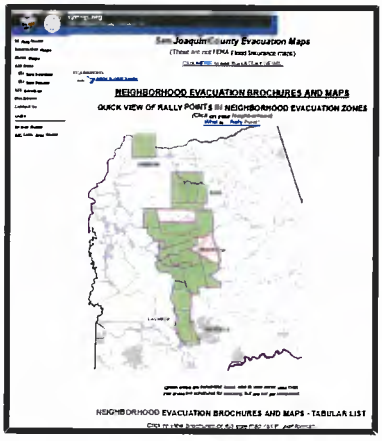
Action	Trigger Condition
Alert the District Board of Trustees and personnel; Official prediction that 8.0' (NAVD 88 datum) tide will be reached at Venice Island Gauge	Issue Delegation of Authority letter appointing District Incident Commander
Activate/Hire District personnel and initiate periodic focused levee inspections	El. 8.0' (NAVD 88) tide at Venice Island Gauge
Initiate 24-hour continuous levee patrols	El. 9.0' (NAVD 88) at Venice Island Gauge
Contact City of Stockton OES/Fire, San Joaquin County Sheriff, and San Joaquin OES	Potential threat to levee integrity or if District begins patrol
Contact the State-Federal Flood Operations Center	Identified problem on levee

The District does not use "phases" where objective conditions trigger a group of actions. Each action indicated will be taken upon reaching the trigger condition shown or if District personnel feel it is warranted. As noted below, the District Engineer and District personnel are responsible for monitoring objective conditions affecting the District.

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

2.3 Public Alert and Warning

The District will promptly notify jurisdictions responsible for alerting and warning of the general public upon identification of a threat to District levees. The District will provide detailed information on the characteristics of the threat and will assist, to the extent possible, with notification of the public if requested. All alert and



General Public Evacuation Maps and Brochures website www.sjmap.org/evacmaps maintained by San Joaquin Operational Area

warning of the general public will be carried out in accordance with the plans of protected jurisdictions.

Figure 2.1

Jurisdictions responsible for alerting and warning of the general public within District are:

- **City of Stockton**
- **County of San Joaquin**

Alerting and warning will be conducted jointly by these jurisdictions through the San Joaquin Operational Area using the procedures contained in the SJOA Warning Annex (see www sjgov.org/oes). The District will provide a representative to the Operational Area and SJOA Joint Information Center to assist with alert and warning messages if requested.

Evacuation maps and brochures for the public are available at a dedicated website maintained by San Joaquin Operational Area (See Figure 2.1). These maps contain information on receiving alerts and warnings within the District along with evacuation and safety instructions.

2.4 Flood Fight Operations

Flood fight operations, including levee patrol, will be conducted in accordance with the procedures in this Basic Plan and those shown on Annex A. Annex A displays the District's concept of operations for emergency communications, patrol, flood fight, and dewatering operations. This concept of operations and response procedures will be modified as needed by the District Incident Commander to meet the demands of actual emergency conditions. Plans of jurisdictions with responsibility for warning and evacuation within the District are referenced on Annex A as well as in this plan.

2.5 Federal and State Disaster Assistance

The District's policy is to maintain mitigation and emergency plans and procedures, and the physical condition of its levees at the level required to be eligible for disaster assistance under the federal Stafford Act and PL84-99 program and the California Disaster Assistance Act. Emergency operations will be conducted and documented in compliance with conditions of those programs for reimbursement of disaster expenses. The District has assigned its contract engineering firm to maintain necessary documentation during an emergency and to participate in any available assistance programs after a disaster on behalf of the District.

To ensure that the District takes steps to quickly access the recovery process, these actions should be considered if an incident is imminent or occurring:

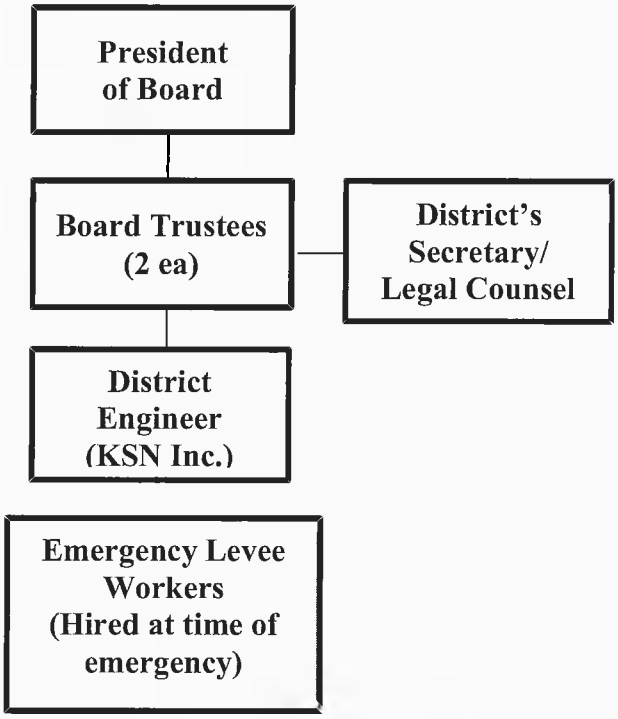
- PL-84-99:
    - Pre-develop a USACE PL84-99 request letter on District letterhead, see Attachment #7
    - Contact DWR Flood Operations Center
    - Follow-up call to USACE District office that a request was made to DWR
    - Notify Operational Area of PL84-99 request, send copy of written request

- State and other Federal programs:
    - Request San Joaquin County to Proclaim the Existence of a Local Emergency
    - Notify District administration when the Proclamation is established

Section 3 – Organization and Assignment of Responsibilities

3.1 Organization

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



District hires additional staff under the job description of "Emergency Levee Worker" for levee patrol once monitoring efforts indicate that conditions for initiating levee patrol will be reached. Emergency workers will work under the designated District Incident Commander.

3.2 Assignment of Responsibilities

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

3.2.1 Make Legal and Financial Commitments on behalf of District

Any single trustee, the District Engineer, or the District Secretary/Legal Counsel are authorized, once the Board has concurred that a local emergency is occurring, to 1) make a legal or financial commitment on behalf of District during emergency operations and 2) purchase additional flood fight supplies or materials. There is no limit to the commitment that can be made. Any single trustee, the District Engineer, or the District Secretary/Legal Counsel can take these actions upon recognition of a threat to levee integrity even without prior Board concurrence that a local emergency is occurring, but in this case the Board must be notified of the action within 24-hours.

The District President or Secretary/Legal Counsel will sign written contracts with private vendors or other public agencies stemming from emergency actions as described above.

3.2.2 Represent District in Operational Area Emergency Management Committee

The District Engineer is authorized and responsible for representing the District at unified field commands as may be established by the San Joaquin Operational Area. The District Engineer is also responsible for representing the District at the San Joaquin Operational Area management committee. The District representative may speak for the District in matters of the condition of District levees, input to protective action decisions being made by public safety agencies, and any requests to modify or conform District response that come out of the multi-agency coordination process.

The Board President will issue a Delegation of Authority letter (see Attachment 2) confirming and defining these specific authorities at the time of an emergency and formally identify the District Incident Commander and Deputy Incident Commander upon reaching the trigger condition described in Section 2.2.3.

3.2.3 Provide Public Information

The District Secretary/Legal Counsel is authorized to speak to the media on behalf of the District as part of the San Joaquin Operational Area Joint Information Center.

3.2.4 Maintain Emergency Equipment, Supplies, and Resources

The District Secretary/Legal Counsel is authorized and responsible for maintaining District equipment, supplies, and resources for emergency response. The Superintendent will ensure that supplies are maintained at inventory levels set by the Board or at any minimum levels that may be set by the Department of Water Resources guidance or statutes.

3.2.5 Monitor Water Conditions, Elevations, and Forecasts

The District Engineer are responsible for monitoring water conditions, elevations, and forecasts for the purpose of identifying conditions warranting additional action beyond routine flood preparedness as outlined in this plan.

3.2.6 Activate and/or Direct District Personnel During Emergency Operations

The District Engineer is authorized and responsible for:

- Activating District staff and resources
- Requesting or providing mutual aid assistance from public agencies
- Supervising District staff, contractors, and/or mutual aid resources assigned to District for levee patrol, 2) flood fight operations, and 3) District de-watering operations.

The Board President will issue a Delegation of Authority letter (see Attachment 2) confirming and defining these authorities as noted in Section 3.2.2.

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

The District Engineer is authorized and responsible for maintaining necessary documentation of emergency expenditures, damage to District infrastructure, and use of supply inventories in accordance with the requirements of federal and state disaster assistance programs.

The District Engineer is authorized and responsible for the preparation and submission of disaster assistance claims during the recovery period through all federal and state disaster assistance programs that may be applicable and relevant to District costs.

Section 4 – Direction, Control and Coordination

4.1 Management and Control of District Operations and Coordination within District

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

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

4.1.1. Management and Policy

The District shall maintain direction and control of District operations during emergency periods. The District Board of Trustees shall meet and confer as deemed necessary by the President during emergency operations to perform their policy making and financial responsibilities during emergency response operations. Board meetings will occur in the field or if needed at the office of the District.

The Board President will issue a Delegation of Authority letter (see Attachment 2) upon reaching the trigger condition indicated in Section 2.2.3.

4.1.2 District Incident Command

The District will appoint one incident commander to manage all incidents occurring on the District levee system as an "incident complex" during any single disaster event as allowed in NIMS protocols. The District will operate on a 24-hour operational period.

4.1.3 Incident Command Facilities

The District does not maintain pre-identified facilities for hosting emergency activities being undertaken by District personnel. District activities will be organized and coordinated in the field or at other incident command facilities established by public safety agencies or the San Joaquin Operational Area.

4.2 Management and Coordination with Other Jurisdictions

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

4.2.1 Unified Flood Fight Command Post

The County of San Joaquin has established four pre-planned unified flood fight commands with pre-identified command post locations to facilitate coordination and mutual aid between neighboring reclamation Districts and supporting city/county, state, and federal agencies. The District Engineer will report to the District's assigned unified flood fight command to coordinate the development and implementation of incident action plans.

Unified situation assessment, resources, and tactical planning of multi-agency flood fight activities will take place within this unified command. See Unified Flood Fight Command Map at www.sjmap.org/oesfcm.

Reclamation District 828 is a member of the METROPOLITAN UNIFIED FLOOD FIGHT COMMAND established by the San Joaquin Operational Area. The Metropolitan Unified Flood Fight Command meets at the San Joaquin Operational Area Emergency Operations Center, 2101 E. Earhart Avenue, Stockton. The boundaries and assignments to this command may be viewed on the SJ County Unified Flood Fight Command Map available at www.sjmap.org/oesfcm.

4.2.2 San Joaquin Operational Area Emergency Operations Center

The County of San Joaquin maintains and hosts the San Joaquin Operational Area emergency operations center (EOC) at 2101 E. Earhart Avenue, Stockton, in the Robert J. Cabral Agricultural Center. There could be other emergency facilities established under the OA-EOC located in separate locations.

The Operational Area Multi-Agency Coordination Group (MAC Group) may be activated to assist the EOC Director prioritize incidents for allocation of scarce resources, including mutual aid, assists Planning/Intelligence in information sharing, and conduct resource coordination processes in accordance with the procedures maintained by San Joaquin County Office of Emergency Services. This group works closely with the OA-EOC Logistics Section.

The San Joaquin Operational Area Planning/Intelligence Section will provide disaster intelligence and situational status to participating jurisdictions upon activation in an emergency. This District will participate as needed in this disaster intelligence and information sharing process. See www.sjgov.org/oes for relevant San Joaquin Operational Area plans.

Reclamation District 828 is a signatory to the San Joaquin Operational Area Agreement and as such, its District Engineer will participate in SJOA multi-agency coordination processes and procedures on behalf of the District. General travel times from District to the SJOA emergency operations center is 20-30 minutes. District representative may remotely communicate with the SJOA EOC through cellular telephone.

4.2.3 State-Federal Flood Operations Center

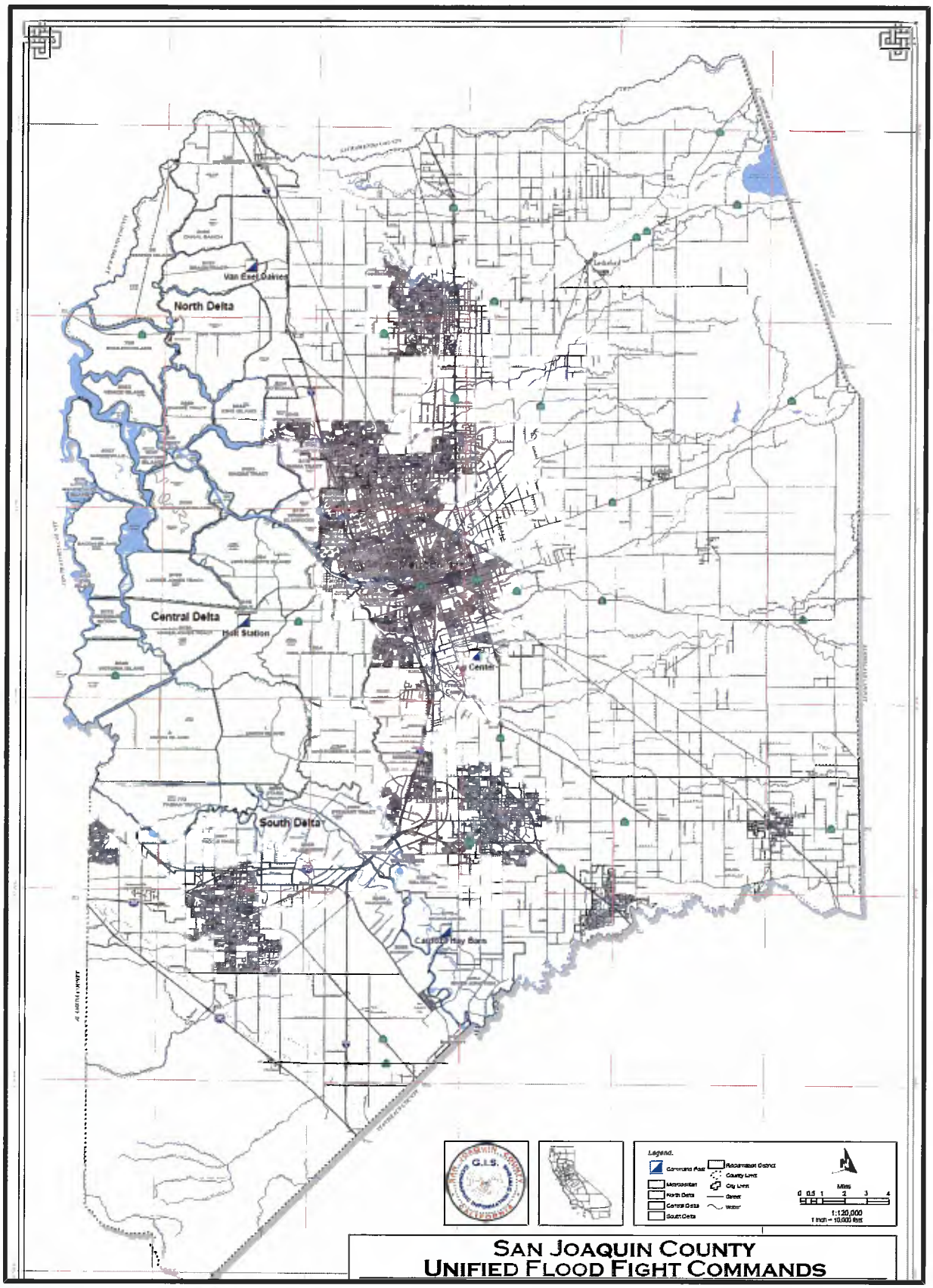
The Department of Water Resources has special authority under Water Code Section 128 to assist Reclamation Districts with flood fight operations. The Department of Water Resources maintains the State-Federal Flood Operations Center (FOC) to perform these functions and support the operations of other State and Federal agencies. The District will maintain communications with the FOC in order to receive and provide information with that facility and to request technical assistance. The District will communicate with the flood operations center through telephone systems or at Metropolitan Unified Flood Fight Command multi-agency coordination activities where FOC representatives are present.

4.2.4 San Joaquin Operational Area Joint Information Center

Risk communication to the general public will also be coordinated, planned, and carried out through the San Joaquin Operational Area Joint Information Center (JIC). The District will assist with risk communication as requested through the operational area. See www.sjgov.org/oes for relevant San Joaquin Operational Area plans and procedures.

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

Figure 4.1 Unified Flood Fight Commands



Section 5 - Communications

5.1 Communications Organization

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

1. Between District personnel, contractors, and other staff working under District supervision
2. With other public agencies operating within the District
3. With neighboring Reclamation Districts
4. With the San Joaquin Operational Area EOC
5. With the State Flood Operations Center

5.2 District Communications

The District does not own or operate communications equipment. The District will rely on personal cell phones of its personnel and trustees to maintain communications between the Board of Trustees, the District Engineer, the District Secretary/Legal Counsel and other response personnel that may be hired during the emergency period. In the event of failure of cellular telephone systems the District will use messengers to transmit information between its personnel and other jurisdictions as well as regularly scheduled coordination meetings of the field unified commands and the San Joaquin Operational Area organization.

5.3 Communications with Other Jurisdictions

The District will maintain communications with other jurisdictions by cellular telephone and by participation in meetings of the Metropolitan Unified Flood Fight Command. The Operational Area may assign radio or phone communications equipment to the District if this will provide reliable contact, if requested.

5.3.1 San Joaquin Operational Area EOC

The District will maintain communications with the San Joaquin Operational Area EOC by cellular telephone and participation in scheduled meetings of the SJOA management group. District will maintain telephone numbers assigned by SJOA for use by reclamation Districts.

5.3.2 Department of Water Resources State-Federal Flood Operations Center

The District will communicate with the Flood Operations Center by cellular telephone. Additional communications equipment may also be provided to ensure contact, if requested

Section 6 - Logistics and Finance/Administration

6.1 Mutual Aid

The County is a signatory to the California Master Mutual Aid Agreement and the District to the San Joaquin Operational Area Agreement. District personnel will follow the processes outlined in those documents for requesting and providing mutual aid. The San Joaquin Operational Area Agreement and San Joaquin County Ordinances have provisions allowing the San Joaquin Operational Area Logistics Section and San Joaquin County Purchasing Agent to acquire and transport, on behalf of the District, resources requested by the District.

Mutual aid requests for technical assistance and services, flood fight crews, supplies and materials, and other resources will be made through the San Joaquin Operational Area Logistics Section and/or the Operational Area Public Works Mutual Aid Coordinator. See www.sjgov.org/oes for operational area plans and procedures.

6.2 Resources

The District does not own or maintain flood fight resources. San Joaquin Operational Area maintains seven twenty-foot containers with flood fight supplies that the district can draw on through the San Joaquin Operational Area Agreement. Inventory of that resource can be obtained from San Joaquin Operational Area.

6.3 Procurement

District maintains standard forms and processes for initiating and executing contracts with appropriately licensed contractors in accordance with Public Contract Code Article 60.5 Sections (20920-20927) and (22050). The District maintains a standard contract form for contracts under $25,000 which do not require a formal public bid process. The District maintains a separate contract form for all contracts for any improvement or unit of work, or for materials or supplies over $25,000 adding a formal bidding process whereby the District shall be responsible for awarding to the to the lowest responsive, responsible bidder except as otherwise provided below.

In the event of any emergency, the District may negotiate and award a contract for the construction of work to prevent damage or repair damaged works without advertising for bids and expend any sum reasonably required in the emergency. If notice for bids to let contracts will not be given, the District shall comply with Chapter 2.5 (commencing with Section 22050).

6.4 Logistics Facilities

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

6.5 Finance and Administration

The District maintains financial and administrative records associated with emergency response in accordance with *44 C.F.R. Part 13--Uniform Administrative Requirements For Grants And Cooperative Agreements To State And Local Governments*. Emergency response and construction records, including field reports, procurement and construction management files are maintained by both the District and the District's Engineer and are

retained as prescribed by the grant authority. District maintains a safety plan for employees and work rules as appropriate.

Section 7 - Plan Development and Maintenance

7.1 Plan Development and Maintenance

The District Secretary/Legal Counsel and District Engineer are responsible for overseeing the development of the Reclamation District 828 Emergency Operations Plan. The District Engineer will maintain the District Flood Contingency Map which constitutes Annex A of the Plan. The District Secretary/Legal Counsel and Engineer are responsible for periodic review of the District Emergency Operations Plan and Annex A to determine the need for revisions or updates.

The District Board will approve this plan when initially completed. The District President is authorized to approve routine updates and revisions. The District Board will review and re-approve the Emergency Operations Plan and Annex A at least every three years. Revised plans must be reviewed and approved by protected cities and the County.

7.2 Training and Exercises

The District will maintain a training program to implement this emergency operations plan and to meet minimum federal and state requirements for disaster reimbursement. All District training will comply with the National Incident Management System (NIMS) and the Standardized Emergency Management System (SEMS). The District Emergency Response and Training Policy explains the District training program in detail (See Attachment 1).

District personnel will receive training on the District EOP – Basic Plan and Annex A – Flood Contingency Map.

District personnel will participate in internal exercises and exercises sponsored by the San Joaquin Operational Area jurisdictions.

7.3 Plan Evaluation

Reclamation District 828 personnel will prepare a written After-Action Report (AAR) after any District declared emergency affecting District levees. The District Secretary/Legal Counsel is responsible for the preparation of this report. The Board will review and approve the AAR which will briefly describe District operations, response problems that arose, and damage sustained by the District. The AAR will also contain recommendations for improving District emergency operations in the future. The Board will provide direction to personnel as to the preparation of changes, additions, or revisions to the District emergency operations plan.

Section 8 - Authorities and References

8.1 Federal

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

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

8.2 State

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

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

8.3 Local

Ordinance Code of San Joaquin County 1995, Title 4 – Public Safety, Division 3. – Civil Defense And Disaster, Section 4-3008

Lower San Joaquin River and Delta South Regional Flood Management Plan, November 2014

Attachment 1

Reclamation District 828 Emergency Response and Training Policy

Reclamation District 828 Board of Trustees hereby adopts the National Incident Management System (NIMS) for organizing emergency response activities. The Board further establishes the following emergency response and training policies.

Emergency Response

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

National Incident Management System Training Guidance

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

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

Reclamation District 828 Training Requirements

The Board of Trustees hereby establishes the following training requirements for District personnel involved in flood emergency operations.

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

The District Secretary/Legal Counsel and District Engineer shall complete, at a minimum, the SEMS Introduction, ICS-100 Introduction to the Incident Command System, ICS-200 ICS for Single Resources and Initial Action Incidents, and IS-700 NIMS An Introduction courses to meet Type 4 incident management requirements. In addition, the District Secretary/Legal

Counsel and District Engineer shall complete IS-800 National Response Framework and IS-701 NIMS MACS course to meet inter-agency coordination responsibilities.

Staff hired or transferred to serve as Emergency Levee Workers at the time of an emergency shall receive a 2-hour RD828 Emergency Safety and NIMS Course that will include a 60 minute summary of the SEMS Introduction, ICS-100 and IS-700 courses and specific safety information for their emergency duties prior to beginning work.

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

By: _____

_____
Title

_____

Attachment 2

Reclamation District 828 Delegation of Authority Letter

As of _____ hrs, _____, I have delegated the authority and responsibility for the
(Time) (Date)

complete management of the Reclamation District 828 _____ Incident to
(Name of Incident)

_____ acting as District Incident
(Name of Individuals)

Commander and Deputy Incident Commander respectively.

Instructions

As Incident Commander, you are accountable to me and the Board of Trustees for the overall management of this incident including control and return to District personnel and contractors. I expect you to adhere to relevant and applicable laws, policies, and professional standards.

My general considerations for management of the incident are:

1. Provide for safety of District personnel.
2. Keep the Board and Board Secretary informed of key actions, and the situation.
3. Comply with the RD828 Flood Safety Plan and document conditions requiring its modification

My specific directions and clarifications of authority for this incident are:

1.

2.

3.

4.

By: _____
(President, Board of Trustees)

_____
Date

Attachment 3

Emergency Resolution Template

RESOLUTION OF THE BOARD OF TRUSTEES
OF RECLAMATION DISTRICT NO. ___

RESOLUTION No.__

Upon special notice to and consent by the Trustees of Reclamation District No ___, of the County of ___, State of California, an emergency meeting of the Board of Trustees was held at the district offices at **[LOCATION]** on **[DAY and DATE]** at **[TIME].** The Board agrees that an emergency situation exists which requires immediate action by the District.

[DESCRIPTION OF EMERGENCY EVENT, JUSTIFICATION]

EMERGENCY DECLARATION

WHEREAS, the trustees of Reclamation District ___ have considered the condition of the District Levees and the potential risk of general operation at the expense of public safety and agricultural production; and

WHEREAS, the Trustees have noted that the Sacramento and San Joaquin Delta is and will continue to experience high water levels resulting from heavy rainfalls and runoff, and high winds; and

WHEREAS, the District is experiencing **[DESCRIPTION OF EMERGENCY EVENT]**; and

WHEREAS, after consultation with the District staff and engineers after a visual assessment of the condition of the District levees on **[DATE(S) and TIME(S)],** the District finds and declares on **[DATE]** that an emergency situation exists and that all necessary and required work to protect the District and the District's levees should be completed at the earliest possible date.

NOW, THEREFORE, BE IT RESOLVED AND ORDERED by the Board of Trustees of the Reclamation District No. ___, as follows:

1. As of **[DATE]** an emergency situation exists within the District and along the District's levees, which requires the District to proceed immediately with the work to prevent the possible flooding of the district, and failure to its levees at the earliest possible time.

2. That the district President, and/or staff be hereby authorized and directed to acquire such materials and equipment and to enter into contracts necessary and appropriate to meet the emergency needs of the district in accordance with Flood Safety Plan.

CERTIFICATION

I, _____, President and trustee for Reclamation District No. ____ (District) do hereby certify that the above is a true and correct copy of the resolution which the Board of Trustees of the District unanimously adopted on **[DATE].**

Executed on _____, in _____, California.

_____
District President

Map not included due to size but is available for review at the District's office. Please call (209) 948-8200 if you are interested in reviewing the map.

Reclamation District No. 828
Operations & Maintenance Manual

Appendix E

Superintendent's Guide to Operation and Maintenance of California's Flood Control Projects

STATE OF CALIFORNIA — THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT

SUPERINTENDENTS GUIDE TO OPERATION & MAINTENANCE OF CALIFORNIA'S FLOOD CONTROL PROJECTS

INTRODUCTION

The Guide has been prepared to help supervisory personnel of reclamation districts, levee districts, flood control districts, and other local agencies with flood control responsibilities in acting as superintendents of flood control projects In California. The Guide is also intended for use by Supervisory personnel of the Department of Water Resources who have similar responsibilities.

The Guide explains the duties and responsibilities of those who supervise the maintenance and operation of flood control facilities in their areas of jurisdiction. It also identifies the federal. State, and local regulations that superintendent is required to know and comply with. Ail personnel who supervise flood control workers should familiarize themselves with this information. It will help them understand the importance of properly operating and maintaining the projects that millions of Californians rely on for protection of their lives and property.

At the time the Guide was released, the U.S. Corps of Engineers was conducting experiments and pilot studies to determine how well certain types of vegetation prevented erosion from occurring on levee slopes. When the study Is completed, the results may differ from the recommendation outlined in this document, which are based on The Reclamation Board's Guide for Vegetation on Project Levees, In the interim, the Board's program will apply.

The Guide has been prepared specifically for use In the Central Valley. This is because the flood control supervision, maintenance, and inspection authority of the Department of Water Resources, under statute or in cooperation with The Reclamation Board, is limited to the drainage of the Sacramento and San Joaquin rivers. However, this Guide should be applicable and useful to all federal flood control projects in the State. Federal projects both inside and outside the Central Valley are authorized in the Water Resources Law of 19Y5 (as amended) and are listed in Section 12639 and following sections of the Water Code.

The Guide is arranged so that it can be readily revised and updated as needed. Comments regarding the contents can be sent to:

Department of Water Resources
Flood Operations Center
1416-9th Street
Sacramento CA '94236-0001

STATE OF CALIFORNIA
George Deukmejian Governor

THE RESOURCES AGENCY
Gordon K. Van Vleck, Secretary for Resources

DEPARTMENT OF WATER RESOURCES
David H. Kennedy, Director

John P. Caffrey
Deputy Director

Robert G. Potter
Deputy Director

Robert E. Whiting
Deputy Director

Salle S. Jantz
Assistant Director

Susan Weber
Chief Counsel

DIVISION OF FLOOD MAMAQEMEHT
G. Donald Meixner, Chief

This publication was prepared under the direction of

Don Neudeck, Chief, Flood Operations Branch

By

Billy E. dark, Deputy Chief, Flood Operations (Retired)

assisted by

Wendy S. Fitzgerald . . . . . Levee Management Specialist
Gayle Dowd . . . . . Water Resources Technician II
Travis Latham . . . . . Research Writer

ACKNOWLEDGMENTS

The Superintendent's Guide has been reviewed by the the U.S. Army Corps of Engineers, Sacramento District; The Reclamation Board; and the Governor's Office of Emergency Services. We appreciate the assistance they gave during preparation of this document.

CONTENTS

SECTION 1. RESPONSIBILITIES AMD DUTIES OF THE SUPERINTENDENT

CONTENTS (Continued)

Figures

SECTION 1

RESPONSIBILITIES AND DUTIES OF THE SUPERINTENDENT

Superintendents, Local Agencies 1.10

The superintendent of a reclamation district, protection district, drainage district, municipality, maintenance area, or other public agency within the limits of any federal flood control project in the Sacramento and San Joaquin River watersheds is responsible for maintaining and operating the project works lying within the boundaries or jurisdiction of such an agency. These activities must be performed in accordance with Sec. 208.10, Title 33, of the Code of Federal Regulations, approved by the Secretary of the Army on August 9,1944.

Superintendents, Department of Water Resources 1.20

Personnel of the Department of Water Resources (DWR) who are designated as superintendents in charge of operations and maintenance of federal flood control projects are also required to meet the requirements of the Code of Federal Regulations.

The Superintendent's Area of Responsibility 1.30

Local Agencies. Under the direction of a local agency's board of directors or board of trustees, local agency superintendents are responsible for maintaining and operating all portions of the projects within the Sacramento and San Joaquin valleys within the boundaries of their jurisdiction, except those works charged the Department of Water Resources under Water Code Sec. 8361 and the maintenance areas that are maintained by DWR, with local beneficiaries paying the costs (Sec. 12878). 1.31

The Department of Water Resources is responsible for maintaining, at State expense, certain channels of the Sacramento River Flood Control. Project and Sacramento River Major and Minor Tributaries Project, the American River Flood Control Project, and the Middle Creek Project (Sec. 8361). This responsibility is defined as channel capacity maintenance. It does not include protection of the levees or private property from erosion or other damage. That work is the responsibility of the local levee maintenance agency or property owner.

1. Assistant

   To appoint and train an assistant to act in the superintendent's absence.

2. Staff

   To maintain and develop a staff of trained personnel who can (a) safely and effectively operate and maintain flood control project structures and facilities and (b) assume responsibility during a flood crisis.

3. Supplies
   To keep on hand a reasonable supply of flood fight tools and materials for flood emergencies, and to have 24-hour access to sources of additional supplies.

4. Emergency Personnel

   To have readily available an up-to-date list of telephone numbers of State and local officials and personnel with special expertise in meeting flood emergencies.

5. Inspections
   To make periodic inspections of all project structures and facilities, including any notable changes in levee crown elevation (subsidence) to ensure these control works will provide the designed flood protection.

6. Budget

   To submit an annual budget that will provide funds adequate for maintenance of the district's flood control responsibilities, (Procedures for review and approval of local district budgets may vary from agency to agency.)

7. Safety

   To support and enforce safety rules and programs.

(Regulations on operation and maintenance of project facilities are stated in the U.S. Corps of Engineers' Standard Operation and Maintenance Manual and Supplements, Title 33) Chap. 2, Part 208, Flood Control Regulations. Special duties of the superintendent during flood emergencies are outlined in Section 6, "Emergency Operations," of this Guide.)

Maintenance Policies 1.40

All superintendents of flood control project, maintenance units, whether they are employed by a local agency or the Department of Water Resources, are required to observe The Reclamation Board's policy to maintain and protect the environment in a manner that is consistent with the protection of lives and property from floods. The protection of wildlife mitigation areas, especially revegetation easements, is essential to environmental protection.

Superintendents are also required to promote good relations with the public by considering the value of property adjacent to project facilities. Superintendents are responsible for ensuring that certain maintenance and operation procedures such as burning, herbicide spraying, crown roadway maintenance, and bypass flooding do not inconvenience or endanger nearby landowners or endanger wildlife mitigation easements. Although not necessarily required, a courtesy visit or phone call to persons who might be affected by such work can do a great deal to promote favorable relationships between project maintenance personnel and property owners.

Authority to Carry Out Duties 1.50

Operation and maintenance of flood control projects In California are governed by two agencies, the U.S, Army Corps of Engineers and The Reclamation Board, as provided for under provisions of the California Water Code. The Corps of Engineers works with other public entities as sponsors of flood control projects, water conservation districts, water districts, and conservation districts.

U.S. Army Corps of Engineers. By an act of 'Congress in 1917, 1.51 the Corps of Engineers was empowered to study and adopt a major flood control plan to minimize the seasonal overflow of navigable streams and their tributaries In the Sacramento and San Joaquin Valleys. After many proposals were considered, a modified version of the 1911 California Debris Commission Plan was adopted. The revised plan consisted of a system of flood control reservoirs, leveed streams, bypasses, weirs, canals, and drainage pumping plants. Although It has never been fully completed, the plan in use today is essentially the same as the one that was adopted in 1917.

The Corps was originally charged with constructing facilities to provide the maximum flood protection for thousands of acres of agricultural land and the many communities situated on major streams in the Central Valley. Later the Corps was commissioned to establish rules, codes, and standards for maintenance of certain project levees, to be performed by State and local agencies wholly at their expense. The Corps' responsibility for planning and building flood control facilities was later expanded by Congress to include other parts of California outside the Central Valley.

Congress has recognized the impacts of flood control development on fish and wildlife. The construction of bank protection units now includes mitigation measures to compensate for environmental losses. Mitigation programs are coordinated with The Reclamation Board and include acquiring prime wildlife areas In fee or through easement and improving marginal areas through revegetation efforts. 1.51 (Cont.)

The Reclamation Board. The Reclamation Board was created in 1911 and reorganized in 1913 as a" agency of the State of California to develop and carry out a plan to control flooding along the Sacramento River and its tributaries. The Board's Jurisdiction was later extended to include the San Joaquin River and its tributaries. 1.52

Recent legislation has increased the scope of the Board to include more active participation in federal flood protection projects and designated floodplain management in the Central Valley.

Changes in federal participation and policy have altered the operation of the Board from time to time, until now Its functions include approving plans, acquiring rights of way and flowage easements, providing assurance of local cooperation, and enforcing maintenance requirements established by the Corps of Engineers. The Board takes lead responsibility for the long-term management and perpetuation of mitigation areas. The Board also reviews applications for any alteration or encroachment of any adopted plan of flood control in the Central Valley and approves or denies the request.

The Board has been administratively part of the Department of Water Resources since 1958, but it functions as a separate agency in exercising its original flood management responsibilities on the Sacramento and San Joaquin rivers and their tributaries.

Staff of the Flood Control Project Branch of the Department of Water Resources has the lead role in representing The Reclamation Board with the Corps of Engineers in developing and maintaining mitigation lands. Questions regarding the location and management of revegetation easements and other mitigation properties should be referred to the Flood Control Project Branch.

(The Reclamation Board, a booklet published by the Board, describes the Board's history and its present involvements.)

The California Water Code. The rules, regulations, and standards set by the Corps of Engineers for operation and maintenance of federal flood control projects are incorporated into the California Water Code. They cover all phases of the use, rights, and distribution of California's water resources. 1.53

(Secs. 8520-9377 codify the law governing The Reclamation Board. Secs. 8340-9577 and Sec. 12878 assign certain responsibilities to the Board regarding maintenance of flood protection works following

Responsibilities of the Department of Water Resources 1.60

Since 1947t the Department has inspected project facilities semi-annually for- compliance with federal, State, and local maintenance requirements. The Department also prepares annual reports that rate the degree of compliance (Water Code Sec. 8371)' This work is part of the assurances The Reclamation Board gives the federal government that certain flood control facilities built by the Corps of Engineers are properly maintained. In areas of the State beyond the limits of the Sacramento-San Joaquin Valley and outside the jurisdiction of The Reclamation Board, the Department has the authority to form maintenance areas for federal flood control projects, when necessary, and to assume responsibility for their maintenance (Water Code Sec. 12878 et seq.).

Maintenance Areas 1.70

The California Water Code (Sec. 12878) empowers The Reclamation Board to establish a maintenance area within its area of jurisdiction when the Department has determined that a unit of the project is not being properly maintained by the local agency having that responsibility. Maintenance costs in a maintenance area are apportioned to property owners in the protected area on an ad valorem basis (according to the value), or on a land use basis, and the assessment is collected as a Special benefit assessment with county taxes.

Responsibility for operation and maintenance of a maintenance area is assigned to the Department of Water Resources. Such responsibility may be returned to a local agency when it has demonstrated the desire and financial ability to meet the obligation.

Local Agencies 1.80

Local agencies-may be organized under any of several designations, depending on the purpose for which they were formed. These include water, reclamation, levee, irrigation, drainage, protection, water storage, flood control, or special districts. As used in this Guide, "local agency" refers only to those organizations that have a direct flood control maintenance responsibilities.

The procedures for dissolving a local agency are contained In Water Code Sees. 56000 et seq. ("Cortese-Knox Local Government Reorganization Act of 1965"). To begin dissolution proceedings, a petition signed by at least 5 percent of the registered voters must be filed with the Local Agency Formation Commission. The responsibilities and maintenance procedures set forth in this guide refer principally to federal flood control projects. However, local agencies whose responsibilities may include non-project and privately owned flood control facilities may also follow these guidelines.

SECTION 2

SAFETY

Permit Requirements 2.10

The superintendent is usually required to obtain a permit before certain maintenance or flood control work can be performed. Permits are issued by city, county, State, or federal agencies, any of which may impose restrictions and regulate other conditions related to the proposed work. Permits may be issued on an annual basis or for some other limited term.

Following is a partial list of maintenance operations for which permits must be obtained.

Equipment Transportation. Moving equipment and vehicles that exceed the legal limits for height, width, and weight requires a permit from the California Department of Transportation (Caltrans) and/or the city or county through which a vehicle unit must pass. A blanket permit may be obtained in some cases. Requirements for legal tie-downs will vary. The California Highway Patrol requires that all regulated loads follow the specific procedures contained In the California Administrative Code, Title 12, Subchap. 7. When DWH personnel are transferring equipment (a non-regulated load), they are required to follow the DWR Maintenance Safety Rules Manual, Sec. 3.17. The California Vehicle Code defines a legal load and the conditions under which such loads may be carried. 2.11

Traffic Control. When traffic must be controlled as a safeguard during maintenance operations on or next to a public street or highway, a notification and approval permit must be obtained from Caltrans or the city or county Involved. Proper warning signs must also be placed In accordance with state and local codes. Burning operations, tree removal, levee erosion repair, slope mowing, and herbicide spray programs are among the projects that may require traffic control. 2.12

Restoration and Repair. Riverbank and levee stabilization activities that require more than one' cubic yard of material per running foot for a distance of more than 500 feet or more than 1,000 cubic yards of import material are covered under Sec. UM of the Federal Clean Water Act. However, in California, approval is required from the Regional Water Quality Control Board. Maintenance work exceeding the foregoing specifications will require permits from the Corps of Engineers. Other permits may be needed from the California Department of Fish and Game (Sec. 2.14). Work of this type may be performed by the Corps of Engineers. 2.13

Channel Clearing. Any project that involves moving soil, sand, or gravel in or near a body of water requires the agency planning the project to reach agreement with the Department of Fish and Game (DFG Code, Secs. 1601-1603). Sec. 1601 applies to government agencies and public utilities. The agency uses Form FG 2023 to notify DFG of its plans. 2.14

The superintendent should coordinate with the nearest U.S. Fish and Wildlife Service, Endangered Species Office, to determine any requirements for avoiding or mitigating Impacts to endangered species.

Once the agency has reached agreement with DFG, routine maintenance work in or near a body of water does not require any further notification or agreement, unless there has been substantial change in vegetation or the fish and game resource. However, by a memorandum of understanding between the two departments, DWR does obtain agreement from DFG for every routine maintenance proposed each year. DFG has similar understandings with other agencies regarding this type of work.

Work of this nature may require additional permits from the Corps of Engineers and the Water Resources Control Board.

Burning. Burning of vegetation on levee slopes or debris left by floods or channel clearing is generally restricted to rural areas. This work requires permits from local fire districts and the local air pollution control board. These agencies must also be notified when the work is to begin. In special cases, when burning is banned for environmental or other reasons, a variance may be obtained, provided the need for the work can be justified. 2.15

Rodent and Vegetation Control. The use of certain "restricted use" materials to control rodents and vegetation on levee slopes and in channels requires a permit from the county agricultural commissioner in the county where the work will be done. To obtain a permit to purchase and apply restricted use materials, applicants must possess a Qualified Applicator Certificate Issued by the Department of Food and Agriculture. 2.16

When a seasonal or annual permit is obtained for restricted use materials, a notice of Intent containing specific information about the proposed project must be submitted to the county agricultural commissioner 24 hours before the start of work. The commissioner may waive the 24-hour requirement or modify some of the Information required, if assurance Is given that the work will be performed according to proper safety and environmental considerations.

A monthly report summarizing pesticide use must be submitted to the county commissioner by the 10th of each month following the use of any pesticide.

A special permit is also required from the California Department of Fish and Game to take beavers, badgers, and other large rodents that can damage levees. 2.16 (Cont.)

Worker Safety 2.20

Maintaining flood control project facilities generally involves using heavy equipment, vehicles to transport heavy equipment, and cutting tools, and handling and using toxic materials. Also, workers are sometimes exposed to weather extremes that create physical hazards.

The importance of taking all reasonable steps to ensure the safety of workers should be kept in mind at all times. Statements such as. "No Job is so important that it cannot be performed safely" and "All accidents are avoidable" are sometimes challenged, but they are, nevertheless, excellent bases for adopting safety practices.

The Department of Water Resources, acting on behalf of the State of California, Is serious about holding injuries to its employees to the lowest possible level. In keeping with this policy, DWR employees who work on flood control project facilities are required to attend safety training classes (Sec. 2.26). DWR superintendents are expected to fully enforce all safety rules and regulations and support safety measures.

Similar programs to promote safety are recommended for local maintaining agencies.

Safety Training 2.30

The Department of Water Resources trains its flood control project personnel in all phases of flood control project maintenance. Employees whose jobs involve such work must satisfactorily complete all relevant training courses before they may assume field maintenance duties.

The superintendent should not assign any employee too potentially hazardous work until the employee is properly trained and considered to be qualified or can be assigned to work under the direction of a properly qualified person.

The superintendent will schedule courses to meet operational needs and will keep complete and accurate records of courses completed by employees.
When it is convenient i DWR crew leaders are expected to supplement classroom training by providing new employees with field duties that relate to their class work. Superintendents should require each employee to prepare a training development plan.

Employees whose duties require handling pesticides must be trained thoroughly in the laws and regulations related to the handling of pesticides and the use of protective clothing and equipment. They must also be well informed about the common symptoms of pesticide poisoning and be warned that it is dangerous to eat, drink, or smoke while engaged in such work. 2.30 (Cont.)

Safety Meetings. All DWR employees who work on flood control project facilities must attend regular safety meetings. The superintendent on the job is responsible for arranging the meetings and providing instructional material for the topic of discussion. Active participation by all personnel is encouraged, and the date, subject matter and names of those present are kept on file. 2.31

The Department also encourages frequent tailgate meetings at the job site. The crew leader conducts informal discussions of safety practices that apply to the work at hand. Procedures for performing the work are reviewed, possible dangers are brought to light, and preventive measures fully discussed. The Department recommends that superintendents of local agencies adopt similar useful practices.

The Department sponsors a Flood Fight School, scheduled annually, at the Bryte maintenance yard in Sacramento. Attendance is mandatory for all DWR flood control project employees. All local agencies personnel with flood control responsibilities are strongly urged to attend this class. Classes will be scheduled at other times upon request.

Protective Gear. The Department issues required protective gear to flood control project employees, along with directions for recommended and mandatory uses. This equipment is provided at no cost to the employees, who are responsible for using it as directed, keeping It in good repair, and requesting replacements when Items are no longer serviceable. 2.32

All agencies must provide the following items of clothing and equipment. Other protective gear may also be necessary for certain types of tasks.

Hard Hats, Hard hats are worn to prevent head injuries. The use of an approved hard hat is mandatory for all personnel Involved in flood control project maintenance activities, whether they are performing field work or only observing the work of others. A smaller, lighter-weight version of the hard hat, commonly called a bump hat, is acceptable for some operations.

Protective Face Wear. The use of safety glasses, goggles, or face shields are necessary to safeguard against eye Injuries caused by flying objects, pesticides, or other environmental hazards. All workers are encouraged to wear appropriate protective face wear for all maintenance activities.. Use of this equipment is required for certain activities.

Gloves. Simple cotton gloves or leather mittens can minimize painful burns, cuts, and bruises during use of hand tools. 2.32 (Cont.)

Coveralls. Coveralls are issued to DWR field employees to protect their own clothes from undue damage, wear, and soiling. The coveralls are laundered regularly at the Department's expense and replaced when no longer fit for use. Coveralls offer some degree of safety against scratches and other minor injuries, but workers should be cautioned that loose clothing is hazardous when worn by someone who is operating machinery with exposed moving parts.

Particle Masks. The use of a particle mask prevents dust particles and other air-borne pollutants from entering the respiratory system.

Ear Plugs. Fitted ear plugs or approved ear muffs must be worn by DWR employees who are operating or working near machinery that emits noise above 85 decibels.

First Aid Kits. Approved first aid kits are installed in all State-owned vehicles. Drivers are responsible for seeing that kits are fully stocked with the appropriate items. The kit is only for temporary emergency care of injuries in the field. Both the injured person, if able, and management personnel should determine whether additional medical attention is advisable. A formal accident report is always required for all accidents. First aid training, including cardiopulmonary resuscitation (CPR), is required of all DWR field personnel.

Safety Belts. Safety belts are installed in all State-owned vehicles, and their use by the operator and all passengers is mandatory. The driver is empowered to enforce this regulation. Failure by driver or passengers to "buckle up" can result in a fine; suspension without pay, or termination.

Protective Gear, Pesticide Use. All flood control workers who handle pesticides must be equipped with protective clothing and equipment appropriate to this work, as directed on the pesticide label. This type of gear includes the following items: 2.33

Gloves. Appropriate protective gloves, worn as directed on a pesticide label, are mandatory when workers are handling pesticides or other hazardous material.

Aprons and Disposable Coveralls. DWR employees are required to wear protective clothing made of a nonabsorbent material when they are mixing and loading pesticides or rinsing emptied pesticide containers. Disposable coveralls should also be worn by any employees who may come Into contact with the pesticide during application.

Particle Masks. A particle mask is required for any DWR employee who is handling herbicides.

Rubber Boots. Rubber boots are necessary for employees who mix and load pesticides and for pesticide applicators who may come Into contact with the spray mixture. 2.33 (Cont.)

(See also Sec. 2.41.)

Foul Weather Gear. Foul weather gear is issued for use primarily during flood emergencies. Few, if any, field maintenance activities can be performed satisfactorily in stormy weather. During such periods) the superintendent should assign duties in locations that provide some protection from the elements. In a flood emergency, however, employees are expected to accept many weather-related hardships. 2.34

Foul weather gear issued to DWR employees usually includes water-proof parkas or jackets, rubber boots (ankle, knee, or hip height), water-repellent trousers, and life jackets approved by the U.S. Coast Guard.

Safe Storage and Handling of Pesticides 2.40

Any use of a pesticide requires strict observance of laws and regulations regarding safe application, control of storage transportation, disposal of empty containers, cleanup of spills, protective clothing and procedures for personal and equipment cleanup.

Because of the toxic characteristics of pesticides and the potential hazards involved in their application, both to users and their surroundings, all aspects of pesticide use are closely regulated by the California Department of Food and Agriculture and county agricultural commissioners' offices. Before DFA authorizes any pesticide for specific use, the pesticide must first be extensively tested for effectiveness and its possible effects on people and the environment.

Pesticides are rated by degree of toxicity; "Danger," "Warning," or "Caution". This must be prominently displayed on the pesticide label. The label must also display appropriate warnings, detailed directions for mixing and use, and Instructions to follow In case of injury by accident or misuse. The label is the law. Read it carefully before starting any application of a pesticide.

Safe Working Conditions. The superintendent is responsible for providing safe working conditions, adequate training, and proper supervision of all personnel who mix, load, transport, apply, or otherwise handle pesticides. Stringent controls adopted by the Department of Food and Agriculture regulate the handling, mixing, application, and cleanup of pesticides. 2.41

The superintendent is responsible for seeing that the mixing site at which employees are handling pesticides has a designated facility for changing into protective clothing and for washing when pesticide use Is completed. It should be equipped with an ample supply of water, soap, and towels for personal use.

The superintendent must also provide employees with appropriate protective clothing, as the pesticide label directs. Also, 2.41 (Cont.)

repair and safe operating condition. This equipment is subject to inspection by county authorities.

Emergency Medical Care. The employing agency must provide emergency medical care for employees whose work Includes mixing, loading, or applying pesticides. The name, address, and telephone number of the medical facility providing such care must be conspicuously posted at the work site and on the application vehicle. Whenever a pesticide related Illness is suspected or whenever a worker has been apparently endangered by overexposure to a pesticide the superintendent must see that the employee receives immediate medical attention. 2.42

Restricted Materials. Certain pesticides are more dangerous than others. These are classified as restricted materials and are subject to limited use and more stringent controls. Their use requires special permits (see Section 2.16). Applicators must hold a certificate as a qualified applicator or work under the direct supervision of a qualified applicator. 2.43

Laws and regulations regarding the application of restricted materials and the Pest Control Licensing and Certification Program are subject to change or revisions without official notification. The superintendent is responsible for keeping informed of any changes. This information is available from the California Department of Food and Agriculture, 1220 H Street, Sacramento CA 95814, or the county agricultural commissioner.

Storage of Pesticides. Pesticide containers, both full and empty, must be stored in a locked enclosure In accordance with the label on the container. When pesticides in storage carry either "Warning" or "Danger" precautions on the label, warning signs in both English and Spanish must be posted on all walls of the storage area. The signs must be readable from a distance of 25 feet. 2.44

Transportation of Pesticides. Pesticides must not be transported In a compartment that Is also occupied by people, food, or animal feed. Pesticides, empty containers, and equipment must be attended at all times while en route. Vehicles used to transport or apply pesticides must be thoroughly cleaned before they are assigned for other uses or are sent to be repaired. 2.45

Rinsing and Disposal of Used Pesticide Containers. A triple rinse and drain procedure approved by the Department of Food and Agriculture must be followed to prepare emptied containers for disposal. Contact the county agricultural commissioner's office for specific requirements on container rinsing and disposal. 2.46

Pesticide Service Containers. As defined by the Department of Food and Agriculture, a service container is any pesticide container. 2.47

hold, or transport a pesticide or a use-diluted pesticide.

Each service container must carry the following labeling:

* Name and address of the person or company responsible for the container.

* Identity of the pesticide (common name or product name). If It is a use-diluted pesticide, the word "diluted" must precede the name.

* A signal word from the original label ("Danger," "Warning," or "Caution").

Pesticide Spills. Spillage of a pesticide or other hazardous material can rapidly become a major health or environmental problem. Whenever a spill occurs, immediate corrective action must be taken, regardless of the type of toxic substance or the amount spilled. The first priority is to give first aid and further medical attention to persona who were exposed to the pesticide. After that, the incident must be reported and the area must be decontaminated. Under no circumstances should pesticide spills be hosed down. 2.48

Contact the local county agricultural commissioner's office for specific requirements for spill cleanup.

The importance of a balanced vegetation management program that preserves the environment without sacrificing the Integrity of flood control structures can't be overemphasized. Natural or planted vegetation on or near project levee slopes can significantly enhance the effectiveness and appearance of a project. When properly managed, vegetation deters surface erosion from rain and runoff. The preservation of vegetation, especially in acquired easement areas, is essential to the management of the flood control project.

However, uncontrolled growth can interfere with routine maintenance and inspections, inhibit flood fight activities, and provide a haven and food sources that attract burrowing animals. Also, when large trees are toppled by wind, disease, or old age, they often dislodge broad areas of protective sod and earth and may divert water into a levee section.

Standards for vegetation control on landward levee slopes differ from those for water ward levee slopes, berms, and overflow areas. Vegetation characteristics, species, and methods of management may vary, depending on the area and soil conditions. Burning) mowing, dragging, spraying, pruning, brush-cutting, and planting are all effective vegetation management tools.

When a levee vegetation management 'program is being planned, several factors should be considered. Levee slopes must allow visibility for regular maintenance inspections and high-water patrolling. Levee personnel must be able to readily detect trouble spots from the crown roadway. Ho vegetation should be allowed to grow within 10 feet of the landside toe of the levee because this is where boils and excess seepage are most lively to occur, also, both landside and waterside toes are often used as access points for maintenance.

Levee slopes should also be kept free of large areas of bunched, woody, or clumped vegetation that would Interfere with flood fighting or emergency repairs. Agricultural pruning and other debris are special targets for removal because they attract burrowing rodents. Crown roadways must be kept free of vegetation, and they should be graveled to provide a sound, drivable surface during floods.

Burning 3.10

Controlled burning of vegetation on levee slopes is an effective method of improving visibility for levee inspection and maintenance. However, in recent years, to minimize air pollution, municipalities and counties have adopted stringent burning regulations. Burning has been banned in some areas, especially in urban areas where air pollution is now recognized as a serious and growing problem. Where burning is permitted; the operation is normally scheduled in July and August when the grasses are thoroughly dry, the game bird hatch has been completed, and most nearby crops harvested. Local air pollution control boards are empowered to designate certain hours and days as suitable for agricultural burning.

On days when burning operations are scheduled, the foreman or other person in charge calls the local air pollution control board for 3.10 (Cont.)

having jurisdiction in the proposed burn area (sea Sec. 2.15).

Because of the risks involved, a supervisor usually oversees extensive burning operations. The amount and type of equipment used and the size of the crew may vary in relation to the size of the area to be burned and conditions on and near the burn site. As an example, a major operation may include a 12-worker crew, with torch men, truck drivers, hose tenders, surveillance crews, and a water supply tank truck operator. Normally, three 500-gallon water tanks mounted on flatbed trucks, with appropriate hoses and pumps, are used to control the Intensity and range of the burn. A 150-gallon water bank mounted on a four-wheel-drive pickup truck is used for surveillance and emergencies. When available, a 4,000-gallon tank truck stands by to refill the fire trucks. The supervisor drives a pickup truck carrying torch fuel and other supplies and directs the operation.

The fire should not be allowed to approach flammable structures. All such structures in or next to the area to be burned should be monitored after they have been chemically fire guarded or soaked with water. Wherever practicable, firebreaks should be placed at the toes of the levee to prevent the fire from spreading to adjoining areas.

All fires, including smoldering debris, must be entirely extinguished before the last employee leaves the burn site.

Mowing 3.20

Mowing levee slopes is an effective alternative where burning is either prohibited or would create an undue hazard to adjacent property or vegetation. Standard levees with uniform surfaces, few encroachments) and slopes no steeper than 2 feet horizontal to 1 foot vertical are ideal for mowing.

The usual procedure is to mow the levee shoulder and a strip 4 feet on the upper part of the levee with a flail mower. A mower with a telescope boom and rotating mowing head is usually enough to mow slope surfaces up to 30 feet wide. Where a 10-foot right of way is available, slopes can be mowed from the levee toe. A push-type power mower or weed-eater is also beneficial for some Irregular conditions. A mower operating in dry vegetation is a fire hazard. If the cutting blade strikes a hard object, creating sparks, the vegetation can be ignited. For that reason, a small water truck should be available.

Spraying 3.30

The use of herbicides to manage vegetation and control weeds can

possible for many maintenance activities.

Permits must be obtained for some herbicide applications, and all safety regulations, including those involving the use of protective gear, must be strictly followed. Care should be taken to prevent spray from drifting into non target areas. Only herbicides that do not vaporize readily should be used.

Broadleaf Selective. Many levee slopes are managed to encourage a solid cover of naturally occurring grasses. Broadleaf weed species on a grass-covered slope tend to be spiny and very tall, and obscure visibility, prohibits access, or otherwise interfere with maintenance and inspection. Broadleaf weeds can be eliminated from desirable sod by broadleaf selective herbicides. Several of these herbicides are also residuals, which means they are incorporated into the soil by rainfall and remain active for some time. Application rates of broadleaf selective herbicides must be closely followed. At higher rates, many of these herbicides will also damage or kill desirable grasses and young trees. These herbicides vary in time of application and the broadleaf species they kill. Special care is needed to keep these materials from reaching desirable vegetation. The county agricultural commissioner's office can supply specific recommendations. 3.31

Bare Ground. Some levee areas, including crown roadways, access points, toe roads, and fireguards, are usually kept free of any vegetation. Nonselective residual herbicides are an economical means of keeping an area free of vegetation for an extended period. Generally, the higher the application rate, the greater the number of species affected and the longer the period of residual activity. Extreme care should be taken to keep these material from drifting into areas where vegetation is desired. Careless applications can create large bare areas of ground that is susceptible to erosion. Careful applications can protect flammable structures from accidental or controlled fires, allow gravel reclamation and roadway maintenance, and make safe travel possible on roads, especially in wet weather. 3.32

Spot Treatment. Spot treatment of weeds is used in a variety of situations where the low density of the target species does not warrant a broadcast application or where the area is inaccessible or otherwise unsuitable for broadcast equipment. 3.33

Spot treatment 13 often used with residual herbicides for fireguarding around structures (Sec. 3.32). It can be used to target a specific weed pest such as Johnson grass or to touch up areas that have been specially sprayed with a broadcast application. The choice of a specific herbicide or combination of herbicides depends on the target species and the area to be sprayed. Contact, residual, and translocating herbicides can all be used for this type of work. (A translocating herbicide is one that moves through a plant into the roots.) The county agricultural commissioner's office can make specific recommendations.

Small-scale spot applications may only require a hand-held pump sprayer, while larger applications could require use of a truck-mounted spray unit with a hose and reel. Since spot applications are 3.33 (Cont.)

needed to minimize drift, especially with high-pressure spray rigs.

Brush and Vines. Brush and vines growing on levees obscure the slope, creating serious inspection problems. Low, dense, and entwined vegetation can prevent routine or emergency access, impede flood flows, divert currents) or plug pumps and drains. Where permissible, the use of herbicides to control brush and vines can be extremely effective, often more so than mechanical clearing, which may stimulate regrowth or break up existing plants into many new plants. 3.34

Spot spraying is generally the application method used to control vines (Sec. 3.33). To completely kill the unwanted plants, a translocating herbicide is necessary. Contact herbicides or incorrectly used translocating herbicides will kill only the above-ground part of the plant, resulting in substantial regrowth in the following season. Special attention should be given to correct timing of application and to obtaining thorough spray coverage. The addition of an Inactive water-base dye can assist spray applicators to achieve uniform spray coverage. Poor coverage is likely to result when plants are dormant, stressed by drought, or covered with dust.

Larger trees can be controlled by cutting them down and immediately spraying or painting the stump with a concentrated herbicide registered for such use.

Where all other options have been exhausted, aerial application of herbicides to control brush over large areas can be considered. This procedure usually requires applying for a 24C Special Local Heed Permit from the California Department of Food and Agriculture. The product manufacturer and all other regulatory agencies must concur before this type of application can be approved. Spray drift from an aerial operation must present no hazard to humans, fish, wildlife, water, or adjacent property.

Federal law (the Endangered Species Act) prohibits the taking of threatened and endangered species without permission of the Endangered Species Office (ESO) of the U.S. Fish and Wildlife Service. Contact the Corps of Engineers, the Fish and Wildlife Service, or the Department of Fish and Game to determine what is endangered.

SECTION 4

PROJECT MAINTENANCE OPERATIONS

Basic maintenance programs related to federal flood control project

Department of Water Resources, enforced by The Reclamation Board, and carried out by local agencies and the Department of Water Resources.

Host maintenance practices in use today have been modified over the years to meet the increased emphasis on preserving ecological and environmental values. Although maintenance costs have risen, the integrity of the flood control system has been preserved and the environment improved.

The maintenance programs most profoundly affected by environmental considerations Include channel clearing rodent control, and vegetation management on or next to project levees, berms, and overflow areas being developed for project mitigation under The Reclamation Board's jurisdiction. Maintenance activity in revegetation and other mitigation areas require special care. This section contains guidelines for specific maintenance operations. Further directions appear in the Board's Guide for Vegetation on Project Levees.

Crown Roadways 4.10

Keeping levee crown roadways, ramps, and State-maintained access roads serviceable are the objective of the crown roadway program. Essentially, the work involves grading and graveling unpaved road Surfaces.

A road maintainer (grader) with a 12-foot moldboard is best suited to smooth the road surface, to minimize ponded water, and to recover gravel displaced by traffic. On crown roadways where heavy traffic has compacted the surface so much that grading causes excessive wear of the blade, scarifying may first be required to loosen the surface. Scarifying the roadway before replenishing the road rook also enhances the bonding of old and new surfacing materials. Road surfaces should be crowned (gradually sloped from centerline to shoulder) to ensure proper drainage.

Dust created by levee crown maintenance and repair work can be a nuisance to nearby residents. It can also damage certain crops growing nearby. Workers should use care during these operations. Some crown roadways require more frequent maintenance than others, principally because of the heavier traffic load they carry. All levee roads, however, should be graded at least twice a year. In the fall after the first rains, and in late spring, before the levees begin drying out and getting dusty, are opportune times for this operation.

Grading of crown roadways is usually a one-person job. Wile the work is being done; the equipment can be parked overnight in a convenient nearby location, provided the site is secure and the property owner grants permission to use it. If such an arrangement is not possible, the equipment should be returned to home base or the

4.10 (Cont.)

reasonable security precautions when not in attendance at the unit, The operator is provided a pickup truck to travel to and from the job site and to haul lubrication and service equipment. A portable two-way radio with a range of at least 25 miles should be provided for emergencies.

Operators of road grading equipment are required to wear hard hats. Safety glasses, masks, and gloves are optional but recommended.

Vegetation Management on Crown Roadways. Uncontrolled growth of 4.11
weeds and grasses on crown roadways may become a maintenance problem. Dense vegetation prevents the grader from operating effectively. Nonselective residual herbicides are generally used to control weeds on crown roadways. Roadways should be sprayed only after grading is completed. (See Sec. 3.32 for information on controlling weed growth on crown roadways.)

Appropriate permits must be obtained before crown roadways are sprayed (see Sec. 2.16).

Fire guarding. Structures or other facilities occupying parts of 4.12
a flood control project must be protected from fire, both accidental and controlled. Removing flammable debris and wild growth from the immediate area is an important fire prevention procedure. Structures must be guarded before or during the early stage of vegetative growth. (See Sees. 3.32 and 3.33 for additional information on the use of herbicides for fire guarding,)

Levee Slopes and Rights of Way 4.20

Levee slopes should be free from nonessential structures, encroachments, or vegetative growth that could interfere with or prevent inspection or hamper flood fighting activities.

Vegetation Management on Levee Slopes. All earthen levees must 4.21
have some sort of erosion protection and yet permit inspection and flood fighting. Sod-forming grasses and ground covers provide the desired protection without interfering with these activities. In some circumstances, The Reclamation Board also permits certain trees and shrubs to grow on levee slopes. (For specific requirements regarding permissible vegetation, consult the Board's Guide for Vegetation on Project Levees.) Broadleaf weeds growing among desirable grasses can be effectively controlled by selective herbicides (see Sec. 3.31).

All levee slopes need thorough periodic inspection for soil erosion; 4.21
animal burrows; weed infestation; diseased, weak, or damaged trees; (Cont.)
and other undesirable growth. Frequency of inspection depends on the nature and location of each levee. Regular mowing or burning enhances inspection. Special care should be taken to protect mitigation areas from mowing and burning. (See Sec. 3 for vegetation management on levee slopes.)

Levee slopes are vulnerable to burrowing rodents » primarily ground squirrels. (See Sec. 5 for control of rodents.)

Dragging. Dragging of levee slopes is a multipurpose operation 4.22
that helps ensure the Integrity of a levee system. It is generally done by pulling a heavy dragging implement, such as a discarded track from a track laying tractor, with a heavy-duty track-laying engine. The drag is rigged with cable controls so the operator can regulate its angle and reach.

Dragging repairs minor surface erosion or Irregularities, preventing more serious erosion. However, disturbing the soil stimulates the growth of weedy plants. OWR personnel schedule broadleaf selective spraying with a pre-emergent herbicide for the fall, following dragging operations (see Sec.3.31).

Hard hats, safety glasses, ear plugs, and a breathing mask are required protective gear for this operation.

Care is needed to avoid removing trees and shrubs that do not interfere with levee inspection. In areas containing elderberry shrubs, coordination with the Endangered Species Office, U.S. Fish and Wildlife Service, is required.

Channel Clearing 4.30

A channel is the entire area of a waterway from the top of one bank to the top of the opposite bank. The general category Includes drainage canals, ditches, and sediment settling basins.

River channels and floodways are rated and designed to carry specific anticipated peak flows. Accumulated silt and wild growth, if not controlled, can lower flow capacities and Impede flows, causing water to rise above intended levels. Such obstructions may also divert flows, eroding banks or levees.

The Corps of Engineers is responsible for periodically dredging navigable channels to remove slit and snags and for removing aged trees deemed to be potential hazards to navigation.

Local agencies and the Department of Water Resources are responsible for clearing channels of excess debris, brush, and other harmful vegetation. One method is to uproot and pile the vegetation with a medium or large bulldozer with a brush rake attachment. A dragline may be better under certain conditions. Piled vegetation must be removed from the floodway before flood season. Where permitted, burning is the most convenient disposal method. (The Department of Fish and Game and The Reclamation Board are the principal permitting agencies.) An alternative method and one that is generally more acceptable, 4.30 (Cont.)
is selective cutting with hand tools, Including chain saws. Woody growth of selected species less than 8 Inches in diameter can be disposed of with a chipper or "brush hog." Spreading and disposal of chips is regulated by the Department of Fish and Game. Personnel of the California Conservation Corps are often available to conduct selective clearing work at low cost. DWR's Flood Project Analysis

operations are discussed In Sec. 2.14.

Unless soil and plant roots are also removed, mechanical control provides only a short-term solution to brush problems. Removal of above-ground plant material stimulates regrowth and suckering in most brush species often resulting In a heavier stand than originally existed.

Where permitted, translocating herbicides can kill above-ground and below-ground plant parts, eliminating or greatly reducing regrowth. Spraying brush in channels without suitable access usually requires a tractor and a trailer-mounted storage tank with a high-pressure pump. Where channels are narrow or where there is improved access, it may be possible to use traditional spray equipment fitted with a long hose. Where all other options are regarded as ineffective, the aerial application of herbicides can be considered. Except as specified on the pesticide container label, special care must be taken to prevent drift or contamination of waterways <see Sec. 3. 4).

Safety practices and gear requirements for channel clearing are the same as those for heavy equipment operation and the handling, use, and disposal of toxic materials. Hard hats, safety glasses, and ear plugs are required for operating chain saws, tractors, and chippers. Consult the pesticide label and also see Sec. 2.22 for recommendations and requirements on the use of specific protective clothing to be worn while handling pesticides.

Drainage Facilities 4.40

Drainage ditches, canals, and settling basins are essential parts of flood control operations and must be periodically inspected and maintained. The flow capacity of drainage facilities can be impaired by undesirable vegetation and built-up silt deposits, primarily from bank sluffing. These facilities can function effectively and safely only when silt and excess growth are periodically removed with a dragline or other suitable equipment. Aquatic herbicides can be used to help control undesirable vegetation. (See See. 3.33! also, consult the county agricultural commissioner's office for recommended materials.) Heavily eroded banks should also be resloped and/or revetted with rock, when needed.

Overhead power lines and underground lines carrying communications, natural gas, oil, or water can endanger channel clearing operations. Most of these hazards can be identified by markers or warning signs. Specific information about location and depth of service lines can be obtained by calling Underground Service Alert (1-800-642-2444).

Control Gates and Culverts. Concrete passageways or corrugated 4.41
metal pipes of varying diameters equipped with manual or automatic flood control gates are situated at appropriate sites in the flood control project. If these facilities malfunctioned, particularly during high-water conditions, flooding could occur in some inhabited or farmed areas. Therefore, normal maintenance of these structures includes keeping the intake and discharge areas free of constricting debris, silt, and wild growth, and Inspecting and testing the

be inspected and tested in the early fall before high water occurs.

Minor Structures 4.50

This category includes mile markers, gates, barricades, and miscellaneous signs. (See Figures 1 - 7, following Sec. 4.67.)

Mile Markers. Mile markers are signs installed on the levee shoulder at half-mile intervals to identify unit designations and levee miles. The markers are seven-foot metal posts with anchors and plates. The posts are driven or set in concrete to a depth of three feet, and the plates are welded to the tops with their faces perpendicular to the levee centerline so they are visible to traffic in either direction. Reflectors fastened to the plates make the markers easy to find when visibility is poor. 4.51

Maintenance of levee mile markers consists mainly of replacing reflectors and damaged plates and keeping signs clean and readable. Vegetative growth that hides the signs from view should be kept clear, either mechanically or with herbicides (see Sec. 3.33).

Gate, Barricades, and Signs. Gates, barricades, and miscellaneous signs are installed to prohibit or discourage unauthorized traffic from using flood control project facilities. Trespassing and vandalism have increased markedly in recent years because of the rise in popularity of recreational vehicles and expansion of housing and Industrial developments. 4.52

Gates on the crown roadway and barricades that extend down levee slopes and across berms are usually effective protection against unlawful entry by motor vehicles. An underlying property owner who needs even greater security may apply to The Reclamation Board for a permit.

Maintenance of gates) barricades, and signs consists mostly of keeping them in good appearance and working properly, including their locking systems. Periodic washing, painting, straightening, and and replacement of reflectors is general maintenance requirements. Visibility must be maintained by eliminating tall vegetation, either mechanically or with herbicides (see Sec. 3.33). Accurate records of the date, time, and type of maintenance performed must be kept to protect the maintaining agency in the event of litigation. (See Figure 7, "Minor Structure Maintenance Report," following Sec. 4.67.)

An acetylene torch or arc welder may be used to Install and repair gates, barricades, and signs, but because of the fire danger, precautions must be taken. A torch or welder should never be used near dry vegetation or when unusually hot or windy conditions exist. At all times, their use should be backed up with a minimum of firefighting equipment: shovels, rakes, appropriate extinguishers) and a supply of water with means of delivering it to a blaze. 4.52 (Cont.)

before the signs are legal. Because regulations and codes vary from area to area, it is best to contact the city or county public works department having jurisdiction. DWR uses signs referring to the State Vehicle Code, Sec. 2116.

Mitigation Measures. Where mitigation and enhancement measures are provided to protect fish and wildlife, endangered species, or other environmental values, care should be taken to avoid harm to these features and to maintain them and any special markings, protective features, etc., as they were installed. These measures are becoming more widely known and installed in connection with federal and state projects as a result of permits from the Corps of Engineers. (See Figures 1 - 7 following Sec. 4.67.) 4.53

Major Structures 4.60

A number of flood control facilities are essential parts of the Sacramento and San Joaquin Rivers flood control projects. These include fixed weirs} control weirs; pumping plants; and diversion, drop, and outfall structures.

Fixed Weirs. A fixed weir designed for flood control functions as a section of a levee. Its crest is at a selected elevation, usually original ground level. The purpose of such a fixed weir is to relieve pressure on a levee system by allowing excess flood water to escape into bypasses or designated drainage basins when river stages begin rising to threatening levels. Fixed weirs allow no discharge to occur until the water level exceeds the weir crest. Fixed weirs are usually built of reinforced concrete, but they may also be built of stone, quarry rook, cobbles, or other suitable material. 4.61

Maintenance of fixed weirs usually requires periodic removal of such obstructions as undesirable vegetation, debris, and silt deposits on the water ward side and clearance of debris from the stilling basin or spillway to permit uniform flow into the escape route. A weir should also be regularly inspected for evidence of spalling or cracking and for exposed reinforcement bars in abutments or wing walls.

Undesirable vegetation should also be removed from the downstream revetment. Where handrails or walkways are present, they should be regularly inspected to ensure that they are safe and meet safety regulations. Where a county or State highway or a railroad is an Integral part of the flood control structure, the maintenance responsibilities are defined in a separate agreement with the agency concerned.

Control Weirs. Control weirs serve essentially the same purpose as fixed weirs. That is, they permit excess water to escape into a bypass system when high river stages occur. Control weirs, however, are designed to release additional flows through a series of control gates to reduce the stress on levee systems, when needed. 4.62

Proper operation of control weirs is considered vital to the safety of residential, industrial, and agricultural property near and down-stream from the facility. Operational guidelines are dictated by the

Removal or leveling of silt deposits, debris, and undesirable vegetation between the river and the structure are essential maintenance activities. The spillway should also be freed of obstructions and the concrete bulkhead and superstructures kept in good repair. Diagrams and maintenance procedures for the control mechanism and a record of maintenance performed should be filed and made readily available for inspection at the headquarters of the operating and maintaining agency. Erosion in the discharge area of the control structure can be expected to occur as gates are opened for flood control. Turbulence created by the volume and velocity of water rushing through the aperture may have a scouring effect.

Whenever the gates of the Sacramento Weir are opened, the event must be documented. The gates are opened and closed under the direction of the Flood Center.

Diversion Structures. Fixed controllable diversion structures divert water from the main channel for flood control, irrigation, or other needs. Accumulated silt, gravel, and debris on the upstream side can restrict flows and interfere with the effectiveness of the structure. 4.63

Maintenance involves removing all obstructive materials, including undesirable trees and wild growth, from the upstream and downstream sides of the structure. The condition of the concrete should be periodically noted and appropriate repairs made. The control gate mechanism should be regularly tested and adjusted to ensure proper operation. Special attention must be given to discharge pipes where obstructions could be present but are not readily visible.

Pumping Plants, A pump or a series of pumps with a wide range of capacities is used to draw excess water from drainage systems and discharge it into the main channel. Steel trash racks are installed to protect the pumps by preventing materials large enough to damage them from entering the intake sump. At some stations, a log boom supplements the function of trash racks. 4.64

All trash, including built-up sand and gravel, must be removed from the area of the log boom, the trash rack, and the gravity discharge pipe or channel before the high-water season begins. Just as important, when the pumps are active, debris captured by intercepting structures must be removed, either by hand tools or mechanical means, before the accumulated materials can clog the system.

Wing walls, bulkheads, splash aprons, and the superstructure are made of reinforced concrete that is subject to cracking and spalling and exposure of the reinforcement bars. Repairs should be made as early as possible. 4.64 (Cont.)

A maintenance guide and inspection check list is located inside each control structure. The superintendent should acquaint himself and all authorized maintenance personnel with the operation) housekeeping, and maintenance procedures for the facility.

that are usually situated in a drainage canal or channel near its confluence with a main river. A series of mechanized discharge pipes or slide gates are incorporated into a reinforced concrete barrier that, when closed, prevents flood water in the river from backing up into the drain system.

The gates can also be operated to maintain desirable levels in the drainage system to meet irrigation needs or to release excess flood water into a bypass system.

Trash gates and/or log booms are positioned on the upstream side of the control gates to prevent debris from fouling their operation. When debris begins to collect in the area, it must be removed immediately. At some facilities, a debris boom is installed for this purpose. Revetment on both sides of the structure should be kept clear of undesirable vegetation and an unobstructed passageway maintained.

The concrete superstructure should be inspected regularly and cracks and spalls patched. The metal works are also subject to some battering, and breaks or distortion can be expected to occur. Such conditions can be corrected by straightening or welding the damaged area. The electrical or hydraulic system should be Inspected and tested frequently by a qualified employee.

Bridges and Roads. The superintendent's responsibilities for county or State bridges and roads that cross a federal flood control waterway include inspection, reporting, and maintenance. When a condition is noted that would affect the safety of the structure or the functioning of the flood control works, it should be reported as a matter of courtesy to the agency responsible for it. 4.66

Drop Structures. The purpose of a drop structure is to stabilize a channel by holding flow velocities below the point of scouring. 4.67

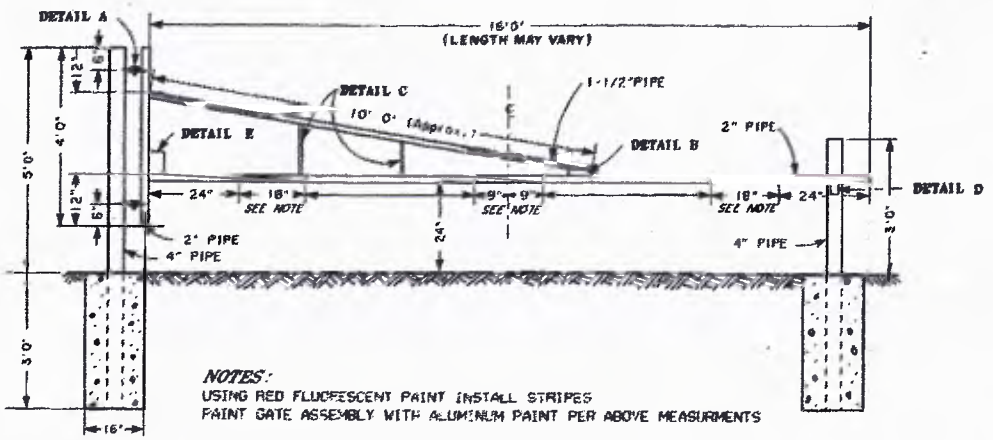
Drop structures are built of reinforced concrete, with wing walls, a crest or headwall, a spillway apron-slab, and end Sills. Revetted slopes on the upstream and downstream ends are essential parts of the facility. Drop structures with headwalls that extend above the invert of the channel have drain ports to prevent ponding of water on the upstream side of the structure. The ports must be kept free of material that would restrict flows.

General maintenance of a drop structure requires removal of any accumulated trash and debris from the intake area of the facility. Silt and gravel deposits in and about the stilling basin should also be removed after each high-water event. Undesirable growth impairs the chief function of the revetted area. It must be eliminated, either mechanically or by the use of herbicides. 4.67 (Cont.)

The reinforced concrete work should be periodically checked for cracks, spalling, and rebar exposure, and repairs should be made at an early

Some drop structures are equipped with a wooden gate or a cable-supported barricade designed to prevent livestock and other animals from falling into the drop basin. These protective devices should be kept in good repair.

Figure 1



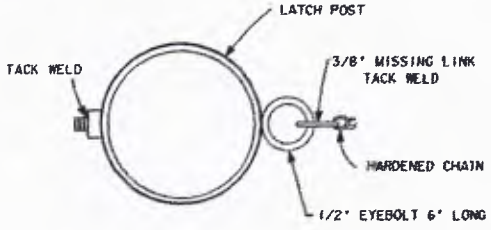
NOTES:
USING RED FLUORESCENT PAINT INSTALL STRIPES
PAINT GATE ASSEMBLY WITH ALUMINUM PAINT PER ABOVE MEASURMENTS

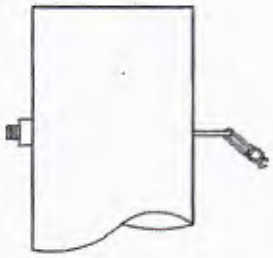
MATERIAL LIST		
ITEM	UNIT	QUANITY
CONCRETE	C.F.	8
4" STEEL PIPE	L.F.	14
2" STEEL PIPE	L.F.	20
1-1/2" STEEL PIPE	L.F.	10
GATE HINGES	EA.	2
POST HINGES	EA.	1
WEB PLATES	EA.	2
GATE REST	EA.	1
SIGN HOLDER	SET	1
MILE MARKER	EA.	2

MATERIAL LIST		
ITEM	UNIT	QUANITY
0/7 HARDENED CHAIN	L.F.	20
3/4"X2" MACH. BOLT	EA.	2
3/4" NUTS	EA.	2
ROAD CLOSED SIGN	EA.	1
MACH. SCREWS	EA.	4
AMBER REFLECTOR	EA.	2
ALUMINUM PAINT	GAL.	1
3" BRUSHES	EA.	2
FLUORESCENT PAINT	QT.	1
MASKING TAPE	ROLL	1

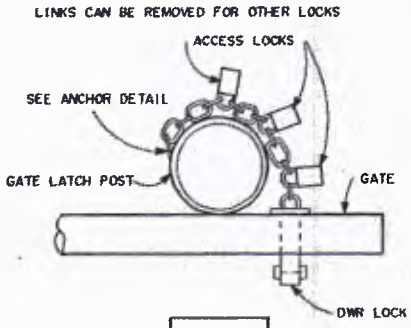
STANDARD PIPE GATE
MANUFACTURED AND INSTALLED

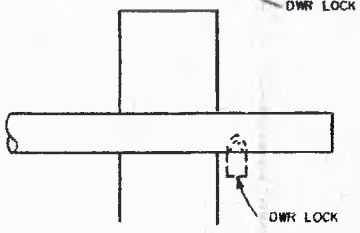
NO SCALE





ANCHOR DETAIL
CHAIN ANCHOR TO POST

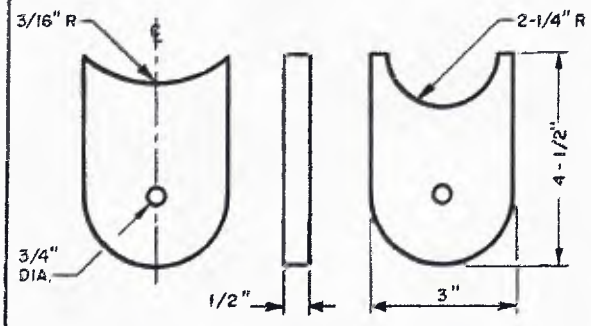


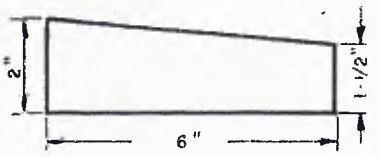


LOCKING DEVICE & ANCHOR DETAIL
NO SCALE

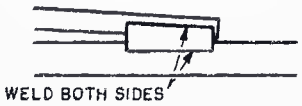
LOCKING DEVICE

Figure 2

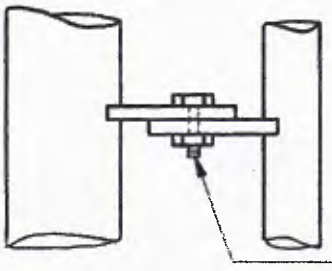




3/16" X 2" FLAT STOCK

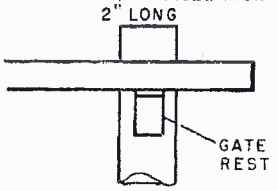


DETAIL B
WEB PLATE

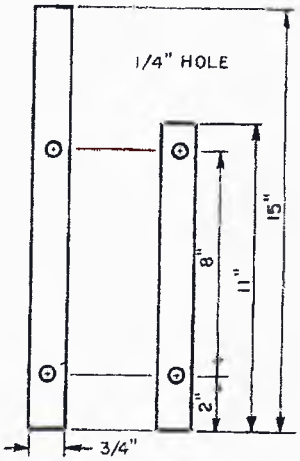


DETAIL A
GATE AND POST HINGE

3" X 3" X 1/4" ANGLE IRON
2" LONG



DETAIL D
GATE REST



1/4" X 3/4" FLAT STOCK
DETAIL C
SIGN HOLDER

(2) 4" X 6" X 1/4" PLATE
DETAIL E
MILE MARKER

NOTES:

(1) AFTER INSTALLATION OF BOLT & NUT TACK WELD NUT TO BOLT. (DETAIL A)

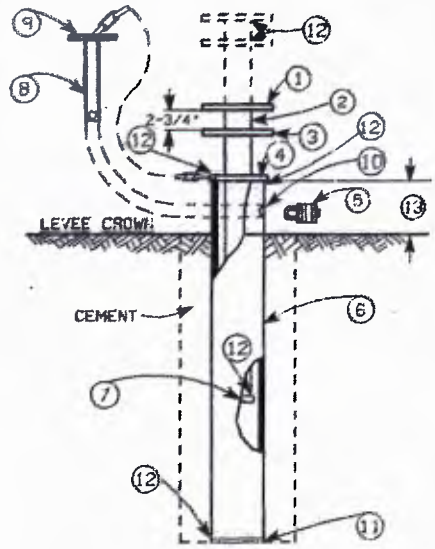
(2) MAKE IN SHOP, INSTALL IN FIELD. NUMBER ON BOTH SIDES. (DETAIL E)

STANDARD PIPE GATE
MANUFACTURED AND INSTALLED

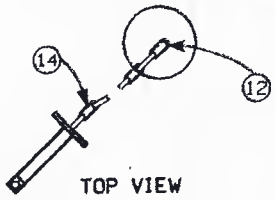
DETAILS

NO SCALE

Figure 3

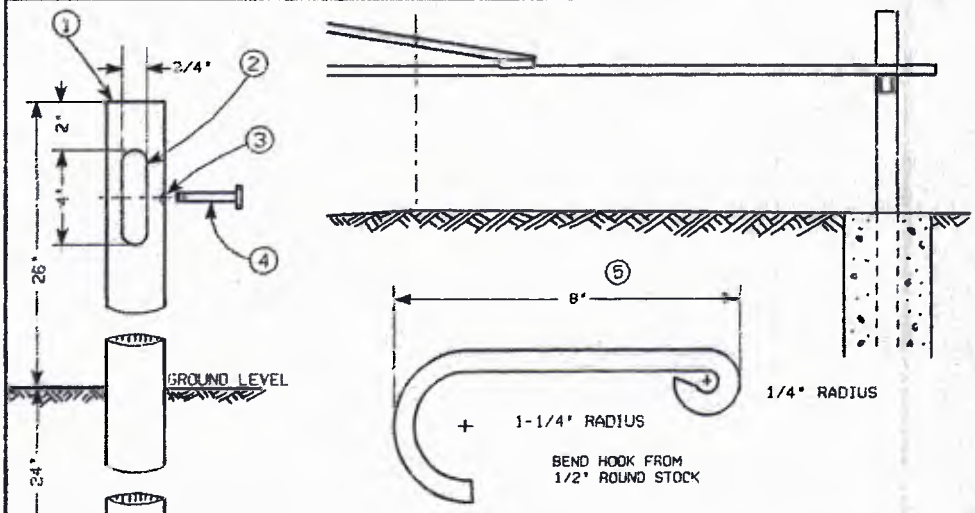


LATCH POST
FOR SPECIAL FARM MACHINE ACCESS
NO SCALE



TOP VIEW

1. ROUND 1/2' PLATE 8 1/2' DIA.
2. PIPE 3' DIA. 22' LENGTH
3. ROUND 1/2' PLATE 8 1/2' DIA. 3 1/2' HOLE CENTERED
4. ROUND 1/2' PLATE 4 1/2' DIA. 3 1/2' HOLE CENTERED
5. AREA LOCK
6. PIPE 4' DIA. 28' LENGTH
7. ROUND 1/2' PLATE 3 1/2' DIA.
8. LOCKING PIN WITH HEAD. 6' X 1' ROUND STOCK 7/8' WASHER HOLE DRILLED IN END FOR LOCK
9. RETAINING CHAIN 10 LINKS
10. HOLE FOR LOCKING PIN
11. ROUND 1/4' PLATE 6' DIA.
12. WELD
13. THIS HEIGHT WILL VARY WITH GATE HEIGHT
14. GATE PIN 10 LINKS OF CHAIN

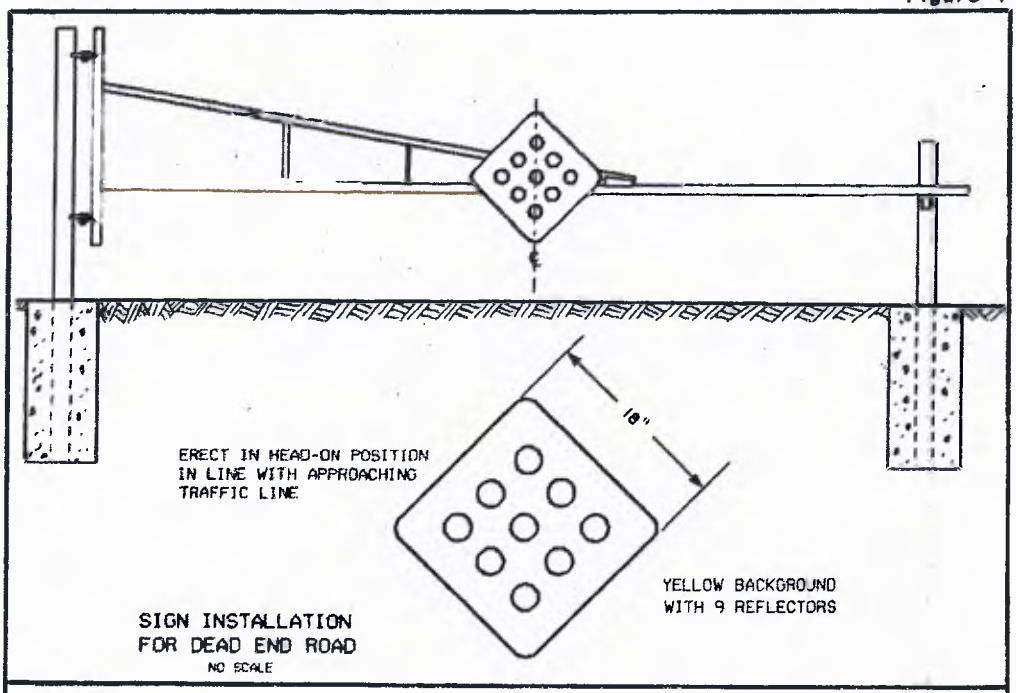


1. 1-1/4' PIPE 54' LONG
2. SLOT CUT THRU PIPE TO RECEIVE HOOK
3. CLEARANCE HOLE FOR 3/8' BOLT
4. 3/8' USS BOLT AND NUT 2-1/2' LONG
5. ROD HOOK

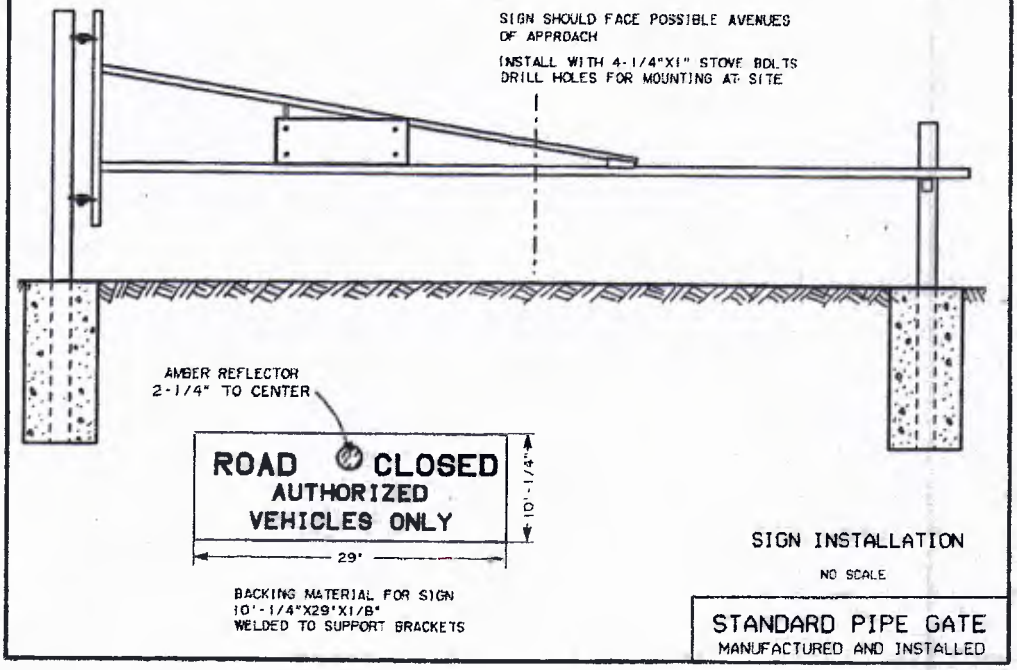
GATE STOP POST
NO SCALE

STANDARD PIPE GATE
MANUFACTURED AND INSTALLED

Figure 4



SIGN INSTALLATION
FOR DEAD END ROAD
NO SCALE



BACKING MATERIAL FOR SIGN
10'-1/4"X29'X1/8"
WELDED TO SUPPORT BRACKETS

SIGN INSTALLATION
NO SCALE

STANDARD PIPE GATE
MANUFACTURED AND INSTALLED

Figure 5

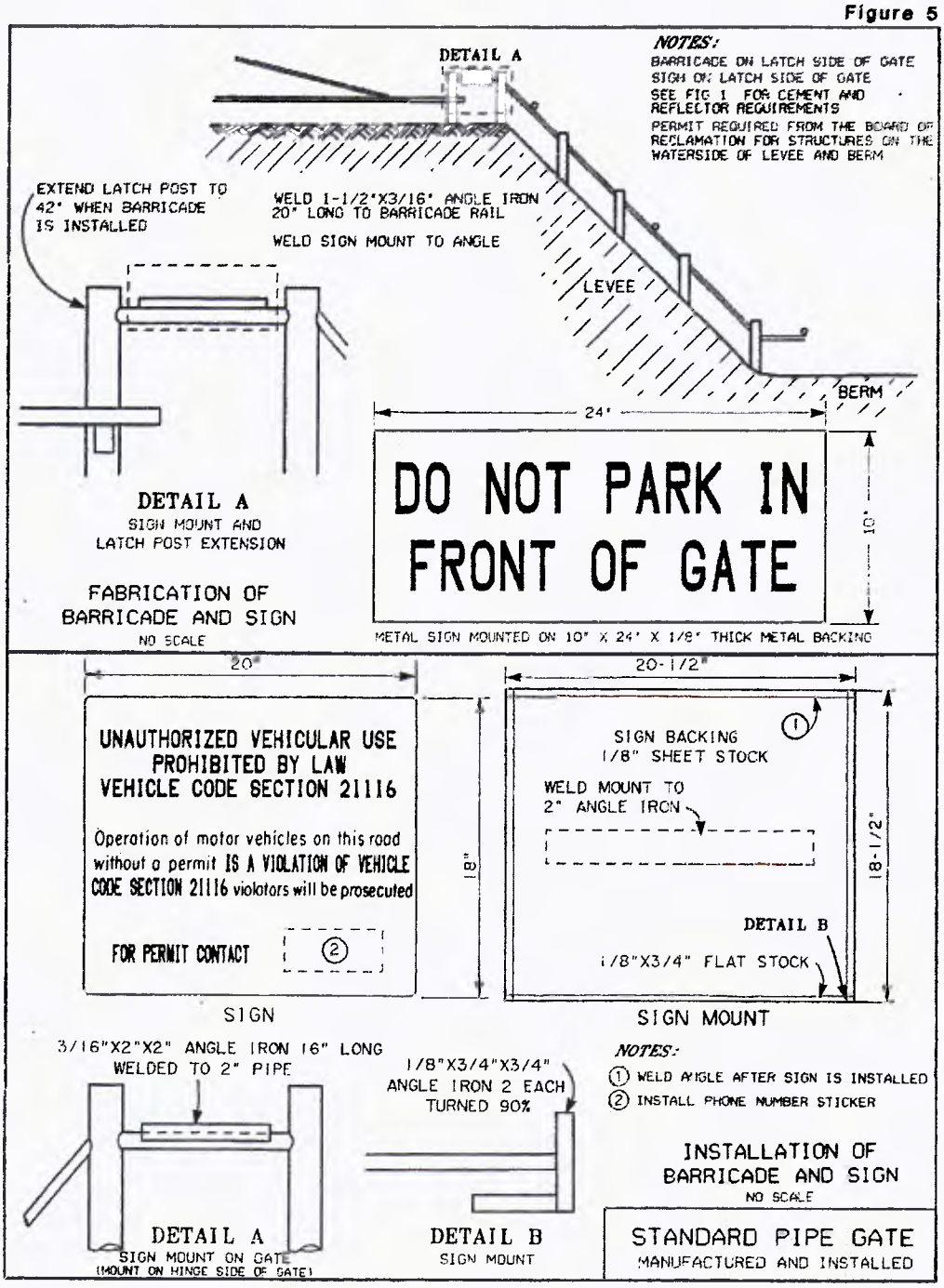
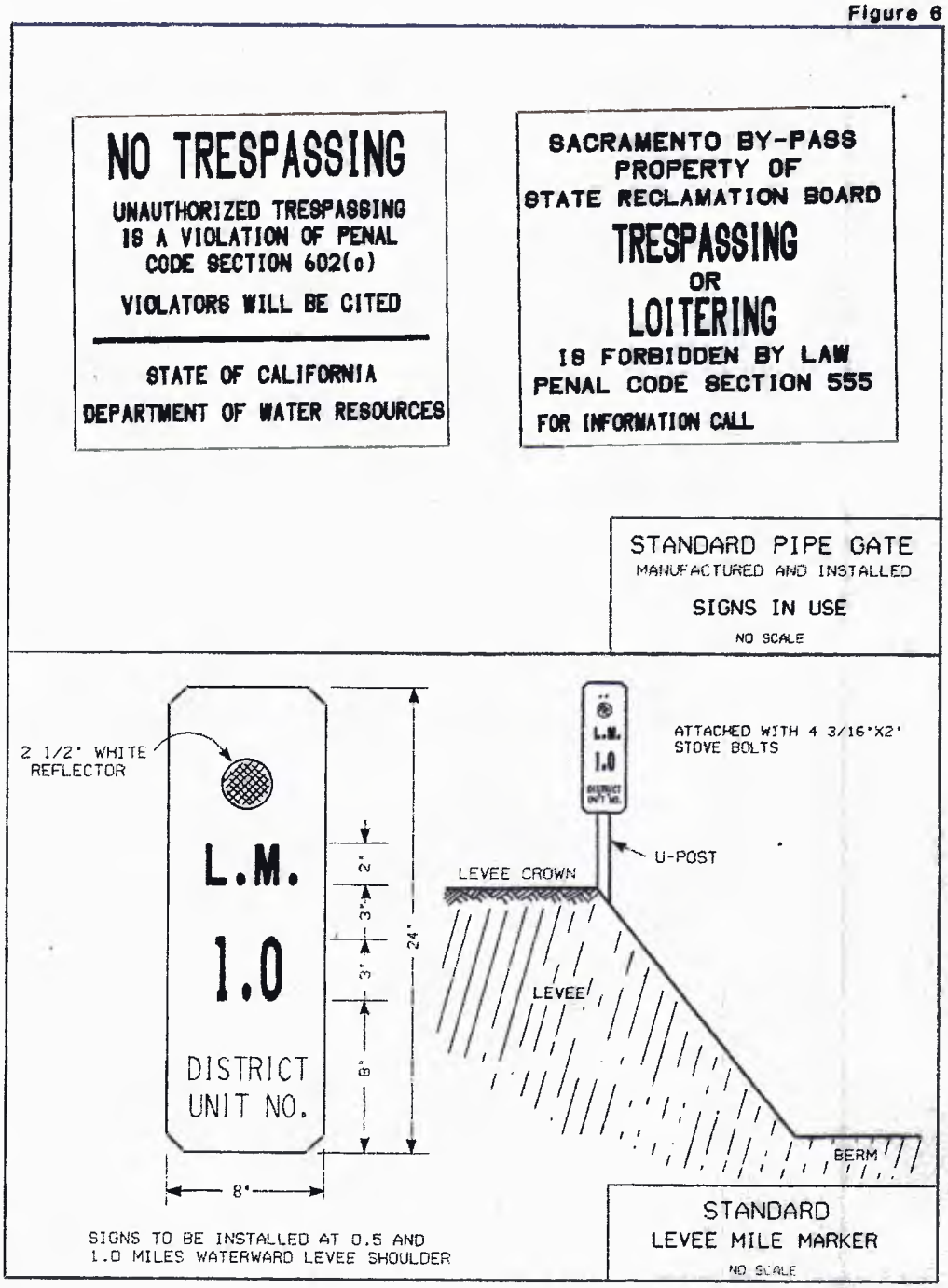

DETAIL A
NOTES:
BARRICADE ON LATCH SIDE OF GATE
SIGN ON LATCH SIDE OF GATE
SEE FIG 1 FOR CEMENT AND REFLECTOR REQUIREMENTS
PERMIT REQUIRED FROM THE BOARD OF RECLAMATION FOR STRUCTURES ON THE WATERSIDE OF LEVEE AND BERM
EXTEND LATCH POST TO 42" WHEN BARRICADE IS INSTALLED
WELD 1-1/2"X3/16" ANGLE IRON 20" LONG TO BARRICADE RAIL
WELD SIGN MOUNT TO ANGLE
LEVEE
BERM
24"
DETAIL A
SIGN MOUNT AND LATCH POST EXTENSION
DO NOT PARK IN FRONT OF GATE
10"
FABRICATION OF BARRICADE AND SIGN
NO SCALE
METAL SIGN MOUNTED ON 10" X 24" X 1/8" THICK METAL BACKING
20"
20-1/2"
UNAUTHORIZED VEHICULAR USE PROHIBITED BY LAW VEHICLE CODE SECTION 21116
Operation of motor vehicles on this road without a permit IS A VIOLATION OF VEHICLE CODE SECTION 21116 violators will be prosecuted
FOR PERMIT CONTACT
2
18"
SIGN BACKING 1/8" SHEET STOCK
1
WELD MOUNT TO 2" ANGLE IRON
18-1/2"
DETAIL B
1/8"X3/4" FLAT STOCK
SIGN
SIGN MOUNT
3/16"X2"X2" ANGLE IRON 16" LONG WELDED TO 2" PIPE
1/8"X3/4"X3/4" ANGLE IRON 2 EACH TURNED 90°
NOTES:
1 WELD AIGLE AFTER SIGN IS INSTALLED
2 INSTALL PHONE NUMBER STICKER
INSTALLATION OF BARRICADE AND SIGN
NO SCALE
DETAIL A
SIGN MOUNT ON GATE
(MOUNT ON HINGE SIDE OF GATE)
DETAIL B
SIGN MOUNT
STANDARD PIPE GATE
MANUFACTURED AND INSTALLED

Figure 6


NO TRESPASSING
UNAUTHORIZED TRESPASSING IS A VIOLATION OF PENAL CODE SECTION 602(o)
VIOLATORS WILL BE CITED
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SACRAMENTO BY-PASS
PROPERTY OF
STATE RECLAMATION BOARD
TRESPASSING
OR
LOITERING
IS FORBIDDEN BY LAW
PENAL CODE SECTION 555
FOR INFORMATION CALL
STANDARD PIPE GATE
MANUFACTURED AND INSTALLED
SIGNS IN USE
NO SCALE
2 1/2" WHITE REFLECTOR
L.M.
1.0
DISTRICT UNIT NO.
2'
3'
3'
8'
24'
8"
ATTACHED WITH 4 3/16"X2" STOVE BOLTS
U-POST
LEVEE CROWN
LEVEE
BERM
SIGNS TO BE INSTALLED AT 0.5 AND 1.0 MILES WATERWARD LEVEE SHOULDER
STANDARD
LEVEE MILE MARKER
NO SCALE

MINOR STRUCTURE MAINTENANCE REPORT

CREW

AREA _____

LEVEE OR UNIT _____

DATE	LEVEE MILE	GATES			BARRICADES			SIGNS				MISCELLANEOUS				WORK PERFORMED OR REMARKS
		Pipe Gate	Cable Gate	Other	Pipe Barricade	Cable Barricade	Other	Levee Mile	Trespass	No Parking	Road Closed	Locks	Reflectors	Paint	Chain	

CODE
✓ ACCEPTABLE O MISSING X NEEDS ATTENTION — DOES NOT APPLY

Figure 7

SECTION 5

RODENT CONTROL

Ground squirrels and other burr-owing rodents can threaten the structural integrity of levees and other flood control structures. When these animals remove material by burrowing, they reduce the structure's ability to contain flows.

Ground Squirrel Control 5.10

The presence of ground squirrels or their burrows on a levee crown, slope, or toe always warrants control measures. Because of their high reproductive potential and extensive burrow systems, ground squirrels present a serious hazard to levees and, to a lesser extent, to other project facilities. Their burrowing loosens the soil, increasing the risk of erosion and sloughing. Also, a burrow can act like a pipe to carry floodwater into and through levee sections.

Ground squirrel densities tend to be higher where an attractive food source such as walnuts or ether seed crops are present.

Rodent Control Techniques 5.20

Areas with high-density ground squirrel populations may require reducing or removing vegetation so that burrow damage can be assessed and control work more easily achieved.
Various rodent control techniques are available. Use of these at at the proper time of the year will Increase their effectiveness and minimize certain problems, such as bait shyness, poor control, and non target kills.

Timing is critical to the success of any rodent control program. Control efforts should be aimed at achieving at least a 90 percent mortality. Any less than that level is likely to result in a rapid regrowth of the population.

Rodenticides used carelessly are hazardous to people, livestock, and non target wildlife. Many rodenticides are restricted use materials that require the applicator to (1) have a permit from the county agricultural commissioner's office; (2) notify the commissioner's office 24 hours in advance of the planned work (by phoning in a Notice of Intent); and (3) either be a certified "qualified applicator" or be able to demonstrate to the commissioner's office possession of a satisfactory level or knowledge of the product to be used.

Fumigation. Fumigants are toxic gases or materials that, when placed in the burrow, generate a toxic gas. A number of fumigants are available for control of ground squirrels, including carbon monoxide, gas cartridges (smoke bombs), methyl bromide, and aluminum phosphide (Phostoxin). 5.31

The most effective times of the year for fumigation are the breeding season, which occurs from February through May, and the fall, after the first rains and before the coldest weather begins. The soil should not be too dry. Soil that is excessively dry is likely to have cracks and other openings that will allow the gas to escape. The squirrels must be active (not hibernating or estivating) and must be in the burrows at the time of fumigation. 5.21 (Cont.)

The general procedure for application is to place the fumigant in the burrow. When aluminum phosphide is being used, it is followed with crumpled sheets of newspaper. The burrow is then sealed with earth. All active burrows should be treated, and all burrows, both active and Inactive, should be sealed with earth. Effectiveness for all forms of fumigants can be improved by treating the burrows again in 48 hours.

Bait Stations. Bait stations are effective in eliminating any rodents that remain after fumigation or the use of acute toxicants. Because of the volume of material that bait stations require, this technique should be used exclusively for small, local ground squirrel colonies. 5.22

Bait stations are used only with anticoagulant baits. These may be formulated as loose grain, paraffin bait blocks, or pellets. The functions of the bait station are to protect the bait from moisture and dirt; to confine it to a small area, while giving the target species access to it; and to reduce or eliminate danger to children, pets, and non target animals.

To be effective, anticoagulant baits must be placed repeatedly. Bait stations must be serviced regularly and kept full of fresh bait. They should be anchored to the ground or some solid structure to reduce spillage and vandalism. They should also be posted with warning notices that displays the name of the toxicant, the concentration being used, and the name and telephone number of the maintaining agency.

Bait stations should not be used in urban areas because of the danger to children and pets and the likelihood of vandalism.

Bait Broadcasting. Bait broadcasting is the technique used to apply acute toxicants, such as zinc phosphide, strychnine, and 1080. Under certain circumstances, anticoagulant baits may also be broadcast. Ground squirrels are excellent foragers. They readily detect and pick up bait that is broadcast at the rate of three to five kernels per square foot. Non target animals are far less likely to find the bait. Bait that is distributed more densely or placed in piles may not be taken by squirrels and, because it may be more noticeable, is extremely hazardous to other wildlife, livestock, and humans. 5.23

Bait may be broadcast by hand around each active burrow (spot halting) or, in high-density areas, may be broadcast in a swath by a mechanical spreader.

achieve the desired results. If they are applied repeatedly, bait shyness or poor bait acceptance can result, thereby lowering the mortality rate. (Cont.)

When anticoagulant bait is used, the bait must be broadcast regularly (daily or on alternate days) to ensure that the supply will last for several days.

Trapping. Small Infestations of ground squirrels or squirrels occupying areas in which it is impractical or unsafe to use fumigants or toxicants may best be controlled with traps. Both live and kill traps may be used. 5.24

Traps should be placed at the burrow entrance, on runways, or in other locations the squirrels frequent. Initially, traps should be placed unset to allow the squirrels to become accustomed to them. After a few days, the traps can be set and balled with grain, nuts, or other foods that attract these animals. Kill traps should be anchored to prevent them from being carried off by predators.

Other Problem Species 5.30

Occasionally other species such as pocket gophers, rats, beaver, or muskrats may present a flood control hazard. The problems they cause tend to be somewhat specialized, and the techniques for combating them cannot be addressed in a general discussion such as this. If any of these or other animals are suspected of causing damage, the local agricultural commissioner's office should be contacted for assistance.

EMERGENCY OPERATIONS

Superintendents of State and local agencies responsible for maintenance of federal flood control project facilities are also responsible for flood emergency preparedness. This includes training personnel in flood fighting methods and stocking flood fighting supplies.

Flood Fight Materials & Equipment Recommended for Patrol Vehicles 6.10

Powerful electric lanterns and extra batteries.
Round-point shovels (to drain ponded water on the crown roadway).
Axes or chain saws (for trees and branches that have fallen across the roadway).
A tow chain (to drag debris from the roadway or assist mired flood tight vehicles).
Highway flares (to warn of dangerous road conditions).
A set of battery jumper cables.
Tire chains.
Visquine sheeting.
Sand bags.

(See also "Flood Fight Check List" In Sec. 6.26.)

High "Water Patrolling 6.20

The Corps of Engineers requires that federal flood control project levees are patrolled when river stages exceed warning levels. To comply with the Corps' requirements, the superintendent must prepare a comprehensive patrol schedule with increasing frequency of patrolling as flood waters rise and a plan that provides for a quick emergency response.

Early detection and evaluation of a developing trouble spot is the key to protecting lives and property during high-water periods. Levee patrols are the first line of defense against levee failure at such times. Patrols must be able to deliver a high standard of performance, even when working long hours in hostile weather and under difficult conditions.

The Mobile Patrol Unit 6.21

A mobile patrol unit usually consists of a journey worker or a supervisor, assisted by an apprentice or temporary employee. One person in each unit is assigned sole responsibility for locating and reporting discrepancies in the patrol area. The two-person crew is Ideal if enough workers are available. A second person means an extra pair of eyes, as well as an extra margin of safety In often dangerous situations.

powerful enough to illuminate levee slopes during darkness. Each unit should be equipped with an installed or portable two-way radio. Because a patrol's primary responsibility is surveillance it does not normally interrupt this function, except to evaluate and mark trouble spots. (Cont.)

Emergencies can develop suddenly, however, that may require the patrol's immediate response. For that reason, it is recommended that patrol vehicles also carry basic emergency flood fighting equipment and materials listed in Sec. 6.10.

Selecting a Sector Boss 6.22

It is a good policy, before the flood season starts, to appoint a qualified employee as sector boss of a specific sector for each 12-hour shift. The sector boss* prime responsibility is overseeing patrol operations. He also inspects reported trouble spots and recommends corrective actions, as needed. To carry out his duties effectively, the sector boss must be fully aware of ail conditions in his sector, including the history of high-water problems.

Patrol Scheduling 6.23

To comply with requirements of the Corps of Engineers for high-water patrolling, the superintendent must prepare a comprehensive patrol schedule and a plan providing for quick emergency response. The schedule should allow for increasingly frequent levee surveillance from warning stage through danger stage.

Patrol schedules should be posted conspicuously at the superintendent's headquarters and a copy sent to the Flood Operations Center in Sacramento.

As a basis for an effective schedule, the superintendent should divide and subdivide his area of responsibility into zones, sectors, and walking patrol stations. The zone concept applies when more than one geographic area is involved.

Quick-Response Plan. Normally, there is ample lead time to meet the Corps of Engineers' patrol requirements when the Joint Federal-State River Forecast Center issues a flood warning bulletin. However, it is sometimes difficult to muster an emergency response crew when a crisis occurs during off hours or on a long holiday weekend. This problem can be partially solved by: 6.231

1. Frequently updating the list of telephone numbers of flood fight personnel.

2. Providing for standby vehicles, equipment, and materials that are ready for immediate use.

3. Requiring key personnel to notify their headquarters office where they can be reached in the event an emergency develops while they are out of their usual areas,

Mobile Patrols. Before leaving headquarters to patrol, a unit is given updated forecasts for tide, weather, and river stages? current and proposed changes in reservoir releases; and the radio call number and location of other units in the area. 6.241

Units should be limited to a levee reach that allows them to cheek both waterside and landside thoroughly at intervals of no more than one hour. As more patrols are added, inspections should be no more than one half hour apart at normal patrol speed.

The terminal point of each mobile patrol district should be clearly marked, preferably by metal posts and plates. When the point has been set, space for vehicle turn-around should be provided.

Walking Patrols. When water levels rise to near flood stage or reach flood stage, patrolling on foot may become necessary, particularly in areas with a history of high-water problems. As a rule, the current or forecast river stage dictates the extent of patrol coverage. However, wind speed and direction frequently have a profound effect on levee stability and the superintendent must take these factors into consideration. 6.242

Each patrol is given a specific area of responsibility and given empty sandbags, stakes, and shovels. The patrols report trouble spots to a sector boss or mobile patrol unit in the area. Because a foot patrol is assigned to cover a smaller area, it can provide more thorough and more frequent surveillance.

Potential or developing trouble spots will need special attention, particularly during long periods of intense rain.

Walking patrol assignments are identified by placing colored flags or other marker or the levee shoulder. The beat covered by a walking patrol should be changed as conditions change.

Reporting Trouble Spots 6.25

As soon as a potentially hazardous condition is discovered by a patrol unit or is brought to the patrol's attention, the patrol marks the location by driving a 4-foot lath into the levee shoulder near the site. The patrol then reports the location, nature, and extent of the problem. The lead man also classifies the problem as needing immediate action or only surveillance. When warranted, an identification number assigned by the command center is attached to the stake, along with other essential Information. The stake should be flagged with fluorescent material so it will be visible to patrols working during darkness.

Before relief patrols go on duty, they should be fully briefed on the current status of staked trouble spots and other problems in their assigned areas.

An ample supply of the following tools, materials, and equipment should be readily available in a convenient location. These supplies should be regularly inventoried and re-stocked.

The Inventory should be adjusted according to length of patrol area, number and type of flood control facilities, and experience during other flood events.

Local agencies might also consider stocking foul weather gear, including extra sets in various sizes.

Items	Quantity (Minimum required)
Visquine plastic sheeting, 10 mil, 100 x 20 feet	2 rolls
Or	
Canvas, 100 x 20 feet	2 rolls
Sandbags	1,000
Twine or baling wire	One box
Stakes, 2-foot, 2" x 4", W/V points	50
Laths, 4-foot	One bundle
Tie buttons or stones	50
Flagging, fluorescent	6 rolls
Lineman's plies	4
Sledge hammers	2
Shovels	5
Life jackets	4
Logbook (to document trouble spots)	
Tire chains	)
Jumper cables	) Quantities
Highway flares	)
Tow chains	) As
Axes	)
Chain saws	) Needed
Electric lanterns	)
Batteries for lanterns	)
Maps	)
Lighting system for night patrol	
Two-way oar radio or car telephone	

When a flood disaster is impending, local and State agencies must fully expend their resources to prevent loss of life and property damage. If an emergency exceeds the capabilities of local and State agencies, aid is available from federal agencies.

During a Flood Emergency 6.31

When flood water reaches the danger level or when other serious problems develop, the superintendent may ask for additional aid from the DWR Flood Operations Center in Sacramento to extend patrol coverage or to engage in a flood fight. The Center is staffed on a 24hour basis during flood alerts and responds to requests for personnel, material, and equipment for flood fighting. The Center also provides engineering and consultation services for damage appraisal or evaluation during flooding.

If a flood control structure is in immediate danger of falling and the situation is more than a local agency can handle, the local superintendent should report the situation to the DWR Chief of Flood Operations in Sacramento at 800-952-5530 or 916-4Y5-3553.

If a DWR representative confirms that conditions also exceed the capabilities of the State's forces, the Director of the Department of Water Resources calls on the Corps of Engineers for assistance.

In time of flooding or coastal storms, the Corps of Engineers can also undertake emergency operations to supplement local disaster assistance, flood fighting, and disaster recovery and rehabilitation. State or local agencies cannot be reimbursed for expenses they have incurred.

After the Flood Emergency Has Ended 6.32

The State Natural Disaster Assistance Act (NDAA) provides for financial aid to State arid local agencies to replace or repair public property destroyed or damaged by a natural disaster. Such aid, which is provided on a cost-sharing basis, is not available until the Governor has declared a state of emergency exists. Facilities used solely for recreation are excluded from such assistance.

NDAA is administered by the Director of the Office of Emergency Services (OES), who may delegate any power or duty Invested in him to another State agency.

A local agency may be eligible for HDAA financial aid after it has met the following conditions:

(1) It has declared a local state of emergency exists and has asked the Director of OES to concur.

(2) It submits a formal application for assistance to the Director of OES.

(3) The application includes a preliminary assessment of costs of repair or replacement.

reports supporting the request to OES. To qualify for HDAA assistance, the declaration of a local emergency must have been made within 10 days of the occurrence of the emergency (following a declaration of emergency by the Governor. (Cont.)

All applications must be filed within 30 days of the local emergency declaration with the Office of Emergency Services, 2800 Meadowview Road, Sacramento CA 95832.

Public Law 8 4-99. This law authorizes the Corps of Engineers, when requested by the Governor or his authorized representative, to assist the State in a flood fight when high-water damage or failure of a federal or nonfederal flood control facility could cause loss of life or property damage. To invoke this law, however, State and local agencies must first expend maximum effort. 6.321

Following emergency operations, the Corps of Engineers, under PL 84-99 (as amended), can give additional help for 10 days.

Conditions governing participation by the Corps of Engineer's for advance measures and emergency operations are outlined in the Corps' handbook, Emergency Operations.

(The form for requesting aid under PL 84-99 follows this section.)

Federal Emergency Management Agency (FEMA). Historically, the American Red Cross, the Salvation Army, church groups, and other nonprofit humanitarian organizations are first at the scene to meet the immediate needs of victims of natural disasters. A wide range of assistance is also available through FEMA before a presidential declaration of disaster. However, FEHA will not participate in post-flood repair of federally constructed flood control projects. 6.322

Following a presidential declaration, public facilities and private property damaged in a disaster are eligible for federal assistance on a conditional and sliding scale basis. This aid is granted to restore properties to predisaster condition. Applications for assistance must be filed with the Office of Emergency Services no more than 30 days following the presidential declaration. (See the OES Disaster Assistance Procedures Manual, 1985.)

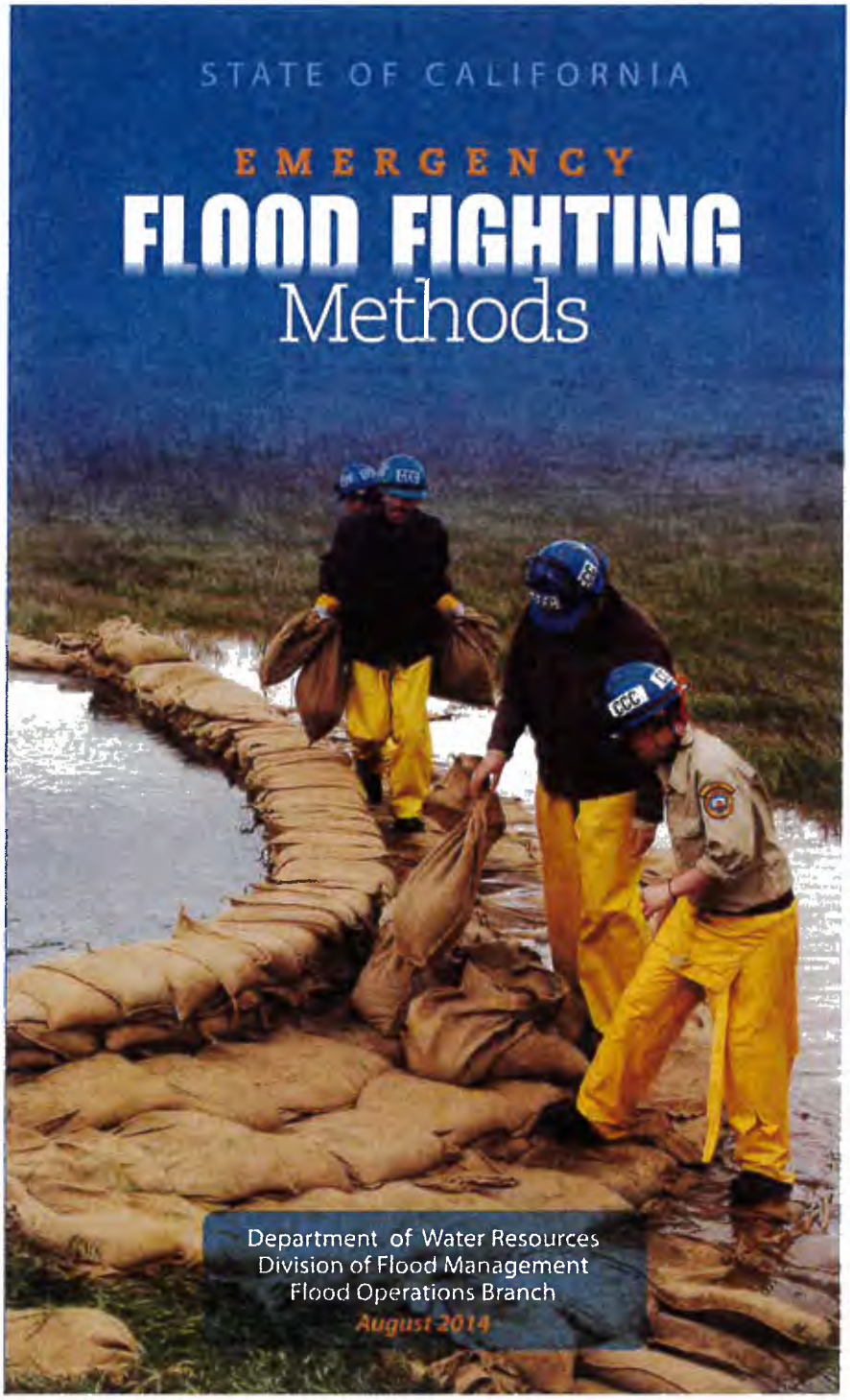
Reclamation District No. 828
Operations & Maintenance Manual

Appendix F

Emergency Flood Fighting Methods

STATE OF CALIFORNIA

EMERGENCY FLOOD FIGHTING Methods



Department of Water Resources
Division of Flood Management
Flood Operations Branch
August 2014

STATE OF CALIFORNIA
CALIFORNIA NATURAL RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

FLOOD FIGHTING
Methods

Division of Flood Management
Flood Operations Branch

August 2014

Prepared by
Rick Burnett
Water Resources Engineering Associate

with assistance from
DWR Graphic Services

Table of Contents

Foreword

The California Department of Water Resources (DWR), Division of Flood Management has been tasked to prevent, reduce, and mitigate the risk of damages associated with flooding. For over fifty years DWR has been the lead State agency responsible for responding to this costly natural disaster. Our mission is to prevent loss of life and damage to property and infrastructure.

Working together State, federal, and local agencies manage California's Flood Control System which consists of reservoirs, levees, weirs, bypasses, and retention debris basins.

This statewide system is managed with support from technologies such as weather and water forecasting, coordination of reservoir releases and a network of rain and stream gauges and snow pack monitoring. The information gathered is extremely important to emergency responders and the public.

The 'Flood Fighting Methods' outlined in this booklet have proven effective during many years of use by DWR, United States Army Corps of Engineers, and local agencies on flood-related emergencies. This handbook is published by the DWR Flood Operations Branch and is designed to be used with the Flood Fighting Methods class.

Levee and Embankment Threats

The main causes of levee failure or flood related problems due to high water are:

- Seepage through or under the levee heavy enough to cause a "boil".
- Erosion of the levee or embankment due to swift moving water or wave action.
- Overtopping resulting from water-surface elevations higher than the levee or embankment.

Patrolling

The best defense against flood related issues and/or levee failure is to identify problems early and repair them immediately. Biannual levee inspections and effective high water patrolling make this possible. The following suggestions will help in organizing patrol teams for this work.

- Operate under the SEMS / ICS system and report to the appropriate section chief.
- Provide a sufficient number of workers for two 12 hour shifts.
- Provide each worker with a copy of this 'Flood Fighting Methods' handbook.
- Assign two people to each mobile patrol.
- Assign each mobile patrol vehicle an area no larger than can be inspected at least every 2 hours, with more frequent patrols as conditions warrant. Foot patrols may offer a more thorough inspection.

- Furnish each mobile patrol vehicle with radio/cell phone or other communication equipment, lights for night patrol, and the following materials: Laths, survey ribbon, permanent marker, pad and pencil, flashlight with extra batteries, 2 shovels, 1 sledge hammer, approximately 50 sandbags (empty), 1 roll of plastic sheeting (visquine), 1 box twine, 100 buttons, 25 wooden stakes, lifeline, personal floatation devices, blanket, First Aid kit, Directory of Flood Officials, and Flood Emergency Phone Card. (see Reference Guide on page 36)
- Identify potential problems: boils, seepage, erosion, cracks, sloughing etc.
- Instruct each patrol team on the correct filling and placement of sandbags. They should know what danger signs to watch for, and how to signal for help.
- Vehicles should remain on high ground in threatened areas. Always have escape routes and make them known to all responders.
- Instruct each leader to check with their team members frequently. Investigate all reported problems.
- Be aware of the locations of stockpiled flood fighting materials, tools and equipment.
- Be prepared to request additional resources on short notice.
- Advise the officials of the district or agency responsible for emergency assistance in the area and if necessary, request their help, i.e. local emergency services office.
- Contact the nearest representative of the Department of Water Resources for technical advice and assistance.

Filling Sandbags

When filling sandbags you should work in pairs, with one person holding the bag while the other shovels in the fill material. The bag holder should find the most comfortable position while holding the bag open (see Figure 1 page 6). **The most common mistake made is overfilling bags.** The first shovel of material should be placed on the lip of the bag to help hold the bag open. The shoveler should use rounded scoops of material until the bag is approximately 1/3 full. Avoid extra movements (turning or twisting of the back) to prevent injury and reduce fatigue.

Filling Sandbags

Figure 1: Proper sandbag filling

Passing Sandbags

Passing Sandbags

To avoid injuries and maximize productivity emergency responders can be organized into a sandbag passing line or 'chain'.

The line is formed by standing facing the next person and slightly off set. The bags are passed down the center of the chain. Do not throw bags.

Passing Sandbags

Sandbag Construction

The use of sandbags is a simple but effective method of preventing or reducing damage from floodwater and debris (see Figure 2). Suggestions for constructing sandbag structures are:

1. Close-weave burlap bags 18" x 30" are recommended for all sandbag construction when available.

2. Fold the empty top of the bag at a 45-degree angle to keep sand from leaching out.

3. Place each bag over the folded top of the preceding bag and stomp into place.

4. Stagger the second layer of bags over the seams of the preceding layer.

5. Stomp all bags to form a tight seal.

6. The last sandbag in a line is referred to as a Key Sack. The empty top of this bag is folded under and stomped into place.

Sandbag Wall Construction

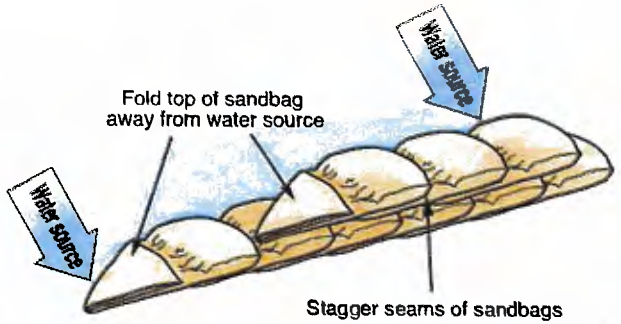


Figure 2: Fill sandbags 1/3 full, fold top of sandbag away from water source and stagger seams of sandbags.

Control of Overtopping

If a levee or stream bank is lower than the anticipated high water elevation, an emergency topping should be constructed to raise the grade above the forecast flood height. A sack topping may be required at road or stock crossings, low levee sections, or railroad crossings. The following sections discuss various methods for increasing levee and bank elevations.

Sack Topping

The most common form of flood control work is the use of sandbags for construction of temporary walls. The use of sandbag walls to increase the height of a levee section is called "sack topping" (see Figure 3). The sacks are laid "as stretcher rows," or along the levee.

Alternate layers can be crossed if additional strength is needed. The sacks should overlap at least one-third and be stomped firmly into place. When properly placed and compacted, each sack layer will provide about 3 to 4 inches of elevation.

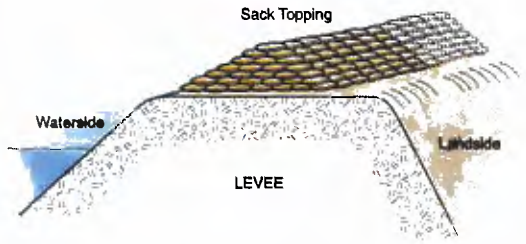


Figure 3: Sack topping on a levee

Sack Topping

Temporary Levee

This method is used to raise low areas during high water periods to prevent overtopping of levees, stream and riverbanks, small earthen dams, roadways, etc. To raise low areas, unfold a 20'x100'x10 mil roll of plastic sheeting and lay out flat on area to be raised (see Figure 4). Place fill material on plastic. Fold plastic over material, lay a single row of sandbags on the backside lip of plastic and on all seams. Fill material can be placed using bottom dump or dump bed trucks, front-end loader or manually.

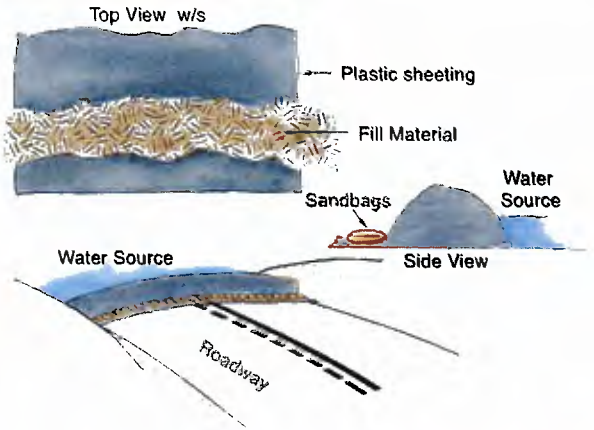


Figure 4: Temporary levee

Temporary Levee

Lumber and Sack Topping

Wooden panels are used on the waterside shoulder and reinforced on the opposite side with sandbags. The method is used to raise subsided areas during high water and divert debris flows (see Figure 5). Stakes 2"x 4"x 6' should be driven on the waterside shoulder 6 feet apart. A shallow trench is dug and lined with empty sandbags to provide a seal. Pre-constructed wooden panels are placed in the

trench and nailed to the landside of the stakes. This wall should then be backed with enough sandbags to support the panels against the expected high water. Attach 2"x 4"x 10' lumber kickers to the stakes that support the panels, and drive 2' stakes into the levee crown. Use at least two nails at each joint to provide rigid construction.

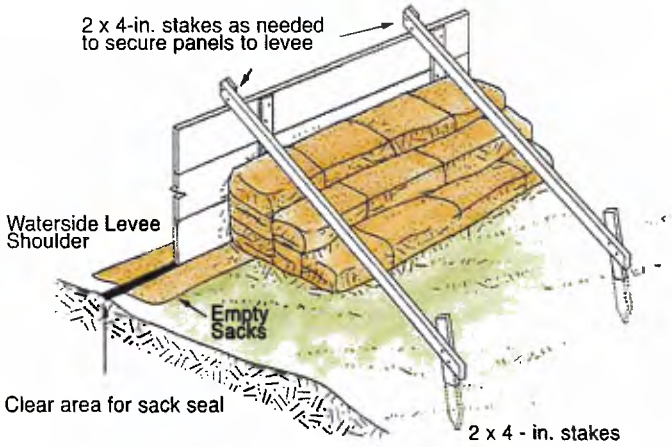


Figure 5: Lumber and sack topping

Control of Boils *(Away from Levee)*

A boil is a condition that occurs when water is "piped" through or under a levee and resurfaces on the landside. These weak points are generally caused by burrowing rodents or decomposed tree roots. High water pressure can begin to erode the interior of the levee and weaken the structure. Levee material will deposit around the exit point as the water discharges on the landside. If the boil is determined to be **"carrying material"** then corrective action is required to control the situation.

If left unattended the material that makes up the levee can be eroded at an accelerated pace, causing subsidence and overtopping of the levee. This could result in a levee break.

The common method for controlling a boil is to create a watertight sack ring around it. The sandbag structure should be high enough to slow the velocity of the water and prevent further discharge of material from the boil (see Figures 6 & 7). The flow of water should never be stopped completely, this may cause the boil to "break out" in an area near the existing sack ring. A spillway must be constructed to direct water away from all boil sites.

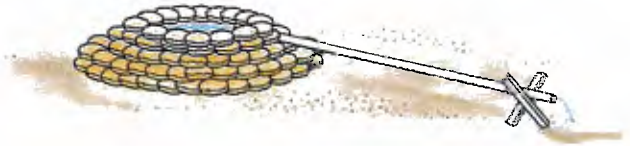


Figure 6: Boil sack ring

Bottom width should be at least 11/2 times the height. Do not sack boils that are not carrying material, but continue to monitor. Boils can begin to carry material after first located.

Boil Sack Ring

The sack ring should be large enough to enclose the area immediately surrounding the discharge point (3 to 4 feet diameter). If several boils carrying material are found, a single large sack ring may be constructed around the entire "nest" of boils.

Figure 7: Flow of water through a levee

Control of Boils *(On Levee Slope)*

If the boil is close to or on the levee slope, a U-shaped sack ring may be built around the boil and keyed into the slope. Construction of this method can be difficult and requires substantial shoring up of the U-shaped sack ring structure. A spillway must be constructed to direct water away from all boil sites (see Figure 8).

NEVER completely stop the flow from a boil. This may cause the boil to "break out" in an adjacent area. ALWAYS control the boil to a point where it ceases to carry material and the water runs clear.

"U" shape Sack Ring

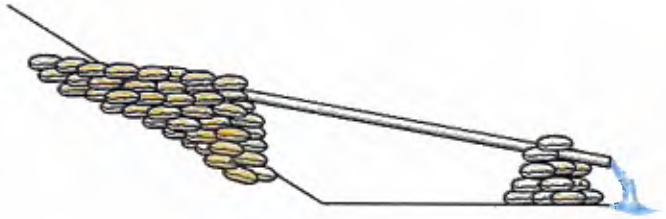


Figure 8: Spillways can be constructed by nailing two 2"x 6" boards together to form a V notch; PVC pipe; two parallel sandbag rows; visquine, etc.

Waterside Boil Inlet Detection

Water running through a levee and carrying material can sometimes be stopped on the waterside, thus eliminating the building of sack rings on the landside (see Figure 9). A six foot long section of 2" diameter metal pipe secured to a 5'x 6' foot piece of plastic or canvas can be rolled over the inlet hole on the waterside. Drive 1"x 3"x 2' stakes into the shoulder of the levee. Suspend half-filled sandbags on top of rolled-out material with twine and tie off to stakes. It can be difficult to locate the waterside inlet of boils. Sometimes a swirl is observed at the water's edge.

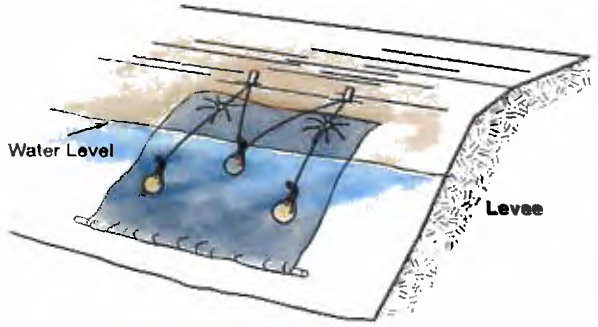


Figure 9: Waterside boil protection

Wavewash Protection

All levees adjacent to wide stretches of water should be watched during periods of strong wind to detect the early stages of wavewash erosion. If the slope is well sodded, short periods of high wind should cause little damage. However during sustained periods of strong wind and high water, experienced personnel should observe and monitor the effected areas.

Envelope Method

When used correctly, plastic sheeting is useful for wavewash protection. Visquine should be purchased in 10 mil rolls, 20 feet wide by 100 feet long. 1"x3"x2' wooden stakes are driven into the ground just above the levee shoulder on the side you wish to protect. Place the stakes 4 feet apart and stagger vertically by 1 foot as shown in Figure 10.

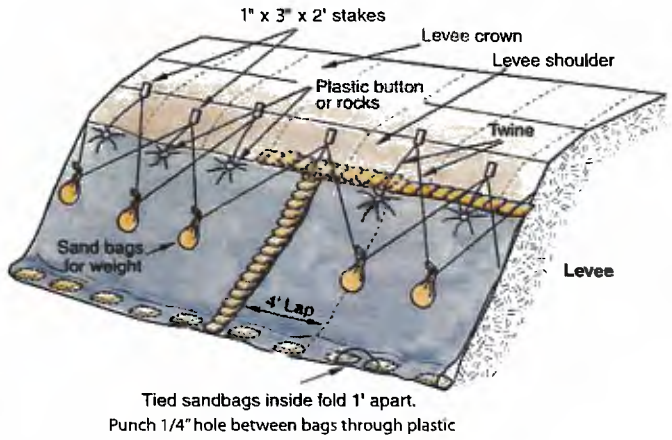


Figure 10: Wavewash Protection

Wavewash Protection

Avoid driving stakes in a straight line; this can to cause cracking and sloughing of the slope. To provide added strength and leverage, drive stakes at a slight angle away from the water source with the wide (3") side facing the water. Be sure the stakes are well into the ground and are secure.

Role out the plastic sheeting along the waterside shoulder. Eight to ten people should assist in shaking out the folds of the envelope. Be sure that both layers are held while the envelope is shaken out. Hold on tight! Use caution in strong winds. If the wind catches the plastic it could billow out and pull you along with it.

While flood workers hold the plastic securely, toss tied sandbags into the envelope. The tied sandbags (see Figure 12, page 20) are thrown into the bottom of the envelope with a one-foot gap between bags. The tied bags provide weight to hold the plastic against the levee slope.

A tie-down button or small stone (preferably round) is secured through both layers of visquine. If a stone is used, tie a slip knot and double half-hitch to secure it. Fasten buttons to the visquine and tie off to the stakes using a minimum 250 lb. tensile strength twine with these points in mind: (See Figure 11).

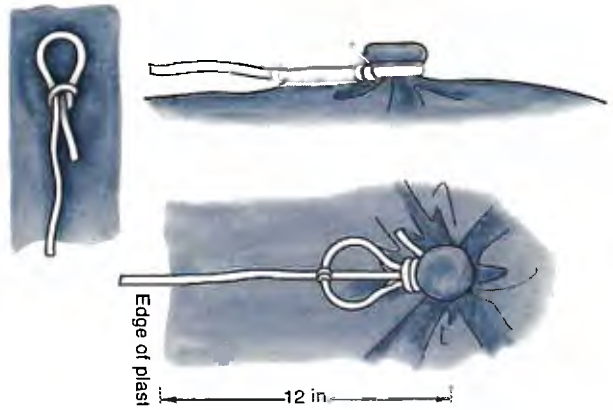


Figure 11: Plastic Tie-Down Buttons

1. Fasten button at least 1 foot from the edge of the plastic.

2. Fasten button to both layers of plastic.

3. Fasten button directly below stakes (one button per stake).

4. Tie twine low on stake for strength and to reduce tripping hazard.

Plastic sheeting is secured using tie down buttons. To attach plastic buttons to the envelope, tie a slipknot on the end of the twine; place loop over button and plastic and draw tight. Tie two half-hitch knots around the button frame. Extend twine to large end of frame, tie a half-hitch knot around the end, and secure twine to stake (see Figure 11).

With the envelope secured to the stakes, punch a small hole between each tied bag in the envelope, (a pencil works well). These holes release water trapped in the envelope. DO NOT use a knife because a slice or slit will tear and

Button Tying

spread in the plastic. If further slope protection is necessary insert an additional envelope into the existing wavewash protection, overlapping at least four feet. To secure the overlap to the stakes attach the two top layers with one button and the two bottom layers with another. The buttons line up with the stakes that are four feet apart. There should be four buttons securing the two envelopes.

Using a continuous piece of twine, hang tied bags from stakes in a zigzag fashion as shown in Figure 10. Tie a double half-hitch knot below the knot in each sandbag. ***Place each bag so that it hangs at the middle of the plastic directly below the next stake.*** Attach twine to every other stake with a double half-hitch. Add a second row of tied bags suspended from the stakes previously skipped. These bags will keep the plastic lying flat against the levee slope in windy conditions. If the upper portion of the slope needs protection, use an additional envelope. Be sure to place the upper layer over the lower layer by 2 to 3 feet. Finally place sandbags along all seams to prevent wind and water from entering the envelope. To prevent slippage, make sure the sandbags forming the top seam cap are half on the plastic and half on the levee as shown in Figure 10. If the levee slope is too steep, some of the bags on the seam may be tied off with twine to the stake above the envelope for support.

Remember, wind is your worst enemy. When using plastic sheeting, be sure all seams are secured with sandbags, and make needed repairs to the envelope as soon as possible.

Tying Sandbags

Most sandbags are used with the open end folded. In some cases sandbags will have to be tied. Fill the bag 1/4 to 1/3 full of material. See Figures 12A–12D for instructions.

Figure 12A: Sandbag filled 1/4 to 1/3 full

Figure 12B: Grasp bag at top corner and spin

Figure 12C: The long tail should be twisted tightly and look like a piece of rope.

Figure 12D: Tie an overhand knot (pretzel knot) as low as possible on the bag.

Raincoat Method

The raincoat method is used to prevent further saturation of levee or hillside slopes. Plastic sheeting is laid out flat on the slope, sandbags are placed around the perimeter with additional bags placed randomly for weight. If the slope is steep, wooden stakes can be driven into the ground just above the area to be protected. The stakes are 4 feet apart with a 1-foot stagger. The plastic is secured to the stakes with tie-down buttons or small round rocks (see Figure 13).

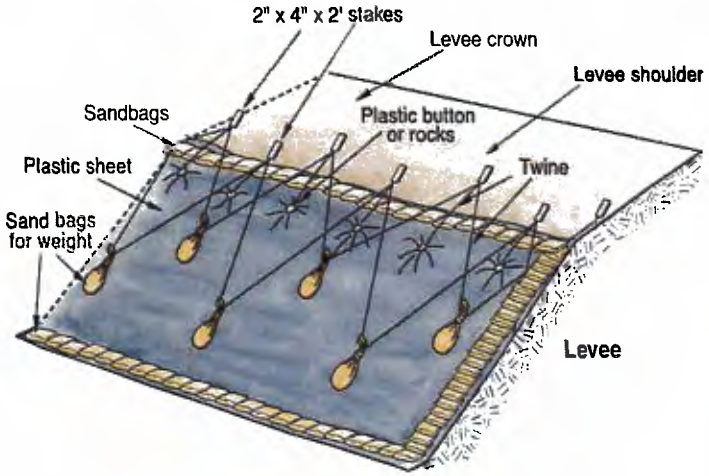


Figure 13: Raincoat method

Use a crisscross method of placing the sandbags (Figure 13) on the plastic. Place a solid row of sandbags on all edges of the plastic (half on the ground, half on the plastic).

Emergency Spillway

To prevent damage to the levee slope due to overtopping, an emergency spillway can be constructed.

Place plastic sheeting over area to be used for spillway. Line all sides with at least a single row of sandbags. Use additional tied sandbags on plastic for weight if needed. Extend spillway beyond the levee toe if necessary.

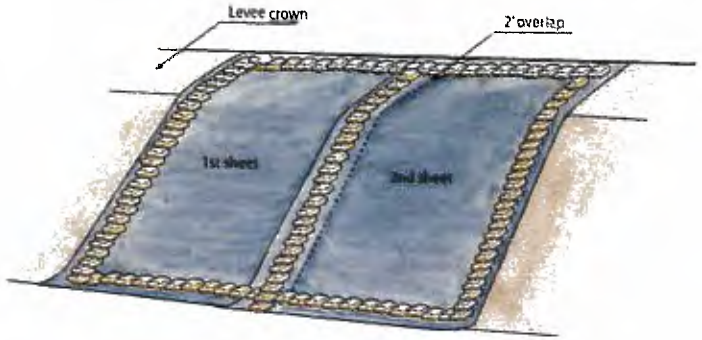


Figure 14: Emergency spillway using plastic sheeting and sandbags

Emergency Spillway

Structure Protection/Diversions

The main causes of damage to structures, homes, and property during heavy rains or flood flows are:

1. Flood water from overwhelmed storm drains and urban diversions, particularly on sloping streets.

2. Flood flows onto property through driveway openings and low spots in curbs.

3. Debris flow from hillsides that have been cleared of vegetation by fire or development.

The flood fighting methods described in the following sections have proved effective in combating floodwaters and debris flows.

Diverting Water or Debris Flows Away from Structures

Homes and structures can be protected from floodwater or debris flows by redirecting the flow as shown in Figure 15. Sandbag barriers must be long enough to divert the flows away from all structures. Barriers constructed of sandbags or lumber can also be used to channel mud and debris away from property improvements.

Structure Protection

Structure Protection

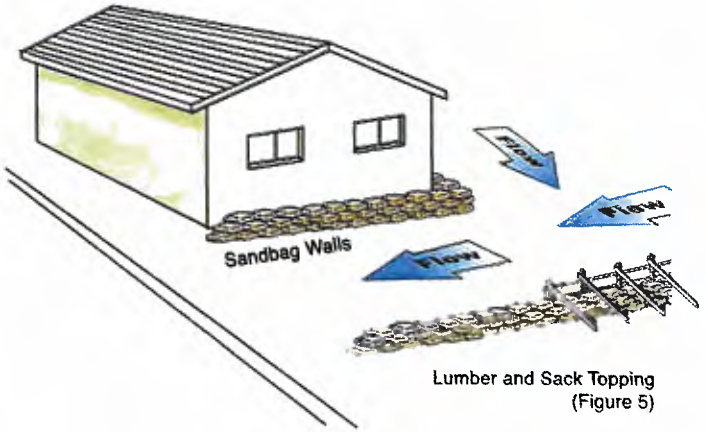


Figure 15: To divert mud, debris, and water, use sandbag walls or lumber and sack topping

Structure Protection

The following method is used for protection of buildings and other structures along lake shores and in similar situations where water is rising with little or no current.

Lay plastic sheeting on the ground and up the building walls to a point at least 1 foot above the predicted water elevation. Place sandbags on the plastic sheeting in the form of a half pyramid against the structure (see Figure 16). Secure plywood over doors and vents. Overlap plastic sheeting and sandbags at corners of buildings.

Home Protection

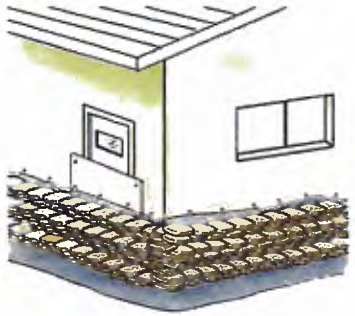
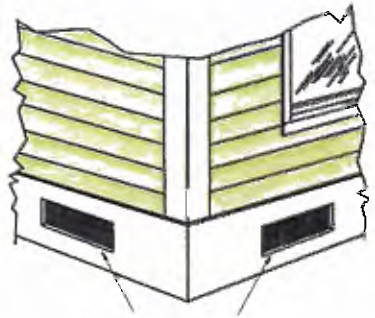


Figure 16: Structure protection

Wet Flood Proofing Requirements for Structures Located Within Special Flood Hazard Areas

National Flood Insurance Program regulations require that buildings on extended wall foundations or that have enclosures below the base flood elevation must have foundation or enclosure wall openings. These openings prevent the foundation or enclosure walls from weakening or collapsing under pressure from hydrostatic forces during a 100 year flood event. The openings allow flood waters to reach equal levels on both sides of the foundation or enclosure wall and minimize the potential for damage from hydrostatic pressure.

THESE OPENINGS MUST NOT BE BLOCKED IF THE BUILDING IS LOCATED WITHIN A SPECIAL FLOOD HAZARD AREA.



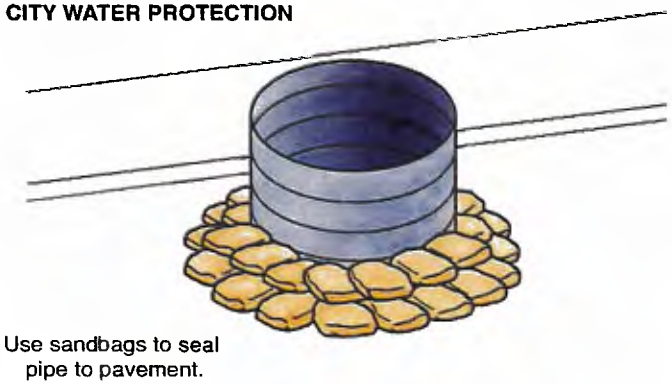
Foundation or wall openings must be kept open within special flood hazard areas

Figure 17: Foundation and wall openings in structures

For details refer to FEMA Technical Bulletins TB1-93 and TB-7. These bulletins may be obtained from the FEMA web site at: *http://www.fema.gov*

Water / Storm Drain Protection

Water or sewer systems can be protected by placing corrugated metal pipe (CMP) over the utility hole (see Figure 18). Lay plastic sheeting up the walls of the CMP and place sandbags in the form of a half pyramid around the CMP to seal it to the pavement. This method will prevent mud and debris from entering the system and also act as a surge chamber.



Using corregated metal pipe (CMP) over utility hole to isolate sewer line or prevent contamination of water system.

Figure 18: Water / storm drain protection

Flood Fight Safety

Numerous potential hazards exist during flood events. These hazards are manageable if identification and communication occur on an ongoing basis. Personal safety requires a conscious effort that every flood fighter must consider in their various duties and activities.

- ***Changing Weather Patterns:*** This occurrence can affect existing conditions and create more serious situations. Always know the forecast and how it affects vulnerable areas, workers and the public.

- ***Changing Water Patterns:*** The rise and fall of water can occur gradually or very quickly. Knowledge of high water and how it relates to levees, communities, and workers is essential. Continuous monitoring and communication of water level influences (i.e. reservoir releases, tides, and drainage inflow) are very important. Always know your area and the flood history around you.

- ***Swift Water:*** High velocities of water are common during flooding events. Extreme caution should be used when anyone is exposed to high water. Workers should have flotation devices, throw ropes, and lifelines in the immediate area. Swift water rescue teams may be available. Use common sense and sound judgement around swift water. Know your resources and how to activate them prior to the event.

- ***Temperature Related Illness:*** During a flood fight, weather patterns can change constantly. Changes in temperature present the potential for hypothermia and heat exhaustion/stroke. Flood fighters should know the signs of distress for these types of illnesses and how to treat them. During cold, wet weather it is recommended that

workers layer clothing to stay warm and dry. A dry blanket and warm clear fluids should be on the work site for emergency use. In warm, hot weather lightweight clothing is recommended. If skin is exposed, a sun block agent may need to be applied. Plenty of drinking water should be on site and consumed regularly. Headgear is recommended in both hot and cold situations.

- ***Insect/Animal Exposure:*** Flooded areas force a variety of animals to evacuate to high ground. Workers in these areas should be aware of these animals and not handle them. If animal removal is needed, contact a local professional. Stinging and biting insects are prominent in certain flood-prone areas. Chemical repellents can be useful as a deterrent. A complete first aid kit should be on site.

- ***Vegetation:*** Noxious plants such as star thistle, stinging nettle, and poison oak are commonly found along rivers, streams, and levees. Avoid direct contact with this type of vegetation to prevent itching and rash. Consult medical personnel if symptoms persist.

- ***Sandpile Safety:*** When shovels are used for filling bags a safe distance for workers is essential. Sandbags and sand may contain contaminates. Have disinfectant available. Safety glasses or goggles are recommended for protection from blowing sand particles.

- ***Contamination:*** Flooded areas can potentially carry high levels of contaminants. Common contaminants include fuel, sewage, and pesticides. Local Haz-Mat teams should be contacted if needed. Always wear protective clothing to help limit contact with water. Carry antibiotic hand soap and wash thoroughly after working around floodwater.

- ***Exhaustion:*** Stress combined with long, physically demanding hours can have an adverse effect on the flood

worker. It is very important to recognize exhaustion or sleep deprivation and treat them immediately. Operation of vehicles, machinery, or equipment should be avoided. A shift rotation of personnel will help eliminate fatigue factors.

- ***Body Mechanics:*** Proper body mechanics while working on floods is very important. The body is expected to work long, physical hours during the event. Each individual must make a conscious effort to use safe lifting and weight distribution techniques. Watch your footing; surfaces can be slippery and cluttered with tripping hazards.

- ***Construction Equipment:*** There are times when equipment and people will occupy the same work area. Workers should wear safety vests and hard hats and be aware of their surroundings. Safety warning devices (i.e. backup alarms and lights) should be in-tact and working on all equipment. Communication and alertness are vital! All operators must be certified for their equipment.

- ***Boat Travel:*** Materials and/or personnel will sometimes need to be transported to work sites by boat. Operators of the watercraft must be certified. Flotation devices must be available for every passenger. Extreme care should be taken while loading and off loading.

- ***Patrolling:*** Patrolling is the key to effective flood fighting. Patrols will identify, initiate control, and monitor trouble spots in affected areas. Vehicle patrols should travel in two person teams with dependable communication devices. Lifelines, flotation devices, and a blanket should be in the vehicle for possible water-related accidents. Foot patrols should also have the same considerations. Extreme caution should be exercised when travelling saturated, cracking, or sloughing areas.

- ***Vehicle Placement:*** Vehicles in work areas along the levee should remain parked on high ground. This is usually the crown roadway. Vehicles should also be parked facing their access point. An escape plan should be communicated to all flood workers.

- ***Structure Considerations:*** When working around structures, be aware of downed power lines, natural gas or propane leaks, and unstable structure supports. Communicate with the structure owner if possible.

- ***Safety Gear:*** Rain gear, warm clothing, handheld lights, gloves, goggles, hardhat, boots, first aid kit, ropes, personal flotation devices (PFD), hip waders.

Flood Fighting Terminology

Boil — Also known as 'Sand Boil', is caused by water flowing through or under a levee, possibly carrying eroded levee material, and surfacing on the land side of the levee.

Button — A plastic tie down device used with plastic sheeting.

Emergency Spillway — Plastic sheeting and sandbags used to allow water to flow over a levee, protecting it from erosion. (Page 23)

Flood Fighting — An effort made to prevent or mitigate the effects of flood waters.

Home Protection — Plastic sheeting and sandbags placed around individual homes to protect from low current flood waters. (Page 26)

Lath — Long, narrow wooden stakes (4 feet long by 1 ½ inch wide) used to mark problem areas during high water patrolling. A brief description of the problem along with the date, time, and patroller's initials are written on the lath with a permanent ink marker. Brightly colored survey ribbon is attached to the lath for easy identification.

Levee — An earthen structure that parallels a river or stream designed to prevent high water flows from inundating urban and/or agricultural land.

Levee Break — A point in the levee system that has failed to perform its designed function, has eroded away and is allowing water to inundate land.

Levee Breach — The same as Levee Break but can sometimes describe a section of levee that has been intentionally broken. If intentional, also known as a relief cut.

Lumber and Sack Topping — Wooden panels and sandbags used to prevent overtopping and to divert water, mud, and debris flows. (Page 11)

Overtopping — When water has risen higher than the banks of a waterway or the top of a levee.

Plastic Sheeting — Made of polyethylene, these 100'x20'x10 mil rolls are sometimes referred to as visquine and are used for erosion control.

Rain Coat — A single layer of plastic sheeting and sandbags used to protect slopes from further rain saturation. (Page 22)

Relief Cut — Intentionally-removed section of levee to relieve hydrologic pressure upstream and downstream of the levee section.

Sack Ring — Multiple sandbag rings used to encircle a boil, slow the flow of water, and stop the erosion of levee material. (Page 13)

Sack Topping — A sandbag wall designed to prevent overtopping. (Page 9)

Sandbag — An 18"x30" bag (burlap or plastic) filled with sand or other appropriate material intended for use as a temporary flood fighting measure.

Sloughing — Soil movement or slides often caused by over-saturated levee or hillside slopes. Can also be referred to as 'mud slides'.

Structure Protection — Sandbags, wooden panels, or other materials used to divert water, mud, and debris flows away from buildings, homes, and other structures. (Page 24)

Temporary Levee — Use of plastic sheeting, fill material and sandbags to raise a low area on a levee or embankment. (Page 10)

Twine — 250lb tensile strength polypropylene tying twine.

'U' Shaped Sack Ring — A sandbag structure used on levee slopes to control boils. (Page 14)

Wooden Panels — Wooden planks or plywood sheets used in conjunction with other flood fighting materials to prevent overtopping of levees or embankments and divert water.

Wavewash — Wind-generated waves breaking against a levee or embankment and possibly causing erosion.

Wavewash Protection — Plastic sheeting, sandbags, twine, stakes, and buttons used to prevent erosion of levee slopes and embankments. (Page 16)

Reference Guide:

DWR Division of Flood Management
www.water.ca.gov/floodmgmt

California Data Exchange Center
CDEC
www.cdec.water.ca.gov

California Emergency Management Agency
California Office of Emergency Services
www.caloes.ca.gov

National Weather Service
www.weather.gov

To request a copy of the Directory of Flood Officials or Flood Emergency Phone Card, contact the DWR Flood Operations Center at (916) 574-2619

Flood Fight Material/Equipment List

Fill/Repair material (Sand, Rock, Road Base)
Sandbags (18" width x 30" length 10 oz.)
Plastic Sheeting (100'x20'x10 millimeter rolls)
Wooden Stakes (1"x3"x24")
Bailing Twine (250lb tensile strength)
Tie Down Buttons
Geotextile Fabric (20'x100' rolls)

Patrolling

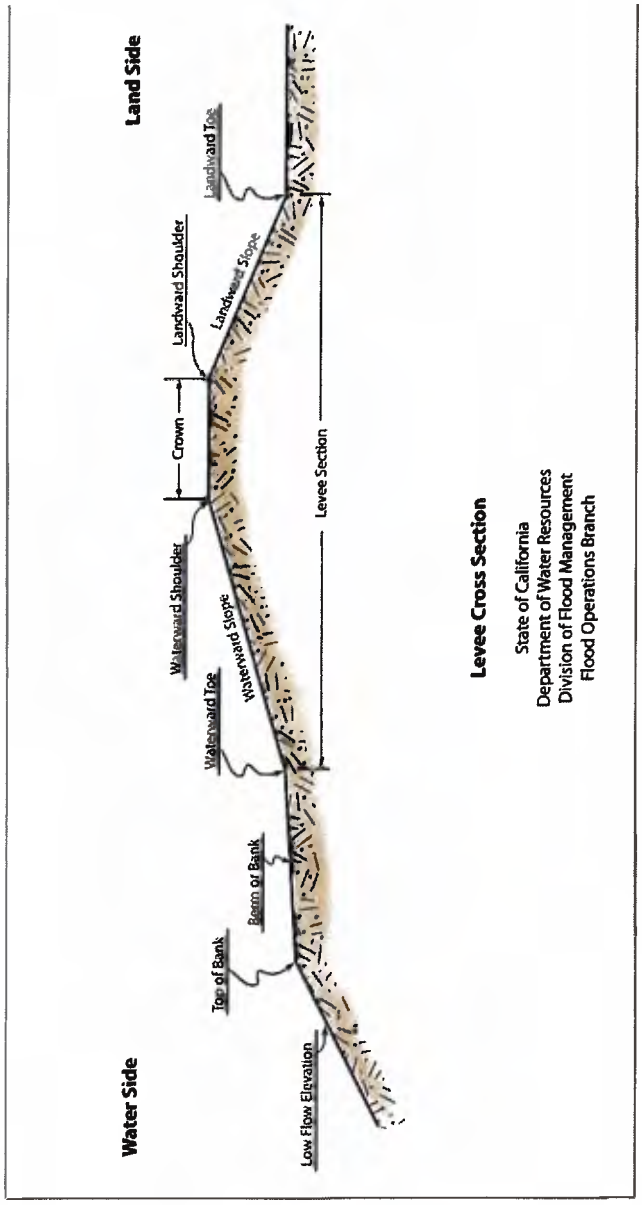
Patrol Vehicle (4Wheel Drive)
Communication Devices (Radio, Cell Phone, Laptop Computer (e-mail)
Global Positioning Satellite Handheld Device (GPS)
Digital Camera
Lighting (Flash Light, Flood Light)
Batteries
Lath (Bundle of 50)
Survey Ribbon (Bright Colors)
Permanent Ink Markers
Patrol Log (Writing Pad and Pencil)
Measuring Tape (100')

Tools

Shovels, Long Handle (#2 Mud Shovel)
Sledge Hammer (10lb)
Multi Purpose Lineman Pliers
Pulaski
McLeod
Loppers

Safety

Rain Gear
Rubber Boots
Hard Hat
Safety Glasses
Gloves
Boots
Personal Flotation Device (PFD)
Personal Safety Light
Warm Clothing
First Aid Kit


Land Side
Landward Toe
Landward Shoulder
Landward Slope
Crown
Levee Section
Waterward Shoulder
Waterward Slope
Waterward Toe
Berm or Bank
Toe of Bank
Low Flow Elevation
Water Side
Levee Cross Section
State of California
Department of Water Resources
Division of Flood Management
Flood Operations Branch

For all flood training information, emergencies, questions, or for additional information, please contact :

State-Federal Flood Operations Center
(916) 574-2619
flood_center@water.ca.gov

For training information, contact:

Rick Burnett
Flood Fight Specialist
(916) 574-1203
rburnett@water.ca.gov

FloodER

FloodSAFE CALIFORNIA DEPARTMENT OF WATER RESOURCES

B

CITY OF STOCKTON
DEPARTMENT OF MUNICIPAL UTILITIES
2500 Navy Drive • Stockton, CA 95206-1191 • 209/937-8750 • Fax 209/937-8708
www.stocktongov.com

July 3, 2017

Reclamation District 828
c/o Kjeldsen, Sinnock & Neudeck, Inc.
Attn: David Carr
711 North Pershing Avenue
Stockton, CA 95203

REQUEST FOR EMERGENCY PERMIT - BUENA VISTA STORM PUMP STATION (INTERSECTION OF BUENA VISTA AVENUE AND SHIMIZU DRIVE)

The City of Stockton, Municipal Utilities Department, requests an emergency permit to replace approximately a 6' section of the 24-inch storm discharge line at Buena Vista Storm Pump Station, which discharges storm water to Smith Canal. See attached drawing of the proposed section to be repaired. During their levee inspections, the staff from Reclamation District 828 and KSN, Inc. found corrosion under the exposed 24-inch discharge pipe, which has caused leaks.

The following scope of work was discussed with Mr. David Carr of KSN, Inc.:

- Cut the section of corroded pipe and replace it with a new 3/8-inch thick mild steel pipe. The replaced pipe will be coated internally and externally with epoxy, and a new pipe saddle will be installed to support the 24-inch pipe.

- Then conduct CCTV inspection on the remainder of the 24-inch pipe that is not underwater, as well as replace damaged sections, as needed.

If you have any questions or concerns regarding the repair, please contact Jeffrey Telmo, Collections System Supervisor, at (209) 937-5647.

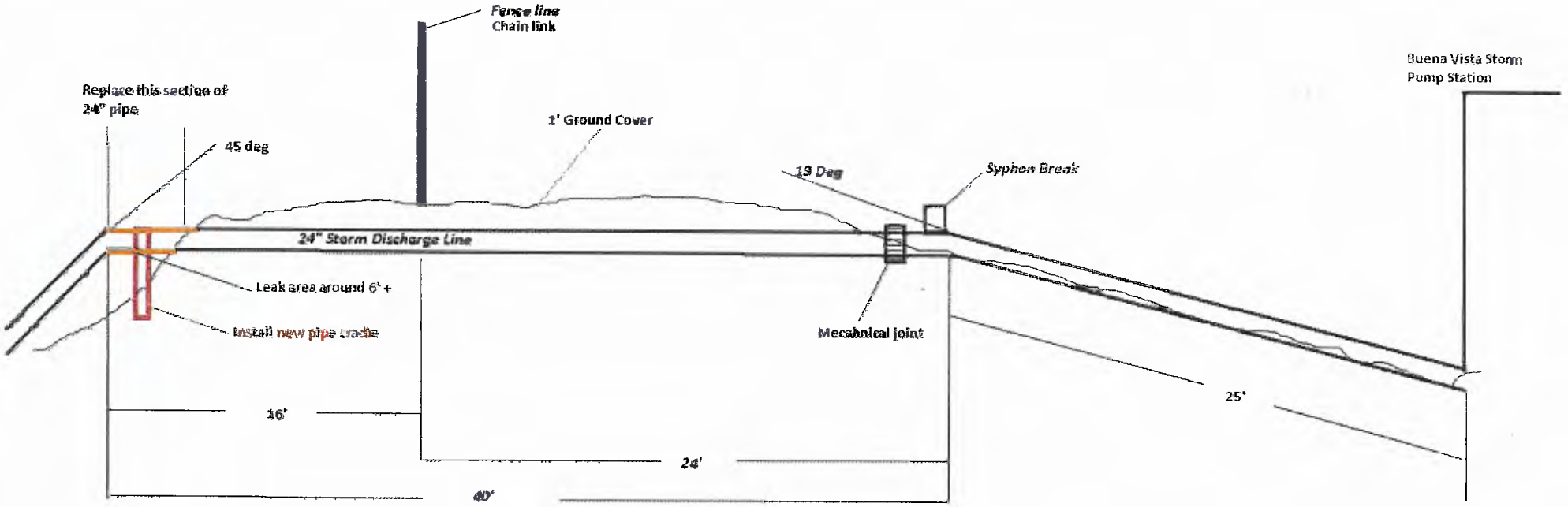
JOHN ABREW
DIRECTOR OF MUNICIPAL UTILITIES

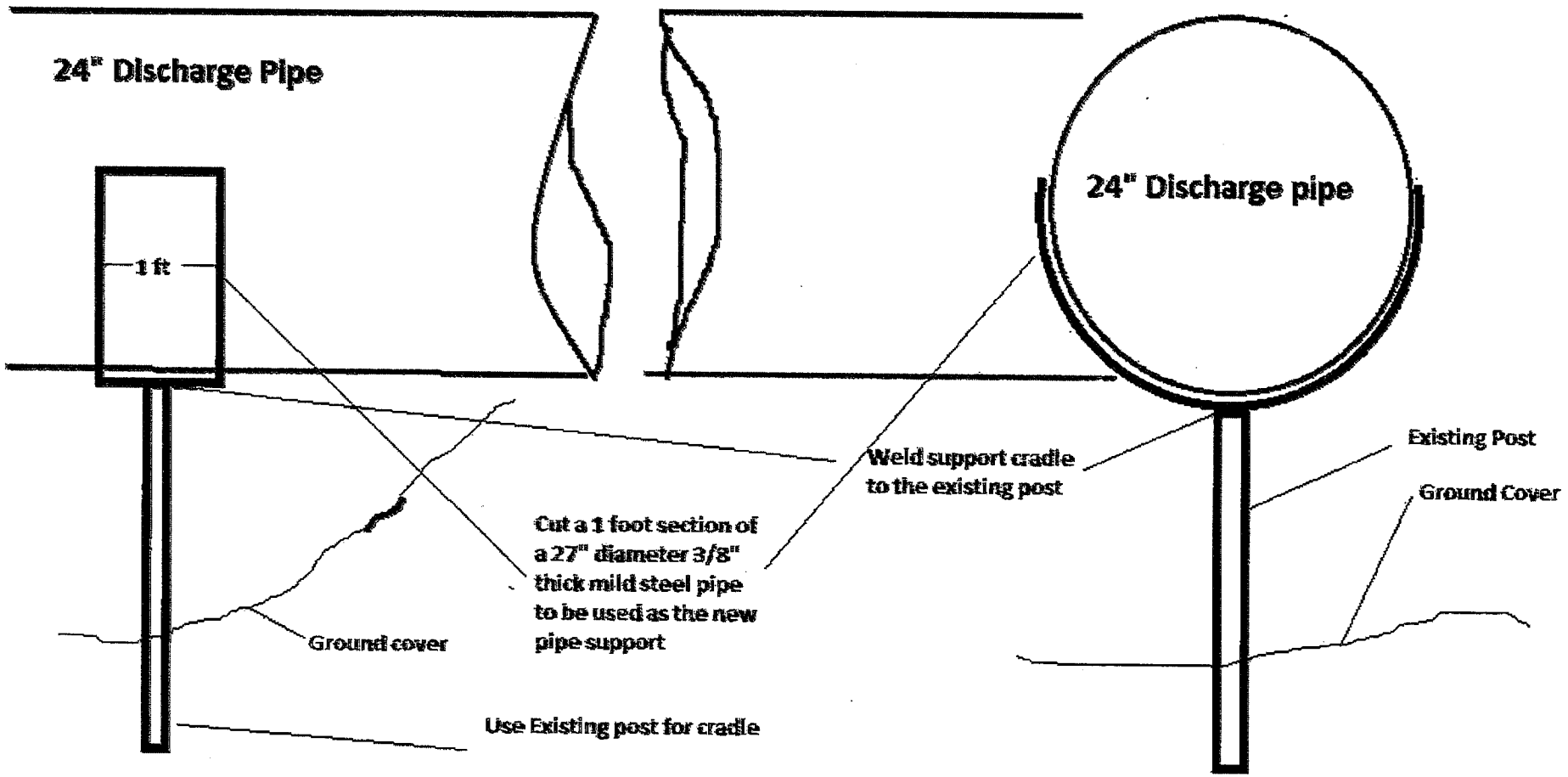
JEFF TELMO
COLLECTIONS SYSTEM SUPERVISOR

JA:BT:JT:mll

Attachment

Stockton
All-America City
1999


Fence line
Chain link
Buena Vista Storm
Pump Station
Replace this section of
24" pipe
1' Ground Cover
45 deg
19 Deg
Syphon Break
24" Storm Discharge Line
Leak area around 6' +
Install new pipe cradle
Mecahnical joint
25'
16'
24'
40'


24" Discharge Pipe
1 ft
24" Discharge pipe
Weld support cradle
to the existing post
Existing Post
Ground Cover
Cut a 1 foot section of
a 27" diameter 3/8"
thick mild steel pipe
to be used as the new
pipe support
Ground cover
Use Existing post for cradle

C

D

KSN inc. KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

Stephen K. Sinnock, P.E.
Christopher H. Neudeck, P.E.
Neal T. Colwell, P.E.
Barry O'Regan, P.E.

1204-0180
06-500

July 11, 2017

Jeff Telmo
City of Stockton
Department of Municipal Utilities
2500 Navy Drive
Stockton, CA 95206

Re: Request for Emergency Permit – Buena Vista Storm Pump Station
No 828 – Weber Tract (RD 828)

Dear Jeff,

I am writing this letter on behalf of Reclamation District 828 (RD 828) to officially notify you of the District's requirements related to the proposed Request for Emergency Permit – Buena Vista Storm Pump Station.

The storm water discharge pipeline replacement project within the RD 828 levee at the Buena Vista Storm Pump Station has the potential to impact RD 828's levee and drainage system and RD 828 shall evaluate, review and process an encroachment permit for said work.

In addition, RD 828 is seeking the execution of a Reimbursement Agreement which shall reimburse RD 828 for all permitting, engineering, legal, secretarial, consulting, and other fees and expenses actually incurred by RD 828 in evaluating, reviewing and processing plans, designs, specifications, environmental analysis, and other documents and data for the Project.

I have attached a draft copy of the proposed Encroachment Permit for your review and consideration. Also attached is a Reimbursement Agreement for signature. The reimbursement agreement shall be executed prior to any work by District necessary to complete the encroachment permit process.

Kjeldsen, Sinnock and Neudeck, Inc. looks forward to working with you and your staff in reviewing and approving the proposed Request for Emergency Permit – Buena Vista Storm Pump Station. If you have any questions, please call me.

Sincerely,
KJELDSEN, SINNOCK & NEUDECK, INC.

_____
Christopher H. Neudeck,
RD 828 District Engineer

w/enclosures

cc: Trustees (with enclosure)
Daniel J. Schroeder, District Secretary / Attorney

BILL MENDELSON, Chairman
ROBERT G. MERDINGER, Trustee
DEBORAH "DEBY" PROVOST, Trustee

RECLAMATION DISTRICT NO. 828
WEBER TRACT
BOARD OF TRUSTEES MEETING
FRIDAY, JULY 21, 2017
8:30 AM
ENGINEER'S REPORT

DANIEL J. SCHROEDER, Atty. & Sec.
CHRISTOPHER H. NEUDECK, Engineer

I. AB 360 DELTA LEVEE SUBVENTIONS PROGRAM

a. Review status of the chopping and removal of Arundo and pampas grass along the District's levee.

b. There are identified locations of cutouts on the water side slopes that were created by homeless encampments. These areas will be repaired subject to available funds for levee repairs.

c. Review and seek Board authority to approve a DRAFT Operations and Maintenance (O&M) Manual for the District Levees.

EXHIBIT A: Reclamation District No. 828 - Weber Tract Draft Operations and Maintenance Manual and Flood Operations Manual for Smith Canal Levees dated June 20, 2017.

II. PG&E GAS MAIN IMPROVEMENTS PERMIT REQUEST

a. Review PG&E's proposed gas main repairs and discuss status of District Reimbursement Agreement and Permit Agreement.

III. CALTRANS LEVEE EROSION REPAIR BENEATH INTERSTATE 5 BRIDGE

a. Review Caltrans efforts and discuss erosion repairs beneath I-5 Bridge across the District's levee.

IV. CITY OF STOCKTON STORM WATER PUMP STATION

a. The City of Stockton is pursuing a project to replace a compromised portion of pipeline that crosses through the RD 828 levee. The pipeline is fed from a pump at their Buena Vista Pump Station. There is an approximate 6'-0" horizontal section of exposed pipe on the water side from the slope to a point where it transitions diagonal down into the water. The pipe invert is completely corroded in this 6'-0" section and the leakage from pipe extends into the levee as well. I reviewed this pipe when it was reported back in February, while it was in operation and leaking and spraying water on the slope. The pump connected to this pipe has been tagged out of service since February when the leak was noted.

b. KSN Inc. has met with City Staff on site recently to identify the compromised pipe and instructed Jeffrey Telmo (COS Collection Systems Supervisor) to provide a plan for replacement. Although their plan indicates replacement of this 6-0" section of pipe, they do mention replacement of other damaged sections as well which I am sure extends through the levee to where it is exposed on the land side.

c. Please see picture attached as an EXHIBIT below. In that picture you will see two pipes, a bottom pipe (the one being replaced) and the top pipe. Underneath the top pipe is a pipe that is capped off and enters the levee at an angle. When KSN Inc. received the pump station as-builts from Jeffrey Telmo it was determined that this angled pipe is connected below grade to a 30" concrete pipe that is installed very low in and through the levee, below low tide elevation in Smith Canal (one cannot see this pipe from the waterside slope). All indications point to this pipe being open ended in the canal and live / direct conduit through the levee where it terminates at this angled pipe cap and concrete plug at the pump station.

d. KSN Inc recommends that this 30" conduit through the levee be removed given that it most likely does not have any maintenance records or condition assessments since it was abandoned in place in 1997.

e. KSN recommends that the District require the City to remove this buried concrete pipeline completely. The encroachment permit for the leaky pipe could be an acceptable means to have this completed unless otherwise directed.

EXHIBIT B: Request for Emergency Permit – Buena Vista Storm Pump Station (Intersection of Buena Vista Avenue and Shimizu Dr.) from the City of Stockton (COS) dated July 3, 2017.

EXHIBIT C: Photo of abandoned 30" pipe running beneath RD 828's levee

EXHIBIT D: Cover letter to the COS seeking a reimbursement agreement to cover the engineering and legal expense reviewing and processing the requested permit together with the proposed removal of their abandoned pipeline.

V. SJAFCA SMITH CANAL GATE STRUCTURE PROJECT

a. Update on Smith Canal gate closure project.

A

Reclamation District No. 828

Weber Tract

Operations and Maintenance Manual

and

Flood Emergency Operations Manual

for

Smith Canal

DRAFT

Prepared by:

Kjeldsen, Sinnock & Neudeck, Inc.
711 N. Pershing Avenue
Stockton, CA 95203

June 20, 2017

Preface

Reclamation District No. 828 (District) was organized under provisions of the California Water Code for the purpose of providing a means of flood control to the land encompassed by the District. Its main function is to adequately maintain the system of levees and drainage pumps which are the major components of the Flood Control System (FCS). A District Base Map is included in Appendix A. This manual has been prepared as an information guide to aid and assist the District, especially in the case of a flood emergency situation.

The District has officially adopted the Superintendent's Guide to Operation & Maintenance of California's Flood Control Projects, published by the State of California, Department of Water Resources (DWR), Division of Flood Management, (see Appendix E) to supplement District maintenance information. This manual has been prepared by DWR to assist reclamation districts in maintaining an adequate level of flood protection. It is specifically intended for use by the District Superintendent, or District Manager, who has primary responsibility for the operation and maintenance of the FCS. The duties and responsibilities of the Superintendent are defined for routine operations and maintenance of the FCS and in the event of a flood emergency.

This Manual includes information to guide and aid the District in the case of a flood emergency situation. It provides emergency triggers with telephone numbers, levee patrol procedures, instructions for possible hazardous levee conditions, District base map, District emergency supplies, and a list of government agencies along with their function. The District uses Standardized Emergency Management System (SEMS) in responding to emergency situation involving multiple jurisdictions or multiple agencies. To supplement flood emergency information, the District has also adopted the Reclamation District 828, Weber Tract, Emergency Operations Plan (EOP) and Flood Contingency Map (FCM) (see Appendix D). The purpose of this EOP is to ensure the effective performance of Reclamation District 828 responsibilities in a flood emergency in collaboration with other jurisdictions performing emergency functions within and around the District. This plan is to be used in conjunction with the emergency operations plans of the State of California and the San Joaquin Operational Area (SJOA) to facilitate multi-jurisdictional coordination within District boundaries.

A separate Operations and Maintenance Manual has been prepared to assist the Smith Canal Closure Device (SCCD) operator in operating and maintaining the closure device and the Dad's Point levee at the mouth of Smith Canal. The SCCD is a gate structure that opens and closes for navigation, and it provides flood protection to the Smith Canal area from extreme high tides. Within the separate manual, the duties and responsibilities of the SCCD operator are defined for routine operations and maintenance in addition to flood emergency situations. The SCCD Operations and Maintenance Manual is a supplement to the District's manual.

DRAFT

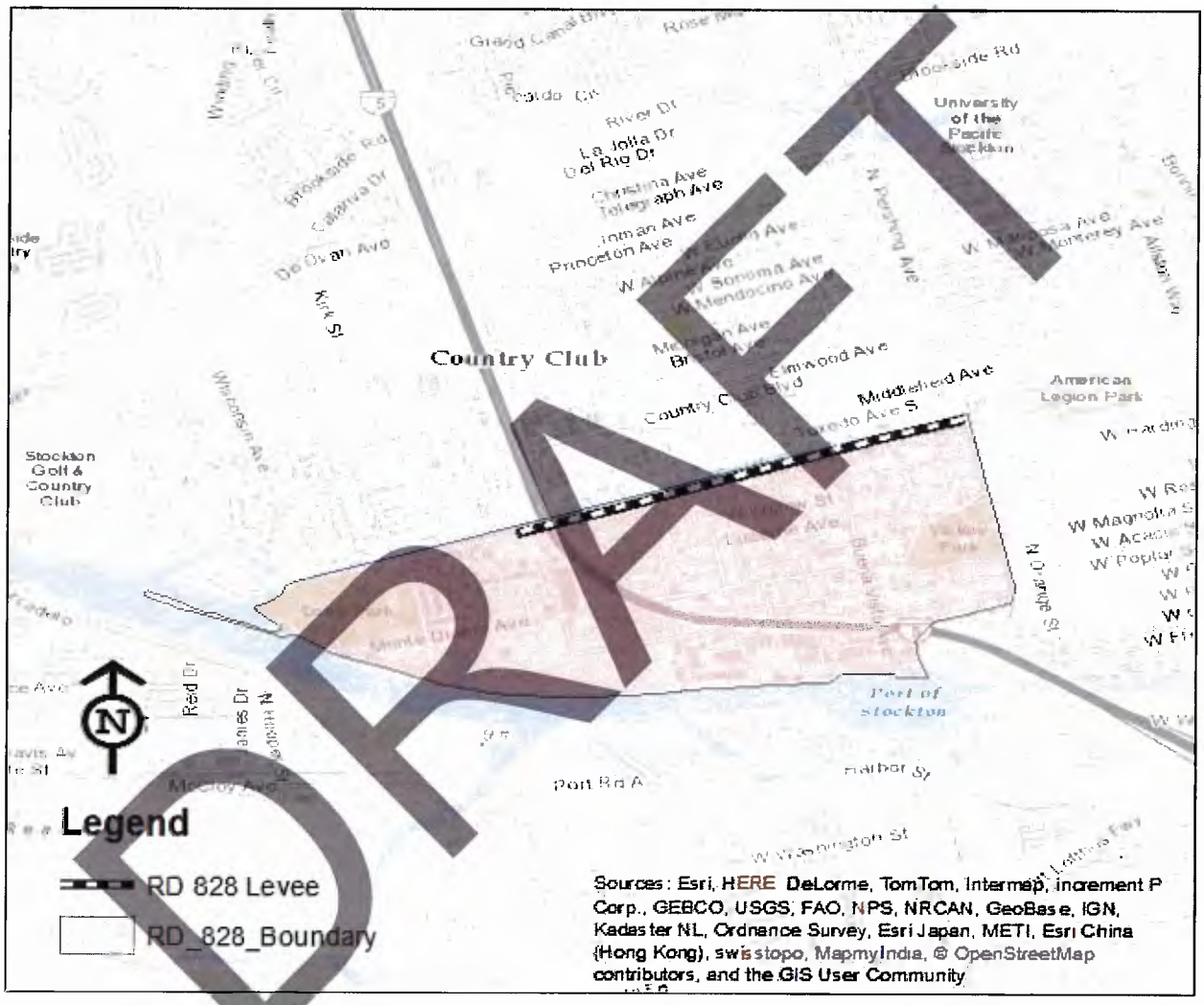
Table of Contents

Appendices

DRAFT

1. Project Description

Reclamation District No. 828 – Weber Tract (District) is located in San Joaquin County within incorporated and unincorporated portions of the City of Stockton. The District encompasses approximately 700 acres and is bounded by Smith Canal to the north, Pershing Avenue to the east, and the Deep Water Channel to the west and south. It is responsible for maintaining the levee system along Smith Canal as indicated below in Figure 1.



DRAFT

Figure 1 - RD 828 Boundary and Levee

2. Routine Inspections and Levee Patrols

Annual Inspections

Thorough inspections shall be made prior to the beginning of the flood season and otherwise at intervals not exceeding one year. Each inspection of the urban portion of levee along Smith Canal shall consist of a "boat" team inspecting the entire length of levee that is otherwise accessible by boat.

An individual assessment on a parcel-by-parcel basis shall be documented by the "boat" team. An inspection form shall be filled out and at least one photograph shall be taken at each parcel. The "boat" team will determine its position using a location map that utilizes Google Earth and a .kmz file on a smartphone or tablet, similar to the representative screenshot as shown below in Figure 2. Observations shall be recorded concerning the extent of recent erosion based on the topography of the levee slope, the presence of existing rock slope protection, the density of vegetation and trees requiring clearing, and the presence of encroachments such as decks, docks, or bulkheads which would require removal or special handling in order for repairs to be performed. A parcel inventory with maps is included in Appendix B, and a copy of the inspection form to be used for each parcel is included in Appendix C.

The data gathered from the field assessment will then be compiled, and a summary of findings and a prioritization of repairs shall be developed. Immediate steps will be taken to correct dangerous conditions disclosed by such inspections. Regular maintenance and repair measures shall be accomplished during the appropriate season.

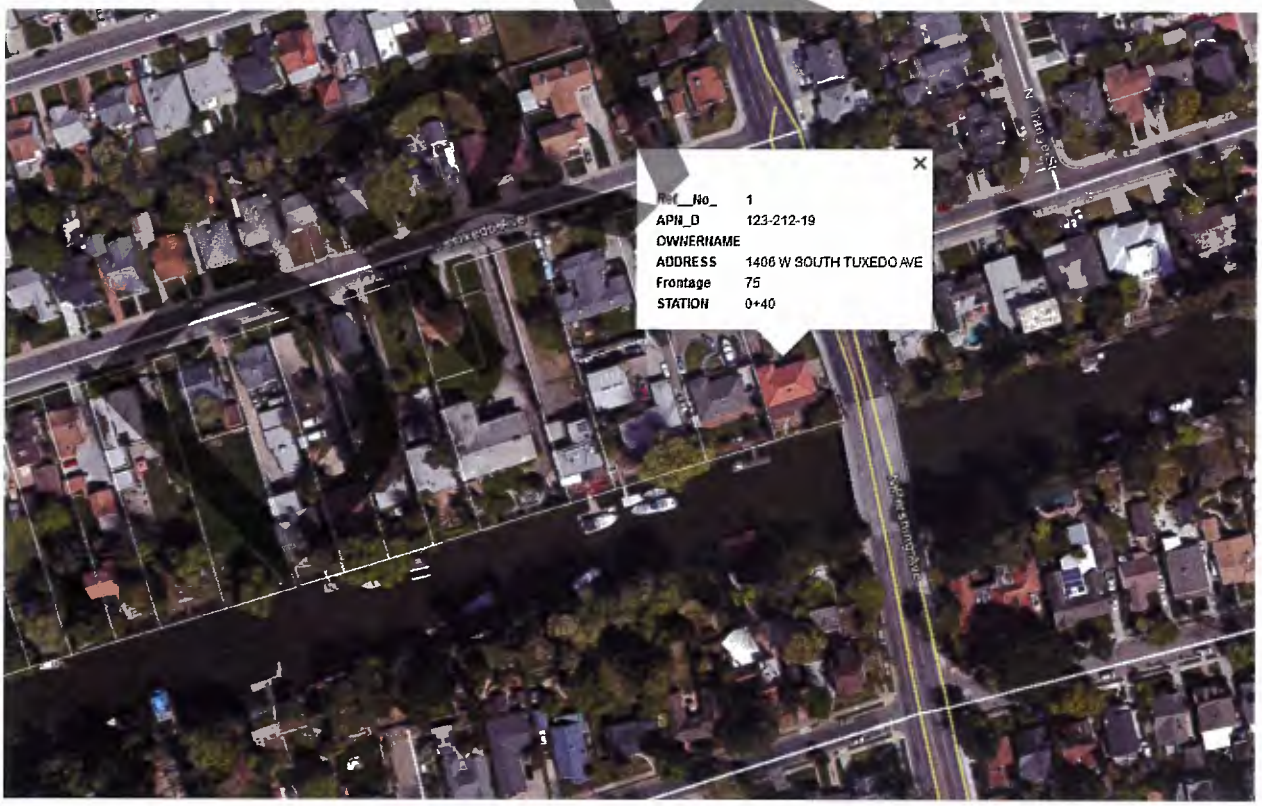


Figure 2 - Example of Smartphone/Tablet Location Map

Routine Monthly Patrols

The District provides routine patrols on a monthly basis or as otherwise may be required to ensure serviceability of the District levees in time of flood. Measures are taken to promote the growth of native grasses, exterminate burrowing animals, and provide for vegetation control of the grass and weeds, removal of wild growth and repair of damage caused by erosion or other forces. Routine monthly patrols shall be performed by the District from the water by boat to ensure that the above maintenance measures are being carried out and further, to evaluate if any of the following is occurring:

- Evaluate unusual settlement, sloughing, or if material loss of grade or levee cross section has taken place;
- Evaluate if slumping has occurred on either the landside or waterside of the levee which might affect the stability of the levee section;
- During flood stages, evaluate if seepage, saturated areas, or sand boils are occurring;
- Evaluate if embankment or riprap has been displaced, washed out, or removed;
- Evaluate that access roads to and on the levee are being properly maintained;
- Evaluate if crown of levee is maintained so as to drain readily and stay well shaped and maintained;
- Evaluate as to whether new encroachments are being made in the levee right-of-way, which might endanger the structure or hinder its proper and efficient functioning during times of emergency.

Special considerations need to be taken into account when performing routine levee patrols along Smith Canal. Because of the residential development adjacent to the levee, there exist many types of encroachments along the levee such as landscaping, decks, docks, patios, etc. As a result, it is much more difficult to visually inspect the condition of the levee within urban areas. Although these encroachments don't allow for a District representative to drive and regularly inspect this portion of levee firsthand, the fact that this portion of levee is within the backyard of a residence translates to frequent observations by home owners. Homeowners will tend to notice certain loss of soil matters in their backyards such as settlement, sloughing, or slumping and should immediately communicate these concerns with the District's Engineer and/or counsel.

Immediate steps will be taken to correct dangerous conditions disclosed by such patrols. Regular maintenance and repair measures shall be accomplished during the appropriate season.

The Superintendent's Guide to Operation & Maintenance of California's Flood Control Projects has been included for additional reference in Appendix E.

DRAFT

3. Levee Maintenance

This section identifies many of the activities that are necessary to maintain flood control works.

Levee Vegetation Management

Planted vegetation on or near levee slopes can significantly enhance the effectiveness and appearance of a levee. When properly managed, vegetation deters surface erosion from rain and runoff.

Levee slopes must allow visibility for regular maintenance inspections and, when necessary, for high water patrolling. Also, landside toes are often used as access points for maintenance. To the extent practicable, trees shall be trimmed five feet above ground level and thinned. Brush and weeds shall be trimmed, thinned, or removed for visibility and access, and groundcovers shall be no more than one foot in height. Levee slopes shall be kept free of large bunched, woody, or clumped vegetation that would interfere with flood fighting or emergency repairs. Agricultural pruning and other debris are special targets for removal because they attract burrowing rodents.

Levee Mowing and Spraying

Portions of the District's levees are covered by sod or some form of turf. These areas are generally mowed by the individual landowners.

Levee Slopes and Right-Of-Ways

Generally, levee slopes shall be free from encroachments or vegetative growth that could interfere with or prevent inspection or hamper flood fighting activities. Although this is currently not always the case along Smith Canal, it should be the ultimate goal. Quarry stone rock slope protection must be kept in good condition, and erosion shall not be occurring.

Gates and Signs

Gates and miscellaneous signs are installed to prohibit or discourage unauthorized personnel and vehicle traffic from using the flood control project facilities.

Rodent Control

The presence of ground squirrels and/or other burrowing rodents on a levee crown, slope or toe always warrants control measures. Because of their high reproductive potential and extensive burrow systems, these animals present a hazard to levees. When material is removed as a result of burrowing, the structural integrity of levees is threatened. Their burrowing loosens the soil, increasing the risk of erosion and sloughing. Also, a burrow can act like a pipe to carry floodwater into and through levee sections. The use of certain "restricted use" materials to control rodents and vegetation on levee slopes requires a permit from the County Agricultural Commissioner in San Joaquin County.

DRAFT

4. Warning System, Emergency Procedures, and Evacuation

Flood Warning System

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

The District will use the Venice Island gauge to monitor tidal conditions and use visual reference as information sources in its monitoring effort. The Mossdale gauge (San Joaquin River) and Benson's Ferry (Mokelumne River) gauges will be used as secondary monitoring sources.

Emergency Procedures

The following actions will be taken when the trigger condition is identified by District personnel. These actions may be taken by District personnel at any time or tidal condition if it is felt that conditions affecting the levees and drainage system warrant such action. A list of triggers and actions is included below in Table 1.

Table 1 - Trigger Conditions

Action	Trigger
Alert the District Board of Trustees and personnel; Issue Delegation of Authority letter appointing District Incident Commander	Official prediction that 8.0' (NAVD 88) tide will be reached at Venice Island Gauge
Activate/hire District personnel and initiate periodic focused levee patrols	El. 8.0' (NAVD 88) tide at Venice Island Gauge
Initiate 24-hour continuous levee patrols	El. 9.0' (NAVD 88) tide at Venice Island Gauge
Contact City of Stockton OES/Fire, San Joaquin County Sheriff, and San Joaquin OES	Potential threat to levee integrity or if District begins patrol
Contact the State-Federal Flood Operations Center	Identified problem on levee

The District does not use "phases" where objective conditions trigger a group of actions. Each action indicated will be taken upon reaching the trigger condition shown or if District personnel feel it is warranted. As noted below, the District Engineer and District personnel are responsible for monitoring objective conditions affecting the District.

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

To supplement flood emergency information, the District has adopted the Reclamation District 828, Weber Tract, Emergency Operations Plan (EOP) and Flood Contingency Map (FCM) as included in Appendix D.

A list of Emergency Contacts is shown below in Table 2.

DRAFT

Table 2 - Emergency Contacts

Contact	Telephone Number
District Engineer:	
Christopher H. Neudeck	office 209-946-0268 mobile 209-481-0316 home 209-948-8479
City of Stockton:	
Fire Department	office 209-937-8801 / 911
San Joaquin County:	
County Office of Emergency Services (OES)	office 209-953-6200
County Sheriff	office 209-468-4400 / 911
State of California:	
Department of Water Resources (DWR)	office 800-952-5530
State-Federal Flood Operations Center	office 916-574-2619
District Counsel:	
Dan Schroeder	office 209-948-8200 mobile 209-993-7130
District Trustees:	
Bill Mendelson	mobile 209-470-8428
Robert Merdinger	mobile 209-401-5536
Deborah Provost	mobile 209-462-2048

Alerting and Warning of the Public

The City of Stockton and San Joaquin County are the jurisdictions responsible for alerting and warning the general public. They have three means of alerting affected residents that there is an emergency and that they would take at least the minimal action of staying tuned to the Emergency Broadcast System (EBS):

- Broadcast over the EBS and other available news media.
- Soundings of sirens where those are located.
- Sweeps of the affected area by law enforcement and other emergency responders using loudspeakers and personal contact

Evacuation

In the event of an evacuation notification, the following District personnel MUST be contacted:

- Christopher H. Neudeck, P.E. — Office: 209-946-0268
  District Engineer — Mobile: 209-481-0316
  Kjeldsen, Sinnock & Neudeck, Inc. — Home: 209-948-8479

Upon being notified, residents should move rapidly to the main roads designated as the most trafficable under adverse weather conditions. The primary evacuation routes are along Interstate 5 as shown below in Figure 3. This evacuation plan can also be found at http:/www.sjmap.org/evacmaps/

DRAFT

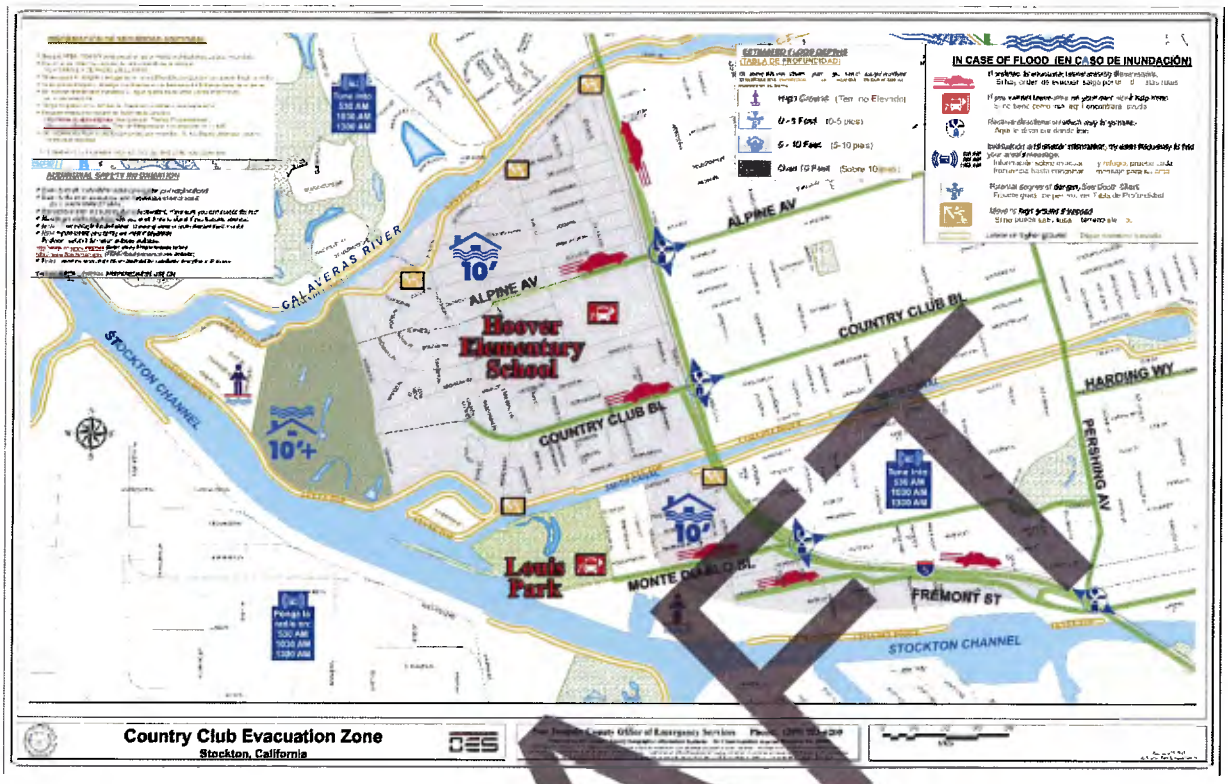


Figure 3 - Evacuation Plan (http:/www.sjmap.org/evacmap/)

DRAFT

5. Assistance from Government Agencies

Local Agencies

SAN JOAQUIN COUNTY OFFICE OF EMERGENCY SERVICES

The San Joaquin County Office of Emergency Services (County OES) is responsible for coordinating County operations during a flood crisis. It maintains control of County flood-fight materials and supervises emergency purchases. It is also responsible for coordinating with State and Federal agencies operating in the County, or providing mutual aid.

209-953-6200

SHERIFF'S DEPARTMENT

The Sheriff's Department is responsible for public safety in unincorporated areas of the delta. This department will assist in rescue activities, evacuations, and will provide general security for impacted areas.

209-468-4400

FIRE DEPARTMENT

The Fire Department will assist in rescue operations and will assist in the protection of property.

209-937-8801

AMERICAN RED CROSS

The American Red Cross provides assistance for food, clothing, shelter and supplemental medical needs to disaster victims. Assistance is in the form of an outright gift and repayment is not required nor requested. The Red Cross provides emergency mass care to congregate groups, and also provides individual/family assistance. Upon the request of government, and resources permitting, the Red Cross may assist with warnings, rescue or evacuations.

800-733-2767

SALVATION ARMY

During an emergency, the Salvation Army may be called upon to provide food, clothing, furniture and housing, emergency communication, mobile canteen services, and spiritual ministry for disaster victims.

209-948-8959

State Agencies

DEPARTMENT OF WATER RESOUCES

The Department of Water Resources provides:

- Flood warnings and information on real and potential flooding
- Coordinates local, state and federal flood fight efforts during a major flood emergency
- Provides experienced personnel to advise and direct flood fight efforts
- Furnishes flood fight crews with experienced personnel to supervise and direct their work.
- Provides flood fight training

800-952-5530

CALIFORNIA OFFICE OF EMERGENCY SERVICES

The California Office of Emergency Services (Cal OES) coordinates State action during emergencies under the California Emergency Services Act and administers the State Natural Disaster Assistance Act by

DRAFT

providing financial assistance to local agencies for repairing and restoring flood damaged facilities.
916-845-8510

CALIFORNIA HIGHWAY PATROL
The Highway Patrol is responsible for traffic control during all emergencies. Direct assistance to State and Federal organizations engaged in flood fighting includes use of Highway Patrol communication facilities.
800-835-5247

CALIFORNIA NATIONAL GUARD
The California National Guard functions as a reserve force for the national armed forces, and is also the State's reserve source of emergency manpower, equipment and transportation during times of local disaster or disorder.
209-982-4621

CALIFORNIA CONSERVATION CORPS
The Flood Operations Center of the Department of Water Resources depends heavily upon the California Conservation Corps (CCC) to provide personnel for flood fighting and levee patrolling during emergency situations. Standby crews are frequently stationed near sites where problems are anticipated due to storm activity, high river stages, high tides or heavy reservoir releases.
209-948-7110

CALIFORNIA DEPARTMENT OF FORESTRY
The California Department of Forestry will provide labor crews to assist in flood fight activities during a flood alert period.
916-845-8680

Federal Agencies

FEDERAL EMERGENCY MANAGEMENT AGENCY
The Federal Emergency Management Agency coordinates the disaster relief functions of all federal agencies during a presidentially declared emergency or major disaster.
800-462-9029

U. S. ARMY CORPS OF ENGINEERS
During a flood alert, the U. S. Army Corps of Engineers gives local authorities the benefit of the Corps' flood fighting experience and answers requests for assistance in flood fighting received through the Department of Water Resources. In addition, the Corps is responsible for operating certain flood control reservoirs and maintaining surveillance over the flood control operations of other reservoirs having federal flood control reservation space.
916-452-1535

U. S. ARMY
Assistance from the U. S. Army may consist of manpower, equipment, and supplies for flood fighting, rescue, and relief work. Such assistance may be sought only when local and State facilities are unable to prevent extensive loss of life or property.
Requests for U. S. Army assistance in flood fighting must be made to the Corps of Engineers through the Department of Water Resources.

DRAFT

NATIONAL WEATHER SERVICE

The National Weather Service disseminates river forecasts, which have been produced at the joint Federal-State River Forecast Center in Sacramento, to its district offices located in Eureka, Reno, San Francisco, Fresno and Redding. The National Weather Service operates on a 24-hour schedule when emergency high water conditions exist or are anticipated.

916-979-3051

www.wrh.noaa.gov/sacramento

DRAFT

6. Flood Fight Supplies

Suggested Flood Fight Supplies

An ample supply of the following tools, materials, and equipment as shown in Table 3 should be readily available in a convenient location. These supplies should be regularly inventoried or restocked.

The inventory should be adjusted according to length of patrol area, number and type of flood control facilities, and experience during other flood events.

Table 3 - Flood Fight Supplies

Item	Quantity (Minimum Required)
Visquine Plastic sheeting, 10 mil, 100 x 20 feet -or- Canvas, 100 x 20 feet	3 rolls
Sandbags	1,000
Twine or baling wire	1 box
Stakes, 2-foot, 2"x4", w/v points	50
Laths, 4-foot	1 bundle
Tie buttons or stones	50
Flagging (fluorescent)	6 rolls
Lineman's pliers	4
Sledge hammers	2
Shovels	5
Life jackets	4
Logbook	1
Tire chains	2
Jumper cables	2
Highway flares	2 bundles
Tow chains	2
Axes	2
Chainsaws	1
Electric lanterns	2
Batteries for lanterns	1 box
Maps	1
Lighting system for night patrol	2
Two-way radios	2

DRAFT

Directory of Materials and Equipment

A directory of materials and equipment suppliers is shown below in Table 4.

Table 4 - Directory of Materials and Equipment Suppliers

Item	Phone Number
Sandbags	
Sacramento Bag Mfg. Co. (Sacramento)	916-441-6121
M. Calosso and Sons (Stockton)	209-466-8994
Lumber and Hardware	
Valley Lumber (Stockton)	209-464-4565
Home Depot (Stockton)	209-474-8285
Canvas and Tarps	
Bonanza Industrial Supply (Oakley)	925-625-1000
Capitol Tarpaulin Co. (Sacramento)	916-451-2801
Construction Equipment	
Teichert Construction (Stockton)	209-983-2300
United Rentals (Stockton)	844-873-4948
Rock, Sand, and Gravel	
Teichert Aggregates (Vernalis)	209-834-8300
FTG Construction Materials (Lodi)	209-334-2112
Dredging and Barge Equipment	
Dutra Dredging (Rio Vista)	707-374-6339

DRAFT

7. Emergency Levee Patrols

Organizing Emergency Patrols

When a flood alert is called, the exterior levee system must be patrolled by boat with increasing frequency as flood conditions worsen. The District Engineer is required to prepare a patrol schedule that assigns specific shifts to individual boat patrol units. Land-based personnel shall be on standby in the event that flood fighting procedures need to be implemented.

Effective levee patrolling is the best defense against levee failure by early detection and remedial repair of weak spots. Patrols should look for wave wash, boils, seepage, cracks, or sloughing. The following will help in organizing personnel:

- Appoint one person to carry the responsibility for the entire operation.
- Provide sufficient number of personnel for two 12-hour shifts.
- Provide each person with a copy of this manual.
- Assign each person a definite length of levee to patrol, usually no more than can be inspected on foot at least once an hour.
- Furnish each person with a shovel, flashlight or lantern, and five to ten sacks with twine.
- Teach each person the correct way to fill and place sandbags, what danger signs to watch for, and how to signal for help.
- Arrange to stockpile sandbags and other tools and equipment at strategic locations along the levee.
- Be prepared to obtain more personnel, tools, and equipment on short notice.
- Advise the officials of the district or agency responsible for emergency assistance in the area of your efforts and, if necessary, request their help.
- Contact the nearest representatives of the Department of Water Resources or the Corps of Engineers for technical advice and assistance

Recommended Supplies for Standby Vehicles

The following are recommended materials and equipment that should be carried in each standby vehicle:

- Powerful electric lanterns and extra batteries
- Round-point shovels (to drain puddle water on the crown roadway)
- Axes or chain saws (for trees and branches that have fallen across the roadway)
- A tow chain (to drag debris from the roadway or assist stuck or trapped flood fight vehicles)
- Highway flares (to warn of dangerous road conditions)
- A set of battery jumper cables
- Tire chains
- Visquine sheeting
- Sandbags
- Stakes
- Rope or twine

DRAFT

8. Main Causes of Levee Failure and How to Control

The main causes of levee failure during high water are:

- Excessive seepage through or under levees is caused by rodent holes, sand lenses, decomposing tree roots, or leaks that result in a boil on the landside slope.
- Levee erosion by currents or wave action.
- Levee overtopping by flood flows that exceed levee height.

Emergency measures used to prevent levee failure from these causes are known as flood fight methods. Appendix F includes flood fight methods prepared by the DWR. These methods have proven effective during many years of use by DWR, USACE, and local agencies during food-related emergencies.

DRAFT

Reclamation District No. 828
Operations & Maintenance Manual

Appendix A

District Base Map

Reclamation District No. 828
Operations & Maintenance Manual

Appendix B

Parcel Inventory and Maps

REF. NO	APN	OWNERNAME	ADDRESS	FRONTAGE	STATION	MAP SHEET
1	135-171-07	WAYNE OSBORN	1701 N PERSHING AVE	79.03	0+00	1
2	135-171-06	CHRISTIAAN & MAYFLOR VANDERSTAAY	1403 W WALNUT ST	75.71	0+90	1
3	135-171-05	BERNIECE L SILVA	1431 W WALNUT ST	75.73	1+60	1
4	135-171-04	DON NICORA	1441 W WALNUT ST	75.73	2+80	1
5	135-171-03	LARRY J & BEVERLY R JOHNSON	1457 W WALNUT ST	60.29	3+10	1
6	135-171-02	DALLAS BRADEN	1459 W WALNUT ST	50.65	3+65	1
7	135-171-01	PAUL R & CYNTHIA M MARSH	1461 W WALNUT ST	55.28	4+10	1
8	135-020-62	CLEVELAND S & DORIS EDWARDS	1505 W WALNUT ST	120.74	5+00	1
9	135-020-61	NEAL H & LYNN L FEARN	1515 W WALNUT ST	60.74	5+95	2
10	135-020-60	BENNIE W & MAY C LIM	1521 W WALNUT ST	60.74	6+50	2
11	135-020-59	RICHARD A HINGLEY	1535 W WALNUT ST	60.74	7+10	2
12	135-020-58	DANIEL S & LINDA L MOORE	1545 W WALNUT ST	60.74	7+75	2
13	135-020-57	PATRICIA F CHAVEZ	1555 W WALNUT ST	60.74	8+35	2
14	135-020-56	KENT A & LISA A SHUBERT	1561 W WALNUT ST	60.74	9+00	2
15	135-020-55	GARY FRISCH	1571 W WALNUT ST	60.74	8+60	2
16	135-020-54	BRANDON V MARINO	1607 W WALNUT ST	60.74	10+20	2
17	135-020-53	FLORENCE T SHIMA	1611 W WALNUT ST	60.74	10+75	2
18	135-020-52	EDWARD J LEE	1625 W WALNUT ST	60.74	11+40	2
19	135-020-51	MARY ELLEN SANCHEZ	1633 W WALNUT ST	60.74	12+00	3
20	135-020-50	RUSSELL & VENIZ RICHENBERG	1641 W WALNUT ST	60.74	12+50	3
21	135-020-49	BEVERLY NANCY GARCIA	1651 W WALNUT ST	60.74	13+20	3
22	135-020-48	WILLIAM C & LYNNE E GOWDY	1661 W WALNUT ST	60.74	13+80	3
23	135-020-47	JOHN JAY & LYNNE MARIE FARRAR	1703 W WALNUT ST	60.74	14+40	3
24	135-020-46	RICHARD D & DIANNE M LANGONE	1711 W WALNUT ST	60.74	15+00	3
25	135-020-45	MICHAEL R & AUDREY DONALDSON	1725 W WALNUT ST	60.74	15+60	3
26	135-020-44	WILLIAM & GINA MARIE BARNEY	1733 W WALNUT ST	60.74	16+20	3
27	135-020-43	DONNA GAIL SAMELSON	1741 W WALNUT ST	60.74	16+80	3
28	135-020-42	ALICE MAE BIRD	1751 W WALNUT ST	60.74	17+40	3
29	135-020-41	TODD & COLETTE MOYSE	1775 W WALNUT ST	60.75	18+00	4
30			**BUENA VISTA AVE**		**18+80**	**4**
31	133-490-13	WAYNE EVERETT & LAURIE A HALLQUIST	1617 BUENA VISTA AVE	63.79	20+00	4
32	133-490-06	JAMES W NICHOLS	1528 ABBEY CT	97	20+90	4
33	133-490-05	WILLIAM F & JEANNIE J FILE	1525 ABBEY CT	133.82	22+00	4
34	133-490-04	SUZETTE RICA	1519 ABBEY CT	10	22+70	4
35	133-460-06	ALLEN MILLER	1852 SHIMIZU DR	60	23+00	4
36	133-460-05	ALLEN & CRISTINA S MILLER	1855 W HARDING WAY	100	23+80	5
37	133-460-60	NEMORIO & IRENE DECASAS	1868 SHIMIZU DR	60	24+60	5
38	133-460-59	ARIE & BEVERLY HOPE	1872 SHIMIZU DR	50	25+15	5
39	133-460-03	JOHN E & PETRA J SCHULTZ	1881 W WALNUT ST	50	25+65	5
40	133-460-02	CHARLES J & WANDA BIGGS	1893 W WALNUT ST	105	26+50	5
41	133-460-01	CHRIS H MARTIN	1530 SAN JUAN AVE	55	27+20	5
42			**SAN JUAN AVE**		**27+80**	**5**
43	133-280-19	PACIFIC GAS &, ELECTRIC CO	1525 SAN JUAN AVE	118.64	28+60	5
44	133-280-17	WARREN MARTIN	1924 SHIMIZU DR	57	29+50	6
45	133-280-15	PAUL ANTHONY FORGACH	1932 SHIMIZU DR	65	30+05	6
46	133-280-50	ALLAN L & LILIA M SANCHEZ	1940 SHIMIZU DR	58.79	30+70	6
47	133-280-13	MARGARET E PRAUS	1947 W HARDING WAY	51.47	31+20	6
48	133-280-12	XAVIER MACIAS	1951 W HARDING WAY	51.47	31+75	6
49	133-280-51	MITSUO H MENDA	1964 SHIMIZU DR	52.71	32+25	6
50	133-280-48	RICHARD G WILSON	1972 SHIMIZU DR	52.5	32+80	6
51	133-280-07	LEO BRATENAS	2006 SHIMIZU DR	66.5	33+40	6
52	133-280-06	SHEREE MAKA	2015 W HARDING WAY	65	34+10	6
53	133-280-05	KEOKI GUTIERREZ	2029 W HARDING WAY	45.78	34+75	6
54	133-280-04	MICHAEL & SANTA MINATRE	2037 W HARDING WAY	55.75	35+40	7
55	133-280-03	WILLIAM L & JANET E MENDELSON	2051 W HARDING WAY	60	36+00	7
56	133-280-02	O TOOLE, T MARK	2053 W HARDING WAY	93	36+80	7
57	133-280-01	EARL & BETTY SCHNEIDER	2077 W HARDING WAY	90.69	37+70	7
58			**CARLTON AVE**		**39+40**	**7**
59	133-250-03	NEIL & MARIA SMYTH	1515 CARLTON AVE	279.5	40+40	8
60	133-250-02	NEMORIO & IRENE DE CASAS	2168 SHIMIZU DR	110.08	42+20	8
61	133-250-01	NEMORIO & IRENE DE CASAS	2170 SHIMIZU DR	110.08	43+30	8
62	133-250-21	CHANNELPORT HOMEOWNERS ASSN	HOLT ST	98.6	44+30	8
63	133-160-12	GERARDO C FELIX	1510 WILSHIRE AVE	102.53	45+40	9
64			**WILSHIRE AVE**		**46+20**	**9**
65	133-160-11	WILLIAM & SHELBY J SULLIVAN	1503 WILSHIRE AVE	55.29	48+65	9
66	133-160-10	WARREN E MORGAN	2309 W HARDING WAY	50.26	47+20	9
67	133-160-09	ANTHONY DAVIS	2317 W HARDING WAY	50.26	47+70	9
68	133-160-08	STEPHEN SOCHACKI	2325 W HARDING WAY	50.26	48+20	9
69	133-160-07	PAUL M & JULIE G PICHARDO	2333 W HARDING WAY	50.26	48+70	9
70	133-160-06	NANCY J MARTIN	2341 W HARDING WAY	50.26	49+20	9
71	133-160-05	ARTURO PAUL & DARLENE T CORONA	2349 W HARDING WAY	50.304	49+70	9
72	133-160-04	KENEDY E & DOLLIE S DEAN	2357 W HARDING WAY	50.33	50+20	9

REF. NO	APN	OWNERNAME	ADDRESS	FRONTAGE	STATION	MAP SHEET
73	133-160-03	DELORES FOSTER	2403 W HARDING WAY	50.4	50+70	9
74	133-160-02	DEBORAH PROVOST	2409 W HARDING WAY	50.47	51+20	10
75	133-160-01	RAYMOND FERRY	2417 W HARDING WAY	50.54	51+75	10
76	133-150-08	MICHEL & DEBORAH HERMANGE	2425 W HARDING WAY	50.62	52+20	10
77	133-150-07	GERARD T HAMMER	2433 W HARDING WAY	50.7	52+70	10
78	133-150-06	GERALD V LUCHA	2441 W HARDING WAY	50.72	53+25	10
79	133-150-05	ROGER NAVARRO	2449 W HARDING WAY	84.94	54+00	10
80	133-150-04	ROBERT JON & B KNUDSEN	2457 W HARDING WAY	71.9	54+70	10
81	133-150-03	ALFONSO & RAWDA VILLALOBOS	1440 DENA CT	128.59	55+70	10
82	133-150-02	ANDREW & V E BELASCO	1441 DENA CT	129.32	57+00	11
83	133-150-35	CESAR & MODESTA HERNANDEZ	2548 SHIMIZU DR	100.32	58+20	11
84			**I-5**		60+25	11

5+50
5+00
4+50
4+00
3+50
3+00
2+50
2+00
1+50
1+00
0+50
0+00

135-020-62
REFERENCE NO. 8
CLEVELAND S & DORIS EDWARDS
1505 W WALNUT ST
FRONTAGE 120.74'
STATION 5+00

135-171-01
REFERENCE NO. 7
PAUL R & CYNTHIA M MARSH
1461 W WALNUT ST
FRONTAGE 55.28'
STATION 4+10

135-171-02
REFERENCE NO. 6
DALLAS BRADEN
1459 W WALNUT ST
FRONTAGE 50.65'
STATION 3+65

135-171-03
REFERENCE NO. 5
LARRY J & BEVERLY R JOHNSON
1457 W WALNUT ST
FRONTAGE 60.29'
STATION 3+10

135-171-04
REFERENCE NO. 4
DON NICORA
1441 W WALNUT ST
FRONTAGE 75.73'
STATION 2+80

135-171-05
REFERENCE NO. 3
BERNIECE L SILVA
1431 W WALNUT ST
FRONTAGE 75.73'
STATION 1+60

135-171-06
REFERENCE NO. 2
CHRISTIAAN & MAYFLOR VANDERSTAAY
1403 W WALNUT ST
FRONTAGE 75.71'
STATION 0+90

135-171-07
REFERENCE NO. 1
WAYNE OSBORN
1701 N PERSHING AVE
FRONTAGE 79.03'
STATION 0+00

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

KSN inc.
KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268

1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900

www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 0+00 - 5+50
PARCEL REFERENCE NUMBERS 1 - 8

EXHIBIT
A

KSN inc.
KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS
711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268
1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900
www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 5+50 - 11+50
PARCEL REFERENCE NUMBERS 9 - 18

EXHIBIT
A

17+50
17+00
16+50
16+00
15+50
15+00
14+50
14+00
13+50
13+00
12+50
12+00
11+50

135-020-42
REFERENCE NO. 28
ALICE MAE BIRD
1751 W WALNUT ST
FRONTAGE 60.74'
STATION 17+40

135-020-43
REFERENCE NO 27
DONNA GAIL SAMELSON
1741 W WALNUT ST
FRONTAGE 60.74'
STATION 16+80

135-020-44
REFERENCE NO 26
WILLIAM & GINA MARIE BARNEY
1733 W WALNUT ST
FRONTAGE 60.74'
STATION 16+20

135-020-45
REFERENCE NO 25
MICHAEL R & AUDREY DONALDSON
1725 W WALNUT ST
FRONTAGE 60.74
STATION 15+60

135-020-46
REFERENCE NO. 24
RICHARD D & DIANNE M LANGONE
1711 W WALNUT ST
FRONTAGE 60.74'
STATION 15+00

135-020-47
REFERENCE NO. 23
JOHN JAY & LYNNE MARIE FARRAR
1703 W WALNUT ST
FRONTAGE 60.74'
STATION 14+40

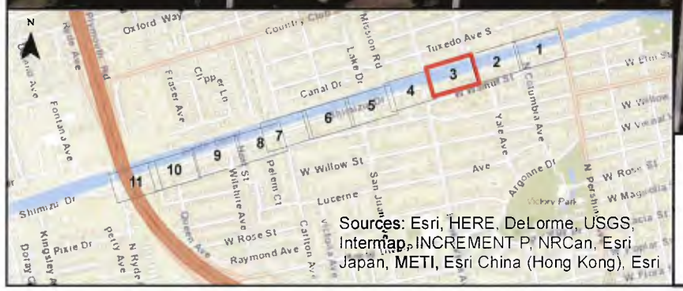
135-020-48
REFERENCE NO. 22
WILLIAM C & LYNNE E GOWDY
1661 W WALNUT ST
FRONTAGE 60.74'
STATION 13+80

135-020-49
REFERENCE NO. 21
BEVERLY NANCY GARCIA
1651 W WALNUT ST
FRONTAGE 60.74'
STATION 13+20

135-020-50
REFERENCE NO. 20
RUSSELL & VENIZ RICHENBERG
1641 W WALNUT ST
FRONTAGE 60.74'
STATION 12+50

135-020-51
REFERENCE NO. 19
MARY ELLEN SANCHEZ
1633 W WALNUT ST
FRONTAGE 60.74'
STATION 12+00

135-0
REFEREN
EDWAR
1625 W W
FRONTA
STATIO



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

KSN inc. KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268

1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900

www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 11+50 - 17+70
PARCEL REFERENCE NUMBERS 19 - 28

EXHIBIT
A

KSN inc.
KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS
711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268
1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900
www.ksninc.com

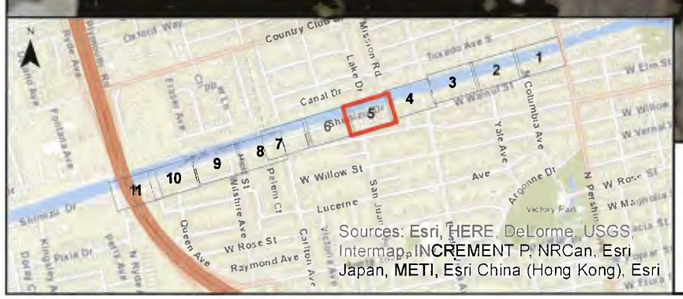
Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 17+70 - 23+50
PARCEL REFERENCE NUMBERS 29 - 35

EXHIBIT
A



KSN inc. KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS
711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268
1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900
www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 23+50 - 29+50
PARCEL REFERENCE NUMBERS 36 - 43

EXHIBIT
A

KSN inc. KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268

1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900

www.ksninc.com

Scale: 1 in = 40 ft

Original Drawing Scale: 0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 29+50 - 35+10
PARCEL REFERENCE NUMBERS 44 - 53

EXHIBIT A

KSN inc. KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268

1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900

www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 35+10 - 39+00
PARCEL REFERENCE NUMBERS 54 - 57

EXHIBIT
A

45+00
44+50
44+00
43+50
43+00
42+50
42+00
41+50
41+00
40+50
40+00
39+50
39+00

133-250-21
REFERENCE NO. 62
CHANNELPORT HOMEOWNERS ASSN
HOLT ST
FRONTAGE 93.60'
STATION 44+30

133-250-01
REFERENCE NO. 61
NEMORIO & IRENE DE CASAS
2170 SHIMIZU DR
FRONTAGE 110.05'
STATION 43+30

133-250-02
REFERENCE NO. 60
NEMORIO & IRENE DE CASAS
2153 SHIMIZU DR
FRONTAGE 110.05'
STATION 42+20

133-250-03
REFERENCE NO. 59
NEIL & MARIA SMYTH
1515 CARLTON AVE
FRONTAGE 279.50'
STATION 40+40

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

KSN inc.
KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268

1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900

www.ksninc.com

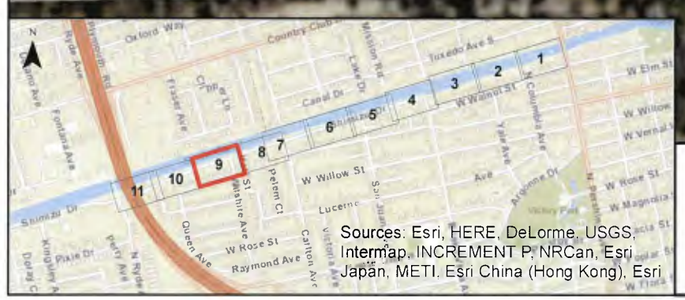
Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 39+00 - 45+00
PARCEL REFERENCE NUMBERS 59 - 62

EXHIBIT
A



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri

KSN inc.
KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS
711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268
1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900
www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 45+00 - 51+00
PARCEL REFERENCE NUMBERS 63 - 73

EXHIBIT
A

57+00
56+50
56+00
55+50
55+00
54+50
54+00
53+50
53+00
52+50
52+00
51+50
51+00

133-150-02
REFERENCE NO. 82
ANDREW & V.E BELASCO
1441 DENA CT
FRONTAGE 129.32'
STATION 57+00

133-150-03
REFERENCE NO. 81
ALFONSO & RAWDA VILLALOBOS
1440 DENA CT
FRONTAGE 128.59'
STATION 55+70

133-150-04
REFERENCE NO. 80
ROBERT JON & B KNUDSEN
2457 W HARDING WAY
FRONTAGE 71.90'
STATION 54+70

133-150-05
REFERENCE NO. 79
ROGER NAVARRO
2449 W HARDING WAY
FRONTAGE 84.94'
STATION 54+00

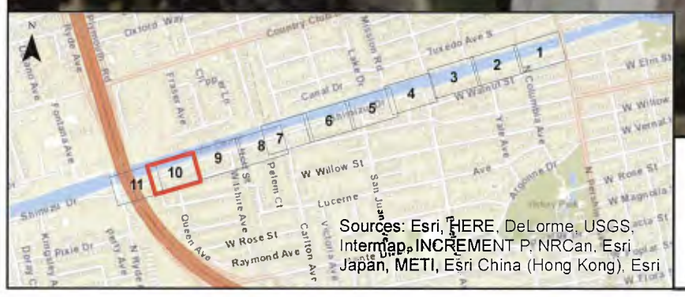
133-150-06
REFERENCE NO. 78
GERALD V LUCHA
2441 W HARDING WAY
FRONTAGE 50.72'
STATION 53+25

133-150-07
REFERENCE NO. 77
GERARD T HAMMER
2433 W HARDING WAY
FRONTAGE 50.70'
STATION 52+70

133-150-08
REFERENCE NO. 76
MICHEL & DEBORAH HERMANGE
2425 W HARDING WAY
FRONTAGE 50.62'
STATION 52+20

133-160-01
REFERENCE NO. 75
RAYMOND FERRY
2417 W HARDING WAY
FRONTAGE 50.54'
STATION 51+75

133-160-02
REFERENCE NO. 74
DEBORAH PROVOST
2409 W HARDING WAY
FRONTAGE 50.47'
STATION 51+20



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

KSN inc.
KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268

1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900

www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 51+00 - 56+50
PARCEL REFERENCE NUMBERS 74 - 81

EXHIBIT
A

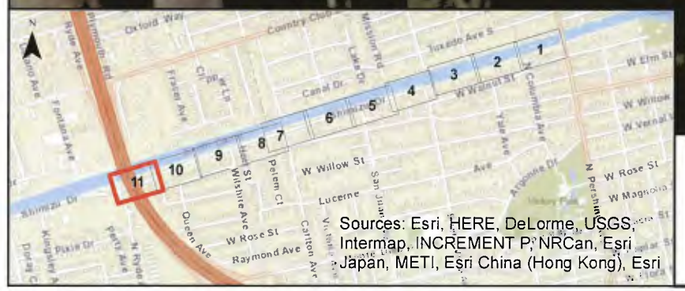
62+50
62+00
61+50
61+00
60+50
60+00
59+50
59+00
58+50
58+00
57+50
57+00
56+50

I-5
REFERENCE NO. 84
STATION 60+25

133-150-35
REFERENCE NO. 83
CESAR & MODESTA HERNANDEZ
2548 SHIMIZU DR
FRONTAGE 100.32'
STATION 58+20

133-150-02
REFERENCE NO. 82
ANDREW & V E BELASCO
1441 DENA CT
FRONTAGE 129.32'
STATION 57+00

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri

KSN inc. KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

711 N. Pershing Avenue
Stockton, CA 95203
209-946-0268

1550 Harbor Blvd., Suite 212
West Sacramento, CA 95691
916-403-5900

www.ksninc.com

Scale
1 in = 40 ft

Original Drawing Scale
0 1/4" 1/2"

NORTH

WEBER TRACT O&M
PARCEL INVENTORY
STATIONS 56+50 - 62+50
PARCEL REFERENCE NUMBERS 82 - 84

EXHIBIT
A

Reclamation District No. 828
Operations & Maintenance Manual

Appendix C

Parcel Annual Inspection Form

Reclamation District No. 828
Weber Tract
Annual Inspection along Smith Canal

Field Survey by:_____ Date:_____
Map Reference No.:_____ APN:_____
Owner:_____
Address:_____
Station:_____ Lot Frontage:_____

Description

Trees:_____

Vegetation:_____

Rock Slope Protection:_____

Bulkhead:_____

Pipes:_____

Decks:_____

Docks:_____

Miscellaneous:_____

Reclamation District No. 828
Weber Tract
Annual Inspection along Smith Canal

Field Survey by:_____ Date:_____
Map Reference No.:_____ APN:_____
Owner:_____
Address:_____
Station:_____ Lot Frontage:_____

Photographs

Reclamation District No. 828
Operations & Maintenance Manual

Appendix D

Reclamation District 828, Weber Tract
Emergency Operations Plan and Flood Contingency Map

Reclamation District 828
Weber Tract

Emergency Operations Plan

(California Water Code Section 9650 Safety Plan)

San Joaquin Operational Area
November 2015

This document was last updated on November 3, 2015.

Prepared by Kjeldsen, Sinnock & Neudeck, Inc. for Reclamation District 828, Weber Tract, with funds awarded under the California Department of Water Resources Flood Emergency Response Grant Program—Delta, Contract No. 4600010754.

This document satisfies the requirements of California Water Code Section 9650.

KJELDSEN SINNOCK NEUDECK
INC.
Civil Engineers and Land Surveyors

Kjeldsen, Sinnock & Neudeck, Inc.
711 N. Pershing Ave
Stockton CA 95203
KSN by Phone:
(209) 946-0268
(916) 403-5900

Plan Promulgation

November 3, 2015

To whom it may concern:

This document and accompanying annex map, having been duly reviewed and approved by the Board of Trustees of Reclamation District 828, Weber Tract (hereinafter Reclamation District 828), is hereby promulgated as the official emergency plan of the District. District personnel are hereby directed to use this plan as the basis for emergency response to flood events. This plan meets the safety plan requirements of Section 9650 of the California Water Code and is compliant with the National Incident Management System and National Response Framework.

The District Secretary/Legal Counsel is hereby directed to distribute this plan to outside agencies in accordance with the Record of Initial Distribution to ensure proper inter-agency coordination during emergency operations. Copies of the plan shall be provided to additional agencies upon request.

The District Secretary/Legal Counsel and District Engineer shall review this plan and accompanying annex annually for needed changes and updates. The District Secretary/Legal Counsel and District Engineer are authorized to make routine updates and changes to the plan required by changes in district operations and personnel and changes to outside agency plans that affect district operations.

The Board of Trustees of Reclamation District 828 shall review this plan once every three years and after any major flood event where the plan was used to guide District response. The District shall maintain a record of Board plan reviews and approval actions in accordance with District documentation procedures and policies.

Sincerely,

Bill Mendelson, President
Board of Trustees
Reclamation District 828

Record of Changes

Revision #	Sections Revised	Date of Distribution	Name of Approving Authority

Record of Initial Distribution

Agency Name	Address	Date Provided
San Joaquin County Office of Emergency Services	2101 E. Earhart Stockton, CA	
City of Stockton Office of Emergency Services	425 N. El Dorado Stockton, CA	
Department of Water Resources Flood Operations Branch	3310 El Camino Ave Sacramento, CA	
California Office of Emergency Services, Inland Region	630 Sequoia Pacific Blvd. Sacramento, CA 95811	
Central Valley Flood Protection Board	3310 El Camino Ave., Rm 151 Sacramento, CA 95821	

Table of Contents

Section 1 - Plan Introduction

1.1 Purpose

The purpose of this Flood Safety Plan is to ensure the effective performance of Reclamation District 828 responsibilities in a flood emergency in collaboration with other jurisdictions performing emergency functions within and around the District. This plan is to be used in conjunction with the emergency operations plans of the State of California and the San Joaquin Operational Area to facilitate multi-jurisdictional coordination within District boundaries. Although this is a public document, specific procedures and information of a sensitive nature as well, as personal information, may be edited out of publicly available versions. The full document is subject to restricted-use handling procedures. This plan meets the requirements of Section 9650 of the California Water Code.

1.2 Scope

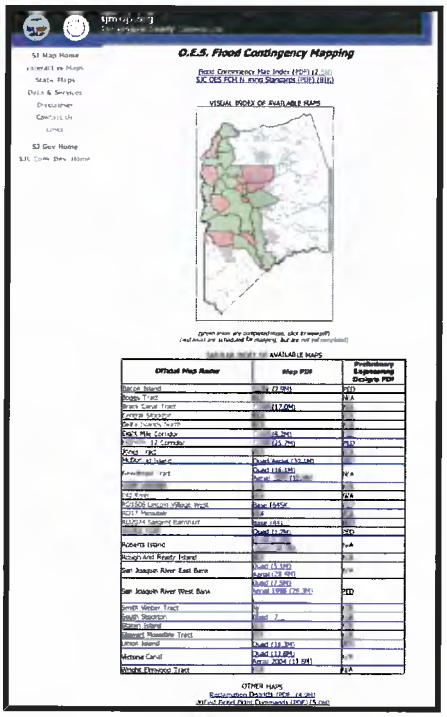
Reclamation District 828 is an independent jurisdiction with responsibility for the operation and maintenance of the levee system within its jurisdictional boundaries. This District emergency operations plan covers only detailed procedures for District responsibilities. Operational plans of other jurisdictions with public safety responsibilities within the District are referenced in this plan.

This plan will cover in detail the following;

- District Flood Preparedness Procedures
- District Levee Patrol Procedures
- District Flood Fight Procedures
- District Flood Water Removal Procedures
- District Recovery and After-Action Procedures

1.3 Plan Structure

This Flood Safety Plan is structured as a traditional functional emergency operations plan in accordance with Comprehensive Preparedness Guide (CPG) 101 v. 2.0 issued by the Federal Emergency Management Agency (FEMA). Consistent with that guidance, and because of the District's limited responsibilities and lack of internal departments, this emergency operations plan consists of this Basic Plan and one hazard-specific annex, Annex A – Flood Contingency Map. The District's existing flood contingency map will constitute this Annex A containing the District's specific flood response procedures. The most current flood contingency map for the district can be accessed at the San Joaquin Operational Area flood contingency map website (Figure 1.1).



www.sjmap.org/oesfcm
Maintained by San Joaquin Operational Area

Figure 1.1

Section 2 - Concept of Operations

2.1 Situation Overview

See the San Joaquin Operational Area Hazard Mitigation Plan for a comprehensive flood risk assessment for the County of San Joaquin. See Annex A for District boundaries, levees, pumping stations, supply depots, historical flooding summary, locations of past breaches and areas of historic seepage or erosion, topography, and characteristics of waterways fronting District levees.

Reclamation District 828, is located along the western edge of the City of Stockton and is South of Reclamation District 1614, Smith Tract and Smith Canal, East of Reclamation District 403, Rough and Ready and the Stockton Deep Water Ship Channel, and North of Reclamation District 404, Boggs Tract and the San Joaquin River. There is little information to provide about this Reclamation District due to it's relatively small area of levee maintaining responsibility. It is estimated that there are approximately Flood system challenges identified for Reclamation District 828 include highly-encroached levees and non-accredited levees along Smith Canal.

Reclamation District 828 is mostly residential structures, with some limited commercial facilities and an elementary school. Reclamation District 828 is a heavily populated area within the city limits of Stockton. The City of Stockton has an estimated population of approximately 295,000 people according to the San Joaquin Area Flood Control Agency.

2.2. General Approach to Seasonal Flood Operations

District personnel will carry out routine preparedness activities at the beginning of flood season as described in below. Annex A of this plan describes the concept of operations for active District flood fight activities. Section 3, Organization and Responsibilities, of this Basic Plan describes authorities and responsibilities for performing routine and emergency activities.

2.2.1 Routine Preparedness and Infrastructure Maintenance

District performs the following routine preparedness actions.

1. Inspect District levees once a week on a routine basis
2. Ongoing and routine baiting and grouting program for ground rodents
3. Ongoing and routine vegetation control program
4. Annual inspection and inventory of District flood fight supplies
5. Semi-annual joint inspection of levees with State inspectors
6. Periodic joint inspection of levees with Federal inspectors
7. Annual inspection and maintenance of access control gates on levees

District does not own or maintain pumping stations for internal drainage control. The City of Stockton is responsible for internal drainage collection, conveyance and terminal drainage. No culverts or through levee pipes exist within District.

2.2.2 *Monitoring and Analysis*

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

The District will use the Venice Island gauge to monitor tidal conditions and use visual reference as information sources in its monitoring effort. The Mossdale gauge (SJ River) and Benson's Ferry (Mokelumne River) gauges will be used as secondary monitoring sources.

2.2.3 *Alerting, Activation, and Initial Response*

The following actions will be taken when the trigger condition is identified by District personnel. These actions may be taken by District personnel at any time or tidal condition if it is felt that conditions affecting the levees and drainage system warrant such action.

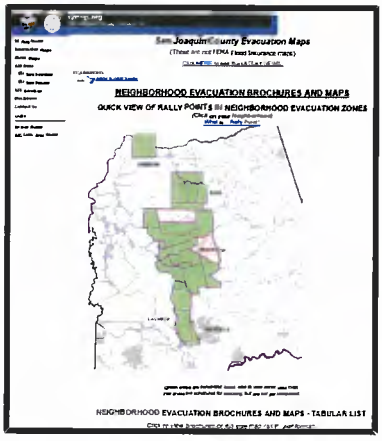
Action	Trigger Condition
Alert the District Board of Trustees and personnel; Official prediction that 8.0' (NAVD 88 datum) tide will be reached at Venice Island Gauge	Issue Delegation of Authority letter appointing District Incident Commander
Activate/Hire District personnel and initiate periodic focused levee inspections	El. 8.0' (NAVD 88) tide at Venice Island Gauge
Initiate 24-hour continuous levee patrols	El. 9.0' (NAVD 88) at Venice Island Gauge
Contact City of Stockton OES/Fire, San Joaquin County Sheriff, and San Joaquin OES	Potential threat to levee integrity or if District begins patrol
Contact the State-Federal Flood Operations Center	Identified problem on levee

The District does not use "phases" where objective conditions trigger a group of actions. Each action indicated will be taken upon reaching the trigger condition shown or if District personnel feel it is warranted. As noted below, the District Engineer and District personnel are responsible for monitoring objective conditions affecting the District.

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

2.3 Public Alert and Warning

The District will promptly notify jurisdictions responsible for alerting and warning of the general public upon identification of a threat to District levees. The District will provide detailed information on the characteristics of the threat and will assist, to the extent possible, with notification of the public if requested. All alert and



General Public Evacuation Maps and Brochures website www.sjmap.org/evacmaps maintained by San Joaquin Operational Area

warning of the general public will be carried out in accordance with the plans of protected jurisdictions.

Figure 2.1

Jurisdictions responsible for alerting and warning of the general public within District are:

- **City of Stockton**
- **County of San Joaquin**

Alerting and warning will be conducted jointly by these jurisdictions through the San Joaquin Operational Area using the procedures contained in the SJOA Warning Annex (see www sjgov.org/oes). The District will provide a representative to the Operational Area and SJOA Joint Information Center to assist with alert and warning messages if requested.

Evacuation maps and brochures for the public are available at a dedicated website maintained by San Joaquin Operational Area (See Figure 2.1). These maps contain information on receiving alerts and warnings within the District along with evacuation and safety instructions.

2.4 Flood Fight Operations

Flood fight operations, including levee patrol, will be conducted in accordance with the procedures in this Basic Plan and those shown on Annex A. Annex A displays the District's concept of operations for emergency communications, patrol, flood fight, and dewatering operations. This concept of operations and response procedures will be modified as needed by the District Incident Commander to meet the demands of actual emergency conditions. Plans of jurisdictions with responsibility for warning and evacuation within the District are referenced on Annex A as well as in this plan.

2.5 Federal and State Disaster Assistance

The District's policy is to maintain mitigation and emergency plans and procedures, and the physical condition of its levees at the level required to be eligible for disaster assistance under the federal Stafford Act and PL84-99 program and the California Disaster Assistance Act. Emergency operations will be conducted and documented in compliance with conditions of those programs for reimbursement of disaster expenses. The District has assigned its contract engineering firm to maintain necessary documentation during an emergency and to participate in any available assistance programs after a disaster on behalf of the District.

To ensure that the District takes steps to quickly access the recovery process, these actions should be considered if an incident is imminent or occurring:

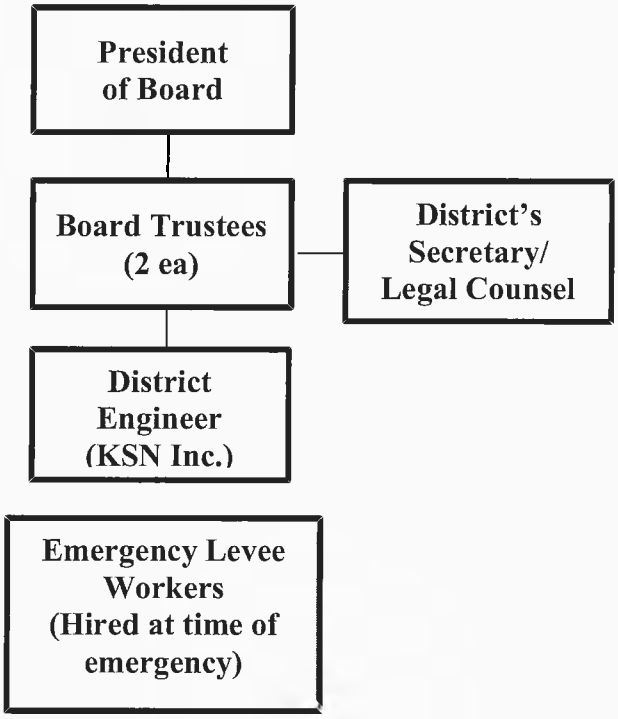
- PL-84-99:
    - Pre-develop a USACE PL84-99 request letter on District letterhead, see Attachment #7
    - Contact DWR Flood Operations Center
    - Follow-up call to USACE District office that a request was made to DWR
    - Notify Operational Area of PL84-99 request, send copy of written request

- State and other Federal programs:
    - Request San Joaquin County to Proclaim the Existence of a Local Emergency
    - Notify District administration when the Proclamation is established

Section 3 – Organization and Assignment of Responsibilities

3.1 Organization

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



District hires additional staff under the job description of "Emergency Levee Worker" for levee patrol once monitoring efforts indicate that conditions for initiating levee patrol will be reached. Emergency workers will work under the designated District Incident Commander.

3.2 Assignment of Responsibilities

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

3.2.1 Make Legal and Financial Commitments on behalf of District

Any single trustee, the District Engineer, or the District Secretary/Legal Counsel are authorized, once the Board has concurred that a local emergency is occurring, to 1) make a legal or financial commitment on behalf of District during emergency operations and 2) purchase additional flood fight supplies or materials. There is no limit to the commitment that can be made. Any single trustee, the District Engineer, or the District Secretary/Legal Counsel can take these actions upon recognition of a threat to levee integrity even without prior Board concurrence that a local emergency is occurring, but in this case the Board must be notified of the action within 24-hours.

The District President or Secretary/Legal Counsel will sign written contracts with private vendors or other public agencies stemming from emergency actions as described above.

3.2.2 Represent District in Operational Area Emergency Management Committee

The District Engineer is authorized and responsible for representing the District at unified field commands as may be established by the San Joaquin Operational Area. The District Engineer is also responsible for representing the District at the San Joaquin Operational Area management committee. The District representative may speak for the District in matters of the condition of District levees, input to protective action decisions being made by public safety agencies, and any requests to modify or conform District response that come out of the multi-agency coordination process.

The Board President will issue a Delegation of Authority letter (see Attachment 2) confirming and defining these specific authorities at the time of an emergency and formally identify the District Incident Commander and Deputy Incident Commander upon reaching the trigger condition described in Section 2.2.3.

3.2.3 Provide Public Information

The District Secretary/Legal Counsel is authorized to speak to the media on behalf of the District as part of the San Joaquin Operational Area Joint Information Center.

3.2.4 Maintain Emergency Equipment, Supplies, and Resources

The District Secretary/Legal Counsel is authorized and responsible for maintaining District equipment, supplies, and resources for emergency response. The Superintendent will ensure that supplies are maintained at inventory levels set by the Board or at any minimum levels that may be set by the Department of Water Resources guidance or statutes.

3.2.5 Monitor Water Conditions, Elevations, and Forecasts

The District Engineer are responsible for monitoring water conditions, elevations, and forecasts for the purpose of identifying conditions warranting additional action beyond routine flood preparedness as outlined in this plan.

3.2.6 Activate and/or Direct District Personnel During Emergency Operations

The District Engineer is authorized and responsible for:

- Activating District staff and resources
- Requesting or providing mutual aid assistance from public agencies
- Supervising District staff, contractors, and/or mutual aid resources assigned to District for levee patrol, 2) flood fight operations, and 3) District de-watering operations.

The Board President will issue a Delegation of Authority letter (see Attachment 2) confirming and defining these authorities as noted in Section 3.2.2.

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

The District Engineer is authorized and responsible for maintaining necessary documentation of emergency expenditures, damage to District infrastructure, and use of supply inventories in accordance with the requirements of federal and state disaster assistance programs.

The District Engineer is authorized and responsible for the preparation and submission of disaster assistance claims during the recovery period through all federal and state disaster assistance programs that may be applicable and relevant to District costs.

Section 4 – Direction, Control and Coordination

4.1 Management and Control of District Operations and Coordination within District

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

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

4.1.1. Management and Policy

The District shall maintain direction and control of District operations during emergency periods. The District Board of Trustees shall meet and confer as deemed necessary by the President during emergency operations to perform their policy making and financial responsibilities during emergency response operations. Board meetings will occur in the field or if needed at the office of the District.

The Board President will issue a Delegation of Authority letter (see Attachment 2) upon reaching the trigger condition indicated in Section 2.2.3.

4.1.2 District Incident Command

The District will appoint one incident commander to manage all incidents occurring on the District levee system as an "incident complex" during any single disaster event as allowed in NIMS protocols. The District will operate on a 24-hour operational period.

4.1.3 Incident Command Facilities

The District does not maintain pre-identified facilities for hosting emergency activities being undertaken by District personnel. District activities will be organized and coordinated in the field or at other incident command facilities established by public safety agencies or the San Joaquin Operational Area.

4.2 Management and Coordination with Other Jurisdictions

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

4.2.1 Unified Flood Fight Command Post

The County of San Joaquin has established four pre-planned unified flood fight commands with pre-identified command post locations to facilitate coordination and mutual aid between neighboring reclamation Districts and supporting city/county, state, and federal agencies. The District Engineer will report to the District's assigned unified flood fight command to coordinate the development and implementation of incident action plans.

Unified situation assessment, resources, and tactical planning of multi-agency flood fight activities will take place within this unified command. See Unified Flood Fight Command Map at www.sjmap.org/oesfcm.

Reclamation District 828 is a member of the METROPOLITAN UNIFIED FLOOD FIGHT COMMAND established by the San Joaquin Operational Area. The Metropolitan Unified Flood Fight Command meets at the San Joaquin Operational Area Emergency Operations Center, 2101 E. Earhart Avenue, Stockton. The boundaries and assignments to this command may be viewed on the SJ County Unified Flood Fight Command Map available at www.sjmap.org/oesfcm.

4.2.2 San Joaquin Operational Area Emergency Operations Center

The County of San Joaquin maintains and hosts the San Joaquin Operational Area emergency operations center (EOC) at 2101 E. Earhart Avenue, Stockton, in the Robert J. Cabral Agricultural Center. There could be other emergency facilities established under the OA-EOC located in separate locations.

The Operational Area Multi-Agency Coordination Group (MAC Group) may be activated to assist the EOC Director prioritize incidents for allocation of scarce resources, including mutual aid, assists Planning/Intelligence in information sharing, and conduct resource coordination processes in accordance with the procedures maintained by San Joaquin County Office of Emergency Services. This group works closely with the OA-EOC Logistics Section.

The San Joaquin Operational Area Planning/Intelligence Section will provide disaster intelligence and situational status to participating jurisdictions upon activation in an emergency. This District will participate as needed in this disaster intelligence and information sharing process. See www.sjgov.org/oes for relevant San Joaquin Operational Area plans.

Reclamation District 828 is a signatory to the San Joaquin Operational Area Agreement and as such, its District Engineer will participate in SJOA multi-agency coordination processes and procedures on behalf of the District. General travel times from District to the SJOA emergency operations center is 20-30 minutes. District representative may remotely communicate with the SJOA EOC through cellular telephone.

4.2.3 State-Federal Flood Operations Center

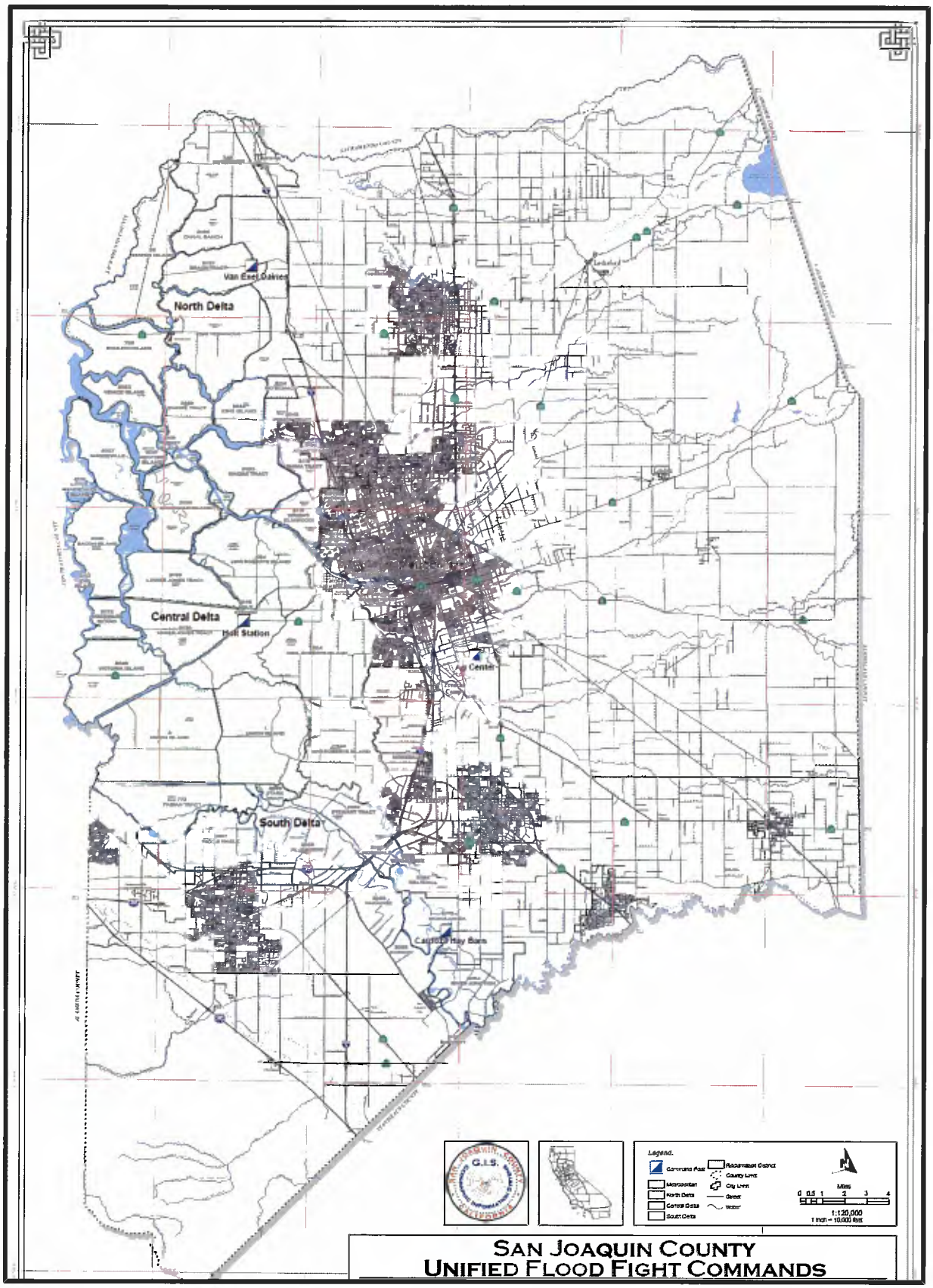
The Department of Water Resources has special authority under Water Code Section 128 to assist Reclamation Districts with flood fight operations. The Department of Water Resources maintains the State-Federal Flood Operations Center (FOC) to perform these functions and support the operations of other State and Federal agencies. The District will maintain communications with the FOC in order to receive and provide information with that facility and to request technical assistance. The District will communicate with the flood operations center through telephone systems or at Metropolitan Unified Flood Fight Command multi-agency coordination activities where FOC representatives are present.

4.2.4 San Joaquin Operational Area Joint Information Center

Risk communication to the general public will also be coordinated, planned, and carried out through the San Joaquin Operational Area Joint Information Center (JIC). The District will assist with risk communication as requested through the operational area. See www.sjgov.org/oes for relevant San Joaquin Operational Area plans and procedures.

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

Figure 4.1 Unified Flood Fight Commands



Section 5 - Communications

5.1 Communications Organization

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

1. Between District personnel, contractors, and other staff working under District supervision
2. With other public agencies operating within the District
3. With neighboring Reclamation Districts
4. With the San Joaquin Operational Area EOC
5. With the State Flood Operations Center

5.2 District Communications

The District does not own or operate communications equipment. The District will rely on personal cell phones of its personnel and trustees to maintain communications between the Board of Trustees, the District Engineer, the District Secretary/Legal Counsel and other response personnel that may be hired during the emergency period. In the event of failure of cellular telephone systems the District will use messengers to transmit information between its personnel and other jurisdictions as well as regularly scheduled coordination meetings of the field unified commands and the San Joaquin Operational Area organization.

5.3 Communications with Other Jurisdictions

The District will maintain communications with other jurisdictions by cellular telephone and by participation in meetings of the Metropolitan Unified Flood Fight Command. The Operational Area may assign radio or phone communications equipment to the District if this will provide reliable contact, if requested.

5.3.1 San Joaquin Operational Area EOC

The District will maintain communications with the San Joaquin Operational Area EOC by cellular telephone and participation in scheduled meetings of the SJOA management group. District will maintain telephone numbers assigned by SJOA for use by reclamation Districts.

5.3.2 Department of Water Resources State-Federal Flood Operations Center

The District will communicate with the Flood Operations Center by cellular telephone. Additional communications equipment may also be provided to ensure contact, if requested

Section 6 - Logistics and Finance/Administration

6.1 Mutual Aid

The County is a signatory to the California Master Mutual Aid Agreement and the District to the San Joaquin Operational Area Agreement. District personnel will follow the processes outlined in those documents for requesting and providing mutual aid. The San Joaquin Operational Area Agreement and San Joaquin County Ordinances have provisions allowing the San Joaquin Operational Area Logistics Section and San Joaquin County Purchasing Agent to acquire and transport, on behalf of the District, resources requested by the District.

Mutual aid requests for technical assistance and services, flood fight crews, supplies and materials, and other resources will be made through the San Joaquin Operational Area Logistics Section and/or the Operational Area Public Works Mutual Aid Coordinator. See www.sjgov.org/oes for operational area plans and procedures.

6.2 Resources

The District does not own or maintain flood fight resources. San Joaquin Operational Area maintains seven twenty-foot containers with flood fight supplies that the district can draw on through the San Joaquin Operational Area Agreement. Inventory of that resource can be obtained from San Joaquin Operational Area.

6.3 Procurement

District maintains standard forms and processes for initiating and executing contracts with appropriately licensed contractors in accordance with Public Contract Code Article 60.5 Sections (20920-20927) and (22050). The District maintains a standard contract form for contracts under $25,000 which do not require a formal public bid process. The District maintains a separate contract form for all contracts for any improvement or unit of work, or for materials or supplies over $25,000 adding a formal bidding process whereby the District shall be responsible for awarding to the to the lowest responsive, responsible bidder except as otherwise provided below.

In the event of any emergency, the District may negotiate and award a contract for the construction of work to prevent damage or repair damaged works without advertising for bids and expend any sum reasonably required in the emergency. If notice for bids to let contracts will not be given, the District shall comply with Chapter 2.5 (commencing with Section 22050).

6.4 Logistics Facilities

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

6.5 Finance and Administration

The District maintains financial and administrative records associated with emergency response in accordance with *44 C.F.R. Part 13--Uniform Administrative Requirements For Grants And Cooperative Agreements To State And Local Governments*. Emergency response and construction records, including field reports, procurement and construction management files are maintained by both the District and the District's Engineer and are

retained as prescribed by the grant authority. District maintains a safety plan for employees and work rules as appropriate.

Section 7 - Plan Development and Maintenance

7.1 Plan Development and Maintenance

The District Secretary/Legal Counsel and District Engineer are responsible for overseeing the development of the Reclamation District 828 Emergency Operations Plan. The District Engineer will maintain the District Flood Contingency Map which constitutes Annex A of the Plan. The District Secretary/Legal Counsel and Engineer are responsible for periodic review of the District Emergency Operations Plan and Annex A to determine the need for revisions or updates.

The District Board will approve this plan when initially completed. The District President is authorized to approve routine updates and revisions. The District Board will review and re-approve the Emergency Operations Plan and Annex A at least every three years. Revised plans must be reviewed and approved by protected cities and the County.

7.2 Training and Exercises

The District will maintain a training program to implement this emergency operations plan and to meet minimum federal and state requirements for disaster reimbursement. All District training will comply with the National Incident Management System (NIMS) and the Standardized Emergency Management System (SEMS). The District Emergency Response and Training Policy explains the District training program in detail (See Attachment 1).

District personnel will receive training on the District EOP – Basic Plan and Annex A – Flood Contingency Map.

District personnel will participate in internal exercises and exercises sponsored by the San Joaquin Operational Area jurisdictions.

7.3 Plan Evaluation

Reclamation District 828 personnel will prepare a written After-Action Report (AAR) after any District declared emergency affecting District levees. The District Secretary/Legal Counsel is responsible for the preparation of this report. The Board will review and approve the AAR which will briefly describe District operations, response problems that arose, and damage sustained by the District. The AAR will also contain recommendations for improving District emergency operations in the future. The Board will provide direction to personnel as to the preparation of changes, additions, or revisions to the District emergency operations plan.

Section 8 - Authorities and References

8.1 Federal

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

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

8.2 State

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

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

8.3 Local

Ordinance Code of San Joaquin County 1995, Title 4 – Public Safety, Division 3. – Civil Defense And Disaster, Section 4-3008

Lower San Joaquin River and Delta South Regional Flood Management Plan, November 2014

Attachment 1

Reclamation District 828 Emergency Response and Training Policy

Reclamation District 828 Board of Trustees hereby adopts the National Incident Management System (NIMS) for organizing emergency response activities. The Board further establishes the following emergency response and training policies.

Emergency Response

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

National Incident Management System Training Guidance

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

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

Reclamation District 828 Training Requirements

The Board of Trustees hereby establishes the following training requirements for District personnel involved in flood emergency operations.

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

The District Secretary/Legal Counsel and District Engineer shall complete, at a minimum, the SEMS Introduction, ICS-100 Introduction to the Incident Command System, ICS-200 ICS for Single Resources and Initial Action Incidents, and IS-700 NIMS An Introduction courses to meet Type 4 incident management requirements. In addition, the District Secretary/Legal

Counsel and District Engineer shall complete IS-800 National Response Framework and IS-701 NIMS MACS course to meet inter-agency coordination responsibilities.

Staff hired or transferred to serve as Emergency Levee Workers at the time of an emergency shall receive a 2-hour RD828 Emergency Safety and NIMS Course that will include a 60 minute summary of the SEMS Introduction, ICS-100 and IS-700 courses and specific safety information for their emergency duties prior to beginning work.

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

By: _____

_____
Title

_____

Attachment 2

Reclamation District 828 Delegation of Authority Letter

As of _____ hrs, _____, I have delegated the authority and responsibility for the
(Time) (Date)

complete management of the Reclamation District 828 _____ Incident to
(Name of Incident)

_____ acting as District Incident
(Name of Individuals)

Commander and Deputy Incident Commander respectively.

Instructions

As Incident Commander, you are accountable to me and the Board of Trustees for the overall management of this incident including control and return to District personnel and contractors. I expect you to adhere to relevant and applicable laws, policies, and professional standards.

My general considerations for management of the incident are:

1. Provide for safety of District personnel.
2. Keep the Board and Board Secretary informed of key actions, and the situation.
3. Comply with the RD828 Flood Safety Plan and document conditions requiring its modification

My specific directions and clarifications of authority for this incident are:

1.

2.

3.

4.

By: _____
(President, Board of Trustees)

_____
Date

Attachment 3

Emergency Resolution Template

RESOLUTION OF THE BOARD OF TRUSTEES
OF RECLAMATION DISTRICT NO. ___

RESOLUTION No.__

Upon special notice to and consent by the Trustees of Reclamation District No ___, of the County of ___, State of California, an emergency meeting of the Board of Trustees was held at the district offices at **[LOCATION]** on **[DAY and DATE]** at **[TIME].** The Board agrees that an emergency situation exists which requires immediate action by the District.

[DESCRIPTION OF EMERGENCY EVENT, JUSTIFICATION]

EMERGENCY DECLARATION

WHEREAS, the trustees of Reclamation District ___ have considered the condition of the District Levees and the potential risk of general operation at the expense of public safety and agricultural production; and

WHEREAS, the Trustees have noted that the Sacramento and San Joaquin Delta is and will continue to experience high water levels resulting from heavy rainfalls and runoff, and high winds; and

WHEREAS, the District is experiencing **[DESCRIPTION OF EMERGENCY EVENT]**; and

WHEREAS, after consultation with the District staff and engineers after a visual assessment of the condition of the District levees on **[DATE(S) and TIME(S)],** the District finds and declares on **[DATE]** that an emergency situation exists and that all necessary and required work to protect the District and the District's levees should be completed at the earliest possible date.

NOW, THEREFORE, BE IT RESOLVED AND ORDERED by the Board of Trustees of the Reclamation District No. ___, as follows:

1. As of **[DATE]** an emergency situation exists within the District and along the District's levees, which requires the District to proceed immediately with the work to prevent the possible flooding of the district, and failure to its levees at the earliest possible time.

2. That the district President, and/or staff be hereby authorized and directed to acquire such materials and equipment and to enter into contracts necessary and appropriate to meet the emergency needs of the district in accordance with Flood Safety Plan.

CERTIFICATION

I, _____, President and trustee for Reclamation District No. ____ (District) do hereby certify that the above is a true and correct copy of the resolution which the Board of Trustees of the District unanimously adopted on **[DATE].**

Executed on _____, in _____, California.

_____
District President

Map not included due to size but is available for review at the District's office. Please call (209) 948-8200 if you are interested in reviewing the map.

Reclamation District No. 828
Operations & Maintenance Manual

Appendix E

Superintendent's Guide to Operation and Maintenance of California's Flood Control Projects

STATE OF CALIFORNIA — THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT

SUPERINTENDENTS GUIDE TO OPERATION & MAINTENANCE OF CALIFORNIA'S FLOOD CONTROL PROJECTS

INTRODUCTION

The Guide has been prepared to help supervisory personnel of reclamation districts, levee districts, flood control districts, and other local agencies with flood control responsibilities in acting as superintendents of flood control projects In California. The Guide is also intended for use by Supervisory personnel of the Department of Water Resources who have similar responsibilities.

The Guide explains the duties and responsibilities of those who supervise the maintenance and operation of flood control facilities in their areas of jurisdiction. It also identifies the federal. State, and local regulations that superintendent is required to know and comply with. Ail personnel who supervise flood control workers should familiarize themselves with this information. It will help them understand the importance of properly operating and maintaining the projects that millions of Californians rely on for protection of their lives and property.

At the time the Guide was released, the U.S. Corps of Engineers was conducting experiments and pilot studies to determine how well certain types of vegetation prevented erosion from occurring on levee slopes. When the study Is completed, the results may differ from the recommendation outlined in this document, which are based on The Reclamation Board's Guide for Vegetation on Project Levees, In the interim, the Board's program will apply.

The Guide has been prepared specifically for use In the Central Valley. This is because the flood control supervision, maintenance, and inspection authority of the Department of Water Resources, under statute or in cooperation with The Reclamation Board, is limited to the drainage of the Sacramento and San Joaquin rivers. However, this Guide should be applicable and useful to all federal flood control projects in the State. Federal projects both inside and outside the Central Valley are authorized in the Water Resources Law of 19Y5 (as amended) and are listed in Section 12639 and following sections of the Water Code.

The Guide is arranged so that it can be readily revised and updated as needed. Comments regarding the contents can be sent to:

Department of Water Resources
Flood Operations Center
1416-9th Street
Sacramento CA '94236-0001

STATE OF CALIFORNIA
George Deukmejian Governor

THE RESOURCES AGENCY
Gordon K. Van Vleck, Secretary for Resources

DEPARTMENT OF WATER RESOURCES
David H. Kennedy, Director

John P. Caffrey
Deputy Director

Robert G. Potter
Deputy Director

Robert E. Whiting
Deputy Director

Salle S. Jantz
Assistant Director

Susan Weber
Chief Counsel

DIVISION OF FLOOD MAMAQEMEHT
G. Donald Meixner, Chief

This publication was prepared under the direction of

Don Neudeck, Chief, Flood Operations Branch

By

Billy E. dark, Deputy Chief, Flood Operations (Retired)

assisted by

Wendy S. Fitzgerald . . . . . Levee Management Specialist
Gayle Dowd . . . . . Water Resources Technician II
Travis Latham . . . . . Research Writer

ACKNOWLEDGMENTS

The Superintendent's Guide has been reviewed by the the U.S. Army Corps of Engineers, Sacramento District; The Reclamation Board; and the Governor's Office of Emergency Services. We appreciate the assistance they gave during preparation of this document.

CONTENTS

SECTION 1. RESPONSIBILITIES AMD DUTIES OF THE SUPERINTENDENT

CONTENTS (Continued)

Figures

SECTION 1

RESPONSIBILITIES AND DUTIES OF THE SUPERINTENDENT

Superintendents, Local Agencies 1.10

The superintendent of a reclamation district, protection district, drainage district, municipality, maintenance area, or other public agency within the limits of any federal flood control project in the Sacramento and San Joaquin River watersheds is responsible for maintaining and operating the project works lying within the boundaries or jurisdiction of such an agency. These activities must be performed in accordance with Sec. 208.10, Title 33, of the Code of Federal Regulations, approved by the Secretary of the Army on August 9,1944.

Superintendents, Department of Water Resources 1.20

Personnel of the Department of Water Resources (DWR) who are designated as superintendents in charge of operations and maintenance of federal flood control projects are also required to meet the requirements of the Code of Federal Regulations.

The Superintendent's Area of Responsibility 1.30

Local Agencies. Under the direction of a local agency's board of directors or board of trustees, local agency superintendents are responsible for maintaining and operating all portions of the projects within the Sacramento and San Joaquin valleys within the boundaries of their jurisdiction, except those works charged the Department of Water Resources under Water Code Sec. 8361 and the maintenance areas that are maintained by DWR, with local beneficiaries paying the costs (Sec. 12878). 1.31

The Department of Water Resources is responsible for maintaining, at State expense, certain channels of the Sacramento River Flood Control. Project and Sacramento River Major and Minor Tributaries Project, the American River Flood Control Project, and the Middle Creek Project (Sec. 8361). This responsibility is defined as channel capacity maintenance. It does not include protection of the levees or private property from erosion or other damage. That work is the responsibility of the local levee maintenance agency or property owner.

1. Assistant

   To appoint and train an assistant to act in the superintendent's absence.

2. Staff

   To maintain and develop a staff of trained personnel who can (a) safely and effectively operate and maintain flood control project structures and facilities and (b) assume responsibility during a flood crisis.

3. Supplies
   To keep on hand a reasonable supply of flood fight tools and materials for flood emergencies, and to have 24-hour access to sources of additional supplies.

4. Emergency Personnel

   To have readily available an up-to-date list of telephone numbers of State and local officials and personnel with special expertise in meeting flood emergencies.

5. Inspections
   To make periodic inspections of all project structures and facilities, including any notable changes in levee crown elevation (subsidence) to ensure these control works will provide the designed flood protection.

6. Budget

   To submit an annual budget that will provide funds adequate for maintenance of the district's flood control responsibilities, (Procedures for review and approval of local district budgets may vary from agency to agency.)

7. Safety

   To support and enforce safety rules and programs.

(Regulations on operation and maintenance of project facilities are stated in the U.S. Corps of Engineers' Standard Operation and Maintenance Manual and Supplements, Title 33) Chap. 2, Part 208, Flood Control Regulations. Special duties of the superintendent during flood emergencies are outlined in Section 6, "Emergency Operations," of this Guide.)

Maintenance Policies 1.40

All superintendents of flood control project, maintenance units, whether they are employed by a local agency or the Department of Water Resources, are required to observe The Reclamation Board's policy to maintain and protect the environment in a manner that is consistent with the protection of lives and property from floods. The protection of wildlife mitigation areas, especially revegetation easements, is essential to environmental protection.

Superintendents are also required to promote good relations with the public by considering the value of property adjacent to project facilities. Superintendents are responsible for ensuring that certain maintenance and operation procedures such as burning, herbicide spraying, crown roadway maintenance, and bypass flooding do not inconvenience or endanger nearby landowners or endanger wildlife mitigation easements. Although not necessarily required, a courtesy visit or phone call to persons who might be affected by such work can do a great deal to promote favorable relationships between project maintenance personnel and property owners.

Authority to Carry Out Duties 1.50

Operation and maintenance of flood control projects In California are governed by two agencies, the U.S, Army Corps of Engineers and The Reclamation Board, as provided for under provisions of the California Water Code. The Corps of Engineers works with other public entities as sponsors of flood control projects, water conservation districts, water districts, and conservation districts.

U.S. Army Corps of Engineers. By an act of 'Congress in 1917, 1.51 the Corps of Engineers was empowered to study and adopt a major flood control plan to minimize the seasonal overflow of navigable streams and their tributaries In the Sacramento and San Joaquin Valleys. After many proposals were considered, a modified version of the 1911 California Debris Commission Plan was adopted. The revised plan consisted of a system of flood control reservoirs, leveed streams, bypasses, weirs, canals, and drainage pumping plants. Although It has never been fully completed, the plan in use today is essentially the same as the one that was adopted in 1917.

The Corps was originally charged with constructing facilities to provide the maximum flood protection for thousands of acres of agricultural land and the many communities situated on major streams in the Central Valley. Later the Corps was commissioned to establish rules, codes, and standards for maintenance of certain project levees, to be performed by State and local agencies wholly at their expense. The Corps' responsibility for planning and building flood control facilities was later expanded by Congress to include other parts of California outside the Central Valley.

Congress has recognized the impacts of flood control development on fish and wildlife. The construction of bank protection units now includes mitigation measures to compensate for environmental losses. Mitigation programs are coordinated with The Reclamation Board and include acquiring prime wildlife areas In fee or through easement and improving marginal areas through revegetation efforts. 1.51 (Cont.)

The Reclamation Board. The Reclamation Board was created in 1911 and reorganized in 1913 as a" agency of the State of California to develop and carry out a plan to control flooding along the Sacramento River and its tributaries. The Board's Jurisdiction was later extended to include the San Joaquin River and its tributaries. 1.52

Recent legislation has increased the scope of the Board to include more active participation in federal flood protection projects and designated floodplain management in the Central Valley.

Changes in federal participation and policy have altered the operation of the Board from time to time, until now Its functions include approving plans, acquiring rights of way and flowage easements, providing assurance of local cooperation, and enforcing maintenance requirements established by the Corps of Engineers. The Board takes lead responsibility for the long-term management and perpetuation of mitigation areas. The Board also reviews applications for any alteration or encroachment of any adopted plan of flood control in the Central Valley and approves or denies the request.

The Board has been administratively part of the Department of Water Resources since 1958, but it functions as a separate agency in exercising its original flood management responsibilities on the Sacramento and San Joaquin rivers and their tributaries.

Staff of the Flood Control Project Branch of the Department of Water Resources has the lead role in representing The Reclamation Board with the Corps of Engineers in developing and maintaining mitigation lands. Questions regarding the location and management of revegetation easements and other mitigation properties should be referred to the Flood Control Project Branch.

(The Reclamation Board, a booklet published by the Board, describes the Board's history and its present involvements.)

The California Water Code. The rules, regulations, and standards set by the Corps of Engineers for operation and maintenance of federal flood control projects are incorporated into the California Water Code. They cover all phases of the use, rights, and distribution of California's water resources. 1.53

(Secs. 8520-9377 codify the law governing The Reclamation Board. Secs. 8340-9577 and Sec. 12878 assign certain responsibilities to the Board regarding maintenance of flood protection works following

Responsibilities of the Department of Water Resources 1.60

Since 1947t the Department has inspected project facilities semi-annually for- compliance with federal, State, and local maintenance requirements. The Department also prepares annual reports that rate the degree of compliance (Water Code Sec. 8371)' This work is part of the assurances The Reclamation Board gives the federal government that certain flood control facilities built by the Corps of Engineers are properly maintained. In areas of the State beyond the limits of the Sacramento-San Joaquin Valley and outside the jurisdiction of The Reclamation Board, the Department has the authority to form maintenance areas for federal flood control projects, when necessary, and to assume responsibility for their maintenance (Water Code Sec. 12878 et seq.).

Maintenance Areas 1.70

The California Water Code (Sec. 12878) empowers The Reclamation Board to establish a maintenance area within its area of jurisdiction when the Department has determined that a unit of the project is not being properly maintained by the local agency having that responsibility. Maintenance costs in a maintenance area are apportioned to property owners in the protected area on an ad valorem basis (according to the value), or on a land use basis, and the assessment is collected as a Special benefit assessment with county taxes.

Responsibility for operation and maintenance of a maintenance area is assigned to the Department of Water Resources. Such responsibility may be returned to a local agency when it has demonstrated the desire and financial ability to meet the obligation.

Local Agencies 1.80

Local agencies-may be organized under any of several designations, depending on the purpose for which they were formed. These include water, reclamation, levee, irrigation, drainage, protection, water storage, flood control, or special districts. As used in this Guide, "local agency" refers only to those organizations that have a direct flood control maintenance responsibilities.

The procedures for dissolving a local agency are contained In Water Code Sees. 56000 et seq. ("Cortese-Knox Local Government Reorganization Act of 1965"). To begin dissolution proceedings, a petition signed by at least 5 percent of the registered voters must be filed with the Local Agency Formation Commission. The responsibilities and maintenance procedures set forth in this guide refer principally to federal flood control projects. However, local agencies whose responsibilities may include non-project and privately owned flood control facilities may also follow these guidelines.

SECTION 2

SAFETY

Permit Requirements 2.10

The superintendent is usually required to obtain a permit before certain maintenance or flood control work can be performed. Permits are issued by city, county, State, or federal agencies, any of which may impose restrictions and regulate other conditions related to the proposed work. Permits may be issued on an annual basis or for some other limited term.

Following is a partial list of maintenance operations for which permits must be obtained.

Equipment Transportation. Moving equipment and vehicles that exceed the legal limits for height, width, and weight requires a permit from the California Department of Transportation (Caltrans) and/or the city or county through which a vehicle unit must pass. A blanket permit may be obtained in some cases. Requirements for legal tie-downs will vary. The California Highway Patrol requires that all regulated loads follow the specific procedures contained In the California Administrative Code, Title 12, Subchap. 7. When DWH personnel are transferring equipment (a non-regulated load), they are required to follow the DWR Maintenance Safety Rules Manual, Sec. 3.17. The California Vehicle Code defines a legal load and the conditions under which such loads may be carried. 2.11

Traffic Control. When traffic must be controlled as a safeguard during maintenance operations on or next to a public street or highway, a notification and approval permit must be obtained from Caltrans or the city or county Involved. Proper warning signs must also be placed In accordance with state and local codes. Burning operations, tree removal, levee erosion repair, slope mowing, and herbicide spray programs are among the projects that may require traffic control. 2.12

Restoration and Repair. Riverbank and levee stabilization activities that require more than one' cubic yard of material per running foot for a distance of more than 500 feet or more than 1,000 cubic yards of import material are covered under Sec. UM of the Federal Clean Water Act. However, in California, approval is required from the Regional Water Quality Control Board. Maintenance work exceeding the foregoing specifications will require permits from the Corps of Engineers. Other permits may be needed from the California Department of Fish and Game (Sec. 2.14). Work of this type may be performed by the Corps of Engineers. 2.13

Channel Clearing. Any project that involves moving soil, sand, or gravel in or near a body of water requires the agency planning the project to reach agreement with the Department of Fish and Game (DFG Code, Secs. 1601-1603). Sec. 1601 applies to government agencies and public utilities. The agency uses Form FG 2023 to notify DFG of its plans. 2.14

The superintendent should coordinate with the nearest U.S. Fish and Wildlife Service, Endangered Species Office, to determine any requirements for avoiding or mitigating Impacts to endangered species.

Once the agency has reached agreement with DFG, routine maintenance work in or near a body of water does not require any further notification or agreement, unless there has been substantial change in vegetation or the fish and game resource. However, by a memorandum of understanding between the two departments, DWR does obtain agreement from DFG for every routine maintenance proposed each year. DFG has similar understandings with other agencies regarding this type of work.

Work of this nature may require additional permits from the Corps of Engineers and the Water Resources Control Board.

Burning. Burning of vegetation on levee slopes or debris left by floods or channel clearing is generally restricted to rural areas. This work requires permits from local fire districts and the local air pollution control board. These agencies must also be notified when the work is to begin. In special cases, when burning is banned for environmental or other reasons, a variance may be obtained, provided the need for the work can be justified. 2.15

Rodent and Vegetation Control. The use of certain "restricted use" materials to control rodents and vegetation on levee slopes and in channels requires a permit from the county agricultural commissioner in the county where the work will be done. To obtain a permit to purchase and apply restricted use materials, applicants must possess a Qualified Applicator Certificate Issued by the Department of Food and Agriculture. 2.16

When a seasonal or annual permit is obtained for restricted use materials, a notice of Intent containing specific information about the proposed project must be submitted to the county agricultural commissioner 24 hours before the start of work. The commissioner may waive the 24-hour requirement or modify some of the Information required, if assurance Is given that the work will be performed according to proper safety and environmental considerations.

A monthly report summarizing pesticide use must be submitted to the county commissioner by the 10th of each month following the use of any pesticide.

A special permit is also required from the California Department of Fish and Game to take beavers, badgers, and other large rodents that can damage levees. 2.16 (Cont.)

Worker Safety 2.20

Maintaining flood control project facilities generally involves using heavy equipment, vehicles to transport heavy equipment, and cutting tools, and handling and using toxic materials. Also, workers are sometimes exposed to weather extremes that create physical hazards.

The importance of taking all reasonable steps to ensure the safety of workers should be kept in mind at all times. Statements such as. "No Job is so important that it cannot be performed safely" and "All accidents are avoidable" are sometimes challenged, but they are, nevertheless, excellent bases for adopting safety practices.

The Department of Water Resources, acting on behalf of the State of California, Is serious about holding injuries to its employees to the lowest possible level. In keeping with this policy, DWR employees who work on flood control project facilities are required to attend safety training classes (Sec. 2.26). DWR superintendents are expected to fully enforce all safety rules and regulations and support safety measures.

Similar programs to promote safety are recommended for local maintaining agencies.

Safety Training 2.30

The Department of Water Resources trains its flood control project personnel in all phases of flood control project maintenance. Employees whose jobs involve such work must satisfactorily complete all relevant training courses before they may assume field maintenance duties.

The superintendent should not assign any employee too potentially hazardous work until the employee is properly trained and considered to be qualified or can be assigned to work under the direction of a properly qualified person.

The superintendent will schedule courses to meet operational needs and will keep complete and accurate records of courses completed by employees.
When it is convenient i DWR crew leaders are expected to supplement classroom training by providing new employees with field duties that relate to their class work. Superintendents should require each employee to prepare a training development plan.

Employees whose duties require handling pesticides must be trained thoroughly in the laws and regulations related to the handling of pesticides and the use of protective clothing and equipment. They must also be well informed about the common symptoms of pesticide poisoning and be warned that it is dangerous to eat, drink, or smoke while engaged in such work. 2.30 (Cont.)

Safety Meetings. All DWR employees who work on flood control project facilities must attend regular safety meetings. The superintendent on the job is responsible for arranging the meetings and providing instructional material for the topic of discussion. Active participation by all personnel is encouraged, and the date, subject matter and names of those present are kept on file. 2.31

The Department also encourages frequent tailgate meetings at the job site. The crew leader conducts informal discussions of safety practices that apply to the work at hand. Procedures for performing the work are reviewed, possible dangers are brought to light, and preventive measures fully discussed. The Department recommends that superintendents of local agencies adopt similar useful practices.

The Department sponsors a Flood Fight School, scheduled annually, at the Bryte maintenance yard in Sacramento. Attendance is mandatory for all DWR flood control project employees. All local agencies personnel with flood control responsibilities are strongly urged to attend this class. Classes will be scheduled at other times upon request.

Protective Gear. The Department issues required protective gear to flood control project employees, along with directions for recommended and mandatory uses. This equipment is provided at no cost to the employees, who are responsible for using it as directed, keeping It in good repair, and requesting replacements when Items are no longer serviceable. 2.32

All agencies must provide the following items of clothing and equipment. Other protective gear may also be necessary for certain types of tasks.

Hard Hats, Hard hats are worn to prevent head injuries. The use of an approved hard hat is mandatory for all personnel Involved in flood control project maintenance activities, whether they are performing field work or only observing the work of others. A smaller, lighter-weight version of the hard hat, commonly called a bump hat, is acceptable for some operations.

Protective Face Wear. The use of safety glasses, goggles, or face shields are necessary to safeguard against eye Injuries caused by flying objects, pesticides, or other environmental hazards. All workers are encouraged to wear appropriate protective face wear for all maintenance activities.. Use of this equipment is required for certain activities.

Gloves. Simple cotton gloves or leather mittens can minimize painful burns, cuts, and bruises during use of hand tools. 2.32 (Cont.)

Coveralls. Coveralls are issued to DWR field employees to protect their own clothes from undue damage, wear, and soiling. The coveralls are laundered regularly at the Department's expense and replaced when no longer fit for use. Coveralls offer some degree of safety against scratches and other minor injuries, but workers should be cautioned that loose clothing is hazardous when worn by someone who is operating machinery with exposed moving parts.

Particle Masks. The use of a particle mask prevents dust particles and other air-borne pollutants from entering the respiratory system.

Ear Plugs. Fitted ear plugs or approved ear muffs must be worn by DWR employees who are operating or working near machinery that emits noise above 85 decibels.

First Aid Kits. Approved first aid kits are installed in all State-owned vehicles. Drivers are responsible for seeing that kits are fully stocked with the appropriate items. The kit is only for temporary emergency care of injuries in the field. Both the injured person, if able, and management personnel should determine whether additional medical attention is advisable. A formal accident report is always required for all accidents. First aid training, including cardiopulmonary resuscitation (CPR), is required of all DWR field personnel.

Safety Belts. Safety belts are installed in all State-owned vehicles, and their use by the operator and all passengers is mandatory. The driver is empowered to enforce this regulation. Failure by driver or passengers to "buckle up" can result in a fine; suspension without pay, or termination.

Protective Gear, Pesticide Use. All flood control workers who handle pesticides must be equipped with protective clothing and equipment appropriate to this work, as directed on the pesticide label. This type of gear includes the following items: 2.33

Gloves. Appropriate protective gloves, worn as directed on a pesticide label, are mandatory when workers are handling pesticides or other hazardous material.

Aprons and Disposable Coveralls. DWR employees are required to wear protective clothing made of a nonabsorbent material when they are mixing and loading pesticides or rinsing emptied pesticide containers. Disposable coveralls should also be worn by any employees who may come Into contact with the pesticide during application.

Particle Masks. A particle mask is required for any DWR employee who is handling herbicides.

Rubber Boots. Rubber boots are necessary for employees who mix and load pesticides and for pesticide applicators who may come Into contact with the spray mixture. 2.33 (Cont.)

(See also Sec. 2.41.)

Foul Weather Gear. Foul weather gear is issued for use primarily during flood emergencies. Few, if any, field maintenance activities can be performed satisfactorily in stormy weather. During such periods) the superintendent should assign duties in locations that provide some protection from the elements. In a flood emergency, however, employees are expected to accept many weather-related hardships. 2.34

Foul weather gear issued to DWR employees usually includes water-proof parkas or jackets, rubber boots (ankle, knee, or hip height), water-repellent trousers, and life jackets approved by the U.S. Coast Guard.

Safe Storage and Handling of Pesticides 2.40

Any use of a pesticide requires strict observance of laws and regulations regarding safe application, control of storage transportation, disposal of empty containers, cleanup of spills, protective clothing and procedures for personal and equipment cleanup.

Because of the toxic characteristics of pesticides and the potential hazards involved in their application, both to users and their surroundings, all aspects of pesticide use are closely regulated by the California Department of Food and Agriculture and county agricultural commissioners' offices. Before DFA authorizes any pesticide for specific use, the pesticide must first be extensively tested for effectiveness and its possible effects on people and the environment.

Pesticides are rated by degree of toxicity; "Danger," "Warning," or "Caution". This must be prominently displayed on the pesticide label. The label must also display appropriate warnings, detailed directions for mixing and use, and Instructions to follow In case of injury by accident or misuse. The label is the law. Read it carefully before starting any application of a pesticide.

Safe Working Conditions. The superintendent is responsible for providing safe working conditions, adequate training, and proper supervision of all personnel who mix, load, transport, apply, or otherwise handle pesticides. Stringent controls adopted by the Department of Food and Agriculture regulate the handling, mixing, application, and cleanup of pesticides. 2.41

The superintendent is responsible for seeing that the mixing site at which employees are handling pesticides has a designated facility for changing into protective clothing and for washing when pesticide use Is completed. It should be equipped with an ample supply of water, soap, and towels for personal use.

The superintendent must also provide employees with appropriate protective clothing, as the pesticide label directs. Also, 2.41 (Cont.)

repair and safe operating condition. This equipment is subject to inspection by county authorities.

Emergency Medical Care. The employing agency must provide emergency medical care for employees whose work Includes mixing, loading, or applying pesticides. The name, address, and telephone number of the medical facility providing such care must be conspicuously posted at the work site and on the application vehicle. Whenever a pesticide related Illness is suspected or whenever a worker has been apparently endangered by overexposure to a pesticide the superintendent must see that the employee receives immediate medical attention. 2.42

Restricted Materials. Certain pesticides are more dangerous than others. These are classified as restricted materials and are subject to limited use and more stringent controls. Their use requires special permits (see Section 2.16). Applicators must hold a certificate as a qualified applicator or work under the direct supervision of a qualified applicator. 2.43

Laws and regulations regarding the application of restricted materials and the Pest Control Licensing and Certification Program are subject to change or revisions without official notification. The superintendent is responsible for keeping informed of any changes. This information is available from the California Department of Food and Agriculture, 1220 H Street, Sacramento CA 95814, or the county agricultural commissioner.

Storage of Pesticides. Pesticide containers, both full and empty, must be stored in a locked enclosure In accordance with the label on the container. When pesticides in storage carry either "Warning" or "Danger" precautions on the label, warning signs in both English and Spanish must be posted on all walls of the storage area. The signs must be readable from a distance of 25 feet. 2.44

Transportation of Pesticides. Pesticides must not be transported In a compartment that Is also occupied by people, food, or animal feed. Pesticides, empty containers, and equipment must be attended at all times while en route. Vehicles used to transport or apply pesticides must be thoroughly cleaned before they are assigned for other uses or are sent to be repaired. 2.45

Rinsing and Disposal of Used Pesticide Containers. A triple rinse and drain procedure approved by the Department of Food and Agriculture must be followed to prepare emptied containers for disposal. Contact the county agricultural commissioner's office for specific requirements on container rinsing and disposal. 2.46

Pesticide Service Containers. As defined by the Department of Food and Agriculture, a service container is any pesticide container. 2.47

hold, or transport a pesticide or a use-diluted pesticide.

Each service container must carry the following labeling:

* Name and address of the person or company responsible for the container.

* Identity of the pesticide (common name or product name). If It is a use-diluted pesticide, the word "diluted" must precede the name.

* A signal word from the original label ("Danger," "Warning," or "Caution").

Pesticide Spills. Spillage of a pesticide or other hazardous material can rapidly become a major health or environmental problem. Whenever a spill occurs, immediate corrective action must be taken, regardless of the type of toxic substance or the amount spilled. The first priority is to give first aid and further medical attention to persona who were exposed to the pesticide. After that, the incident must be reported and the area must be decontaminated. Under no circumstances should pesticide spills be hosed down. 2.48

Contact the local county agricultural commissioner's office for specific requirements for spill cleanup.

The importance of a balanced vegetation management program that preserves the environment without sacrificing the Integrity of flood control structures can't be overemphasized. Natural or planted vegetation on or near project levee slopes can significantly enhance the effectiveness and appearance of a project. When properly managed, vegetation deters surface erosion from rain and runoff. The preservation of vegetation, especially in acquired easement areas, is essential to the management of the flood control project.

However, uncontrolled growth can interfere with routine maintenance and inspections, inhibit flood fight activities, and provide a haven and food sources that attract burrowing animals. Also, when large trees are toppled by wind, disease, or old age, they often dislodge broad areas of protective sod and earth and may divert water into a levee section.

Standards for vegetation control on landward levee slopes differ from those for water ward levee slopes, berms, and overflow areas. Vegetation characteristics, species, and methods of management may vary, depending on the area and soil conditions. Burning) mowing, dragging, spraying, pruning, brush-cutting, and planting are all effective vegetation management tools.

When a levee vegetation management 'program is being planned, several factors should be considered. Levee slopes must allow visibility for regular maintenance inspections and high-water patrolling. Levee personnel must be able to readily detect trouble spots from the crown roadway. Ho vegetation should be allowed to grow within 10 feet of the landside toe of the levee because this is where boils and excess seepage are most lively to occur, also, both landside and waterside toes are often used as access points for maintenance.

Levee slopes should also be kept free of large areas of bunched, woody, or clumped vegetation that would Interfere with flood fighting or emergency repairs. Agricultural pruning and other debris are special targets for removal because they attract burrowing rodents. Crown roadways must be kept free of vegetation, and they should be graveled to provide a sound, drivable surface during floods.

Burning 3.10

Controlled burning of vegetation on levee slopes is an effective method of improving visibility for levee inspection and maintenance. However, in recent years, to minimize air pollution, municipalities and counties have adopted stringent burning regulations. Burning has been banned in some areas, especially in urban areas where air pollution is now recognized as a serious and growing problem. Where burning is permitted; the operation is normally scheduled in July and August when the grasses are thoroughly dry, the game bird hatch has been completed, and most nearby crops harvested. Local air pollution control boards are empowered to designate certain hours and days as suitable for agricultural burning.

On days when burning operations are scheduled, the foreman or other person in charge calls the local air pollution control board for 3.10 (Cont.)

having jurisdiction in the proposed burn area (sea Sec. 2.15).

Because of the risks involved, a supervisor usually oversees extensive burning operations. The amount and type of equipment used and the size of the crew may vary in relation to the size of the area to be burned and conditions on and near the burn site. As an example, a major operation may include a 12-worker crew, with torch men, truck drivers, hose tenders, surveillance crews, and a water supply tank truck operator. Normally, three 500-gallon water tanks mounted on flatbed trucks, with appropriate hoses and pumps, are used to control the Intensity and range of the burn. A 150-gallon water bank mounted on a four-wheel-drive pickup truck is used for surveillance and emergencies. When available, a 4,000-gallon tank truck stands by to refill the fire trucks. The supervisor drives a pickup truck carrying torch fuel and other supplies and directs the operation.

The fire should not be allowed to approach flammable structures. All such structures in or next to the area to be burned should be monitored after they have been chemically fire guarded or soaked with water. Wherever practicable, firebreaks should be placed at the toes of the levee to prevent the fire from spreading to adjoining areas.

All fires, including smoldering debris, must be entirely extinguished before the last employee leaves the burn site.

Mowing 3.20

Mowing levee slopes is an effective alternative where burning is either prohibited or would create an undue hazard to adjacent property or vegetation. Standard levees with uniform surfaces, few encroachments) and slopes no steeper than 2 feet horizontal to 1 foot vertical are ideal for mowing.

The usual procedure is to mow the levee shoulder and a strip 4 feet on the upper part of the levee with a flail mower. A mower with a telescope boom and rotating mowing head is usually enough to mow slope surfaces up to 30 feet wide. Where a 10-foot right of way is available, slopes can be mowed from the levee toe. A push-type power mower or weed-eater is also beneficial for some Irregular conditions. A mower operating in dry vegetation is a fire hazard. If the cutting blade strikes a hard object, creating sparks, the vegetation can be ignited. For that reason, a small water truck should be available.

Spraying 3.30

The use of herbicides to manage vegetation and control weeds can

possible for many maintenance activities.

Permits must be obtained for some herbicide applications, and all safety regulations, including those involving the use of protective gear, must be strictly followed. Care should be taken to prevent spray from drifting into non target areas. Only herbicides that do not vaporize readily should be used.

Broadleaf Selective. Many levee slopes are managed to encourage a solid cover of naturally occurring grasses. Broadleaf weed species on a grass-covered slope tend to be spiny and very tall, and obscure visibility, prohibits access, or otherwise interfere with maintenance and inspection. Broadleaf weeds can be eliminated from desirable sod by broadleaf selective herbicides. Several of these herbicides are also residuals, which means they are incorporated into the soil by rainfall and remain active for some time. Application rates of broadleaf selective herbicides must be closely followed. At higher rates, many of these herbicides will also damage or kill desirable grasses and young trees. These herbicides vary in time of application and the broadleaf species they kill. Special care is needed to keep these materials from reaching desirable vegetation. The county agricultural commissioner's office can supply specific recommendations. 3.31

Bare Ground. Some levee areas, including crown roadways, access points, toe roads, and fireguards, are usually kept free of any vegetation. Nonselective residual herbicides are an economical means of keeping an area free of vegetation for an extended period. Generally, the higher the application rate, the greater the number of species affected and the longer the period of residual activity. Extreme care should be taken to keep these material from drifting into areas where vegetation is desired. Careless applications can create large bare areas of ground that is susceptible to erosion. Careful applications can protect flammable structures from accidental or controlled fires, allow gravel reclamation and roadway maintenance, and make safe travel possible on roads, especially in wet weather. 3.32

Spot Treatment. Spot treatment of weeds is used in a variety of situations where the low density of the target species does not warrant a broadcast application or where the area is inaccessible or otherwise unsuitable for broadcast equipment. 3.33

Spot treatment 13 often used with residual herbicides for fireguarding around structures (Sec. 3.32). It can be used to target a specific weed pest such as Johnson grass or to touch up areas that have been specially sprayed with a broadcast application. The choice of a specific herbicide or combination of herbicides depends on the target species and the area to be sprayed. Contact, residual, and translocating herbicides can all be used for this type of work. (A translocating herbicide is one that moves through a plant into the roots.) The county agricultural commissioner's office can make specific recommendations.

Small-scale spot applications may only require a hand-held pump sprayer, while larger applications could require use of a truck-mounted spray unit with a hose and reel. Since spot applications are 3.33 (Cont.)

needed to minimize drift, especially with high-pressure spray rigs.

Brush and Vines. Brush and vines growing on levees obscure the slope, creating serious inspection problems. Low, dense, and entwined vegetation can prevent routine or emergency access, impede flood flows, divert currents) or plug pumps and drains. Where permissible, the use of herbicides to control brush and vines can be extremely effective, often more so than mechanical clearing, which may stimulate regrowth or break up existing plants into many new plants. 3.34

Spot spraying is generally the application method used to control vines (Sec. 3.33). To completely kill the unwanted plants, a translocating herbicide is necessary. Contact herbicides or incorrectly used translocating herbicides will kill only the above-ground part of the plant, resulting in substantial regrowth in the following season. Special attention should be given to correct timing of application and to obtaining thorough spray coverage. The addition of an Inactive water-base dye can assist spray applicators to achieve uniform spray coverage. Poor coverage is likely to result when plants are dormant, stressed by drought, or covered with dust.

Larger trees can be controlled by cutting them down and immediately spraying or painting the stump with a concentrated herbicide registered for such use.

Where all other options have been exhausted, aerial application of herbicides to control brush over large areas can be considered. This procedure usually requires applying for a 24C Special Local Heed Permit from the California Department of Food and Agriculture. The product manufacturer and all other regulatory agencies must concur before this type of application can be approved. Spray drift from an aerial operation must present no hazard to humans, fish, wildlife, water, or adjacent property.

Federal law (the Endangered Species Act) prohibits the taking of threatened and endangered species without permission of the Endangered Species Office (ESO) of the U.S. Fish and Wildlife Service. Contact the Corps of Engineers, the Fish and Wildlife Service, or the Department of Fish and Game to determine what is endangered.

SECTION 4

PROJECT MAINTENANCE OPERATIONS

Basic maintenance programs related to federal flood control project

Department of Water Resources, enforced by The Reclamation Board, and carried out by local agencies and the Department of Water Resources.

Host maintenance practices in use today have been modified over the years to meet the increased emphasis on preserving ecological and environmental values. Although maintenance costs have risen, the integrity of the flood control system has been preserved and the environment improved.

The maintenance programs most profoundly affected by environmental considerations Include channel clearing rodent control, and vegetation management on or next to project levees, berms, and overflow areas being developed for project mitigation under The Reclamation Board's jurisdiction. Maintenance activity in revegetation and other mitigation areas require special care. This section contains guidelines for specific maintenance operations. Further directions appear in the Board's Guide for Vegetation on Project Levees.

Crown Roadways 4.10

Keeping levee crown roadways, ramps, and State-maintained access roads serviceable are the objective of the crown roadway program. Essentially, the work involves grading and graveling unpaved road Surfaces.

A road maintainer (grader) with a 12-foot moldboard is best suited to smooth the road surface, to minimize ponded water, and to recover gravel displaced by traffic. On crown roadways where heavy traffic has compacted the surface so much that grading causes excessive wear of the blade, scarifying may first be required to loosen the surface. Scarifying the roadway before replenishing the road rook also enhances the bonding of old and new surfacing materials. Road surfaces should be crowned (gradually sloped from centerline to shoulder) to ensure proper drainage.

Dust created by levee crown maintenance and repair work can be a nuisance to nearby residents. It can also damage certain crops growing nearby. Workers should use care during these operations. Some crown roadways require more frequent maintenance than others, principally because of the heavier traffic load they carry. All levee roads, however, should be graded at least twice a year. In the fall after the first rains, and in late spring, before the levees begin drying out and getting dusty, are opportune times for this operation.

Grading of crown roadways is usually a one-person job. Wile the work is being done; the equipment can be parked overnight in a convenient nearby location, provided the site is secure and the property owner grants permission to use it. If such an arrangement is not possible, the equipment should be returned to home base or the

4.10 (Cont.)

reasonable security precautions when not in attendance at the unit, The operator is provided a pickup truck to travel to and from the job site and to haul lubrication and service equipment. A portable two-way radio with a range of at least 25 miles should be provided for emergencies.

Operators of road grading equipment are required to wear hard hats. Safety glasses, masks, and gloves are optional but recommended.

Vegetation Management on Crown Roadways. Uncontrolled growth of 4.11
weeds and grasses on crown roadways may become a maintenance problem. Dense vegetation prevents the grader from operating effectively. Nonselective residual herbicides are generally used to control weeds on crown roadways. Roadways should be sprayed only after grading is completed. (See Sec. 3.32 for information on controlling weed growth on crown roadways.)

Appropriate permits must be obtained before crown roadways are sprayed (see Sec. 2.16).

Fire guarding. Structures or other facilities occupying parts of 4.12
a flood control project must be protected from fire, both accidental and controlled. Removing flammable debris and wild growth from the immediate area is an important fire prevention procedure. Structures must be guarded before or during the early stage of vegetative growth. (See Sees. 3.32 and 3.33 for additional information on the use of herbicides for fire guarding,)

Levee Slopes and Rights of Way 4.20

Levee slopes should be free from nonessential structures, encroachments, or vegetative growth that could interfere with or prevent inspection or hamper flood fighting activities.

Vegetation Management on Levee Slopes. All earthen levees must 4.21
have some sort of erosion protection and yet permit inspection and flood fighting. Sod-forming grasses and ground covers provide the desired protection without interfering with these activities. In some circumstances, The Reclamation Board also permits certain trees and shrubs to grow on levee slopes. (For specific requirements regarding permissible vegetation, consult the Board's Guide for Vegetation on Project Levees.) Broadleaf weeds growing among desirable grasses can be effectively controlled by selective herbicides (see Sec. 3.31).

All levee slopes need thorough periodic inspection for soil erosion; 4.21
animal burrows; weed infestation; diseased, weak, or damaged trees; (Cont.)
and other undesirable growth. Frequency of inspection depends on the nature and location of each levee. Regular mowing or burning enhances inspection. Special care should be taken to protect mitigation areas from mowing and burning. (See Sec. 3 for vegetation management on levee slopes.)

Levee slopes are vulnerable to burrowing rodents » primarily ground squirrels. (See Sec. 5 for control of rodents.)

Dragging. Dragging of levee slopes is a multipurpose operation 4.22
that helps ensure the Integrity of a levee system. It is generally done by pulling a heavy dragging implement, such as a discarded track from a track laying tractor, with a heavy-duty track-laying engine. The drag is rigged with cable controls so the operator can regulate its angle and reach.

Dragging repairs minor surface erosion or Irregularities, preventing more serious erosion. However, disturbing the soil stimulates the growth of weedy plants. OWR personnel schedule broadleaf selective spraying with a pre-emergent herbicide for the fall, following dragging operations (see Sec.3.31).

Hard hats, safety glasses, ear plugs, and a breathing mask are required protective gear for this operation.

Care is needed to avoid removing trees and shrubs that do not interfere with levee inspection. In areas containing elderberry shrubs, coordination with the Endangered Species Office, U.S. Fish and Wildlife Service, is required.

Channel Clearing 4.30

A channel is the entire area of a waterway from the top of one bank to the top of the opposite bank. The general category Includes drainage canals, ditches, and sediment settling basins.

River channels and floodways are rated and designed to carry specific anticipated peak flows. Accumulated silt and wild growth, if not controlled, can lower flow capacities and Impede flows, causing water to rise above intended levels. Such obstructions may also divert flows, eroding banks or levees.

The Corps of Engineers is responsible for periodically dredging navigable channels to remove slit and snags and for removing aged trees deemed to be potential hazards to navigation.

Local agencies and the Department of Water Resources are responsible for clearing channels of excess debris, brush, and other harmful vegetation. One method is to uproot and pile the vegetation with a medium or large bulldozer with a brush rake attachment. A dragline may be better under certain conditions. Piled vegetation must be removed from the floodway before flood season. Where permitted, burning is the most convenient disposal method. (The Department of Fish and Game and The Reclamation Board are the principal permitting agencies.) An alternative method and one that is generally more acceptable, 4.30 (Cont.)
is selective cutting with hand tools, Including chain saws. Woody growth of selected species less than 8 Inches in diameter can be disposed of with a chipper or "brush hog." Spreading and disposal of chips is regulated by the Department of Fish and Game. Personnel of the California Conservation Corps are often available to conduct selective clearing work at low cost. DWR's Flood Project Analysis

operations are discussed In Sec. 2.14.

Unless soil and plant roots are also removed, mechanical control provides only a short-term solution to brush problems. Removal of above-ground plant material stimulates regrowth and suckering in most brush species often resulting In a heavier stand than originally existed.

Where permitted, translocating herbicides can kill above-ground and below-ground plant parts, eliminating or greatly reducing regrowth. Spraying brush in channels without suitable access usually requires a tractor and a trailer-mounted storage tank with a high-pressure pump. Where channels are narrow or where there is improved access, it may be possible to use traditional spray equipment fitted with a long hose. Where all other options are regarded as ineffective, the aerial application of herbicides can be considered. Except as specified on the pesticide container label, special care must be taken to prevent drift or contamination of waterways <see Sec. 3. 4).

Safety practices and gear requirements for channel clearing are the same as those for heavy equipment operation and the handling, use, and disposal of toxic materials. Hard hats, safety glasses, and ear plugs are required for operating chain saws, tractors, and chippers. Consult the pesticide label and also see Sec. 2.22 for recommendations and requirements on the use of specific protective clothing to be worn while handling pesticides.

Drainage Facilities 4.40

Drainage ditches, canals, and settling basins are essential parts of flood control operations and must be periodically inspected and maintained. The flow capacity of drainage facilities can be impaired by undesirable vegetation and built-up silt deposits, primarily from bank sluffing. These facilities can function effectively and safely only when silt and excess growth are periodically removed with a dragline or other suitable equipment. Aquatic herbicides can be used to help control undesirable vegetation. (See See. 3.33! also, consult the county agricultural commissioner's office for recommended materials.) Heavily eroded banks should also be resloped and/or revetted with rock, when needed.

Overhead power lines and underground lines carrying communications, natural gas, oil, or water can endanger channel clearing operations. Most of these hazards can be identified by markers or warning signs. Specific information about location and depth of service lines can be obtained by calling Underground Service Alert (1-800-642-2444).

Control Gates and Culverts. Concrete passageways or corrugated 4.41
metal pipes of varying diameters equipped with manual or automatic flood control gates are situated at appropriate sites in the flood control project. If these facilities malfunctioned, particularly during high-water conditions, flooding could occur in some inhabited or farmed areas. Therefore, normal maintenance of these structures includes keeping the intake and discharge areas free of constricting debris, silt, and wild growth, and Inspecting and testing the

be inspected and tested in the early fall before high water occurs.

Minor Structures 4.50

This category includes mile markers, gates, barricades, and miscellaneous signs. (See Figures 1 - 7, following Sec. 4.67.)

Mile Markers. Mile markers are signs installed on the levee shoulder at half-mile intervals to identify unit designations and levee miles. The markers are seven-foot metal posts with anchors and plates. The posts are driven or set in concrete to a depth of three feet, and the plates are welded to the tops with their faces perpendicular to the levee centerline so they are visible to traffic in either direction. Reflectors fastened to the plates make the markers easy to find when visibility is poor. 4.51

Maintenance of levee mile markers consists mainly of replacing reflectors and damaged plates and keeping signs clean and readable. Vegetative growth that hides the signs from view should be kept clear, either mechanically or with herbicides (see Sec. 3.33).

Gate, Barricades, and Signs. Gates, barricades, and miscellaneous signs are installed to prohibit or discourage unauthorized traffic from using flood control project facilities. Trespassing and vandalism have increased markedly in recent years because of the rise in popularity of recreational vehicles and expansion of housing and Industrial developments. 4.52

Gates on the crown roadway and barricades that extend down levee slopes and across berms are usually effective protection against unlawful entry by motor vehicles. An underlying property owner who needs even greater security may apply to The Reclamation Board for a permit.

Maintenance of gates) barricades, and signs consists mostly of keeping them in good appearance and working properly, including their locking systems. Periodic washing, painting, straightening, and and replacement of reflectors is general maintenance requirements. Visibility must be maintained by eliminating tall vegetation, either mechanically or with herbicides (see Sec. 3.33). Accurate records of the date, time, and type of maintenance performed must be kept to protect the maintaining agency in the event of litigation. (See Figure 7, "Minor Structure Maintenance Report," following Sec. 4.67.)

An acetylene torch or arc welder may be used to Install and repair gates, barricades, and signs, but because of the fire danger, precautions must be taken. A torch or welder should never be used near dry vegetation or when unusually hot or windy conditions exist. At all times, their use should be backed up with a minimum of firefighting equipment: shovels, rakes, appropriate extinguishers) and a supply of water with means of delivering it to a blaze. 4.52 (Cont.)

before the signs are legal. Because regulations and codes vary from area to area, it is best to contact the city or county public works department having jurisdiction. DWR uses signs referring to the State Vehicle Code, Sec. 2116.

Mitigation Measures. Where mitigation and enhancement measures are provided to protect fish and wildlife, endangered species, or other environmental values, care should be taken to avoid harm to these features and to maintain them and any special markings, protective features, etc., as they were installed. These measures are becoming more widely known and installed in connection with federal and state projects as a result of permits from the Corps of Engineers. (See Figures 1 - 7 following Sec. 4.67.) 4.53

Major Structures 4.60

A number of flood control facilities are essential parts of the Sacramento and San Joaquin Rivers flood control projects. These include fixed weirs} control weirs; pumping plants; and diversion, drop, and outfall structures.

Fixed Weirs. A fixed weir designed for flood control functions as a section of a levee. Its crest is at a selected elevation, usually original ground level. The purpose of such a fixed weir is to relieve pressure on a levee system by allowing excess flood water to escape into bypasses or designated drainage basins when river stages begin rising to threatening levels. Fixed weirs allow no discharge to occur until the water level exceeds the weir crest. Fixed weirs are usually built of reinforced concrete, but they may also be built of stone, quarry rook, cobbles, or other suitable material. 4.61

Maintenance of fixed weirs usually requires periodic removal of such obstructions as undesirable vegetation, debris, and silt deposits on the water ward side and clearance of debris from the stilling basin or spillway to permit uniform flow into the escape route. A weir should also be regularly inspected for evidence of spalling or cracking and for exposed reinforcement bars in abutments or wing walls.

Undesirable vegetation should also be removed from the downstream revetment. Where handrails or walkways are present, they should be regularly inspected to ensure that they are safe and meet safety regulations. Where a county or State highway or a railroad is an Integral part of the flood control structure, the maintenance responsibilities are defined in a separate agreement with the agency concerned.

Control Weirs. Control weirs serve essentially the same purpose as fixed weirs. That is, they permit excess water to escape into a bypass system when high river stages occur. Control weirs, however, are designed to release additional flows through a series of control gates to reduce the stress on levee systems, when needed. 4.62

Proper operation of control weirs is considered vital to the safety of residential, industrial, and agricultural property near and down-stream from the facility. Operational guidelines are dictated by the

Removal or leveling of silt deposits, debris, and undesirable vegetation between the river and the structure are essential maintenance activities. The spillway should also be freed of obstructions and the concrete bulkhead and superstructures kept in good repair. Diagrams and maintenance procedures for the control mechanism and a record of maintenance performed should be filed and made readily available for inspection at the headquarters of the operating and maintaining agency. Erosion in the discharge area of the control structure can be expected to occur as gates are opened for flood control. Turbulence created by the volume and velocity of water rushing through the aperture may have a scouring effect.

Whenever the gates of the Sacramento Weir are opened, the event must be documented. The gates are opened and closed under the direction of the Flood Center.

Diversion Structures. Fixed controllable diversion structures divert water from the main channel for flood control, irrigation, or other needs. Accumulated silt, gravel, and debris on the upstream side can restrict flows and interfere with the effectiveness of the structure. 4.63

Maintenance involves removing all obstructive materials, including undesirable trees and wild growth, from the upstream and downstream sides of the structure. The condition of the concrete should be periodically noted and appropriate repairs made. The control gate mechanism should be regularly tested and adjusted to ensure proper operation. Special attention must be given to discharge pipes where obstructions could be present but are not readily visible.

Pumping Plants, A pump or a series of pumps with a wide range of capacities is used to draw excess water from drainage systems and discharge it into the main channel. Steel trash racks are installed to protect the pumps by preventing materials large enough to damage them from entering the intake sump. At some stations, a log boom supplements the function of trash racks. 4.64

All trash, including built-up sand and gravel, must be removed from the area of the log boom, the trash rack, and the gravity discharge pipe or channel before the high-water season begins. Just as important, when the pumps are active, debris captured by intercepting structures must be removed, either by hand tools or mechanical means, before the accumulated materials can clog the system.

Wing walls, bulkheads, splash aprons, and the superstructure are made of reinforced concrete that is subject to cracking and spalling and exposure of the reinforcement bars. Repairs should be made as early as possible. 4.64 (Cont.)

A maintenance guide and inspection check list is located inside each control structure. The superintendent should acquaint himself and all authorized maintenance personnel with the operation) housekeeping, and maintenance procedures for the facility.

that are usually situated in a drainage canal or channel near its confluence with a main river. A series of mechanized discharge pipes or slide gates are incorporated into a reinforced concrete barrier that, when closed, prevents flood water in the river from backing up into the drain system.

The gates can also be operated to maintain desirable levels in the drainage system to meet irrigation needs or to release excess flood water into a bypass system.

Trash gates and/or log booms are positioned on the upstream side of the control gates to prevent debris from fouling their operation. When debris begins to collect in the area, it must be removed immediately. At some facilities, a debris boom is installed for this purpose. Revetment on both sides of the structure should be kept clear of undesirable vegetation and an unobstructed passageway maintained.

The concrete superstructure should be inspected regularly and cracks and spalls patched. The metal works are also subject to some battering, and breaks or distortion can be expected to occur. Such conditions can be corrected by straightening or welding the damaged area. The electrical or hydraulic system should be Inspected and tested frequently by a qualified employee.

Bridges and Roads. The superintendent's responsibilities for county or State bridges and roads that cross a federal flood control waterway include inspection, reporting, and maintenance. When a condition is noted that would affect the safety of the structure or the functioning of the flood control works, it should be reported as a matter of courtesy to the agency responsible for it. 4.66

Drop Structures. The purpose of a drop structure is to stabilize a channel by holding flow velocities below the point of scouring. 4.67

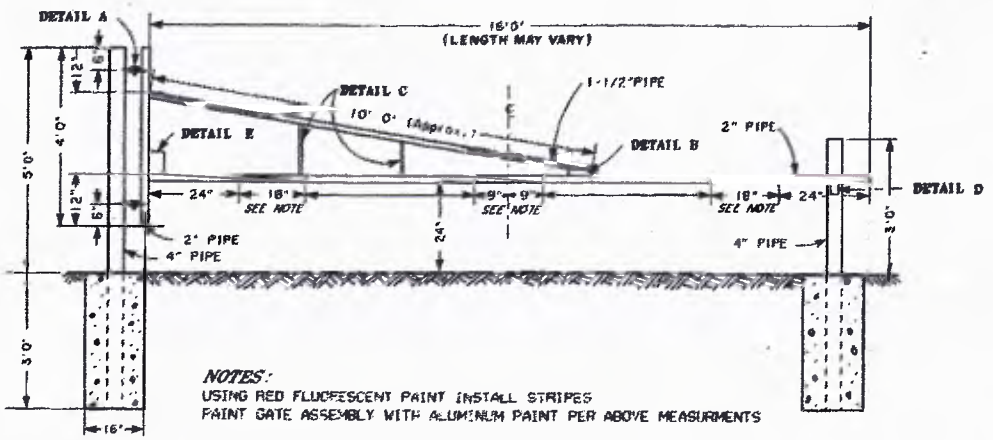
Drop structures are built of reinforced concrete, with wing walls, a crest or headwall, a spillway apron-slab, and end Sills. Revetted slopes on the upstream and downstream ends are essential parts of the facility. Drop structures with headwalls that extend above the invert of the channel have drain ports to prevent ponding of water on the upstream side of the structure. The ports must be kept free of material that would restrict flows.

General maintenance of a drop structure requires removal of any accumulated trash and debris from the intake area of the facility. Silt and gravel deposits in and about the stilling basin should also be removed after each high-water event. Undesirable growth impairs the chief function of the revetted area. It must be eliminated, either mechanically or by the use of herbicides. 4.67 (Cont.)

The reinforced concrete work should be periodically checked for cracks, spalling, and rebar exposure, and repairs should be made at an early

Some drop structures are equipped with a wooden gate or a cable-supported barricade designed to prevent livestock and other animals from falling into the drop basin. These protective devices should be kept in good repair.

Figure 1



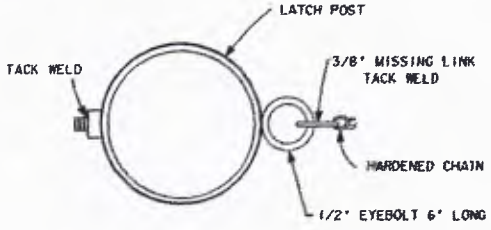
NOTES:
USING RED FLUORESCENT PAINT INSTALL STRIPES
PAINT GATE ASSEMBLY WITH ALUMINUM PAINT PER ABOVE MEASURMENTS

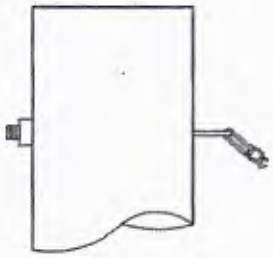
MATERIAL LIST		
ITEM	UNIT	QUANITY
CONCRETE	C.F.	8
4" STEEL PIPE	L.F.	14
2" STEEL PIPE	L.F.	20
1-1/2" STEEL PIPE	L.F.	10
GATE HINGES	EA.	2
POST HINGES	EA.	1
WEB PLATES	EA.	2
GATE REST	EA.	1
SIGN HOLDER	SET	1
MILE MARKER	EA.	2

MATERIAL LIST		
ITEM	UNIT	QUANITY
0/7 HARDENED CHAIN	L.F.	20
3/4"X2" MACH. BOLT	EA.	2
3/4" NUTS	EA.	2
ROAD CLOSED SIGN	EA.	1
MACH. SCREWS	EA.	4
AMBER REFLECTOR	EA.	2
ALUMINUM PAINT	GAL.	1
3" BRUSHES	EA.	2
FLUORESCENT PAINT	QT.	1
MASKING TAPE	ROLL	1

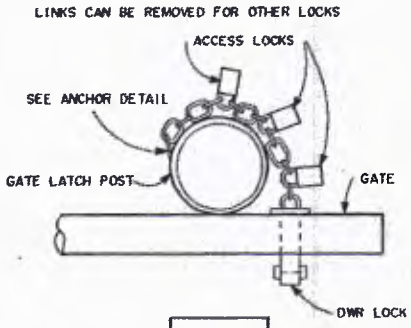
STANDARD PIPE GATE
MANUFACTURED AND INSTALLED

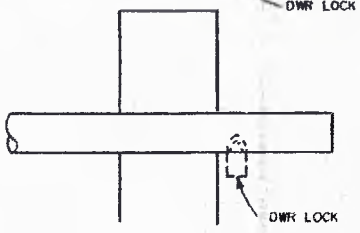
NO SCALE





ANCHOR DETAIL
CHAIN ANCHOR TO POST

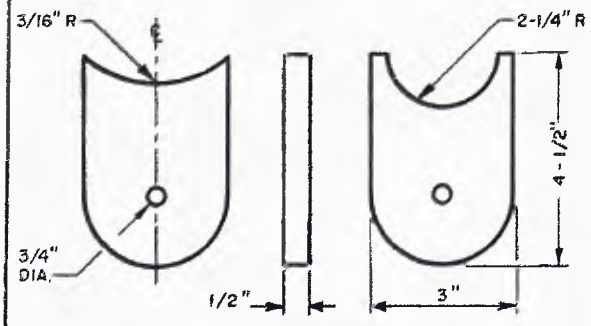


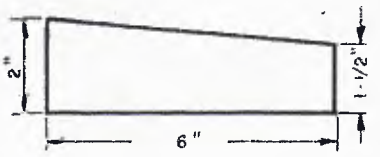


LOCKING DEVICE & ANCHOR DETAIL
NO SCALE

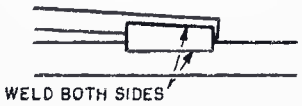
LOCKING DEVICE

Figure 2

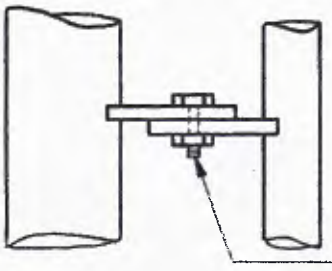




3/16" X 2" FLAT STOCK

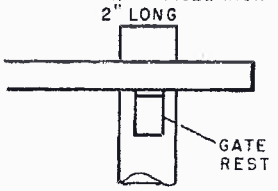


DETAIL B
WEB PLATE

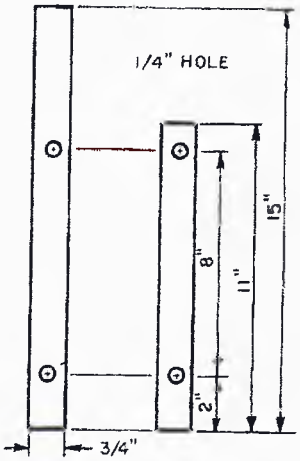


DETAIL A
GATE AND POST HINGE

3" X 3" X 1/4" ANGLE IRON
2" LONG



DETAIL D
GATE REST



1/4" X 3/4" FLAT STOCK
DETAIL C
SIGN HOLDER

(2) 4" X 6" X 1/4" PLATE
DETAIL E
MILE MARKER

NOTES:

(1) AFTER INSTALLATION OF BOLT & NUT TACK WELD NUT TO BOLT. (DETAIL A)

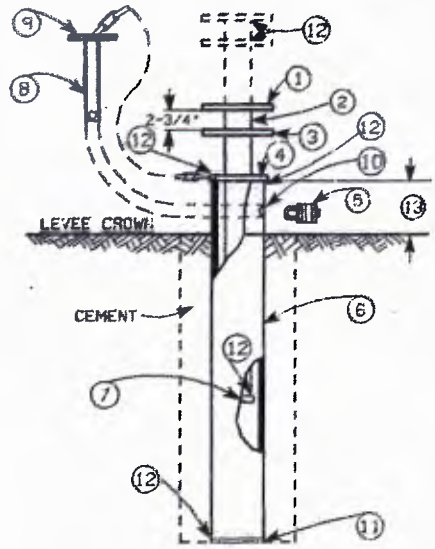
(2) MAKE IN SHOP, INSTALL IN FIELD. NUMBER ON BOTH SIDES. (DETAIL E)

STANDARD PIPE GATE
MANUFACTURED AND INSTALLED

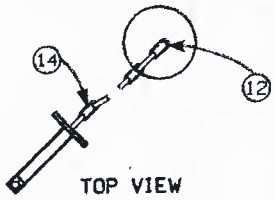
DETAILS

NO SCALE

Figure 3

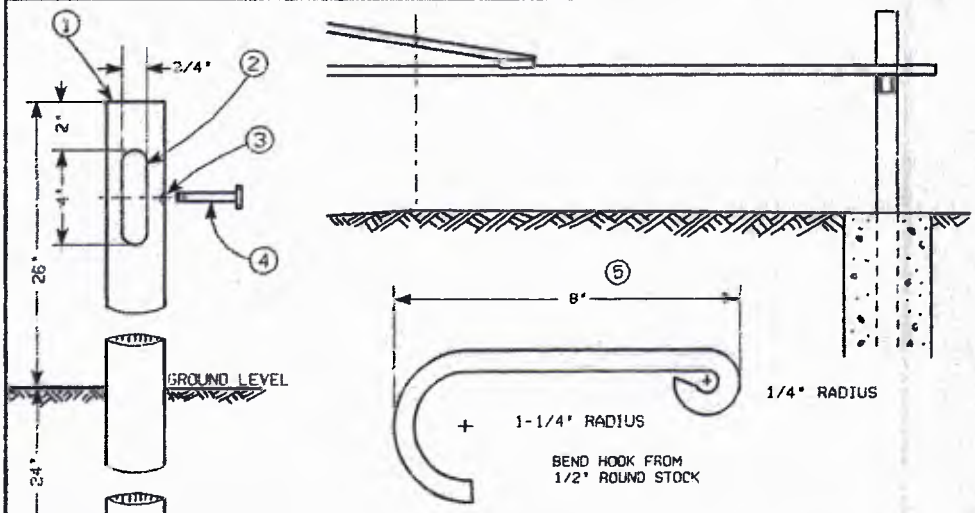


LATCH POST
FOR SPECIAL FARM MACHINE ACCESS
NO SCALE



TOP VIEW

1. ROUND 1/2' PLATE 8 1/2' DIA.
2. PIPE 3' DIA. 22' LENGTH
3. ROUND 1/2' PLATE 8 1/2' DIA. 3 1/2' HOLE CENTERED
4. ROUND 1/2' PLATE 4 1/2' DIA. 3 1/2' HOLE CENTERED
5. AREA LOCK
6. PIPE 4' DIA. 28' LENGTH
7. ROUND 1/2' PLATE 3 1/2' DIA.
8. LOCKING PIN WITH HEAD. 6' X 1' ROUND STOCK 7/8' WASHER HOLE DRILLED IN END FOR LOCK
9. RETAINING CHAIN 10 LINKS
10. HOLE FOR LOCKING PIN
11. ROUND 1/4' PLATE 6' DIA.
12. WELD
13. THIS HEIGHT WILL VARY WITH GATE HEIGHT
14. GATE PIN 10 LINKS OF CHAIN

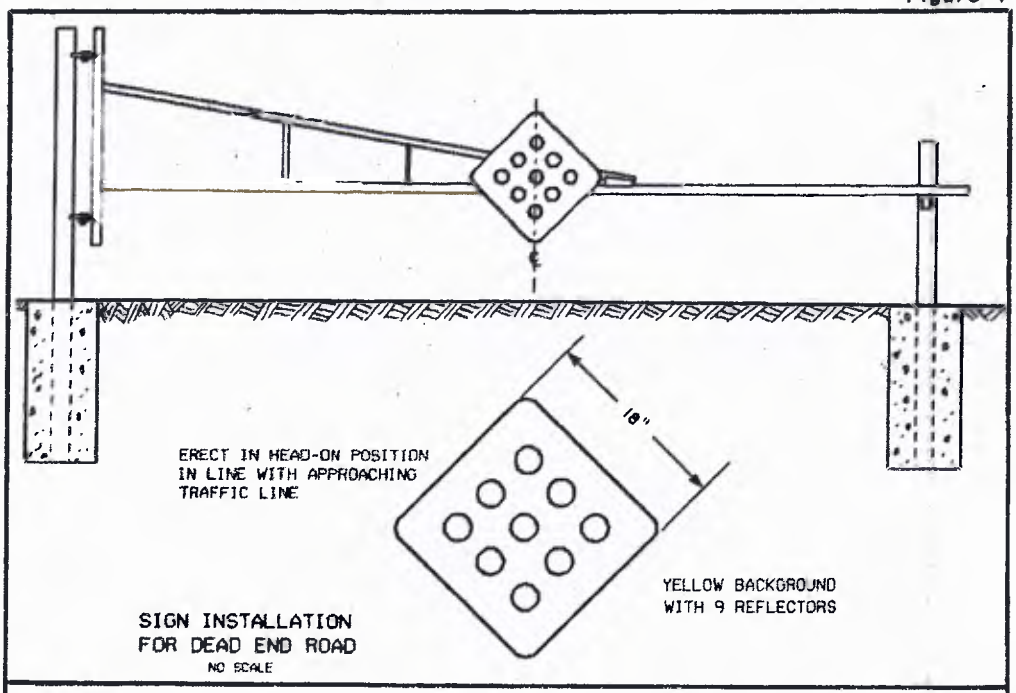


1. 1-1/4' PIPE 54' LONG
2. SLOT CUT THRU PIPE TO RECEIVE HOOK
3. CLEARANCE HOLE FOR 3/8' BOLT
4. 3/8' USS BOLT AND NUT 2-1/2' LONG
5. ROD HOOK

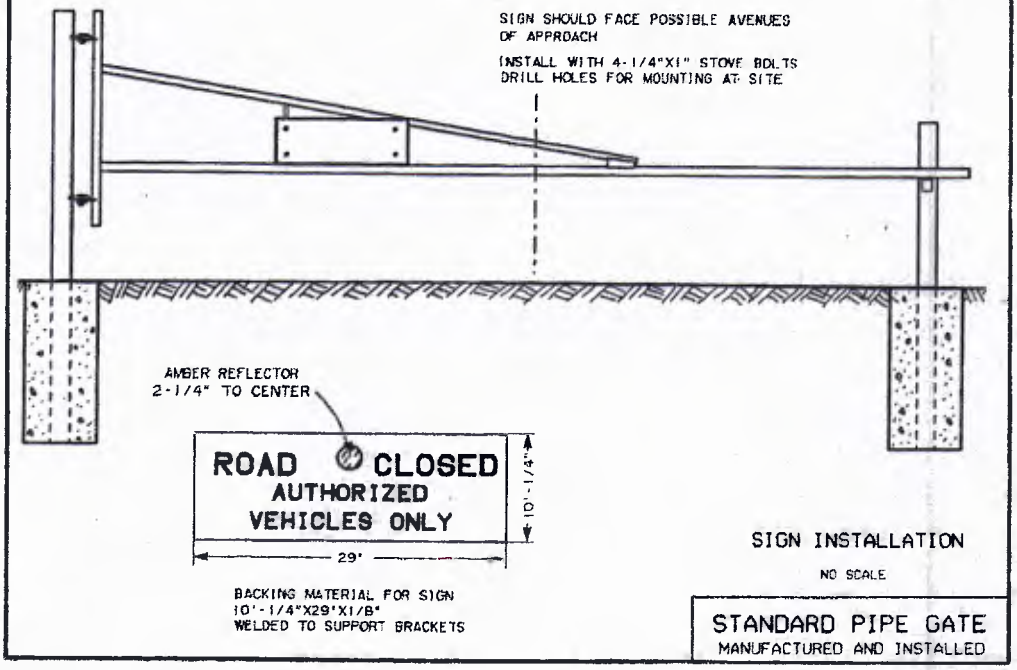
GATE STOP POST
NO SCALE

STANDARD PIPE GATE
MANUFACTURED AND INSTALLED

Figure 4



SIGN INSTALLATION
FOR DEAD END ROAD
NO SCALE



BACKING MATERIAL FOR SIGN
10'-1/4"X29'X1/8"
WELDED TO SUPPORT BRACKETS

SIGN INSTALLATION
NO SCALE

STANDARD PIPE GATE
MANUFACTURED AND INSTALLED

Figure 5

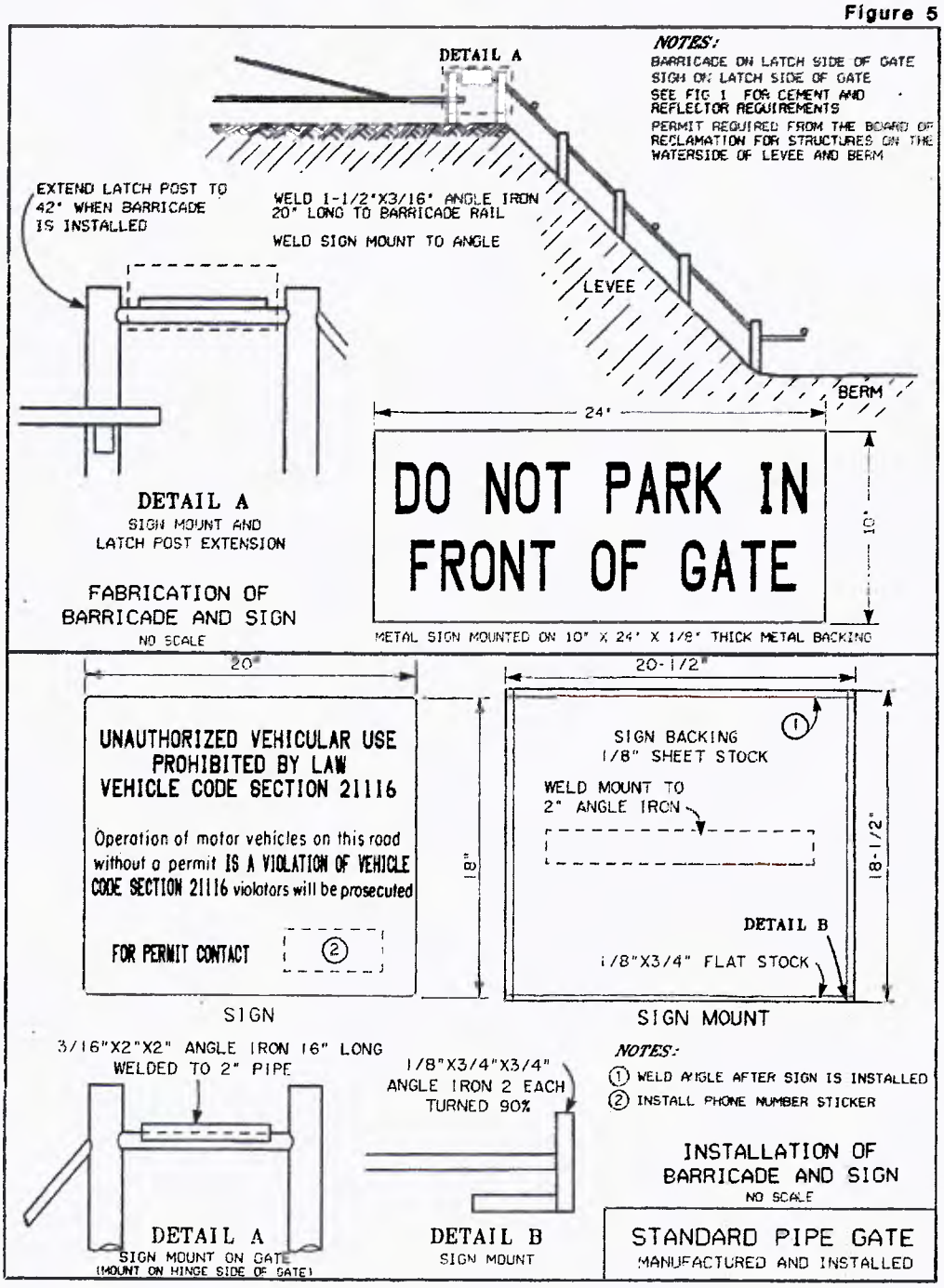
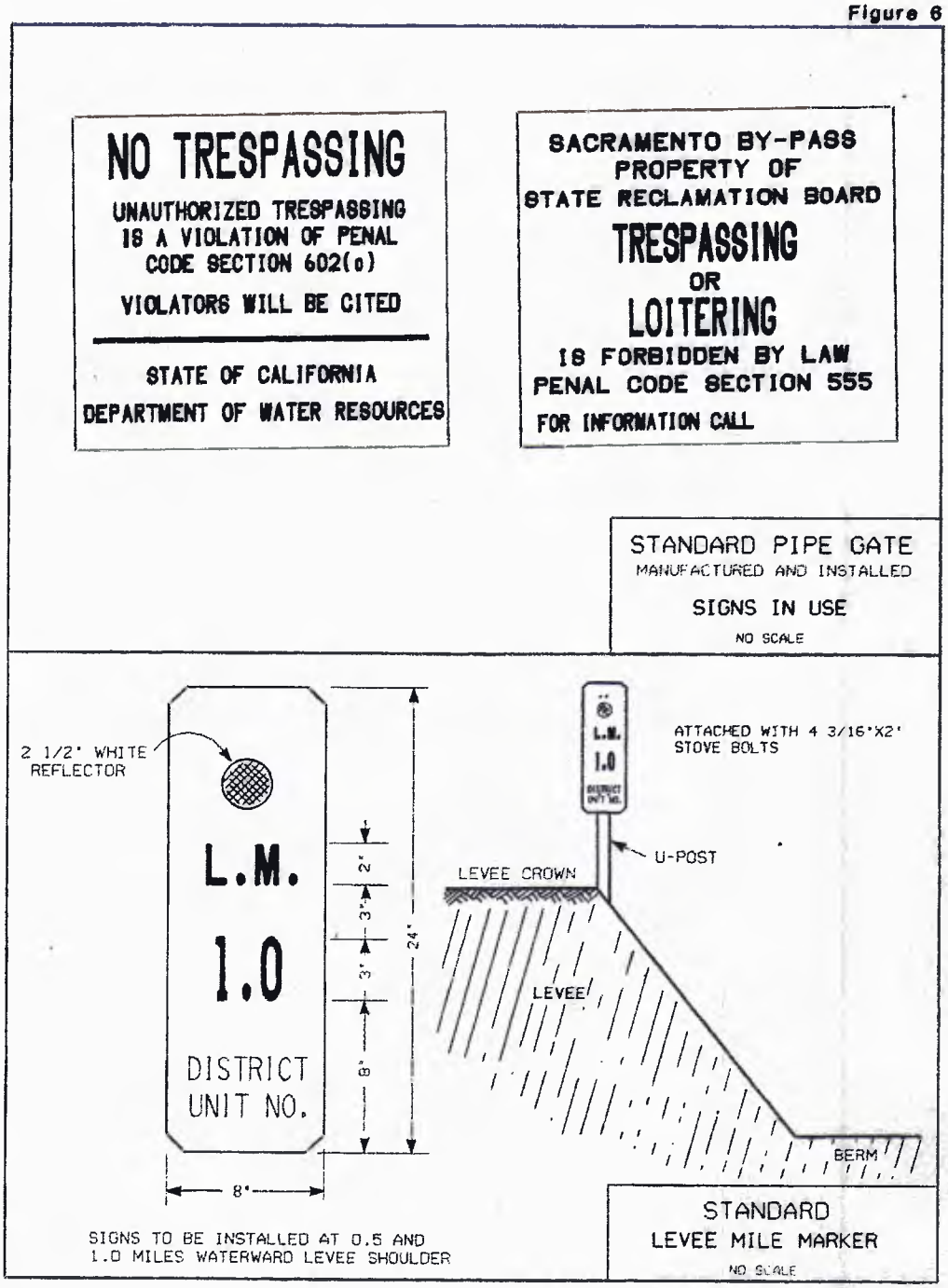

DETAIL A
NOTES:
BARRICADE ON LATCH SIDE OF GATE
SIGN ON LATCH SIDE OF GATE
SEE FIG 1 FOR CEMENT AND REFLECTOR REQUIREMENTS
PERMIT REQUIRED FROM THE BOARD OF RECLAMATION FOR STRUCTURES ON THE WATERSIDE OF LEVEE AND BERM
EXTEND LATCH POST TO 42" WHEN BARRICADE IS INSTALLED
WELD 1-1/2"X3/16" ANGLE IRON 20" LONG TO BARRICADE RAIL
WELD SIGN MOUNT TO ANGLE
LEVEE
BERM
24"
DETAIL A
SIGN MOUNT AND LATCH POST EXTENSION
DO NOT PARK IN FRONT OF GATE
10"
FABRICATION OF BARRICADE AND SIGN
NO SCALE
METAL SIGN MOUNTED ON 10" X 24" X 1/8" THICK METAL BACKING
20"
20-1/2"
UNAUTHORIZED VEHICULAR USE PROHIBITED BY LAW VEHICLE CODE SECTION 21116
Operation of motor vehicles on this road without a permit IS A VIOLATION OF VEHICLE CODE SECTION 21116 violators will be prosecuted
FOR PERMIT CONTACT
2
18"
SIGN BACKING 1/8" SHEET STOCK
1
WELD MOUNT TO 2" ANGLE IRON
18-1/2"
DETAIL B
1/8"X3/4" FLAT STOCK
SIGN
SIGN MOUNT
3/16"X2"X2" ANGLE IRON 16" LONG WELDED TO 2" PIPE
1/8"X3/4"X3/4" ANGLE IRON 2 EACH TURNED 90°
NOTES:
1 WELD AIGLE AFTER SIGN IS INSTALLED
2 INSTALL PHONE NUMBER STICKER
INSTALLATION OF BARRICADE AND SIGN
NO SCALE
DETAIL A
SIGN MOUNT ON GATE
(MOUNT ON HINGE SIDE OF GATE)
DETAIL B
SIGN MOUNT
STANDARD PIPE GATE
MANUFACTURED AND INSTALLED

Figure 6


NO TRESPASSING
UNAUTHORIZED TRESPASSING IS A VIOLATION OF PENAL CODE SECTION 602(o)
VIOLATORS WILL BE CITED
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SACRAMENTO BY-PASS
PROPERTY OF
STATE RECLAMATION BOARD
TRESPASSING
OR
LOITERING
IS FORBIDDEN BY LAW
PENAL CODE SECTION 555
FOR INFORMATION CALL
STANDARD PIPE GATE
MANUFACTURED AND INSTALLED
SIGNS IN USE
NO SCALE
2 1/2" WHITE REFLECTOR
L.M.
1.0
DISTRICT UNIT NO.
2'
3'
3'
8'
24'
8"
ATTACHED WITH 4 3/16"X2" STOVE BOLTS
U-POST
LEVEE CROWN
LEVEE
BERM
SIGNS TO BE INSTALLED AT 0.5 AND 1.0 MILES WATERWARD LEVEE SHOULDER
STANDARD
LEVEE MILE MARKER
NO SCALE

MINOR STRUCTURE MAINTENANCE REPORT

CREW

AREA _____

LEVEE OR UNIT _____

DATE	LEVEE MILE	GATES			BARRICADES			SIGNS				MISCELLANEOUS				WORK PERFORMED OR REMARKS
		Pipe Gate	Cable Gate	Other	Pipe Barricade	Cable Barricade	Other	Levee Mile	Trespass	No Parking	Road Closed	Locks	Reflectors	Paint	Chain	

CODE
✓ ACCEPTABLE O MISSING X NEEDS ATTENTION — DOES NOT APPLY

Figure 7

SECTION 5

RODENT CONTROL

Ground squirrels and other burr-owing rodents can threaten the structural integrity of levees and other flood control structures. When these animals remove material by burrowing, they reduce the structure's ability to contain flows.

Ground Squirrel Control 5.10

The presence of ground squirrels or their burrows on a levee crown, slope, or toe always warrants control measures. Because of their high reproductive potential and extensive burrow systems, ground squirrels present a serious hazard to levees and, to a lesser extent, to other project facilities. Their burrowing loosens the soil, increasing the risk of erosion and sloughing. Also, a burrow can act like a pipe to carry floodwater into and through levee sections.

Ground squirrel densities tend to be higher where an attractive food source such as walnuts or ether seed crops are present.

Rodent Control Techniques 5.20

Areas with high-density ground squirrel populations may require reducing or removing vegetation so that burrow damage can be assessed and control work more easily achieved.
Various rodent control techniques are available. Use of these at at the proper time of the year will Increase their effectiveness and minimize certain problems, such as bait shyness, poor control, and non target kills.

Timing is critical to the success of any rodent control program. Control efforts should be aimed at achieving at least a 90 percent mortality. Any less than that level is likely to result in a rapid regrowth of the population.

Rodenticides used carelessly are hazardous to people, livestock, and non target wildlife. Many rodenticides are restricted use materials that require the applicator to (1) have a permit from the county agricultural commissioner's office; (2) notify the commissioner's office 24 hours in advance of the planned work (by phoning in a Notice of Intent); and (3) either be a certified "qualified applicator" or be able to demonstrate to the commissioner's office possession of a satisfactory level or knowledge of the product to be used.

Fumigation. Fumigants are toxic gases or materials that, when placed in the burrow, generate a toxic gas. A number of fumigants are available for control of ground squirrels, including carbon monoxide, gas cartridges (smoke bombs), methyl bromide, and aluminum phosphide (Phostoxin). 5.31

The most effective times of the year for fumigation are the breeding season, which occurs from February through May, and the fall, after the first rains and before the coldest weather begins. The soil should not be too dry. Soil that is excessively dry is likely to have cracks and other openings that will allow the gas to escape. The squirrels must be active (not hibernating or estivating) and must be in the burrows at the time of fumigation. 5.21 (Cont.)

The general procedure for application is to place the fumigant in the burrow. When aluminum phosphide is being used, it is followed with crumpled sheets of newspaper. The burrow is then sealed with earth. All active burrows should be treated, and all burrows, both active and Inactive, should be sealed with earth. Effectiveness for all forms of fumigants can be improved by treating the burrows again in 48 hours.

Bait Stations. Bait stations are effective in eliminating any rodents that remain after fumigation or the use of acute toxicants. Because of the volume of material that bait stations require, this technique should be used exclusively for small, local ground squirrel colonies. 5.22

Bait stations are used only with anticoagulant baits. These may be formulated as loose grain, paraffin bait blocks, or pellets. The functions of the bait station are to protect the bait from moisture and dirt; to confine it to a small area, while giving the target species access to it; and to reduce or eliminate danger to children, pets, and non target animals.

To be effective, anticoagulant baits must be placed repeatedly. Bait stations must be serviced regularly and kept full of fresh bait. They should be anchored to the ground or some solid structure to reduce spillage and vandalism. They should also be posted with warning notices that displays the name of the toxicant, the concentration being used, and the name and telephone number of the maintaining agency.

Bait stations should not be used in urban areas because of the danger to children and pets and the likelihood of vandalism.

Bait Broadcasting. Bait broadcasting is the technique used to apply acute toxicants, such as zinc phosphide, strychnine, and 1080. Under certain circumstances, anticoagulant baits may also be broadcast. Ground squirrels are excellent foragers. They readily detect and pick up bait that is broadcast at the rate of three to five kernels per square foot. Non target animals are far less likely to find the bait. Bait that is distributed more densely or placed in piles may not be taken by squirrels and, because it may be more noticeable, is extremely hazardous to other wildlife, livestock, and humans. 5.23

Bait may be broadcast by hand around each active burrow (spot halting) or, in high-density areas, may be broadcast in a swath by a mechanical spreader.

achieve the desired results. If they are applied repeatedly, bait shyness or poor bait acceptance can result, thereby lowering the mortality rate. (Cont.)

When anticoagulant bait is used, the bait must be broadcast regularly (daily or on alternate days) to ensure that the supply will last for several days.

Trapping. Small Infestations of ground squirrels or squirrels occupying areas in which it is impractical or unsafe to use fumigants or toxicants may best be controlled with traps. Both live and kill traps may be used. 5.24

Traps should be placed at the burrow entrance, on runways, or in other locations the squirrels frequent. Initially, traps should be placed unset to allow the squirrels to become accustomed to them. After a few days, the traps can be set and balled with grain, nuts, or other foods that attract these animals. Kill traps should be anchored to prevent them from being carried off by predators.

Other Problem Species 5.30

Occasionally other species such as pocket gophers, rats, beaver, or muskrats may present a flood control hazard. The problems they cause tend to be somewhat specialized, and the techniques for combating them cannot be addressed in a general discussion such as this. If any of these or other animals are suspected of causing damage, the local agricultural commissioner's office should be contacted for assistance.

EMERGENCY OPERATIONS

Superintendents of State and local agencies responsible for maintenance of federal flood control project facilities are also responsible for flood emergency preparedness. This includes training personnel in flood fighting methods and stocking flood fighting supplies.

Flood Fight Materials & Equipment Recommended for Patrol Vehicles 6.10

Powerful electric lanterns and extra batteries.
Round-point shovels (to drain ponded water on the crown roadway).
Axes or chain saws (for trees and branches that have fallen across the roadway).
A tow chain (to drag debris from the roadway or assist mired flood tight vehicles).
Highway flares (to warn of dangerous road conditions).
A set of battery jumper cables.
Tire chains.
Visquine sheeting.
Sand bags.

(See also "Flood Fight Check List" In Sec. 6.26.)

High "Water Patrolling 6.20

The Corps of Engineers requires that federal flood control project levees are patrolled when river stages exceed warning levels. To comply with the Corps' requirements, the superintendent must prepare a comprehensive patrol schedule with increasing frequency of patrolling as flood waters rise and a plan that provides for a quick emergency response.

Early detection and evaluation of a developing trouble spot is the key to protecting lives and property during high-water periods. Levee patrols are the first line of defense against levee failure at such times. Patrols must be able to deliver a high standard of performance, even when working long hours in hostile weather and under difficult conditions.

The Mobile Patrol Unit 6.21

A mobile patrol unit usually consists of a journey worker or a supervisor, assisted by an apprentice or temporary employee. One person in each unit is assigned sole responsibility for locating and reporting discrepancies in the patrol area. The two-person crew is Ideal if enough workers are available. A second person means an extra pair of eyes, as well as an extra margin of safety In often dangerous situations.

powerful enough to illuminate levee slopes during darkness. Each unit should be equipped with an installed or portable two-way radio. Because a patrol's primary responsibility is surveillance it does not normally interrupt this function, except to evaluate and mark trouble spots. (Cont.)

Emergencies can develop suddenly, however, that may require the patrol's immediate response. For that reason, it is recommended that patrol vehicles also carry basic emergency flood fighting equipment and materials listed in Sec. 6.10.

Selecting a Sector Boss 6.22

It is a good policy, before the flood season starts, to appoint a qualified employee as sector boss of a specific sector for each 12-hour shift. The sector boss* prime responsibility is overseeing patrol operations. He also inspects reported trouble spots and recommends corrective actions, as needed. To carry out his duties effectively, the sector boss must be fully aware of ail conditions in his sector, including the history of high-water problems.

Patrol Scheduling 6.23

To comply with requirements of the Corps of Engineers for high-water patrolling, the superintendent must prepare a comprehensive patrol schedule and a plan providing for quick emergency response. The schedule should allow for increasingly frequent levee surveillance from warning stage through danger stage.

Patrol schedules should be posted conspicuously at the superintendent's headquarters and a copy sent to the Flood Operations Center in Sacramento.

As a basis for an effective schedule, the superintendent should divide and subdivide his area of responsibility into zones, sectors, and walking patrol stations. The zone concept applies when more than one geographic area is involved.

Quick-Response Plan. Normally, there is ample lead time to meet the Corps of Engineers' patrol requirements when the Joint Federal-State River Forecast Center issues a flood warning bulletin. However, it is sometimes difficult to muster an emergency response crew when a crisis occurs during off hours or on a long holiday weekend. This problem can be partially solved by: 6.231

1. Frequently updating the list of telephone numbers of flood fight personnel.

2. Providing for standby vehicles, equipment, and materials that are ready for immediate use.

3. Requiring key personnel to notify their headquarters office where they can be reached in the event an emergency develops while they are out of their usual areas,

Mobile Patrols. Before leaving headquarters to patrol, a unit is given updated forecasts for tide, weather, and river stages? current and proposed changes in reservoir releases; and the radio call number and location of other units in the area. 6.241

Units should be limited to a levee reach that allows them to cheek both waterside and landside thoroughly at intervals of no more than one hour. As more patrols are added, inspections should be no more than one half hour apart at normal patrol speed.

The terminal point of each mobile patrol district should be clearly marked, preferably by metal posts and plates. When the point has been set, space for vehicle turn-around should be provided.

Walking Patrols. When water levels rise to near flood stage or reach flood stage, patrolling on foot may become necessary, particularly in areas with a history of high-water problems. As a rule, the current or forecast river stage dictates the extent of patrol coverage. However, wind speed and direction frequently have a profound effect on levee stability and the superintendent must take these factors into consideration. 6.242

Each patrol is given a specific area of responsibility and given empty sandbags, stakes, and shovels. The patrols report trouble spots to a sector boss or mobile patrol unit in the area. Because a foot patrol is assigned to cover a smaller area, it can provide more thorough and more frequent surveillance.

Potential or developing trouble spots will need special attention, particularly during long periods of intense rain.

Walking patrol assignments are identified by placing colored flags or other marker or the levee shoulder. The beat covered by a walking patrol should be changed as conditions change.

Reporting Trouble Spots 6.25

As soon as a potentially hazardous condition is discovered by a patrol unit or is brought to the patrol's attention, the patrol marks the location by driving a 4-foot lath into the levee shoulder near the site. The patrol then reports the location, nature, and extent of the problem. The lead man also classifies the problem as needing immediate action or only surveillance. When warranted, an identification number assigned by the command center is attached to the stake, along with other essential Information. The stake should be flagged with fluorescent material so it will be visible to patrols working during darkness.

Before relief patrols go on duty, they should be fully briefed on the current status of staked trouble spots and other problems in their assigned areas.

An ample supply of the following tools, materials, and equipment should be readily available in a convenient location. These supplies should be regularly inventoried and re-stocked.

The Inventory should be adjusted according to length of patrol area, number and type of flood control facilities, and experience during other flood events.

Local agencies might also consider stocking foul weather gear, including extra sets in various sizes.

Items	Quantity (Minimum required)
Visquine plastic sheeting, 10 mil, 100 x 20 feet	2 rolls
Or	
Canvas, 100 x 20 feet	2 rolls
Sandbags	1,000
Twine or baling wire	One box
Stakes, 2-foot, 2" x 4", W/V points	50
Laths, 4-foot	One bundle
Tie buttons or stones	50
Flagging, fluorescent	6 rolls
Lineman's plies	4
Sledge hammers	2
Shovels	5
Life jackets	4
Logbook (to document trouble spots)	
Tire chains	)
Jumper cables	) Quantities
Highway flares	)
Tow chains	) As
Axes	)
Chain saws	) Needed
Electric lanterns	)
Batteries for lanterns	)
Maps	)
Lighting system for night patrol	
Two-way oar radio or car telephone	

When a flood disaster is impending, local and State agencies must fully expend their resources to prevent loss of life and property damage. If an emergency exceeds the capabilities of local and State agencies, aid is available from federal agencies.

During a Flood Emergency 6.31

When flood water reaches the danger level or when other serious problems develop, the superintendent may ask for additional aid from the DWR Flood Operations Center in Sacramento to extend patrol coverage or to engage in a flood fight. The Center is staffed on a 24hour basis during flood alerts and responds to requests for personnel, material, and equipment for flood fighting. The Center also provides engineering and consultation services for damage appraisal or evaluation during flooding.

If a flood control structure is in immediate danger of falling and the situation is more than a local agency can handle, the local superintendent should report the situation to the DWR Chief of Flood Operations in Sacramento at 800-952-5530 or 916-4Y5-3553.

If a DWR representative confirms that conditions also exceed the capabilities of the State's forces, the Director of the Department of Water Resources calls on the Corps of Engineers for assistance.

In time of flooding or coastal storms, the Corps of Engineers can also undertake emergency operations to supplement local disaster assistance, flood fighting, and disaster recovery and rehabilitation. State or local agencies cannot be reimbursed for expenses they have incurred.

After the Flood Emergency Has Ended 6.32

The State Natural Disaster Assistance Act (NDAA) provides for financial aid to State arid local agencies to replace or repair public property destroyed or damaged by a natural disaster. Such aid, which is provided on a cost-sharing basis, is not available until the Governor has declared a state of emergency exists. Facilities used solely for recreation are excluded from such assistance.

NDAA is administered by the Director of the Office of Emergency Services (OES), who may delegate any power or duty Invested in him to another State agency.

A local agency may be eligible for HDAA financial aid after it has met the following conditions:

(1) It has declared a local state of emergency exists and has asked the Director of OES to concur.

(2) It submits a formal application for assistance to the Director of OES.

(3) The application includes a preliminary assessment of costs of repair or replacement.

reports supporting the request to OES. To qualify for HDAA assistance, the declaration of a local emergency must have been made within 10 days of the occurrence of the emergency (following a declaration of emergency by the Governor. (Cont.)

All applications must be filed within 30 days of the local emergency declaration with the Office of Emergency Services, 2800 Meadowview Road, Sacramento CA 95832.

Public Law 8 4-99. This law authorizes the Corps of Engineers, when requested by the Governor or his authorized representative, to assist the State in a flood fight when high-water damage or failure of a federal or nonfederal flood control facility could cause loss of life or property damage. To invoke this law, however, State and local agencies must first expend maximum effort. 6.321

Following emergency operations, the Corps of Engineers, under PL 84-99 (as amended), can give additional help for 10 days.

Conditions governing participation by the Corps of Engineer's for advance measures and emergency operations are outlined in the Corps' handbook, Emergency Operations.

(The form for requesting aid under PL 84-99 follows this section.)

Federal Emergency Management Agency (FEMA). Historically, the American Red Cross, the Salvation Army, church groups, and other nonprofit humanitarian organizations are first at the scene to meet the immediate needs of victims of natural disasters. A wide range of assistance is also available through FEMA before a presidential declaration of disaster. However, FEHA will not participate in post-flood repair of federally constructed flood control projects. 6.322

Following a presidential declaration, public facilities and private property damaged in a disaster are eligible for federal assistance on a conditional and sliding scale basis. This aid is granted to restore properties to predisaster condition. Applications for assistance must be filed with the Office of Emergency Services no more than 30 days following the presidential declaration. (See the OES Disaster Assistance Procedures Manual, 1985.)

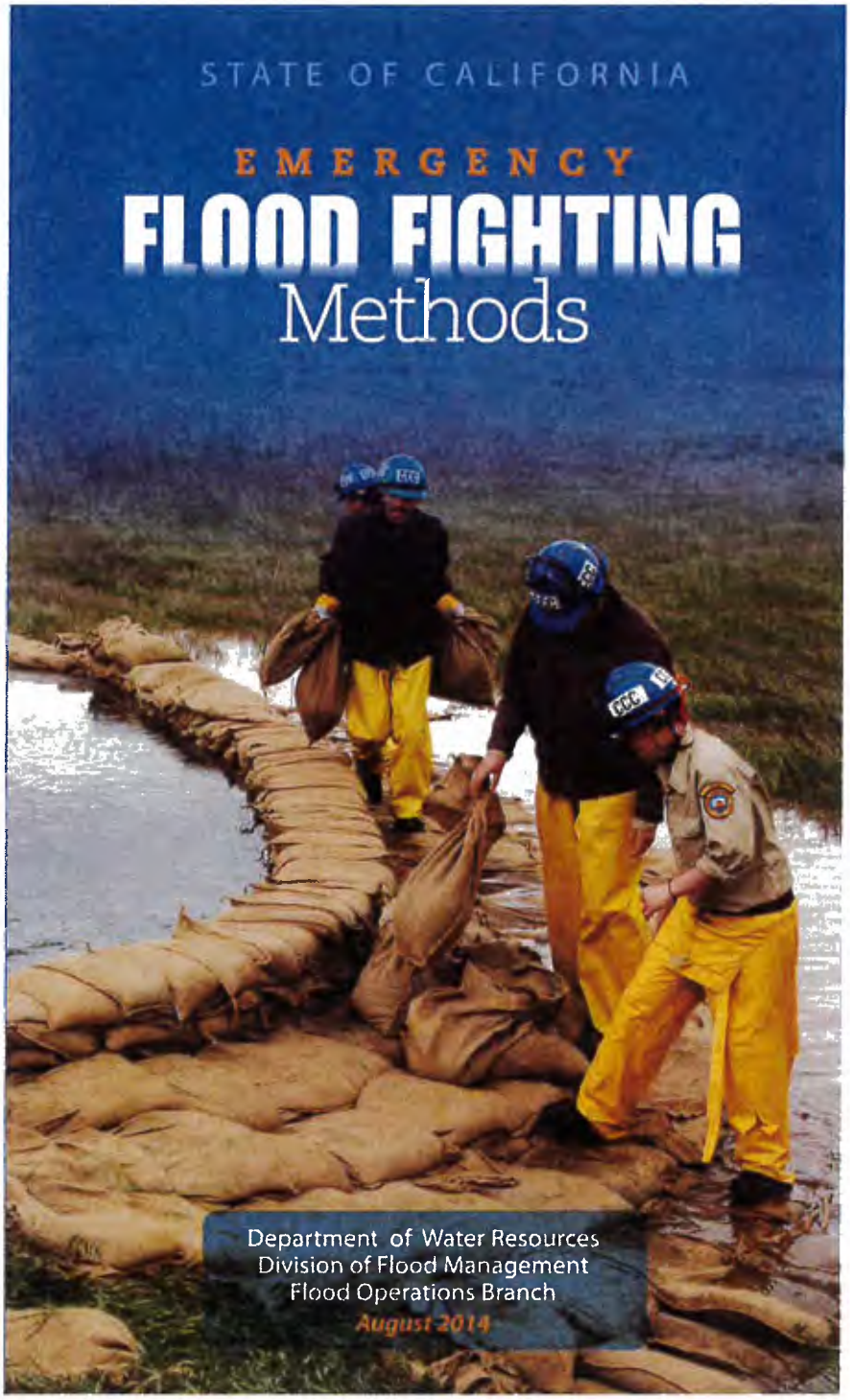
Reclamation District No. 828
Operations & Maintenance Manual

Appendix F

Emergency Flood Fighting Methods

STATE OF CALIFORNIA

EMERGENCY FLOOD FIGHTING Methods



Department of Water Resources
Division of Flood Management
Flood Operations Branch
August 2014

STATE OF CALIFORNIA
CALIFORNIA NATURAL RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

FLOOD FIGHTING
Methods

Division of Flood Management
Flood Operations Branch

August 2014

Prepared by
Rick Burnett
Water Resources Engineering Associate

with assistance from
DWR Graphic Services

Table of Contents

Foreword

The California Department of Water Resources (DWR), Division of Flood Management has been tasked to prevent, reduce, and mitigate the risk of damages associated with flooding. For over fifty years DWR has been the lead State agency responsible for responding to this costly natural disaster. Our mission is to prevent loss of life and damage to property and infrastructure.

Working together State, federal, and local agencies manage California's Flood Control System which consists of reservoirs, levees, weirs, bypasses, and retention debris basins.

This statewide system is managed with support from technologies such as weather and water forecasting, coordination of reservoir releases and a network of rain and stream gauges and snow pack monitoring. The information gathered is extremely important to emergency responders and the public.

The 'Flood Fighting Methods' outlined in this booklet have proven effective during many years of use by DWR, United States Army Corps of Engineers, and local agencies on flood-related emergencies. This handbook is published by the DWR Flood Operations Branch and is designed to be used with the Flood Fighting Methods class.

Levee and Embankment Threats

The main causes of levee failure or flood related problems due to high water are:

- Seepage through or under the levee heavy enough to cause a "boil".
- Erosion of the levee or embankment due to swift moving water or wave action.
- Overtopping resulting from water-surface elevations higher than the levee or embankment.

Patrolling

The best defense against flood related issues and/or levee failure is to identify problems early and repair them immediately. Biannual levee inspections and effective high water patrolling make this possible. The following suggestions will help in organizing patrol teams for this work.

- Operate under the SEMS / ICS system and report to the appropriate section chief.
- Provide a sufficient number of workers for two 12 hour shifts.
- Provide each worker with a copy of this 'Flood Fighting Methods' handbook.
- Assign two people to each mobile patrol.
- Assign each mobile patrol vehicle an area no larger than can be inspected at least every 2 hours, with more frequent patrols as conditions warrant. Foot patrols may offer a more thorough inspection.

- Furnish each mobile patrol vehicle with radio/cell phone or other communication equipment, lights for night patrol, and the following materials: Laths, survey ribbon, permanent marker, pad and pencil, flashlight with extra batteries, 2 shovels, 1 sledge hammer, approximately 50 sandbags (empty), 1 roll of plastic sheeting (visquine), 1 box twine, 100 buttons, 25 wooden stakes, lifeline, personal floatation devices, blanket, First Aid kit, Directory of Flood Officials, and Flood Emergency Phone Card. (see Reference Guide on page 36)
- Identify potential problems: boils, seepage, erosion, cracks, sloughing etc.
- Instruct each patrol team on the correct filling and placement of sandbags. They should know what danger signs to watch for, and how to signal for help.
- Vehicles should remain on high ground in threatened areas. Always have escape routes and make them known to all responders.
- Instruct each leader to check with their team members frequently. Investigate all reported problems.
- Be aware of the locations of stockpiled flood fighting materials, tools and equipment.
- Be prepared to request additional resources on short notice.
- Advise the officials of the district or agency responsible for emergency assistance in the area and if necessary, request their help, i.e. local emergency services office.
- Contact the nearest representative of the Department of Water Resources for technical advice and assistance.

Filling Sandbags

When filling sandbags you should work in pairs, with one person holding the bag while the other shovels in the fill material. The bag holder should find the most comfortable position while holding the bag open (see Figure 1 page 6). **The most common mistake made is overfilling bags.** The first shovel of material should be placed on the lip of the bag to help hold the bag open. The shoveler should use rounded scoops of material until the bag is approximately 1/3 full. Avoid extra movements (turning or twisting of the back) to prevent injury and reduce fatigue.

Filling Sandbags

Figure 1: Proper sandbag filling

Passing Sandbags

Passing Sandbags

To avoid injuries and maximize productivity emergency responders can be organized into a sandbag passing line or 'chain'.

The line is formed by standing facing the next person and slightly off set. The bags are passed down the center of the chain. Do not throw bags.

Passing Sandbags

Sandbag Construction

The use of sandbags is a simple but effective method of preventing or reducing damage from floodwater and debris (see Figure 2). Suggestions for constructing sandbag structures are:

1. Close-weave burlap bags 18" x 30" are recommended for all sandbag construction when available.

2. Fold the empty top of the bag at a 45-degree angle to keep sand from leaching out.

3. Place each bag over the folded top of the preceding bag and stomp into place.

4. Stagger the second layer of bags over the seams of the preceding layer.

5. Stomp all bags to form a tight seal.

6. The last sandbag in a line is referred to as a Key Sack. The empty top of this bag is folded under and stomped into place.

Sandbag Wall Construction

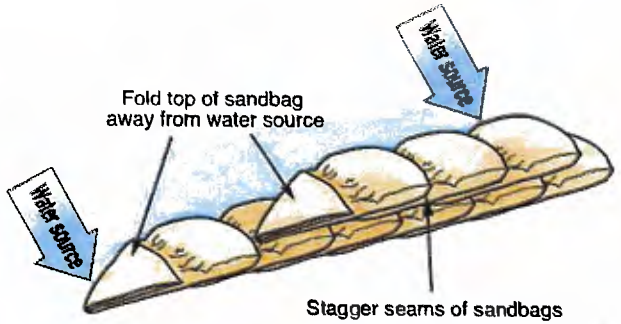


Figure 2: Fill sandbags 1/3 full, fold top of sandbag away from water source and stagger seams of sandbags.

Control of Overtopping

If a levee or stream bank is lower than the anticipated high water elevation, an emergency topping should be constructed to raise the grade above the forecast flood height. A sack topping may be required at road or stock crossings, low levee sections, or railroad crossings. The following sections discuss various methods for increasing levee and bank elevations.

Sack Topping

The most common form of flood control work is the use of sandbags for construction of temporary walls. The use of sandbag walls to increase the height of a levee section is called "sack topping" (see Figure 3). The sacks are laid "as stretcher rows," or along the levee.

Alternate layers can be crossed if additional strength is needed. The sacks should overlap at least one-third and be stomped firmly into place. When properly placed and compacted, each sack layer will provide about 3 to 4 inches of elevation.

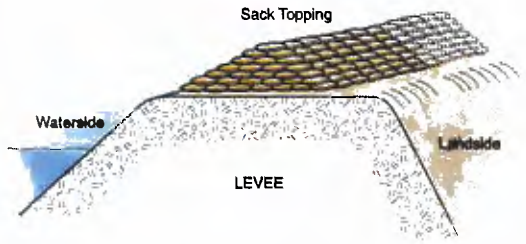


Figure 3: Sack topping on a levee

Sack Topping

Temporary Levee

This method is used to raise low areas during high water periods to prevent overtopping of levees, stream and riverbanks, small earthen dams, roadways, etc. To raise low areas, unfold a 20'x100'x10 mil roll of plastic sheeting and lay out flat on area to be raised (see Figure 4). Place fill material on plastic. Fold plastic over material, lay a single row of sandbags on the backside lip of plastic and on all seams. Fill material can be placed using bottom dump or dump bed trucks, front-end loader or manually.

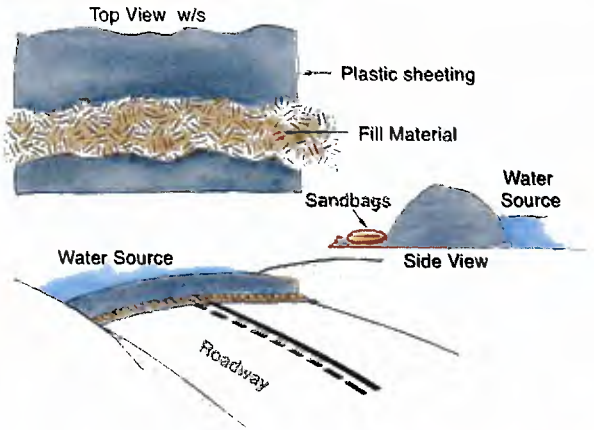


Figure 4: Temporary levee

Temporary Levee

Lumber and Sack Topping

Wooden panels are used on the waterside shoulder and reinforced on the opposite side with sandbags. The method is used to raise subsided areas during high water and divert debris flows (see Figure 5). Stakes 2"x 4"x 6' should be driven on the waterside shoulder 6 feet apart. A shallow trench is dug and lined with empty sandbags to provide a seal. Pre-constructed wooden panels are placed in the

trench and nailed to the landside of the stakes. This wall should then be backed with enough sandbags to support the panels against the expected high water. Attach 2"x 4"x 10' lumber kickers to the stakes that support the panels, and drive 2' stakes into the levee crown. Use at least two nails at each joint to provide rigid construction.

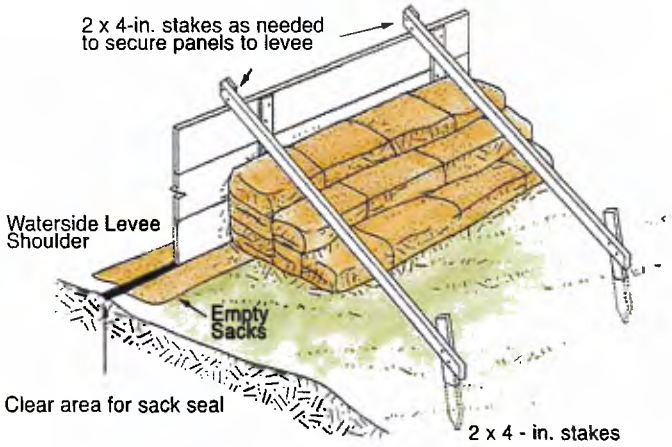


Figure 5: Lumber and sack topping

Control of Boils *(Away from Levee)*

A boil is a condition that occurs when water is "piped" through or under a levee and resurfaces on the landside. These weak points are generally caused by burrowing rodents or decomposed tree roots. High water pressure can begin to erode the interior of the levee and weaken the structure. Levee material will deposit around the exit point as the water discharges on the landside. If the boil is determined to be **"carrying material"** then corrective action is required to control the situation.

If left unattended the material that makes up the levee can be eroded at an accelerated pace, causing subsidence and overtopping of the levee. This could result in a levee break.

The common method for controlling a boil is to create a watertight sack ring around it. The sandbag structure should be high enough to slow the velocity of the water and prevent further discharge of material from the boil (see Figures 6 & 7). The flow of water should never be stopped completely, this may cause the boil to "break out" in an area near the existing sack ring. A spillway must be constructed to direct water away from all boil sites.

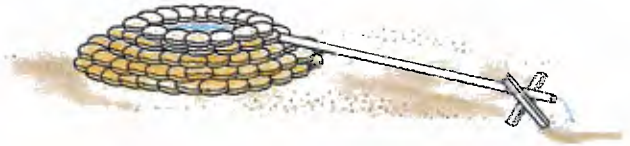


Figure 6: Boil sack ring

Bottom width should be at least 11/2 times the height. Do not sack boils that are not carrying material, but continue to monitor. Boils can begin to carry material after first located.

Boil Sack Ring

The sack ring should be large enough to enclose the area immediately surrounding the discharge point (3 to 4 feet diameter). If several boils carrying material are found, a single large sack ring may be constructed around the entire "nest" of boils.

Figure 7: Flow of water through a levee

Control of Boils *(On Levee Slope)*

If the boil is close to or on the levee slope, a U-shaped sack ring may be built around the boil and keyed into the slope. Construction of this method can be difficult and requires substantial shoring up of the U-shaped sack ring structure. A spillway must be constructed to direct water away from all boil sites (see Figure 8).

NEVER completely stop the flow from a boil. This may cause the boil to "break out" in an adjacent area. ALWAYS control the boil to a point where it ceases to carry material and the water runs clear.

"U" shape Sack Ring

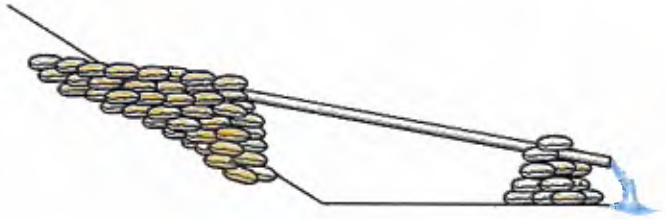


Figure 8: Spillways can be constructed by nailing two 2"x 6" boards together to form a V notch; PVC pipe; two parallel sandbag rows; visquine, etc.

Waterside Boil Inlet Detection

Water running through a levee and carrying material can sometimes be stopped on the waterside, thus eliminating the building of sack rings on the landside (see Figure 9). A six foot long section of 2" diameter metal pipe secured to a 5'x 6' foot piece of plastic or canvas can be rolled over the inlet hole on the waterside. Drive 1"x 3"x 2' stakes into the shoulder of the levee. Suspend half-filled sandbags on top of rolled-out material with twine and tie off to stakes. It can be difficult to locate the waterside inlet of boils. Sometimes a swirl is observed at the water's edge.

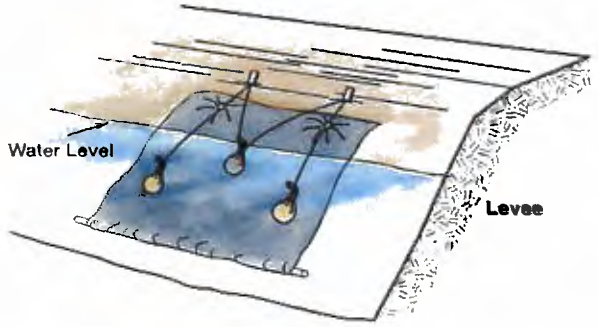


Figure 9: Waterside boil protection

Wavewash Protection

All levees adjacent to wide stretches of water should be watched during periods of strong wind to detect the early stages of wavewash erosion. If the slope is well sodded, short periods of high wind should cause little damage. However during sustained periods of strong wind and high water, experienced personnel should observe and monitor the effected areas.

Envelope Method

When used correctly, plastic sheeting is useful for wavewash protection. Visquine should be purchased in 10 mil rolls, 20 feet wide by 100 feet long. 1"x3"x2' wooden stakes are driven into the ground just above the levee shoulder on the side you wish to protect. Place the stakes 4 feet apart and stagger vertically by 1 foot as shown in Figure 10.

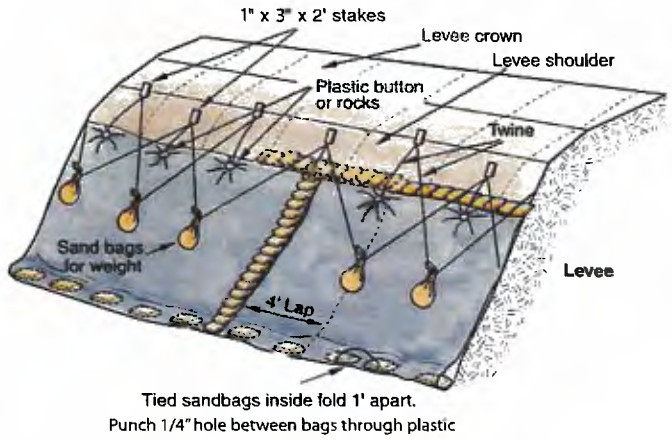


Figure 10: Wavewash Protection

Wavewash Protection

Avoid driving stakes in a straight line; this can to cause cracking and sloughing of the slope. To provide added strength and leverage, drive stakes at a slight angle away from the water source with the wide (3") side facing the water. Be sure the stakes are well into the ground and are secure.

Role out the plastic sheeting along the waterside shoulder. Eight to ten people should assist in shaking out the folds of the envelope. Be sure that both layers are held while the envelope is shaken out. Hold on tight! Use caution in strong winds. If the wind catches the plastic it could billow out and pull you along with it.

While flood workers hold the plastic securely, toss tied sandbags into the envelope. The tied sandbags (see Figure 12, page 20) are thrown into the bottom of the envelope with a one-foot gap between bags. The tied bags provide weight to hold the plastic against the levee slope.

A tie-down button or small stone (preferably round) is secured through both layers of visquine. If a stone is used, tie a slip knot and double half-hitch to secure it. Fasten buttons to the visquine and tie off to the stakes using a minimum 250 lb. tensile strength twine with these points in mind: (See Figure 11).

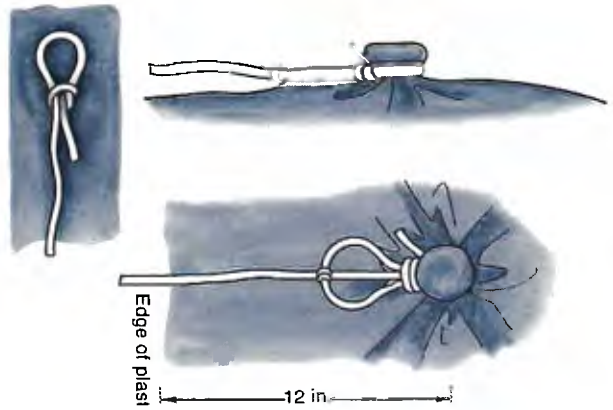


Figure 11: Plastic Tie-Down Buttons

1. Fasten button at least 1 foot from the edge of the plastic.

2. Fasten button to both layers of plastic.

3. Fasten button directly below stakes (one button per stake).

4. Tie twine low on stake for strength and to reduce tripping hazard.

Plastic sheeting is secured using tie down buttons. To attach plastic buttons to the envelope, tie a slipknot on the end of the twine; place loop over button and plastic and draw tight. Tie two half-hitch knots around the button frame. Extend twine to large end of frame, tie a half-hitch knot around the end, and secure twine to stake (see Figure 11).

With the envelope secured to the stakes, punch a small hole between each tied bag in the envelope, (a pencil works well). These holes release water trapped in the envelope. DO NOT use a knife because a slice or slit will tear and

Button Tying

spread in the plastic. If further slope protection is necessary insert an additional envelope into the existing wavewash protection, overlapping at least four feet. To secure the overlap to the stakes attach the two top layers with one button and the two bottom layers with another. The buttons line up with the stakes that are four feet apart. There should be four buttons securing the two envelopes.

Using a continuous piece of twine, hang tied bags from stakes in a zigzag fashion as shown in Figure 10. Tie a double half-hitch knot below the knot in each sandbag. ***Place each bag so that it hangs at the middle of the plastic directly below the next stake.*** Attach twine to every other stake with a double half-hitch. Add a second row of tied bags suspended from the stakes previously skipped. These bags will keep the plastic lying flat against the levee slope in windy conditions. If the upper portion of the slope needs protection, use an additional envelope. Be sure to place the upper layer over the lower layer by 2 to 3 feet. Finally place sandbags along all seams to prevent wind and water from entering the envelope. To prevent slippage, make sure the sandbags forming the top seam cap are half on the plastic and half on the levee as shown in Figure 10. If the levee slope is too steep, some of the bags on the seam may be tied off with twine to the stake above the envelope for support.

Remember, wind is your worst enemy. When using plastic sheeting, be sure all seams are secured with sandbags, and make needed repairs to the envelope as soon as possible.

Tying Sandbags

Most sandbags are used with the open end folded. In some cases sandbags will have to be tied. Fill the bag 1/4 to 1/3 full of material. See Figures 12A–12D for instructions.

Figure 12A: Sandbag filled 1/4 to 1/3 full

Figure 12B: Grasp bag at top corner and spin

Figure 12C: The long tail should be twisted tightly and look like a piece of rope.

Figure 12D: Tie an overhand knot (pretzel knot) as low as possible on the bag.

Raincoat Method

The raincoat method is used to prevent further saturation of levee or hillside slopes. Plastic sheeting is laid out flat on the slope, sandbags are placed around the perimeter with additional bags placed randomly for weight. If the slope is steep, wooden stakes can be driven into the ground just above the area to be protected. The stakes are 4 feet apart with a 1-foot stagger. The plastic is secured to the stakes with tie-down buttons or small round rocks (see Figure 13).

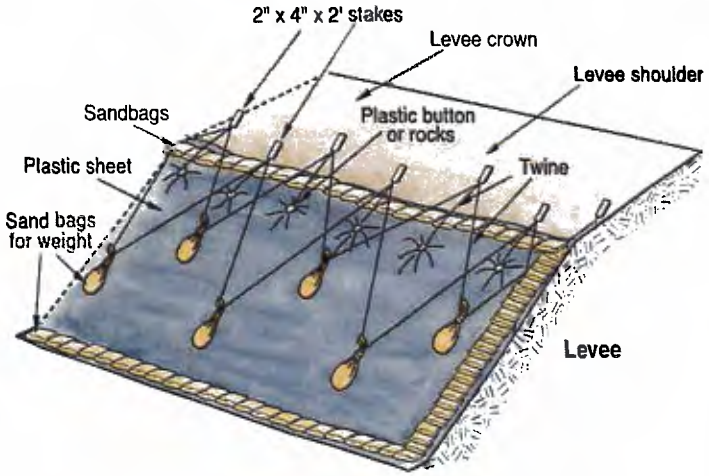


Figure 13: Raincoat method

Use a crisscross method of placing the sandbags (Figure 13) on the plastic. Place a solid row of sandbags on all edges of the plastic (half on the ground, half on the plastic).

Emergency Spillway

To prevent damage to the levee slope due to overtopping, an emergency spillway can be constructed.

Place plastic sheeting over area to be used for spillway. Line all sides with at least a single row of sandbags. Use additional tied sandbags on plastic for weight if needed. Extend spillway beyond the levee toe if necessary.

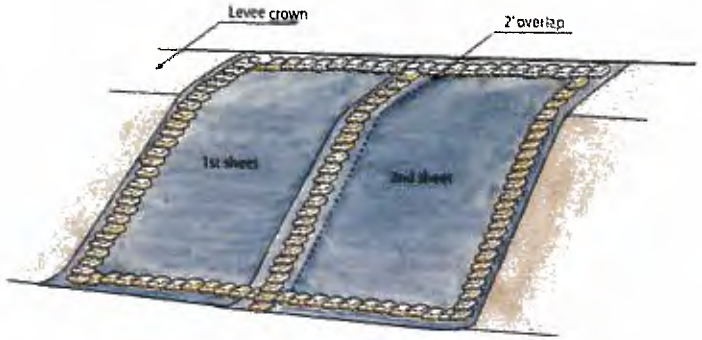


Figure 14: Emergency spillway using plastic sheeting and sandbags

Emergency Spillway

Structure Protection/Diversions

The main causes of damage to structures, homes, and property during heavy rains or flood flows are:

1. Flood water from overwhelmed storm drains and urban diversions, particularly on sloping streets.

2. Flood flows onto property through driveway openings and low spots in curbs.

3. Debris flow from hillsides that have been cleared of vegetation by fire or development.

The flood fighting methods described in the following sections have proved effective in combating floodwaters and debris flows.

Diverting Water or Debris Flows Away from Structures

Homes and structures can be protected from floodwater or debris flows by redirecting the flow as shown in Figure 15. Sandbag barriers must be long enough to divert the flows away from all structures. Barriers constructed of sandbags or lumber can also be used to channel mud and debris away from property improvements.

Structure Protection

Structure Protection

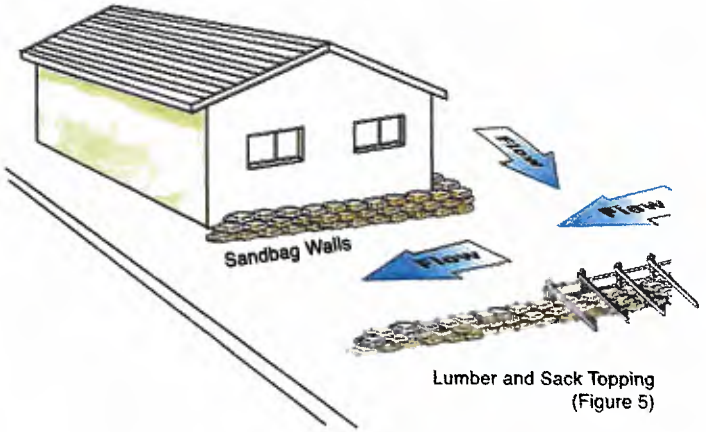


Figure 15: To divert mud, debris, and water, use sandbag walls or lumber and sack topping

Structure Protection

The following method is used for protection of buildings and other structures along lake shores and in similar situations where water is rising with little or no current.

Lay plastic sheeting on the ground and up the building walls to a point at least 1 foot above the predicted water elevation. Place sandbags on the plastic sheeting in the form of a half pyramid against the structure (see Figure 16). Secure plywood over doors and vents. Overlap plastic sheeting and sandbags at corners of buildings.

Home Protection

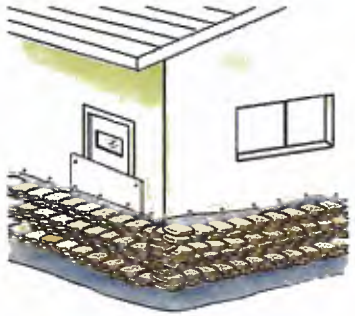
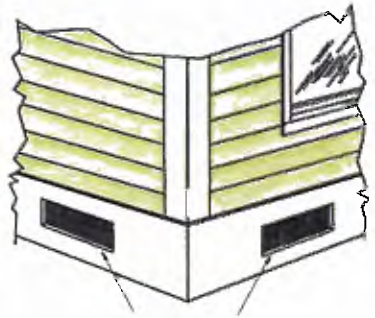


Figure 16: Structure protection

Wet Flood Proofing Requirements for Structures Located Within Special Flood Hazard Areas

National Flood Insurance Program regulations require that buildings on extended wall foundations or that have enclosures below the base flood elevation must have foundation or enclosure wall openings. These openings prevent the foundation or enclosure walls from weakening or collapsing under pressure from hydrostatic forces during a 100 year flood event. The openings allow flood waters to reach equal levels on both sides of the foundation or enclosure wall and minimize the potential for damage from hydrostatic pressure.

THESE OPENINGS MUST NOT BE BLOCKED IF THE BUILDING IS LOCATED WITHIN A SPECIAL FLOOD HAZARD AREA.



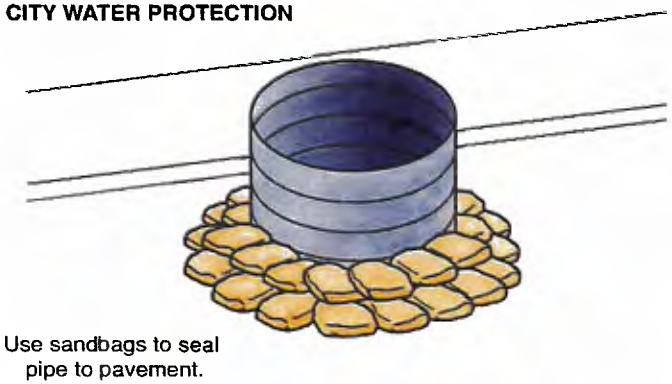
Foundation or wall openings must be kept open within special flood hazard areas

Figure 17: Foundation and wall openings in structures

For details refer to FEMA Technical Bulletins TB1-93 and TB-7. These bulletins may be obtained from the FEMA web site at: *http://www.fema.gov*

Water / Storm Drain Protection

Water or sewer systems can be protected by placing corrugated metal pipe (CMP) over the utility hole (see Figure 18). Lay plastic sheeting up the walls of the CMP and place sandbags in the form of a half pyramid around the CMP to seal it to the pavement. This method will prevent mud and debris from entering the system and also act as a surge chamber.



Using corregated metal pipe (CMP) over utility hole to isolate sewer line or prevent contamination of water system.

Figure 18: Water / storm drain protection

Flood Fight Safety

Numerous potential hazards exist during flood events. These hazards are manageable if identification and communication occur on an ongoing basis. Personal safety requires a conscious effort that every flood fighter must consider in their various duties and activities.

- ***Changing Weather Patterns:*** This occurrence can affect existing conditions and create more serious situations. Always know the forecast and how it affects vulnerable areas, workers and the public.

- ***Changing Water Patterns:*** The rise and fall of water can occur gradually or very quickly. Knowledge of high water and how it relates to levees, communities, and workers is essential. Continuous monitoring and communication of water level influences (i.e. reservoir releases, tides, and drainage inflow) are very important. Always know your area and the flood history around you.

- ***Swift Water:*** High velocities of water are common during flooding events. Extreme caution should be used when anyone is exposed to high water. Workers should have flotation devices, throw ropes, and lifelines in the immediate area. Swift water rescue teams may be available. Use common sense and sound judgement around swift water. Know your resources and how to activate them prior to the event.

- ***Temperature Related Illness:*** During a flood fight, weather patterns can change constantly. Changes in temperature present the potential for hypothermia and heat exhaustion/stroke. Flood fighters should know the signs of distress for these types of illnesses and how to treat them. During cold, wet weather it is recommended that

workers layer clothing to stay warm and dry. A dry blanket and warm clear fluids should be on the work site for emergency use. In warm, hot weather lightweight clothing is recommended. If skin is exposed, a sun block agent may need to be applied. Plenty of drinking water should be on site and consumed regularly. Headgear is recommended in both hot and cold situations.

- ***Insect/Animal Exposure:*** Flooded areas force a variety of animals to evacuate to high ground. Workers in these areas should be aware of these animals and not handle them. If animal removal is needed, contact a local professional. Stinging and biting insects are prominent in certain flood-prone areas. Chemical repellents can be useful as a deterrent. A complete first aid kit should be on site.

- ***Vegetation:*** Noxious plants such as star thistle, stinging nettle, and poison oak are commonly found along rivers, streams, and levees. Avoid direct contact with this type of vegetation to prevent itching and rash. Consult medical personnel if symptoms persist.

- ***Sandpile Safety:*** When shovels are used for filling bags a safe distance for workers is essential. Sandbags and sand may contain contaminates. Have disinfectant available. Safety glasses or goggles are recommended for protection from blowing sand particles.

- ***Contamination:*** Flooded areas can potentially carry high levels of contaminants. Common contaminants include fuel, sewage, and pesticides. Local Haz-Mat teams should be contacted if needed. Always wear protective clothing to help limit contact with water. Carry antibiotic hand soap and wash thoroughly after working around floodwater.

- ***Exhaustion:*** Stress combined with long, physically demanding hours can have an adverse effect on the flood

worker. It is very important to recognize exhaustion or sleep deprivation and treat them immediately. Operation of vehicles, machinery, or equipment should be avoided. A shift rotation of personnel will help eliminate fatigue factors.

- ***Body Mechanics:*** Proper body mechanics while working on floods is very important. The body is expected to work long, physical hours during the event. Each individual must make a conscious effort to use safe lifting and weight distribution techniques. Watch your footing; surfaces can be slippery and cluttered with tripping hazards.

- ***Construction Equipment:*** There are times when equipment and people will occupy the same work area. Workers should wear safety vests and hard hats and be aware of their surroundings. Safety warning devices (i.e. backup alarms and lights) should be in-tact and working on all equipment. Communication and alertness are vital! All operators must be certified for their equipment.

- ***Boat Travel:*** Materials and/or personnel will sometimes need to be transported to work sites by boat. Operators of the watercraft must be certified. Flotation devices must be available for every passenger. Extreme care should be taken while loading and off loading.

- ***Patrolling:*** Patrolling is the key to effective flood fighting. Patrols will identify, initiate control, and monitor trouble spots in affected areas. Vehicle patrols should travel in two person teams with dependable communication devices. Lifelines, flotation devices, and a blanket should be in the vehicle for possible water-related accidents. Foot patrols should also have the same considerations. Extreme caution should be exercised when travelling saturated, cracking, or sloughing areas.

- ***Vehicle Placement:*** Vehicles in work areas along the levee should remain parked on high ground. This is usually the crown roadway. Vehicles should also be parked facing their access point. An escape plan should be communicated to all flood workers.

- ***Structure Considerations:*** When working around structures, be aware of downed power lines, natural gas or propane leaks, and unstable structure supports. Communicate with the structure owner if possible.

- ***Safety Gear:*** Rain gear, warm clothing, handheld lights, gloves, goggles, hardhat, boots, first aid kit, ropes, personal flotation devices (PFD), hip waders.

Flood Fighting Terminology

Boil — Also known as 'Sand Boil', is caused by water flowing through or under a levee, possibly carrying eroded levee material, and surfacing on the land side of the levee.

Button — A plastic tie down device used with plastic sheeting.

Emergency Spillway — Plastic sheeting and sandbags used to allow water to flow over a levee, protecting it from erosion. (Page 23)

Flood Fighting — An effort made to prevent or mitigate the effects of flood waters.

Home Protection — Plastic sheeting and sandbags placed around individual homes to protect from low current flood waters. (Page 26)

Lath — Long, narrow wooden stakes (4 feet long by 1 ½ inch wide) used to mark problem areas during high water patrolling. A brief description of the problem along with the date, time, and patroller's initials are written on the lath with a permanent ink marker. Brightly colored survey ribbon is attached to the lath for easy identification.

Levee — An earthen structure that parallels a river or stream designed to prevent high water flows from inundating urban and/or agricultural land.

Levee Break — A point in the levee system that has failed to perform its designed function, has eroded away and is allowing water to inundate land.

Levee Breach — The same as Levee Break but can sometimes describe a section of levee that has been intentionally broken. If intentional, also known as a relief cut.

Lumber and Sack Topping — Wooden panels and sandbags used to prevent overtopping and to divert water, mud, and debris flows. (Page 11)

Overtopping — When water has risen higher than the banks of a waterway or the top of a levee.

Plastic Sheeting — Made of polyethylene, these 100'x20'x10 mil rolls are sometimes referred to as visquine and are used for erosion control.

Rain Coat — A single layer of plastic sheeting and sandbags used to protect slopes from further rain saturation. (Page 22)

Relief Cut — Intentionally-removed section of levee to relieve hydrologic pressure upstream and downstream of the levee section.

Sack Ring — Multiple sandbag rings used to encircle a boil, slow the flow of water, and stop the erosion of levee material. (Page 13)

Sack Topping — A sandbag wall designed to prevent overtopping. (Page 9)

Sandbag — An 18"x30" bag (burlap or plastic) filled with sand or other appropriate material intended for use as a temporary flood fighting measure.

Sloughing — Soil movement or slides often caused by over-saturated levee or hillside slopes. Can also be referred to as 'mud slides'.

Structure Protection — Sandbags, wooden panels, or other materials used to divert water, mud, and debris flows away from buildings, homes, and other structures. (Page 24)

Temporary Levee — Use of plastic sheeting, fill material and sandbags to raise a low area on a levee or embankment. (Page 10)

Twine — 250lb tensile strength polypropylene tying twine.

'U' Shaped Sack Ring — A sandbag structure used on levee slopes to control boils. (Page 14)

Wooden Panels — Wooden planks or plywood sheets used in conjunction with other flood fighting materials to prevent overtopping of levees or embankments and divert water.

Wavewash — Wind-generated waves breaking against a levee or embankment and possibly causing erosion.

Wavewash Protection — Plastic sheeting, sandbags, twine, stakes, and buttons used to prevent erosion of levee slopes and embankments. (Page 16)

Reference Guide:

DWR Division of Flood Management
www.water.ca.gov/floodmgmt

California Data Exchange Center
CDEC
www.cdec.water.ca.gov

California Emergency Management Agency
California Office of Emergency Services
www.caloes.ca.gov

National Weather Service
www.weather.gov

To request a copy of the Directory of Flood Officials or Flood Emergency Phone Card, contact the DWR Flood Operations Center at (916) 574-2619

Flood Fight Material/Equipment List

Fill/Repair material (Sand, Rock, Road Base)
Sandbags (18" width x 30" length 10 oz.)
Plastic Sheeting (100'x20'x10 millimeter rolls)
Wooden Stakes (1"x3"x24")
Bailing Twine (250lb tensile strength)
Tie Down Buttons
Geotextile Fabric (20'x100' rolls)

Patrolling

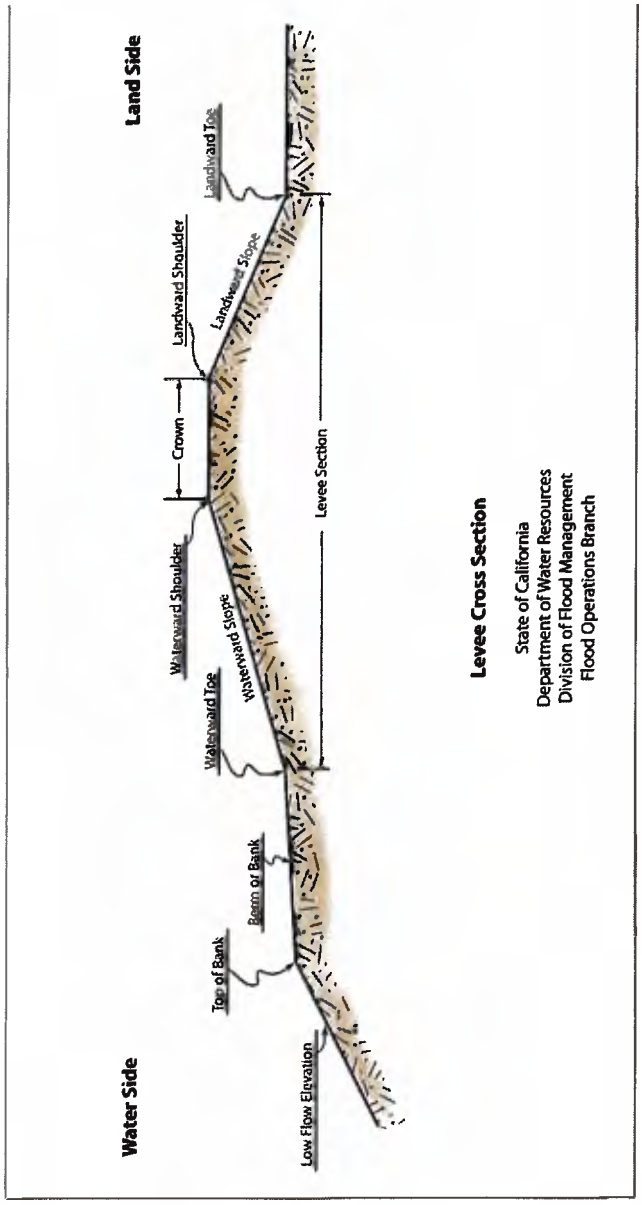
Patrol Vehicle (4Wheel Drive)
Communication Devices (Radio, Cell Phone, Laptop Computer (e-mail)
Global Positioning Satellite Handheld Device (GPS)
Digital Camera
Lighting (Flash Light, Flood Light)
Batteries
Lath (Bundle of 50)
Survey Ribbon (Bright Colors)
Permanent Ink Markers
Patrol Log (Writing Pad and Pencil)
Measuring Tape (100')

Tools

Shovels, Long Handle (#2 Mud Shovel)
Sledge Hammer (10lb)
Multi Purpose Lineman Pliers
Pulaski
McLeod
Loppers

Safety

Rain Gear
Rubber Boots
Hard Hat
Safety Glasses
Gloves
Boots
Personal Flotation Device (PFD)
Personal Safety Light
Warm Clothing
First Aid Kit


Land Side
Landward Toe
Landward Shoulder
Landward Slope
Crown
Levee Section
Waterward Shoulder
Waterward Slope
Waterward Toe
Berm or Bank
Toe of Bank
Low Flow Elevation
Water Side
Levee Cross Section
State of California
Department of Water Resources
Division of Flood Management
Flood Operations Branch

For all flood training information, emergencies, questions, or for additional information, please contact :

State-Federal Flood Operations Center
(916) 574-2619
flood_center@water.ca.gov

For training information, contact:

Rick Burnett
Flood Fight Specialist
(916) 574-1203
rburnett@water.ca.gov

FloodER

FloodSAFE CALIFORNIA DEPARTMENT OF WATER RESOURCES

B

CITY OF STOCKTON
DEPARTMENT OF MUNICIPAL UTILITIES
2500 Navy Drive • Stockton, CA 95206-1191 • 209/937-8750 • Fax 209/937-8708
www.stocktongov.com

July 3, 2017

Reclamation District 828
c/o Kjeldsen, Sinnock & Neudeck, Inc.
Attn: David Carr
711 North Pershing Avenue
Stockton, CA 95203

REQUEST FOR EMERGENCY PERMIT - BUENA VISTA STORM PUMP STATION (INTERSECTION OF BUENA VISTA AVENUE AND SHIMIZU DRIVE)

The City of Stockton, Municipal Utilities Department, requests an emergency permit to replace approximately a 6' section of the 24-inch storm discharge line at Buena Vista Storm Pump Station, which discharges storm water to Smith Canal. See attached drawing of the proposed section to be repaired. During their levee inspections, the staff from Reclamation District 828 and KSN, Inc. found corrosion under the exposed 24-inch discharge pipe, which has caused leaks.

The following scope of work was discussed with Mr. David Carr of KSN, Inc.:

- Cut the section of corroded pipe and replace it with a new 3/8-inch thick mild steel pipe. The replaced pipe will be coated internally and externally with epoxy, and a new pipe saddle will be installed to support the 24-inch pipe.

- Then conduct CCTV inspection on the remainder of the 24-inch pipe that is not underwater, as well as replace damaged sections, as needed.

If you have any questions or concerns regarding the repair, please contact Jeffrey Telmo, Collections System Supervisor, at (209) 937-5647.

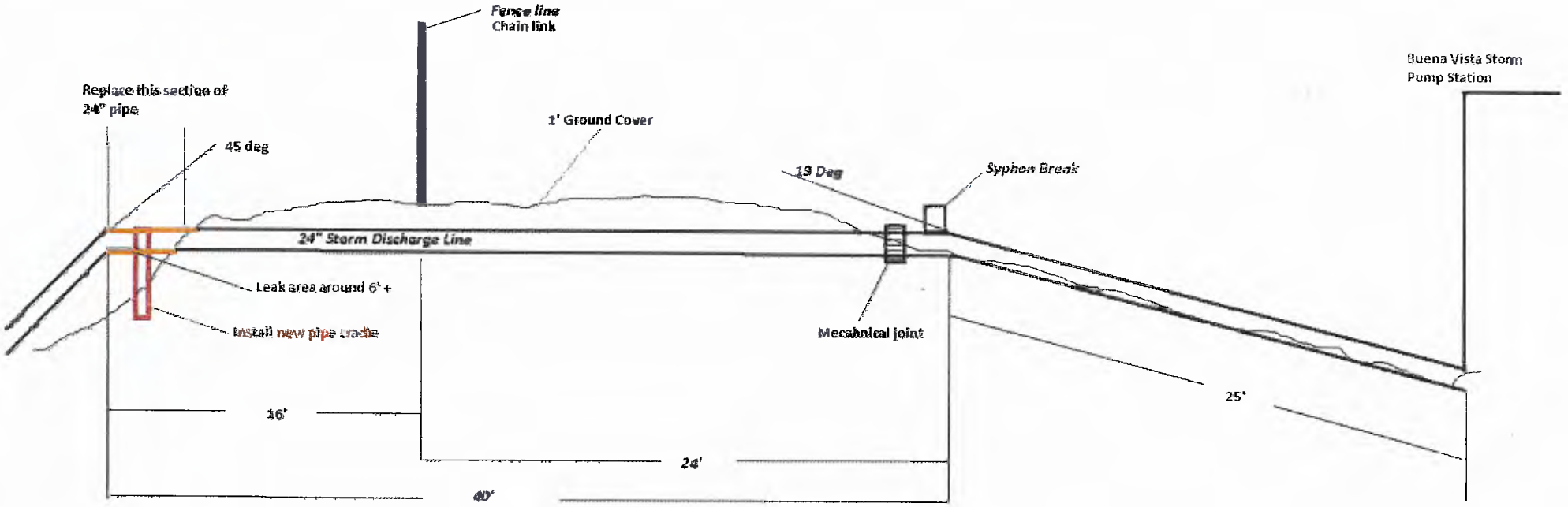
JOHN ABREW
DIRECTOR OF MUNICIPAL UTILITIES

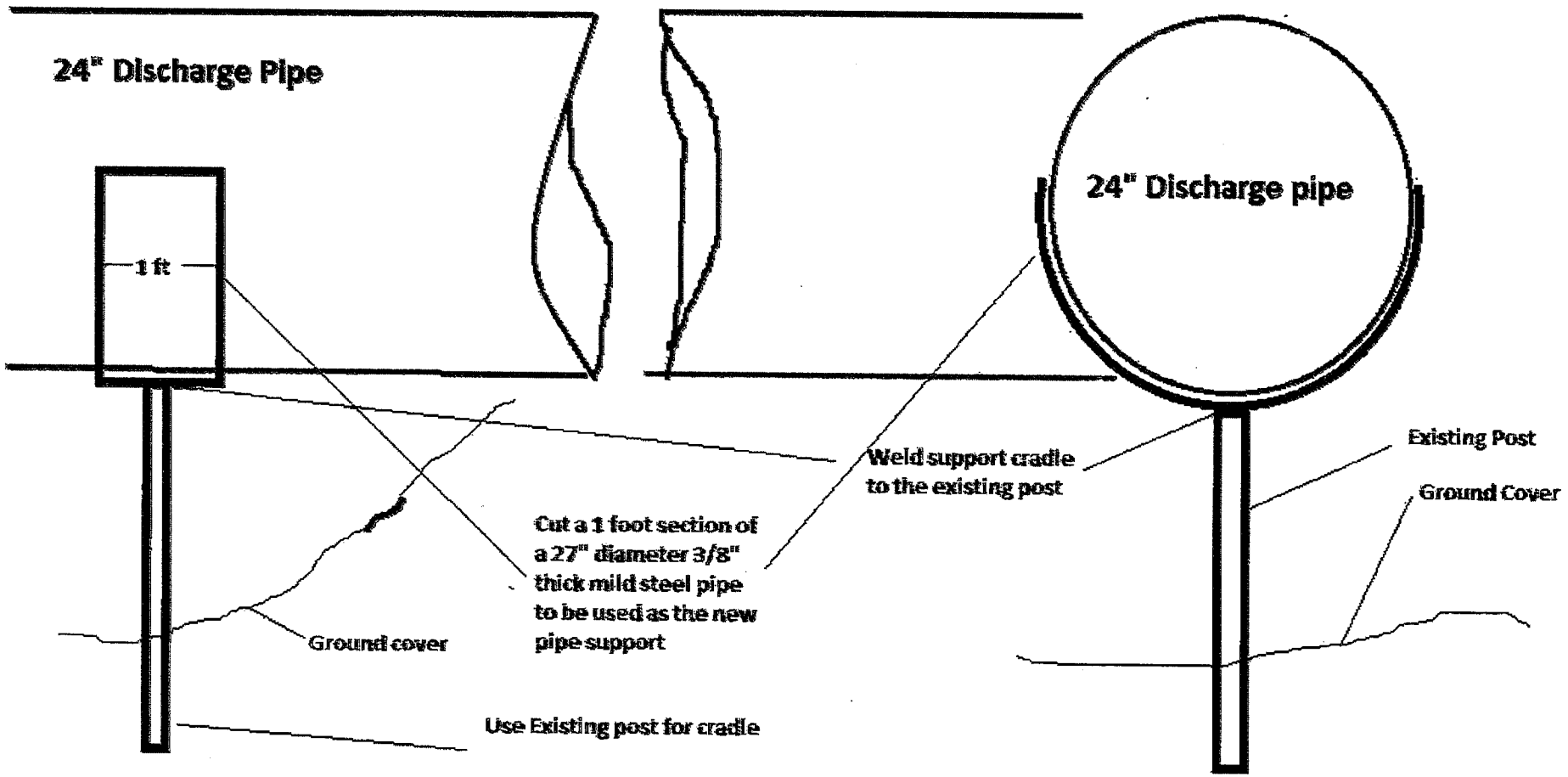
JEFF TELMO
COLLECTIONS SYSTEM SUPERVISOR

JA:BT:JT:mll

Attachment

Stockton
All-America City
1999


Fence line
Chain link
Buena Vista Storm
Pump Station
Replace this section of
24" pipe
1' Ground Cover
45 deg
19 Deg
Syphon Break
24" Storm Discharge Line
Leak area around 6' +
Install new pipe cradle
Mecahnical joint
25'
16'
24'
40'


24" Discharge Pipe
1 ft
24" Discharge pipe
Weld support cradle
to the existing post
Existing Post
Ground Cover
Cut a 1 foot section of
a 27" diameter 3/8"
thick mild steel pipe
to be used as the new
pipe support
Ground cover
Use Existing post for cradle

C

D

KSN inc. KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

Stephen K. Sinnock, P.E.
Christopher H. Neudeck, P.E.
Neal T. Colwell, P.E.
Barry O'Regan, P.E.

1204-0180
06-500

July 11, 2017

Jeff Telmo
City of Stockton
Department of Municipal Utilities
2500 Navy Drive
Stockton, CA 95206

Re: Request for Emergency Permit – Buena Vista Storm Pump Station
No 828 – Weber Tract (RD 828)

Dear Jeff,

I am writing this letter on behalf of Reclamation District 828 (RD 828) to officially notify you of the District's requirements related to the proposed Request for Emergency Permit – Buena Vista Storm Pump Station.

The storm water discharge pipeline replacement project within the RD 828 levee at the Buena Vista Storm Pump Station has the potential to impact RD 828's levee and drainage system and RD 828 shall evaluate, review and process an encroachment permit for said work.

In addition, RD 828 is seeking the execution of a Reimbursement Agreement which shall reimburse RD 828 for all permitting, engineering, legal, secretarial, consulting, and other fees and expenses actually incurred by RD 828 in evaluating, reviewing and processing plans, designs, specifications, environmental analysis, and other documents and data for the Project.

I have attached a draft copy of the proposed Encroachment Permit for your review and consideration. Also attached is a Reimbursement Agreement for signature. The reimbursement agreement shall be executed prior to any work by District necessary to complete the encroachment permit process.

Kjeldsen, Sinnock and Neudeck, Inc. looks forward to working with you and your staff in reviewing and approving the proposed Request for Emergency Permit – Buena Vista Storm Pump Station. If you have any questions, please call me.

Sincerely,
KJELDSEN, SINNOCK & NEUDECK, INC.

_____
Christopher H. Neudeck,
RD 828 District Engineer

w/enclosures

cc: Trustees (with enclosure)
Daniel J. Schroeder, District Secretary / Attorney