

**San Luis Obispo County
Flood Control and Water Conservation District**



**2005/2006 Annual On-Site Inspection of the
Arroyo Grande Creek Channel and
Los Berros Creek Diversion Channel**

December 15, 2006

Report prepared by:
Nola Engelskirger
San Luis Obispo County Public Works Department

**San Luis Obispo County Flood Control and Water Conservation District
2005/2006 Annual On-Site Inspection of the
Arroyo Grande Creek Channel and Los Berros Creek Diversion Channel**

On November 28, 2006, Nola Engelskirger of the San Luis Obispo County Flood Control and Water Conservation District (SLCFC&WCD) conducted the 2006 annual on-site inspection of the Arroyo Grande Creek Channel and the Los Berros Creek Diversion. During the inspection, Ms. Engelskirger was accompanied by Susan Litteral of the Natural Resource Conservation Service (NRCS), and Julie Thomas of the Coastal San Luis Resource Conservation District (CSLRCD). The last annual inspection was performed on March 16, 2004, by Susan Litteral of the NRCS and Dean Benedix of the SLCFC&WCD. A copy of the last report is attached hereto as reference.

Record of Significant Event:

On January 23, 2006 a debris jam in Arroyo Grande Creek above the confluence with Los Berros Creek was observed and reported to Julie Thomas of the CSLRCD by a resident in Zone 1/1A. Ms. Thomas forwarded the report to Glen Priddy of the SLCFC&WCD on January 24, 2006 after she confirmed that there were in fact three debris jams. A map showing the locations of the debris jams has been attached to this report as reference.

Two debris jams were located approximately 100-feet downstream of the northern Zone 1/1A boundary. The first debris jam is upstream of an arundo stand and the other was downstream from the first, atop a beaver dam. The location of the third debris jam was located downstream of the Highway 1 bridge in the vicinity of the mobile home parks. Photos of the debris jams have been attached to this report as reference.

The debris jams appeared to be caused by trees that had been chopped down on the banks of the channel, but had not been removed from the channel. The trees were not chopped down during the vegetation maintenance coordinated by the CSLRCD or the SLCFC&WCD, but had apparently been chopped down and left by a resident who probably thought that they were helping by cutting down the trees, not knowing that the cut limbs would cause jams if left on the bank.

There was no immediate risk of flooding since there was no forecast for rain at the time the debris jams were noted. However, there was potential for flooding if a large storm were to come through and the debris jams remained.

The debris jams were removed a week after they were reported. The CSLRCD obtained the required permits and coordinated the required red-legged frog monitoring. The SLCFC&WCD contracted with the California Conservation Corps to remove the debris jam and provided necessary equipment such as chipper and dump truck. Work to remove the debris jams commenced February 2, 2006 and was completed February 8, 2006.

Record of Recent Maintenance Completed:

October 2005 Levee Maintenance

In October 2005, the SLCFC&WCD added approximately 500 cubic yards of road base grindings to the south levee of Arroyo Grande Creek between stations 80+00 and 95+73, the reach just east of the 22nd Street Bridge. The south levee was raised along this reach an average of 0.97 feet to level out the south levee and bring it up to within 0.5 feet of the north levee. The south levee level was held below the north levee by 0.5 feet in this area to ensure overtopping would occur south into the farmlands rather than north into the residential areas.

This maintenance was necessary because the south levee top had several significantly low areas from erosion and vehicle traffic, such as farm equipment that utilize the levee top for accessing fields and turning around. The work has improved the flood protection for the agricultural property owners to the south, while still providing additional flood protection for the residents to the north by keeping the south levee 0.5 feet below the north levee.

2006 Vegetation Maintenance

Vegetation maintenance was conducted from August 14 through November 3 of 2006. The CSLRCD coordinated most of the vegetation maintenance effort, with assistance from the SLCFC&WCD. The vegetation maintenance work was mostly performed by the California Conservation Corps with assistance from the California Men's Colony work crews toward the later end of the work period. Vegetation maintenance was conducted on almost the entire channel. A map showing the areas where vegetation maintenance was completed is included in Attachment 2.

Since assessments were not approved until July 18, 2006, scheduling of the vegetation maintenance was not done until August. Due to late scheduling, there were limited crews available to complete the maintenance. In order to ensure the most important maintenance was performed, the areas needing work were prioritized by the CSLRCD and approved by the SLCFC&WCD. The high priority reaches were defined as the reaches with the highest probability of overtopping, or were reaches that did not receive any maintenance the previous year due to time constraints and work restrictions in areas with sensitive habitat where red-legged frogs were observed. All the high priority reaches were completed and most of the remaining channel received some maintenance. As in the previous year, only a few localized sections did not receive any vegetation maintenance and it was again due to time constraints and work restrictions in areas with sensitive habitat where red-legged frogs were observed. The sizeable areas are:

- a. Los Berros Channel from Valley Road to the confluence with Arroyo Grande Creek.
- b. East Levee of Arroyo Grande Creek north of the Highway 1 Bridge to Zone 1/1A boundary.

- c. West Levee of Arroyo Grande Creek starting 100 yards north of Highway 1 Bridge to Zone 1/1A boundary.
- d. South Levee of Arroyo Grande Creek west of 13th Street to ocean outlet.

Summary of Observations of Inspection:

The most significant issue of concern relative to channel maintenance is the large volume of sediment which has accumulated and remains in the bottom of the Arroyo Grande Creek from the Valley Road crossing area to the Guiton's Road Crossing area. As noted in previous reports, the sediment buildup has reduced the estimated capacity of the channel to less than a 5 year storm capacity in some segments.

Thick willow and other vegetation growth continue to flourish in the Arroyo Grande Creek bottom sediment islands and along the channel banks. This growth contributes to the further reduction of flow capacity in the channels. This vegetative growth is particularly heavy in the area between the north boundary of Zone 1/1A and Highway 1 Bridge and in some of the other areas that did not receive any vegetation thinning this year. However, in areas where this was the third time that willows were trimmed and vegetation was removed, it appears that the willows are getting "trained" and there was less re-growth to cut down. It is anticipated that after a few more years of aggressive vegetation removal, the vegetation may be "trained" so that only minor trimming and vegetation thinning will be required to maintain the vegetation in the channels.

Several piles of willows and arunda were left in the channel after the recent vegetation thinning. These piles will contribute to the potential for a debris jam if not removed prior to storm flows commencing.

The condition of the facility's flap gates is poor. The Sand Canyon Outlet Structure and the Los Berros Outlet Structure flap gates are not functioning properly and both should be replaced. Other flap gates appeared functional. However, minor maintenance, such as sediment clearing, is required to ensure proper function of each this winter.

While several beaver dams were observed, they do not appear to be detrimental to the channels functioning. The beaver dams may actually be helpful to the creeks by reducing willow growth over the summer. Beaver dams create ponds and willows do not grow in inundated areas. Additionally, it is theorized that when storm flows begin, the beaver dams will wash out and the additional flow volume from the beaver pond may help to flush out sediments in the bottom of the channel.

There continues to be intrusion of earth into the channels from agricultural operations at the bank top. This intrusion appears to have covered over the existing creek banks and reduced the effective width and therefore capacity of segments of both channels. The intrusion is most apparent on the south bank of the Los Berros channel from the Valley Road area to the confluence. There are other locations along the channels with intrusion and they are typically located immediately adjacent to the creek edge farm roads which are adjacent to cultivated fields under production.

Several piles of debris were observed during the inspection. Observed debris included landscaping waste, furniture, tires, and household garbage by the truckload. There was an entire pick-up truck bed-liner filled with trash left on top of the north levee near Station 90+00. The debris piles can cause several problems for the proper functioning and health of the channels including adding to potential risk of flooding due to a debris jam and pollution of the natural stream.

The condition of the levees and channels remains consistent with that reported over the past several years of annual reports.

Noteworthy Detailed Comments:

1. Arroyo Grande Creek – downstream to upstream
 - a. At approximately Station 25+00, west of Guiton's crossing and near South County Sanitation District WWTP, there are three piles of cut arunda that need to be picked up.
 - b. Area where levee was repaired after 2001 breach (approx. Station 60+00), there appears to be extensive sedimentation. This part of the creek channel was widened after breach, and due to the widening the flows slow in this segment and sedimentation is occurring. The channel appears to be filling in to re-create a smaller, more natural stream that existed prior to the breach and repair widening.
 - c. In vicinity of Station 55+00 on north levee, a homeless camp was observed. See Attachment 5, photos 1 and 2.
 - d. Along the north levee, east of the 22nd Street bridge, several bags of garbage and a truck liner filled with garbage were dumped. See Attachment 5, photo 3.
 - e. On the south levee, east of the 22nd Street bridge, a mattress and a dresser were dumped.
 - f. Station 82+90, 18" flap gate rusted open.
 - g. Between 82+90 and 93+30, two 12" flap gates operable, but sediment in pipes.
 - h. Between 82+90 and 93+30, two 3-inch discharge pipes daylight through north levee from sump pumps for mobile home park drainage basin. Owner of the park indicated he installed sump pumps in the last couple of years because basins would fill faster than flap gates would allow flow out.
 - i. In vicinity of Station 85+00, observed a large log on south levee opposite from horse ranch. The log has potential to create a debris jam at the 22nd Street bridge if it is carried downstream by high flows in the channel.
 - j. Station 93+30, near east gate on north levee, flap gate is buried.
 - k. Between approximate Station 103+00 and 103+50 there appears to be farmland encroaching on the north levee. See Attachment 5, photo 4.
 - l. Approximate Station 103+50, at equipment crossing, observed significant low spot on north levee due to erosion from vehicle traffic. See Attachment 5, photo 5.

- m. Approximate Station 103+50, flap gate is buried. Earth ditch and culvert leading to flap gate appears to be adding sediment to creek. See Attachment 5, photo 6.
 - n. Several areas just south of Highway 1 bridge, appear to have received inconsistent vegetation thinning. Islands of small willows and patches of castor bean and arunda need to be trimmed/removed.
 - o. Areas just south of Highway 1 bridge display obvious re-growth of willows and castor bean within 3 months of vegetation thinning work.
 - p. Approximate Station 125+50, near 1st home north of Highway 1 bridge, there are piles of cut willows in channel.
 - q. Areas north of Highway 1 bridge appear to have obvious re-growth of castor bean; several large patches were observed.
 - r. North end of Zone 1/1A, near Arroyo Grande City Limits where un-permitted willow removal occurred previous year by resident, observed abundant willow re-growth. See Attachment 5, photo 7.
2. Los Berros Channel – downstream to upstream
- a. Station 13+25, concrete stabilizer is eroded on both upstream and downstream sides so that original concrete rip rap on channel bottom and sides are exposed. See Attachment 5, photos 8 and 9.
 - b. Near Station 18+00, concrete stabilizer has significant sedimentation up to top of concrete on upstream side and filling up to the weep holes on downstream side; haunches are caving in.
 - c. Near Station 25+00, concrete stabilizer has significant sedimentation that has nearly buried structure on both upstream and downstream sides.
 - d. Inconsistent vegetation thinning between Valley Road bridge and Century Lane bridge. However, minimal willows exist in this area.
 - e. North of Century Lane Bridge was clear of willows for 50 feet upstream of the bridge for the first time in several years. See Attachment 5, photo 10.

Recommended Maintenance:

1. High Priority Maintenance:
- a. Remove debris from levee tops between 22nd Street and Highway 1 Bridge (pick-up truck bed liner, mattress, dresser, garbage, etc.)
 - b. Remove cut vegetation from along north levee west of 22nd Street Bridge and from within channel north of Highway 1 Bridge.
 - c. Remove or cut up large log on south levee near Station 85+00, opposite horse ranch.
 - d. Fill/raise low spot near approximate Station 103+50 caused by farm equipment and other vehicle traffic accessing the nearby equipment crossing.
 - e. Repair flap gates and clear culverts along the north levee between 22nd Street bridge and Highway 1 bridge.

2. Priority Maintenance

- a. Raise north levee additional 2 feet above south levee between Stations 70+00 and Station 105+00 to provide additional flood protection to the residents living immediately north.
 - i. Raise by placement of k-rail wrapped in visqueen - \$106,000
 - ii. Raise by placement of fill - \$93,000
- b. Replace facility flap gates with rubber "duck bill" type check-valves
 - i. Los Berros Outlet Structure - \$30,000
 - ii. Sand Canyon Outlet Structure - \$40,000
- c. Work with property owner at 2750 Cienaga Street (APN: 075-032-011) to make repairs to north levee where farmland appears to be encroaching on levee top between approximate stations 103+00 and 103+50.
- d. Reduce sedimentation to channel by requesting CSLRCD and NRCS work with property owners immediately adjacent to the creek channels to improve erosion control. (Could start with owner of property where earth swale was observed to be adding sediment to Arroyo Grande Creek, just south of the Highway 1 bridge near approximate station 103+50. This is the same property that appears to be encroaching on north levee, see item c immediately above.)
- e. Determine and implement best approach to reduce debris dumping on levees. Ideas discussed during inspection included replacement of gates with locks on levees, posting of "Dumping Prohibited" signs displaying penalties (i.e. fines), neighborhood watch, etc.

3. Long-term Maintenance

- a. Remove sediment from bottom of creek channels, especially in Arroyo Grande Creek near the Railroad bridge and on Los Berros Creek between the confluence with Arroyo Grande Creek and the Valley Road Bridge.
- b. Continue annual vegetation maintenance.
- c. Place permanent station markers along north and south levees to enable more accurate reference of location on future inspections and maintenance.
- d. Monitor sedimentation in creek channel by obtaining new profile of channel bottom every 2-3 years.

Attachments: 1 – NRCS March 16, 2004 Inspection Report (w/o attachments)
2 – Map of January 2006 Debris Jams
3 – Photos of January 2006 Debris Jams
4 - Map of 2006 Vegetation Maintenance
5 – Photos of Inspection
6 – Recommended Maintenance Project Cost Estimates

File: 340.70.01 - Zone 1/1A Assessment Inspection Check-list

V:\Hydraulic Planning Unit\Flood Control\Zone 1_1A\2006 Inspection Report.doc

Natural Resources Conservation Service
2003/2004 Annual On Site Inspection
of the
Arroyo Grande Creek Channel and Los Berros Creek Diversion Channel

Performed March 16, 2004 by
Susan Litteral, Natural Resource Conservation Service

On March 16, 2004, Susan Litteral of the Natural Resource conservation Service, San Luis Obispo County Office, conducted the 2003/2004 annual onsite inspection of the Arroyo Grande Creek Channel and the Los Berros Creek Diversion. During the inspection, Ms. Litteral was accompanied by Dean Benedix of the San Luis Obispo County Flood Control and Water Conservation District. The last annual inspection was performed on October 7, 2002 by NRCS Susan Litteral and SLO County FC and WCD Construction Engineer David O'Halloran. A copy of the undated last report, received by SLO County on December 16, 2002, is attached hereto as reference.

Record of Significant Event:

On Monday, December 22, 2003, a magnitude 6.5 earthquake occurred centered northeast of San Simeon at approximately 11:00 AM. As a result, significant settlement and cracking of the Arroyo Grande Creek channel levees was observed the afternoon of December 22. With heavy rain forecast for Wednesday, December 24, emergency forces of the San Luis Obispo County Public Works Department were deployed, together with independent contractors, a consulting engineering geologist, and others to conduct immediate site assessment and repairs. Public Works personnel walked the entire levee and located segments where settlement was observed. In these locations, the levee earth was excavated down to the apparent limit of the cracking, and the material replaced and recompacted to the original grade and configuration. Attached is a copy of George Gibson's February 2, 2004 file memorandum detailing the damage repairs performed, and Earth Systems Pacific levee inspection report dated December 29, 2003. These emergency repairs were funded through the Federal Emergency Management Administration.

Summary of observations of inspection:

The most significant issue of concern relative to channel maintenance is the large volume of sediment which has accumulated and remains in the bottom of the AG Channel from the Valley Road crossing area to the Guiton's Road crossing area. This sediment buildup has reduced the estimated capacity of the channel from the original estimated 100 year design to less than a 5 year storm capacity in some segments. Additionally, thick willow and other vegetative growth continues to flourish in the AG creek bottom sediment islands and along the channel banks. This growth contributes to the further reduction of flow capacity in the channels. This vegetative growth is particularly heavy, and increases in density from medium to heavy from an area about halfway between the Los Berros confluence and Highway 1 to the channel outlet at the estuary. The goat grazing which

the District conducted in August 2003 appears to have been successful in maintaining a status quo level of reoccurring willow and other vegetation regrowth along the entire channel corridor. Isolated locations of invasive vegetation, i.e. castor bean and pampas grass, levels consistent with previous inspections, were observed. Restrictive environmental permitting requirements and limited Flood Zone funding continue to hamper the District's ability to perform urgently needed channel maintenance in the interim, while the California State Department of Water Resources gears up to implement channel restoration activities scheduled to commence July 2004.

The AG Creek channel levee locations where remedial recompaction was performed in response to the December 22, 2004 earthquake show no signs of additional settlement, cracking or degradation.

Several beaver dams were observed, however they do not appear to be detrimental to the channels functioning. One large size sycamore tree trunk, approximately 30" in diameter by 30 feet long, was observed hung up on mid-channel sediment island vegetation just upstream of the Highway 1 bridge crossing.

An additional issue of concern is the apparent intrusion of earth from bank top agricultural operations into the channels at two extended locations. This intrusion appears to have covered over the existing creek banks and effectively reduced the effective width and therefore capacity of segments of both channels. The two locations are on the south bank of the Los Berros channel from the Valley Road area to the confluence, and along approximately 1800 feet of the south bank of the AG Channel beginning at the 22nd Street bridge crossing. Both locations are immediately adjacent to the creek edge farm roads which are adjacent to cultivated fields under production.

The condition of the levees and channels remains consistent with that reported over the past several years of annual reports.

Noteworthy detail comments:

1. Los Berros Creek Diversion Channel - Upstream to downstream
 - A. From Century Lane to confluence of old Los Berros Creek - Minor aggregation, bank vegetation light, bottom relatively clear of sediment.
 - B. Confluence of old Los Berros to Valley Road bridge - bank vegetation medium dense
 - C. Valley Road Crossing area - Significant sediment at Station 22+50 concrete "stabilizer" structure. Limited Willows this area, mostly grasses and mustard vegetation. Bottom sediment bars reduce flow area of channel by 10% to 30 %. Sinuous stream thread in this area.
 - D. Station 13+25 vicinity at concrete Stabilizer structure -significant apparent intrusion of earth from bank top agricultural operations into and over the south bank of the channel (possibly in the range of up to 10 feet horizontally). This intrusion appears to have covered over the existing creek bank and effectively reduced the effective width and therefore capacity of this area of the channel. The approximate extent along the south bank of this segment of the channel from the Valley Road area downstream to

the confluence. The location is immediately adjacent to the creek edge farm road adjacent to cultivated fields under production.

2. At Confluence with AG Creek Channel

A. Isolated light density willows and other vegetation to about half way to Highway 1 crossing. Creek bottom sediment build up remains as has existed for past several years, no apparent change. Some farm grading encroachment into channel on south bank.

3. Arroyo Grande Creek Chanel - upstream to downstream

A. Area of station 135+00 and downstream - willow density thickening to medium density on banks and channel bottom sediment bars. Isolated castor bean.

B. Just upstream (about 200 feet) of Highway 1 bridge crossing - One large size sycamore tree trunk, approximately 30" in diameter by 30 feet long, hung up on mid-channel sediment island vegetation just upstream of the Highway 1 bridge crossing. Needs to be cut up or removed. Additionally approximately 10 cubic yards of vegetative debris hung up on channel bed sediment islands should be removed.

C. Downstream of highway 1 bridge - light medium willow density on sediment sand bars and banks.

D. Station 104+00 area - approximately 2' high beaver dam, causing no apparent problem. Medium dense willow growth looking downstream.

E. Station 90+00 to 22nd Street Bridge crossing (@ station 72+87) - apparent intrusion of earth from bank top agricultural operations into the channel. This intrusion appears to have covered over the existing creek banks and effectively reduced the effective width and therefore capacity of this segment of the channel. The intrusion is immediately adjacent to the creek edge farm road which are adjacent to cultivated fields under production. The area of intrusion appears to be 10 feet to 20 feet wide, sloping at approximately 10% toward the creek, and has been recently tilled. Willows are medium heavy through this section on both the banks and in the channel bottom sediment islands.

F. At 22nd Street Bridge crossing area - beaver dam, approximately 3 feet high completely across the channel just upstream of the bridge. It appears that about a 20 linear foot portion of the north section of the dam broke and resulted in the natural erosion of about 30 to 50 cubic yards of accumulated sediment to erode from the north channel bottom sediment island. In other words, it appears the beaver dam breach has assisted in clearing the sediment from a section of the channel bottom where the District was unable to excavate.

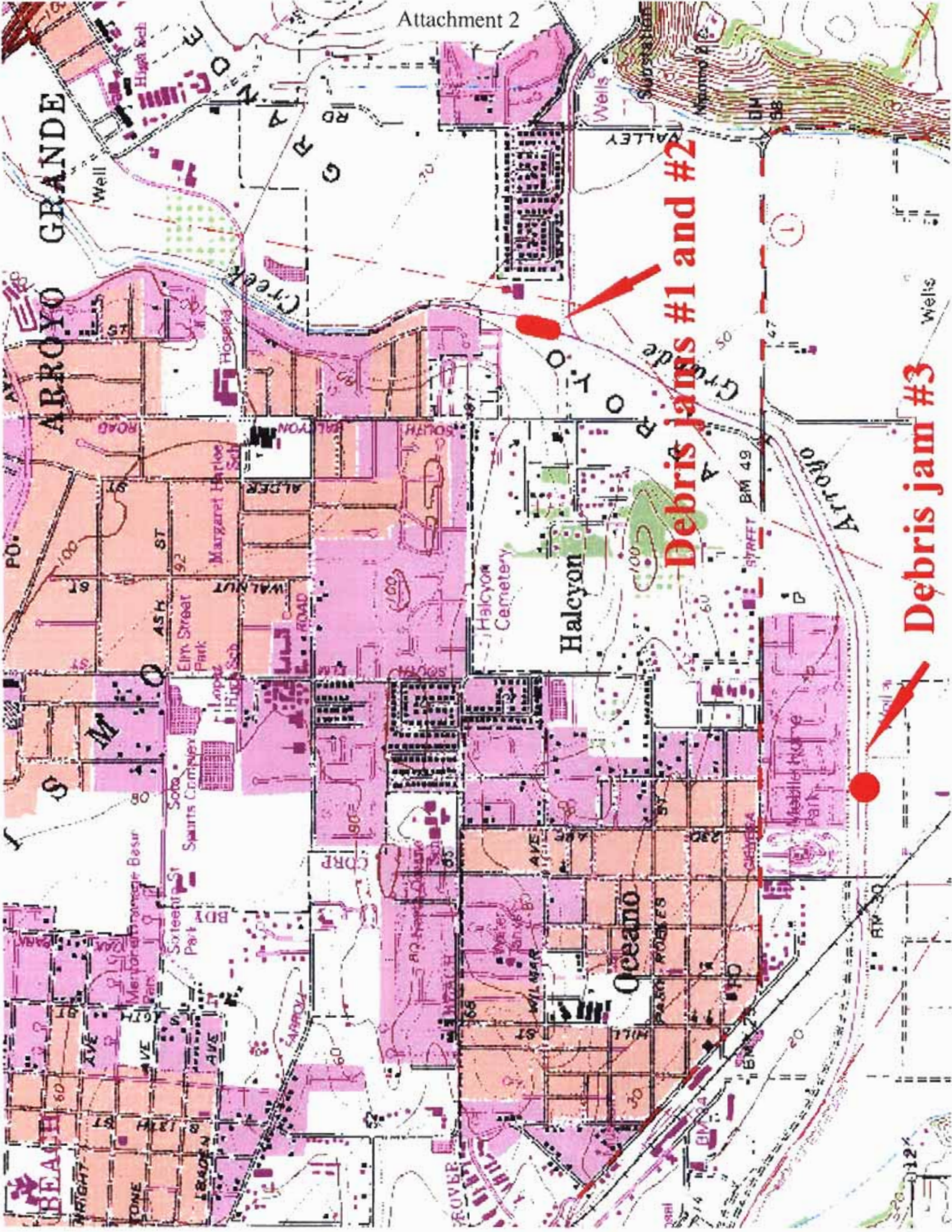
G. Existing vegetation is medium heavy on the channel banks and channel bottom sediment bar/islands from 22nd Street bridge downstream to the Railroad bridge crossing.

H. Railroad bridge downstream to the area of repaired breach in 2001 (approximate station 55+00) - Young (1" to 3" is size) medium dense willows on banks and in sediment islands.

I. Station 55+00 to Guiton's crossing - heavy willow growth on banks and in sediment islands. South levee shows signs of edge settlement and compaction due to equestrian traffic on top near the hinge point. The top +/- 6" of levee earth material is loose from horse traffic.

J. Guiton's crossing to Estuary - heavy willows, on channel banks, but channel bottom clear, as has been observed in the past inspections. North top of levee material is loose earth due to horse traffic, edge at hinge point is somewhat compacted and rutted from equestrian traffic. No significant degradation of top of levee from approximate station 55+00 to estuary since last inspection.

Attachments: NRCS October 7, 2002 annual inspection letter
SLO County Public Works George Gibson February 2, 2004 file memorandum detailing the December 22, 2003 damage repairs performed
Earth Systems Pacific levee inspection report dated December 29, 2003.



Debris jams #1 and #2

Debris jam #3

Attachment 3
Photos of January 2006 Debris Jams

Photo 1:
All the debris



Photo 2:
Scour around debris



Attachment 3
Photos of January 2006 Debris Jams

Photo 3:
Beaver swimming away from debris



Photo 4:
Debris jam from east



Attachment 3
Photos of January 2006 Debris Jams

Photo 5:
Debris jams, view from top of Haleyon Road looking east



Photo 6:
Cut limbs at top of bank



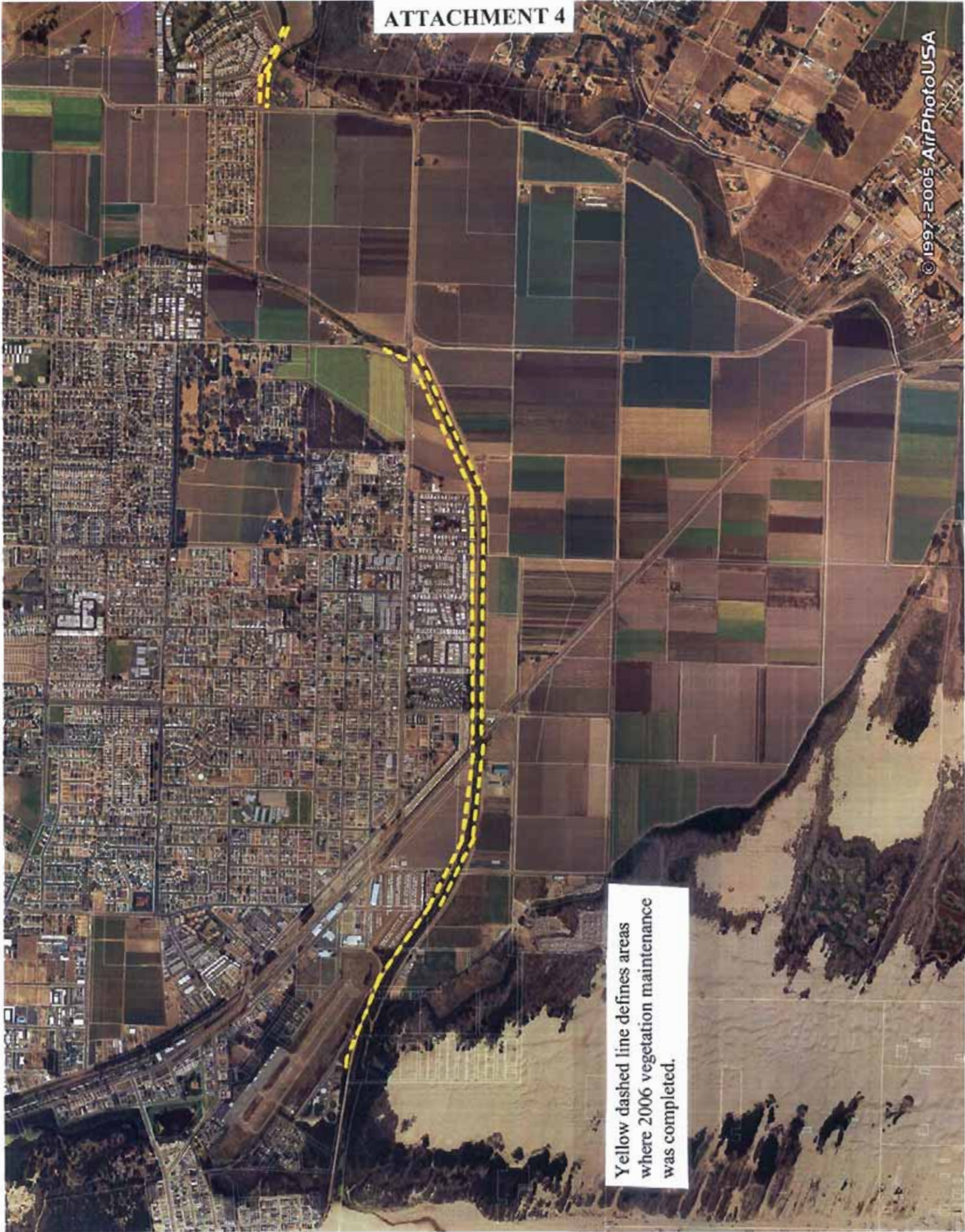
Attachment 3
Photos of January 2006 Debris Jams

Photo 7:
Looking downstream from equipment crossing



V:\Hydraulic Planning Unit\Flood Control\Zone 1_1A\2006 Insp Report - Att 3.doc

Yellow dashed line defines areas where 2006 vegetation maintenance was completed.



**Attachment 5
Inspection Photos**

Photo 1:
Homeless Camp on north levee, below the railroad bridge – view from south levee



Photo 2:
Homeless camp on north levee, below the railroad bridge – close up view



Attachment 5 Inspection Photos

Photo 3:
Pick-up truck bed liner filled with trash dumped on north levee above 22nd Street bridge -



Photo 4:
Farmland cutting into north levee top between approximate Stations 103+00 and 103+50 -



Attachment 5 Inspection Photos

Photo 5:
Low spot on north levee near approximate Station 103+50 –



Photo 6:
Earthen ditch contributing sediments to AG Creek –



**Attachment 5
Inspection Photos**

Photo 7:
Abundant willow regrowth near north boundary of Zone 1/1A –



Photo 8:
Concrete stabilizer with erosion on both sides of concrete barrier –



Photo 9:

**Attachment 5
Inspection Photos**

Front view of concrete stabilizer –



Photo 10:
Vegetation cleared upstream of Century Lane bridge –



V:\Hydraulic Planning Unit\Flood Control\Zone 1_1A\2006 Insp Report - Att 3.doc

ATTACHMENT 6

RECOMMENDED MAINTENANCE PROJECT COST ESTIMATES

Temporary Levee Raise by K-Rail

*Use K-rail wrapped in visqueen on North Levee to provide temporary increased flood protection for up to a 16.6 year event for residences immediately north of Arroyo Grande Creek

Location: North of 22nd Street Bridge (Arroyo Grande Creek Station 70+00 to Station 105+00)

Materials	Unit Cost	Unit	Quantity	Total
Temporary Railing (Type K)	\$12	ft.	3500	\$42,000
10x100 (4 mil) Poly Sheeting / Visqueen	\$60	roll	35	\$2,100
Sand Bags	\$0.20	ea.	7000	\$1,400
Sand	\$10	cy	300	\$3,000
Laborr/Equipment				
Public Works Work Crew	\$2,550	day	4	\$10,200
Crane	\$535	day	4	\$2,139
Loader	\$129	day	4	\$515
Flatbed Trucks (2)	\$251	day	4	\$1,004
Engineering Administration	\$70	hour	20	\$1,405
SUBTOTAL				\$63,763
CONTINGENCY			15%	\$9,565
TOTAL				\$73,328

<---- RENTAL COST

Notes

- Unit cost for Temporary Railing (Type K), is per quote from Burke Construction dated December 12, 2006 (\$3 per foot per month; assume 4 months of use).
- Unit cost for visqueen approximated from wholesale estimates at Packaging Supplies.com
- All rates for labor and equipment are from the 2006-07 Budget Official Labor Rates and the 2006-07 Official ISF Rates, respectively.
- Public Works Work Crew cost per day is based on a crew of 8 PW Worker III's at a rate of \$39.82/hr for 8 hours.
- Crane cost per day is based on the Crane, Little Giant rate of \$66.85/hr for 8 hours.
- Loader cost per day is based on the Loader rate of \$16.10/hour for 8 hours.
- Flatbed trucks cost per day is based on the flatbed truck rate of \$15.69/hour for 8 hours for 2 trucks.
- Engineering Administration cost is the rate for an Engineer III to coordinate work and perform inspection of work.

Temporary Levee Raise by K-Rail

*Use K-rail wrapped in visqueen on North Levee to provide temporary increased flood protection for up to a 16.6 year event for residences immediately north of Arroyo Grande Creek

Location: North of 22nd Street Bridge (Arroyo Grande Creek Station 70+00 to Station 105+00)

	Unit Cost	Unit	Quantity	Total
Materials				
Temporary Railing (Type K)	\$20	ft.	3500	\$70,000
10x100 (4 mil) Poly Sheeting / Visqueen	\$60	roll	35	\$2,100
Sand Bags	\$0.20	ea.	7000	\$1,400
Sand	\$10	cy	300	\$3,000
Labor/Equipment				
Public Works Work Crew	\$2,550	day	4	\$10,200
Crane	\$535	day	4	\$2,139
Loader	\$129	day	4	\$515
Flatbed Trucks (2)	\$251	day	4	\$1,004
Engineering Administration	\$70	hour	20	\$1,405
SUBTOTAL				\$91,763
CONTINGENCY			15%	\$13,765
TOTAL				\$105,528

<----- PURCHASE PRICE

Notes

- Unit cost for Temporary Railing (Type K), is per quote from Midstate Concrete dated November 16, 2006 (\$399/stick, stick = 20 feet).
- Unit cost for visqueen approximated from wholesale estimates at Packaging Supplies.com
- All rates for labor and equipment are from the 2006-07 Budget Official Labor Rates and the 2006-07 Official ISF Rates, respectively.
- Public Works Work Crew cost per day is based on a crew of 8 PW Worker III's at a rate of \$39.82/hr for 8 hours.
- Crane cost per day is based on the Crane, Little Giant rate of \$66.85/hr for 8 hours.
- Loader cost per day is based on the Loader rate of \$16.10/hour for 8 hours.
- Flatbed trucks cost per day is based on the flatbed truck rate of \$15.69/hour for 8 hours for 2 trucks.
- Engineering Administration cost is the rate for an Engineer III to coordinate work and perform inspection of work.

Levee Raise by Fill

*Raise north levee by 2 feet with borrow to increase flood protection for residences immediately north of Arroyo Grande Creek

Location: North of 22nd Street Bridge (Arroyo Grande Creek Station 70+00 to Station 105+00)

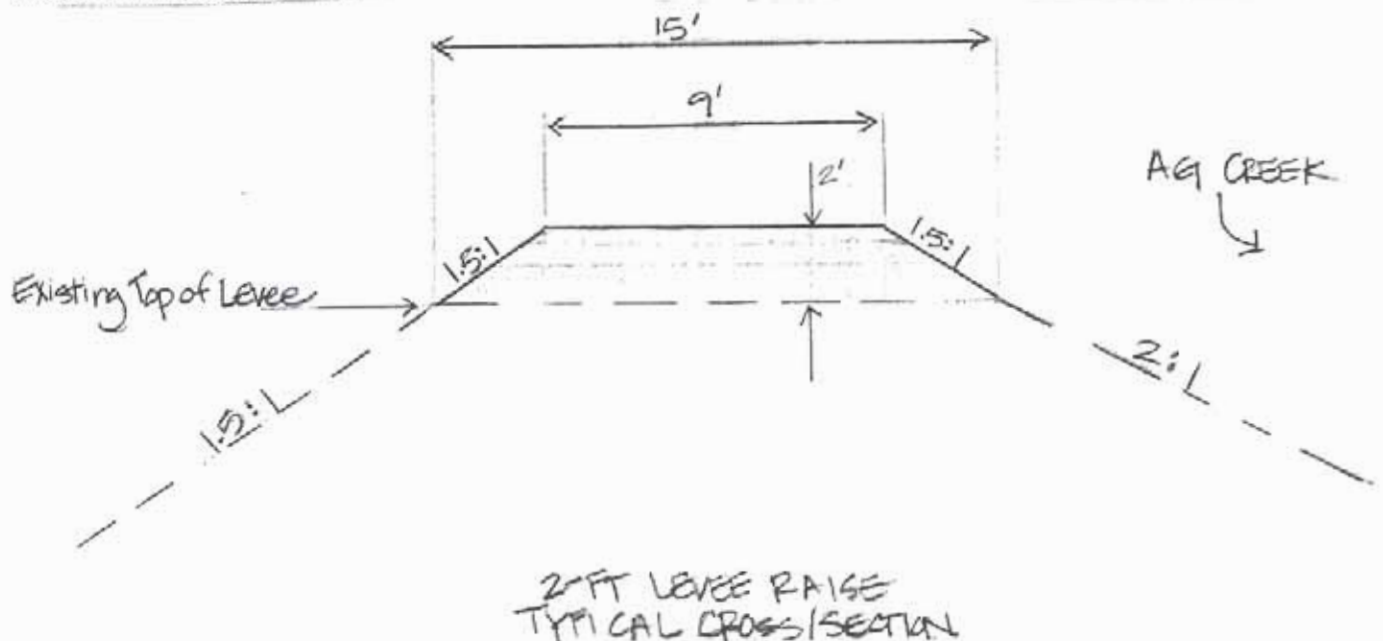
	Unit Cost	Unit	Quantity	Total
Materials				
Fill material ¹	\$10	Ton	3890	\$38,900
Class 2 Aggregate Base ²	\$16	Ton	815	\$13,040
Labor/Equipment				
Public Works Work Crew	\$1,275	day	10	\$12,750
Dump Truck	\$158	day	10	\$1,578
Loader, skid steer with planer	\$406	day	10	\$4,063
Survey Crew	\$1,360	day	2	\$2,720
Soils Technician	\$640	day	10	\$6,400
Engineering Administration	\$70	hour	20	\$1,405
SUBTOTAL				\$80,857
CONTINGENCY				15% \$12,128
TOTAL				\$92,985

Assumptions

1. Assume (13.33')(1.5')(3500')(1 cy/27 cf)(1.5 tons/1cy)
2. Assume (9')(0.5')(3500')(1 cy/27 cf)(1.4 tons/1 cy)

Notes

3. All rates for labor and equipment are from the 2006-07 Budget Official Labor Rates and the 2006-07 Official ISF Rates, respectively.
4. Public Works Work Crew cost per day is based on a crew of 4 PW Worker III's at a rate of \$39.82/hr for 8 hours.
5. Loader cost per day is based on the Loader rate of \$50.79/hour for 8 hours.
6. Dump truck cost per day is based on the dump truck rate of \$19.73/hour for 8 hours.
7. Survey crew cost per day is based on the rate for 1 CE Tech III and 1 CE Tech I for a combined rate of \$170/hour for 8 hours.
8. Soils Technician cost per day is based on the CE Tech II rate of \$80/hour for 8 hours.
9. Engineering Administration cost is the rate for an Engineer III to coordinate work and perform inspection of work.



**Los Berros Outlet Structure: Replacement of flap gates with rubber duck bills
Cost Estimate**

Item	Unit Cost	Unit	Quantity	Total
Parts and Materials				
Rubber Duck Bill Check Valve ¹	\$8,725	each	2	\$17,450
Labor and Equipment²				
Public Works Work Crew ³	\$1,593	day	2	\$3,186
Crane ⁴	\$535	day	2	\$1,070
Bridge Truck ⁵	\$126	day	2	\$251
Engineering Administration ⁶	\$70	hour	10	\$703
			Subtotal	\$22,659
		Contingency	15%	\$3,399
			TOTAL	\$26,058

Notes:

1. Unit cost based on estimate provided by General Rubber (800-233-6294) for their Flex-Valve 4200, flanged style rubber Duck-Bill Check Valve, 42" (ID).
2. All rates for labor and equipment are from the 2006-07 Budget Official Labor Rates and the 2006-07 Official ISF Rates, respectively.
3. Public Works Work Crew cost per day is based on a crew of 5 PW Worker III's at a rate of \$39.82/hr for 8 hours.
4. Crane cost per day is based on the Crane, Little Giant rate of \$66.85/hr for 8 hours.
5. Bridge truck cost per day is based on the 2.5 Ton Truck rate of \$15.69/day.
6. Engineering Administration cost is the rate for an Engineer III to coordinate work and perform inspection of work.

**Sand Canyon Outlet Structure: Replacement of flap gates with rubber duck bills
Cost Estimate**

Item	Unit Cost	Unit	Quantity	Total
Parts and Materials				
Rubber Duck Bill Check Valve ¹	\$14,200	each	2	\$28,400
Labor and Equipment²				
Public Works Work Crew ³	\$1,593	day	2	\$3,186
Crane ⁴	\$535	day	2	\$1,070
Bridge Truck ⁵	\$126	day	2	\$251
Engineering Administration ⁶	\$70	hour	10	\$703
			Subtotal	\$33,609
		Contingency	15%	\$5,041
			TOTAL	\$38,650

Notes:

1. Unit cost based on estimate provided by General Rubber (800-233-6294) for their Flex-Valve 4200, flanged style rubber Duck-Bill Check Valve, 60" (ID).
2. All rates for labor and equipment are from the 2006-07 Budget Official Labor Rates and the 2006-07 Official ISF Rates, respectively.
3. Public Works Work Crew cost per day is based on a crew of 5 PW Worker III's at a rate of \$39.82/hr for 8 hours.
4. Crane cost per day is based on the Crane, Little Giant rate of \$66.85/hr for 8 hours.
5. Bridge truck cost per day is based on the 2.5 Ton Truck rate of \$15.69/day.
6. Engineering Administration cost is the rate for an Engineer III to coordinate work and perform inspection of work.