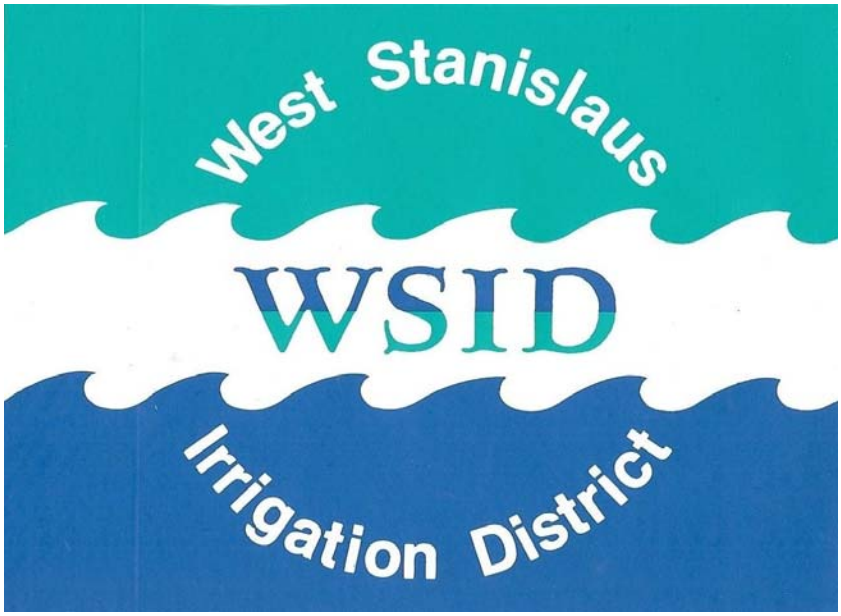
West Stanislaus Irrigation District
Water Management Plan
2011 Criteria



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Section I: Description of the District

District Name: West Stanislaus Irrigation District (WSID)

Contact Name: Robert Pierce, PE

Title: General Manager

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Web Address: NA

A. History

1. Date district formed: May, 1920 *Date of first Reclamation contract*: 1953

Original size (acres): 24,800 *Current year (last complete calendar year)*: 2011

2. Current size, population, and irrigated acres.

	2011
Size (acres)	24,800
Population served (urban connections)	0
Irrigated acres	20,155

3. Water supplies received in current year.

Water Source	*AF*
Federal urban water (Tbl 1)	0
Federal agricultural water (Tbl 1)	8,361
State water (Tbl 1)	0
Other Wholesaler (define) (Tbl 1)	0
Local surface water (Tbl 1)	60,472
Upslope drain water (Tbl 1)	0
District groundwater (Tbl 2)	0
Banked water (Tbl 1)	0
Transferred water (Tbl 1)	0
Recycled water (Tbl 3)	0
Other (define) (Tbl 1)	0
Total	68,833

4. Annual entitlement under each right and/or contract.

	AF	*Source*	*Contract #*	*Availability period(s)*
Reclamation Urban AF/Y	NA			
Reclamation Agriculture	50,000	Delta-Mendota	14-06-200-1072-	Mar. 1, 2005 –

AF/Y		Canal (DMC)	LTR1	Feb. 28, 2030
Other AF/Y	262 cfs	SJR Appropriation	3957	Jan. 1 – Dec. 31 of each year

5. Anticipated land-use changes. For Ag contractors, also include changes in irrigated acres.

No anticipated changes in land-use.

6. Cropping patterns (Agricultural only)

List of current crops (crops with 5% or less of total acreage) can be combined in the 'Other' category.

Original Plan (1986)		*Previous Plan (2006)*		*Current Plan*	
Crop Name	*Acres*	*Crop Name*	*Acres*	*Crop Name*	*Acres*
Almonds	1,554	Alfalfa	2,679	Almonds	6,388
Apricots	2,171	Almonds	4,205	Dry Beans	3,179
Walnuts	1,424	Apricots	1,541	Cannery Tomato	2,714
Beans	5,396	Beans	4,933	Alfalfa	1,991
Melons	2,001	Melons	587	Walnuts	1,479
Tomatoes	4,783	Tomatoes	4,469	Apricots	1,431
Wheat	1,984	Walnuts	1,041	Corn	911
				Wheat	785
				Melons	597
				Grapes	584
				Oats	468
Other (<5%)	5,429	*Other (<5%)*	3,801	*Other (<5%)*	1,126
Total	24,742	*Total*	23,256	*Total*	*21,653

* 1,498 acres were double cropped.

7. Major irrigation methods (by acreage) (Agricultural only)

Original Plan (1986)		*Previous Plan (2006)*		*Current Plan*	
Irrigation Method	*Acres*	*Irrigation Method*	*Acres*	*Irrigation Method*	*Acres*
Level Basin		Level Basin		Level Basin	2,459
Furrow/Border	24,742	Furrow/Border	14,997	Furrow/Border	3,320
Sprinkler		Sprinkler	5,756	Sprinkler	8,912
Low-volume		Low-volume	819	Low-volume	1,815
Multiple		Multiple		Multiple	4,255
Other		*Other*	1,684	*Other*	579
Total	24,742	*Total*	23,256	*Total*	*21,653

* 1,498 acres were double cropped.

B. Location and Facilities

See Attachment A for maps containing the following: incoming flow locations, turnouts (internal flow), and outflow (spill) points, conveyance system, storage facilities, operational loss recovery system, district wells and lift pumps, water quality monitoring locations, and groundwater facilities.

1. Incoming flow locations and measurement methods.

Location Name	*Physical Location*	*Type of Measurement Device*	*Accuracy*
Delta-Mendota Canal	N37.5548, W-121.2475	Propeller Meter	±6%
Station 1 (SJR Diversion)	N37.5840, W-121.2014	Acoustic Doppler Flow Meter	±6%

2. Current year Agricultural Conveyance System

Miles Unlined - Canal	*Miles Lined - Canal*	*Miles Piped*	*Miles - Other*
15	46	23	

3 Current year Urban Distribution System.

N/A

4. Storage facilities (tanks, reservoirs, regulating reservoirs)

NONE

5. Description of the agricultural spill recovery system and outflow points.

NONE – Flows released by the District are discharged to the San Joaquin River.

6. Agricultural delivery system operation (check all that apply)

Scheduled	*Rotation*	*Other (describe)*
X		

7. Restrictions on water source(s.)

Source	*Restriction*	*Cause of Restriction*	*Effect on Operations*
San Joaquin River	Water Quality	Upstream drainage inflow	Reliance on lower TDS CVP water at times.
San Joaquin River	River Stage	Drought	Additional water required for to meet demand and for leaching.
Groundwater	Water Quality	Groundwater of marginal quality	Minimal effect as groundwater makes up a small percentage of water supply.
San Joaquin River	262 cfs Flow Restriction	Water Rights license	Limits peak deliveries.
CVP*	Flow	Limited conveyance capacity	cannot serve entire District from DMC

CVP*	Flow	Delta export regulations	Can't serve peak demand periods requiring fallowing of land
Groundwater	Flow	Limited number of wells	limited conjunctive use opportunity

*Central Valley Project

8. Proposed changes or additions to facilities and operations for the next 5 years.

WSID completed its Main Canal Renovation Feasibility Study (Modernization Plan) in July 2011. The Modernization Plan is included herewith as Attachment J. The first phase of construction is completed. This phase is the construction of Pump Station 1A and associated conveyance pipeline to replace Pump Station 1, Canal Reach 1, Pump Station 2 and Canal Reach 2.

Phase 2 consists of construction of Pump Station 5A and associated conveyance pipeline to parallel Canal Reaches 5 and 6 and connect the Main Canal to the DMC. The DMC connection will provide for the movement of water from the San Joaquin River into the DMC service area. Construction of the Phase 2 facilities is currently underway.

The third phase will be the construction of Pump Station 3A and associated conveyance pipeline to replace Pump Stations 3 and 4 and Canal Reaches 3 and 4. The Modernization Plan also includes the automation and remote control of the headworks of the 12 lateral connections on the Main Canal. The lateral headgates will be automatically controlled to maintain the selected flowrate needed to meet the water orders on the lateral. Flowrate changes can be programmed into the water delivery strategy to meet water orders at selected times thereby improving water use flexibility and reducing spill and energy consumption. The District's Supervisory Control and Data Acquisition System (SCADA) is being improved and extended to provide the automatic local control and centralized monitoring .With the Modernization Plan, the water delivery flexibility and reliability will be greatly improved. The Modernization Plan is expected to be completed in 2017. The total capital cost of the Modernization Plan is expected to be in the range of $40,000,000.

Following the modernization of the Main Canal, the District will move to the modernization of the lateral delivery system to increase the level of service, better regulate the water supply, reduce system losses, and improve water measurement systems to accomplish accurate water management and accounting. The Lateral Modernization Plan is in the formulation stage. The District intends to begin the planning process in 2015. The planning will evaluate viable alternatives for distributing water from the Main Canal System to the water users, selection and description of the best alternative, and setting forth the plan of implementation including budgets and schedules. The plan will be detailed and comprehensive and is expected to be completed in 2016. Plan implementation is expected to take up to 10 years depending on project cost and ability to finance.

C. Topography and Soils

1. Topography of the district and its impact on water operations and management.

Generally the land is relatively flat, sloping less than 3%. The topography of the land within the district does not cause a problem with water management.

2. District soil association map (Agricultural only)

Soil Association	*Estimated Acres*	*Effect on Water Operations and Management*
Capay Clay	6761.76	Moderately well drained; negligible to high runoff, slow to very slow permeability.
Vernalis - Zacharias Complex	4087.23	NA
Stomar Clay Loam	2477.9	Well drained; negligible to high runoff; slow permeability.
El Solyo Silty Clay Loam	2355.69	moderately well drained
Zacharias Gravelly Clay Loam	2060.82	Well drained. In areas with high applications of irrigational water, an apparent water table has developed.
Vernalis Loam	1920.53	Well drained; permeability is moderate; run off is slow
Zacharias Clay Loam	1038.88	Well drained. In areas with high applications of irrigational water, an apparent water table has developed.
Vernalis Clay Loam	550.87	Well drained; permeability is moderate; run off is slow
El Salado Fine Sandy Loam	302.4	Well drained, negligible to low runoff; moderate permeability. Some areas are wetter due to irrigation.
Cortina Gravelly Sandy Loam	254.24	Somewhat excessively drained; negligible to low runoff; rapid permeability
El Salado Loam	140.21	Well drained, negligible to low runoff; moderate permeability. Some areas are wetter due to irrigation.
Columbia	83.39	Moderately well drained; negligible to medium runoff; moderately rapid permeability.
Water	80.44	
Dos Palos - Bolfar Complex	68.65	Poorly drained; negligible to medium runoff; slow permeability.
Columbia Complex	4.45	Moderately well drained; negligible to medium runoff; moderately rapid permeability.
Clear Lake Clay	3.51	Poorly drained; negligible to high runoff (if assumed concave runoff is always negigible); slow to very slow permeability.

See Attachment A, District Soils Map

3. Agricultural limitations resulting from soil problems (Agricultural only)

No agricultural limitations exist. The District has not seen build-up of salinity in the soil. The District has no data to trend to see if a build-up of salinity is an issue. It is normal irrigation practice to apply a certain amount of water above the crop water requirement to leach salts from the root zone.

D. Climate

1. General climate of the district service area.

The climate is Hot Mediterranean/Semi-Arid with cool wet winters and hot dry months in the summers. The long term average rainfall is 12.33 inches with the majority of the precipitation occurring between November and March.

	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Annual*
Avg Precip.	2.40	2.13	1.90	1.08	0.47	0.10	0.03	0.04	0.19	0.65	1.30	2.09	12.33
Avg Temp.	45.8	50.9	55.2	60.2	66.6	72.6	77.2	75.7	72.0	63.9	53.2	46.1	61.5
Max. Temp.	53.9	60.9	66.9	73.4	81.2	88.3	94.3	92.3	87.8	77.9	64.5	54.4	74.6
Min. Temp	37.7	41.0	43.6	47.0	51.9	56.8	60.2	59.1	56.2	49.8	41.9	37.8	48.5
ETo	1.59	2.20	3.66	5.08	6.83	7.80	8.67	7.81	5.67	4.03	2.13	1.59	57.06

Weather station ID: Modesto 045738 *Data period: Year* 01/1931 *to Year* 12/2011

ET Station ID 161 *Average annual frost-free days:* 290

2. Impact of microclimates on water management within the service area.

NONE

E. Natural and Cultural Resources

1. Natural resource areas within the service area.

Name	*Estimated Acres*	*Description*
Salado Creek	NA	Lies in the southern area of the District with west to east flow
Del Puerto Creek	NA	Intersects District in west to east flow
Ingram Creek	NA	Flows west to east through district a mile north of Main Canal
Hospital Creek	NA	Flows west to east through district approximately 3 miles north of Ingram Creek.

2. Description of district management of these resources in the past or present.

WSID is not directly involved in management of these resources. The District has had general discussions with the county agencies regarding flood control dams upstream in the creek watersheds. There is a possibility that off-stream storage could be a component to these flood storage dams. The County of Stanislaus oversees the use and maintenance of these channels.

3. Recreational and/or cultural resources areas within the service area.

Name	*Estimated Acres*	*Description*
NONE		

F. Operating Rules and Regulations

1. Operating rules and regulations.

See Attachment B, District Rules and Regulations (water related)

2. Water allocation policy (Agricultural only)

See Attachment B, Page (1)

Summary – Each year WSID will determine the amount of water that will be available from the CVP and develop the District's water supply plan, formulated primarily around their river supply supplemented by CVP supply and groundwater. The annual CVP water allocation available is used to determine if adequate supplies can be expected and if shortages during peak months may occur. The District will use the CVP supply when the demand exceeds the river supply. Groundwater pumping occurs during drought conditions and when needed for to meet peak demands. When demand exceeds supply sources then the water allocation policy will take effect.

WSID will cooperate in efforts to make maximum use of private well water during drought conditions. From time to time WSID will allow introduction and conveyance of groundwater in District facilities from private wells for delivery within the District boundaries. Before any well water will be allowed in District canals, it is tested along with the blended supply to ensure water quality in the District's conveyance system will meet District standards.

3. Official and actual lead times necessary for water orders and shut-off (Agricultural only)

See Attachment B, Page (1)

Summary – The lead time is 20 hours (11:00 AM the preceding day for a 7:00 AM delivery). WSID may delay the notification to a 5:00PM deadline providing that the District does not require changes in diversions from the DMC for the following day. A four hour lead time is necessary when ordering a shut-off.

Shut-offs

Request for a reduction in size or cessation of a delivery must be received prior to 2:00PM to be effective that same day. Since each ditch tender is responsible for his canals on a 24 hour basis, shut-offs or change in delivery heads which would keep the ditch tender on duty after 7:00 PM will be effective the following day.

4. Policies regarding return flows (surface and subsurface drainage from farms) and outflow (Agricultural only)

Summary – Farm operators are responsible for management of their drainage water, which is recaptured and reused or discharged into area drains for return to the San Joaqiun River. The policy is provided in the District's Rules and Regulations under "Control of Water by Irrigators" and is communicated to growers and administered by District representatives.

5. Policies on water transfers by the district and its customers.

Summary – No formal policy at this time. Currently the District does not allow transfer of water supplies on a long term basis. Short term transfer proposals are evaluated on a case by case basis. Transfer of water by the District is part of the normal water management activity.

G. Water Measurement, Pricing, and Billing

1. Agricultural Customers

Refer to BMP A.1. Information on water measurement for agricultural contractors is completed under BMP A.1 on page 4-15.

2. Urban Customers

N/A

3. Agricultural and Urban Rates

a. Current year agricultural and /or urban water charges - including rate structures and billing frequency.

See Attachment B, Page (4), for current year rate ordinance

b. Annual charges collected from agricultural customers

Fixed Charges			
Charges ($ unit)	*Charge units $/acre, etc.*	*Units billed during year acres, etc.*	*$ collected ($ times units)*
$USD	$20.00/acre	20,155	$403,100

Volumetric charges			
Charges ($ unit)	*Charge units $/AF, etc.*	*Units billed during year AF, etc.*	*$ collected ($ times units)*
$USD	$65.00/AF	56,736	$3,687,840.00

c. Describe the contractor's record management system.

Water use data have been maintained and stored in a computer data-base for at least 15 years. The District is in the process of development of a geographical information system (GIS) to record and maintain water demand, supply and delivery data for each water user.

H. Water Shortage Allocation Policies

1. *Current year water shortage policies or shortage response plan - specifying how reduced water supplies are allocated.*

See Attachment B, page (1), Rationing

Periods of Shortages – During periods of shortage the following rules will be followed:

1. "Period of Shortage" means any period when the demand for water exceeds available supply. "Water Entitlement" means the amount of water available on a daily basis in cubic feet per second to which the water user shall be entitled during the period of shortage.
2. The daily water entitlement of any water user during any period of shortage shall be based on the proportion which the irrigable acreage controlled bears to the total irrigable acreage controlled by those who wish water on that same day. (Total number of cfs available, divided by the total number of acres irrigating, times the water users total acreage). This will continue on a day-to-day basis until the available supply exceeds the total demand.
3. Water will be allocated on acreage basis without any crop preference. However, on crops such as alfalfa, if larger heads are required for efficient irrigation, attempts will be made to provide larger heads of water for shorter periods of time.

2. *Current year policies that address wasteful use of water and enforcement methods.*

See Attachment B, page (2)

Each irrigator shall control the water the so that no damage will be caused to WSID or to any other parties. If water is wasted or improperly used in the judgment of the Manager or his authorized representative, further delivery of water may be curtailed until the cause of waste or improper use is corrected.

I. Evaluate Policies of Regulatory Agencies Affecting the Contractor and Identify Policies that Inhibit Good Water Management.

Discuss possible modifications to policies and solutions for improved water management.
The District relies and defers to the San Luis Delta Mendota Water authority to monitor and address the policies that affect the CVP contractors.

Section II: Inventory of Water Resources

A. Surface Water Supply

1. *Surface water supplies in acre feet, imported and originating within the service area, by month (Table 1).*

See Section V, Water Inventory Tables, Table 1

2. *Amount of water delivered to the district by each of the district sources for the last 10 years.*

See Section V, Water Inventory Tables, Table 8.

B. Groundwater Supply

1. Groundwater extracted by the district and delivered, by month (Table 2).

See Section V, Water Inventory Tables, Table 2

2. Groundwater basin(s) that underlies the service area.

Name	*Size (Square Miles)*	*Usable Capacity (AF)*	*Safe Yield (AF/Y)*
San Joaquin Valley Delta-Mendota	11,170	81,800,000	unknown

3. Map of district-operated wells and managed groundwater recharge areas.

See Attachment A, for Facilities Map showing the location of the 4 District wells.

4. Description of conjunctive use of surface and groundwater.

WSID operates as a conjunctive use district. Four District groundwater wells that are located adjacent to the Main Canal provide additional irrigation water to most users. Many water users also operate their own groundwater wells throughout the District. The District has no dedicated groundwater recharge areas. The groundwater is recharged through rainfall and seepage from local streams and conveyance systems. Incidental groundwater recharge occurs as a result of application of irrigation water. This recharge becomes water in storage, an important water supply source for the area including the City of Patterson and the Communities of Westley and Grayson.

5. Groundwater Management Plan.

The District is a Participating Agency of the regional groundwater management plan pursuant to AB3030 and SB1938 prepared by the San Luis Delta Mendota Water Authority and adopted the plan on January 10, 2012. The Groundwater Management Plan is available by request.

6. Groundwater Banking Plan.

None – Westside San Joaquin River Watershed Coalition (Westside Coalition) report confirms that due to unsuitable soil and slope characteristics, WSID has no favorable groundwater banking sites for artificial recharge of surface water.

C. Other Water Supplies

1. "Other" water used as part of the water supply – Describe supply.

See Section V, Water Inventory Tables, Table 1

D. Source Water Quality Monitoring Practices

1. Potable Water Quality (Urban only)

N/A

2. Agricultural water quality concerns: *Yes* X *No* _____

In drought years the salinity of the San Joaquin River is higher than normal (500 ppm increases to 1200 ppm). Higher salinity concentrations can damage the soils, increase the salinity of the underlying groundwater, reduce crop yields and necessitate the application of additional water for leaching the salts past the crop root zones.

The District currently checks the TDS of the San Joaquin River water once a week and tracks it in a spreadsheet. These data are provided to growers upon request to assist them with their management decisions. When there are large changes occurring in the quality of the water supply, the District can quickly notice all water users by e-mail or written notice. The District understands the value of a District dedicated web site for communication purposes, but has yet to conclude that its value will outweigh the cost of site maintenance for such a district with relatively few water users. Establishment of a web site is an ongoing consideration with an expected inaugural date within 5 years.

As the Modernization Plan is implemented, water quality data will be more thoroughly tracked by the improved SCADA system where water quality reports will be generated. A web site may then be the most efficient way to quickly communicate water supply and use information to the water users.

3. Description of the agricultural water quality testing program and the role of each participant, including the district, in the program.

Salinity is the water quality parameter of most concern to the District. WSID operates an electro conductivity (salinity) meter upstream of Station 1 which logs salinity readings each hour. The District receives monthly water quality reports from DWR of the California Aqueduct water quality and salinity data as well as other water quality monitoring on the Delta Mendota Canal received from the San Luis Delta Mendota Water Authority, the agency which operates and maintains the canal.

4. *Current water quality monitoring programs for surface water by source (Agricultural only)*

Analyses Performed	*Frequency*	*Concentration Range*	*Average*
TDS	Once a week	500ppm - 1,200ppm	700ppm

5. Current water quality monitoring programs for groundwater by source (Agricultural only)

Analyses Performed	*Frequency*	*Concentration Range*	*Average*
Electrical Conductivity	Every 3 Years	900ppm – 1,400ppm	1,200ppm

E. Water Uses within the District

1. Agricultural.

See Section V, Water Inventory Tables, Table 5 - Crop Water Needs

2. Types of irrigation systems used for each crop in current year.

Crop name	*Total Acres*	*Level Basin - acres*	*Furrow - acres*	*Sprinkler – acres*	*Low Volume - acres*	*Multiple methods -acres*
Alfalfa	1,991	1,991				
Almonds	6,388			6,388		
Apples	20			20		
Apricots	1,118			1,118		
Blackeye peas	10		10			
Broccoli	163					163
Cherries	49			49		
Corn	911		911			
C. Tomatoes	2,714		1,614		1,100	
Dry beans	3,179					3,179
Fallow	313					
Grapes	584				584	
Green Tomato	56					56
Melons	597					597
Oats	468	468				
Olives	131				131	
Parsley	98					98
Peaches	176			176		
Safflower	58					58
Spinach	104					104
Walnuts	1,161			1,161		
Wheat	785		785			
Other	579					
TOTAL	21,653	2,459	3,320	8,912	1,815	4,255

3. *Urban use by customer type in current year.*

N/A

4. Urban Wastewater Collection/Treatment Systems serving the service area.

N/A

5. Groundwater recharge in current year (Table 6)

Recharge Area	*Method of Recharge*	*AF*	*Method of Retrieval*
No recharge projects in District			
	Total		

6a. Transfers and exchanges into the service area in current year – (Table 1).

From Whom	*To Whom*	*AF*	*Use*
None			

	Total		

*6b. Transfers and exchanges **out** of the service area in current year – (Table 6).*

From Whom	*To Whom*	*AF*	*Use*
West Stanislaus ID	Westlands WD	2,500	Irrigation
	Total	2,500	

7. Wheeling, or other transactions in and out of the district boundaries – (Table 6).

From Whom	*To Whom*	*AF*	*Use*
None			
	Total		

8. Other uses of water.

Other Uses	*AF*
None	

F. Outflow from the District (Agricultural only)

See Facilities Map, Attachment A, for the location of surface and subsurface outflow points, outflow measurement points, outflow water-quality testing locations

1. Surface and subsurface drain/outflow.

The District measures operational spill on occasion for specific project needs or to address what appears to be spills resulting from mismanagement. No continual records are maintained. Monitoring and means of control and reuse of spill water will be part of the Lateral Modernization Plan to be completed by the end of 2015.

Outflow point	*Location description*	*AF*	*Type of measurement*	*Accuracy (%)*	*% of total outflow*	*Acres drained*
1N	North		Weir Flow	5%	UNK	UNK
2N & 3N	North		Weir Flow	5%	UNK	UNK
4N	North		Weir Flow	5%	UNK	UNK
5N & 6N	North		Weir Flow	5%	UNK	UNK
2S	South		Weir Flow	5%	UNK	UNK
3S	South		Weir Flow	5%	UNK	UNK
4S	South		Weir Flow	5%	UNK	UNK
5S	South		Weir Flow	5%	UNK	UNK
6S	South		Weir Flow	5%	UNK	UNK

Outflow point	*Where the outflow goes (drain, river or other location)*	*Type Reuse (if known)*
1N	San Joaquin River	SJR & Wetlands

2N & 3N	San Joaquin River	SJR & Wetlands
4N	San Joaquin River	SJR & Ag Reuse
5N & 6N	San Joaquin River	SJR & Ag Reuse
2S	San Joaquin River	SJR & Ag Reuse
3S	San Joaquin River	SJR & Ag Reuse
4S	San Joaquin River	SJR & Ag Reuse
5S	San Joaquin River	SJR & Ag Reuse
6S	San Joaquin River	SJR & Ag Reuse

2. *Description of the Outflow (surface and subsurface) water quality testing program and the role of each participant in the program.*

The Westside Coalition performs tests according to the Monitoring and Reporting Program Order (MRP Order) NO. R5-2008-0831 to determine compliance with the Amended Coalition Group Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands, Order No. R5-2006-0053 (Waiver).

The monitoring strategy for the MRP Order includes the different types of monitoring needed to meet MRP Order objectives. These include Assessment Monitoring for the condition of the water body, Core Monitoring for trends, Rain Event monitoring and Special Project Monitoring for source identification and other problem solving, as described below. The monitoring sites identified in the MRP Order are sites that have been previously monitored by the Westside Coalition, and the descriptions and relevance of the monitoring sites are described in the Westside Coalition's approved Monitoring and Reporting Plan, dated 1 February 2008. The monitoring sites are sufficiently representative to generally characterize water quality for surface waters of the State that may be affected by irrigated agriculture within Westside Coalition boundaries.

The MPR Order Objectives are consistent with the "Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program," May 2004 (NPS Policy) and include the following:

1. To determine whether the discharge of waste from irrigated lands within the Coalition Group boundaries causes or contributes to exceedances of applicable water quality standards or causes nuisance;
2. To provide information about the Coalition Group area characteristics, including but not limited to, land use, crops grown, and chemicals used;
3. To monitor the effectiveness of management practices implemented to address exceedances of applicable water quality standards;
4. To determine which management practices are most effective in reducing wastes discharged to surface waters from irrigated lands;
5. To specify details about monitoring periods, parameters, protocols, and quality assurance;
6. To support the development and implementation of the Conditional Waiver;
7. To verify the adequacy and effectiveness of the Conditional Waiver's conditions; and
8. To evaluate the Coalition Group's compliance with the terms and conditions of the Conditional Waiver.

3. *Outflow (surface drainage & spill) Quality Testing Program*.

See Attachment K which contains test results for the MRP in 2011 for the four monitoring sites affected by WSID surface water drainage discharge. The sites are Del Puerto Creek, Westley Wasteway, Ingram Creek and Hospital Creek.

4. *Outflow (subsurface drainage) Quality Testing Program.*

Analyses Performed	*Frequency*	*Concentration Range*	*Average*	*Reuse limitation?*
N/A				

5. *Provide a brief discussion of the District's involvement in Central Valley Regional Water Quality Control Board programs or requirements for remediating or monitoring any contaminants that would significantly degrade water quality in the receiving surface waters.*

Landowners in the District are subject to the Irrigated Lands Regulatory Program and receive conditional waivers of waste discharge requirements through the Westside San Joaquin River Watershed Coalition. The coalition monitors water quality in drainages on the Westside of the San Joaquin Valley and reports the findings to members and regulators. See discussion above. The coalition's goal is to identify and eliminate sources of water pollution emanating from irrigated lands by promoting Best Management Practices (BMP's). This is performed by obtaining current On Farm Management Plans from each grower and educating growers on alternative BMP's to eliminate sources of water pollutants.

G. Water Accounting (Inventory)

See Section V, District Water Inventory Tables

Section III: Best Management Practices (BMPs) for Agricultural Contractors

A. Critical Agricultural BMPs

1. *Measure the volume of water delivered by the district to each turnout with devices that are operated and maintained to a reasonable degree of accuracy, under most conditions, to +/- 6%.*

   a. *Number of delivery points (turnouts and connections)* 307

   b. *Number of delivery points serving more than one farm* 14

   c. *Number of measured delivery points (meters and measurement devices)* *307*

   d. *Percentage of delivered water that was measured at a delivery point* 100

   e. *Total number of delivery points not billed by quantity* *0*

   f. *Delivery point measurement device table*

Measurement Type	*Number*	*Accuracy* (+/- %)*	*Reading Frequency (Days)*	*Calibration Frequency (Months)*	*Maintenance Frequency (Months)*
Orifices					
Propeller meter					
Weirs	307	3	Daily	12	12
Flumes					
Venturi					
Metered gates	307	6	Daily	12	12
Acoustic doppler					
Other (define)					
Total	307				

**Documentation verifying the accuracy of measurement devices must be submitted with Plan and included in Attachment C.*

The District has relied on measurement of water deliveries to the water users using 307 standard meter gate installations and published tabulated flowrates based upon gate size, gate opening and head differential. In addition, a sharp crested weir is installed downstream of each of the 307 meter gates, providing a means for subsequent measurement for comparison with calculated flow through the turnout based on gate opening and head differential.

Deliveries to separate ownerships from a common distribution system are independently measured. Deliveries made from 14 turnouts are made to multiple fields, all of which are under the same landowner. There are no turnouts where delivery are made to multiple ownerships.

Recent changes in delivery measurement regulations in California contained in Senate Bill (SB)x7-7, as the Agricultural Water Measurement Regulation, places new requirements on agricultural water suppliers for the measurement of water. These requirements must be met by the District at the time funding becomes available to install the necessary facilities and institute the necessary procedures to

comply with the new regulations. The District expects that they will become subject to the new regulations in the near future due to funding source(s) becoming available.

As a result of the new regulations, the District has embarked on development of a plan to comply including providing the required documentation through attachments as specified in SBx7-7 to render the CVPIA WMP in compliance with SBx7-7 regulations.

The current water measurement protocol is as follows: In the morning, the ditch tenders know the day's deliveries from the previous day's orders. First thing, they will visit the gate(s) with new deliveries and adjust the gate until they reach the desired flow rate as estimated through the meter gate. Once they make adjustments as appropriate, they move on to the next delivery site. After all new orders are placed including any shut offs, they go back through and recheck each delivery site as conditions in the lateral and have equalized. Adjustments are made to the gates as needed. At some of the delivery locations, flowrate is checked or confirmed by measuring water depths over the sharp crested weir either located downstream of the turnout gate and/or in the lateral. All deliveries are checked during the remainder of the day and adjustments are made as necessary. Usually, if there are any changes to lateral turnout flowrates, the ditch tenders know in advance from a call from growers being either short at the turnout or short at the end of the lateral. If growers are short at the end, someone is usually taking more water than what they ordered or there is or has been a problem with the Main Canal which reduces the inflow into the lateral. With the modernization of the canal system these events have become rare.

The total of the deliveries are compared to the flow at the head of each lateral to confirm that the total of the deliveries corresponds to the flow at the head with consideration given to the known lateral flow characteristics. Delivery rates are checked if comparison indicates a possible flow measurement problem. Since deliveries to all owners are measured the delivery record serves as the basis to address water delivery issues.

The District is currently developing the plan to comply with the SBx7-7 Agricultural Water Measurement Regulations including tasks, schedules and budgets. A new inventory of the turnout metering systems has not been performed since the 2006 plan. The inventory will be updated as part of the SB7-7 compliance plan. In addition, the plan will address measurement of District deliveries as well as multiple field level measurements served from one District delivery point to the accuracy required by the regulation.

2. *Designate a water conservation coordinator to develop and implement the Plan and develop progress reports.*

Name: Robert Pierce, PE *Title:* General Manager

Address: 116 E St., Westley, CA 95387

Telephone: (209) 894-3091 *E-mail:* bobby.pierce@weststanislausid.org

Provide the job description and minimum qualifications:

The General Manager is responsible for all operations of the District including all water operations, reporting to the Board of Directors. Oversees and directs the activities of the water district personnel. Responsible in seeing that water deliveries can be accomplished reliably and efficiently and that facilities are maintained to accomplish the deliveries.

3. Provide or support the availability of water management services to water users:

The District hosts grower workshops to promote BMP's for water quality improvement, provide information on new regulations and enforcement, provide information on available grants and other resources, etc.

a. On-Farm Evaluations: On-farm irrigation system evaluations are coordinated by the District for the westside irrigation districts through the SLDMWA. Through grant funding and partial grower cost share, on farm evaluations are performed to improve water use efficiency and to improve water quality in local waterways. The District tracks the availability of programs that offer on-farm irrigation system evaluations and provides information to growers. When a program becomes available, the growers are made aware of the program and the benefits to be gained through participation. The District may offer incentives to growers for participation in an evaluation. A recommended source for these evaluations is the Irrigation Training and Research Center, Cal Poly, San Luis Obispo.

If growers perform an On-Farm Evaluation, the results are not necessarily provided to the District even upon District request. Providing rebates for On-Farm Evaluations has been considered in the past, but due to limited program availability and low level of grower interest, the program was never formalized. Further development of a program to promote on-farm evaluations is under consideration and will be further researched and implemented within the next two to three years as found financially feasible by the District.

1) On farm irrigation and drainage system evaluations using a mobile lab type assessment.

	Total in district	*# surveyed last year*	*# surveyed in current year*	*# projected for next year*	*# projected 2nd yr in future*
Irrigated acres	20,155	UNK	UNK	UNK	UNK
Number of farms	94				

*Information not available. Evaluations are water user directed activities.

2) Timely field and crop-specific water delivery information to the water user:

Water use by turnout is monitored and tracked daily by the District. The water use by crop is based upon water deliveries made pursuant to water orders for specific crops and fields. Water use is measured and tracked through each metering point. Daily tracking of water deliveries through each turnout, field, crop type, acres and grower are submitted to all growers in a monthly statement and at other times at the growers' request. Historical records of these data are maintained by the District. Growers are advised when their applied water appears excessive when compared to other water deliveries and calculated water requirements.

b. Real-time and normal irrigation scheduling and crop ET information

Due to the limited water supply and the cost of water, the water users respect the value of good on-farm water management. The District also counsels the growers about proper irrigation water application to meet the farm water delivery requirement and provides information on proper irrigation water management. Water users are directed to sources of crop water needs data and calculation methods, resources such as CIMIS station data, the Irrigation Training and Research Center at Cal Poly San Luis Obispo, and irrigation consultants which can be of assistance. The District is currently researching generating a website, one of the reasons being to provide information such as real-time crop water need

projections produced from ET data. In addition, the District plans to install a CIMIS station at the new Administration, Operation and Maintenance Complex due to begin construction in 2014. Upon approval of the governing Board of Directors, institution of a District web site will occur within a year where links to other web sources will be provided to assist in real time irrigation scheduling based upon real-time ETo data such as http://weather.wsu.edu/ism/. If a District web site fails to be implemented, real time irrigation scheduling data will be posted at the District headquarters weekly and viewable by all public.

c. Surface, ground, and drainage water quantity and quality data provided to water users.

As reported, the District monitors the water quality of the water supply sources with salinity concentrations of the greatest concern. As part of the Main Canal System Modernization Plan, the salinity of the District's water supply will be continually monitored at selected locations throughout the system and reported to the District office on a continual basis via the Supervisory Control and Data Acquisition System (SCADA). This system will provide the District and the water users "real time data" on supply water quality. As the District develops a website in the future, real time water quality data will be posted. Turbidity of irrigation tailwater discharged into local creeks is checked once a month. Growers are notified if high turbidity levels are detected so they can implement immediate remedial measures.

d. Agricultural water management educational programs and materials for farmers, staff, and the public.

Program	*Co-Funders (If Any)*	*Yearly Targets*
Irrigation Seminars and Short Courses. District continues to notify water users of available seminars and short courses and promotes their attendance.	Water Efficiency Program	All water users anually.
Sediment and Pesticide Control	Westside Coalition	All water users annually.
Information and reports from the ILRP	Westside Coalition	All water users annually.

See Attachment F for samples of provided materials and notices

4. Pricing structure - based at least in part on quantity delivered.

All billing for water delivered by the District is based on the volume of water delivered.

5. Evaluate and improve efficiencies of district pumps.

WSID has approximately 35 lift pumps. The District performs all pump tests in house. The last major evaluation was done in 2010 where pump performance test were performed on each pump and the overall pumping plant efficiency was determined. Information obtained from this study was used in the development of the Modernization Plan. The District is in the process of replacing pumps along the Main Canal as part of the canal modernization. Each year the District rebuilds several pumps.

	Total in district	*# surveyed last year*	*# surveyed in current year*	*# projected for next year*
Wells	4	1	1	1
Lift pumps	35	35	0	0

B. Exemptible BMPs for Agricultural Contractors

1. Facilitate alternative land use.

Drainage Characteristic	*Acreage*	*Potential Alternate Uses*
High water table (<5 feet)	None	
Poor drainage	None	
Groundwater Selenium concentration > 50 ppb	None	
Poor productivity	None	

N/A. Lands within the District are highly productive and are well drained.

2. Facilitate use of available recycled urban wastewater.

Sources of Recycled Urban Waste Water	*AF/Y Available*	*AF/Y Currently Used in District*
None		

No sources currently available. There is discussion regarding the transfer of reclaimed urban waste water from the eastside of the San Joaquin River for use as an agricultural water supply on the Westside. WSID continues to monitor the activities under this program as it may impact the WSID water supply conditions.

3. Facilitate the financing of capital improvements for on-farm irrigation systems.

Program	*Description*
None	

The District currently does not have a financing plan to assist growers in implementing on-farm irrigation improvements. The District does however distribute and inform all growers on financing programs available to implement such projects. Refer to Attachment I for an example of grower notification.

4. Incentive pricing.

The District charges for water by water measured and delivered to each water user. No additional pricing incentives are needed to promote water conservation due to an already limited water supply and high water rates based on the volume of water used. The current pricing structure encourages use of District water in favor of private groundwater use for the most part, unless a grower finds it more convenient to use private well water, a conjunctive use of the two sources of supply. Groundwater levels are maintained within acceptable levels under the current pricing scheme. Groundwater levels are typically always below levels that would adversely affect crop growth and at levels that do not adversely

affect water quality, and the cost and availability of the groundwater supply. An escalating tier water pricing structure for the District water supply will distort the current balance between use of District water and private well water and may reduce the amount of imported water used within the District resulting in local groundwater overdraft.

5. a) Line or pipe ditches and canals.

WSID has never completed a study on seepage in unlined sections of canals, but has a program to line all canals to reduce seepage and annual operating and maintenance costs.

Canal/Lateral (Reach)	*Type of Improvement*	*Number of Miles in Reach*	*Estimated Seepage (AF/Y)*	*Accomplished/ Planned Date*
Lateral 6	Replace Pipeline	0.30	Unknown	12/31/2012
Main Canal Pool 1	Convert Open Channel to Pipeline	.75	Unknown	06/2012
Main Canal Pool 3	Convert Open Channel to Pipeline	0.5	Unknown	06/2017
Main Canal Pool 5 and Pool 6	Parallel Open Channel with Pipeline	1.0	Unknown	06/2014
Lateral 2-South	Convert earthen channel to concrete lined	4.2	Unknown	02/2021
Lateral 4-North	Convert earthen channel to concrete lined	4.0	Unknown	02/2023
Lateral 6-North	Convert earthen channel to concrete lined	1.1	Unknown	02/2025

b) Construct/line regulatory reservoirs.

In 1998 WSID completed a water supply regulatory reservoir study. The study determined that while new regulatory reservoirs would improve quality and timing of deliveries, the program was not found to be cost effective. The District has been investigating the installation of a reservoir on Lateral 4 to increase delivery flexibility and reduce operational spill. Regulatory reservoirs will be investigated further in the Lateral Modernization Feasibility Study and may be incorporated into the Lateral Modernization Plan. The Lateral Modernization Feasibility Study is scheduled to be completed in 2016.

Reservoir Name	*Location*	*Describe improved operational flexibility and AF savings*
Lateral 4 North	Lateral 4 North	Improved water delivery flexibility in Laterals 4N, 5N and 6N. Savings estimated at 800 af/yr.

6. Increase flexibility in water ordering by, and delivery to, water users.

See Attachment G, contractor 'agricultural water order' form. Modernization of Main Canal including automation of the lateral headings; Automatic control of the Main Canal and remote monitoring and control of the lateral headings will provide improved water delivery flexibility. The District will have the ability to program the control system to adjust the flow in the Main Canal and the deliveries to each lateral at any time to allow orders to be filled at most any time. This operating strategy will be developed over time as the new system is brought on line occurring between 2012 and 2017. Further flexibility in water delivery will occur with the modernization of the laterals which is planned to occur between 2016 and 2025.

7. Construct and operate district spill and tailwater recovery systems.

Operational spills return to the river and are beneficially used by others. The spilled water is not lost to a saline sink. However, the SCADA system has improved canal control and operations which have reduced operational spills. Spills are being further reduced with the Main Canal Modernization Project currently underway. Additional measurement and control of operational spill will be a focus of the Lateral Modernization Plan.

8. *Plan to measure outflow.*

This plan is being developed and locations will be prioritized as part of the Lateral Modernization Plan.

9. Optimize conjunctive use of surface and groundwater.

Groundwater available to WSID and to the landowners through the use of private wells has higher salinity and boron concentration than available surface water. The District produces groundwater only during shortages, droughts, and periods of exceptionally high demand. District groundwater generally provides less than two percent of the District's water supply and private groundwater pumping provides approximately 15% in a representative year. Groundwater pumping increases in dry years and decreases in wet years to meet demand as the supply of surface water fluctuates. Natural and incidental recharge along with limited use of the groundwater has maintained the groundwater basin's average storage levels within an acceptable range as surface water supply has fluctuated between wet and dry periods.

During drought periods the District, pursuant to the "Water Service Policy", Attachment L, will allow privately produced groundwater to be conveyed in District facilities to increase the availability of groundwater to lands within the District provided that water quality standards are maintained within the District facilities.

10. Automate distribution and/or drainage system structures.

The District is in the process of modernizing the water distribution facilities to increase water delivery flexibility and efficiency. The modernization plan for the Main Canal has been completed and construction is underway, to be completed in three phases through 2017. Anticipated reduction in operational spill is estimated to be on the order of 5,000 acre feet. Additional automation is expected to be a part of the Lateral Modernization to follow.

11. Facilitate or promote water customer pump testing and evaluation.

Customer pump testing and evaluations are water user directed activities and are conducted according to the water users' prerogatives. As programs become available, the District will distribute information to the growers in a timely fashion through written notice or e-mail until the availability of a District web site.

12. *Mapping.*

The District is in the process of revising its mapping system. The general district map showing the location of the water distribution system and the drainage collection system has been produced in a computer aided drafting form utilizing several layers. The mapping system is planned to be converted into a graphical information system (GIS) to facilitate operations and maintenance, tracking various factors related to cropping, irrigation systems, water delivery and billing as well as information on the condition and use of the water delivery and drainage facilities.

	Estimated cost (in $1,000s)				
	2012	*2013*	*2014*	*2015*	*2016*
Layer 1 – Distribution system	1			30	
Layer 2 – Drainage system		1			20
Suggested layers:					
Layer 3 – Groundwater information					
Layer 4 – Soils map					
Layer 5 – Natural & cultural resources					
Layer 6 – Problem areas					

C. Provide a 3-Year Budget for Implementing BMPs

See Attachment H

1. Amount actually spent during current year.

Year 2012 or Year 1			*Actual Expenditure*	
BMP #		*BMP Name*	*(not including staff time)*	*Staff Hours*
A	*1*	*Measurement*	*$1,200*	*72*
	2	*Conservation staff*	*$1,200*	*72*
	3	*On-farm evaluation /water delivery info*	*$940*	*16*
		Irrigation Scheduling	*$0*	*0*
		Water quality	*$480*	*16*
		Agricultural Education Program	*$2,000*	*64*
	4	*Quantity pricing*	*$0*	*64*
	5	*Contractor's pumps*	*$1,464,000*	*180*
B	*1*	*Alternative land use*	$0	0
	2	*Urban recycled water use*	$0	0
	3	*Financing of on-farm improvements*	$0	40
	4	*Incentive pricing*	$0	0

	5	*Line or pipe canals/install reservoirs*	$1,464,000	140
	6	*Increase delivery flexibility*	$1,464,000	0
	7	*District spill/tailwater recovery systems*	$0	80
	8	*Measure outflow*	*$0*	*0*
	9	*Optimize conjunctive use*	$0	0
	10	*Automate canal structures*	$2,664,000	550
	11	*Customer pump testing*	$0	0
	12	*Mapping*	$1,000	*16*
		Total	$7,062,820	1,310

2. *Projected budget summary for the next year.*

Year 2013 or Year 2			*Budgeted Expenditure*	
BMP #		*BMP Name*	*(not including staff time)*	*Staff Hours*
A	*1*	*Measurement*	*$2,400*	*96*
	2	*Conservation staff*	*$2,400*	*96*
	3	*On-farm evaluations/water delivery info*	*$1,200*	*20*
		Irrigation Scheduling	*$800*	*6*
		Water quality	*$480*	*16*
		Agricultural Education Program	*$2,000*	*64*
	4	*Quantity pricing*	*$0*	*16*
	5	*Contractor's pumps*	$2,485,250	*550*
B	*1*	*Alternative land use*	$0	0
	2	*Urban recycled water use*	$0	0
	3	*Financing of on-farm improvements*	$0	0
	4	*Incentive pricing*	$0	0
	5	*Line or pipe canals/install reservoirs*	$2,485,250	16
	6	*Increase delivery flexibility*	$2,485,250	0
	7	*District spill/tailwater recovery systems*	$0	80
	8	*Measure outflow*	*$0*	*0*
	9	*Optimize conjunctive use*	$0	0
	10	*Automate canal structures*	$2,485,250	40
	11	*Customer pump testing*	$0	0
	12	*Mapping*	$1,000	40
		Total	$9,951,280	1,040

3. *Projected budget summary for 3rd year.*

Year 2014 or Year 3			*Budgeted Expenditure*	
BMP #		*BMP Name*	*(not including staff time)*	*Staff Hours*
A	*1*	*Measurement*	*$0*	*0*

	2	*Conservation staff*	*$2,400*	*72*
	3	*On-farm evaluations/water delivery info*	*$1,200*	*20*
		Irrigation Scheduling	*$0*	*0*
		Water quality	*$480*	*16*
		Agricultural Education Program	*$2,000*	*64*
	4	*Quantity pricing*	*$0*	*64*
	5	*Contractor's pumps*	$2,127,500	*550*
B	*1*	*Alternative land use*	$0	0
	2	*Urban recycled water use*	$0	0
	3	*Financing of on-farm improvements*	$0	0
	4	*Incentive pricing*	$0	0
	5	*Line or pipe canals/install reservoirs*	$2,127,500	550
	6	*Increase delivery flexibility*	$2,127,500	0
	7	*District spill/tailwater recovery systems*	$0	80
	8	*Measure outflow*	*$0*	*0*
	9	*Optimize conjunctive use*	$0	0
	10	*Automate canal structures*	$2,127,500	0
	11	*Customer pump testing*	$0	0
	12	*Mapping*	$50,000	*160*
		Total	$8,566,080	1,576

Section IV: Best Management Practices for Urban Contractors Verify information.

N/A

Section V: District Water Inventory Tables

Year of Data | 2011 | **Enter data year here**

Table 1

Surface Water Supply

2011 Month	**Federal Ag Water** (acre-feet)	**Federal non-Ag Water.** (acre-feet)	**State Water** (acre-feet)	**Local Water (S.J.River)** (acre-feet)	**Other Water** (acre-feet)	**Transfers into District** (acre-feet)	**Upslope Drain Water** (acre-feet)	**Total** (acre-feet)
Method	C3			C3				
January	0	0	0	0	0	0	0	0
February	788	0	0	114	0	0	0	902
March	1	0	0	1,031	0	0	0	1,032
April	0	0	0	6,429	0	0	0	6,429
May	2,583	0	0	10,388	0	0	0	12,971
June	337	0	0	9,112	0	0	0	9,449
July	2,810	0	0	11,814	0	0	0	14,624
August	1,842	0	0	11,055	0	0	0	12,897
September	0	0	0	6,514	0	0	0	6,514
October	0	0	0	1,415	0	0	0	1,415
November	0	0	0	1,750	0	0	0	1,750
December	0	0	0	851	0	0	0	851
TOTAL	8,361	0	0	60,472	0	0	0	68,833

Table 2

Ground Water Supply

2011 Month	District Groundwater (acre-feet)	Urban Groundwater *(acre-feet)	Agric Groundwate *(acre-feet)
Method			C3
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	2,000
May	0	0	2,000
June	0	0	3,000
July	0	0	4,000
August	0	0	4,000
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
TOTAL	0	0	15,000

*normally estimated

Table 3

Total Water Supply

2011 Month	Surface Water Total (acre-feet)	District Groundwater (acre-feet)	M&I Wastewater (acre-feet)	District Water (acre-feet)
Method				
January	0	0	0	0
February	902	0	0	902
March	1,032	0	0	1,032
April	6,429	0	0	6,429
May	12,971	0	0	12,971
June	9,449	0	0	9,449
July	14,624	0	0	14,624
August	12,897	0	0	12,897
September	6,514	0	0	6,514
October	1,415	0	0	1,415
November	1,750	0	0	1,750
December	851	0	0	851
TOTAL	68,833	0	0	68,833

*Recycled M&I Wastewater is treated urban wastewater that is used for agriculture.

2011 Precipitation Worksheet				
	inches precip	ft precip	acres	AF/Year
Jan	1.04	0.09	0.00	0.00
Feb	2.09	0.17	2.62	2.06
Mar	2.91	0.24	1.56	1.22
Apr	0.14	0.01	1.76	1.38
May	0.56	0.05	1.72	1.35
Jun	1.69	0.14	1.24	0.97
Jul	0.00	0.00	1.29	1.01
Aug	0.00	0.00	1.93	1.51
Sept	0.00	0.00	8.59	6.73
Oct	0.68	0.06	1.58	1.24
Nov	0.20	0.02	5.62	4.41
Dec	0.10	0.01	8.73	6.84
			14.33	11.23
			3.73	2.93
			8.26	6.48
			7.53	5.90
			1.58	1.24
			10.49	8.23
			1.91	1.50
			8.88	6.97
			11.85	9.29
			1.89	1.48
TOTAL	**9.41**	**0.78**		

2011 Evaporation Worksheet				
	inches evap	ft evap	acres	AF/YEAR
Jan	0.79	0.07	0.00	0.00
Feb	2.52	0.21	2.62	11.86
Mar	3.05	0.25	1.56	7.04
Apr	4.76	0.40	1.76	7.98
May	6.18	0.52	1.72	7.79
Jun	7.89	0.66	1.24	5.61
Jul	8.39	0.70	1.29	5.85
Aug	6.86	0.57	1.93	8.74
Sept	5.64	0.47	8.59	38.84
Oct	3.86	0.32	1.58	7.15
Nov	2.21	0.18	5.62	25.43
Dec	2.14	0.18	8.73	39.48
			14.33	64.81
			3.73	16.89
			8.26	37.39
			7.53	34.05
			1.58	7.13
			10.49	47.46
			1.91	8.63
			8.88	40.19
			11.85	53.59
			1.89	8.55
TOTAL	**54.29**	**4.52**		

Table 4

Agricultural Distribution System

2011 Canal, Pipeline, Lateral, Reservoir	Length (feet)	Width (feet)	Surface Area (square feet)	Precipitatio (acre-feet)	Evaporation (acre-feet)	Spillage (acre-feet)	Seepage (acre-feet)	Total (acre-feet)
Intake Channel	10,560	115	1,214,400	0.0	0.0	0	0	0
Main Canal Pool 1	3,870	30	114,165	2.1	11.9	0	43	(53)
MC Pool #2	2,380	29	67,830	1.2	7.0	0	26	(32)
MC Pool #3	2,770	28	76,868	1.4	8.0	0	29	(36)
MC Pool #4	2,940	26	74,970	1.3	7.8	0	28	(35)
MC Pool #5	2,350	23	54,050	1.0	5.6	0	20	(25)
MC Pool #6	2,680	21	56,280	1.0	5.8	0	21	(26)
Lateral 1 North	7,650	11	84,150	1.5	8.7	227	32	(266)
2 South Unlined	22,000	17	374,000	6.7	38.8	647	425	(1,104)
Lateral 3 North	9,840	7	68,880	1.2	7.2	290	26	(322)
Lateral 3 South	27,200	9	244,800	4.4	25.4	342	93	(456)
4 North unlined	21,120	18	380,160	6.8	39.5	1,372	432	(1,837)
Lateral 4 North	52,000	12	624,000	11.2	64.8	0	236	(290)
4 South unlined	11,616	14	162,624	2.9	16.9	736	185	(935)
Lateral 4 South	36,000	10	360,000	6.5	37.4	0	136	(167)
Lateral 5 North	32,780	10	327,800	5.9	34.0	401	124	(554)
5 South unlined	6,864	10	68,640	1.2	7.1	745	78	(829)
Lateral 5 South	45,700	10	457,000	8.2	47.5	0	173	(212)
6 North unlined	5,934	14	83,076	1.5	8.6	424	94	(525)
Lateral 6 North	38,700	10	387,000	7.0	40.2	0	147	(180)
Lateral 6 South	43,000	12	516,000	9.3	53.6	459	195	(698)
4 North long latera	6,864	12	82,368	1.5	8.6	0	31	(38)
TOTAL	394,818			84.0	484.5	5,643	2,576	(8,620)

Urban Distribution System

2011 Area or Line	Length (feet)	Leaks (acre-feet)	Breaks (acre-feet)	Flushing/Fire (acre-feet)	Total (acre-feet)
	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
TOTAL	0	0	0	0	0

Table 5

Crop Water Needs

2011 Crop Name	Area (crop acres)	Crop ET (AF/Ac)	Requirement (AF/Ac)	Cultural Practices (AF/Ac)	Precipitation (AF/Ac)	Appl. Crop Water Use (acre-feet)
Alfalfa	2,309	4.4	0.7		0.4	10,947.4
Almonds	6,388	3.6	0.8		0.4	25,719.0
Apples	20	3.6	0.8		0.4	80.2
Apricots	1,118	3.6	0.8		0.4	4,435.0
Black-eye peas	10	1.4	0.5		0.4	15.8
Brocolli	163	2.2	0.2		0.4	335.3
Cherries	49	3.6	0.8		0.4	196.5
Corn	911	2.2	0.4		0.4	2,097.9
Cannery Tomatoes	2,714	2.4	0.3		0.4	6,413.6
Dry Beans	3,179	1.4	0.6		0.4	5,104.5
Fallow	313	0.0	0.0		0.4	
Grapes	584	2.7	0.6		0.4	1,726.2
Green Tomatoes	56	2.4	0.3		0.4	132.3
Melons	597	2.5	0.3		0.4	1,414.4
Oats	468	1.1	0.2		0.4	427.0
Olives	131	3.6	0.3		0.4	464.7
Parsley	98	2.7	0.4		0.4	274.1
Pasture	261	2.2	0.0		0.4	473.5
Peaches	176	3.4	0.6		0.4	635.7
Safflower	58	1.0	0.0		0.4	35.2
Spinach	104	0.4	0.1		0.4	6.0
Walnuts	1,161	3.6	0.8		0.4	4,658.0
Wheat	785	2.2	0.1		0.4	1,513.5
Crop Acres	21,653					67,105.8

Total Irrig. Acres 20,155 (If this number is larger than your known total, it may be due to double cropping)

Table 6

2011 District Water Inventory

Water Supply		Table 3		68,833
Environmental Consumptive Use		(Distribution, Drain, etc.)	minus	0
Groundwater recharge		(intentional - ponds, injection)	minus	0
Seepage		Table 4	minus	2,576
Evaporation - Precipitation		Table 4	minus	401
Spillage		Table 4	minus	5,643
Leaks, Breaks, Flushing / Fire		Table 4	minus	0
Transfers out of District			minus	2,500
Water Available for sale to customers				57,713
Actual Agricultural Water Sales	2011	From District Sales Records		56,736
Private Groundwater		Table 2	plus	15,000
Crop Water Needs		Table 5	minus	67,106
Drainwater outflow		(tail and tile not recycled)	minus	0
Percolation from Agricultural Land		(calculated)		4,630
M&I Actual Water Sales	2011	From District Records		
Inside Use		Feb urban use x 12		
Landscape / Outside Use		(calculated)		0
Unaccounted for Water		(calculated)		977

Table 7

Influence on Groundwater and Saline Sink

2011

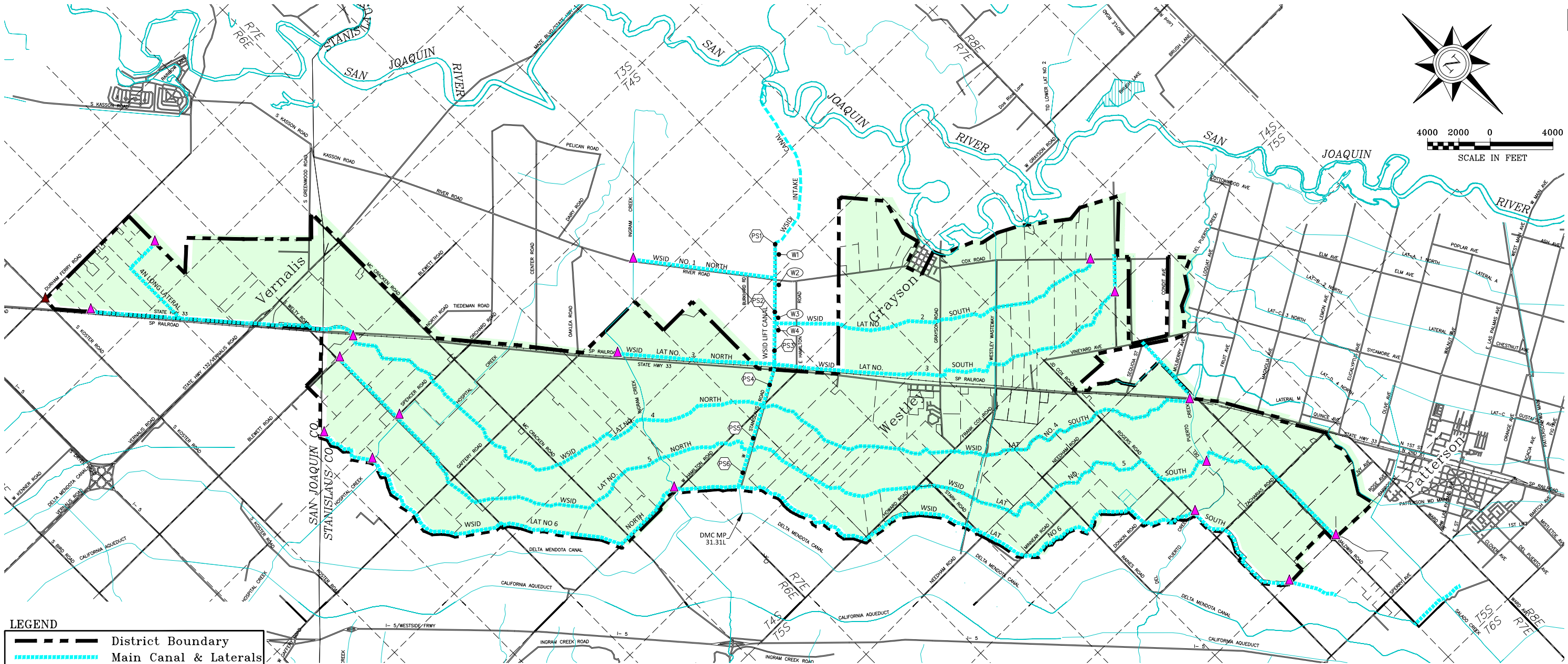
Agric Land Deep Perc + Seepage + Recharge - Groundwater Pumping = District Influence	7,206
Estimated actual change in ground water storage, including natural recharge)	0
Irrigated Acres (from Table 5)	21,653
Irrigated acres over a perched water table	0
Irrigated acres draining to a saline sink	0
Portion of percolation from agri seeping to a perched water table	0
Portion of percolation from agri seeping to a saline sink	0
Portion of On-Farm Drain water flowing to a perched water table/saline sink	0
Portion of Dist. Sys. seep/leaks/spills to perched water table/saline sink	0
Total (AF) flowing to a perched water table and saline sink	0

Table 8

Annual Water Quantities Delivered Under Each Right or Contract

Year	Federal Ag Water (acre-feet)	Federal non-Ag Water. (acre-feet)	State Water (acre-feet)	Local Water (S.J.River) (acre-feet)	Other Water (acre-feet)	Transfers into District (acre-feet)	Upslope Drain Water (acre-feet)	Total (acre-feet)
2002	36,884	0	0	36,584	0	0	0	73,468
2003	38,902	0	0	29,386	0	0	0	68,288
2004	29,631	0	0	37,374	0	0	0	67,005
2005	35,224	0	0	31,945	0	0	0	67,169
2006	34,108	0	0	28,021	0	0	0	62,129
2007	27,821	0	0	39,190	0	0	0	67,011
2008	17,723	0	0	41,902	0	0	0	59,625
2009	5,150	0	0	49,145	140	0	0	54,435
2010	25,047	0	0	57,330	140	0	0	82,517
2011	8,361	0	0	60,472	0	0	0	68,833
Total	258,851	0	0	411,349	280	0	0	670,480
Average	25,885	0	0	41,135	28	0	0	67,048

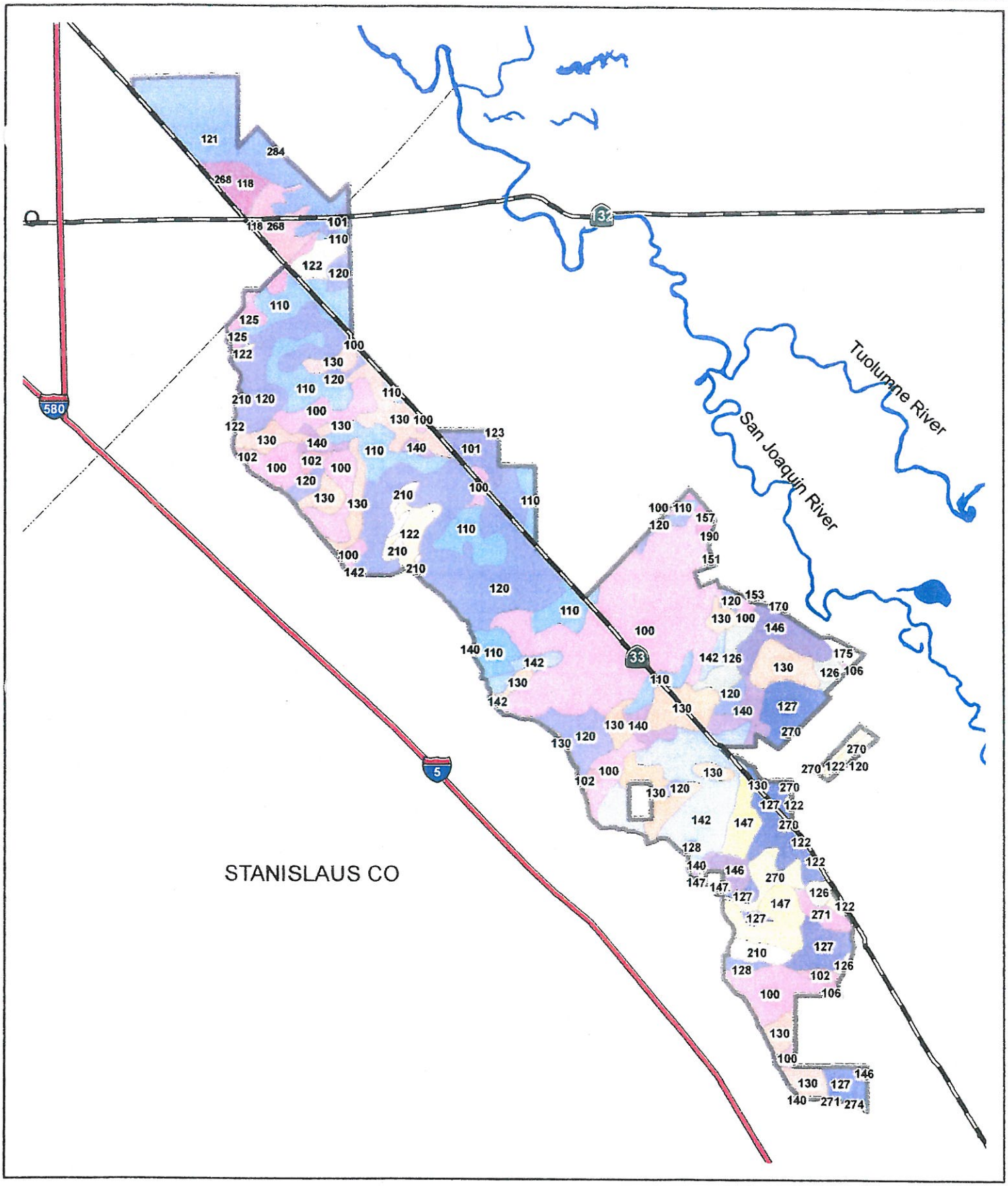
West Stanislaus Irrigation District
A
District Maps



WEST STANISLAUS IRRIGATION DISTRICT
FACILITIES MAP

REVISION DATE
NOVEMBER 13, 2013

PROVOST & PRITCHARD
Engineers Consultants
1130 WEST I STREET, SUITE C
LOS BANOS, CALIFORNIA 93635
209/829-1685 FAX 209/829-1675
www.ppeng.com



**See corresponding tables for soil type and total acres

West Stanislaus ID
Soil Survey - Stanislaus and San Joaquin Counties

Date: December 14, 2006
Author: serysian
SCCAO GIS
Path Name: K:\serysian\projects\water conservation\soil maps\west_sj_division\west stan_id.mxd

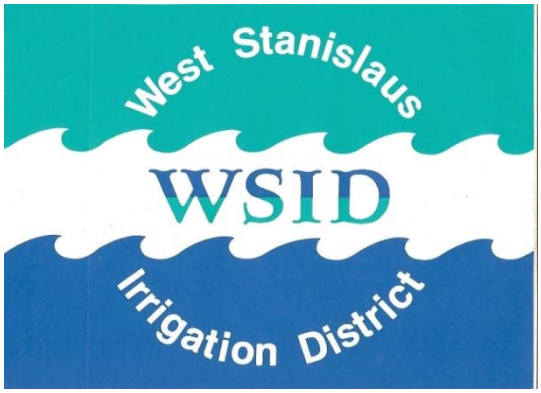
West Stanislaus ID - Soil Survey Stanislaus County		
Soil type	**Sum_Acres**	**Map Unit number**
Capay clay, 0 to 2 percent slopes	4592.44	100
Capay clay, 0 to 2 percent slopes, rarely flooded	32.98	106
Capay clay, loamy substratum, 0 to 2 percent slopes	170.31	102
Capay clay, wet, 0 to 2 percent slopes	315.82	101
Clear Lake clay, 0 to 2 percent slopes, occasionally flooded	3.51	190
Columbia complex, 0 to 2 percent slopes, occasionally flooded	4.45	151
Columbia complex, 0 to 2 percent slopes, rarely flooded	80.50	157
Columbia fine sandy loam, channeled, partially drained, o to 2 p	2.89	153
Cortina gravelly sandy loam, 0 to 5 percent slopes, rarely floode	254.24	210
Dospalos-Bolfar complex, 0 to 2 percent slopes, occasionally flo	0.03	170
Dospalos-Bolfar complex, 0 to 2 percent slopes, rarely flooded	68.62	175
El Solyo silty clay loam, 0 to 2 percent slopes	2355.69	110
Elsalado fine sandy loam, 0 to 2 percent slopes, rarely flooded	302.40	270
Elsalado loam, 0 to 2 percent slopes	10.19	274
Elsalado loam, 0 to 2 percent slopes, rarely flooded	130.02	271
Stomar clay loam, 0 to 2 percent slopes	2477.90	130
Vernalis clay loam, 0 to 2 percent slopes	183.93	125
Vernalis clay loam, wet, 0 to 2 percent slopes	3.16	123
Vernalis loam, 0 to 2 percent slopes	557.26	122
Vernalis loam, 0 to 2 percent slopes, rarely flooded	1363.27	127
Vernalis-Zacharias complex, 0 to 2 percent slopes	3691.42	120
Vernalis-Zacharias complex, 0 to 2 percent slopes, rarely floode	395.81	126
Water	78.89	128
Zacharias clay loam, 0 to 2 percent slopes	507.64	140
Zacharias clay loam, 0 to 2 percent slopes, rarely flooded	531.24	146
Zacharias gravelly clay loam, 0 to 2 percent slopes	1409.17	142
Zacharias gravelly clay loam, 0 to 2 percent slopes, rarely floode	651.65	147

West Stanislaus ID - Soil Survey San Joaquin County		
Soil Type	**Sum_Acres**	**mapunit number**
Capay clay, 0 to 2 percent slopes	267.79	118
Capay clay, wet, 0 to 2 percent slopes	1382.42	121
Vernalis clay loam, 0 to 2 percent slopes	363.78	268
Water	1.55	284

West Stanislaus Irrigation District
B
District Rules and Regulations

West Stanislaus Irrigation District

Rules and Regulations – Water Service



Adopted January 1988

SERVING OUR DISTRICT SINCE 1920

Table of Contents

The Purpose and Benefit of this Booklet

The purpose of this booklet is to inform you, the Landowners and Water Users of the obligations and duties of both the District and the Customers being served. It is hoped that the use of this booklet is a guide to what is expected of each party in the District.

The General Manager of WSID is designated as the responsible party for day-to-day operations of the policies in this booklet. WSID Board of Directors is the final authority for enforcement of the policies in the booklet, and the overall business of WSID.

WSID Mission Statement

WSID is dedicated to providing water to its customers in an efficient manner and at a reasonable cost, to ensure long term reliability of the system and service to customers, and to work with governmental and public agencies to promote the common welfare of the landowners and water users of WSID.

Further, WSID is committed to providing its employees with a working atmosphere of mutual respect and appreciation. WSID policies promote a superior work force, encourage career opportunities, and individual professional growth. As employees are important, so too are the contributions the group as a whole confers upon the ultimate success of the District.

Orders:

All orders for water must be placed at least the day prior to the day of delivery. Since orders for supplemental water from the Bureau of Reclamation must be telephoned to Tracy operations prior to 11:00 AM each day, it may be necessary to hold up orders received after that hour an additional day.

Each Water User must supply the following information:

1. Name of Water User
2. Name of Landowner
3. Acres and crop to be Irrigated
4. Lateral Ditch
5. Gate (if more than one serves the field)
6. Size of head wanted
7. When Needed

All new heads of water will be diverted from the Main Canal early in the morning only.

At the time of ordering, all water used up to that time must be paid for and the appropriate installment of the Stand-By charge and the Minimum Water Service Charge must also be paid.

Shutoffs:

Reductions in size of head and shut-off notices must be received prior to 2:00 PM to be effective that same day.

Since each ditch tender is responsible for his ditch on a 24-hour basis, shut-offs or changes in head which would keep the ditch tender on duty after 7:00 PM will be effective the following morning.

Rationing:

When the demand for water on any lateral exceeds the capacity of the facilities the District will prorate each Water Users share on the basis of acreage farmed on that lateral.

Continuous Use of Water:

When water is turned on the land, the water shall be used day and night until the irrigation is completed.

Control of System:

The operation and maintenance of all canals, structures and works of the District shall be under the control of the General Manager appointed by the Board of Directors. No other person, except those authorized by the Manager, shall have any right to operate or to interfere with the operation of any part of the Irrigation System.

Access to Water Users' Ditches and Land:

Authorized personnel of the District shall at all times have access to the ditches of the Water User and the lands irrigated from the Districts canals for District purposes.

Control of Water by Irrigators:

Each irrigator shall so control the water that no damage will be caused to the District or to any other parties.

If water is wasted or improperly used in the judgment of the General Manager or his authorized representative, further delivery of water may be refused until cause of waste or improper use is corrected.

Service Points:

The District will construct additional service points in main laterals of the District should such additional service points be necessary, in the judgment of the District Manager, to provide a more efficient delivery service for the District.

The District will not be liable for construction of added lateral, sub-lateral or service points to supply water to any parcels which result from voluntary or involuntary sub-divisions or parcel splits.

The District will construct or cause to be constructed any additional service points requested by Water User(s) for delivery of water to any separated parcels. Such additional service points, including suitable measuring devices, must be reimbursed by the Water User(s) requesting such service points.

Measurement of Water:

The District will assume the responsibility for measuring quantities of water delivered to all parcels of land which are held in different ownerships including those parcels which are served by a common water distribution system.

The District will furnish the measuring devices in accordance with "Service Points" of these Rules and Regulations, and maintain them, and they will remain the property of the District even though they may be installed in private systems. The District will be the sole judge of the particular type of measuring device to be provided; such as calibrated measuring gate, weir, or meter.

It will be the responsibility of the Landowners to provide satisfactory access to measuring devices provided by the District at no expense to the District.

Use of Facilities for Other Waters:

Transportation of water other than District water through the facilities of the District will be permitted at the discretion of the Board. This permission shall be revocable at any time.

All costs of getting water other than District water into the facilities of the District, including measurement facilities satisfactory to the District, shall be borne by the applicant.

Water to be transported shall be of a quality acceptable to the District and the District shall be the sole judge as to the acceptability.

A service charge will be made for transporting other waters through District facilities. This service charge shall be set by the Board of Directors and shall be paid by the applicant upon presentation of the bill.

Use of District Roads:

Landowners and Water Users and their authorized personnel shall be allowed to use District roads so long as such use does not interfere with District operations.

No equipment or tools which might cause damage to the District roads shall be allowed on District roads.

Oiling of Roads:

The District will pay the full cost of oiling and maintaining District roads.

The District will pay its fair share of the cost of oiling and maintaining private roads used from time to time for District purposes.

Maintenance of Drains:

The District will maintain all drains carrying surface runoff from District lands from the point where such drains enter the property of another landowner, except in newly sub-divided parcels, where it will be the discretion of the Board to accept the responsibility of maintenance.

Where the ownership of the last parcel of land that has a District maintained drain and the ownership of the last parcel served by that drain comes under the same ownership, than the drainage facility will become the responsibility of the owner.

Liability of the District:

Nothing in the Rules and Regulations regarding water deliveries shall be construed as an assumption of liability by the District, its Directors, Officers or employees for any damage occasioned from the use of water by any Water User.

DISCHARGE DATA
For 24 inch Calibrated Gate Measuring Device
24" CALCO GATE

Hd. in Ft.	Net Gate Opening in Inches																
	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"	14"	16"	18"	20"	22"	24"
0.02	0.3	0.5	0.6	0.7	0.8	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.8	1.9	2.1	2.2	2.2
0.04	0.5	0.6	0.8	1.0	1.2	1.3	1.5	1.7	1.8	2.0	2.1	2.3	2.5	2.7	2.9	3.1	3.2
0.06	0.6	0.8	1.0	1.3	1.4	1.7	1.8	2.0	2.2	2.4	2.6	2.8	3.1	3.4	3.6	3.8	3.9
0.08	0.7	0.9	1.2	1.4	1.7	1.9	2.1	2.3	2.6	2.8	3.0	3.3	3.6	3.9	4.2	4.4	4.5
0.10	0.7	1.0	1.3	1.6	1.9	2.1	2.4	2.6	2.9	3.1	3.3	3.7	4.0	4.3	4.7	4.9	5.0
0.12	0.8	1.1	1.4	1.8	2.0	2.3	2.6	2.9	3.1	3.4	3.6	4.0	4.4	4.7	5.1	5.3	5.5
0.14	0.9	1.2	1.5	1.9	2.2	2.5	2.8	3.1	3.4	3.7	3.9	4.3	4.7	5.1	5.5	5.8	6.0
0.16	0.9	1.3	1.6	2.0	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.6	5.1	5.5	5.9	6.2	6.4
0.18	1.0	1.3	1.7	2.2	2.5	2.9	3.2	3.5	3.8	4.2	4.4	4.9	5.4	5.8	6.2	6.5	6.8
0.20	1.0	1.4	1.8	2.3	2.6	3.0	3.4	3.7	4.1	4.4	4.7	5.2	5.7	6.1	6.6	6.9	7.1
0.22	1.1	1.5	1.9	2.4	2.8	3.2	3.5	3.9	4.3	4.6	4.9	5.4	5.9	6.4	6.9	7.2	7.5
0.24	1.1	1.6	2.0	2.5	2.9	3.3	3.7	4.1	4.4	4.8	5.1	5.7	6.2	6.7	7.2	7.5	7.8
0.26	1.2	1.6	2.1	2.6	3.0	3.4	3.8	4.2	4.6	5.0	5.3	5.9	6.5	7.0	7.5	7.9	8.1
0.28	1.2	1.7	2.2	2.7	3.1	3.6	4.0	4.4	4.8	5.2	5.5	6.1	6.7	7.3	7.8	8.2	8.4
0.30	1.2	1.7	2.2	2.8	3.2	3.7	4.1	4.5	5.0	5.4	5.7	6.3	6.9	7.5	8.1	8.4	8.7
0.32	1.3	1.8	2.3	2.9	3.3	3.8	4.3	4.7	5.1	5.6	5.9	6.5	7.2	7.8	8.3	8.7	9.0
0.34	1.3	1.9	2.4	3.0	3.4	3.9	4.4	4.8	5.3	5.7	6.1	6.7	7.4	8.0	8.6	9.0	9.3
0.36	1.4	1.9	2.5	3.1	3.5	4.0	4.5	5.0	5.5	5.9	6.3	6.9	7.6	8.2	8.8	9.3	9.5
0.38	1.4	2.0	2.5	3.1	3.6	4.1	4.6	5.1	5.6	6.1	6.5	7.1	7.8	8.4	9.1	9.5	9.8
0.40	1.4	2.0	2.6	3.2	3.7	4.3	4.8	5.2	5.7	6.2	6.6	7.3	8.0	8.7	9.3	9.7	10.1
0.42	1.5	2.1	2.7	3.3	3.8	4.4	4.9	5.4	5.9	6.4	6.8	7.5	8.2	8.9	9.5	10.0	10.3
0.44	1.5	2.1	2.7	3.4	3.9	4.5	5.0	5.5	6.0	6.5	6.9	7.7	8.4	9.1	9.8	10.2	10.5
0.46	1.5	2.2	2.8	3.5	4.0	4.6	5.1	5.6	6.2	6.7	7.1	7.9	8.6	9.3	10.0	10.5	10.8
0.48	1.6	2.2	2.8	3.5	4.1	4.7	5.2	5.7	6.3	6.8	7.3	8.0	8.8	9.5	10.2	10.7	11.0
0.50	1.6	2.2	2.9	3.6	4.2	4.8	5.3	5.9	6.4	6.9	7.4	8.2	8.9	9.7	10.4	10.9	11.2
0.55	1.7	2.3	3.0	3.8	4.4	5.0	5.6	6.1	6.7	7.3	7.8	8.6	9.4	10.2	10.9	11.4	11.8
0.60	1.8	2.5	3.2	3.9	4.6	5.2	5.8	6.4	7.0	7.6	8.1	9.0	9.8	10.6	11.4	12.0	12.3
0.65	1.8	2.6	3.3	4.1	4.8	5.4	6.1	6.7	7.3	7.9	8.4	9.3	10.2	11.1	11.9	12.4	12.8
0.70	1.9	2.7	3.4	4.3	4.9	5.6	6.3	6.9	7.6	8.2	8.8	9.7	10.6	11.5	12.3	12.9	13.3
0.75	2.0	2.7	3.6	4.4	5.1	5.8	6.5	7.2	7.9	8.5	9.1	10.0	10.9	11.9	12.7	13.4	13.8
0.80	2.0	2.8	3.7	4.5	5.3	6.0	6.7	7.4	8.1	8.8	9.4	10.3	11.3	12.3	13.2	13.8	14.2
0.85	2.1	2.9	3.8	4.7	5.4	6.2	6.9	7.6	8.4	9.1	9.6	10.7	11.6	12.6	13.6	14.2	14.7
0.90	2.1	3.0	3.9	4.8	5.6	6.4	7.1	7.9	8.6	9.3	9.9	11.0	12.0	13.0	14.0	14.6	15.1
0.95	2.2	3.1	4.0	5.0	5.8	6.6	7.3	8.1	8.9	9.6	10.2	11.3	12.3	13.4	14.4	15.0	15.5
1.00	2.3	3.2	4.1	5.1	5.9	6.7	7.5	8.3	9.1	9.8	10.5	11.6	12.6	13.7	14.7	15.4	15.9
1.05	2.3	3.2	4.2	5.2	6.1	6.9	7.7	8.5	9.3	10.1	10.7	11.8	12.9	14.1	15.1	15.8	16.3
1.10	2.4	3.3	4.3	5.3	6.2	7.1	7.9	8.7	9.5	10.3	11.0	12.1	13.2	14.4	15.4	16.2	16.7
1.15	2.4	3.4	4.4	5.5	6.3	7.2	8.1	8.9	9.8	10.5	11.2	12.4	13.5	14.7	15.8	16.5	17.1
1.20	2.5	3.5	4.5	5.6	6.5	7.4	8.2	9.1	9.9	10.7	11.5	12.7	13.8	15.0	16.1	16.9	17.4
1.25	2.5	3.5	4.6	5.7	6.6	7.5	8.4	9.3	10.1	11.0	11.7	12.9	14.1	15.3	16.4	17.2	17.8
1.30	2.6	3.6	4.7	5.8	6.7	7.7	8.6	9.4	10.3	11.2	11.9	13.2	14.4	15.6	16.8	17.6	18.1
1.35	2.6	3.7	4.8	5.9	6.9	7.8	8.7	9.6	10.6	11.4	12.2	13.4	14.7	15.9	17.1	17.9	18.5
1.40	2.7	3.8	4.9	6.0	7.0	8.0	8.9	9.8	10.7	11.6	12.4	13.7	14.9	16.2	17.4	18.2	18.8
1.45	2.7	3.8	5.0	6.1	7.1	8.1	9.0	10.0	10.9	11.8	12.6	13.9	15.2	16.5	17.7	18.6	19.2
1.50	2.8	3.9	5.0	6.2	7.2	8.3	9.2	10.1	11.1	12.0	12.8	14.2	15.5	16.8	18.0	18.9	19.5

WEST STANISLAUS IRRIGATION DISTRICT
WATER SERVICE CHARGES

ALL CHARGES ARE DETERMINED BY THE DISTRICT'S GOVERNING BOARD AND ALL CHARGES IMPOSED ARE THE RESPONSIBILITY OF THE LANDOWNER (WHETHER DISTRICT WATER IS USED OR NOT).

STAND-BY CHARGES OF TWO KINDS

1. Per Acre Stand-by Charge: A per acre charge (per the county assessor maps). Billed to the landowner in two equal installments.

Due: Upon billing. 1st Installment becomes delinquent December 20th of each year for the following year's charge. 2nd Installment becomes delinquent June 20th of each year.

2. Minimum Water Stand-by Charge: A minimum of 2 acre feet of water per acre. Billed in two equal installments.

Due: March 1st or when water is ordered, whichever is first. 2nd installment due June 1st, unless more water than the minimum, as specified, has been used.

NO DISTRICT WATER WILL BE DELIVERED TO ANY LANDS UNLESS THE STAND-BY CHARGES ARE PAID. THE MINIMUM WATER STAND-BY CHARGE SHALL NOT BE TRANSFERABLE.

The landowner is responsible for all charges imposed and if the respective installments are not paid by the date due the District, pursuant to Section 25806 of the Water Code of the State of California will file a lien against the landowner. All liens will accrue a penalty at the rate determined in accordance with the provisions of Section 6621 of the Internal Revenue Code and is subject to change semi-annually.

WATER SERVICE CHARGES FOR 2005 YEAR

$20.00 Per Acre Stand-by Charge

$92.00 Minimum Water Stand-by Charge per acre (2 acre feet of water per acre)

$46.00 Per Acre Foot of water used above the minimum of 2 acre feet

West Stanislaus Irrigation District
C
Measurement Device Documentation

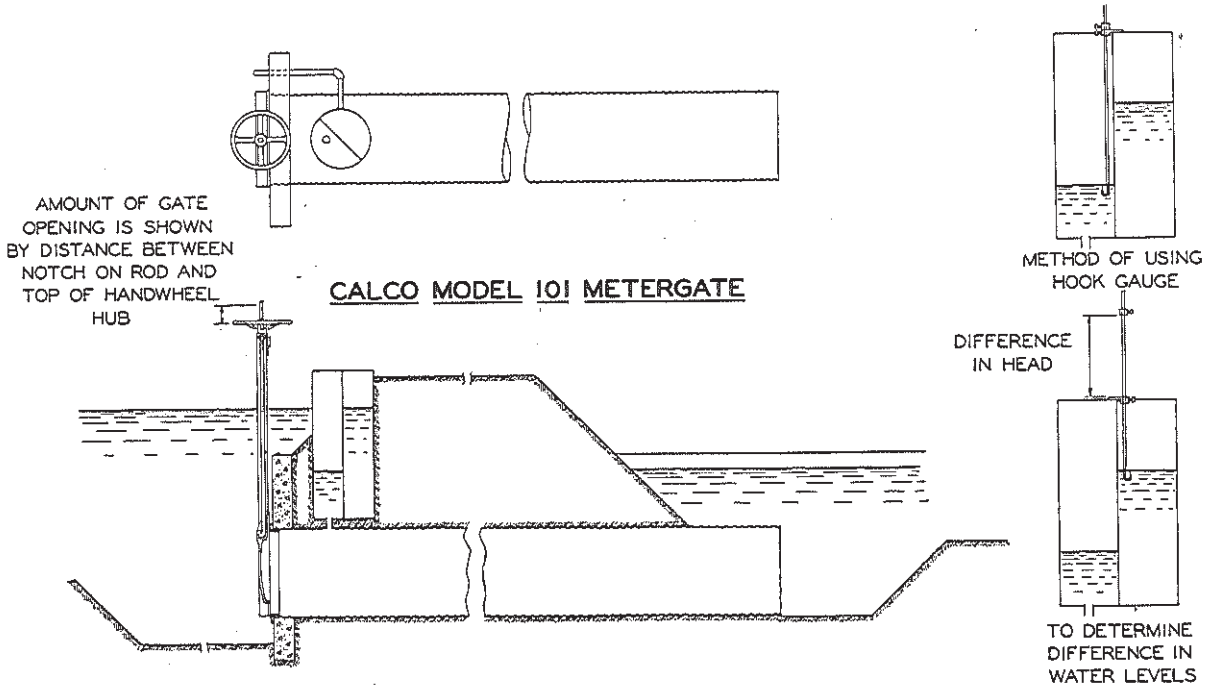


TABLE I—DISCHARGE DATA— 8" CA

Head in Inches	Net Gate Opening in						
	2	2½	3	3½	4	4½	5
	Discharge in Cubic Feet p						
1	.24	.29	.34	.38	.42	.47	.51
1¼	.27	.32	.38	.42	.47	.52	.57
1½	.29	.35	.42	.47	.51	.57	.63
1¾	.32	.38	.45	.50	.56	.62	.68
2	.34	.41	.48	.54	.60	.66	.73
2¼	.36	.44	.51	.58	.64	.71	.77
2½	.38	.46	.54	.61	.67	.75	.82
2¾	.40	.49	.57	.64	.71	.78	.86
3	.42	.51	.60	.67	.74	.82	.90
3¼	.44	.53	.62	.70	.77	.85	.93
3½	.45	.55	.65	.72	.80	.89	.97
3¾	.47	.57	.67	.75	.83	.92	1.00
4	.49	.59	.70	.78	.86	.95	1.04
4¼	.50	.61	.72	.80	.89	.98	1.07
4½	.52	.63	.74	.83	.92	1.01	1.10
4¾	.53	.65	.76	.85	.94	1.03	1.13
5	.55	.66	.78	.88	.97	1.06	1.16
5½	.58	.70	.82	.92	1.02	1.12	1.22
6	.61	.73	.87	.96	1.08	1.16	1.29
6½	.63	.76	.90	1.00	1.11	1.22	1.33
7	.65	.79	.93	1.04	1.15	1.26	1.38
7½	.68	.82	.97	1.07	1.20	1.31	1.43
8	.70	.85	1.00	1.12	1.24	1.36	1.48
8½	.72	.88	1.03	1.15	1.28	1.40	1.53
9	.75	.90	1.07	1.18	1.33	1.45	1.57
9½	.77	.93	1.09	1.22	1.35	1.48	1.62
10	.79	.96	1.12	1.25	1.39	1.52	1.66
11	.83	1.00	1.18	1.32	1.46	1.60	1.75
12	.87	1.05	1.24	1.38	1.53	1.67	1.84
13	.90	1.10	1.30	1.44	1.60	1.75	1.91
14	.94	1.14	1.35	1.50	1.66	1.82	1.98
15	.97	1.17	1.39	1.55	1.72	1.88	2.06
16	1.00	1.23	1.44	1.60	1.79	1.95	2.13
17	1.03	1.26	1.48	1.66	1.84	2.00	2.20
18	1.07	1.30	1.53	1.72	1.90	2.07	2.26

Data derived from Calibration by the Fresno Ir

West Stanislaus Irrigation District
D
District Sample Bill

10/31/2012

West Stanislaus Irrigation District

Post Office Box 37
Westley, CA 95387-0037
(209)894-3091

Account No. 1DEL01

Invoice No. 15409

WESTLEY, CA 95387-0596

Please refer to the Account Number when making payments. Please notify us if you sell your Property.

Group No.	Lateral	Tag Number	Crop	Start Date	End Date	Acre Ft
DD200	3SOUTH	20121470	ALMONDS	10/1/2012	10/13/2012	29.9
TD210	4SOUTH	20121472	ALMONDS	10/1/2012	10/5/2012	18.8
DD100	4SOUTH	20121473	CTOMATO	10/1/2012	10/11/2012	24.5
TD240	4SOUTH	20121475	ALMONDS	10/1/2012	10/20/2012	25.0
DD250	4SOUTH	20121492	ALMONDS	10/3/2012	10/26/2012	60.2
TD210	4SOUTH	20121511	ALMONDS	10/15/2012	10/19/2012	16.0
TD240Z	4SOUTH	20121547	MELONS	10/29/2012	10/31/2012	11.0
						185.4

Assessed 1280.00 **Acre Ft** **Total Due** $89,600.00
1st Installment $44,800.00 **Due** 3/1/2012
2nd Installment $44,800.00 **Due** 6/1/2012

	Acre Ft
Prior Water Used	3253.80
Water Used This Invoice	185.40
TOTAL WATER USED	3439.20
Prior Water Billed	3253.80
Water Billed This Invoice	185.40

Please Remit To:

West Stanislaus Irrigation District
Post Office Box 37
Westley, CA 95387-0037

Tier	Ac Ft	At	Amount
Tier 1	185.40	$70.00	$12,978.00

AMOUNT DUE FOR EXCESS WATER USED $12,978.00

This Invoice Due and Payable Upon Receipt
This account must be cleared prior to additional water

West Stanislaus Irrigation District
E
Groundwater Management Plan

Due to the size of the report the Groundwater Management Plan is Available by Request

West Stanislaus Irrigation District
F
Notices of District Education Programs and Services Available to Customers

You're Invited to Attend

Westside San Joaquin River Watershed Coalition
Fall 2012 Update

Date	Time	Location
Tuesday November 27, 2012	10:00am - 12:00pm plus lunch	Westley Fire Station Westley, CA

Meeting Agenda

10:00 am Welcome and introductions — Joe McGahan, *Watershed Coordinator*

Coalition update — **Joe McGahan**

- Review of water and sediment monitoring results

Irrigated Lands Regulatory Program — **Joe McGahan/Dave Cory**

- Expected new surface program water requirements
- Expected new groundwater program requirements
- Expected new farm reporting requirements
- Estimated costs to administer the program
- Estimated costs for growers to comply with the program
- Questions/comments

Best Management Practices for Westside Ag — **Rich Peltzer/Chester Anderson**

- Grants for BMP installations
- What practices are working best to manage Pesticide runoff

Coalition for Urban Rural Environmental Stewardship/Westside RCD/NRCS

Update on Stanislaus County Pesticide Enforcement — **Gary Caseri**, Stanislaus Co. Agricultural Commissioner

Westside Resource Protection — **West Stanislaus Resource Conservation** District Board member

Next steps discussion: Where do we go from here? — Farmers/PCA's/Applicators/Others

12:00 pm Lunch

2.0 hours of CE credits, laws and regulations, have been applied for.

Sponsored by:

Del Puerto Water District
West Stanislaus Irrigation District
Central California Irrigation District
Patterson Irrigation District
Westside San Joaquin River Watershed Coalition
Coalition for Urban/Rural Environmental Stewardship (CURES)
Stanislaus County Agricultural Commissioner
West Stanislaus Resource Conservation District

Please RSVP by November 16 to
West Stanislaus Irrigation District: 209-894-3091

Expected Key Grower Requirements of the new Long-term Irrigated Lands Regulatory Program
(November 15, 2012)

The overall intent of the Central Valley Regional Board's irrigated lands program is to induce growers to implement management practices to protect water quality. The new program will apply to discharges to both surface water and groundwater. The groundwater component will address waste (i.e. salt, nitrate or pesticides) percolating past the root zone into groundwater. It will not address pumping of groundwater. The Westside coalition program will not be adopted by the Central Valley Regional Board until the fall of 2013. However, based upon other coalitions' draft requirements, the following are likely to be some of the key components of the new program.

- Landowners or operators of all lands within the Westside coalition area will be required to confirm their intent to remain covered by the new program.
- Any lands electing not to be covered by the coalition program will be required to seek individual coverage directly with the Regional Board. Individual coverage will be more expensive than coalition coverage
- Growers will be required to submit to the coalition a Farm Evaluation Plan specifying measures the farm is taking to protect water quality. These plans shall be kept at the farming headquarters and must be provided to the Regional Board upon request.
- Growers will be required to implement managements practices necessary to protect both surface and groundwater quality.
- Growers within the Westside coalition area will be required to attend annual coalition sponsored education/outreach events.
- Growers with the potential to discharge sediment to surface waters during irrigation events or storm events must prepare and implement a Sediment Control Plan.
- Growers within areas vulnerable to nitrate contamination of groundwater must prepare and implement a certified Nitrogen Management Plan summarizing the amount of nitrogen applied to the land and the amount of nitrogen used by the crop.
- Farming operations of less than 60 acres may be given additional time to comply with some of the new program requirements.
- Growers are required to maintain a copy of the Regional Board's irrigated lands general order at the farm headquarters and shall be familiar with the contents of the Order.
- Growers shall permit representatives of the Regional Board, at reasonable hours, to enter premises to inspect, copy, or photograph any records or facilities. Growers shall provide phone numbers to the coalition of individuals with the authority to provide consent to access facilities.
- The Regional Board is likely to continue to increase enforcement actions against growers and landowners that do not obtain regulatory coverage either through the coalition program or the individual program.
- The Regional Board is likely to continue increased enforcement actions against growers and landowners that do not effectively implement management practices to protect the quality of both surface water and groundwater.

UPDATE

August 2012

Westside San Joaquin River Watershed Coalition

A Coalition of Westside water districts and the San Joaquin Valley Drainage Authority providing Irrigated Lands Regulatory Program coverage for farmers and landowners

State Ramping Up Enforcement Efforts
The Regional Board has issued a letter to the Westside Coalition which states that if off-site movement of pesticides is not reduced and water quality objectives are not met, the Regional Water Board will identify individual grower and begin enforcement actions (see attached letter).

The Regional Water Board has assigned field enforcement personnel to travel the Westside Coalition to identify issues. Several farmers have been visited. It is important to work with these field representatives. If questions arise please contact Joe McGahan at 559-582-9237

Chlorpyrifos (Lorsban, Lock-On, Govern, NuPhos) Found Again in Spring 2012
The insecticide chlorpyrifos was again found above standards in April and May in four waterways within the coalition area. Hospital Creek, Blewitt Drain at Highway 132 and Poso Slough near Dos Palos all registered levels in April above the state limits. In May, an exceedance occurred at Marshall Road Drain. Dimethoate insecticide was also found above standards at Newman Wasteway near Hills Ferry Road in April.

Chlorpyrifos in waterways has been an ongoing problem in the Westside Coalition. Likely sources were pesticide applications in alfalfa. The Westside Coalition continues its focused outreach efforts in those areas to raise awareness of the chlorpyrifos issues.

A reminder to use extreme caution when applying chlorpyrifos (Lorsban, NuPhos, Govern, etc.) to alfalfa, walnuts and almonds this summer. Chlorpyrifos exceedances are a concern to the Westside Coalition because multiple waterways in the region are under Management Plans to address past exceedances of the widely used insecticide. The state limit for chlorpyrifos is 15 parts per trillion which means a small amount in a waterway or drain can cause an exceedance. Past detections have been attributed to spray drift leaving fields adjacent to waterways and drains or irrigation drainage after treatments. Effective management practices to prevent chlorpyrifos from entering local waterways:
-- not allowing irrigation drain water to leave a treated field for at least 72 hours, longer if possible;
-- spray when wind is blowing away from adjacent waterways and drains;
-- mix and load away from any waterway or drain.

Outreach Efforts and Program Assistance
The Westside Coalition is continuing its outreach efforts in conjunction with your districts, CURES and the West Stanislaus Resource Conservation District to provide technical assistance for farmers dealing with the water quality issues. The coalition is offering on-farm irrigator training to help farmers explain to employees the importance of proper irrigation drainage management. The meetings are under 30 minutes in length and are geared toward Spanish speaking employees (translators are provided). Contact Rich Peltzer (209-404-2642) or Chester Anderson (209-581-7558) to schedule an irrigator field workshop.

Rich is also continuing coalition member meetings in watersheds with management plans for pesticides. He can often be seen driving around the coalition region in a vehicle clearly marked with Westside Coalition signage. Rich is helping farmers understand their responsibilities and following up on surveys and management practice efforts of the Westside Coalition. Rich and Chester's efforts are not regulatory but to assist farmers. Either can assist Westside growers in navigating the NRCS funding process, be it EQIP or AWEP.

Coalitions Begin Process on New Groundwater Program
The Regional Water Board this spring released the first draft of new regulations that add groundwater to the existing surface water program. Unlike the existing Irrigated Lands Regulatory Program (ILRP), the new

requirements will be developed individually for each of the seven water quality coalitions in the Central Valley. First in line is the Eastside San Joaquin River coalition followed by the rice farmers in northern California and South San Joaquin Valley coalition. Each of the three groups are currently working to refine their draft "Waste Discharge Requirements (WDR)" that will be voted on separately over the next six months. The Westside Coalition is due to get its draft WDR by September 2012 with a Regional Board vote expected in September 2013.

While the Central Valley coalitions were told by the Regional Water Board in 2011 that each WDR would be unique to its crops and conditions, draft WDRs being reviewed by the eastside and south valley coalitions are largely identical in content. And unless something changes, the Westside Coalition will likely see a WDR very similar to those adopted first. The Eastside San Joaquin Coalition is schedule for a Regional Water Board vote in October 2012 with the South San Joaquin expected in February 2013.

Groundwater Vulnerability Classifications
The main difference in coalition WDRs will be the amount of farmland in each region classified as "highly vulnerable" to discharges of sediment or farm inputs to either surface water or groundwater. Classifications for surface water will be based on existing management plans while groundwater vulnerability will be determined using several factors: groundwater protection areas for pesticides (established by the Department of Pesticide Regulations), existing soil classifications by the State Water Resources Control Board and the results of assessments by each coalition of these and other information sources on existing groundwater quality conditions. Farms in high vulnerability areas will have shorter compliance timeframes and increased reporting requirements versus farms in low vulnerability areas.

Watershed Coordinator
Joe McGahan, Summers Engineering
559-582-9237

Westside SJR Watershed Coalition
c/o San Joaquin Valley Drainage Authority
P. O. Box 2157, Los Banos, CA 93635

Grants Provide Support to Growers for BMP Installations
Funding sources are available to growers in the Westside Coalition to help offset the cost of installing farm practices to protect surface water. Some projects can be funded by using a combination of local, state and federal programs.
The programs include:

- USDA Agricultural Water Quality Enhancement Program. AWEP can fund approximately 50% of the statewide average cost for installation of practices to protect water quality. The program is administered through the Natural Resources Conservation Service and applies to Stanislaus, Merced and Madera counties. The next application period for the program, entering its fifth year, is expected in fall 2012.
- The Westside San Joaquin River Watershed Coalition is offering its members a total of $30,000 for constructing new tailwater silt ponds or to clean out existing silt ponds. The program will fund 75% of the costs of any single project, up to a maximum of $6,000 per project. Applications for the funding are available from local water districts or by calling Joe McGahan at 559-582-9237

Coalition Member Districts
Your local water district was instrumental in forming the Westside Coalition. They are committed to assisting landowners and farmers in reaching its goals and include:

- Del Puerto Water District
- Patterson Irrigation District
- San Joaquin River Exchange Contractors Water Authority (including Central California Irrigation District, San Luis Canal Company, Firebaugh Canal Water District, and Columbia Canal Company)
- Tranquillity Irrigation District
- Fresno Slough Water District
- Twin Oaks Irrigation District
- West Stanislaus Irrigation District
- Oak Flat Water District
- Stevinson Water District
- White Lake Mutual Water Company
- Lone Tree Mutual Water Company
- Turner Island Water District
- San Luis Water District
- Grassland Water District and RCD

California Water Boards

Edmund G. Brown Jr.
Governor

Matthew Rodriquez
Secretary for Environmental Protection

Central Valley Regional Water Quality Control Board

12 July 2012

TO: Members of Westside San Joaquin River Watershed Coalition

PREVENTING OFF-SITE MOVEMENT OF PESTICIDES

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) recently evaluated data collected by the Westside San Joaquin River Watershed Coalition (Coalition) to determine compliance with the Irrigated Lands Regulatory Program (ILRP) requirements. Monitoring results indicate that concentrations of chlorpyrifos, malathion, diuron, and other pesticides, and toxicity to invertebrates in water and sediments often exceed acceptable levels. Discharges to local tributaries to the San Joaquin River can impair water quality for downstream users in the Sacramento-San Joaquin River Delta, which is home to a number of endangered and threatened aquatic species and supplies two-thirds of State's residents with drinking water.

All agricultural operations are responsible for preventing pesticides from reaching the waterways and contributing to exceedances of the water quality objectives. The most common pesticide pathways to surface water include irrigation or storm drainage from treated fields or spray drift from applications to fields adjacent to the waterways. Growers can seek guidance regarding effective management practices for preventing off-site movement of pesticides from the Coalition representatives, the University of California Statewide IPM Program and Cooperative Extension, California Department of Pesticide Regulation, Department of Food and Agriculture, or from the U.S. Department of Agriculture Natural Resource Conservation Services.

If off-site movement of pesticides is not reduced and water quality objectives are not met, the Central Valley Water Board will focus enforcement efforts on the affected areas, identifying individual growers that contribute to the problems. Enforcement actions may include requiring growers in the affected watersheds to submit farm-specific management plans to the Central Valley Water Board, issuing monetary fines (up to $5,000 per day or up to $10 per gallon waste discharged; California Water Code § 13350), and/or removing individual growers from the Coalition. If terminated as a Coalition member, growers will be required to obtain individual regulatory coverage and prepare and implement a site-specific monitoring and reporting program. Individual requirements are generally more costly and arduous for growers to comply with. Other mitigation measures that may be considered include requesting the County Agricultural Commissioners to designate certain chemicals of concern as permit materials.

If you have any questions regarding this letter, please contact the ILRP at (916) 464-4677 or IrrLands@waterboards.ca.gov and staff will contact you within two business days.

Joe Karkoski, Program Manager
Irrigated Lands Regulatory Program

Susan Fregien, Unit Supervisor
Monitoring and Implementation Unit
Irrigated Lands Regulatory Program

WATERSHED COALITION News

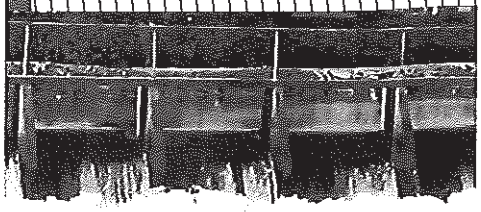
INFORMATION FOR CENTRAL VALLEY AGRICULTURE

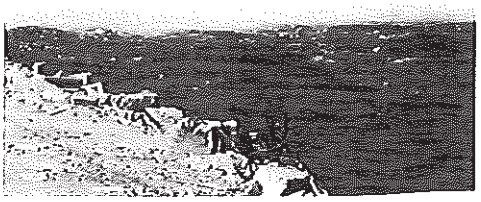
GROUNDWATER REGULATION SPECIAL ISSUE

SUMMER 2012

SOUTH VALLEY

IN THIS ISSUE





Groundwater Regulations Taking Shape

Central Valley growers got their final shot in August at shaping groundwater regulations for the East San Joaquin Water Quality Coalition (eastside coalition) region. The Regional Water Board on July 6 released a public review draft of the "General Order" that spells out new requirements for the eastside coalition. Comments were due August 6.

This coalition is the first of seven agricultural third-party entities working through the process of developing individual General Orders or Waste Discharge Requirements (WDR) over the next two years. Each coalition's Order will be voted on individually by the sitting Water Board with a vote on the eastside coalition set for October 4, 2012.

A Regional Board workshop on June 7 focused on the draft eastside coalition order revealed that Board members want to see a program that has accountability but is not overly burdensome for farmers. Community water activists are pushing for reporting of individual farm and fertilizing practices while farmers counter that the proposed reporting requirements create excessive paperwork with little improvement in water quality.

The draft WDR and workshop are the culmination of more than five years of activities devoted to developing what is called the Long Term Irrigated Lands Regulatory Program (ILRP). A programmatic Environmental Impact Report (EIR) was adopted by the Regional Board in June 2011, setting the stage for drafting the WDRs by Regional Water Board staff. Agricultural organizations got a preview in 2010 of what the WDR might contain when the Regional Board and stakeholders developed five potential options or approaches for the comprehensive regulations (WCN Spring 2010 issue). The draft WDRs now being considered take elements from each of those options.

As expected, legal action has already been taken against the programmatic EIR by activist and farm groups. California Sport Fisherman's Alliance (CSPA) filed an action in superior court, demanding that the EIR be invalidated and that all future actions be stopped until the EIR is revised and recirculated. In their lawsuit, CSPA argues that the EIR and the existing Conditional Waiver are inadequate because they fail to require individual farm reporting and individual farm monitoring. CSPA continues to argue that the coalitions are inappropriate in the role that they play and that there should be more direct, public reporting between individual growers and the Regional Board.

While the Regional Board claimed that each coalition would develop WDRs unique to their geography and conditions, documents released so far are for the most part identical to the eastside coalition WDR. The administrative draft for the South San Joaquin Water Quality Coalition released on July 7 had no substantial differences in key requirements for coalition members compared to the eastside coalition draft WDR. All other Central Valley Coalitions will be receiving initial draft WDR documents before the end of 2012.

Timelines for Central Valley Coalition WDR*

ENTITY	PUBLIC COMMENT	BOARD VOTE
EAST SAN JOAQUIN WATER QUALITY COALITION	JULY 2012	OCTOBER 2012
CALIFORNIA RICE COMMISSION	AUGUST 2012	DECEMBER 2012
SOUTH SAN JOAQUIN WATER QUALITY COALITION	OCTOBER 2012	FEBRUARY 2013
SACRAMENTO VALLEY WATER QUALITY COALITION	FEBRUARY 2013	JUNE 2013
WESTLANDS WATER DISTRICT	MAY 2013	AUGUST 2013
SAN JOAQUIN COUNTY AND DELTA COALITION	AUGUST 2013	OCTOBER 2013
WESTSIDE SAN JOAQUIN RIVER WATERSHED COALITION	AUGUST 2013	OCTOBER 2013

SUBJECT TO CHANGE

Published by
Coalition for Urban/Rural Environmental Stewardship
www.curesworks.org
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Editor: Parry Klassen
pklassen@unwiredbb.com

Is Your Farmland "Vulnerable?"

All irrigated farmland in the Central Valley covered by the proposed Waste Discharge Requirements will eventually be classified into two broad categories: high vulnerability and low vulnerability areas. These terms describe the potential risk of discharges of sediment or farm inputs to either surface water or groundwater.

Classifications for surface water will be based initially on existing management plans while groundwater vulnerability will be determined by using several factors including, but not limited to: physical conditions of the area (soil type, depth to groundwater, beneficial uses, etc.); water quality monitoring data; and farming practices (pesticide permit and use conditions, label requirements, application methods, etc.). Additional information such as models, studies and other data collected may also be considered in designating the level of vulnerability.

An initial requirement for coalitions is to prepare a "Groundwater Assessment Report." This report will be a compilation of all existing information about groundwater vulnerability in their region. High vulnerability will likely be designated to:

- areas already under groundwater protection programs for pesticides set by the California Department of Pesticide Regulations;
- areas already classified as such by the State Water Resources Control Board;
- the results of assessing additional information sources on existing groundwater quality;
- hydrogeological conditions and other factors such as areas of high fertilizer use.

According to the draft WDR, a high vulnerability designation occurs where "available information indicates irrigated lands could cause or contribute to an exceedance of water quality objectives or degradation of groundwater quality that may threaten applicable beneficial uses." Conversely, low vulnerability areas for groundwater do not exhibit characteristics of high vulnerability groundwater areas.

In each assessment report, coalitions will propose vulnerability designations that may be refined and updated periodically. The Regional Water Board will ultimately make the final determination of vulnerability. Based on the draft WDR, farms in high vulnerability areas will have shorter compliance timeframes and increased reporting requirements versus farms in low vulnerability areas.

Farm Evaluation Characterizes Management Practices

A new requirement for all coalition members under the draft Waste Discharge Requirements (WDR) is prepare a farm evaluation. A completed evaluation will list and describe all the management practices implemented by a grower to protect surface and groundwater quality. Included in the evaluation will be information such as location of the farm, surface water discharge points, location of irrigation wells and abandoned wells and types of wellhead protection practices.

According to the draft WDR being considered for the East San Joaquin Water Quality Coalition, the farm evaluation template is proposed to be developed with Regional Water Board staff working with coalitions, commodity groups, technical service providers and other interested stakeholders. Once developed and approved, farm evaluations will need to be completed and returned to the coalition for compilation. A copy will also need to be kept at a farm headquarters and be available should a Regional Board inspector request the evaluation.

Regional Water Board staff justify in the draft WDR why all members need to complete the evaluation as follows:

- It provides the Water Board with information on individual member implementation of WDR requirements;
- Without this information, the board would rely solely on regional surface and groundwater monitoring to determine compliance with water quality objectives;
- Regional monitoring cannot determine whether all members are implementing protective practices, such as wellhead protection measures for groundwater.
- Regional monitoring does not allow identification of which practices are protective in areas where impacts are observed and multiple practices are employed. For groundwater protection practices, it may take years in many areas (even decades in some areas) before broad trends in groundwater may be measured and associated with implementation of the WDR.
- Farm evaluations will provide assurance that members are implementing management practices to protect groundwater quality while well trend data are collected.
- Reporting of practices will allow the coalition and board to evaluate changes in water quality relative to changes in practices. Absent such information, it will be difficult to determine how effective practices are in protecting surface water and groundwater quality.

A farm's location in a high or low vulnerability area will dictate the frequency of updating or revising the farm evaluation.

Sediment and Erosion Control Plans Mandated

Should a field have the potential to discharge irrigation drain water or have frequent storm water runoff, coalition members will be required to have a sediment and erosion control plan certified by a qualified engineer. This mandate is aimed at farms classified as highly vulnerable to surface water discharges. Many of these watersheds and farms have already been identified through a management plan triggered by sediment or pesticide exceedances found in coalition monitoring of a waterway.

Coalitions are expressing concerns in comment letters to the Regional Water Board about requiring that sediment and erosion control plans be written and certified by a qualified sediment and erosion control plan developer. A plan developer would need to be one of the following:

- professional civil engineer;
- professional geologist or engineering geologist;
- landscape architect;
- professional hydrologist;
- certified professional in erosion and sediment control; or
- certified professional in storm water control.

Coalitions or their members can seek assistance in plan development from the Natural Resources Conservation Service or the University of California Cooperative Extension but need to retain written documentation of the recommendations. Currently, neither NRCS or UC provide certification of plans.

According to the draft WDR, "Requiring that qualified personnel develop these plans is consistent with the State Water Board's Construction Stormwater Program."

Annual Nitrogen Budgets To Track Use Efficiency

Groundwater contamination by nitrates has been documented in many regions of the Central Valley. Nitrate sources vary by site and could originate from fertilizers, animal manures, rural septic systems, water treatment plants and other sources.

Gathering information on agriculture's potential contribution to nitrates in groundwater – or its protection from contamination -- is the goal of the annual nitrogen budgets. Rather than reporting total nitrogen fertilizer applied, the budget is intended to take into account the amount of nitrogen needed to produce a viable crop and compare it to the actual amount applied in fertilizer, manure or compost. A draft nitrogen budget being circulated by the East San Joaquin Water Quality Coalition uses a ratio that is calculated by comparing crop need to the nitrogen applications for producing that crop. A ratio of "one" means the amount of nitrogen applied equals the amount of nitrogen consumed for crop production.

Similar to farm evaluations and sediment and erosion control plans, the Regional Water Board intends to work with coalitions, commodity groups and others to develop the nitrogen budget template. Key components will include nitrogen application timing, consideration of organic nitrogen fertilizer, consideration of irrigation water nitrogen levels, meeting crop nitrogen requirements and crop yield potential. The stated goal in the draft WDR is that coalition members implement practices that minimize excess nitrogen applications relative to predicted crop need and minimize nitrate movement through surface runoff and leaching past the root zone.

In the current draft WDR, coalition members are required to complete an annual nitrogen budget for the upcoming crop year and final nitrogen applications for the previous crop year. Budget sheets must be kept at a member's farming headquarters.

In areas designated highly vulnerable because of nitrate contamination, members will be required to submit their nitrogen budgets to the coalition each year for compilation and reporting to the Regional Water Board. Growers in those areas will also be required to have nitrogen budgets signed by a certified nutrient management plan specialist. Certified nutrient management plan specialists listed in the draft WDR include Professional Soil Scientists, Professional Agronomists, Certified Crop Advisors (CCA) or Technical Service Providers certified in nutrient management in California by the NRCS. A member will be able to self-certify a nitrogen budget if they attend a training program for nutrient management from the California Department of Food and Agriculture or other entities approved by the Regional Water Board.

As stated in the draft WDR, "Nitrogen budget reporting will provide assurance that coalition members are managing nutrients to protect groundwater quality while trend data are collected."

Ask the Water Board

Watershed Coalition News asks readers to pose questions to the Water Board. The question this issue is answered by Joe Karkoski, Program Manager, Central Valley Regional Water Quality Control Board.

What are the goals of the new Irrigated Lands Regulatory Program?

We had numerous stakeholder meetings over the last several years to plan this program and there was general agreement on the goals. Understanding that irrigated agriculture in the Central Valley provides valuable food and fiber products to communities worldwide, the overall goals of the new orders are to:

1. restore and/or maintain the highest reasonable quality of state waters considering all the demands being placed on the water;
2. minimize waste discharge from irrigated agricultural lands that could degrade the quality of state waters;
3. maintain the economic viability of agriculture in California's Central Valley; and
4. ensure that irrigated agricultural discharges do not impair access by Central Valley communities and residents to safe and reliable drinking water.

What are the objectives of the General Orders or Waste Discharge Requirements?

- Restore and/or maintain appropriate beneficial uses established in Central Valley Water Board water quality control plans by ensuring that all state waters meet applicable water quality objectives.
- Encourage the implementation of management practices that improve water quality in keeping with the first objective without jeopardizing the economic viability for all sizes of irrigated agricultural operations in the Central Valley or placing an undue burden on rural communities to provide safe drinking water.
- Provide incentives (i.e., financial assistance, monitoring reductions, certification, or technical help) for agricultural operations to minimize waste discharge to state waters from their operations.
- Coordinate with other Central Valley Water Board programs;
- Promote coordination with other regulatory and non-regulatory programs associated with agricultural operations to minimize duplicative regulatory oversight while ensuring program effectiveness.

What are the farm performance standards in the draft WDR?

Selection of practices must be considered on a farm by farm basis but coalition members must achieve performance standards including:

- minimize waste discharge offsite in surface water;
- minimize or eliminate the discharge of sediment above natural background levels;
- minimize percolation of waste to groundwater;
- minimize excess nutrient application relative to predicted crop need;
- prevent pollution and nuisance;
- achieve and maintain water quality objectives and beneficial uses;
- protect wellheads from surface water intrusion.

Coalition for Urban/Rural Environmental Stewardship
531-D North Alta Ave.
Dinuba, CA 93618-3203

Enrolling in the New Program

Once the Regional Water Board adopts a WDR for a coalition, the process of enrolling members begins. If the WDR is adopted in its current form, existing coalition members will be grandfathered into the new program but will be required to sign and submit a "notice of confirmation" to the coalition acknowledging their willingness to continue membership in the coalition and stating that they are familiar with the new WDR requirements. Those notices must be submitted to the coalition within 120 days after the Regional Board approves that coalition's ability to represent growers (each coalition is required to reapply for that ability). Growers who lease land or manage for absentee landowners will also be required to notify their landlords about the WDR requirements. Confirmation of that notification must be provided to the coalition.

Growers not currently enrolled in a coalition will have 120 days to apply for membership to the entity encompassing the region they farm (unless they plan to file for an individual WDR). The 120-day period will be a "membership holiday" where growers will not have to apply first to the Regional Water Board and pay an application fee as is currently the case. Growers who do not enroll within the 120-day grace period will have three requirements: 1) send the Regional Water Board a Notice of Intent (NOI) to comply with the terms and conditions of the Order; 2) pay an administrative processing fee; and 3) submit a membership application to the third-party group (or file for an individual WDR).

Unchanged for the new WDR is the coalition requirement to submit an annual membership list to the Regional Water Board. This list specifies members in good standing, revoked memberships or pending revocations. Regional Board says it will conduct enforcement activities as needed based on the list of revoked/pending revocations.

Sacramento Valley Water Quality Coalition Contact Information

Sacramento Valley

Sacramento Valley Water Quality Coalition
(also Sacramento Valley subwatershed contacts)

Bruce Houdesheldt
bruceh@norcalwater.org

Northern California Water Association
916-442-8333
www.norcalwater.org

California Rice Commission

Tim Johnson
916-929-2264
www.calrice.org

San Joaquin Valley & Delta

San Joaquin County &
Delta Water Quality Coalition

Michael Wackman
209-472-7127, ext. 125
michaelkw@msn.com

Westside San Joaquin River Watershed Coalition

Joseph C. McGahan
559-582-9237
jmcgahan@summerseng.com

East San Joaquin Water Quality Coalition

Parry Klassen
Coalition for Urban/Rural
Environmental Stewardship
559-288-8125
pklassen@unwiredbb.com

Wayne Zipser
Stanislaus County Farm Bureau
209-522-7278
WayneZ@stanfarmbureau.org
www.esjcoalition.org

Southern San Joaquin Valley Water Quality Coalition
David Orth
Kings River Conservation District
559-237-5567
dorth@krcd.org
www.krcd.org

Westlands Water District
Sue Ramos
552-241-6215
sramos@westlandswater.org
www.westlandswater.org

Westside San Joaquin River Watershed Coalition

Nov 27, 2012 Westley Meeting

SIGN IN SHEET

1. Eric Winter
2. Salvador Anaya
3. Bruno Pasquinelli
4. Paul Santoro
5. Patrick Alves
6. Bill Vee
7. [illegible]
8. David J. Silva
9. [illegible]
10. Ramsey Pcor
11. X Rajinder Bhatia
12. X [illegible]
13. [illegible]
14. [illegible]
15. [illegible]
16. [illegible]
17. Dan Robinson
18. [illegible]
19. Matt Cox
20. GREG PORTER
21. Peter Rietkerk
22. HEN PEREZ
23. DAVE SANTOS
24. Joe Martini
25. JAKE BREUGEM
26. DEDRICK STEL
27. [illegible]
28. Sylvia Wright
29. [illegible]
30. John Casey
31. [illegible]
32. [illegible] VanKriesen
33. Jeff Shut
34. Ray Flanders
35. Ed Martin
36. Greg Garro
37. John Hansen
38. Anthea Hansen
39. Julie B. Lara
40. Craig Moore
41. Lisa Adams
42. Frank M Bowers Jr
43. Lorna D. Marchetta
44. Daniel Roberts
45. Joe Nijskens
46. David Pizzanelli
47. Ruth Pizzanelli
48. Bobby Yamamoto
49. Myron Jamasel
50. Tom Maring

51. Rob Brooks
52. Melissa Magee
53. Jarod Lara
54. Daniel Bays
55.
56.
57.
58.
59.
60.

West Stanislaus Irrigation District
G
District Agricultural Water Order Form

WATER ORDER

WATER USER _____ **TAG #**

ACCOUNT # _____

CROP _____ **FIELD #** _____

IRRIGATION METHOD: _____ FLOOD

_____ DRIP/MICRO

ORDERED BY _____

TIME _____ AM PM DATE _____

RECEIVED BY _____

DAY _____ **AM** **PM**

DATE _____

_____ **NORTH** _____ **SOUTH**

_____ **GATE / PUMP**

_____ **START** _____ **C.F.S.**

_____ **INCREASE** _____ **C.F.S.**

_____ **MOVE** _____ **C.F.S.**

_____ **CUT** _____ **C.F.S.**

_____ **ALL OFF** _____ **C.F.S.**

West Stanislaus Irrigation District
H
District Capital Improvement Project 10 Year Plan

West Stanislaus Irrigation District Draft Capital Improvement Project 10 Year Plan

Projects	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
~~Upgrades/Capacity Increase at Sta #6 (New MCC, VFD, SSS, SCADA)~~	~~$ 350,000~~										
~~DMC Pump In W/ Diesel Pumps~~	~~$ 174,000~~	$ -									
Fish Screen Project Feasibility	~~$ 150,000~~	~~$ 170,000~~	$ 110,000								
Fish Screen Design, Envir & Permit		-------									
Fish Screen Construction											
~~Main Canal SCADA/Automation - Phase I (Design & Planning)~~	~~$ 50,000~~										
~~Main Canal SCADA/Automation - Phase II (Imp. Station 1, 5, 6, lat 2S,6S)~~		~~$ 340,000~~									
Main Canal SCADA/Automation Phase III (Imp. Station 3 & 4)			$ 52,000								
Main Canal SCADA/Automation - Phase IV (Imp. Lat 3N,3S,4N,4S,5N,5S,6N,6S)			$ 400,000								
Main Canal SCADA/Automation - Phase V (Main Canal Emergency Spill)				$ 376,000							
Station #5 Upgrades (New MCC, VFD, SSS, SCADA)		~~$ 290,000~~									
Main Canal Modernization Phase I (Sta 1A Design, Env. Comp., & Permitting)			$ 370,000								
Main Canal Modernization Phase I (Sta 1A Construction)			$ 4,000,000	$ 8,000,000							
Main Canal Modernization Phase II (Sta 3A Design & Contract Docs)				$ 280,000							
Main Canal Modernization Phase II (Sta 5A Construction)					$ 9,500,000						
Main Canal Modernization Phase III (Sta 3A Construction)						$ 9,500,000					
Construct O&M Facility					$ 500,000	$ 1,000,000					
Install New Line at Lateral 6N (1,500 LF)			$ 60,000								
Install Blewett Drain Pipeline to Lat. 4-North to collect spill water				$ 45,000							
Repair/Resurface Main Canal O&M Roads					$ 410,000						
Replace Gantry Cranes in Pump Stations #5 and #6			$ 64,000								
Replace Gantry Cranes in Pump Stations #1, 2, 3 & 4				$ 140,000							
Concrete Lining Upgrades (Grant Match)						$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000
Repair/Gravel Lateral Roads (6 mi./yr.)						$ 115,000	$ 115,000	$ 115,000	$ 115,000	$ 115,000	$ 115,000
Lateral 4-North Regulatory Reservoir											
Total Annual Cost:	***$ 724,000***	***$ 3,300,000***	***$ 8,201,000***	***$ 9,561,000***	***$ 10,745,000***	***$ 10,915,000***	***$ 415,000***	***$ 415,000***	***$ 415,000***	***$ 415,000***	***$ 415,000***
10 Year Running Average Cost:	$ 4,552,100	$ 4,552,100	$ 4,552,100	$ 4,552,100	$ 4,552,100	$ 4,552,100	$ 4,552,100	$ 4,552,100	$ 4,552,100	$ 4,552,100	$ 4,552,100

West Stanislaus Irrigation District
I
Example of Financial Incentive Program Notification

Cures

Coalition for Urban/Rural Environmental Stewardship
www.curesworks.org

Attention Landowners & Growers

$8 million in new State funding for BMP installations

75% funding / 25% match for projects in fields adjacent to these waterways:

- **Orestimba Creek**
- **Del Puerto Creek**
- **Westley Wasteway**
- **Ingram Creek**
- **Hospital Creek**

The State Water Resources Control Board recently approved **$8 million** in Proposition 84 funding for 2011-12 for grants to improve water quality of waterways in the Central Valley. The highest ranked projects will be those on farms adjacent to waterways listed above (in Merced and Stanislaus Counties) and regularly have irrigation drainage. Funding pays 75% of a project cost; the applicant must cover the remaining 25%.

Where does the money come from? The Proposition 84 Agricultural Water Quality Grant Program passed by state voters in 2006. Funds pass through the State Water Resources Control Board as a grant to CURES, who manages the applications, contracts and project payments. A review panel, whose members represent state agencies, watershed coalitions, NRCS and CURES, ranks and makes recommendations on projects to be funded. Central Valley Regional Water Board gives final approval. Some projects may be eligible to use EQUIP or AWEP funding by Natural Resource Conservation Service (NRCS) to offset some of the 25% match requirement.

What types of projects can be funded? High priority projects include irrigation tailwater recirculation systems, irrigation drainage sediment basins and depending on location and crop, drip irrigation systems. Larger community (multi-farm/group project) systems can also be funded.

What are the requirements for receiving funds? Applications will be accepted from landowners with lands along waterways with management plans in place by the local watershed coalition and located in the northern San Joaquin Valley, San Joaquin County/Sacramento Rivers Delta and southern Sacramento Valley. Once approved by the projects review panel, the landowner must sign a project contract with CURES. The payment rate is 75% of the total cost of the project and is paid at project completion (reimbursement of expenses). Any combination with NRCS funding must be directed by the local NRCS office. Priority for the funding will be given to fields located in watersheds with existing Management Plans (those listed above) that have frequent irrigation or storm water drainage.

When can growers begin applying? Immediately! The application deadline is July 1, 2011. Go to our website for the application at http://www.curesworks.org/bmp/prop84.asp or call me at the number below.

If you have questions about the application process or have a project in mind, contact me at the number below or

Thanks,

Parry Klassen
Executive Director
559-288-8125

WEST STANISLAUS IRRIGATION DISTRICT

116 E Street
Post Office Box 37
Westley, CA 95387

209/894-3091
209/894-3383 fax
wsid@gvni.com

September 18, 2012

Westside Growers:

The West Stanislaus Irrigation District, through West Stanislaus Resource Conservation District (Conservation District), is applying for funds from the Natural Resources Conservation Service to address the conservation goals of: water quality, water conservation and wildlife. The issues that primarily need to be addressed on the Westside include control of pesticides and sediment to protect water resources and wildlife and to assist growers in complying with State regulations.

It is important that the Conservation District understand the degree to which Growers need assistance to comply with the upcoming regulations of the Long Term Irrigated Lands Program. More information about this Program may be found at www.wsrcd.org.

Below is a draft list of conservation practices that have been effectively put in place by Growers to improve operations and comply with the regulations. Please let Chester Anderson of the Conservation District know what type of demand you might have for the following types of practices and for any other practice that you see might be relevant.

Conservation Practice	Please provide a rough estimate of the acreage the practice needs to cover in your area.	Please provide a rough estimate of the total cost to implement the practice in your area.
Tail water return systems		
Sub-surface drip		
Sprinkler systems		
Sediment basins		
Use of Polyacrylamide (PAM)		
Smart sprayers for pesticides		
Wetland systems for filtration of sediment		
Creek setbacks and filter strips		
Surface Drip		
Others:		

Time is of the essence. Please submit your information directly to the West Stanislaus Irrigation District office no later than September 26, 2012. If you have questions, you can contact Mr. Anderson directly via email (chester@eaststanrcd.org), phone (209-581-7558) or mail: 3800 Cornucopia Way, Suite E, Modesto, CA, 95358.

Thank you for your feedback.

Bobby Pierce, P.E.
General Manager
West Stanislaus Irrigation District

West Stanislaus Irrigation District
J
WSID Main Canal Renovation Feasibility Study

West Stanislaus Irrigation District

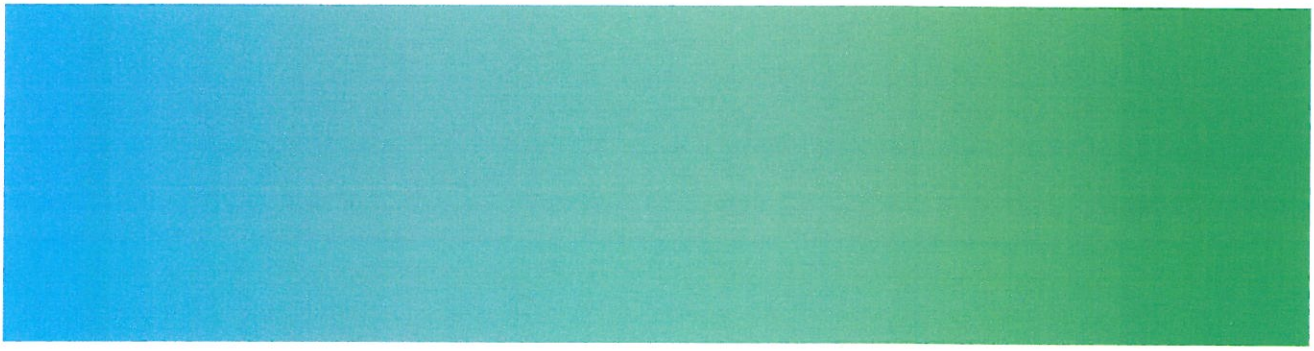
Main Canal Renovation Feasibility Study

July 2011

AECOM

Main Canal Renovation Feasibility Study

West Stanislaus Irrigation District



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July 2011

West Stanislaus Irrigation District

Robert Pierce, PE, General Manager

AECOM

Robert Stoddard, PE, Principal-in-Charge

1360 East Spruce Avenue, Suite 101, Fresno, CA 93720

Table of Contents

Figures

Section 1
Introduction

1.1 Project Purpose

In accordance with our scope of services included in our January 2011 proposal, AECOM has prepared this Main Canal Renovation Feasibility Study (Study) to evaluate and determine the feasibility of renovating the section of the West Stanislaus Irrigation District (WSID or District) Main Canal water conveyance system from the San Joaquin River (SJR) intake channel to the proposed Pump Station 5A (Station 5A). As originally designed and constructed, the existing conveyance system was sized to divert the full amounts available to the district under its water right license from the SJR (262 cubic-feet per second (cfs)) as well as the 45 cfs WSID is obligated to provide to White Lake Mutual Water Company, and to convey the full 262 cfs of WSID entitlement throughout the entire District. Building on previous studies, this Study explores various alternatives to restore and renovate the Main Canal system from Station 1 to the proposed Station 5A which is being installed to convey SJR diversions from the Main Canal to the Delta-Mendota Canal (DMC). In this Study, the term renovation means to upgrade, restore and/or replace the existing facilities to provide a cost effective, efficient and reliable means for WSID to deliver water to existing District laterals which serve the lands within the District and to provide pumping capacity to deliver SJR water through District facilities to Station 5A for further conveyance to the DMC during low demand periods.

1.2 District Background

The District was established in 1920 for the purpose of providing water for area farmers to grow crops in the San Joaquin Valley. The District diverts 262 cfs per their water right for irrigation from the SJR between Mendota Pool and Vernalis in accordance with their License Number 3957 (Permit 2758, Application 1987). The District's Point of Diversion is described as north twenty nine degrees fifty minutes east (N29d50E), nineteen thousand two hundred ninety (19,290) feet from W ½ corner of Section 28, T4S, R7E, Mount Diablo Base and Meridian (MDB&M), being within the SE ¼ NE ¼ of Section 10, T4S, R7E MDB&M.

The District serves an area that is unincorporated and agricultural, located west of the SJR, northwest of the City of Patterson, and includes the unincorporated communities of Westley, Grayson and Vernalis. A small portion of the district extends into San Joaquin County. District boundaries include approximately 21,676 acres. The District provides its customers with irrigation water for agricultural purposes. This water is provided via several sources including surface water from the Tuolumne and San Joaquin Rivers, groundwater from four deep wells within the District's boundaries, and importing water from the Central Valley Project (CVP).

In addition, the District is obligated by a 1938 agreement to divert at its diversion point on the SJR, 45 cfs of riparian water for irrigation of approximately 2,207 acres of riparian land adjacent to the District, known as the White Lake Mutual Water Company (north of the unincorporated community of Grayson). That agreement is still binding between the parties, and imposes upon WSID the continuing obligation to dedicate 45 cfs of pumping capacity to the adjacent riparian lands. This was confirmed by a State Water Resources Control Board September 11, 1941 Memorandum of Field Visit stating: ". . .the district is obligated to supply up to 45 cfs to the Burkhard property by an agreement since 1928 and merely acts as a transporting agent for this water which is under riparian and an old appropriative right."

The District also receives CVP water annually from the DMC per their contract 14-06-200-1072-LTR. The contract provides for delivery of 50,000 AF of project water used to supplement crop delivery requirements from March 1 through February 28 annually. The crops grown in the District service area are primarily row crops, including alfalfa, almonds, apricots, beans, and tomatoes. The average farm size in the District is about 160 acres.

1.3 Existing Conveyance System Configuration

The Main Canal conveyance system is located within the WSID, near Westley, California. The existing conveyance system was originally constructed in the late 1920s to convey water from the SJR for agricultural irrigation. In the early 1950s modifications were incorporated into the system to enhance supplies by delivering water from the DMC through a gravity connection at the west end of the Main Canal. In addition, the District owns five wells, of which four are currently pumped into the Main Canal to supplement water supplies. Well 5 is no longer in service. Many of the Main Canal structures have been in service for over 80 years. The Main Canal is approximately three miles in length and consists of a series of 6 vertically separated concrete lined canals (reaches) interconnected by pump stations designed to lift water from the SJR intake channel into the Main Canal for irrigation delivery. The first pump station lifts water from the intake channel approximately 30 feet into the Main Canal. Each subsequent pump station lifts the water approximately 20 feet for a total vertical lift of approximately 130 ft. The pump stations are sequentially designated by WSID as Station 1 through Station 6 from east to west along the Main Canal, with Station 1 being located on the SJR intake channel and Station 6 at the head of the westernmost reach. For the purposes of this Study, the reaches of the Main Canal have also been similarly designated Reach 1 through Reach 6, based on the pump station number at the head of the reach. For example, Station 1 lifts water from the SJR intake channel to Reach 1, Station 2 lifts water from Reach 1 into Reach 2, Station 3 lifts water from Reach 2 into Reach 3, etc.

A series of existing laterals (open channel and pipelines) distribute water from the Main Canal to lands within the District's service area. Two laterals are connected to each reach of the Main Canal; one lateral distributing water to the north of the Main Canal and one lateral distributing water south of the Main Canal. All water deliveries made from the first reach are delivered to the White Lake Mutual Water Company and portions of water deliveries made from the second and third lifts are also made to the White Lake Mutual Water Company for a combined delivery rate of 45 cfs. All other deliveries are made to WSID.

Also, along the intake channel, which ends at Pump Station 1, there are four small pumps with capacities of 10 cfs each owned by United States Fish and Wildlife Service (USFWS) used to irrigate the riparian habitat maintained on the San Joaquin River National Wildlife Refuge.

Figure 1 shows the project location and general layout of the Main Canal facilities, including District owned wells.

1.4 Planned Projects

Based on the Main Canal – Delta Mendota Canal Intertie, Project Concept Development Study (AECOM 2010a), plans and specifications are in development to restore and enhance the Main Canal system by constructing a new pump station, designated Station 5A, and associated 96-inch pipeline designed to deliver 250 cfs from the end of Reach 4 to the DMC. The proposed improvements will also be capable of delivering water to Reaches 5 and 6 in the event either Station 5 or 6 fails to perform as needed. These improvements will enable up to 78,000 acre-feet per year (afy) of water from the SJR to be diverted to the DMC during low demand periods in addition to providing the required capacity to meet District demands.

Additionally, as recommended in the Pump Station 1 Rehabilitation or Replacement Study (AECOM 2010b), Station 1 should be replaced to maintain and restore the District's ability to divert approximately 307 cfs from the SJR (262 cfs pursuant to WSID license and 45 cfs for White Lake Mutual Water Company). An additional 43 cfs of redundant pumping capacity will be built into the system to accommodate pump wear and potential pump failures during peak irrigation season for a combined capacity of 350 cfs.

Section 2
Project Alternatives and Constraints

2.1 Conceptual Project Alternatives

As noted in the Pump Station 1 Rehabilitation or Replacement Study (AECOM 2010b), before proceeding with the replacement of Station 1, the plan for renovation of the Main Canal system between Station 1 and proposed Station 5A must be formulated. There are several possible alternatives for renovation. These conceptual alternatives are presented below.

1. Alternative 1. Construct a new Station 1 (Station 1B) and pipeline (Station 1B Pipeline) to convey water from the SJR intake channel to Reach 4 with metered turnouts to serve Laterals 1N, 1S, 2N, 2S, 3N and 3S. The pipeline would be approximately 120 inches in diameter and decrease to approximately 108 inches after the turnouts to Laterals 2N and 2S. Existing Stations 1 through 4 would be abandoned and use of Reaches 1, 2 and 3 of the Main Canal would be maintained for conveyance of DMC water and groundwater. Modifications to District wells may be made to allow groundwater to be pumped directly into the Station 1B Pipeline. Alternative 1 is depicted on Figure 2.

2. Alternative 2. Combination of new pipeline and existing channel conveyance and two new pump stations. A new Pump Station 1 (Station 1A) would convey water to Reach 2 through an approximately 120-inch pipeline (Station 1A Pipeline) with metered turnouts to serve Laterals 1N and 1S. A new Pump Station 3 (Station 3A) would convey water from Reach 2 to Reach 4 through an approximately 108-inch pipeline (Station 3A Pipeline) with metered turnouts to serve Laterals 3N and 3S. Existing Pump Stations 1 through 4 would be abandoned and Reaches 1 and 3 of the Main Canal would be maintained for conveyance of DMC water and groundwater. Modifications to District wells may be made to convey pumped groundwater directly into the Station 1A Pipeline and Station 3A Pipeline. Alternative 2 is depicted on Figure 3.

3. Alternative 3. Maintain the current configuration of the Main Canal system with some minor upgrades, and completely replace Stations 1 through 4. Alternative 3 is depicted on Figure 4.

4. Alternative 4. Maintain the current configuration of the Main Canal system with some minor upgrades, and restore Stations 1 through 4. Alternative 4 is depicted on Figure 5.

2.2 Project Alignment Constraints

The following is a discussion of some of the constraints that may affect the installation of new pumping and conveyance facilities along the Main Canal alignment. Figures 6 through 9 show the approximate locations of existing WSID facilities and right-of-way (ROW) and the physical features which may constrain the location and construction of new facilities.

2.2.1 Right-of-Way

Based on Book 016 of the Stanislaus County Assessor Parcel Maps, the Main Canal ROW is 150 feet wide west of State Route 33 (SR-33), and 160 feet wide east of SR-33 to River Road (Stanislaus County, 2011). Based on prior surveys conducted by GDR Engineering and Provost & Pritchard Consulting Group, the Main Canal ROW boundary west of Hamilton Road is parallel to and approximately 50 feet north of and 100 feet

south of the center of the Main Canal. East of River Road, the Main Canal ROW appears to shift slightly northwards along the southern boundary. In the vicinity of Station 1 and the intake channel, the north ROW line shifts northward by approximately 50 feet along the northern boundary for a distance of approximately 330 feet.

Between SR-33 and River Road, the East Stanislaus Road is within a 40-foot-wide County road ROW adjacent to the south boundary of the 160-foot-wide Main Canal ROW. East of River Road there is no County road ROW indicated for East Stanislaus Road.

West of SR-33 there is also no County road ROW for West Stanislaus Road. West Stanislaus Road lies within the southerly 40 feet of the Main Canal ROW. Depending upon the recommended project alternative, it appears that some of the improvements may be accommodated within the WSID ROW. ROW availability is considered in the selection and development of the recommended alternative to minimize the need for ROW acquisition and impact to adjoining lands.

2.2.2 Physical Constraints to Project Alignment

There are numerous physical features and structures along the Main Canal that could interfere with the location/alignment, construction and/or operation of new facilities.

2.2.2.1 Roadways

Replacement or protection of road surfaces associated with construction within or near improved roads can add cost and time to the project. Additional project cost and time would also be needed for other items, such as, special construction, permitting and regulatory oversight, adjacent property accessibility, disruption of traffic, and construction safety. The following section describes the roads that are in the immediate vicinity of the Main Canal alignment that could impact the selection of the alignment for conceptual design elements and proposed project alternatives. The locations of roadways are shown on Figures 6 through 9.

There are two two-lane asphalt paved roads adjacent and parallel to portions of the Main Canal; West Stanislaus Road along the south side of the Main Canal and a private road along the north side. Each road is approximately 25 feet wide. Throughout the entire length of the Main Canal, West Stanislaus Road parallels the Main Canal alignment along the south side of the canal at a distance of approximately 65 feet to 85 feet from the center of the Main Canal to the near side edge of the road. The private north side road is adjacent to the north side of the Main Canal east of River Road. It parallels the Main Canal alignment with a distance of approximately 55 feet between the centerline of the Main Canal and the centerline of the road. In the vicinity of Station 1 the road alignment shifts approximately 80 feet further north.

At a variety of locations along the Main Canal, improved roads cross the Main Canal through the use of culverts or bridges. The paved road crossings include: Hamilton Road, SR-33 and River Road. Past hydraulic modeling of the Main Canal system and measurement of head loss across these structures show these crossings to be moderately hydraulically restrictive. Recently measured head losses were: across River Road 0.18 feet at 211 cfs, across UPRR and SR-33 0.25 feet at 159 cfs and across Hamilton Road 0.09 feet at 101 cfs. In the development of the renovation plan, consideration should be given to the effect of the restrictions at the road crossings. In addition, there is also an unpaved access road that crosses the Main Canal at a bridge deck located approximately 1,550 feet east of Pump Station 3, which is not hydraulically restrictive.

Maintenance of access to adjacent properties must be a part of the project. Additionally, travel-ways affected by the project must be maintained or restored to pre-project condition. In some cases

accesses and roadways must remain operable throughout the project. Provisions should be included in renovations plans for maintaining access and repairing or protecting travel-ways. In particular, SR-33 will need to remain operable throughout the construction process. Encroachment permits or easements will be required where construction affects other property.

2.2.2.2 Railroad

The Union Pacific Railroad (UPRR) parallels SR-33. The water conveyance facilities used in the crossing of the UPRR will be in common with those of SR-33. Crossing the UPRR will require license from UPRR and compliance with their design and construction standards. UPRR must review and approve plans for construction within their ROW and will monitor construction activities.

2.2.2.3 Electrical Utilities

The locations of electrical utilities that may impact location/alignment, construction and/or operation of the proposed facilities are shown on Figures 6 through 9. A description of these electrical utilities is provided below:

- Each existing pump station has a step down transformer station associated with the facility. The WSID electric power distribution system facilities, consisting of overhead power lines and towers, are located adjacent to and approximately 10 to 20 feet north of the edge of pavement of West Stanislaus Road from just east of Station 1 to Station 6. These towers and the overhead electrical lines must be considered in selecting pipeline alignments and other facilities such as access roads and embankment setbacks for pumping facilities. Construction around such facilities requires a greater level of care, oversight, and safety measures.

- Local overhead power distribution lines parallel West Stanislaus Road, approximately 5 feet south of the edge of pavement and extend from Station 1 to just east of the proposed location of Station 5A. There is approximately 50 feet between this system and the WSID electric power distribution system. There are overhead power lines crossing the Main Canal alignment. These include crossings for local connections to pumps adjacent to the Main Canal and power lines that comprise part of the power distribution network along River Road, SR-33 and Hamilton Road.

- The substation that provides power to the WSID electrical power distribution system is located at the southwest corner of River Road and West Stanislaus Road. There is a particularly dense convergence of power lines connected to this substation.

The nature and location of the various electrical facilities can constrain alignment opportunities, increase the complexity of construction, and increase construction cost and schedule for various alternatives. Relocation of power poles, towers and electrical lines requires permitting, involvement of other agencies or personnel, increases the complexity of a project, and can significantly increase construction cost and schedule. To the extent feasible, alignments should be selected to avoid interference with existing power facilities.

2.2.2.4 Water Distribution (Laterals)

The renovated Main Canal System must service the existing laterals. The existing lateral headings include control and measurement structures. For Laterals 2 through 6, these consist of a radial gate and a sharp crested weir for flow measurement. Laterals 1N and 1S flows are controlled by canal side vertical canal gates. WSID maintains concrete buildings for power and control for the radial

gates at the headings of Laterals 2 through 6. The lateral headings, including the power and control facilities may be abandoned or have to be replaced or reconfigured depending on the project alternative selected. Alternatives that include pipelines will include turnouts to serve certain laterals as described in the Conceptual Project Alternatives section of this report and as shown on Figures 2 through 5. Where service to a lateral is be provided from a turnout on a new pipeline, the lateral heading equipment may not require replacement or reconfiguration.

Repair of the stilling basins, radial gate structures and measurement weirs at the lateral headings would require an extensive amount of time and be very costly, thus alternative alignments should consider these facilities when locating the crossings.

2.2.2.5 WSID Pumping Facilities

The major pumping facilities along the Main Canal Alignment consist of the existing six lift stations for conveying water through the Main Canal system from the SJR. These facilities are comprised of large concrete buildings to house the pump equipment and controls, discharge piping, bypass piping from the upper reach, and large concrete inlet and outlet structures. The existing facilities occupy a large foot print at the head of each reach. In some cases, demolition of the existing structures may be required to install new structures. However, existing facilities must remain operable during construction or alternative temporary facilities must be installed.

The District also owns and operates four wells that are used to supplement District water supplies. The four wells discharge into the Main Canal as shown on Figure 1. As previously mentioned, Well 5 is no longer in service. Modification of well equipment and discharge locations may be required depending on the project alternative selected.

2.2.2.6 Private Pumping Facilities

There are a number of small private pumping systems with electric motors at locations adjacent to the Main Canal. Some are associated with surface water irrigation pumping and some are associated with groundwater wells. The approximate locations of the various pumps and wellheads are shown on Figures 6 through 9. They are typically installed on concrete pads or structures with connections to the Main Canal or a lateral. They are supplied with power from the nearby power lines along the southern side of the Main Canal. These private pumping systems and related conveyance facilities must be protected, relocated or replaced to maintain service during and after construction. Groundwater wells can be very expensive to relocate, repair or replace. As much as reasonably possible, conflict with groundwater wells should be avoided when choosing facilities locations and alignments.

2.2.2.7 Slopes and Embankments

Because of the steepness of the natural slope of the land along the alignment of the Main Canal, the canal reaches consist of lined canal sections constructed above natural grade on the eastern end of each reach and below natural grade on the western end.

These slopes and embankments represent additional soil to be moved to establish appropriate lines and grades for new facilities in relation to the Main Canal. Additionally, the steep slopes can present problems for equipment access to construction areas, possibly requiring access roads to be constructed.

2.2.2.8 Other Structures

Numerous buildings and structures occupy lands adjacent to the Main Canal, some of which are associated with District operations. Many of these buildings constrain the construction of new facilities. Some project alternatives may dictate that buildings be replaced or protected to accommodate new project facilities. These constraints are considered in the analysis of project alternatives.

Along with the fixed structures, the District also stores materials, vehicles and equipment in the area near Station 1 as shown on Figure 6. Access to this area is restricted east of River Road by a chain link fence and gate.

Adjacent to the Main Canal ROW are a number of residential buildings that must be considered during the analysis of project alternatives, as construction activities could impact access and use of these buildings. There are two houses of note adjacent to West Stanislaus Road. The two residences are located approximately 1,600 feet southeast and 500 feet southeast of the Hamilton Road crossing near Reach 4. These houses are located southwest of proposed Station 5A. Another residence is located approximately 350 feet southeast of the River Road crossing along the south side of West Stanislaus Road near Reach 2. This residence is located adjacent to a shop building and the power substation at River Road. All of these facilities are accessed off West Stanislaus Road and would be impacted by any construction that affects the utilization of West Stanislaus Road in this vicinity.

Section 3
Water Demands and Facilities Sizing

This section presents a summary of the WSID Main Canal system demands based on daily flow measurement data for each lateral for the period of 2005 through 2010. The analysis of the historical demand data was used to size the proposed pump stations and pipelines for the various alternatives.

3.1 Annual Water Demands

The demand for water in the Main Canal system tends to be greater in the upper, western end of the system, with substantially less water demand occurring in Reach 1, based on delivery records provided by WSID and as shown in Table 1. In particular, Reach 4 has the highest annual demand, averaging 24,438 afy, nearly double any other reach of the system.

Table 1. Main Canal Deliveries by Lateral for the Period of 2005 through 2010

Lateral Year	1N/1S (af)	2N/2S (af)	3N/3S (af)	4N/4S (af)	5N/5S (af)	6N/6S (af)
2005	3,218	9,361	8,942	26,327	13,400	13,437
2006	2,275	9,622	8,073	24,531	12,653	13,390
2007	2,637	10,348	8,739	28,630	15,329	13,544
2008	3,214	10,383	6,988	22,152	14,468	13,938
2009	3,243	9,267	6,678	21,053	13,948	11,877
2010	2,342	10,398	6,515	23,936	13,962	12,816
Average	2,822	9,897	7,656	24,438	13,960	13,169

For water delivered from the SJR to meet the demands along the Main Canal system, each pump station would have to lift sufficient water to provide for the demands for all reaches above the pump station. This means that demands that each pump station must be capable of meeting, under this delivery configuration, are cumulative as water must be conveyed through each lower station up through subsequent stations to the point of distribution. As originally designed and constructed, the existing conveyance system was sized to convey the full 262 cfs of District entitlement from the SJR throughout the entire district. Over the years, low SJR water levels and poor water quality in the SJR forced the District to look elsewhere for its full supplies. Therefore, water has been imported from the CVP to augment supplies and to help meet demands in the upper end of the system, reducing the volume of SJR water that must flow through the lower end of the system. As an example, in excess of 34,100 af, 17,700 af and 8,500 af of CVP water was imported in 2006, 2008 and 2010, respectively. In some months in excess of 3,000 af of CVP water was imported to augment supplies to meet demands. This cumulative annual demand above (downstream of) each pump station is presented in Table 2. As a result, pumps have not been replaced in the lower system, and the current District conveyance configuration cannot meet existing peak demands from the SJR. The District wishes to remedy this situation and maximize its use of its licensed water rights.

Table 2. Total Annual Cumulative Main Canal Demand for the Period of 2005 through 2010

Date	Above Station 1 (af)	Above Station 2 (af)	Above Station 3 (af)	Above Station 4 (af)	Above Station 5 (af)	Above Station 6 (af)
2005	74,685	71,467	62,106	53,164	26,837	13,437
2006	70,544	68,269	58,647	50,574	26,043	13,390
2007	79,227	76,590	66,242	57,503	28,873	13,544
2008	71,143	67,929	57,546	50,558	28,406	13,938
2009	66,076	62,833	53,566	46,888	25,835	11,877
2010	69,969	67,627	57,229	50,714	26,778	12,816
Average	71,941	69,119	59,223	51,567	27,129	13,169

These cumulative demands in combination with the projected annual pumping for storage or transfer in the DMC, provide an estimate of the anticipated annual pumping for each pump station to meet demands which is used to estimate the energy requirements of each alternative.

3.2 Daily Water Demands

The historic peak daily water demand during the period of study, 2005 to 2010, is presented in Table 3. This information is for a six year study period compared to the one year (2009) used in the Project Concept Development Report (AECOM, 2010a). The water demand above each station varies significantly from year to year. For instance, the maximum day demand at Station 1 for the period of study was approximately 384 cfs, or nearly 85 cfs (28%) greater than the 6-year average maximum day demand. These more extensive data are compared to the pump station size recommendations in that report.

Table 3. Maximum Day Water Demand for the Period of 2005 through 2010

Year	Above Station 1 (cfs)	Above Station 2 (cfs)	Above Station 3 (cfs)	Above Station 4 (cfs)	Above Station 5 (cfs)	Above Station 6 (cfs)
2005	383.7	366.0	312.1	257.1	134.1	68.6
2006	297.0	295.4	258.6	233.4	115.0	59.5
2007	273.8	261.2	232.9	200.2	94.3	50.4
2008	260.2	252.1	225.9	196.1	102.3	53.9
2009	271.7	252.6	211.2	195.1	93.3	45.9
2010	311.1	303.5	268.7	247.5	138.6	60.5
Maximum	383.7	366.0	312.1	257.1	138.6	68.6
Average	299.6	288.5	251.6	221.6	112.9	56.5

For the purposes of estimating the amounts of water which could be delivered (transferred to) the DMC, the year was divided between the lower demand months of November through June and the higher demand months of July through October. The lower demand months are considered the time when SJR diversions could be delivered to the DMC (the Transfer Months) and the higher demand months are the times when the DMC could be used to meet WSID peak demands. Table 4 presents the maximum day demand data during the transfer months which are substantially less than the maximum day flows for the entire year presented in Table 3.

Table 4. Maximum Day Demand During the Transfer Months (November - June) for the Period of 2005 through 2010

Date	Above Station 1 (cfs)	Above Station 2 (cfs)	Above Station 3 (cfs)	Above Station 4 (cfs)	Above Station 5 (cfs)	Above Station 6 (cfs)
2005	238.5	237.5	220.8	187.6	97.8	48.9
2006	278.8	271.2	231.9	210.7	113.9	59.5
2007	273.8	261.2	232.9	200.2	94.3	50.4
2008	260.2	252.1	225.9	196.1	102.3	53.9
2009	208.2	200.2	164.4	144.7	85.7	45.4
2010	249.1	243.0	207.7	188.6	113.9	55.5
Maximum	278.8	271.2	232.9	210.7	113.9	59.5
Average	251.4	244.2	213.9	188.0	101.3	52.3

While the annual maximum day demands are substantially greater than the maximum day demand during Transfer Months, the annual maximum day demand exceeded the Transfer Months maximum day demand only 16 days in 2005, 11 days in 2006, and 16 days in 2010. During the Transfer Months, the largest maximum day demands occurred in years 2007 through 2009.

3.3 Pump Station Sizing

The Project Concept Development Report (AECOM, 2010a) evaluated numerous pumping scenarios in the evaluation of Station 5A options. The options were developed by considering various improvements to the existing system and how those improvements would affect the ability of the system to divert water from the SJR to the DMC. While this analysis was somewhat constrained by the capacity of the existing system and was based one year of flow data, it provides valuable information in the selection of appropriate capacity for the renovated system.

As this study progressed, WSID was also in the process of evaluating options for a new fish screen at the SJR diversion. The recommended capacity for the fish screen, based in part upon the existing rights to divert water at this location was 347 cfs. This fish screen diversion rate provides for the diversion of 262 cfs under WSID License 3957; 45 cfs of riparian water under the ownership of the White Lake Mutual Water Company; and a 40 cfs right to divert owned by the USFWS, which occurs downstream of the fish screen but upstream of Station 1.

Table 5 presents the recommended pump station capacities under the four project alternatives. These station capacities can supply the full maximum day water demands recorded over the 2005 through 2010 period with the exception of a few days when the daily demand was unusually high with a large portion of the water supply drawn from the DMC.

Table 5. Recommended Pump Stations Capacities for the Various Alternatives and Projected System Demands

Project Alternative	Recommended Pump Station Capacity			
	Station 1 (cfs)	Station 2 (cfs)	Station 3 (cfs)	Station 4 (cfs)
Alternative 1	350	N/A	N/A	N/A
Alternative 2	350	N/A	310	N/A
Alternative 3	350	335	310	305
Alternative 4	350	335	310	305
Max. Day Demand	385	336	312	257
Max. Day Demand (Transfer Months)	279	272	233	211

Section 4
Selection of Apparent Best Alternative

The factors considered in the selection of the apparent best alternative for renovation of the Main Canal are as follows:

1. Constructability
2. Dependability
3. Environmental and regulatory permitting
4. Capital and life cycle costs

A qualitative analysis of the four project alternatives as they relate to the first four factors was conducted to determine the alternatives that are viable. For the alternatives deemed viable, feasibility level estimates of the capital and life cycle costs were then prepared to provide an additional factor to consider in the selection of the apparent best alternative.

A rating of 1 to 4 was assigned to each alternative as it relates to the particular factor. The alternative that is the most favorable with respect to a specific factor was assigned a rating of 1. The alternative that is the least favorable with respect to a specific factor was assigned a rating of 4. Multiple alternatives may be assigned the same ranking where there are insignificant differences between the alternatives as they relate to a specific factor. The lower the cumulative score of an alternative the more favorable the alternative is with respect the factors evaluated.

4.1 Constructability

The Construction Industry Research and Information Association define constructability as the extent to which the design of the project facilitates ease of construction, subject to the overall requirements for the completed project. There are a number of elements that may influence the constructability of a project: technical complexity, volume and scale of work, existing structures and other obstructions that could constrain construction efforts, environmental constraints, required mitigation measures, and schedule impacts from time sensitive or critical path elements of the project. A ranking of these elements, as well as the overall constructability rankings for the alternatives is presented in Table 6.

Table 6. Ranking of Alternatives Based on Elements Affecting Constructability

Project Alternative	Technical Complexity	Volume or Scale	Existing Obstructions	Environ-mental Constraints	Schedule	Overall Score	Overall Ranking
1	1	4	3	4	1	13	3
2	2	3	2	3	2	12	2
3	3	2	1	2	3	11	1
4	4	1	4	1	4	14	4

A discussion of these various elements that impact the overall constructability of the project and which are the basis for the rankings in Table 6 is presented below.

4.1.1 Technical Complexity

There are numerous factors that can affect the complexity of the proposed project alternatives, including:

- Existing physical constraints or obstructions
- The degree to which existing facilities are incorporated and the quality of those facilities
- The number, size, difference and complexity of pumping facilities
- The size, length and alignment of conveyance facilities
- The number, size and complexity of inlet and discharge structures
- Operational system pressures
- Consistency in practices used for construction
- Probability of unknown conditions that can adversely impact construction
- Specialized structures or facilities needs

These factors can influence final construction costs, the quality of the final product, and operation and maintenance costs.

- **Alternative 1**. Alternative 1 does not utilize any of the existing Main Canal pumping or conveyance facilities between the intake channel and the Station 1B Pipeline discharge point in Reach 4 of the Main Canal. Alternative 1 only utilizes 1 pump station (Station 1B), reducing the overall system complexity due to the inherent complexities of pump stations and the accumulation of those complexities as the number of stations increases. Alternative 1 does allow for some flexibility in locating the one pump station to avoid existing obstructions. However, Alternative 1 includes the most pipeline turnout facilities of all the alternatives since it has to be connected to all laterals being served by Reaches 1, 2 and 3. In addition, Alternative 1 includes the longest pipeline and thus has more obstructions and constraints, some of which may not be avoided, such as the roads and railroad, which the pipeline must cross and may potentially impact. There are some risks associated with excavation of deep trenches associated with the construction of large diameter pipelines due to space limitations and unknown conditions that can influence construction complexity. However, the construction of subsurface large diameter pipelines is a common construction practice in the area and well qualified contractors are available. Additionally, there is some increase in complexity relating to the substantially higher operational pressure required for Alternative 1, such as the need to incorporate energy dissipation structures at turnouts, more robust components and substantial pressure transient control measures. Also, Alternative 1 requires Wells 1 through 4 to be modified to enable the pumped groundwater to be discharged directly into the Station 1B Pipeline.

- **Alternative 2**. Alternative 2 utilizes two pump stations (Stations 1A and 3A) to convey water from the SJR intake channel to the Station 3A Pipeline discharge point in Reach 4 of the Main Canal. This adds to the system complexity simply by adding additional facilities to operate and the required system controls. Obstructions and constraints along the pipeline alignment will be less than in Alternative 1 since Reach 2 is being utilized to convey water to Station 3A in lieu of additional pipeline. In addition, Laterals 2N and 2S will be served off the Main Canal instead of a new pipeline. Alternative has twice the new pump stations as compared to Alternative 1, however, the system operating pressure can be reduced, by about 50 percent through use of this configuration, substantially reducing system complexities relating to operating pressure, such as transient control facilities, energy dissipating structures, and robustness of elements. It is assumed that by maintaining some degree of consistency between the pump station and connection designs some of the increase in system complexity can be mitigated. Alternative 2 requires only three wells (Wells 1, 2, and 3) to be modified to enable the pumped groundwater to be discharged directly into the new pipelines. Well 4 would continue to discharge into Reach 2 of the Main Canal. There is some small risk associated with utilizing a portion of the existing canal system due to its age and condition, but the existing canal will be maintained to convey DMC water. Both use of existing facilities intermixed

into the system and subsurface facilities pose a risk of encountering unknown conditions that can have some impact on construction though this is considered to likely be minor. The use of the Main Canal adds a storage component to the conveyance system which provides a degree of flexibility in water operations. For these reasons Alternative 2 is ranked slightly less favorable than Alternative 1 with respect to construction complexities.

- **Alternative 3**. Alternative 3 includes replacement of Pump Stations 1 through 4 but maintains the use of the Main Canal to convey water between stations and to delivery water to existing lateral turnouts. It is anticipated that by increasing the number of pump stations the complexity of construction would also increase substantially. Also, there are more connections between system elements to be considered, which also increases complexity. There are also major obstructions to construction of the new pump stations, such as, the existing pumping facilities that add to the complexity of construction. However, there is some reduction in risk relating to unknown conditions encountered in excavations, since the excavations associated with this alternative are of much smaller scope than Alternatives 1 or 2 because the alternative does not include new pipeline. Additionally, Alternative 3 allows for substantially reduced systems pressures relative to Alternatives 1 or 2. Overall this alternative ranks slightly less favorable than Alternatives 1 and 2 from a construction complexity perspective primarily due to the fact that four new pump stations would have to be constructed.

- **Alternative 4**. Alternative 4 appears to be the most complex in regards to construction. There is the inherent complexity of constructing four different pump stations while trying to maintain the use of the existing structures. The condition of the existing pump stations that affect the viability of upgrading the existing structures are described in the February 3, 2011 memo (AECOM, 2011). Based on a review of the existing pump stations conducted on February 1, 2011, the repair and upgrade of said facilities was deemed infeasible due to the condition of the facilities (AECOM, 2011). Repairs of existing facilities would require replacement of many major components and major modifications to the remaining components. Thus the cost would be equal to, if not greater than, a complete replacement of the facilities. In addition, major renovation of the existing facilities would require a shutdown of the existing facilities for a substantial period of time while repairs were being implemented. Given the age and condition of the existing facilities, the repair of these very old facilities would likely involve a great deal of customization at each facility. Due to design inadequacies and capacity limitations of the existing pump stations substantial modifications would be required to make the existing facilities useable. Additionally, repairs and modifications may not be feasible and may not provide the quality, life expectancy or capacity required for this project. Alternative 4 ranks very poorly in comparison with the other alternatives from a construction complexity perspective.

4.1.2 Volume or Scale

With their large diameter pipelines and associated turnouts Alternatives 1 and 2 would require a substantial amount of construction activity along the entire alignment of the Main Canal. Large amounts of earthwork and land disturbance would occur along the entire alignment. These alternatives pose the potential for disturbing other activities and traffic in the area along the length of the proposed alignments throughout the period of construction. There are many different construction elements that constitute these alternatives and these alternatives would require larger scale and volume of construction activities. Alternative 1 includes additional pipeline but one fewer pump station. From a scale or volume perspective, Alternative 2 may be slightly more favorable than Alternative 1.

Alternatives 3 and 4 would limit the construction activities to those areas where the replacement or upgrade of the stations take place, though at times the volume of construction traffic may be significant. The earthwork and land disturbance would be related to the station being constructed or upgraded, and is

anticipated to be less than that required to install pipelines. Therefore, Alternatives 3 and 4 would include a smaller scale or volume of construction activities than Alternatives 1 and 2 due primarily due to fact that they do not include new pipeline. In addition, Alternative 4 construction activities would be limited to the existing pump station structures and the immediate surrounding areas.

4.1.3 Existing Structures and Obstructions

There are a number of existing structures and facilities that can constrain or obstruct construction of the elements of each alternative. Many of these have to be considered in selecting the best alignment for each alternative, but even then there are still some obstructions to construction that cannot be avoided. Alternatives 1 and 2 require long linear continuous alignments for construction of the pipelines. Thus any facilities crossing those alignments cannot be avoided. These facilities must be protected or repaired as part of the construction process. These facilities typically consist of such things as the existing pump station facilities, electrical power lines and poles, roads, railroad, and canal laterals. Most of these can be readily protected through common construction techniques, or cost effectively repaired. Installing underground pipelines under the UPRR and SR-33 is more problematic. These existing structures can be protected through special trenchless construction techniques, which are more expensive than typical pipeline installation techniques but are relatively easy to accomplish with minimal disruption to existing structures and operations. The existing pump stations and Main Canal system may pose the greatest constraint or obstruction to be considered in construction of new improvements. The Main Canal system must remain capable of delivering water to users during most of the year. For limited timeframes during specific noncritical demand periods elements of the Main Canal system, including the pump stations, may be offline.

Alternative 3 affords more flexibility regarding obstructions in that the proposed stations may be relocated to some degree to accommodate some existing obstructions, and no long continuous linear pipeline alignments are included. However, the existing pump stations are a major obstruction due to the fact that they must remain operational during construction of the project. There are four pump stations to consider under this alternative. Also, the location of the replacement pump stations along the Main Canal does not afford the degree of flexibility that the other alternatives have. Therefore, the prospect of potential risk from existing physical structures and operations affecting construction is greater under this alternative.

Alternative 4 presents the least favorable alternative, as the existing facilities are major obstructions to maintaining operations during construction. During construction at each pump station, the station must be taken offline. A temporary system would have to be employed to make deliveries above any pump station being rehabilitated under Alternative 4, which presents additional considerations for construction complexity, schedule and cost. Some degree of demolition and removal of some components that are not viable must occur before rehabilitation may proceed.

4.1.4 Environmental Constraints

Based on previous environmental documents for related improvements along the Main Canal system, it is anticipated that there would be relatively few environmental constraints that might affect construction of any of the alternatives. However, the larger the disturbance area (construction footprint) the larger the potential for environmental constraints and need for mitigation measures. Therefore, Alternative 4 would have the least potential for environmental constraints since it would not include development of new sites for pump stations and would be ranked the most favorable from an environmental constraint perspective. Alternative 3 does include construction of pump stations on potentially new sites. However, the location of the pump stations would be within the maintained ROW of the Main Canal and therefore Alternative 3 would be ranked the second most favorable from an environmental constraint perspective. Alternatives 1 and 2 both include construction of a significant amount of large diameter pipeline and would disturb much more ground than either Alternatives 3 and 4. However, the potential pipeline alignments are in areas that are currently

maintained or farmed and little environmental constraints are assumed. In addition, Alternative 2 includes construction of two new pump stations versus only one for Alternative 1. Therefore, from an environmental constraint perspective, Alternatives 1 and 2 would be ranked less favorable than Alternatives 3 and 4, with Alternative 1 ranked less favorable than Alternative 2 due to the larger construction footprint associated with the additional length of new pipeline. There are no environmental constraints from a project operations perspective since all four alternatives will continue to serve the same lands within the District and will all facilitate the use of Station 5A to convey water to the DMC.

4.1.5 Schedule

There are several factors that affect the length of the construction period and the schedule of construction for the various alternatives. These include:

- The need to keep the WSID system in operation during construction
- Permitting of crossings of the UPRR and State and County roads
- The procurement of long-lead time items
- Environmental compliance
- Cropping patterns on lands impacted by construction, whether permanently or temporarily affected

Of all the factors listed above, the requirement that the Main Canal system must remain operational throughout the construction period will have the greatest impact on the length of construction and will drive the schedule for some alternatives more than others. This requirement will also require additional construction management costs associated with the coordination and scheduling of construction activities with District operations. Alternative 4, which includes upgrades of Stations 1, 2, 3 and 4, will require the greatest challenge in scheduling the improvements so that District operations are not impacted. Alternative 3 would construct new stations and therefore existing stations could remain operational during construction. Depending on the location of the new stations the impacts to existing operations could still be significant with regards to tie-ins and controls during switch over to the new stations. The other listed factors will not apply to Alternatives 3 and 4 with the exception of procurement of long-lead items, which would be similar for the two alternatives. Environmental compliance would also be similar for both Alternatives 3 and 4 since the alternatives only include the replacement or upgrade of existing facilities, involving work in close proximity of the existing facilities. Maintaining operation of existing facilities would impact when construction may occur on new facilities. Work would have to be much more coordinated with the operations of existing facilities. Therefore, Alternatives 3 and 4 rank less favorable than Alternatives 1 and 2 with respect to schedule issues, with Alternative 4 ranking the least favorable.

All of the listed factors apply to Alternatives 1 and 2 since they both include construction of pipeline to replace the use of certain reaches of the Main Canal for water conveyance purposes. The primary factor again is the requirement to keep the Main Canal system operational during construction. Both Alternatives 1 and 2 will have less impact from this factor than Alternatives 3 or 4 because fewer pump stations are being replaced or upgraded in these alternatives. Alternative 2 includes construction of one more pump station than Alternative 1 and therefore will require more scheduling coordination than Alternative 1. Cropping patterns may affect the timing of construction as well as the alignment of the pipelines for both Alternatives 1 and 2. Permitting of the UPRR and road crossings can impact the schedule for both Alternatives 1 and 2. Procurement of long-lead items would be similar for the two alternatives with Alternative 1 requiring additional larger diameter pipe, but Alternative 2 requiring additional large capacity pumps and motors. Motor control centers and instrumentation are also long-lead time items. Environmental compliance for Alternative 1 may be slightly more complicated due to the larger project footprint. Based on these factors, Alternatives 1 and 2 rank more favorable than Alternative 3 and 4 with Alternative 1 slightly more favorable than Alternative 2 primarily due to the fact that it has one less new pump station to construct.

4.1.6 Overall Constructability

The overall evaluation of the constructability factors for the four alternatives shown in Table 6 appears to indicate that Alternatives 1 through 4 are all relatively similar with regards to constructability with Alternative 4 being the least favorable, primarily due to its technical complexity, existing obstructions and scheduling issues. Alternative 3 ranks the highest.

4.2 Dependability

Dependability consists of a number of attributes relating the overall quality of a system's performance. These attributes can be grouped into one of five categories or elements that comprise the overall dependability: Availability, Reliability, Safety, Integrity, and Maintainability. These five elements may be simply defined as the following:

- Availability is the readiness for correct service.
- Reliability is the continuity of correct service.
- Safety is the absence of catastrophic consequences to the user(s) and the environment.
- Integrity is the absence of improper system alteration.
- Maintainability is the ability for a process to undergo modifications and repairs to maintain effective operations.

A ranking of these elements of dependability as well as the overall dependability rankings for the alternatives are presented in Table 7.

Table 7. Ranking of Alternatives Based on Elements of Dependability

Project Alternative	Availability	Reliability	Safety	Integrity	Maintain-ability	Overall Score	Overall Ranking
1	4	1	1	1	1	8	1
2	3	2	1	2	1	9	2
3	1	3	3	3	3	13	3
4	2	4	4	4	4	18	4

A discussion of the various elements that impact the overall dependability of the project and which are the basis for the rankings is presented below.

4.2.1 Availability

All alternatives include electromechanically controlled systems that are approximately equivalent with regard to availability. With proper design all alternatives are highly responsive to initiate or stop proper operations throughout the operational life of the system. However, a failure in a key component could influence operational readiness of a pump station. There is a systemic risk to availability that can be caused by a lack of key system redundancy. With greater redundancy the risk of an impact from the failure of a single element has less influence on operational readiness, or less impact on the service provided. Thus the risk to the entire system operation is slightly greater with Alternative 1 than the others, as a failure of operational readiness at Station 1B would impact the entire system. Under Alternative 2, a failure of one of the two pump stations could adversely impact the entire system or only the upper reaches of the Main Canal. A failure of a pump station in Alternatives 3 or 4 would adversely impact only those reaches of the Main Canal up gradient of the failed pump station and thus potentially less than the Alternatives 1 and 2. The rankings are highly influenced by the systems control redundancy. Therefore, if it is assumed that key system redundancy is incorporated into all alternatives then the availability rankings would be based on the number pump stations operated under the alternative with consideration given for the overall age of the major components of the

pump station. Based on the fact that Alternative 1 has only one pump station the availability of the system to meet demands is at the highest risk under Alternative 1. Therefore, Alternative 1 is the least favorable with respect to availability. Consequently, Alternative 2 with two pump stations would rank the second lowest with respect to availability. Alternatives 3 and 4 are both more favorable than Alternatives 1 and 2 since they both have four pump stations. However, due to the age of the renovated pump stations in Alternative 4 it would not be as favorable as Alternative 3 which includes new pump stations. The ranking of the alternatives with respect to availability is shown in Table 7.

4.2.2 Reliability

In general, reliability indicates the capacity of the system for sustaining correct service during the life of the facility. Reliability is a major system consideration on its own as well as a major component of dependability. For this qualitative analysis of the alternatives, the ranking of the alternatives with respect to reliability is included as one of the elements in the dependability analysis.

The average life expectancy of various critical elements of the system as well as their mode of failure is important to measuring the reliability of the system. The average life expectancy of some of the critical elements of each alternative is in many ways similar. The assumed average operational life expectancy of critical elements is shown in Table 8.

Table 8. Average Life Expectancy of Critical Elements

Element	Average Life Expectancy (Years)
Pumps	20
Electrical motors	15
Concrete pipelines	>50
Steel pipelines	>50
Concrete-lined canals	>50
Electromechanical control systems, metering and valving	10
Structures	>50

The critical elements that determine the reliability of the system are the control systems and valving. Both of which can affect the performance of the system and lead to a critical failure. Other elements such as structures, pipelines and canal liners require relatively low maintenance throughout their life and can perform within design standards for a substantial period of time. Also, pipelines have a very long average life expectancy, typically longer than the life expectancy of the pump stations, estimated to be in the range of 75 to 100 years. Pumps and other electromechanical systems typical have much shorter life expectancies as shown above. This means that there is generally a much higher risk of failure in a pump or electromechanical system than a catastrophic pipeline failure during the 50 year life of the facilities. In addition, typically pipeline systems "fail well" such that operations may continue until a less critical period of time when repairs may be made. Electromechanical systems and pumps tend to fail poorly, such that the system would require immediate repair in order to deliver the needed water supply. However, higher operating pressures are likely to cause increased wear and tear on the system and reduce the life expectancy.

Therefore, the reliability of Alternatives 1 and 2 is expected to be very similar, with Alternative 1 ranked more favorable than Alternative 2 since it has only one pump station. The reliability of Alternatives 3 and 4 would be less than that of Alternatives 1 and 2 because of the increased number of pump stations, including control systems, pumps, motors and valving. Alternative 4 would be the least favorable due to the age of the facilities and the fact that some of the facilities would not likely be replaced as part of the renovation and upgrade of the pump stations. The ranking of the alternatives with respect to reliability is shown in Table 7.

4.2.3 Safety

Safety is an important consideration in the dependability of a system. If the system has some inherent safety risk associated with some elements, the system may not be operable during periods when high exposure to that risk may occur or special mitigation measures may have to be incorporated in the operation of that system. All four alternatives can be designed and constructed to be relatively safe for the operators and the environment. Safety risks to the general public should be similar for all four alternatives. Project facilities will not be accessible to the general public. As far as safety to the District operators there is inherent risk built in to the operation and maintenance of pump stations and therefore, the more pump stations that are operated and maintained the greater potential risk there is. In addition, the higher the operating pressure the greater the risk to equipment and personnel when there is a failure of certain pump station components. The overall safety factor for Alternatives 1, 2 and 3 should be similar and their ranking would be based on the numbers of pump stations and the operating pressure of the pump stations. Alternative 1 has the least amount of pump stations but would also have the highest operating pressure. Therefore, Alternatives 1 and 2 are ranked equivalent even though Alternative 2 has two pump stations, and both rank more favorable than Alternatives 3 and 4. Alternative 4 would have the least favorable safety factor rating due to the age of the pump stations and the fact that components of the existing pump stations would be utilized in the upgraded stations. Failures of the older components and the structure itself pose the greatest safety risk to system operations and personnel. The ranking of the alternatives with respect to safety is shown in Table 7.

4.2.4 Integrity

Integrity represents the absence of improper system alteration. At this stage of the project it may be assumed that all alternatives will be designed to contain no improper system alterations. Having said this, the integrity of some of the components and the structures of the existing pump stations and lateral turnout facilities is unknown and there is no assurance of that integrity even upon examination. Therefore, Alternative 4 would have the least favorable ranking for the integrity factor and Alternative 1 would have the most favorable ranking since it would not rely on any existing pump stations or lateral turnout facilities. Alternatives 2 and 3 also do not rely on existing pump stations but Alternative 3 would rely on all of the existing turnout facilities whereas Alternative 2 only relies on the existing Lateral 2N and 2S turnout facilities. Therefore Alternative 2 would have a more favorable ranking than Alternative 3 with respect to integrity. The ranking of the alternatives with respect to integrity is shown in Table 7.

4.2.5 Maintainability

Maintainability is another important factor to consider in the overall dependability of a system. If a system is troublesome or complicated to maintain, it is likely that maintenance may not occur with the degree of thoroughness or timeliness necessary to keep the system operating properly. Additionally, some systems require greater care and routine maintenance than others. The ease of maintenance and degree of maintenance necessary to keep the system operating properly can influence the performance of the system and its availability, reliability, and safety over the life of the project. Systems that employ fewer moving, or electromechanical parts, will require less maintenance. Those that employ passive systems also require less maintenance. All the conveyance systems are relatively passive in all alternatives, and anticipated to require minimal inspections and maintenance over long periods of time, as well as being relatively insensitive to delays in maintenance. Thus, while the inspection and repair of the underground pipeline system is more problematic than inspection and repair of a canal system, it is anticipated that this has a negligible influence on the overall maintainability of the system. As Alternatives 3 and 4 include use of four pump stations, they are likely to require more maintenance than Alternatives 1 and 2. Alternative 1 includes a single pump station and a long pipeline, which is a fairly passive system which requires minimal minor maintenance. However, the single pump station in Alternative 1 will require higher operating pressures than the two pump stations in Alternative 2 which will require additional monitoring of system components that can incur additional wear

from the higher pressure. Therefore, it is anticipated that the maintainability of Alternative 1 and 2 would be similar even though Alternative 2 includes an additional pump station. The maintenance requirements for Alternative 4 would be greater than Alternative 3 due to the age of the existing pump stations, and in particular the structures. The maintenance requirements for the new facilities in all alternatives should be considerably less than existing maintenance requirements due to the age and condition of the existing facilities. The ranking of the alternatives with respect to maintainability is shown in Table 7.

4.2.6 Overall Dependability

The overall dependability of Alternatives 1 and 2 are very similar and are the most favorably ranked. Alternative 3 ranks slightly less favorable than Alternatives 1 and 2 and Alternative 4 ranks substantially less favorable than Alternatives 1 and 2. The ranking of the alternatives with respect to overall dependability is shown in Table 7.

4.3 Environmental and Regulatory Permitting

Besides the constructability and dependability of the alternatives, there are other factors that need to be considered such as the complexity of the environmental and regulatory permitting required for the project. These other factors can influence the cost and schedule of a project, the complexity of construction, require mitigations beyond the basic purpose of the project, limit that design opportunities, and in some cases stop progress of a project. A ranking of these elements of permitting complexity as well as the overall permitting complexity rankings for the alternatives is presented in Table 9.

Table 9. Ranking of Alternatives Based on Permitting Complexity

Project Alternative	Environmental Permitting	Regulatory Permitting	Overall Score	Overall Ranking
1	3	4	7	4
2	2	3	5	2
3	1	2	3	1
4	4	1	5	2

A discussion of the various elements that impact the overall permitting complexity of the project and which are the basis for the rankings is presented below.

4.3.1 Environmental Permitting

California Environmental Quality Act (CEQA) compliance is required for all alternatives. The differentiators of the four alternatives include the demolition of potentially recorded historic structures or facilities and the size of the construction footprint which relates directly to the potential for construction related environmental impacts. All of the alternatives could potentially include the demolition of at least portions of existing facilities, including pump stations. However, Alternative 4 would have the greatest impact on structures that would likely be considered historic. The construction footprints for Alternatives 1 and 2 are much greater than those of Alternatives 3 and 4 since pipeline construction is included in Alternatives 1 and 2. Pipeline construction and the associated crossings of roads and the UPRR bring increased impacts on traffic, noise, and air quality that will require additional mitigation measures be implemented as part of the project. It is not anticipated that environmental compliance will be difficult for the facilities located along the Main Canal. Appropriate mitigation measures would be incorporated into all alternatives. However, construction of a new Station 1 may require a Section 404 permit from the United States Army Corp of Engineers (USACE) and a Streambed Alteration Permit from the California Department of Fish and Game and will require an increased

level of monitoring and implementation of mitigation measures during construction. The ranking of the alternatives with respect to environmental permitting is shown in Table 9.

4.3.2 Regulatory Permitting

Any improvements that involve crossing of County roads, SR-33, railroads and other utilities would have to be permitted and inspected by the applicable regulatory agencies, such as, Stanislaus County Public Works, Caltrans, UPRR and local utility companies. Each agency may require additional features be included in the final constructed project depending on the size and alignment of the crossing. Alternatives 1 and 2 are much more prone to being impacted by the regulatory agencies responsible for the roadways, railroads and utilities, as both of these alternatives require pipeline to cross under these features. Therefore, Alternatives 1 and 2 rank less favorable in the regulatory permitting category due to the greater impact on the project design and construction. Alternatives 3 and 4 rank more favorable in the regulatory permitting category because they do not include road, railroad and utility crossings like Alternatives 1 and 2. Alternative 4 would likely require less regulatory permitting than Alternative 3 since it would essentially be utilizing the same pump station sites and structures. Alternative 1 would likely require additional regulatory permitting as compared to Alternative 2 due to the increased length of pipeline. As previously mentioned, there will be permitting required from several agencies for the construction of a new Station 1. The ranking of the alternatives with respect to environmental permitting is shown in Table 9.

4.3.3 Overall Permitting

The overall permitting complexity of Alternative 3 is the most favorable. Permitting requirements for Alternatives 2 and 4 are very similar. Alternative 1 ranks substantially less favorable than the other alternatives with respect to permitting complexity primarily due to the number of permits required due to its long pipeline and associated crossings. The ranking of the alternatives with respect to overall permitting complexity is shown in Table 9.

4.4 Overall Evaluation of Factors Affecting Selection of the Apparent Best Alternative

The qualitative evaluation of alternatives based on the various factors discussed in this section was used to determine which alternatives would be carried forward for further development and evaluation, including development of estimated capital costs and life cycle costs. A summary of the scores of the alternatives for the various factors considered is presented in Table 10.

Table 10. Overall Scores and Ranking of Alternatives

Project Alternative	Construct-ability	Dependability	Permitting	Overall Score	Overall Ranking
1	13	8	7	28	3
2	12	9	5	26	1
3	11	13	3	27	2
4	14	18	5	37	4

The individual factors shown in Table 10 may have a slightly greater or lesser influence on the overall project than is apparent from this analysis. However, it does appear that based on the analysis, Alternative 4 ranks substantially less favorable than the other alternatives, and therefore was not considered for further evaluation. This is primarily due to the age of the pump stations and the many unknowns and uncertainties associated with trying to upgrade or retrofit the existing facilities with new equipment. These uncertainties

and reliability issues impact the ability to construct the new facilities as well as their ongoing operation and maintenance.

Alternatives 1, 2 and 3 all score very closely with respect to the factors considered. Alternative 2 appears to be slightly more favorable based on the analysis, though it is relatively consistent with the ranking of Alternatives 1 and 3. However, this qualitative analysis and ranking of alternatives does not provide sufficient data to select an apparent best alternative. Therefore, to further aid in the selection process, Alternatives 1, 2 and 3 were further developed and an estimated life cycle cost was prepared for each alternative.

4.5 Cost of Project Alternatives

Estimates of construction, operation and maintenance (O&M) and life cycle costs for Alternatives 1, 2 and 3 are presented in this section. The life cycle cost for each alternative is based on the estimated capital cost of constructing the new facilities and the estimated O&M cost throughout the expected operational life of the facilities. Detailed estimates of construction and O&M costs for Alternatives 1, 2 and 3 are included in Appendix A. The following assumptions were utilized in developing the cost estimates:

- An operational life expectancy of 50 years was utilized based on USACE guidance published in Engineering Manual EM 1110-2-3104.
- The nominal annual interest rate used to represent the time value of money for calculating present value (PV) and equivalent annual cost (EAC) was 3%.
- The water delivery volume used to calculate the EAC/af is the average of the total annual delivery volume for the period of 2005-2010 (Table 2).
- All water to meet District demands was conveyed through the new facilities proposed in the applicable alternative.
- Debt service was not included in this analysis as interests rates may vary substantially depending upon the types of debt, period of repayment, and time at which the debt is incurred.

Capital Cost

- No cost recovery values were included since the analysis was performed as a cradle to grave analysis in which all recovery value has been expended during the life cycle of the facilities.
- The conceptual layout for each alternative shown in Figures 2 through 4 was utilized for estimating purposes.

Operations and Maintenance Cost

- For the purposes of this analysis, the O&M costs do not include any cost escalation factors for power costs, labor rates or materials costs during the 50 year life cycle.
- Electric power costs were based on current rates of approximately $0.08 per kW-hr.
- Operation costs include labor and equipment costs associated with maintaining and operating the facilities and administration costs specific to the operations and maintenance of facilities.
- Estimated replacement costs for equipment were included in the total operations and maintenance cost.
- Operation costs do not include any costs associated with the conveyance of water to the DMC.

The estimated capital cost, O&M cost and total life cycle costs associated with each alternative is summarized in Table 11. The costs presented in Table 11 are expressed in terms of the EAC and EAC per unit volume of water delivered.

The life cycle cost analysis demonstrates that the total life cycle costs for the three alternatives over a 50 year operation life are relatively similar, even though there are significant differences in the estimated cost for specific elements such as construction and power. The estimated equivalent annual cost per unit of water delivered for these project alternatives would be between $27 per af and $29 per af. While the estimated capital cost per unit water delivered is lowest for Alternative 3, the cost of operations, maintenance and replacement (OMR) of four pump stations in Alternative 3 is significantly more than the OMR costs for Alternatives 1 and 2 which have 1 and 2 pump stations, respectively. The total life cycle costs of the three alternatives are within a few percent of each other. This is an insignificant difference given the range of variability in long-term costs and the assumptions used for the assumed 50 year operational life of the project.

Table 11. Estimated Life Cycle Cost of Project Alternatives

Project Alternative[1]	Units of Water Delivery[2] (af)	Capital			Operations and Maintenance					Total Life Cycle Cost	
					Power	Replacement	Operations	Total			
		Total Cost ($)	EAC[3] ($)	EAC/ Unit[4] ($/af)	EAC[3] ($)	EAC[3] ($)	EAC[3] ($)	EAC[3] ($)	EAC/ Unit[4] ($/af)	EAC[3] ($)	EAC/ Unit[4] ($/af)
1	71,941	26,720,000	1,038,500	14.42	773,000	148,000	117,000	1,038,000	14.43	2,076,500	28.86
2	71,941	25,980,000	1,009,500	14.02	709,500	196,500	143,000	1,049,000	14.57	2,058,500	28.61
3	71,941	21,010,000	816,500	11.34	690,500	271,500	197,000	1,159,000	16.10	1,975,500	27.46

[1] As described in the Conceptual Project Alternative section and as shown in Figures 2-4.
[2] Based on the average annual demands shown in Table 2.
[3] Equivalent annual cost for a 50 year project life at a 3% nominal annual interest rate.
[4] Equivalent annual cost per unit of water delivered.

Section 5
Conclusions

Based on qualitative analysis of the factors considered for the selection of the apparent best alternative Alternative 4 ranked substantially less favorable than the other alternatives and therefore was not considered for further evaluation. There is no significant differentiation between Alternatives 1, 2 and 3 based on the overall scores in the qualitative analysis. Alternative 2 ranks slightly more favorable than Alternatives 1 or 3, though the difference is minimal based on the qualitative nature of the analysis. The estimated life cycle cost of Alternative 3 is marginally less than that of Alternatives 1 and 2, but the life cycle costs for all three alternatives are within a few percent of each other. This difference is considered insignificant given the conceptual design level that the estimated construction costs are based on. Therefore, other factors must be considered in the selection of the apparent best alternative.

Evaluation of the cost components that are included in the life cycle cost estimates shows that Alternative 3 is the most vulnerable to future operations and replacement cost increases due to the fact that the alternative includes four pump stations. It follows that Alternative 1 would be the least impacted by the potential of increased operations and replacement costs since it has only one pump station and Alternative 2 would be slightly more vulnerable than Alternative 1 because it has two pump stations. Alternative 1 is the most sensitive to energy cost increases while Alternative 2 and 3 are approximately equivalent in this regard.

The District has expressed the need for project facilities to accommodate future capacity increases. Evaluation of the alternatives' ability to accommodate a future increase in capacity indicates that Alternative 1 is the least flexible due to the single long pipeline. The pipeline would have to be sized to accommodate future capacity increases which would increase the construction cost of the pipeline. Alternative 3 presents the least risk of restriction on the capacity of the future system since it does not include conveyance pipeline and pump stations can be designed for future expansion of capacity for a relatively small increase in initial construction cost. As discussed in the Main Canal – Delta Mendota Canal Intertie, Project Concept Development Study (AECOM 2010a) the capacity of the individual Main Canal reaches must also be considered when determining the capacity of the system to convey water in either direction.

Based on review of the qualitative comparison of alternatives, the estimated life cycle costs, the vulnerability of the alternatives to future cost increases and the flexibility of the alternatives to accommodate future capacity increases the apparent best alternative is Alternative 2.

Due to the inclusion of some existing canal system components in Alternative 2, some additional focused analysis of those existing elements of the system may need to be conducted prior to design. In addition, a detailed topographic survey of the project area and Main Canal facilities would be required prior to design of the project. The estimated capital cost for Alternative 2 (proposed project) is approximately $26,000,000.

Section 6
Proposed Project

The proposed project is Alternative 2. The major components and the operation of the proposed project are described below.

- Main Canal Pump Stations 1 through 4 will be replaced with two new pump stations, Stations 1A and 3A. New pipelines will be constructed to convey water from Stations 1A and 3A to Laterals 1N/S through 4N/S as shown in Figures 3, 10 and 11.

- Station 1A would be located approximately 200 feet east of existing Pump Station 1 on the north side of the SJR inlet channel. Station 3A would be located approximately 200 feet east of existing Pump Station 3 on the north side of the Main Canal. Stations 1A and 3A would be constructed with pumping capacities of 350 cfs and 310 cfs, respectively. Each station will consist of a large structure comprised of reinforced concrete floor, walls and deck. Each structure will be approximately 80 feet long and 50 feet wide. Station 1A will be approximately 25 to 30 feet tall, with the floor of the structure lying below the bottom of the inlet channel by approximately 10 feet. The structure will be recessed into the channel, such that the deck of the structure is at or below the surrounding road grade.

- Water will be conveyed from Station 1A through a 120-inch diameter ASTM C361 reinforced concrete pipeline along the north side of the existing Main Canal to a discharge point in the Main Canal just west of existing Pump Station 2. The Station 1A pipeline will include turnouts connected directly to Laterals 1N and 1S that are sized to enable delivery of water to meet peak demands on those laterals. Wells 1, 2 and 3 will be modified to enable the water produced from the wells to be pumped directly into the Station 1A pipeline unless the existing pump stations are maintained to convey groundwater. This configuration eliminates the need for Reach 1 of the Main Canal for conveyance of SJR water. The crossing of River Road with the 120-inch pipeline will likely utilize open cut excavation techniques with the roadway restored to pre-project condition after construction.

- Water will be conveyed from Station 3A through a 108-inch diameter ASTM C361 reinforced concrete pipeline along the north side of the existing Main Canal to a discharge point in the Main Canal just west of existing Pump Station 4. The Station 3A pipeline will include turnouts connected directly to Laterals 3N and 3S that are sized to enable delivery of water to meet peak demands on those laterals. This configuration eliminates the need for Reach 3 of the Main Canal for conveyance of SJR water, but the reach will be maintained to convey DMC water. A 108-inch diameter pipeline undercrossing of the UPRR and SR-33 will be installed by trenchless processes. The crossing of Hamilton Road with the 108-inch pipeline will likely utilize open cut excavation techniques with the roadway restored to pre-project condition after construction.

Table 12 presents a more detailed description of the major elements of the proposed project, including their approximate locations. Table 13 presents descriptions of observed constraints that potentially impact the alignment and location of proposed project facilities. The descriptions of the constraints include methods for resolution or mitigation of the constraint as noted.

Table 12. Location of Major System Elements for Proposed Project

System Element	Main Canal Station	Description
Station 1A and 1A Pipeline		
Inlet Structure	Sta. 1+00 to Sta. 2+00	Reinforced concrete inlet structure connecting Station 1A to the SJR intake channel.
Pump Station 1A	Sta. 1+70 to Sta. 2+00	Reinforced concrete structure with separated bays for 5 pumps, electric motors and associated facilities. Built to convey 310 cfs (upgradable to 350 cfs).
Manifold and Pipeline Connection	Sta. 2+30 to Sta. 3+10	Steel pipe manifold, isolation valves and check valves to connect 5 pumps to 120" RCP Station 1A Pipeline.
Station 1A Pipeline (120" RCP)	Sta. 3+10 to Sta. 45+20	Precast reinforced concrete pipe meeting ASTM C361 standards. Pipe design pressure at least 50 feet of head.
Well 1 Modification	Sta. 6+90	Modification of Well 1, including potential replacement of well pump and motor, and extension of discharge piping to connect to Station 1A pipeline.
Lateral 1N Turnout	Sta. 22+40	Tee in Station 1A Pipeline, a lateral pipeline and reinforced concrete energy dissipating structure discharging to Lateral 1N.
Lateral 1S Turnout	Sta. 22+40	Tee in Station 1A Pipeline, a lateral pipeline and reinforced concrete energy dissipating structure discharging to Lateral 1S.
Well 2 Modification	Sta. 25+10	Modification of Well 2, including potential replacement of well pump and motor, and extension of discharge piping to connect to Station 1A pipeline.
Well 3 Modification	Sta. 35+90	Modification of Well 3, including potential replacement of well pump and motor, and extension of discharge piping to connect to Station 1A pipeline.
Station 1A Pipeline Discharge Structure	Sta. 45+20 to Sta. 45+60	Reinforced concrete structure connecting Station 1A Pipeline to Main Canal, above existing Pump Station 2 discharge.
Station 3A and 3A Pipeline		
Inlet Structure	Sta. 66+20 to Sta. 67+00	Reinforced concrete inlet structure connecting Station 3A to the Main Canal below existing Pump Station 3.
Pump Station 3A	Sta. 66+70 to Sta. 67+70	Reinforced concrete structure with separated bays for 5 pumps, electric motors and associated facilities. Built to convey 270 cfs (upgradable to 310 cfs).
Manifold and Pipeline Connection	Sta. 67+50 to Sta. 68+30	Steel pipe manifold, isolation valves and check valves to connect 5 pumps to 108" RCP Station 3A Pipeline.
Station 3A Pipeline (108" RCP)	Sta. 68+30 to Sta. 98+40	Precast reinforced concrete pipe meeting ASTM C361 standards. Pipe design pressure at least 50 feet of head.
Lateral 3N Turnout	Sta. 79+40	Tee in Station 3A Pipeline, a lateral pipeline and reinforced concrete energy dissipating structure discharging to Lateral 3N.
Lateral 3S Turnout	Sta. 79+40	Tee in Station 3A Pipeline, a lateral pipeline and reinforced concrete energy dissipating structure discharging to Lateral 3S.
UPRR and SR-33 Undercrossing	Sta. 79+50 to Sta. 82+50	Trenchless, e.g. tunnel and jack, underground installation of approximately 300 feet of 108" pipe from east side of the UPRR to west side of SR-33.
Station 3A Pipeline Discharge Structure	Sta. 98+40 to Sta. 98+80	Reinforced concrete structure connecting 108" main pipeline to Main Canal above existing Pump Station 4 discharge.

Table 13. Observed Constraints for Proposed Project

System Element	Main Canal Station	Constraint	Comments
Station 1A and Inlet Structure	Sta. 0+90	Drain pipes into SJR intake channel	At eastern edge of construction site, extending from intake channel slope.
	Sta. 1+00 to Sta. 2+80	SJR intake channel	Potential alignment, location and elevations are constrained by the existing alignment of the SJR intake channel, the channel side slopes, depth of channel, water levels, and the need to maintain deliveries to Pump Station 1.
	Sta. 1+00 to Sta. 5+50	Existing access road	Road alignment conflicts with proposed location of Station 1A. Requires relocation of access road.
	Sta. 1+40	Gate on access road	Existing gate along access road may be impacted by construction and relocation of access road.
	Sta. 2+00 to Sta. 3+10	Easement	A corner of the proposed Station 1A structure appears to extend approximately 10 feet beyond current WSID ROW in this area.
	Sta. 1+00 to Sta. 44+50	Temporary construction easement	Area within existing ROW appears to be relatively narrow for open excavation construction techniques.
	Sta. 3+30 to Sta. 4+50	Existing Pump Station 1	Electrical wires, towers and transformers, concrete head wall, concrete building structure, foundations and pump intake structures, and steel discharge pipes extending up to Main Canal Reach 1 constrain location and alignment of proposed Pump Station 1A. Additionally, deliveries from Pump Station 1 must be maintained during most of the construction schedule.
	Sta. 1+00 to Sta. 2+80	Existing Topography	Potential alignment, location and elevations are constrained by the existing topography. The existing SJR intake channel is about 20 feet below surrounding grades with steep side slopes.
Station 1A Manifold	Sta. 2+30 to Sta. 3+10	Proposed Facilities	The alignment, locations and elevations are constrained by proposed Pump Station 1A and the Station 1A pipeline.
	Sta. 2+30 to Sta. 2+90	Easement	The proposed manifold appears to extend approximately to the current WSID ROW in this area.

System Element	Main Canal Station	Constraint	Comments
Station 1A Pipeline (120" RCP)	Sta. 1+00 to Sta. 44+50	Temporary construction easement	Area within existing Main Canal ROW appears to be relatively narrow for open excavation construction techniques. Additional easement may be required for construction.
	Sta. 4+50 to Sta. 5+00	Easement	Portions of pipeline would lie beyond current WSID ROW in this area. A triangular easement adjacent SR-33 should be acquired (approx. size - 25'x60').
	Sta. 4+00 to Sta. 1`2+00	Elevated Main Canal land topography	The western end of Main Canal Reach 1 is elevated above surrounding grade and supported by a levee up to approximately 8 feet in height with an access road atop. The Main Canal must remain operational during pipeline installation. The toe of slope for the levee lies within 5 feet of the paved access road under which the proposed pipeline is to be installed.
	Sta. 4+00 to Sta. 12+00	Paved access road	Excavation for pipeline installation will impact the 25-foot-wide paved access road, as the proposed pipeline will lie under the road.
	Sta. 6+90	Well 1 connection	Well 1 must discharge to the Station 1A pipeline but is constrained by system operating pressures and requires crossing of the Main Canal.
	Sta. 22+40	Station 1A Pipeline turnout connections to Laterals 1N and 1S	Connections are constrained by system operating pressures, alignment of existing laterals, and the need to cross the Main Canal.
	Sta. 22+70 to Sta. 23+10	River Road Crossing	Pipeline alignment must cross River Road. Excavation for pipeline installation will impact the 25-foot-wide paved County road.
	Sta. 23+50	Overhead power line and electrical tower adjacent River Road	The electrical power line and towers running along the west side of River Road can impact construction as special safety precautions and procedures must be followed when working near these facilities.
	Sta. 25+10	Well 2 connection	Well 2 must discharge to the Station 1A pipeline but is constrained by system operating pressures and requires crossing of the Main Canal.
	Sta. 23+30 to Sta. 43+00	Private irrigation ditches, irrigation control valves and cropped land	Private facilities appear to lie within WSID ROW and conflict with proposed pipeline alignment. Excavation may impact these facilities and they may need relocation.
	Sta. 30+00 to Sta. 45+00	Elevated/depressed Main Canal and topography	The eastern end of Main Canal Reach 1 is depressed by about 8 feet below surrounding grade and elevated above surrounding grade toward the eastern end of Reach 2 by about 8 feet. The Main Canal must remain operational during pipeline installation. The toe of the levee lies within about 10 feet of the proposed pipeline alignment.
	Sta. 35+90	Well 3 connection	Well 3 must discharge to the Station 1A pipeline but is constrained by system operating pressures and requires crossing of the Main Canal.
	Sta. 43+20 to Sta. 44+40	Existing Pump Station 2	Station 1A Pipeline (120" RCP)

System Element	Main Canal Station	Constraint	Comments
Station 1A Pipeline Discharge Structure	Sta. 45+00 to Sta. 45+50	Elevated Main Canal and topography	The eastern end of Main Canal Reach 2 is elevated above surrounding grade by about 8 feet. Deliveries along the Main Canal Reach 2 must be maintained during most of the construction schedule.
	Sta. 45+00 to Sta. 45+50	Pump Station 2 and Main Canal	Constrained by existing Main Canal structures locations, alignment and elevations, and proximity of Pump Station 2 structures, and steel discharge pipes extending up to Reach 2. Deliveries along the Main Canal Reach 2 must be maintained during most of construction schedule.
Station 3A and Inlet Structure	Sta. 66+00 to Sta. 67+70	Main Canal Reach 2	The alignments, locations and elevations are constrained by the existing alignment of the Main Canal Reach 2, the channel side slopes, depth of channel, water levels, and the need to maintain deliveries to Pump Station 3.
	Sta. 67+20 to Sta. 67+80	Easement	A corner of the proposed Station 3A structure appears to extend approximately 10 feet beyond current WSID ROW in this area.
	Sta. 67+00 to Sta. 68+30	Temporary construction easement	Area within existing ROW appears to be relatively narrow for open excavation construction techniques.
	Sta. 66+00 to Sta. 67+70	Private irrigation ditches, irrigation control valves and cropped land	Private facilities appear to lie within WSID ROW and conflict with proposed Station 3A facilities. Excavation may impact private facilities and they may need relocation.
	Sta. 77+50 to Sta. 79+50	Existing Pump Station 3	Concrete building structure, foundations and pump intake structures, and steel discharge pipes extending up to Reach 3 constrain location and alignment of proposed Station 3A. Additionally, deliveries from Pump Station 3 must be maintained during most of the construction schedule.
	Sta. 66+00 to Sta. 67+70	Existing Topography	The alignment, locations and elevations are constrained by the existing topography. The existing Main Canal Reach 2 is depressed by about 8 feet below surrounding grades with steep side slopes.
Station 3A Manifold	Sta. 68+00 to Sta. 68+30	Proposed Facilities	The alignment, locations and elevations are constrained by proposed Station 3A and Station 3A pipeline (108" RCP).
	Sta. 67+50 to Sta. 68+10	Easement	The proposed manifold appears to extend approximately to the WSID ROW in this area.
	Sta. 67+50 to Sta. 68+30	Private irrigation ditches, irrigation control valves and cropped land	Private facilities appear to lie within WSID ROW and conflict with proposed Station 3A facilities. Excavation may impact private facilities and they may need relocation.

System Element	Main Canal Station	Constraint	Comments
Station 3A Pipeline (108" RCP)	Sta. 68+30 to Sta. 79+50	Temporary construction easement	Area within existing Main Canal ROW appears to be relatively narrow for open excavation construction techniques. Additional easement may be required for construction.
	Sta. 68+30 to Sta. 79+30	Private irrigation ditches, irrigation control valves and cropped land	Private facilities appear to lie within WSID ROW and conflict with proposed Station 3A pipeline. Excavation may impact private facilities and they may need relocation.
	Sta. 79+40	Station 3A Pipeline turnout connections to Laterals 3N and 3S	Connections are constrained by system operating pressures, alignment of existing laterals, and the need to cross the Main Canal.
	Sta. 78+50 to Sta. 82+50	Access Road, UPRR, and SR-33	Pipeline alignment must cross the UPRR and SR-33. Trenchless installation will require construction entry and exit pits, as well as permitting and inspection by Caltrans and the Railroad.
	Sta. 81+90 to Sta. 82+50	Easement	Pipeline construction would extend beyond current WSID ROW in this area. A triangular easement adjacent to SR-33 may be required (approximately 25'x60').
	Sta. 81+90 to Sta. 98+00	Temporary construction easement	Insufficient room for proper excavation setbacks. Pipeline alignment appears to be within 10 feet of ROW.
	Sta. 81+90 to Sta. 98+00	Existing Pump Station 4	Concrete building structure, foundations and pump intake structures, and steel discharge pipes extending up to Reach 4 constrain location and alignment of the Station 3A Pipeline. Additionally, deliveries from Pump Station 4 must be maintained during most of the construction schedule.
Station 3A Pipeline Discharge Structure	Sta. 98+40 to Sta. 98+80	Elevated Main Canal and topography	The Main Canal along the eastern end of Reach 3 is elevated above surrounding grade by about 8 feet. Deliveries along the Main Canal Reach 3 must be maintained during most of the construction schedule.
	Sta. 98+40 to Sta. 98+80	Pump Station 4 and Main Canal	Constrained by existing Main Canal structure locations, alignment and elevations, and proximity of Pump Station 4 structures, and steel discharge pipes extending up to Reach 5. Deliveries along the Main Canal Reach 4 must be maintained during most of the construction schedule.

Section 7
References

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Stanislaus County, 2011. Stanislaus County Assessor Map Books website. http://qa.co.stanislaus.ca.us/AssessorWeb/public/MapBooks

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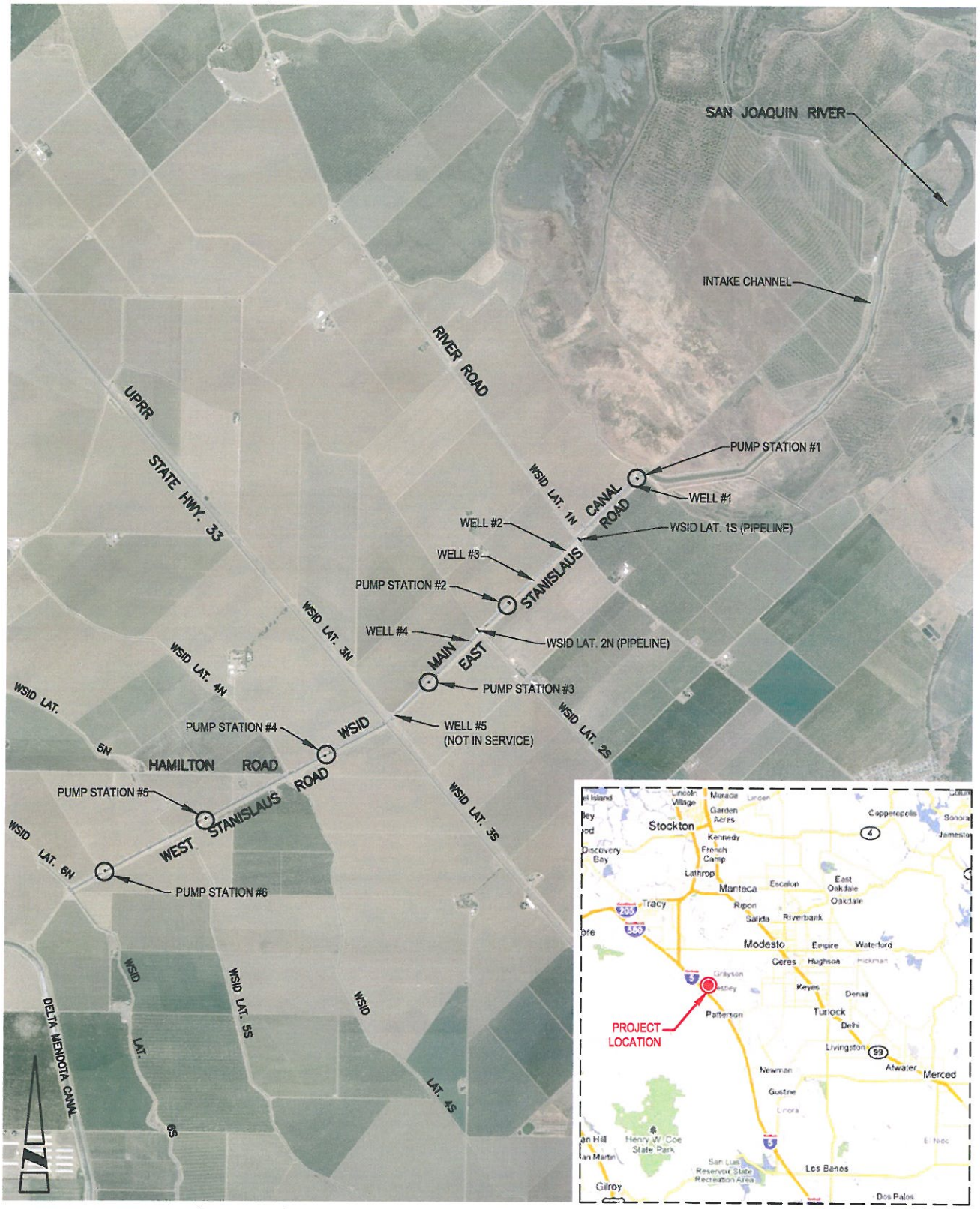
Figures



1" = 3000'

NOT TO SCALE

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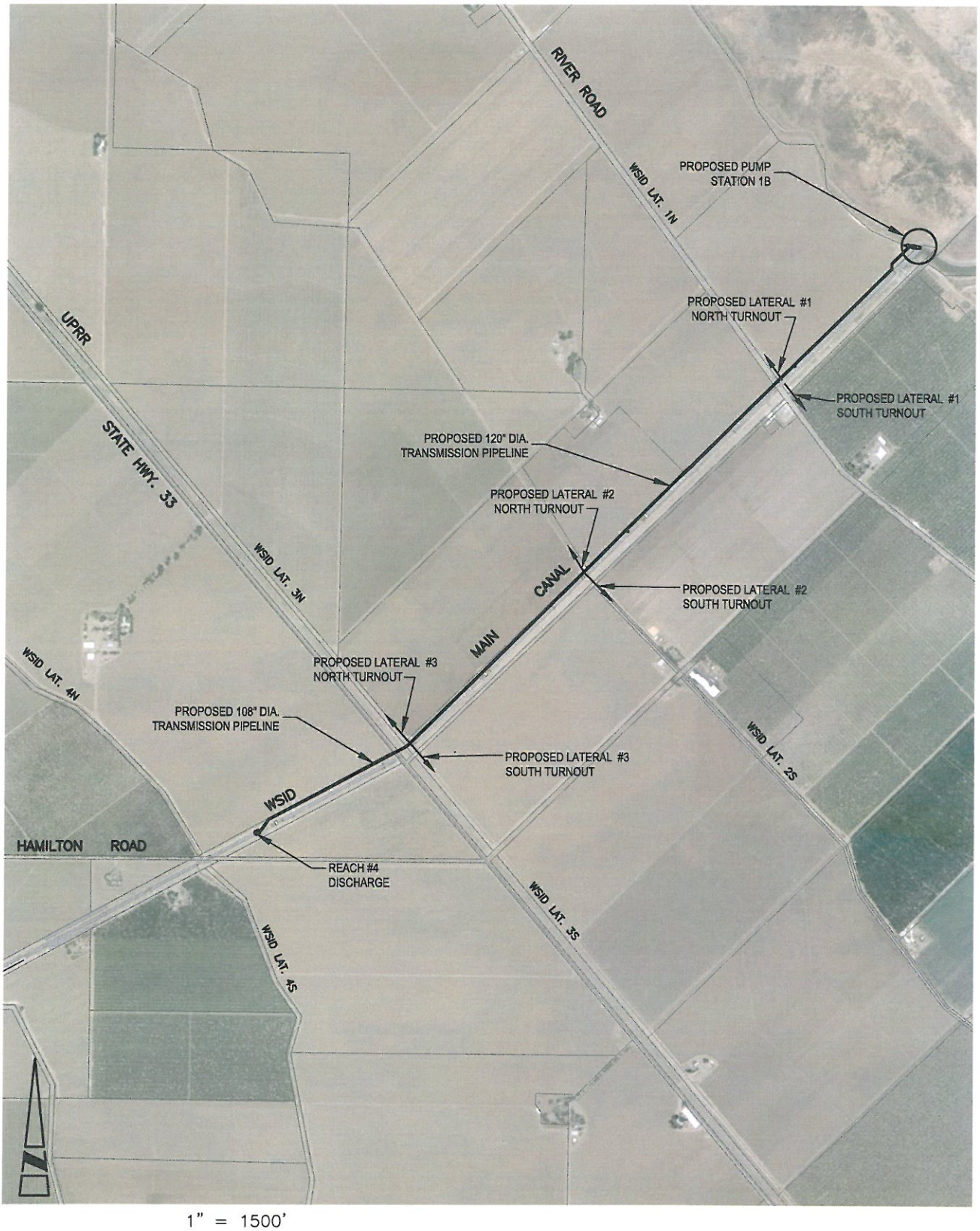
WEST STANISLAUS IRRIGATION DISTRICT

MAIN CANAL RENOVATION FEASIBILITY STUDY

LOCATION AND SITE MAP
EXISTING WATER CONVEYANCE SYSTEM FACILITIES

AECOM PROJECT NO.
60185095

FIGURE
1



1" = 1500'

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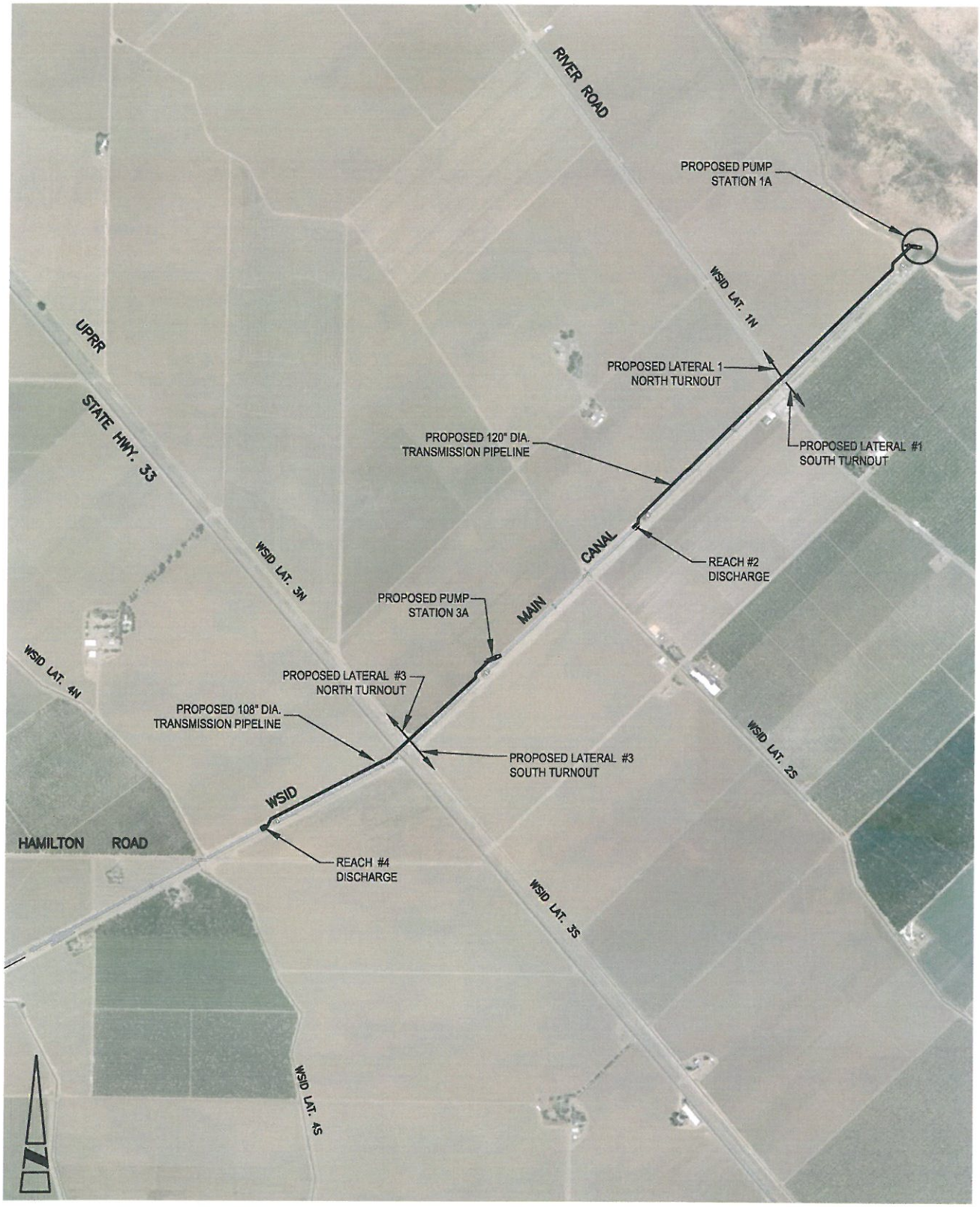
MAIN CANAL RENOVATION FEASIBILITY STUDY

ALTERNATIVE 1 - NEW STATION 1B WITH CONVEYANCE PIPELINE

AECOM PROJECT NO. 60185095

FIGURE 2



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MAIN CANAL RENOVATION FEASIBILITY STUDY

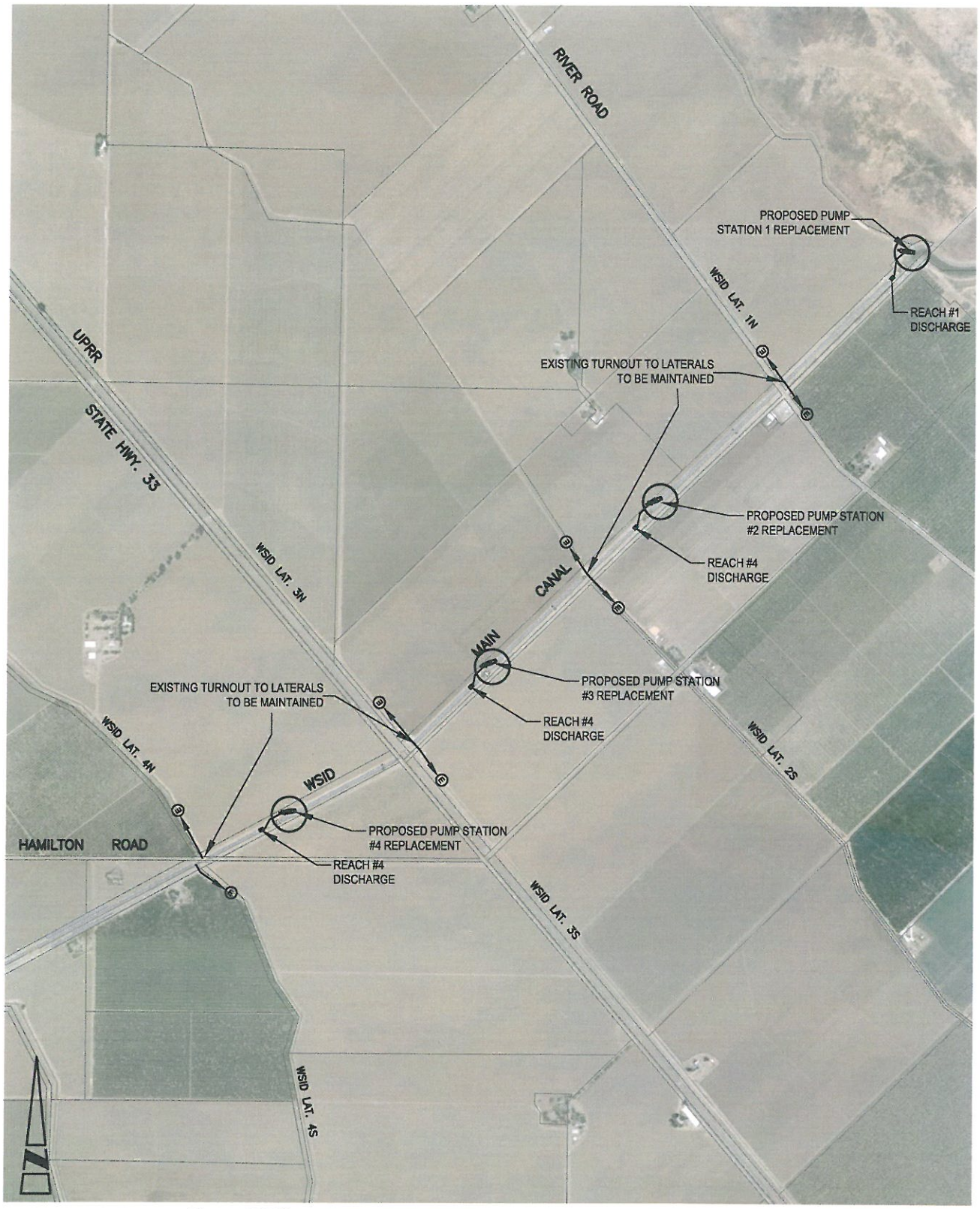
ALTERNATIVE 2 - NEW STATION 1A & STATION 3A WITH CONVEYANCE PIPELINES

AECOM PROJECT NO.

60185095

FIGURE

3



1" = 1500'

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MAIN CANAL RENOVATION FEASIBILITY STUDY

ALTERNATIVE 3 - REPLACEMENT OF EXISTING PUMP STATIONS 1 - 4

AECOM PROJECT NO. 60185095

FIGURE 4

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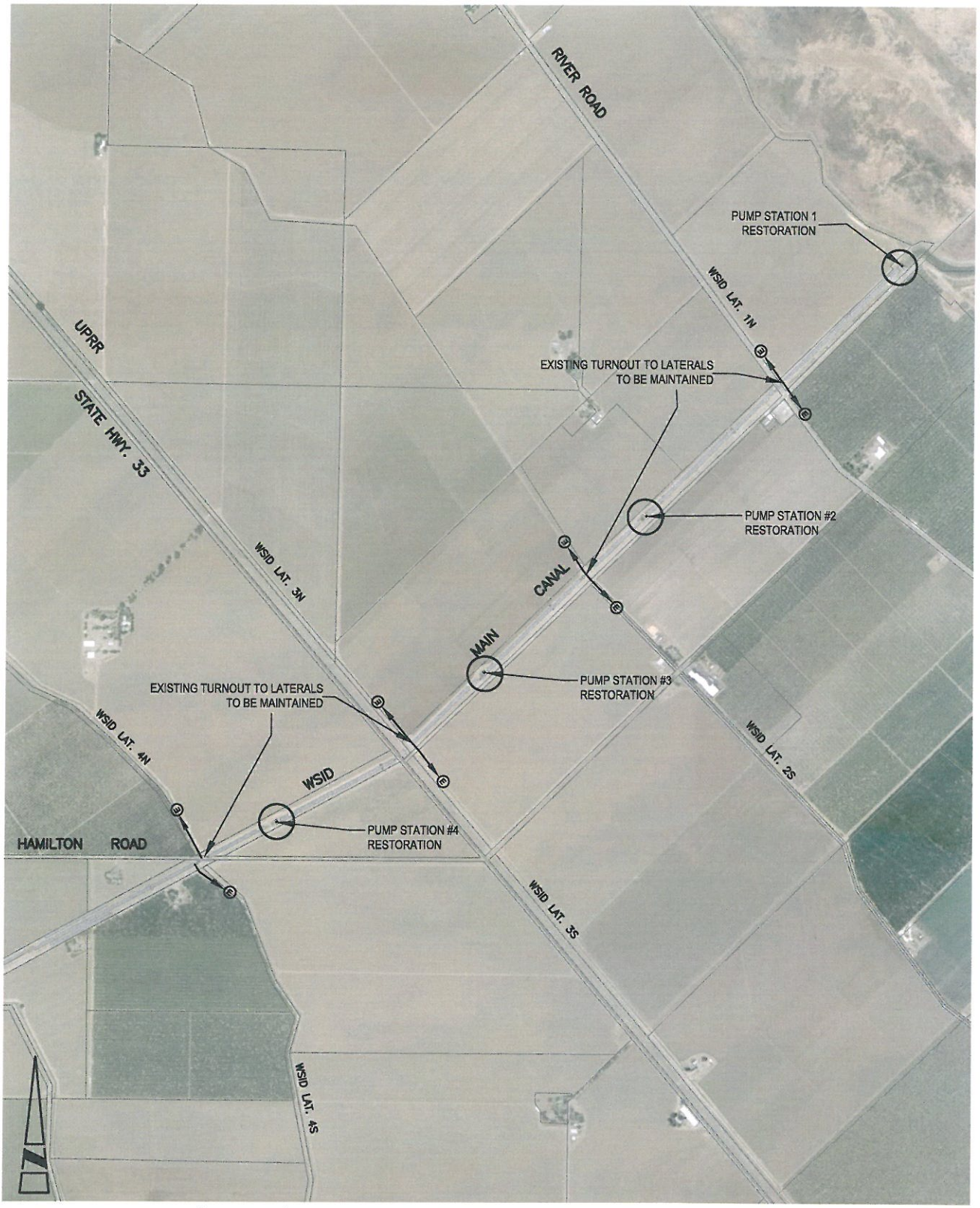

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MAIN CANAL RENOVATION FEASIBILITY STUDY

ALTERNATIVE 4 - RESTORATION AND UPGRADE OF PUMP STATIONS 1 - 4

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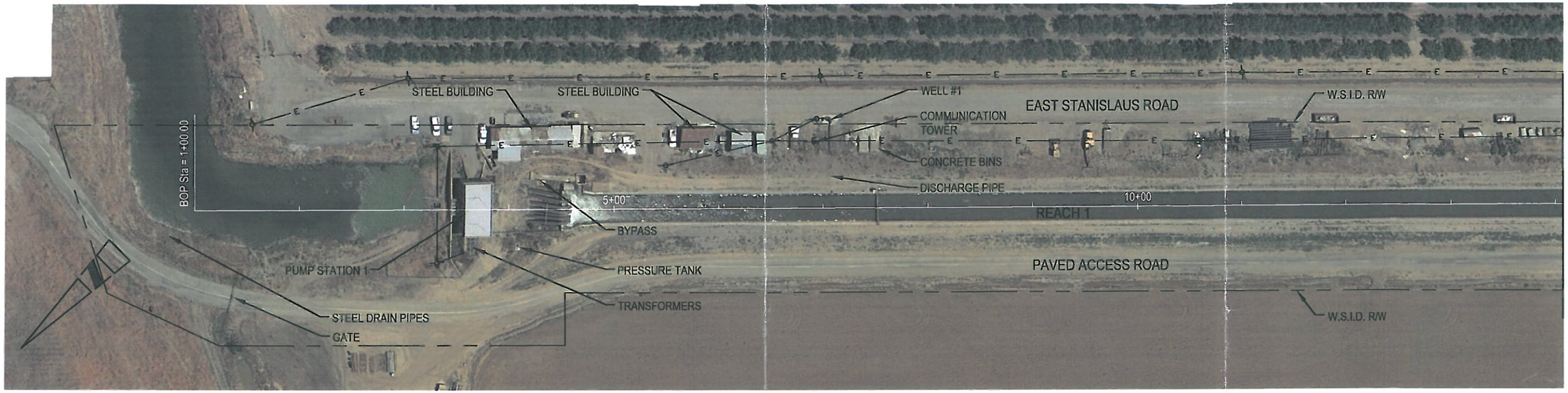
FIGURE 5



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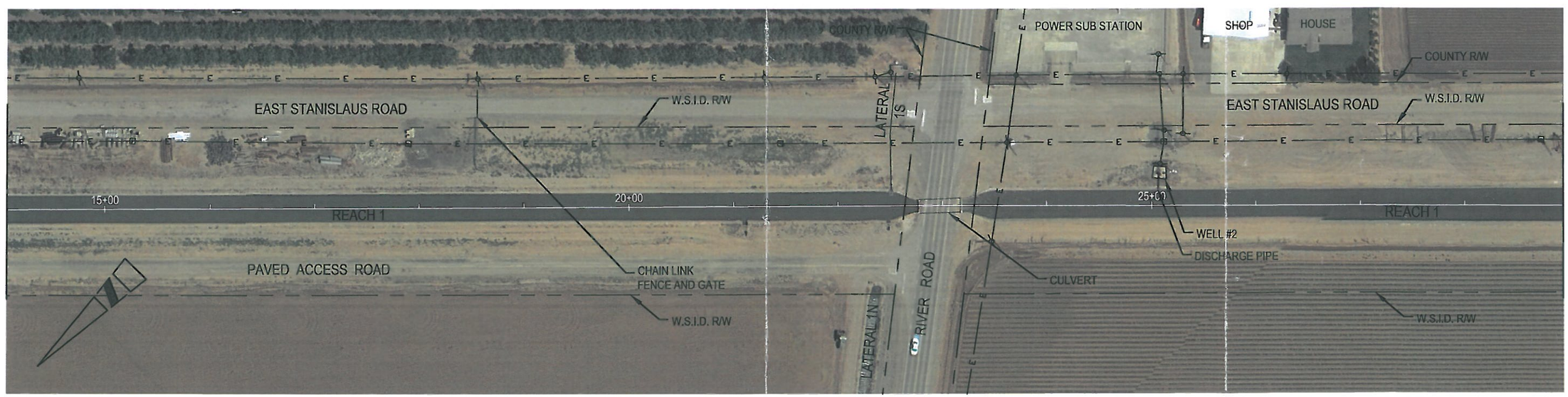

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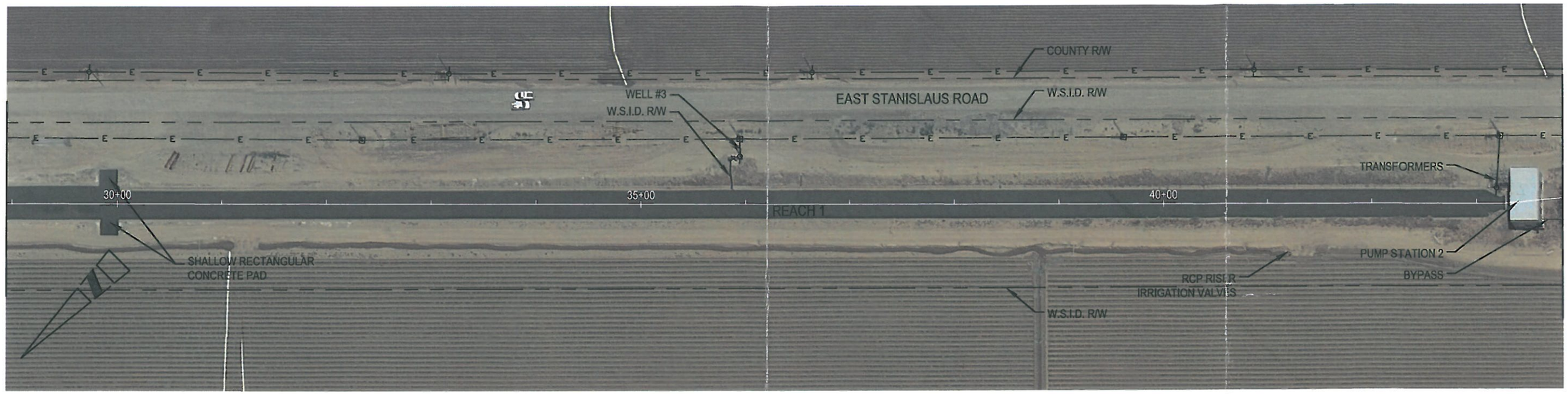
MAIN CANAL RENOVATION FEASIBILITY STUDY

CONSTRAINTS MAP

AECOM PROJECT NO. 60185095

FIGURE 6



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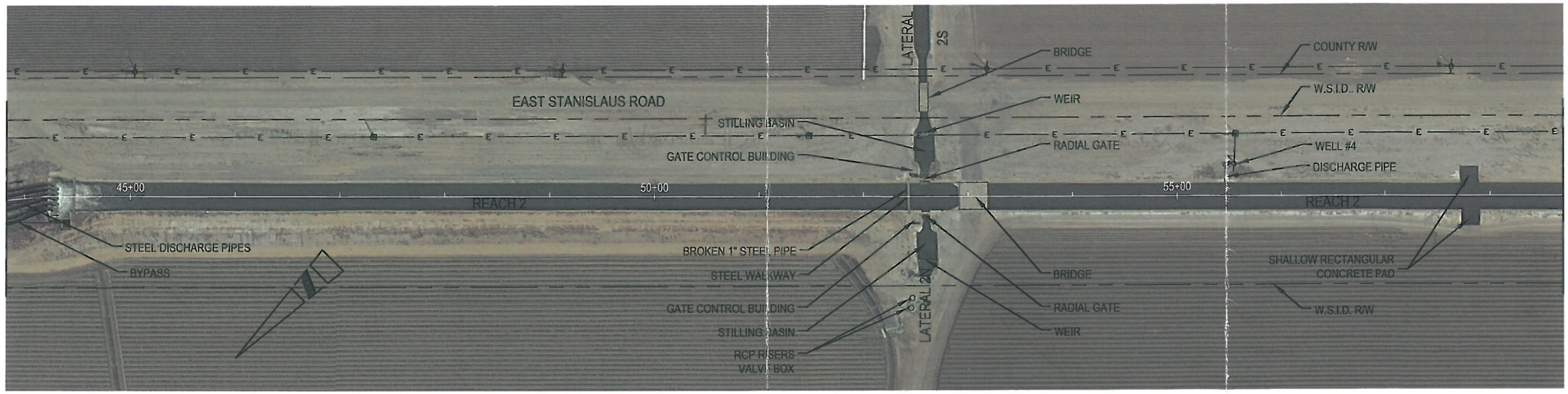

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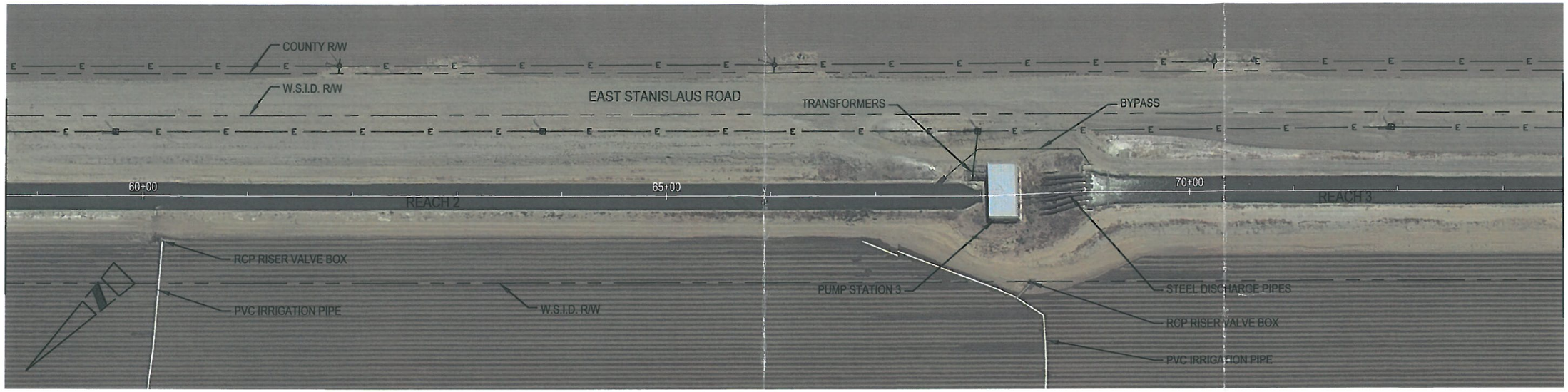
MAIN CANAL RENOVATION FEASIBILITY STUDY

CONSTRAINTS MAP

AECOM PROJECT NO. 60185095

FIGURE 7



MATCH LINE
SEE FIGURE 7

MATCH LINE
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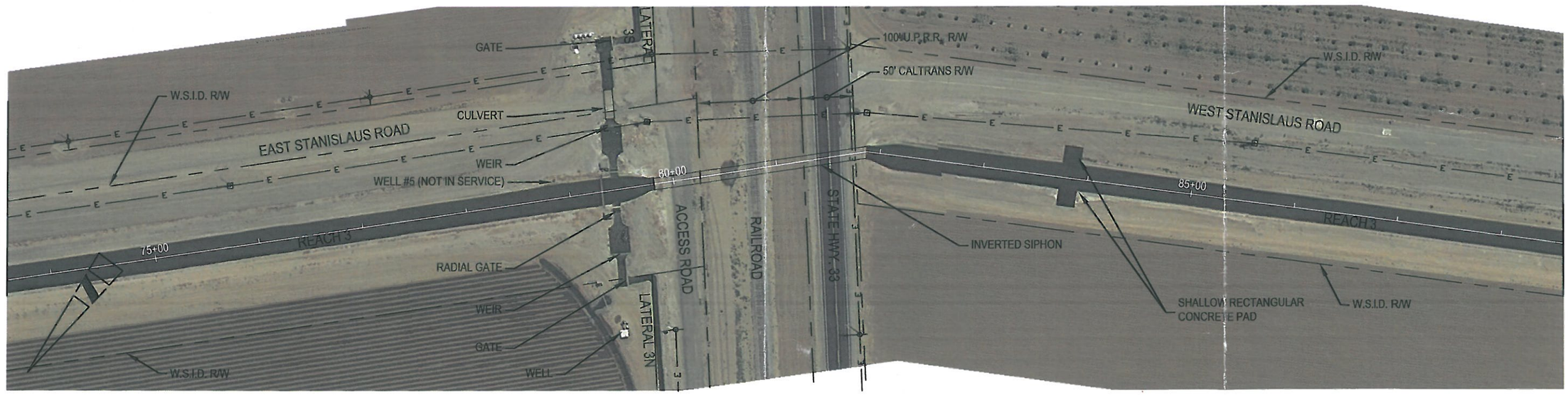

MATCH LINE
SEE UPPER RIGHT

MATCH LINE
SEE FIGURE 9

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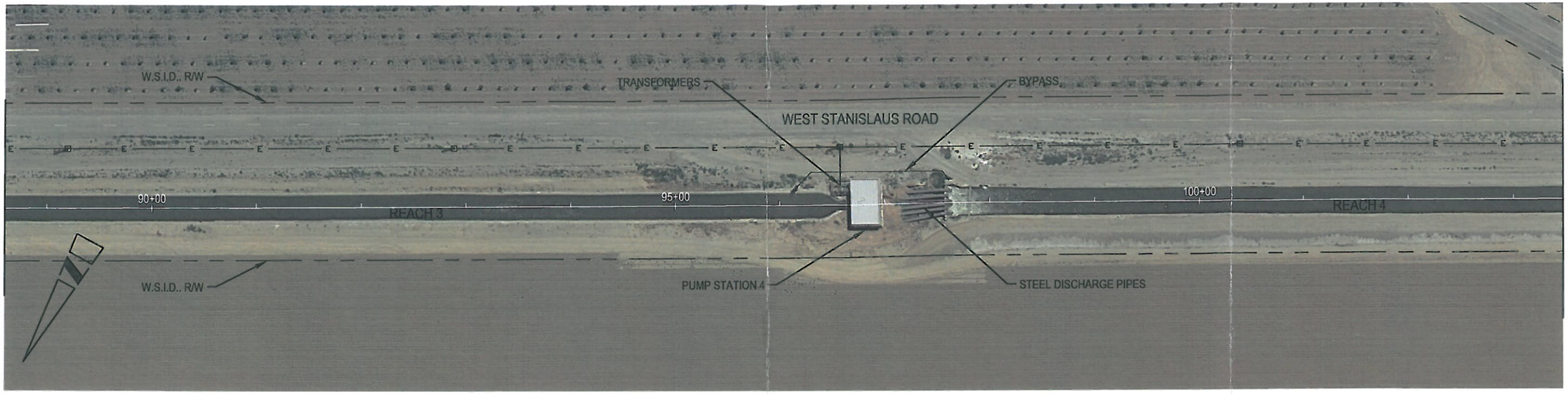
MAIN CANAL RENOVATION FEASIBILITY STUDY

CONSTRAINTS MAP

AECOM PROJECT NO. 60185095

FIGURE 8



MATCH LINE
SEE FIGURE 8

MATCH LINE
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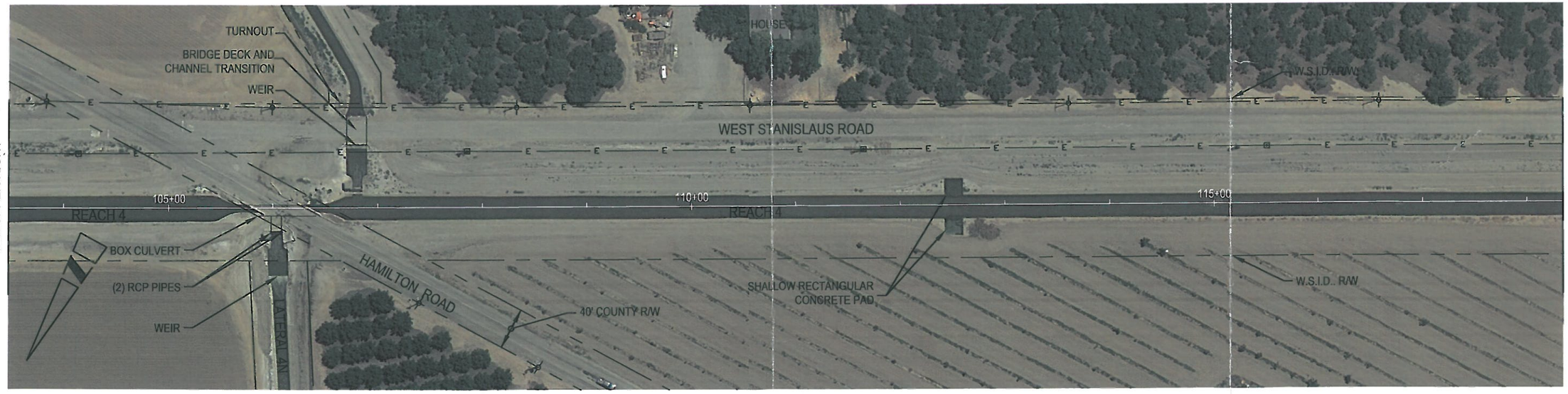

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SEE FIGURE 10

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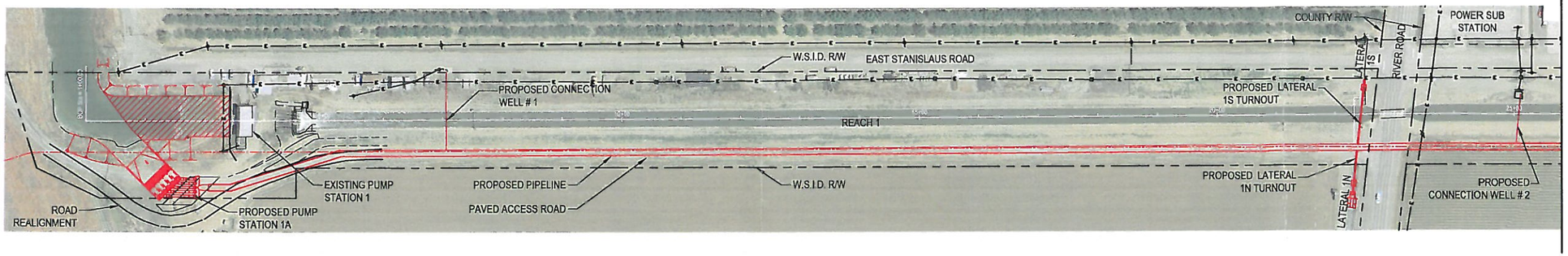
WEST STANISLAUS IRRIGATION DISTRICT

MAIN CANAL RENOVATION FEASIBILITY STUDY

CONSTRAINTS MAP

AECOM PROJECT NO. 60185095

FIGURE 9



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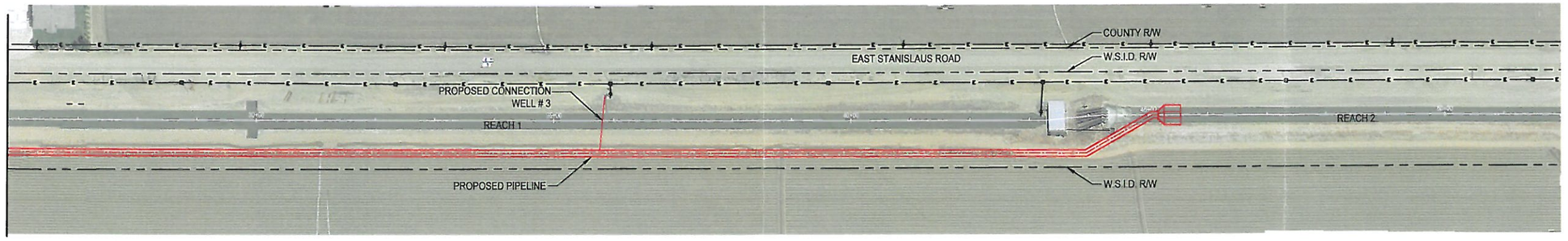

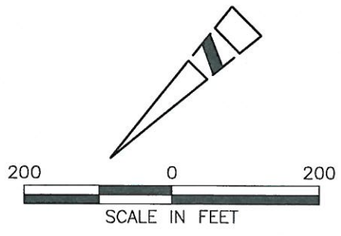

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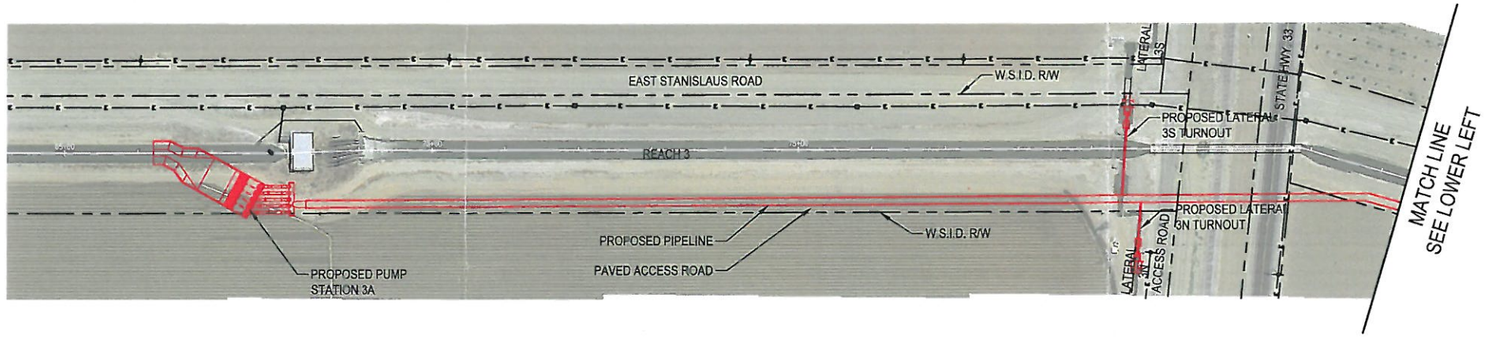
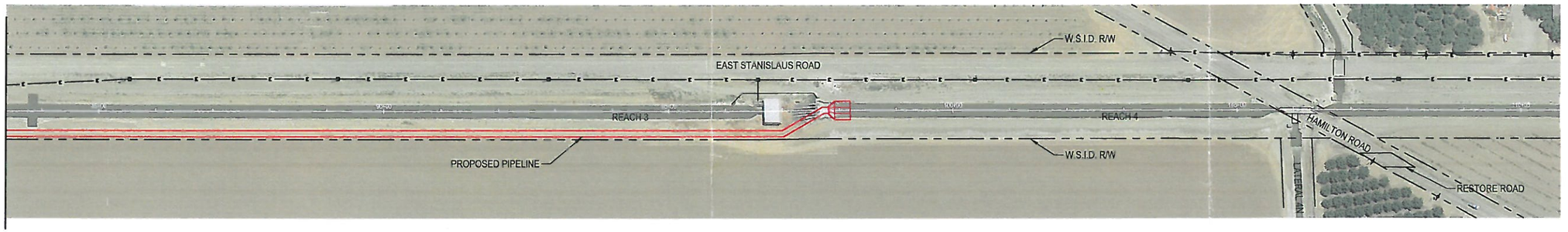
WEST STANISLAUS IRRIGATION DISTRICT

MAIN CANAL RENOVATION FEASIBILITY STUDY
ALTERNATIVE 2
PROPOSED PUMP STATION #1A

AECOM PROJECT NO. 60185095

FIGURE 10





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WEST STANISLAUS IRRIGATION DISTRICT

MAIN CANAL RENOVATION FEASIBILITY STUDY

ALTERNATIVE 2
PROPOSED PUMP STATION #3A

AECOM PROJECT NO. 60185095

FIGURE 11

Appendix A
Project Cost Estimates for Alternatives 1, 2, and 3

Main Canal Renovation Feasibility Study
Feasibility Level Project Cost Estimate
Alternative 1

Construction Cost

Element	Quantity	Units	Cost per Unit	Cost	
Mobilization/Demobilization	1	ea	$50,000	$50,000	
Demolition (existing channel)	60	ton	$20	$1,200	
Earthwork	30000	cuft	$1.55	$46,500	
Pump Station Structure	676	cuyd	$1,460	$986,960	
Valving & Manifolding	1	ea	$671,000	$671,000	
90 cfs VFD Pumps	2	ea	$465,000	$930,000	
90 cfs CSD Pumps	1	ea	$416,000	$416,000	
45 cfs VFD Pumps	1	ea	$254,000	$254,000	
45 cfs CSD Pumps	1	ea	$219,000	$219,000	
Transient Control (Pressure Tank and Accessories)	1	ea	LS	$104,900	
Electrical Control Building	1	ea	LS	$1,686,000	
Mainline Flow Metering	1	ea	$15,000	$15,000	
Turnout Installation w/ Metering	6	ea	$33,000	$198,000	
Replumb Existing Wells, Connect to Pipeline	5	ea	$40,000	$200,000	
78" Steel Pipe	20	feet	$800	$16,000	
108" Concrete Pipe	4350	feet	$1,250	$5,437,500	
120" Concrete Pipe	4800	feet	$1,450	$6,960,000	
Reach 4 Outlet Structure and Metering	1	ea	$36,000	$36,000	
18' Wide Paved Roadway	2200	feet	$180	$396,000	
Lateral Crossings	4	ea	$2,000	$8,000	
River Road Crossing	1	ea	LS	$20,300	
Trenchless SR-33 & RR Crossing (300 feet)	1	ea	LS	$1,160,000	
Construction Cost Subtotal					**$19,812,000**
Engineering, Legal, and Administrative	6.0%	of	$19,812,000	$1,189,000	
Environmental Compliance/SWPPP	1	ea	LS	$50,000	
Easement	2.2	ac	$12,000	$26,653	
Construction Mgmt and Administration	6.0%	of	$19,812,000	$1,189,000	
Subtotal					**$2,454,653**
Capital Cost Subtotal					**$22,266,653**
Contingencies	20% of		$22,266,653		$4,453,000
TOTAL PROJECT COST					**$26,719,653**

Main Canal Renovation Feasibility Study
Feasibility Level Operations and Maintenance Cost Estimate
Alternative 1

Replacement Costs (50 Year Life)					
Pump Replacement Cost @ 20 yr interval	5	ea	LS		$1,819,000
Butterfly Valving Replacement Cost @ 10 yr interval	17	ea	LS		$159,500
Check Valving Replacement Cost @ 10 yr interval	5	ea	$10,500	per	$52,500
Air Relief Valve Replacement Cost @ 10 yr interval	5	ea	$5,500	per	$27,500
Electro-Mechanical Control Systems Cost @ 15 yr interval	1	ea	LS		$986,500
Metering Cost @ 10 yr interval	7	ea	$25,000	per	$175,000
Annual Operations Costs					
Annual Electrical Cost	9,381,423	kW-hr	$0.08	per kW-hr	$750,500
Annual Labor Cost[1]			LS		$113,500
TOTAL OPERATION COST					**$864,000**
Administration Costs					
Annual Labor[2]	36	Man-hours	$35	per Hr	$1,250
TOTAL ADMINISTRATION COST					**$1,250**

[1] Annual operations labor cost estimate based on 0.25% of capital cost for pipeline facilities and 1.25% of capital cost for pump station and related facilities.

[2] Administrative costs estimate based on 3 hours per month of labor for entire facility plus 10% for each additional pump station.

Main Canal Renovation Feasibility Study
Feasibility Level Project Cost Estimate
Alternative 2

Construction Cost

Element	Quantity	Units	Cost per Unit	Cost	
Mobilization/Demobilization	1	ea	$25,000	$25,000	
Demolition (existing channel)	60	ton	$20	$1,200	
Earthwork	30,000	cuft	$1.55	$46,500	
Pump Station Structure	676	cuyd	$1,460	$986,960	
Valving & Manifolding	1	ea	$671,000	$671,000	
90 cfs VFD Pumps	2	ea	$293,000	$586,000	
90 cfs CSD Pumps	1	ea	$266,000	$266,000	
45 cfs VFD Pumps	1	ea	$168,000	$168,000	
45 cfs CSD Pumps	1	ea	$144,000	$144,000	
Transient Control (Pressure Tank and Accessories)	1	ea	LS	$64,300	
Electrical Control Building	1	ea	LS	$1,086,000	
Mainline Flow Metering	1	ea	$15,000	$15,000	
Turnout Installation w/ Metering	2	ea	$33,000	$66,000	
Replumb Existing Wells, Connect to Pipeline	3	ea	$40,000	$120,000	
78" Steel Pipe	20	feet	$800	$16,000	
120" Concrete Pipe	4,250	feet	$1,450	$6,162,500	
Reach 2 Outlet Structure and Metering	1	ea	$36,000	$36,000	
18' Wide Paved Roadway	2,200	feet	$180	$396,000	
Lateral 1 Crossing	1	ea	LS	$2,000	
River Road Crossing	1	ea	LS	$20,300	
Pump Station 1A Subtotal					**$10,879,000**
Demolition (existing channel)	60	ton	$20	$1,200	
Earthwork	30,000	cuft	$1.55	$46,500	
Pump Station Structure	533	cuyd	$1,460	$778,000	
Valving & Manifolding	1	ea	$658,000	$658,000	
78 cfs VFD Pumps	2	ea	$241,000	$482,000	
78cfs CSD Pumps	1	ea	$215,000	$215,000	
39 cfs VFD Pumps	1	ea	$166,000	$166,000	
39 cfs CSD Pumps	1	ea	$143,000	$143,000	
Transient Control (Pressure Tank and Accessories)	1	ea	LS	$64,300	
Electrical Control Building	1	ea	LS	$931,000	
Mainline Flow Metering	1	ea	$15,000	$15,000	
Turnout Installation w/ Metering	2	ea	$33,000	$66,000	
Replumb Existing Wells, Connect to Pipeline	1	ea	$40,000	$120,000	
78" Steel Pipe	20	feet	$800	$16,000	
108" Concrete Pipe	2,650	feet	$1,250	$3,312,500	
Reach 4 Outlet Structure and Metering	1	ea	$36,000	$36,000	
Lateral 3 Crossing	1	ea	LS	$2,000	
Trenchless SR-33 & RR Crossing (300 feet)	1	ea	LS	$1,160,000	
Pump Station 3A Subtotal					**$8,213,000**
Construction Cost Subtotal					**$19,092,000**
Engineering, Legal, and Administrative	6.5%	of	$19,092,000	$1,241,000	
Environmental Compliance/SWPPP	1	ea	LS	$50,000	
Easement	2.2	ac	$12,000	$26,653	
Construction Mgmt and Administration	6.5%	of	$19,092,000	$1,241,000	
Subtotal					**$2,558,653**
Capital Cost Subtotal					**$21,650,653**
Contingencies	20%	of	$21,650,653		**$4,330,000**
TOTAL PROJECT COST					**$25,980,653**

Main Canal Renovation Feasibility Study
Feasibility Level Operations and Maintenance Cost Estimate
Alternative 2

Replacement Costs (50 Year Life)					
Pump Replacement Cost @ 20 yr interval	10	ea	LS		$1,365,000
Butterfly Valving Replacement Cost @ 10 yr interval	1	ea	LS		$224,000
Check Valving Replacement Cost @ 10 yr interval	10	ea	$10,500	per	$105,000
Air Relief Valve Replacement Cost @ 10 yr interval	14	ea	$5,500	per	$77,000
Electro-Mechanical Control Systems Cost @ 15 yr interval	2	ea	LS		$1,180,000
Metering Cost @ 10 yr interval	6	ea	$25,000	per	$150,000
Annual Operations Costs					
Annual Electrical Cost	8,614,267	kW-hr	$0.08	per kW-hr	$689,000
Annual Labor Cost[1]			LS		$139,000
TOTAL OPERATION COST					**$828,000**
Administration Costs					
Annual Labor[2]	40	Man-hours	$35	per Hr	$1,400
TOTAL ADMINISTRATION COST					**$1,400**

[1] Annual operations labor cost estimate based on 0.25% of capital cost for pipeline facilities and 1.25% of capital cost for pump station and related facilities.

[2] Administrative costs estimate based on 3 hours per month of labor for entire facility plus 10% for each additional pump station.

Main Canal Renovation Feasibility Study
Feasibility Level Project Cost Estimate
Alternative 3

Construction Cost

Element	Quantity	Units	Cost per Unit	Cost	
Mobilization/Demobilization	1	ea	$50,000	$50,000	
Demolition (existing channel)	175	ton	$20	$3,500	
Earthwork	45000	cuft	$1.55	$70,000	
Channel Repairs/Improvements	4000	ft	$55	$220,000	
Pump Station Structure	676	cuyd	$1,460	$987,000	
Manifolding & Valving	1	ea	$671,000	$671,000	
90 cfs VFD Pumps	2	ea	$183,000	$366,000	
90 cfs CSD Pumps	1	ea	$159,000	$159,000	
45 cfs VFD Pumps	1	ea	$122,000	$122,000	
45 cfs CSD Pumps	1	ea	$97,000	$97,000	
Electrical Control Building	1		LS	$671,000	
Mainline Flow Metering	1	ea	$15,000	$15,000	
Reach 1 Outlet Structure and Metering	1	ea	$36,000	$36,000	
78" Steel Pipe	20	feet	$800	$16,000	
120" Concrete Pipe	350	feet	$1,450	$508,000	
18' Wide Paved Roadway	650	feet	$180	$117,000	
Pump Station 1 Replacement Subtotal					**$4,109,000**
Demolition (existing channel)	175	ton	$20	$3,500	
Earthwork	45000	cuft	$1.55	$70,000	
Channel Repairs/Improvements	2400	ft	$55	$132,000	
Pump Station Structure	676	cuyd	$1,460	$987,000	
Manifolding & Valving	1	ea	$671,000	$671,000	
88 cfs VFD Pumps	2	ea	$183,000	$366,000	
88 cfs CSD Pumps	1	ea	$159,000	$159,000	
44 cfs VFD Pumps	1	ea	$122,000	$122,000	
44 cfs CSD Pumps	1	ea	$97,000	$97,000	
Electrical Control Building	1		LS	$671,000	
Mainline Flow Metering	1	ea	$15,000	$15,000	
Reach 2 Outlet Structure and Metering	1	ea	$36,000	$36,000	
78" Steel Pipe	20	feet	$800	$16,000	
120" Concrete Pipe	350	feet	$1,450	$508,000	
Pump Station 2 Replacement Subtotal					**$3,854,000**
Demolition (existing channel)	175	ton	$20	$3,500	
Earthwork	45000	cuft	$1.55	$70,000	
Channel Repairs/Improvements	2600	ft	$35	$91,000	
Pump Station Structure	676	cuyd	$1,460	$987,000	
Manifolding & Valving	1	ea	$658,000	$658,000	
78 cfs VFD Pumps	2	ea	$182,000	$364,000	
78 cfs CSD Pumps	1	ea	$158,000	$158,000	
39 cfs VFD Pumps	1	ea	$117,000	$117,000	
39 cfs CSD Pumps	1	ea	$92,000	$92,000	
Electrical Control Building	1	ea	LS	$658,000	
Mainline Flow Metering	1	ea	$15,000	$15,000	
Reach 3 Outlet Structure and Metering	1	ea	$36,000	$36,000	
78" Steel Pipe	20	feet	$800	$16,000	
108" Concrete Pipe	350	feet	$1,250	$438,000	
Pump Station 3 Replacement Subtotal					**$3,704,000**
Demolition (existing channel)	175	ton	$20	$3,500	
Earthwork	45000	cuft	$1.55	$70,000	
Channel Repairs/Improvements	825	ft	$35	$29,000	
Pump Station Structure	676	cuyd	$1,460	$987,000	
Manifolding & Valving	1	ea	$658,000	$658,000	
75 cfs VFD Pumps	2	ea	$182,000	$364,000	
75 cfs CSD Pumps	1	ea	$158,000	$158,000	
38 cfs VFD Pumps	1	ea	$117,000	$117,000	
38cfs CSD Pumps	1	ea	$92,000	$92,000	
Electrical Control Building	1	ea	LS	$658,000	
Mainline Flow Metering	1	ea	$15,000	$15,000	
Reach 3 Outlet Structure and Metering	1	ea	$36,000	$36,000	
78" Steel Pipe	20	feet	$800	$16,000	
108" Concrete Pipe	350	feet	$1,250	$438,000	
Pump Station 4 Replacement Subtotal					**$3,642,000**
Construction Cost Subtotal					**$15,307,000**
Engineering, Legal, and Administrative	7.0%	of	$15,307,000	$1,071,000	
Environmental Compliance/SWPPP	1	ea	LS	$50,000	
Easement	1.0	ac	$12,000	$12,000	
Construction Mgmt and Administration	7.0%	of	$15,307,000	$1,071,000	
Subtotal					**$2,204,000**
Capital Cost Subtotal					**$17,511,000**
Contingencies	20%	of	$17,511,000		**$3,502,000**
TOTAL PROJECT COST					**$21,013,000**

Main Canal Renovation Feasibility Study
Feasibility Level Operations and Maintenance Cost Estimate
Alternative 3

Replacement Costs (50 Year Life)					
Pump Replacement Cost @ 20 yr interval	20	ea	LS		$2,950,000
Butterfly Valving Replacement Cost @ 10 yr interval	20	ea	LS		$354,000
Check Valving Replacement Cost @ 10 yr interval	20	ea	$10,500	per	$210,000
Air Relief Valve Replacement Cost @ 10 yr interval	4	ea	$5,500	per	$22,000
Electro-Mechanical Control Systems Cost @ 15 yr interval	1	ea	LS		$1,555,000
Metering Cost @ 10 yr interval	20	ea	$25,000	per	$500,000
Annual Operations & Maintenance Costs					
Annual Electrical Cost	8,381,199	kW-hr	$0.08	per kW-hr	$670,500
Annual Labor Cost[1]			LS		$191,500
TOTAL OPERATION COST					**$862,000**
Administration Costs					
Annual Labor[2]	44	Man-hours	$35	per Hr	$1,500
TOTAL ADMINISTRATION COST					**$1,500**

[1] Annual operations labor cost estimate based on 0.25% of capital cost for pipeline facilities and 1.25% of capital cost for pump station and related facilities.

[2] Administrative costs estimate based on 3 hours per month of labor for entire facility plus 10% for each additional pump station.

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West Stanislaus Irrigation District
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Westside San Joaquin River Watershed Coalition Monitoring Data

2011 MRP Test Results
for WSID Drainages

Constituent	Number of Test	Range		Average	Units	Matrix
		Min	Max			
DO	53	2.7	8.55	6.67	mg/l	
EC	53	114	1328	462	µmhos/cm	
pH	53	6.34	7.84	7.04		
Temp	53	5	24	13.55	℃	
Aldicarb	41	ND	ND	ND	ug/L	samplewater
Aldrin	41	ND	ND	ND	ug/L	samplewater
Ammonia as N	44	ND	1.5	0.27	mg/L	samplewater
Arsenic	41	0.93	7.6	2.90	ug/L	samplewater
Atrazine	41	ND	ND	ND	ug/L	samplewater
Azinphos methyl	41	ND	ND	ND	ug/L	samplewater
Boron	41	74	1260	319	ug/L	samplewater
Bromide	44	ND	1.2	0.19	mg/L	samplewater
Cadmium	41	ND	0.24	0.01	ug/L	samplewater
Cadmium (Dissolved)	41	ND	0.05	ND	ug/L	samplewater
Carbaryl	41	ND	ND	ND	ug/L	samplewater
Carbofuran	41	ND	0.054	ND	ug/L	samplewater
Chlordane, Alpha-	41	ND	ND	ND	ug/L	samplewater
Chlordane, gamma-	41	ND	ND	ND	ug/L	samplewater
Chlorpyrifos	41	ND	0.38	0.02	ug/L	samplewater
Copper	41	1.9	56	9.52	ug/L	samplewater
Copper (Dissolved)	41	0.74	8.9	2.58	ug/L	samplewater
Cyanazine	41	ND	ND	ND	ug/L	samplewater
DDD(p,p')	41	ND	0.0066	ND	ug/L	samplewater
DDE(p,p')	41	ND	0.1	0.01	ug/L	samplewater
DDT(p,p')	41	ND	0.012	ND	ug/L	samplewater
Decachlorobiphenyl(Surrogate)	41	28.8	91	63.49	%	samplewater
Demeton-s	41	ND	ND	ND	ug/L	samplewater
Diazinon	41	ND	ND	ND	ug/L	samplewater
Dichlorvos	41	ND	ND	ND	ug/L	samplewater
Dicofol	41	ND	0.017	ND	ug/L	samplewater
Dieldrin	41	ND	0.0065	ND	ug/L	samplewater
Dimethoate	41	ND	0.62	ND	ug/L	samplewater
Diphenamid(Surrogate)	43	35	100	72.40	%	samplewater
Dissolved Organic Carbon	44	2.2	13	4.82	mg/L	samplewater
Dissolved Solids	44	99	1000	381	mg/L	samplewater
Disulfoton	41	ND	ND	ND	ug/L	samplewater
Diuron	41	ND	3.1	0.14	ug/L	samplewater
E. coli	44	3	2400	737	MPN/100mL	samplewater
Endosulfan I	41	ND	ND	ND	ug/L	samplewater
Endosulfan II	41	ND	ND	ND	ug/L	samplewater
Endosulfan Sulfate	41	ND	ND	ND	ug/L	samplewater
Endrin	41	ND	ND	ND	ug/L	samplewater
EPTC	41	ND	ND	ND	ug/L	samplewater
Hardness as CaCO3	44	29	470	183	mg/L	samplewater
HCH, alpha	41	ND	ND	ND	ug/L	samplewater

2011 MRP Test Results
for WSID Drainages

Constituent	Number of Test	Range		Average	Units	Matrix
		Min	Max			
HCH, beta	41	ND	ND	ND	ug/L	samplewater
HCH, delta	41	ND	ND	ND	ug/L	samplewater
HCH, gamma	41	ND	ND	ND	ug/L	samplewater
Heptachlor	41	ND	ND	ND	ug/L	samplewater
Heptachlor epoxide	41	ND	ND	ND	ug/L	samplewater
Lead	41	0.2	21	2.57	ug/L	samplewater
Lead (dissolved)	41	ND	0.36	ND	ug/L	samplewater
Linuron	41	ND	ND	ND	ug/L	samplewater
Malathion	41	ND	0.067	ND	ug/L	samplewater
Methamidophos	43	ND	ND	ND	ug/L	samplewater
Methidathion	41	ND	ND	ND	ug/L	samplewater
Methiocarb	41	ND	ND	ND	ug/L	samplewater
Methomyl	41	ND	ND	ND	ug/L	samplewater
Methoxychlor	41	ND	ND	ND	ug/L	samplewater
Nickel	41	1.8	122	13.36	ug/L	samplewater
Nickel (Dissolved)	41	0.86	4.2	2.07	ug/L	samplewater
Nitrate + Nitrite as N	44	ND	11	3.17	mg/L	samplewater
Nitrogen, Total Kjeldahl	44	ND	3.9	1.22	mg/L	samplewater
OrthoPhosphate as P	44	ND	1.8	0.18	mg/L	samplewater
Oxamyl	41	ND	ND	ND	ug/L	samplewater
Parathion, Ethyl	41	ND	ND	ND	ug/L	samplewater
Parathion, Methyl	41	ND	ND	ND	ug/L	samplewater
Phorate	41	ND	ND	ND	ug/L	samplewater
Phosmet	41	ND	ND	ND	ug/L	samplewater
Phosphate as P	44	0.021	2	0.31	mg/L	samplewater
Pimephales promelas	46	82.5	100	96.25	%	samplewater
Prowl	41	ND	ND	ND	ug/L	samplewater
Selenium	13	0.12	1.9	0.80	ug/L	samplewater
Selenium (reaction cell)	28	0.19	1.8	0.54	ug/L	samplewater
Simazine	41	ND	ND	ND	ug/L	samplewater
Suspended Solids	44	ND	1550	156	mg/L	samplewater
Tetrachloro-m-xylene(Surrogate)	41	36.7	76.7	52.09	%	samplewater
Total Organic Carbon	44	2.6	16	5.23	mg/L	samplewater
Total Solids	2	96	97	96.50	%	samplewater
Toxaphene	41	ND	0.77	ND	ug/L	samplewater
Tributylphosphate(Surrogate)	123	64.2	146	91.62	%	samplewater
Trifluralin	41	ND	ND	ND	ug/L	samplewater
Triphenyl phosphate(Surrogate)	82	67.9	142	94.50	%	samplewater
Turbidity	44	1.5	660	73.52	NTU	samplewater
Zinc	41	3.4	120	23.32	ug/L	samplewater
Zinc (Dissolved)	41	ND	30	5.10	ug/L	samplewater
Allethrin	5	ND	ND	ND	ug/kg	sediment
Bifenthrin	5	0.16	5.1	2.71	ug/kg	sediment
Chlorpyrifos	5	ND	4.1	1.25	ug/kg	Sediment
Clay <0.005 mm	5	0.9	33.19	18.58	%	sediment

2011 MRP Test Results
for WSID Drainages

Constituent	Number of Test	Range		Average	Units	Matrix
		Min	Max			
Cyfluthrin	3	ND	ND	ND	ug/kg	sediment
Cyfluthrin, total	2	ND	ND	ND	ug/kg	Sediment
Cyhalothrin, lambda, total	2	0.85	3.5	2.18	ug/kg	Sediment
Cypermethrin	3	ND	ND	ND	ug/kg	sediment
Cypermethrin, total	2	ND	ND	ND	ug/kg	Sediment
Decachlorobiphenyl (SS)	3	79	98	86.00	%	sediment
Deltamethrin:Tralomethrin	5	ND	ND	ND	ug/kg	sediment
Diazinon	5	ND	0.42	0.01	ug/kg	sediment
Esfenvalerate:Fenvalerate	5	ND	24.5	5.38	ug/kg	Sediment
Fenpropathrin	5	ND	ND	ND	ug/kg	sediment
Gravel 4.75 to <75 mm	5	ND	ND	ND	%	sediment
Lambda-Cyhalothrin	3	0.66	32.2	11.39	ug/kg	sediment
Permethrin	3	ND	2.6	0.89	ug/kg	sediment
Permethrin, total	2	ND	0.43	0.16	ug/kg	Sediment
Sand 0.075 to <4.75 mm	15	ND	55.42	11.08	%	sediment
Silt 0.005 to <0.075 mm	5	2.47	65.17	48.17	%	sediment
Solids, Percent	3	93	100	96.33	%	sediment
Tau-Fluvalinate	5	ND	ND	ND	ug/kg	sediment
Tetramethrin	5	ND	ND	ND	ug/kg	sediment
Total Organic Carbon	5	630	21000	9186	mg/kg	sediment

West Stanislaus Irrigation District
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WSID Water Service Policy

WEST STANISLAUS IRRIGATION DISTRICT

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Water Service Policy

The following is the current Water Service Policy of the West Stanislaus Irrigation District ("District") as adopted by the Board of Directors of the District.

The District receives water from three principal sources: The Central Valley Project ("CVP"), the San Joaquin River ("SJR"), and groundwater supplies (collectively "District Supplies"). Each year the District attempts to predict the amount of water that can be diverted from the SJR. The quantity of water the District anticipates will be available is used to determine if adequate supplies can be expected or if shortages may exist. If the available supply from the SJR exceeds the demand at any particular time, there will be no rationing. When demand exceeds SJR supply, CVP water and/or groundwater will be diverted to meet demand to the extent either is available. CVP water is managed so that supplies will be available during peak irrigation demand periods when demand has greater potential to exceed SJR supply. When demand exceeds supplies from the SJR, CVP, and groundwater, water rationing will take effect. During times of water rationing, the District will cooperate in all efforts to make maximum use of groundwater from landowner wells.

DEFINITIONS

- "Period of Shortage" means any period when demand for water exceeds available District Supplies.

- "Water Entitlement" means the amount of water available on a daily basis in cubic feet per second to which the water user shall be entitled during the periods of shortage.

PERIODS OF SHORTAGE

During a Period of Shortage the following rules apply:

1. The daily Water Entitlement for any water user during any Period of Shortage shall be proportionate to the irrigable acreage the water user controls when weighed against the total irrigable acreage controlled by those who also order water on that same day. The amount of water available to the water user is calculated based on the total rate of water available, in cubic feet per second ("cfs"), divided by the total number of acres irrigating, and multiplied by the water user's total acreage. This will continue on a day-to-day basis until the available supply exceeds the total demand.

2. Water will be allocated on an acreage basis only and there will be no crop preference.

WSID Board approved on April 15, 2014

3. In the event a water user places an order that exceeds his or her Water Entitlement (for example, because the water user operates a pressurized system) orders may be allowed for reduced periods of time. Reduced periods of time will be determined on a case by case basis.

4. Drainage must be kept to a minimum. The District will limit or suspend one's Water Entitlement if water is not being put to beneficial use. The District will vigorously enforce this policy.

GENERAL WELL WATER POLICY

The District allows introduction, conveyance and delivery of private groundwater into District facilities. During Periods of Shortage, the District may ask private landowners within or without the District to make their groundwater wells available to the District, subject to the terms and conditions below:

1. Well owners must execute a Well Discharge Facility Agreement ("WDFA"), in substantially the same form as that attached hereto as Exhibit A, with the District prior to discharging groundwater into District facilities.

2. Prior to discharge, all wells must provide the District with a starting well water quality test acceptable to the District's General Manager. Samples taken for this purpose must be witnessed by District staff. Test results are good for three (3) years after which new samples must be taken.

3. All wells must provide the District with water depth measurements before pumping water into District facilities. Measurement of groundwater will be taken at the point of introduction into District facilities.

4. All wells must have facilities capable of conveying water into existing District facilities. Any and all facilities shall be constructed at the water user's expense.

5. Water introduced into District facilities must be put to beneficial use, meaning there must be demand for the water downstream.

6. Groundwater originating within Stanislaus County must be delivered to lands located within Stanislaus County.

7. The volume of groundwater, in acre-feet ("AF"), that a landowner introduces into District facilities must be ten percent (10%) more than the volume of water drawn from District facilities by the same landowner.

8. Notice of intent to introduce private groundwater into District facilities must be made to the District forty-eight (48) hours in advance.

The District does not purchase landowner groundwater; however, if the District requests to use water from a private landowner well, the well owner’s account will be credited the volume (acre-feet) of water discharged from the well.

<u>During Period of Shortage</u>:

1. Recipients of Landowner Groundwater Originating from Within District:

    a. If a landowner from within the District introduces water into the District's laterals, he or she may: (i) draw water from the same lateral; or (ii) draw water from another lateral. In both instances, the well owner will pay the District's **Conveyance Rate** for the water received.

    b. If a water user enters into a separate agreement with a groundwater well owner to purchase water from the well owner, the owner of the groundwater well shall pay the District's **Conveyance Rate** for the water introduced regardless of what lateral the water is taken delivery from and regardless if the recipient is located within or out of the District boundaries. In this instance, delivery of groundwater must be within Stanislaus County.

2. Recipients of Landowner Groundwater Originating from Outside District:

    a. If a landowner from outside the District introduces water into the District's laterals, he or she may: (i) draw water from the same lateral; or (ii) draw water from another lateral. In both instances, the well owner will pay the District's **Conveyance Rate** for the water received.

If a water user enters into a separate agreement with a groundwater well owner located outside the District boundaries to purchase water from the well owner, the owner of the groundwater well shall pay the District's **Conveyance Rate** for the water received regardless of what lateral the water is taken delivery from and regardless if the recipient is located within or out of the District boundaries. In this instance, delivery of groundwater must be within Stanislaus County.

No Water Shortage:

1. Recipients of Landowner Groundwater Originating from Within District:

    a. If a landowner from within the District introduces water into the District's laterals, he or she may: (i) draw water from the same lateral and pay the District's **Conveyance Rate** for the water received; or (ii) draw water from another lateral and pay the District's **Water Rate and Conveyance Rate** for the water received.

    b. If the recipient landowner is located outside of the District, he or she shall pay the District's **Water Rate and Conveyance Rate**.

    c. The recipient landowner located within the District must be the landowner's groundwater taken delivery of. Exchanges of landowner groundwater to other landowners is not allowed at time the District is not short water.

2. Recipients of Landowner Groundwater Originating from Outside District:

    a. If a landowner from outside the District introduces water into the District's laterals, he or she may draw water from the same lateral and pay the District's **Conveyance Rate** for

the water received. The landowner may only take delivery of groundwater from the same lateral it's introduced.

b. If the recipient of outside landowner groundwater is anyone other than the landowner who introduced the water, and he or she is located outside the District, then he or she shall pay the District's **Water Rate and Conveyance Rate**. Groundwater originating from outside the District is not allowed for delivery within the District.

RATE SCHEDULE

Description	Cost/AF
District Water Rate	$70.00
Within District introduction, conveyance, and delivery on the same lateral. (Conveyance Rate)	$35.00

The Board of Directors of the West Stanislaus irrigation District sets rate described above annually and reserves the right to amend or terminate this policy at any time. You are encouraged to pick up a copy of the District's "Rules and Regulations – Water Service" booklet of policies available at the District office.