

DRAFT REPORT

# IN-DELTA STORAGE PROGRAM EARTHWORK CONSTRUCTION COST ESTIMATE

*Prepared for*  
Department of Water Resources  
901 P Street  
Sacramento, CA 94236

June 2003

**URS**

URS Corporation  
500 12th Street, Suite 200  
Oakland, California 94607

26814169

# TABLE OF CONTENTS

---

Section 1	Introduction.....	1-1
	1.1 Background and Purpose of Study.....	1-1
	1.2 Scope of Work .....	1-1
Section 2	Project Description.....	2-1
	2.1 Existing Conditions.....	2-1
	2.2 Proposed Reservoirs.....	2-1
Section 3	Quantity Estimates.....	3-1
	3.1 Basis of Quantity Estimates .....	3-1
	3.2 Estimated Quantities .....	3-2
Section 4	Survey of Imported Materials .....	4-1
	4.1 Materials .....	4-1
	4.2 Potential Aggregate Sources .....	4-2
Section 5	Basis of Construction Cost Estimates.....	5-1
	5.1 General.....	5-1
	5.2 Cost Estimate Assumptions .....	5-1
	5.3 Construction Approach and Schedule.....	5-2
	5.4 Construction Cost Estimates.....	5-3
Section 6	Conclusions and Recommendations.....	6-1
Section 7	References .....	7-1

## List of Tables

Table 3-1	Quantity Estimate for Webb Tract (Rock Berm Option)
Table 3-2	Quantity Estimate for Webb Tract (Bench Option)
Table 3-3	Quantity Estimate for Bacon Island (Rock Berm Option)
Table 3-4	Quantity Estimate for Bacon Island (Bench Option)
Table 5-1	Construction Cost Estimate, Rock Berm Option
Table 5-2	Construction Cost Estimate, Bench Option
Table 6-1	Summary of Estimated Construction Costs

# TABLE OF CONTENTS

---

## List of Figures

- Figure 1 Site Vicinity
- Figure 2 Webb Tract Plan
- Figure 3 Bacon Island Plan
- Figure 4 Typical Embankment Sections

## List of Appendices

- Appendix A Survey of Imported Materials
- Appendix B Basis of Construction Cost Estimates
- Appendix C Integrated Facility Earthworks Construction Cost Estimate and Overall Project Construction Schedule

## 1.1 BACKGROUND AND PURPOSE OF STUDY

The Department of Water Resources (DWR) is conducting feasibility-level engineering and environmental studies under the Integrated Storage Investigations Program. As part of the project evaluations, DWR is evaluating the technical feasibility and conducting engineering investigation for the In-Delta Storage Program. Engineering investigation will aim at developing solutions to enhance project reliability through improved embankment design and consolidation of inlet and outlet structures.

## 1.2 SCOPE OF WORK

As part of this feasibility study, the Department requests that URS Corporation (URS) carry out the following tasks: analyze suitable construction methods and estimate total project construction costs. The work will be conducted in accordance with all applicable standards and guidelines contained in Standard Agreement No. 4600001747 and in coordination with Department staff.

The work proposed below will include reviewing different applicable construction methods and evaluate the most feasible methods that are suitable for the proposed project, and prepare an estimate of the construction costs related to the proposed project. It is understood that the contractor will select its own method for construction.

The scope of work consists of the following tasks:

### ***Task 1.1 – Collect and review existing information***

Review all available information pertaining to the planned project, including existing reports, past studies, planned project configuration and design information.

### ***Task 1.2 – Estimation of Quantities***

Hydraulic and structural design information, design drawings, and quantity estimates for inlet/outlet structures, fish screens, pump stations and other related appurtenances as well as environmental mitigation work will be provided by DWR. Local island soil borrow material and earthwork volume estimates for all embankments are covered separately under Task Order No. IDS-1002-1747-006. Prepare additional quantity estimates for slope protection, piping protection and seepage control (pumping wells).

### ***Task 1.3 – Construction Methods Analysis***

Considering the subsurface conditions at the project islands, other constraints (physical, environmental, logistic, etc.), and quantity estimates, review applicable methods for constructing the various earthwork/embankment components and evaluate the most feasible method. Construction of fish screens, inlet/outlet structure, pumping stations and associated channels are covered in Task Order IDS-1102-1747-008. Provide details on task sequencing, including dewatering for borrow excavation, and construction of foundations.

***Task 1.4 – Undertake Market Research and Establish Relevant Unit Costs for different construction materials and labor related to the project***

Undertake market research, including quotations from contractors and suppliers, to obtain relevant unit costs for acquiring different construction materials (including compacted fill) and transporting to the project site, and the cost of labor and equipment required for placement of these materials, as applicable. Labor rates will be in prevailing wages. Costs related to land acquisition and permitting are not required.

***Task 1.5 – Undertake Feasibility Cost Estimate for Earthwork***

Based on the findings of Tasks 1.1 through 1.4, prepare a feasibility-level cost estimate for constructing the earthwork components for the proposed project, including excavation, dewatering for borrow areas, preparation and placement of fill materials, embankment, riprap, and seepage control. Prepare feasibility-level cost spreadsheets including information on the extent of labor, materials and equipment required for overall construction. In addition, estimate contractor's general and administrative costs, general requirements, and profit and bond mark-ups to be applied to the direct construction cost. Cost estimate will include allowances (in percentage of overall construction cost) for contingencies, engineering and design, and construction contract administration and management. Cost estimates for fish screens, inlet/outlet structure, pumping stations and associated channels are covered in Task Order IDS-1102-1747-008.

## 2.1 EXISTING CONDITIONS

Webb Tract and Bacon Islands are located in the Sacramento – San Joaquin River Delta, near Stockton, California, as shown on Figure 1. Webb Tract is located in the northeast corner of Contra Costa County near Oakley, California. Bacon Island is located within San Joaquin County, approximately 4 miles south of Webb Tract.

The Sacramento-San Joaquin River Delta was developed for agricultural purposes from a tidal marsh in the 1800s. As part of the development, levees were constructed on the underlying peat and soft clay to form islands. The existing channels were improved, and new channels were dredged.

Webb Tract and Bacon Island encompass about 5,500 acres and 5,600 acres, respectively. The combined length of levees on both islands is about 27 miles. The ground elevation of both Webb Tract and Bacon Island, initially, was near sea level. Land subsidence, primarily as a result of the loss of organic material and peat, has steadily decreased the surface elevation. The loss of organic material is caused by exposure of peat to oxygen (oxidation), wind erosion, burning as well as some other factors. The existing ground surface elevation on most of Webb Tract and Bacon Island ranges from about –10 feet to lower than –15 feet below mean sea level.

The interiors of both islands consist of agricultural areas and irrigation ponds. The agricultural areas are linked by unpaved embankment roads. Ditches were excavated throughout the islands as part of the irrigation and drainage systems. The sites are mostly covered with plowed soil for future crop growing or dried crops left from the previous harvest. Areas with no agricultural use are covered with grass and shrubs. Many parts of the islands are marshy, especially on Webb Tract.

## 2.2 PROPOSED RESERVOIRS

The proposed reservoirs on the islands will be developed by constructing embankments against the existing levees to crest elevation +10. The plan views of Webb Tract and Bacon Island showing the potential borrow area limits are presented on Figures 2 and 3, respectively. The typical conceptual embankment sections are shown on Figure 4. The two options shown on Figure 4 that were considered for construction cost estimation are the Rock Berm Option and Bench Option. The Rock Berm Option consists of placing rockfill on the slough-side of the levee to provide for stability (URS, 2003a). For the Bench Option, a bench would be excavated at elevation +3.0 to provide for stability. As shown on Figures 2 and 3, the Rock Berm Option includes 3,000 lineal feet of embankments on each island that are configured as the Bench Option to reduce the size of slough-side rockfill sections. Riprap and riprap bedding would be placed on the upper portion of the slough-side slopes to protect the embankment slopes from wave erosion as shown on Figure 4.

Both options include embankment fill on the reservoir side that would be obtained from excavations in borrow areas within the islands as shown on Figures 2 and 3. The reservoir-side slopes would be 3H:1V from the crest to elevation +4.0 (the maximum reservoir elevation), and the slope would be 10H:1V below elevation +4.0. Riprap underlain by riprap bedding would be placed from the crest to elevation +3.0 to protect the steeper part of the slope from wave erosion.

Riprap would also be placed on the north and west facing 10:1 slopes, which are the general prevailing wind and storm wind directions.

A heavy-duty woven filter fabric would be located between the existing levee and new embankment fill to mitigate piping potential as indicated in the Embankment Design Analysis report (URS, 2003a). In addition, woven filter fabric would be placed on the 10:1 slopes. Where not covered by riprap, the filter fabric would be covered by a 2-foot thick layer of compacted sandy fill. This fill would require continual periodic maintenance to repair erosion.

Both options have a seepage control system consisting of interceptor wells along the crest of the embankments as shown on Figure 4. The wells would have an average depth of 50 feet and a spacing of about 200 feet, and would be used to pump water from the sandy soils beneath the peat.

### 3.1 BASIS OF QUANTITY ESTIMATES

The plan views of Webb Tract and Bacon Island shown on Figures 2 and 3, respectively, and the typical embankment sections for the Rock Berm and Bench options shown on Figure 4, are the basis for quantity and cost estimation. The following assumptions were used to estimate earthwork quantities:

- Excavation
  - No excavation assumed for Rock Berm option
  - Excavate existing levee to elevation +3.0 feet for Bench Option
  - Bench width varies with base of peat elevation to maintain adequate stability
- Embankment Fill
  - Volume based on average sections developed for stability analysis
  - Volume varies with base of peat elevations
- Reservoir-side Filter Fabric, Riprap Bedding and Riprap
  - Riprap bedding thickness of 1.0 foot above elevation +3.0 and filter fabric below this elevation
  - Riprap thickness of 2.5 feet above elevation +3.0 and 1.75 feet thick below this elevation (on the north and west facing slopes)
  - Earthfill placed on top of filter fabric on south and east facing slopes
  - Filter fabric placed on the reservoir-side of the existing levee embankments for mitigation of piping potential (see Section 2.2). The filter fabric extends from the crest to 30 feet along the ground surface as shown on Figure 4.
- Slough-side Rockfill, Riprap Bedding and Riprap
  - Rock Berm Option
    1. Based on conversations with Delta Wetlands and field observations, the rockfill volumes are based on an assumed average thickness of 2 feet of existing rockfill on the slough-side slopes of the levees for Webb Tract and Bacon Island, extending to elevation -2 feet (1 foot below low tide).
    2. Rock berm slopes were based on stability, which depends on bottom of peat elevation, slough slope, and slough bottom elevation
    3. From crest of new embankment to crest of existing embankment:
      - Riprap bedding thickness of 1.0 foot
      - Riprap thickness of 2.0 feet
  - Bench Option
    1. Riprap bedding thickness of 1.0 foot

2. Riprap thickness of 2.0 feet (except 16,000 feet adjacent to Frank's Tract and Mildred Island, which is 2.5 feet)
  3. Riprap extends from crest to elevation, +3.0 feet
- Seepage Control System
    - Interceptor well depth of 50 feet and spacing of 200 feet, with 20% additional wells
    - No interceptor wells adjacent to Frank's Tract, Mildred Island, along the San Joaquin deep ship channel (see Figures 2 and 3 for locations of wells)

### 3.2 ESTIMATED QUANTITIES

The estimated excavation and in-place embankment quantities for the Webb Tract Rock Berm and Bench options are presented in Tables 3-1 and 3-2, respectively. The estimated excavation and in-place embankment quantities for the Bacon Island Rock Berm and Bench options are presented in Tables 3-3 and 3-4, respectively.

**Table 3-1**  
**Quantity Estimate for Webb Tract (Rock Berm Option)**

Item	Units	Estimated Quantity
Excavation	CY	0
Embankment Fill	CY	4,600,000
Reservoir Riprap Bedding	CY	74,000
Reservoir Riprap above el. +3	CY	185,000
Reservoir Riprap on 10:1 slope	CY	300,000
Slough Riprap Bedding	CY	7,500
Slough Riprap	CY	15,000
Slough Rockfill	CY	405,000 <sup>1</sup>

<sup>1</sup>Includes a 20% increase due to loss from under-water placement.

**Table 3-2**  
**Quantity Estimate for Webb Tract (Bench Option)**

Item	Units	Estimated Quantity
Excavation	CY	500,000
Embankment Fill	CY	10,000,000
Reservoir Riprap Bedding	CY	74,000
Reservoir Riprap above el. +3	CY	185,000
Reservoir Riprap on 10:1 slope	CY	300,000
Slough Riprap Bedding	CY	55,000
Slough Riprap	CY	110,000
Slough Rockfill	CY	0

**Table 3-3**  
**Quantity Estimate for Bacon Island (Rock Berm Option)**

Item	Units	Estimated Quantity
Excavation	CY	0
Embankment Fill	CY	5,100,000
Reservoir Riprap Bedding	CY	80,000
Reservoir Riprap above el. +3	CY	200,000
Reservoir Riprap on 10:1 slope	CY	284,000
Slough Riprap Bedding	CY	8,500
Slough Riprap	CY	17,000
Slough Rockfill	CY	240,000 <sup>1</sup>

<sup>1</sup>Includes a 20% increase due to loss from under-water placement.

**Table 3-4**  
**Quantity Estimate for Bacon Island (Bench Option)**

<b>Item</b>	<b>Units</b>	<b>Estimated Quantity</b>
Excavation	CY	480,000
Embankment Fill	CY	10,100,000
Reservoir Riprap Bedding	CY	80,000
Reservoir Riprap above el. +3	CY	200,000
Reservoir Riprap on 10:1 slope	CY	284,000
Slough Riprap Bedding	CY	65,000
Slough Riprap	CY	130,000
Slough Rockfill	CY	0

**4.1 MATERIALS**

Riprap bedding, riprap, and slough-side rockfill materials will need to be imported from commercial sources. For cost estimating purposes, the preliminary gradations shown below were developed to obtain material costs. The riprap bedding gradation was based on USBR (1987) filter criteria to prevent the sandy embankment soils from washing out through the riprap. Riprap sizing was based on wave height estimates (Flooding Analysis, URS, 2003b).

**RIPRAP BEDDING**

<b>Particle Size</b>	<b>Percent Passing</b>
3-inch	100
1-inch	70 – 85
No. 4 sieve	40 – 60
No. 200 sieve	5

**RIPRAP 1**

<b>Particle Weight (lbs)</b>	<b>Percent Passing</b>
1,500	100
250	40 – 60
5	15 – 25
1	0 – 5

**RIPRAP 2**

<b>Particle Weight (lbs)</b>	<b>Percent Passing</b>
750	100
125	40 – 60
5	15 – 25
1	0 – 5

**SLOUGH-SIDE ROCKFILL (CALTRANS ¼ TON)**

<b>Particle Weight (lbs)</b>	<b>Percent Passing</b>
1,000 (450 kg)	95 – 100
500 (220 kg)	0 – 50
75 (34 kg)	0 – 5

**4.2 POTENTIAL AGGREGATE SOURCES**

A survey of commercial sources was conducted to obtain prices for the materials discussed in Section 4.1 for use in cost estimation. The results of the survey are included in Appendix A. Shown below is a list of six commercial gravel and rock suppliers that were contacted. However, only Dutra Materials and Syar Industries quoted prices.

Dutra Materials, Inc.  
1000 Point San Pedro Road  
San Rafael, CA  
415-258-6876  
415-258-9714 (fax)  
Contact: Harry Stewart

Syar Industries, Inc. Madison Sand &  
Gravel  
2301 Napa-Vallejo Highway  
P.O. Box 2540  
Napa, CA  
707-259-5839  
707-254-3018 (fax)  
Contact: Scott Thomas

RMC Pacific Materials  
515 Mitchell Canyon Road  
Clayton, CA  
925-426-2130  
925-426-2112 (fax)  
Contact: Josh Hinchey

Sevens Creek Quarry, Inc.  
12100 Stevens Canyon Road  
Cupertino, CA  
408-253-2512  
408-253-7621 (fax)  
Contact: Pat Hennigar

Hanson Aggregates Mid-Pacific, Inc.  
P.O. Box 580  
Pleasanton, CA  
925-426-4033

DSS Company Vernalis Plant  
2648 W. Blewett Road  
Tracy, CA  
209-830-5130  
209-830-5133 (fax)  
Contact: Julie Jimenez

## 5.1 GENERAL

The engineer's construction cost estimate prepared is intended to be used for budgetary requirements and economic analysis. The estimate was prepared in accordance with a Class 4 engineer's construction cost estimate as defined by Association for the Advancement of Cost Engineering International (AACE, 1997). The typical expected accuracy range for this class estimate is -15% to -30% on the low side and +20% to +50% on the high side.

The cost estimates have been prepared from the information available at the time of the estimate. The final construction costs will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, and other variable factors. The construction cost estimates do not include costs for land and environmental permitting and mitigation. An experienced construction cost estimator with construction and hard-dollar contract bid experience prepared this cost estimate.

Construction pricing for the project is in March 2003 U.S. dollars and is based on the quantity estimates discussed in Section 4. Pricing is accomplished with unit pricing from published and internally developed and maintained historical databases and from crew make-up for the earthwork. All unit pricing is factored for location, contractor markups and other project specific criteria. Material pricing, where necessary, was obtained from vendor quotations as discussed in Section 4, current cost estimates, and cost estimator experience. Crews and equipment spreads were developed for the major earthwork activities. Logic, methods and procedures for developing costs are typical for the construction industry.

## 5.2 COST ESTIMATE ASSUMPTIONS

The assumptions used in the construction cost estimates are as follows:

- Costs for project management, administration and quality control staffing are based on usual wages and salaries for the area.
- Prevailing wage rates were used to estimate labor costs.
- General and administrative (G&A) cost is 5% of the direct cost; profit is 10% of the direct cost plus G&A cost; and bond is 1% of the direct cost plus G&A cost plus profit.
- Costs have not been included for maintaining and operating the existing dewatered condition of the interior of the islands during construction.
- A barge dock unloading facility will be constructed for unloading riprap bedding, riprap, and rockfill materials.
- A 20% yield factor was used to estimate the required borrow excavation volume to provide the required in-place embankment fill volumes indicated in Section 4.
- Overburden excavation volumes were estimated based on the borrow area exploration work at Webb Tract and Bacon Island (URS, 2003c). For Bacon Island, the overburden volume was estimated at 3.6 times the required borrow excavation volume. For Webb Tract, the borrow excavation was assumed to be in the western part of the island where the overburden is the thinnest, and the overburden volume was estimated at 1.3 times the required borrow

excavation volume. Costs developed for removal of overburden assume that excavated overburden is wasted in adjacent borrow pits where excavation has been completed.

- Pricing for riprap bedding, riprap, and rockfill is from local commercial material suppliers with allowance for delivery to the islands by barge.
- Rockfill for the Rock Berm option will be placed underwater; due to underwater placement, a loss factor of 20% was assumed.
- It is understood that earthwork construction to buttress Delta levees has not required dewatering of the borrow area excavations (Hultgren-Tillis, 2002 and 2003). Based on this experience, costs for groundwater dewatering systems (e.g., well-points) for excavation in the borrow areas were not included. However, pumping from the existing groundwater control system would continue throughout construction. Construction costs presented in this report allow for drainage ditch and sump excavation and sump pumping.
- A 5-year embankment construction period was assumed due to the weak peat soil foundation (Embankment Design Analysis, URS, 2003a).
- A contingency allowance has not been included. DWR will include a contingency allowance in the project cost estimates.

### 5.3 CONSTRUCTION APPROACH AND SCHEDULE

The construction approach that follows is the engineer's general assessment of how the construction could proceed. However, each contractor would have its own approach to optimize construction and minimize costs.

A construction schedule for the Rock Berm Option was prepared, as this option was found to be significantly less costly than the Bench Option (see Section 5.4). The construction schedule for the embankments is shown within the overall project construction schedule in Appendix C. The schedule shows a 6-year total construction duration (5 years for embankment construction plus one year for the seepage control system), working about 8 months per year (between April and November). The contractor would need to keep a work force on site to monitor, maintain and repair the earthworks during the winter months.

The schedule shows the basic sequence of construction activities and that work on both islands would proceed concurrently. Earthwork construction could proceed under one large contract or could be executed under three separate contracts: one each for Webb Tract embankments, Bacon Island embankments, and the seepage control system. The schedule also indicates the engineering and bidding periods. The main construction activities are discussed below.

- **Mobilization:** Mobilization includes securing required permits, transporting equipment to the site, and setting up temporary facilities (offices, storage areas, water supply, power, etc.).
- **Clearing, Grubbing and Site Preparation:** This activity will include clearing and grubbing the site, stripping the peat, and excavating drainage ditches and sumps in borrow area paddock areas. The peat will be stockpiled near the paddock excavations and replaced in the paddocks as the borrow materials become exhausted. The peat could be excavated by large excavators (equipped with wide, low contact pressure tracks) or drag-lines. The stability of the borrow excavation slopes with adjacent heavy equipment would need to be evaluated.

- **Borrow Area Excavation and Embankment Fill Construction:** Constructing haul roads, the barge dock unloading facility, and other temporary construction are included in this activity. Haul roads would require ongoing grading, maintenance, and dust control. Excavation of borrow materials would be accomplished by large excavators and hauled by trucks along haul roads to stockpiles. Moisture conditioning to dry out the materials would be done in the stockpiles by disking and aerating the materials prior to hauling the materials to the embankments by scrapers or trucks. Bulldozers would spread the materials and rollers would compact the materials in lifts. The maximum fill differential elevation would need to be limited to reduce the potential for foundation failure during construction. Therefore, the fill would need to be placed in horizontal lifts around the entire island perimeter prior to beginning another lift. For embankment construction to be completed in 5 years, approximately 1.9 million cubic yards of earthfill per year would need to be placed in the embankments, on average, in both reservoir islands combined (about 5,400 cubic yards per day per island). For estimating purposes, earthfill operations would generally take place 5 days per week, 8 hours per day.
- **Rockfill on Slough side:** Placement of rockfill would be accomplished by placing rock with cranes from barges.
- **Riprap and Bedding:** Riprap and bedding on the reservoir and slough sides would be placed by excavators, lagging behind the embankment fill placement. Bulldozers would also be used to spread the riprap and bedding materials.
- **Placement of Filter Fabric:** Woven filter fabric would be placed on the reservoir side of the existing levees during the first two years of embankment placement to serve for erosion and piping control during construction (see Section 2.2). Filter fabric would also be placed on the 10:1 slopes of the new fill.
- **Road Base:** The road base would be placed on the embankment crests after they have been topped out.
- **Instrumentation:** Vibrating wire piezometers and survey points would be installed at selected locations as the embankments are placed to monitor embankment performance during construction. Inclinedometers and final survey points would be installed at the completion of embankment construction. Due to the length of the reservoir island embankments (total of 27 miles) and the need for a comprehensive monitoring program, an automated data acquisition system (ADAS) is included.
- **Seepage Control System:** Well drilling would begin after the embankments have been completed. This work would occur during the sixth year of construction to allow for some settlement prior to well installation; this would reduce the potential for damage to the wells.

#### **5.4 CONSTRUCTION COST ESTIMATES**

The construction cost estimates are summarized in Table 5-1 for the Rock Berm option and in Table 5-2 for the Bench option. Development of the construction costs estimates for the embankments is included in Appendix B. Appendix C, which was prepared by DWR, includes cost estimate details and construction methodology for the earthworks required at the integrated facilities. Appendix C also includes an overall project construction schedule for the island embankments, integrated facility earthworks and integrated facility structures. The costs for the

integrated facility earthworks are summarized in Section 6. Cost estimates for the integrated facility structures are presented in a separate report by CH2M Hill.

Tables 5-1 and 5-2 show subtotals without contingency allowances; contingencies will be included by DWR in their cost estimate presentations. The contingency pertains to unlisted items and for quantity changes that normally result during succeeding phases of design development. As such, this is a "design contingency", and does not address change orders and other construction growth items that occur during construction. The most significant risk items are in the earthfill costs, specifically management of groundwater and overburden stripping.

As shown in Tables 5-1 and 5-2, the Rock Berm Option was found to cost significantly less than the Bench Option.

IDS PROJECT  
CONSTRUCTION COST ESTIMATE  
TABLE 5-1. ROCK BERM OPTION

Item	Total Quantity	Units	Unit Price	Amount	Comments
<b>1. ISLAND EMBANKMENTS</b>					
<b>Webb Tract</b>					
Clear and Grub	280	Acres	1,722.00	482,160	
Rockfill	405,000	CY	70.00	28,350,000	
Embankment Fill	4,600,000	CY	7.90	36,340,000	
Filter Fabric (btwn levee & new emb)	7,400,000	SF	0.22	1,628,000	added 25% for overlaps
Filter Fabric - Reservoir Side (10:1)	9,760,000	SF	0.22	2,147,200	added 10% for overlaps
Riprap - Slough Side	15,000	CY	52.60	789,000	2.0 feet thick (2.5 feet thick adjacent to Franks Tract)
Bedding - Slough Side	7,500	CY	49.10	368,250	1.0 feet thick
Riprap - Reservoir Side	185,000	CY	47.40	8,769,000	2.5 feet thick
Bedding - Reservoir Side	74,000	CY	43.90	3,248,600	1.0 feet thick
Riprap - 10:1 Reservoir Slope	300,000	CY	47.40	14,220,000	north and west facing slopes only; 1.75 feet thick (avg.)
Road base (20' x 6")	25,000	CY	34.30	857,500	
<b>Subtotal</b>				<b>97,199,710</b>	
<b>Bacon Island</b>					
Clear and Grub	210	Acres	1,722.00	361,620	
Rockfill	240,000	CY	77.20	18,528,000	
Embankment Fill	5,100,000	CY	9.30	47,430,000	
Filter Fabric (btwn levee & new emb)	8,600,000	SF	0.22	1,892,000	added 25% for overlaps
Filter Fabric - Reservoir Side (10:1)	10,820,000	SF	0.22	2,380,400	added 10% for overlaps
Riprap - Slough Side	17,000	CY	52.60	894,200	2.0 feet thick (2.5 feet thick adjacent to Mildred Island)
Bedding - Slough Side	8,500	CY	49.10	417,350	1.0 feet thick
Riprap - Reservoir Side	200,000	CY	47.40	9,480,000	2.5 feet thick
Bedding - Reservoir Side	80,000	CY	43.90	3,512,000	1.0 feet thick
Riprap - 10:1 Reservoir Slope	284,000	CY	47.40	13,461,600	north and west facing slopes only; 1.75 feet thick (avg.)
Road base (20' x 6")	28,000	CY	34.30	960,400	
<b>Subtotal</b>				<b>99,317,570</b>	
<b>2. SEEPAGE CONTROL SYSTEM</b>					
Interceptor Wells	480	EA	19,044.00	9,141,120	assume 1 per 200 l.f. emb.; 40 gpm each
Monitoring Wells	100	EA	5,490.00	549,000	
Electrical and Control Systems	480	EA	5,229.00	2,509,920	
<b>Subtotal</b>				<b>12,200,040</b>	
<b>3. INSTRUMENTATION</b>					
	1	LS	3,000,000.00	<b>3,000,000</b>	
<b>SUBTOTAL</b>				<b>211,717,320</b>	
<b>MOBILIZATION</b>	1	LS	14,986,000.00	<b>14,986,000</b>	
<b>SUBTOTAL (without contingency)</b>				<b>226,703,320</b>	
<b>Say</b>				<b>227,000,000</b>	

Notes:

Embankment fill includes haul roads, remove overburden, excavate and moisture condition borrow, load, haul, and compact fill.

Imported rockfill cost includes cost for barge unloading dock facility:

Webb: \$ 59.61 + 10.43 = 70.04 say \$70.00 (4,223,500 / 405,000 = \$10.43)

Bacon: \$ 59.61 + 17.60 = 77.21 say \$77.20 (4,223,500 / 240,000 = \$17.60)

IDS PROJECT  
CONSTRUCTION COST ESTIMATE  
TABLE 5-2. BENCH OPTION

Item	Total Quantity	Units	Unit Price	Amount	Comments
<b>1. ISLAND EMBANKMENTS</b>					
<b>Webb Tract</b>					
Clear and Grub	280	Acres	1,722.00	482,160	
Excavation	500,000	CY	3.90	1,950,000	
Embankment Fill	10,000,000	CY	7.90	79,000,000	
Filter Fabric (btwn levee and new emb)	7,400,000	SF	.22	1,628,000	added 25% for overlaps
Filter Fabric - Reservoir Side (10:1)	9,760,000	SF	.22	2,147,200	added 10% for overlaps
Riprap - Slough side	110,000	CY	58.20	6,402,000	2.0 feet thick (2.5 feet thick adjacent to Franks Tract)
Bedding - Slough Side	55,000	CY	54.70	3,008,500	1.0 feet thick
Riprap - Reservoir Side	185,000	CY	53.00	9,805,000	2.5 feet thick
Bedding - Reservoir Side	74,000	CY	49.50	3,663,000	1.0 feet thick
Riprap - 10:1 Reservoir Slope	300,000	CY	53.00	15,900,000	north and west facing slopes only; 1.75 feet thick (avg.)
Road base (20' x 6")	25,000	CY	39.90	997,500	
<b>Subtotal</b>				<b>124,983,360</b>	
<b>Bacon Island</b>					
Clear and Grub	310	Acres	1,722.00	533,820	
Excavation	480,000	CY	3.90	1,872,000	
Embankment Fill	10,100,000	CY	9.35	94,435,000	
Filter Fabric (btwn levee and new emb)	8,600,000	SF	.22	1,892,000	added 25% for overlaps
Filter Fabric - Reservoir Side (10:1)	10,820,000	SF	.22	2,380,400	added 10% for overlaps
Riprap - Slough side	130,000	CY	58.00	7,540,000	2.0 feet thick (2.5 feet thick adjacent to Mildred Island)
Bedding - Slough Side	65,000	CY	54.50	3,542,500	1.0 feet thick
Riprap - Reservoir Side	200,000	CY	52.70	10,540,000	2.5 feet thick
Bedding - Reservoir Side	80,000	CY	49.20	3,936,000	1.0 feet thick
Riprap - 10:1 Reservoir Slope	284,000	CY	52.70	14,966,800	north and west facing slopes only; 1.75 feet thick (avg.)
Road base (20' x 6")	28,000	CY	39.60	1,108,800	
<b>Subtotal</b>				<b>142,747,320</b>	
<b>2. SEEPAGE CONTROL SYSTEM</b>					
Interceptor Wells	480	EA	19,044.00	9,141,120	assume 1 per 200 l.f. emb.; 40 gpm each
Monitoring Wells	100	EA	5,490.00	549,000	
Electrical and Control Systems	480	EA	5,229.00	2,509,920	
<b>Subtotal</b>				<b>12,200,040</b>	
<b>3. INSTRUMENTATION</b>					
	1	LS	3,000,000.00	<b>3,000,000</b>	
<b>SUBTOTAL</b>				<b>282,930,720</b>	
<b>MOBILIZATION</b>	1	LS	14,986,000.00	<b>14,986,000</b>	
<b>SUBTOTAL (without contingency)</b>				<b>297,916,720</b>	
<b>Say</b>				<b>298,000,000</b>	

Notes:

Embankment fill includes haul roads, remove overburden, excavate and moisture condition borrow, load, haul, and compact fill.

Imported riprap, bedding, and road base costs include cost for barge unloading dock facility:

Webb: add \$5.63 per CY to unit cost from Appendix B (4,223,500 / 749,000 = \$5.63)

Bacon: add \$5.36 per CY to unit cost from Appendix B (4,223,500 / 787,000 = \$5.36)

This report presents URS’ estimated construction costs for earthwork for the reservoirs at Webb Tract and Bacon Island. The engineer’s construction cost estimate prepared is intended to be used for budgetary requirements and economic analysis. Construction cost estimates for fish screens, inlet/outlet structure, pumping stations and associated channels are covered separately.

Cost estimates were developed for two reservoir options: Rock Berm Option and Bench Option. The Rock Berm Option consists of placing rockfill on the slough-side of the levee to provide for stability. For the Bench Option, a bench would be excavated at elevation +3.0 to provide for stability. Earthwork quantities were estimated and a survey of commercial sources was conducted to obtain prices for riprap, riprap bedding and rockfill materials for use in cost estimation. Crews and equipment spreads were developed for major earthwork activities.

The estimated subtotal construction costs, without contingencies, for the two reservoir embankment options, and the integrated facility earthworks, are summarized in Table 6-1 below.

**Table 6-1. Summary of Estimated Construction Costs**

<b>Option</b>	<b>Embankments <sup>a</sup></b>	<b>Earthworks for Integrated Facilities <sup>b</sup></b>	<b>Total</b>
Rock Berm	\$227 million	\$71.2 million	\$298 million
Bench	\$296 million	\$71.2 million	\$367 million

<sup>a</sup> See Tables 5-1 and 5-2, and Appendix B.

<sup>b</sup> See Appendix C.

The Rock Berm Option was found to cost about \$69 million (excluding contingency) less than the Bench Option. DWR will need to include contingencies as discussed in Section 5.4. Cost allowances will need to be included for engineering, legal, lands and right-of-way, permits, environmental mitigation, administration, and escalation. Reestablishing the embankment crest following completion of construction, erosion repair, interceptor well and pump maintenance, and other operation and maintenance costs have not been evaluated as part of these capital construction cost estimates.

The construction approach was discussed and the construction schedule was developed for the Rock Berm Option. It is estimated that 6 years would be required to construct the reservoir islands (embankments and seepage control systems).

It is understood that earthwork construction to buttress Delta levees has not required dewatering of the borrow area excavations. Based on this experience, costs for well-point dewatering systems for excavation in the borrow areas were not included. However, pumping from the existing groundwater control system would continue throughout construction. Further design development should include field test excavations in the borrow areas at both Webb Tract and Bacon Island to confirm that dewatering systems are or are not needed for borrow excavations. This field test work should also include assessments of effort required to dry out the borrow materials sufficiently for use in embankment construction. The results of the field test work would be used to improve the reliability of the cost estimates. The costs associated with maintaining and operating the existing groundwater control system during construction should also be assessed and included the cost estimates.

Overburden excavation has a significant effect on construction costs, especially for Bacon Island. Further field investigations of the borrow areas are recommended to better define the available material quantities and characteristics, and to confirm the required overburden excavation at the islands. These field tests would also be used to assess whether borrow excavations should be extended below the 15-foot limit used in the cost estimates for this study. Deeper excavations could be more efficient considering the amount of required overburden excavation, although groundwater issues would increase.

Further investigations should include a survey of the slough-sides of the levees to confirm the amount and extent of existing rockfill. This information would be used to evaluate where additional rockfill would be required.

Association for the Advancement of Cost Engineering International (1997). Cost Estimate Classification System, AACE International Recommended Practice No. 17R-97.

Department of Water Resources, In-Delta Storage Program's Draft Report on Engineering Investigations (2002). Calfed Bay-Delta Program. May.

Hultgren-Tillis (2002). Borrow Sites, Staged Filling and Slough-side Slope Stability, Delta Wetlands Reservoirs, Contra Costa County and San Joaquin County, California. July 25.

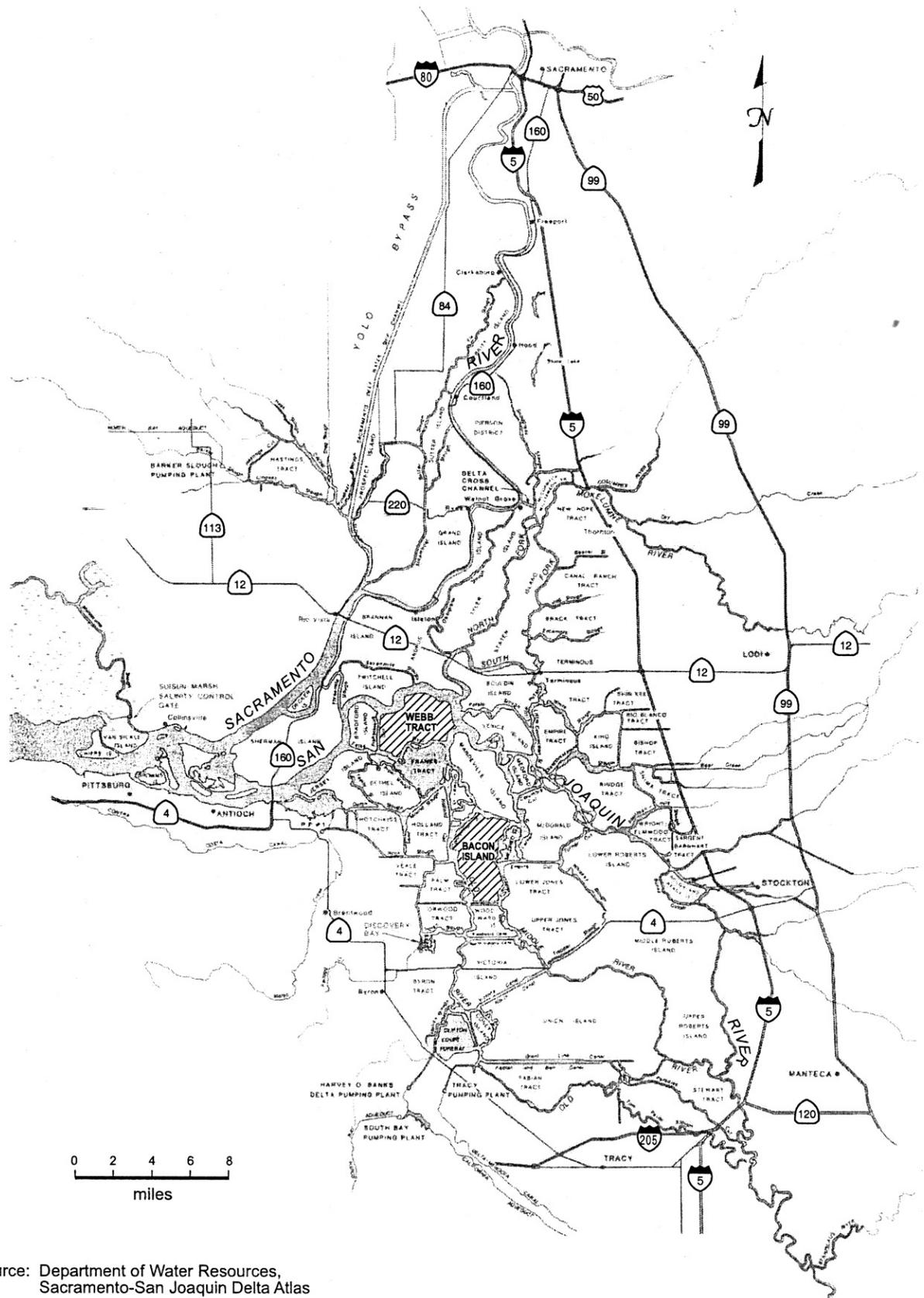
Hultgren-Tillis (2003). Communication with Ed Hultgren of Hultgren-Tillis Engineers and Mike Forrest and John Roadifer of URS. March 26.

URS Corporation (2003a). In-Delta Storage Program, Embankment Design Analysis.

URS Corporation (2003b). In-Delta Storage Program, Flooding Analysis.

URS Corporation (2003c). In-Delta Storage Program, Borrow Area Geotechnical Report.

U.S. Bureau of Reclamation (1987). Design Standards No. 13, Embankment Dams, Chapter 5, Protective Filters. May 13.



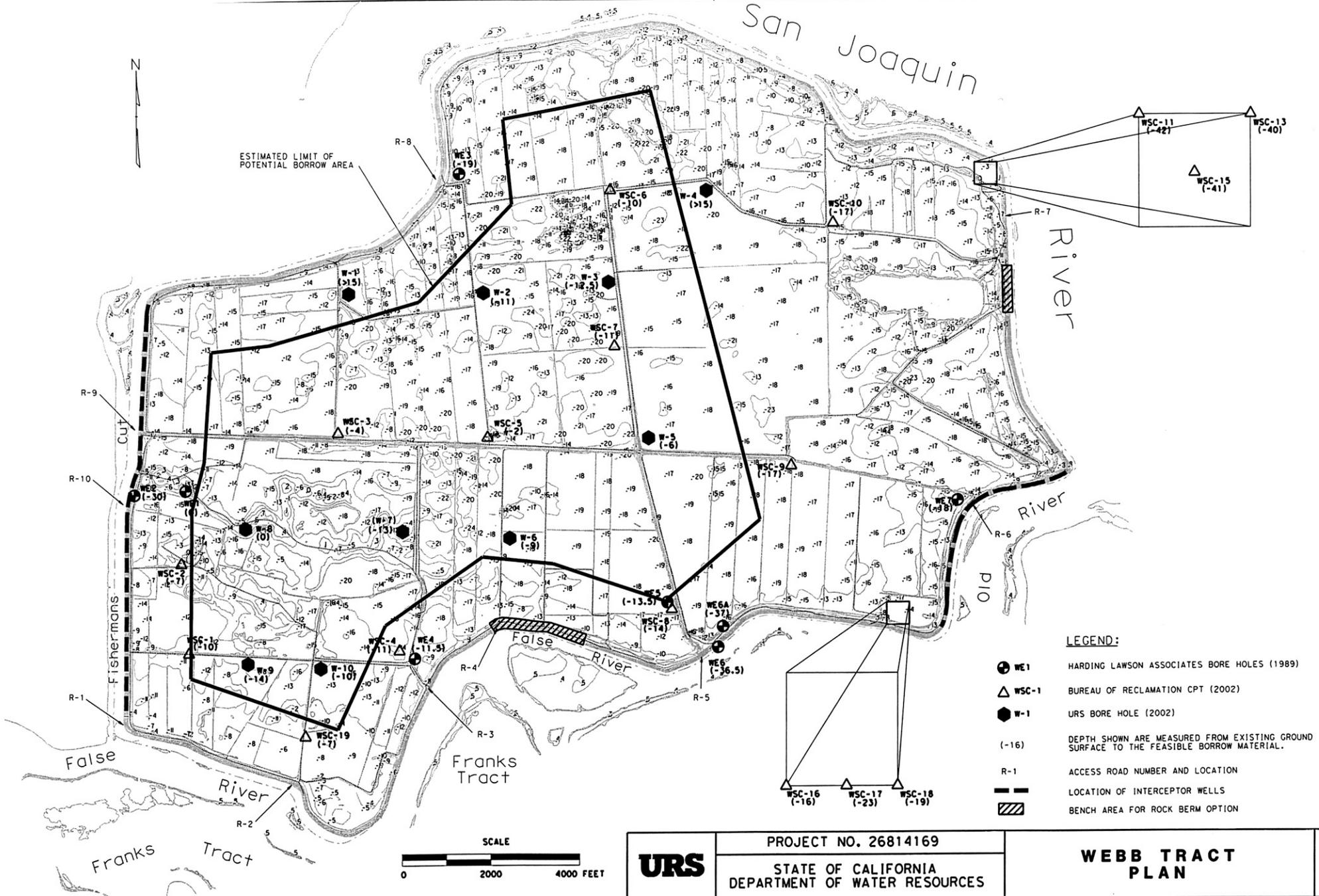
Source: Department of Water Resources,  
Sacramento-San Joaquin Delta Atlas

Project No. 26814169

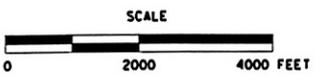
STATE OF CALIFORNIA  
DEPARTMENT OF WATER  
RESOURCES

SITE VICINITY

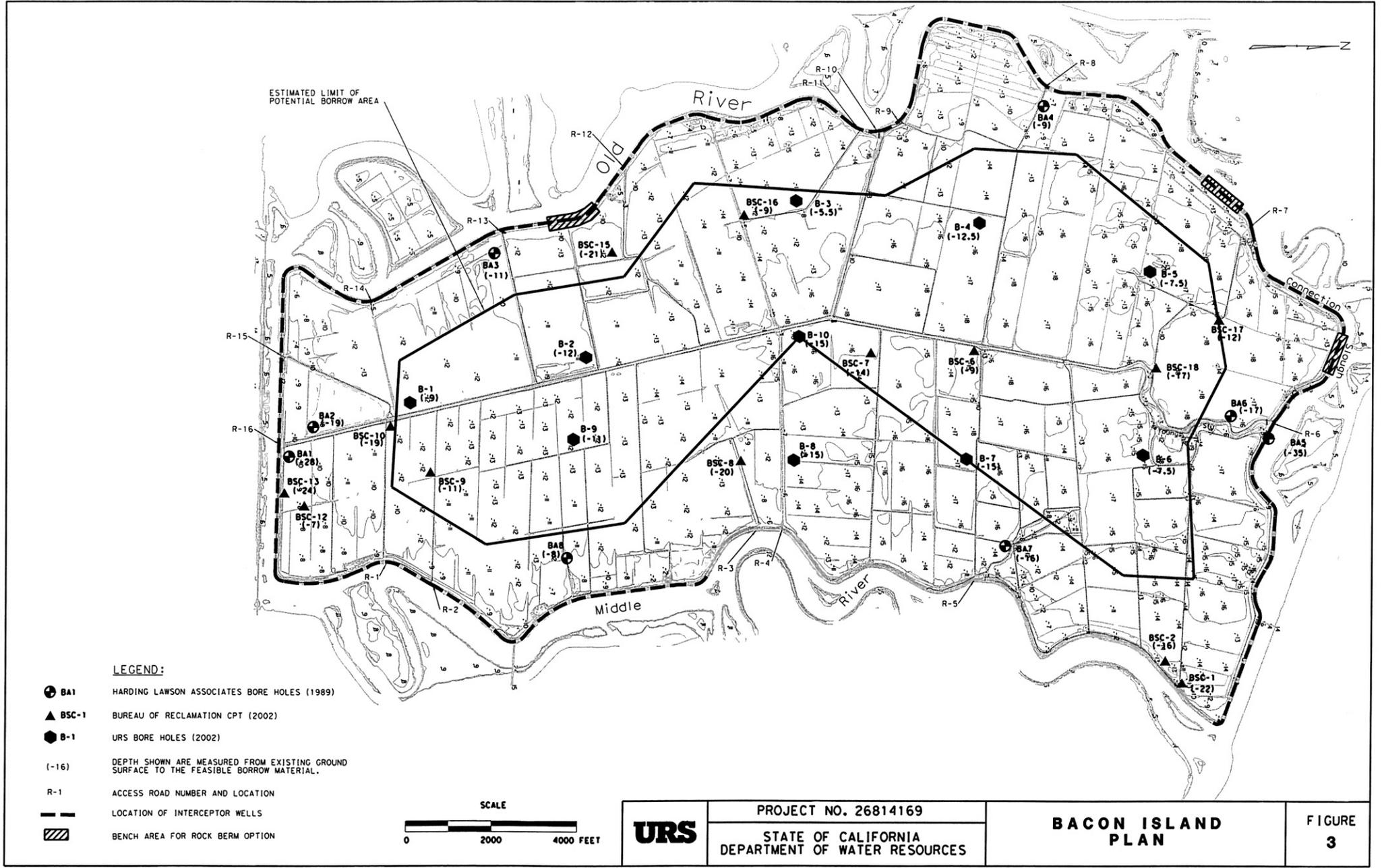
FIGURE  
1



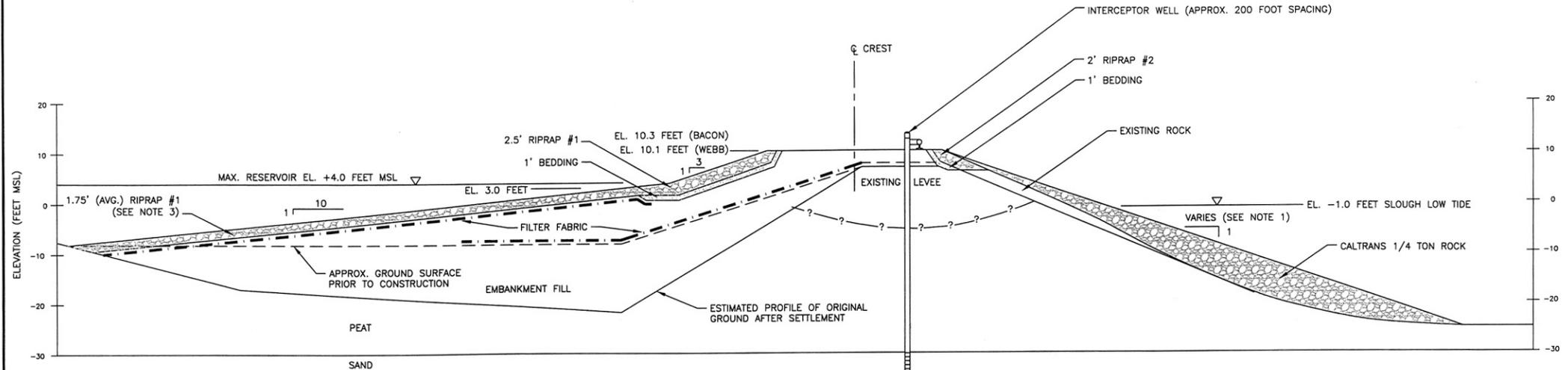
- LEGEND:**
- WE-1 HARDING LAWSON ASSOCIATES BORE HOLES (1989)
  - ▲ WSC-1 BUREAU OF RECLAMATION CPT (2002)
  - W-1 URS BORE HOLE (2002)
  - (-16) DEPTH SHOWN ARE MEASURED FROM EXISTING GROUND SURFACE TO THE FEASIBLE BORROW MATERIAL.
  - R-1 ACCESS ROAD NUMBER AND LOCATION
  - INTERCEPTOR WELLS
  - ▨ BENCH AREA FOR ROCK BERM OPTION



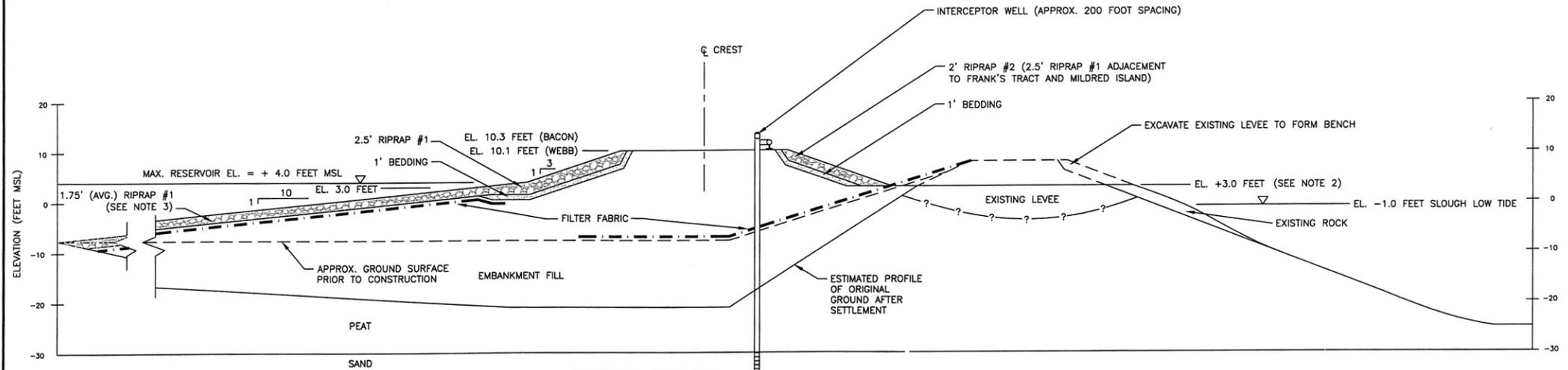
<b>URS</b>	PROJECT NO. 26814169	<b>WEBB TRACT PLAN</b>	FIGURE <b>2</b>
	STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES		



Jun 18, 2003 - 10:23am  
 J:\CAD\SHARE\In-Delta\Fig4.dwg



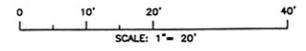
**ROCK BERM OPTION**  
 SCALE 1"=20'



**BENCH OPTION**  
 SCALE 1"=20'

**NOTES**

1. ROCK SLOPE DEPENDS ON SLOUGH-SIDE SLOPE, SLOUGH BOTTOM ELEVATION, AND BASE OF PEAT ELEVATION. (SLOPE SHOWN IS PRIOR TO SETTLEMENT)
2. BENCH WIDTH VARIES FROM 31' TO 65' DEPENDING ON BASE OF PEAT ELEVATION.
3. RIPRAP TO BE PLACED ON NORTH AND WEST FACING SLOPES. 2' EARTH FILL COVER OVER FILTER FABRIC ON SOUTH AND EAST FACING SLOPES.



<b>URS</b>	Project No. 26814169	<b>TYPICAL EMBANKMENT SECTIONS CONCEPTUAL</b>	FIGURE <b>4</b>
	IN-DELTA STORAGE PROGRAM		

**Appendix A**  
**Survey of Imported Materials**

**BACON AND WEBB TRACT ISLAND LEVEE CONSTRUCTION  
DWR FEASIBILITY STUDY  
IMPORT MATERIAL SURVEYS**

Project Location: Bacon and Webb Tract Island, Sacramento - San Joaquin River Delta, California  
Estimated Construction Duration : 5 years

---

Person Quoting/Title: Harry Stewart Company Dutra Materials  
Address: 1000 Point San Pedro Rd, San Rafael CA Distance from the Site : 40 ± Miles  
Phone: 415-258-6876 Fax: 415 258 9714  
Ability to produce the Specified Quantities (yes/no) : yes Lead Time Required: 6-8 mos.  
Approximate Production Rate per Day: 6000 Ton Plant will be operated in the next 10 years (yes/no) yes  
Recorded by: George Chiu Date: \_\_\_\_\_

---

**Notes:**

- 1) All unit cost quotation shall include approximate County tax.
- 2) All riprap materials shall conform to CALTRANS Standard Specifications Section 72 and gradation as specified in the attached tables, and shall be durable, dense, sound, angular, free from cracks, seams, and other natural causes and free from foreign matter.
- 3) All sand filter materials shall conform to CALTRANS Standard Specifications Section 72 and gradation as specified in the attached tables, and ASTM C33 and shall consist of sound, durable processed sands free from organic matter, clay balls, soft particles and other foreign matter.
- 4) Please indicate if the supplied material is from river-run, rock quarry, or process from alluvium, etc.

\*<sub>1</sub> = Terminating ...  
 \*<sub>2</sub> = San Rafael Rock Quarry  
 \*<sub>3</sub> = Budgetary only  
 Barge Delivery

MATERIAL PRODUCT SHEET (Rock Berm Option)  
 @ 1.6 Ton/cy

Item	Materials	Material required for Duration	Estimated Quantities (Ton) cy	Source of Materials (note 4)	Cost per Ton @ Plant * <sub>3</sub>	Cost per Ton deliver to Site	Remarks/ Assumptions
1	Sand Filter	Year 1 to 3	2,400,000 3,840,000 T.	* <sub>1</sub> In Bay Deposits.	11 <sup>00</sup> /ton	+ 3 <sup>50</sup> /T.	Barge Delivery
2	Bedding	Year 3 to 5	376,000 537,600 T.	SRPQ * <sub>2</sub>	10 <sup>75</sup> /ton	+ 3 <sup>50</sup> /T.	Barge Delivery
3	Riprap, Large	Year 3 to 5	780,000 1,248,000 T.	SRPQ * <sub>2</sub>	12 <sup>75</sup> /ton	+ 3 <sup>50</sup> /T.	Barge Delivery
4	Riprap, Small	Year 3 to 5	32,000 51,200 T.	SRPQ * <sub>2</sub>	11 <sup>25</sup> /ton	+ 3 <sup>50</sup> /T.	Barge Delivery
5	Rockfill	Year 1 to 3	700,000 1,120,000 T.	SRPQ * <sub>2</sub>	14 <sup>75</sup> /ton	+ 5 <sup>50</sup> /T.	Barge Delivery

SAND FILTER

Particle Size	Percent Passing
1.5-inch	100
#4 sieve	60 - 75
#200 sieve	3

4,248,000 cy  
6,796,800 T.

ROCKFILL (Caltrans 1/4 Ton)

Rock Mass	Percent Larger Than
450 kg (1/2 Ton)	0-5
220 kg (1/4 Ton)	50-100
34 kg (75 Lbs)	95-100

BEDDING

Particle Size	Percent Passing
3-inch	100
1-inch	70 - 85
#4 sieve	40 - 60
#200 sieve	5

RIPRAP Large

Particle Weight (lbs)	Percent Passing
1,500	100
250	40 - 60
5	15 - 25
1	0 - 5

RIPRAP Small

Particle Weight (lbs)	Percent Passing
750	100
125	40 - 60
5	15 - 25
1	0 - 5

FRF-14-2003 11:17 AM  
 NIPS CORPORATION

02/20/2003 09:33 FAX 415 258 9714 THE DUTRA GROUP

15109743258 P. 03/04

\*1 = Permitting likely required  
 \*2 - San Rafael Rock Quarry  
 \*3 - Budgetary only.

MATERIAL PRODUCT SHEET (Bench Option)  
 @ 1.6 T/cy

Barge

Item	Materials	Material required for Duration	Estimated Quantities (Ton) cy	Source of Materials (note 4)	Cost per Ton @ Plant	Cost per Ton deliver to Site	Remarks/ Assumptions
1	Sand Filter	Year 1 to 3	3,070,000	In Bay Deposits	*3		
2	Bedding	Year 3 to 5	4,912,000 T.	*1	11 <sup>00</sup> /ton	+ 3 <sup>50</sup> /ton	Barge Del. very
3	Riprap, Large	Year 3 to 5	696,000 T 780,000	*2 S12RQ	10 <sup>75</sup> /ton	+ 3 <sup>50</sup> /ton	Barge Delivery
4	Riprap, Small	Year 3 to 5	1,248,000 T. 230,000 368,000 T.	*2 S12RQ	12 <sup>75</sup> /ton	+ 3 <sup>50</sup> /ton	Barge Delivery
				*2 S12RQ	11 <sup>25</sup> /ton	+ 3 <sup>50</sup> /ton	Barge Delivery

SAND FILTER

Particle Size	Percent Passing
1.5-inch	100
#4 sieve	60 - 75
#200 sieve	3

4,515,000 cy  
 7,224,000 T.

ROCKFILL (Caltrans 1/4 Ton)

Rock Mass	Percent Larger Than
450 kg (1/2 Ton)	0-5
220 kg (1/4 Ton)	50 - 100
34 kg (75 Lbs)	95 - 100

BEDDING

Particle Size	Percent Passing
3-inch	100
1-inch	70 - 85
#4 sieve	40 - 60
#200 sieve	5

RIPRAP Large

Particle Weight (lbs)	Percent Passing
1,500	100
250	40 - 60
5	15 - 25
1	0 - 5

RIPRAP Small

Particle Weight (lbs)	Percent Passing
750	100
125	40 - 60
5	15 - 25
1	0 - 5

NO. 051 P. 03/B

DUTRA/MATERIALS

1:44PM

FEB. 14. 2003

FEF-14-1003 1054  
 OPS CORPORATION

15108743268 P. 02/04

BACON AND WEBB TRACT ISLAND LEVEE CONSTRUCTION  
DWR FEASIBILITY STUDY  
IMPORT MATERIAL SURVEYS

cc. Mike Forrest  
2-20-03  
2-25-03

Project Location: Bacon and Webb Tract Island, Sacramento - San Joaquin River Delta, California  
Estimated Construction Duration : 5 years

Person Quoting/Title: Scott Thomas, Sales Rep Company Syar Madison  
Address: 2301 Napa - Vallejo Highway, Napa, CA 94558 Distance from the Site : 45-50 Miles  
Phone: 707-259-5839 Fax: 707-259-3018  
Ability to produce the Specified Quantities (yes/no) : No Lead Time Required: 3 months  
Approximate Production Rate per Day: see notes below Ton Plant will be operated in the next 10 years (yes/no) yes  
Recorded by: George Chiu Date: 2-20-03

Notes:

- 1) All unit cost quotation shall include approximate County tax.
- 2) All riprap materials shall conform to CALTRANS Standard Specifications Section 72 and gradation as specified in the attached tables, and shall be durable, dense, sound, angular, free from cracks, seams, and other natural causes and free from foreign matter.
- 3) All sand filter materials shall conform to CALTRANS Standard Specifications Section 72 and gradation as specified in the attached tables, and ASTM C33 and shall consist of sound, durable processed sands free from organic matter, clay balls, soft particles and other foreign matter.
- 4) Please indicate if the supplied material is from river-run, rock quarry, or process from alluvium, etc.

Notes for Production Rate:

1. Sand Filter - 20,000 Ton/year
2. Bedding - 50,000 Ton/year
3. Rip rap - 20,000 ~ 30,000 Ton/year
4. Rock fill - 30,000 ~ 40,000 Ton/year

5. production rates ~~depend~~ are specific for this project. Potential to do more depending on backlog.  
6. He did not know average production rate for their plants.

**MATERIAL PRODUCT SHEET (Rock Berm Option)**

Item	Materials	Material required for Duration	Estimated Quantities (CY)	Source of Materials (note 4)	Cost per Ton @ Plant	Cost per Ton deliver to Site	Remarks/ Assumptions
1	Sand Filter	Year 1 to 3	2,400,000	River Run from this Madison plant	\$ 10	/	
2	Bedding	Year 3 to 5	336,000	Lake Herman Rock Quarry	\$ 13		
3	Riprap, Large	Year 3 to 5	780,000	↓	\$ 20 *		
4	Riprap, Small	Year 3 to 5	32,000		\$ 20 *		
5	Rockfill	Year 1 to 3	700,000		\$ 20 *		

**SAND FILTER**

Particle Size	Percent Passing
1.5-inch	100
#4 sieve	60 - 75
#200 sieve	3

**BEDDING**

Particle Size	Percent Passing
3-inch	100
1-inch	70 - 85
#4 sieve	40 - 60
#200 sieve	5

**ROCKFILL (Caltrans 1/4 Ton)**

Rock Mass	Percent Larger Than
450 kg (1/2 Ton)	0-5
220 kg (1/4 Ton)	50 - 100
34 kg (75 Lbs)	95 - 100

**RIPRAP Large**

Particle Weight (lbs)	Percent Passing
1,500	100
250	40 - 60
5	15 - 25
1	0 - 5

**RIPRAP Small**

Particle Weight (lbs)	Percent Passing
750	100
125	40 - 60
5	15 - 25
1	0 - 5

*\* They will look into the cost more closely if it is a real bid. Stand material may cost \$ 2 ~ 3 less a ton.*

*No trucking/hauling cost included.*

**MATERIAL PRODUCT SHEET (Bench Option)**

*Same as Rock Bench Option.*

Item	Materials	Material required for Duration	Estimated Quantities (CY)	Source of Materials (note 4)	Cost per Ton @ Plant	Cost per Ton deliver to Site	Remarks/ Assumptions
1	Sand Filter	Year 1 to 3	3,070,000				
2	Bedding	Year 3 to 5	435,000				
3	Riprap, Large	Year 3 to 5	780,000				
4	Riprap, Small	Year 3 to 5	230,000				

**SAND FILTER**

Particle Size	Percent Passing
1.5-inch	100
#4 sieve	60 – 75
#200 sieve	3

**BEDDING**

Particle Size	Percent Passing
3-inch	100
1-inch	70 – 85
#4 sieve	40 – 60
#200 sieve	5

**ROCKFILL (Caltrans ¼ Ton)**

Rock Mass	Percent Larger Than
450 kg (1/2 Ton)	0-5
220 kg (1/4 Ton)	50 – 100
34 kg (75 Lbs)	95 – 100

**RIPRAP Large**

Particle Weight (lbs)	Percent Passing
1,500	100
250	40 – 60
5	15 – 25
1	0 – 5

**RIPRAP Small**

Particle Weight (lbs)	Percent Passing
750	100
125	40 – 60
5	15 – 25
1	0 – 5

**Appendix B**  
**Basis of Construction Cost Estimates**

Appendix B includes the following parts:

- Webb Tract, Rock Berm Option
- Bacon Island, Rock Berm Option
- Webb Tract, Bench Option
- Bacon Island, Bench Option
- Seepage Control System

URS Corporation  
Engineer's Class 4 Design Construction Cost Estimate  
WEBB TRACT IN-DELTA STORAGE ROCK BERM OPTION

---

**WEBB TRACT IN-DELTA STORAGE ROCK BERM OPTION**

Integrated Storage Investigations Programs  
California Department of Water Resources  
San Joaquin River Delta Stockton, California

Prepared By: URS Corporation  
Denver, Colorado

The Estimated Construction Cost is calculated with Microsoft Excel software and presented in the following categories and sheets. The categories are Detail, Direct Summary and Indirect Summary containing 5 sheets each. All data is entered on the 5 sheets in the Detail Category. The Direct and Indirect Summary communicate with the Detail category sheets. Each feature is subtotaled on the respective sheet in the Direct and Indirect Summary. A total is presented on sheet 5 of the Direct and Indirect Summary. The Direct Summary summarizes all data entered on the Detail sheets and computes Unit Prices. The Indirect Summary adds General Requirements, General and Administrative, Profit and Bond costs to the Direct Summary and computes "marked up" Unit Prices.

# Cost Summary

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE ROCK BERM OPTION**

<b>GENERAL REQUIREMENTS</b>			
Management	\$	2,918,708	
Administration		1,049,895	
Quality		1,224,878	
Facilities		524,948	
Mobilizaiton		657,934	
Engineering		<u>1,116,388</u>	7,492,751 7%
<b>SITE PREPARATION</b>			
Site Clearing: Clearing and Grubbing		482,112	
Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT USED			
Dewatering: Operate and Maintain Well Point System NOT USED			
Shoring and Underpinning: Barge Unloading Facility		<u>4,223,494</u>	4,705,606 4%
<b>SITE CONSTRUCTION EMBANKMENT</b>			
Excavation		17,103,956	
Embankment		43,256,257	
Erosion and Sediment Contol Filter Fabric		3,803,420	
Erosion and Sediment Contol Riprap		27,373,854	
Aggregate Surfacing		855,956	92,393,443 88%
<b>Subtotal:</b>	<b>\$</b>	<b><u>104,591,800</u></b>	<b>100%</b>

104591800
7492751
97099049

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

**1 GENERAL REQUIREMENTS**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>DIRECT</i>	<i>GEN REQ</i>	<i>G &amp; A</i>	<i>PROFIT</i>	<i>BOND</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
01310.0	Management	60.0	MO	2,502,000		125,100	262,710	28,898	2,918,708	48,645.14
01320.0	Administration	60.0	MO	900,000		45,000	94,500	10,395	1,049,895	17,498.25
01430.0	Quality	60.0	MO	1,050,000		52,500	110,250	12,128	1,224,878	20,414.63
01520.0	Facilities	60.0	MO	450,000		22,500	47,250	5,198	524,948	8,749.13
01540.0	Mobilizaiton	50.0	EA	564,000		28,200	59,220	6,514	657,934	13,158.68
01720.0	Engineering	60.0	MO	957,000		47,850	100,485	11,053	1,116,388	18,606.47
<b>GENERAL REQUIREMENTS</b>		<b>5,611,500.0</b>	<b>CY</b>	<b>6,423,000</b>		<b>321,150</b>	<b>674,415</b>	<b>74,186</b>	<b>7,492,751</b>	<b>1.34</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

**2 SITE PREPARATION**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>DIRECT</i>	<i>GEN REQ</i>	<i>G &amp; A</i>	<i>PROFIT</i>	<i>BOND</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
02230.0	Site Clearing: Clearing and Grubbing	280.0	AC	413,280		20,664	43,394	4,773	482,112	1,721.83
02240.0	Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT US		MO							
02240.0	Dewatering: Construct Well Point System NOT USED		EA							
02240.0	Dewatering: Operate and Maintain Well Point System NO		MO							
02250.0	Shoring and Underpinning: Barge Unloading Facility	65,000.0	SF	3,620,500		181,025	380,153	41,817	4,223,494	64.98
	<b>SITE PREPARATION</b>	<b>5,611,500.0</b>	<b>CY</b>	<b>4,033,780</b>		<b>201,689</b>	<b>423,547</b>	<b>46,590</b>	<b>4,705,606</b>	<b>0.84</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

**3 SITE CONSTRUCTION EMBANKMENT**

SPEC.	DESCRIPTION	QUANTITY	UOM	DIRECT	GEN REQ	G & A	PROFIT	BOND	TOTAL COST	UNIT PRICE
02315.0	Excavation and Fill: Haul Roads NOT USED		LF							
02315.0	Excavation and Fill: Sediment Traps NOT USED		EA							
02315.0	Excavation and Fill: Holding Ponds NOT USED		EA							
02315.0	Excavation: Exc., Load, Haul, Waste Overburden	7,200,000.0	CY	6,192,000		309,600	650,160	71,518	7,223,278	1.00
02315.0	Excavation: Exc., Load, Haul, Stockpile Borrow	5,500,000.0	CY	8,470,000		423,500	889,350	97,829	9,880,679	1.80
02330.0	Embankment: Moisture Conditon Borrow	5,500,000.0	CY	2,585,000		129,250	271,425	29,857	3,015,532	0.55
02330.0	Embankment: Load, Haul, Place, Compact Borrow	4,600,000.0	CY	13,800,000		690,000	1,449,000	159,390	16,098,390	3.50
02330.0	Embankment : Unload, Haul, Place Rock Fill	405,000.0	CY	20,695,500		1,034,775	2,173,028	239,033	24,142,336	59.61
02370.0	Erosion and Sed. Control: Geotex. Line Sed. Traps NOT U		EA							
02370.0	Erosion and Sed. Control: Geotex. Line Hold Ponds NOT U		EA							
02370.0	Erosion and Sed. Control: Filter Fabric Levee	7,400,000.0	SF	1,406,000		70,300	147,630	16,239	1,640,169	0.22
02370.0	Erosion and Sed. Control: Filter Fabric Reservoir	9,760,000.0	SF	1,854,400		92,720	194,712	21,418	2,163,250	0.22
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bed	7,500.0	CY	315,750		15,788	33,154	3,647	368,338	49.11
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	15,000.0	CY	676,500		33,825	71,033	7,814	789,171	52.61
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bed	74,000.0	CY	2,782,400		139,120	292,152	32,137	3,245,809	43.86
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	185,000.0	CY	7,511,000		375,550	788,655	86,752	8,761,957	47.36
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	300,000.0	CY	12,180,000		609,000	1,278,900	140,679	14,208,579	47.36
02700.0	Aggregate Surfacing: Unload, Haul, Place, Compact Roc	25,000.0	CY	733,750		36,688	77,044	8,475	855,956	34.24
<b>SITE CONSTRUCTION EMBANKMENT</b>		<b>5,611,500.0</b>	<b>CY</b>	<b>79,202,300</b>		<b>3,960,115</b>	<b>8,316,242</b>	<b>914,787</b>	<b>92,393,443</b>	<b>16.47</b>
<b>TOTAL DIRECT AND INDIRECT COST</b>		<b>5,611,500</b>	<b>CY</b>	<b>89,659,080</b>		<b>4,482,954</b>	<b>9,414,203</b>	<b>1,035,562</b>	<b>104,591,800</b>	<b>18.64</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

**1 GENERAL REQUIREMENTS**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
01310.0	Management	60.0	MO	2,190,000	312,000			2,502,000	41,700.00
01320.0	Administration	60.0	MO	750,000	150,000			900,000	15,000.00
01430.0	Quality	60.0	MO	750,000	300,000			1,050,000	17,500.00
01520.0	Facilities	60.0	MO	90,000	330,000	30,000		450,000	7,500.00
01540.0	Mobilizaiton	50.0	EA	189,000	375,000			564,000	11,280.00
01720.0	Engineering	60.0	MO	912,000	30,000	15,000		957,000	15,950.00
	<b>GENERAL REQUIREMENTS</b>	<b>5,611,500.0</b>	<b>CY</b>	<b>4,881,000</b>	<b>1,497,000</b>	<b>45,000</b>		<b>6,423,000</b>	<b>1.14</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

**2 SITE PREPARATION**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
02230.0	Site Clearing: Clearing and Grubbing	280.0	AC	91,280	322,000			413,280	1,476.00
02240.0	Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT USED		MO						
02240.0	Dewatering: Construct Well Point System NOT USED		EA						
02240.0	Dewatering: Operate and Maintain Well Point System NOT USED		MO						
02250.0	Shoring and Underpinning: Barge Unloading Facility	65,000.0	SF	422,500	1,183,000	2,015,000		3,620,500	55.70
	<b>SITE PREPARATION</b>	<b>5,611,500.0</b>	<b>CY</b>	<b>513,780</b>	<b>1,505,000</b>	<b>2,015,000</b>		<b>4,033,780</b>	<b>.72</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

**3 SITE CONSTRUCTION EMBANKMENT**

SPEC.	DESCRIPTION	QUANTITY	UOM	LABOR	EQUIPMENT	MATERIAL	OTHER	TOTAL COST	UNIT PRICE
02315.0	Excavation and Fill: Haul Roads NOT USED		LF						
02315.0	Excavation and Fill: Sediment Traps NOT USED		EA						
02315.0	Excavation and Fill: Holding Ponds NOT USED		EA						
02315.0	Excavation: Exc., Load, Haul, Waste Overburden	7,200,000.0	CY	2,376,000	3,816,000			6,192,000	.86
02315.0	Excavation: Exc., Load, Haul, Stockpile Borrow	5,500,000.0	CY	2,200,000	6,270,000			8,470,000	1.54
02330.0	Embankment: Moisture Conditon Borrow	5,500,000.0	CY	1,155,000	1,430,000			2,585,000	.47
02330.0	Embankment: Load, Haul, Place, Compact Borrow	4,600,000.0	CY	4,370,000	9,430,000			13,800,000	3.00
02330.0	Embankment : Unload, Haul, Place Rock Fill	405,000.0	CY	2,389,500	5,346,000	12,960,000		20,695,500	51.10
02370.0	Erosion and Sed. Control: Geotex. Line Sed. Traps NOT USED		EA						
02370.0	Erosion and Sed. Control: Geotex. Line Hold Ponds NOT USED		EA						
02370.0	Erosion and Sed. Control: Filter Fabric Levee	7,400,000.0	SF	592,000	296,000	518,000		1,406,000	.19
02370.0	Erosion and Sed. Control: Filter Fabric Reservoir	9,760,000.0	SF	780,800	390,400	683,200		1,854,400	.19
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding	7,500.0	CY	44,250	99,000	172,500		315,750	42.10
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	15,000.0	CY	88,500	198,000	390,000		676,500	45.10
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding	74,000.0	CY	259,000	821,400	1,702,000		2,782,400	37.60
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	185,000.0	CY	647,500	2,053,500	4,810,000		7,511,000	40.60
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	300,000.0	CY	1,050,000	3,330,000	7,800,000		12,180,000	40.60
02700.0	Aggregate Surfacing: Unload, Haul, Place, Compact Road Base	25,000.0	CY	51,250	107,500	575,000		733,750	29.35
	<b>SITE CONSTRUCTION EMBANKMENT</b>	<b>5,611,500.0</b>	<b>CY</b>	<b>16,003,800</b>	<b>33,587,800</b>	<b>29,610,700</b>		<b>79,202,300</b>	<b>14.11</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

<b>1 GENERAL REQUIREMENTS</b>										
<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT COST</i>	
01310.0	Management	60.0	MO	36,500.00	5,200.00			41,700.00		
				2,190,000	312,000			2,502,000	41,700.00	
01320.0	Administration	60.0	MO	12,500.00	2,500.00			15,000.00		
				750,000	150,000			900,000	15,000.00	
01430.0	Quality	60.0	MO	12,500.00	5,000.00			17,500.00		
				750,000	300,000			1,050,000	17,500.00	
01520.0	Facilities	60.0	MO	1,500.00	5,500.00	500.00		7,500.00		
				90,000	330,000	30,000		450,000	7,500.00	
01540.0	Mobilizaiton	50.0	EA	3,780.00	7,500.00			11,280.00		
				189,000	375,000			564,000	11,280.00	
01720.0	Engineering	60.0	MO	15,200.00	500.00	250.00		15,950.00		
				912,000	30,000	15,000		957,000	15,950.00	
	<b>GENERAL REQUIREMENTS</b>	<b>5,611,500.0</b>	<b>CY</b>	<b>4,881,000</b>	<b>1,497,000</b>	<b>45,000</b>		<b>6,423,000</b>		<b>1.14</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

<b>2 SITE PREPARATION</b>									
<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT COST</i>
02230.0	Site Clearing: Clearing and Grubbing	<b>280.0</b>	AC	326.00	1,150.00			1,476.00	
				91,280	322,000			413,280	1,476.00
02240.0	Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT USED		MO					.00	
02240.0	Dewatering: Construct Well Point System NOT USED 3500 GPM Per Set		EA					.00	
02240.0	Dewatering: Operate and Maintain Well Point System NOT USED		MO					.00	
02250.0	Shoring and Underpinning: Barge Unloading Facility	65,000.0	SF	6.50	18.20	31.00		55.70	
				422,500	1,183,000	2,015,000		3,620,500	55.70
	SITE PREPARATION	5,611,500.0	CY	513,780	1,505,000	2,015,000		4,033,780	.72

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

<b>3 SITE CONSTRUCTION EMBANKMENT</b>										
<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT COST</i>	
02315.0	Excavation and Fill: Haul Roads NOT USED		LF					.00		
02315.0	Excavation and Fill: Sediment Traps NOT USED		EA					.00		
02315.0	Excavation and Fill: Holding Ponds NOT USED		EA					.00		
02315.0	Excavation: Exc., Load, Haul, Waste Overburden	7,200,000.0	CY	.33	.53			.86		
				2,376,000	3,816,000			6,192,000	.86	
02315.0	Excavation: Exc., Load, Haul, Stockpile Borrow Assume Yield 70%	5,500,000.0	CY	.40	1.14			1.54		
				2,200,000	6,270,000			8,470,000	1.54	
02330.0	Embankment: Moisture Conditon Borrow	5,500,000.0	CY	.21	.26			.47		
				1,155,000	1,430,000			2,585,000	.47	
02330.0	Embankment: Load, Haul, Place, Compact Borrow 7,500 LF Haul	<b>4,600,000.0</b>	CY	.95	2.05			3.00		
				4,370,000	9,430,000			13,800,000	3.00	
02330.0	Embankment : Unload, Haul, Place Rock Fill	<b>405,000.0</b>	CY	5.90	13.20	32.00		51.10		
				2,389,500	5,346,000	12,960,000		20,695,500	51.10	
02370.0	Erosion and Sed. Control: Geotex. Line Sed. Traps NOT USED		EA					.00		
02370.0	Erosion and Sed. Control: Geotex. Line Hold Ponds NOT USED		EA					.00		
02370.0	Erosion and Sed. Control: Filter Fabric Levee	<b>7,400,000.0</b>	SF	.08	.04	.07		.19		
				592,000	296,000	518,000		1,406,000	.19	
02370.0	Erosion and Sed. Control: Filter Fabric Reservoir	<b>9,760,000.0</b>	SF	.08	.04	.07		.19		
				780,800	390,400	683,200		1,854,400	.19	
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding Slough	<b>7,500.0</b>	CY	5.90	13.20	23.00		42.10		
				44,250	99,000	172,500		315,750	42.10	
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap Slough	<b>15,000.0</b>	CY	5.90	13.20	26.00		45.10		
				88,500	198,000	390,000		676,500	45.10	
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding Reservoir	<b>74,000.0</b>	CY	3.50	11.10	23.00		37.60		
				259,000	821,400	1,702,000		2,782,400	37.60	
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap Reservoir	<b>185,000.0</b>	CY	3.50	11.10	26.00		40.60		
				647,500	2,053,500	4,810,000		7,511,000	40.60	
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap Reservoir 10:1 Slope	<b>300,000.0</b>	CY	3.50	11.10	26.00		40.60		
				1,050,000	3,330,000	7,800,000		12,180,000	40.60	
02700.0	Aggregate Surfacing: Unload, Haul, Place, Compact Road Base	<b>25,000.0</b>	CY	2.05	4.30	23.00		29.35		
				51,250	107,500	575,000		733,750	29.35	
	<b>SITE CONSTRUCTION EMBANKMENT</b>	<b>5,611,500.0</b>	<b>CY</b>	<b>16,003,800</b>	<b>33,587,800</b>	<b>29,610,700</b>		<b>79,202,300</b>	<b>14.11</b>	

URS Corporation  
Engineer's Class 4 Design Construction Cost Estimate  
BACON ISLAND IN-DELTA STORAGE ROCK BERM OPTION

---

**BACON ISLAND IN-DELTA STORAGE ROCK BERM OPTION**

Integrated Storage Investigations Programs  
California Department of Water Resources  
San Joaquin River Delta Stockton, California

Prepared By: URS Corporation  
Denver, Colorado

The Estimated Construction Cost is calculated with Microsoft Excel software and presented in the following categories and sheets. The categories are Detail, Direct Summary and Indirect Summary containing 5 sheets each. All data is entered on the 5 sheets in the Detail Category. The Direct and Indirect Summary communicate with the Detail category sheets. Each feature is subtotaled on the respective sheet in the Direct and Indirect Summary. A total is presented on sheet 5 of the Direct and Indirect Summary. The Direct Summary summarizes all data entered on the Detail sheets and computes Unit Prices. The Indirect Summary adds General Requirements, General and Administrative, Profit and Bond costs to the Direct Summary and computes "marked up" Unit Prices.

# Cost Summary

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE ROCK BERM OPTION**

<b>GENERAL REQUIREMENTS</b>			
Management	\$	2,918,708	
Administration		1,049,895	
Quality		1,224,878	
Facilities		524,948	
Mobilizaiton		657,934	
Engineering		<u>1,116,388</u>	7,492,751 7%
<b>SITE PREPARATION</b>			
Site Clearing: Clearing and Grubbing		361,584	
Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT USED			
Dewatering: Operate and Maintain Well Point System NOT USED			
Shoring and Underpinning: Barge Unloading Facility		<u>4,223,494</u>	4,585,078 4%
<b>SITE CONSTRUCTION EMBANKMENT</b>			
Excavation		31,321,868	
Embankment		30,442,289	
Erosion and Sediment Contol Filter Fabric		4,304,336	
Erosion and Sediment Contol Riprap		27,744,000	
Aggregate Surfacing		958,671	94,771,164 89%
<b>Subtotal:</b>	<b>\$</b>	<b>106,848,992</b>	<b>100%</b>

106848992
7492751
99356241

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California

**BACON ISLAND IN-DELTA STORAGE ROCK BERM OPTION**

Effective Date: June, 2003

**1 GENERAL REQUIREMENTS**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>DIRECT</i>	<i>GEN REQ</i>	<i>G &amp; A</i>	<i>PROFIT</i>	<i>BOND</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
01310.0	Management	60.0	MO	2,502,000		125,100	262,710	28,898	2,918,708	48,645.14
01320.0	Administration	60.0	MO	900,000		45,000	94,500	10,395	1,049,895	17,498.25
01430.0	Quality	60.0	MO	1,050,000		52,500	110,250	12,128	1,224,878	20,414.63
01520.0	Facilities	60.0	MO	450,000		22,500	47,250	5,198	524,948	8,749.13
01540.0	Mobilizaiton	50.0	EA	564,000		28,200	59,220	6,514	657,934	13,158.68
01720.0	Engineering	60.0	MO	957,000		47,850	100,485	11,053	1,116,388	18,606.47
<b>GENERAL REQUIREMENTS</b>		<b>5,957,500.0</b>	<b>CY</b>	<b>6,423,000</b>		<b>321,150</b>	<b>674,415</b>	<b>74,186</b>	<b>7,492,751</b>	<b>1.26</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California

**BACON ISLAND IN-DELTA STORAGE ROCK BERM OPTION**

Effective Date: June, 2003

**2 SITE PREPARATION**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>DIRECT</i>	<i>GEN REQ</i>	<i>G &amp; A</i>	<i>PROFIT</i>	<i>BOND</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
02230.0	Site Clearing: Clearing and Grubbing	210.0	AC	309,960		15,498	32,546	3,580	361,584	1,721.83
02240.0	Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT		MO							
02240.0	Dewatering: Construct Well Point System NOT USED		EA							
02240.0	Dewatering: Operate and Maintain Well Point System N		MO							
02250.0	Shoring and Underpinning: Barge Unloading Facility	65,000.0	SF	3,620,500		181,025	380,153	41,817	4,223,494	64.98
<b>SITE PREPARATION</b>		<b>5,957,500.0</b>	<b>CY</b>	<b>3,930,460</b>		<b>196,523</b>	<b>412,698</b>	<b>45,397</b>	<b>4,585,078</b>	<b>0.77</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

**3 SITE CONSTRUCTION EMBANKMENT**

SPEC.	DESCRIPTION	QUANTITY	UOM	DIRECT	GEN REQ	G & A	PROFIT	BOND	TOTAL COST	UNIT PRICE
02315.0	Excavation and Fill: Haul Roads NOT USED		LF							
02315.0	Excavation and Fill: Sediment Traps NOT USED		EA							
02315.0	Excavation and Fill: Holding Ponds NOT USED		EA							
02315.0	Excavation: Exc., Load, Haul, Waste Overburden	22,000,000.0	CY	18,920,000		946,000	1,986,600	218,526	22,071,126	1.00
02315.0	Excavation: Exc., Load, Haul, Stockpile Borrow	6,100,000.0	CY	7,930,000		396,500	832,650	91,592	9,250,742	1.52
02330.0	Embankment: Moisture Condition Borrow	6,100,000.0	CY	2,867,000		143,350	301,035	33,114	3,344,499	0.55
02330.0	Embankment: Load, Haul, Place, Compact Borrow	5,100,000.0	CY	10,965,000		548,250	1,151,325	126,646	12,791,221	2.51
02370.0	Embankment : Unload, Haul, Place Rock Fill	240,000.0	CY	12,264,000		613,200	1,287,720	141,649	14,306,569	59.61
02370.0	Erosion and Sed. Control: Geotex. Line Sed. Traps NOT		EA							
02370.0	Erosion and Sed. Control: Geotex. Line Hold Ponds NO		EA							
02370.0	Erosion and Sed. Control: Filter Fabric Levee	8,600,000.0	SF	1,634,000		81,700	171,570	18,873	1,906,143	0.22
02370.0	Erosion and Sed. Control: Filter Fabric Reservoir	10,820,000.0	SF	2,055,800		102,790	215,859	23,744	2,398,193	0.22
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap B	8,500.0	CY	357,850		17,893	37,574	4,133	417,450	49.11
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	17,000.0	CY	766,700		38,335	80,504	8,855	894,394	52.61
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap B	80,000.0	CY	3,008,000		150,400	315,840	34,742	3,508,982	43.86
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	200,000.0	CY	8,120,000		406,000	852,600	93,786	9,472,386	47.36
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	284,000.0	CY	11,530,400		576,520	1,210,692	133,176	13,450,788	47.36
02700.0	Aggregate Surfacing: Unload, Haul, Place, Compact R	28,000.0	CY	821,800		41,090	86,289	9,492	958,671	34.24
<b>SITE CONSTRUCTION EMBANKMENT</b>		<b>5,957,500.0</b>	<b>CY</b>	<b>81,240,550</b>		<b>4,062,028</b>	<b>8,530,258</b>	<b>938,328</b>	<b>94,771,164</b>	<b>15.91</b>
<b>TOTAL DIRECT AND INDIRECT COST</b>		<b>5,957,500</b>	<b>CY</b>	<b>91,594,010</b>		<b>4,579,701</b>	<b>9,617,371</b>	<b>1,057,911</b>	<b>106,848,992</b>	<b>17.94</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California

**BACON ISLAND IN-DELTA STORAGE ROCK BERM OPTION**

Effective Date: June, 2003

**1 GENERAL REQUIREMENTS**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
01310.0	Management	60.0	MO	2,190,000	312,000			2,502,000	41,700.00
01320.0	Administration	60.0	MO	750,000	150,000			900,000	15,000.00
01430.0	Quality	60.0	MO	750,000	300,000			1,050,000	17,500.00
01520.0	Facilities	60.0	MO	90,000	330,000	30,000		450,000	7,500.00
01540.0	Mobilizaiton	50.0	EA	189,000	375,000			564,000	11,280.00
01720.0	Engineering	60.0	MO	912,000	30,000	15,000		957,000	15,950.00
	<b>GENERAL REQUIREMENTS</b>	<b>5,957,500.0</b>	<b>CY</b>	<b>4,881,000</b>	<b>1,497,000</b>	<b>45,000</b>		<b>6,423,000</b>	<b>1.08</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

**2 SITE PREPARATION**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
02230.0	Site Clearing: Clearing and Grubbing	210.0	AC	68,460	241,500			309,960	1,476.00
02240.0	Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT USED		MO						
02240.0	Dewatering: Construct Well Point System NOT USED		EA						
02240.0	Dewatering: Operate and Maintain Well Point System NOT USED		MO						
02250.0	Shoring and Underpinning: Barge Unloading Facility	65,000.0	SF	422,500	1,183,000	2,015,000		3,620,500	55.70
	<b>SITE PREPARATION</b>	<b>5,957,500.0</b>	<b>CY</b>	<b>490,960</b>	<b>1,424,500</b>	<b>2,015,000</b>		<b>3,930,460</b>	<b>.66</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

**3 SITE CONSTRUCTION EMBANKMENT**

SPEC.	DESCRIPTION	QUANTITY	UOM	LABOR	EQUIPMENT	MATERIAL	OTHER	TOTAL COST	UNIT PRICE
02315.0	Excavation and Fill: Haul Roads NOT USED		LF						
02315.0	Excavation and Fill: Sediment Traps NOT USED		EA						
02315.0	Excavation and Fill: Holding Ponds NOT USED		EA						
02315.0	Excavation: Exc., Load, Haul, Waste Overburden	22,000,000.0	CY	7,260,000	11,660,000			18,920,000	.86
02315.0	Excavation: Exc., Load, Haul, Stockpile Borrow	6,100,000.0	CY	1,830,000	6,100,000			7,930,000	1.30
02330.0	Embankment: Moisture Condition Borrow	6,100,000.0	CY	1,281,000	1,586,000			2,867,000	.47
02330.0	Embankment: Load, Haul, Place, Compact Borrow	5,100,000.0	CY	3,060,000	7,905,000			10,965,000	2.15
02370.0	Embankment : Unload, Haul, Place Rock Fill	240,000.0	CY	1,416,000	3,168,000	7,680,000		12,264,000	51.10
02370.0	Erosion and Sed. Control: Geotex. Line Sed. Traps NOT USED		EA						
02370.0	Erosion and Sed. Control: Geotex. Line Hold Ponds NOT USED		EA						
02370.0	Erosion and Sed. Control: Filter Fabric Levee	8,600,000.0	SF	688,000	344,000	602,000		1,634,000	.19
02370.0	Erosion and Sed. Control: Filter Fabric Reservoir	10,820,000.0	SF	865,600	432,800	757,400		2,055,800	.19
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding	8,500.0	CY	50,150	112,200	195,500		357,850	42.10
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	17,000.0	CY	100,300	224,400	442,000		766,700	45.10
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding	80,000.0	CY	280,000	888,000	1,840,000		3,008,000	37.60
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	200,000.0	CY	700,000	2,220,000	5,200,000		8,120,000	40.60
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	284,000.0	CY	994,000	3,152,400	7,384,000		11,530,400	40.60
02700.0	Aggregate Surfacing: Unload, Haul, Place, Compact Road Base	28,000.0	CY	57,400	120,400	644,000		821,800	29.35
	<b>SITE CONSTRUCTION EMBANKMENT</b>	<b>5,957,500.0</b>	<b>CY</b>	<b>18,582,450</b>	<b>37,913,200</b>	<b>24,744,900</b>		<b>81,240,550</b>	<b>13.64</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

<b>1 GENERAL REQUIREMENTS</b>										
<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT COST</i>	
01310.0	Management	60.0	MO	36,500.00	5,200.00			41,700.00		
				2,190,000	312,000			2,502,000	41,700.00	
01320.0	Administration	60.0	MO	12,500.00	2,500.00			15,000.00		
				750,000	150,000			900,000	15,000.00	
01430.0	Quality	60.0	MO	12,500.00	5,000.00			17,500.00		
				750,000	300,000			1,050,000	17,500.00	
01520.0	Facilities	60.0	MO	1,500.00	5,500.00	500.00		7,500.00		
				90,000	330,000	30,000		450,000	7,500.00	
01540.0	Mobilizaiton	50.0	EA	3,780.00	7,500.00			11,280.00		
				189,000	375,000			564,000	11,280.00	
01720.0	Engineering	60.0	MO	15,200.00	500.00	250.00		15,950.00		
				912,000	30,000	15,000		957,000	15,950.00	
	<b>GENERAL REQUIREMENTS</b>	<b>5,957,500.0</b>	<b>CY</b>	<b>4,881,000</b>	<b>1,497,000</b>	<b>45,000</b>		<b>6,423,000</b>		<b>1.08</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

<b>2 SITE PREPARATION</b>										
<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT COST</i>	
02230.0	Site Clearing: Clearing and Grubbing	<b>210.0</b>	AC	326.00	1,150.00			1,476.00		
				68,460	241,500			309,960	1,476.00	
02240.0	Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT USED		MO					.00		
02240.0	Dewatering: Construct Well Point System NOT USED 3500 GPM Per Set		EA					.00		
02240.0	Dewatering: Operate and Maintain Well Point System NOT USED		MO					.00		
02250.0	Shoring and Underpinning: Barge Unloading Facility	65,000.0	SF	6.50	18.20	31.00		55.70		
				422,500	1,183,000	2,015,000		3,620,500	55.70	
	<b>SITE PREPARATION</b>	<b>5,957,500.0</b>	<b>CY</b>	<b>490,960</b>	<b>1,424,500</b>	<b>2,015,000</b>		<b>3,930,460</b>	<b>.66</b>	

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE ROCK BERM OPTION**  
 Effective Date: June, 2003

<b>3 SITE CONSTRUCTION EMBANKMENT</b>										
<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT COST</i>	
02315.0	Excavation and Fill: Haul Roads NOT USED		LF					.00		
02315.0	Excavation and Fill: Sediment Traps NOT USED		EA					.00		
02315.0	Excavation and Fill: Holding Ponds NOT USED		EA					.00		
02315.0	Excavation: Exc., Load, Haul, Waste Overburden	22,000,000.0	CY	.33	.53			.86		
				7,260,000	11,660,000			18,920,000	.86	
02315.0	Excavation: Exc., Load, Haul, Stockpile Borrow	6,100,000.0	CY	.30	1.00			1.30		
	Assume Yield 70%			1,830,000	6,100,000			7,930,000	1.30	
02330.0	Embankment: Moisture Condition Borrow	6,100,000.0	CY	.21	.26			.47		
				1,281,000	1,586,000			2,867,000	.47	
02330.0	Embankment: Load, Haul, Place, Compact Borrow	<b>5,100,000.0</b>	CY	.60	1.55			2.15		
	4,000 LF Haul			3,060,000	7,905,000			10,965,000	2.15	
02370.0	Embankment : Unload, Haul, Place Rock Fill	<b>240,000.0</b>	CY	5.90	13.20	32.00		51.10		
				1,416,000	3,168,000	7,680,000		12,264,000	51.10	
02370.0	Erosion and Sed. Control: Geotex. Line Sed. Traps NOT USED		EA					.00		
02370.0	Erosion and Sed. Control: Geotex. Line Hold Ponds NOT USED		EA					.00		
02370.0	Erosion and Sed. Control: Filter Fabric Levee	<b>8,600,000.0</b>	SF	.08	.04	.07		.19		
				688,000	344,000	602,000		1,634,000	.19	
02370.0	Erosion and Sed. Control: Filter Fabric Reservoir	<b>10,820,000.0</b>	SF	.08	.04	.07		.19		
				865,600	432,800	757,400		2,055,800	.19	
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding Slough	<b>8,500.0</b>	CY	5.90	13.20	23.00		42.10		
				50,150	112,200	195,500		357,850	42.10	
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap Slough	<b>17,000.0</b>	CY	5.90	13.20	26.00		45.10		
				100,300	224,400	442,000		766,700	45.10	
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding Reservoir	<b>80,000.0</b>	CY	3.50	11.10	23.00		37.60		
				280,000	888,000	1,840,000		3,008,000	37.60	
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap Reservoir	<b>200,000.0</b>	CY	3.50	11.10	26.00		40.60		
				700,000	2,220,000	5,200,000		8,120,000	40.60	
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap Reservoir 10:1 Slope	<b>284,000.0</b>	CY	3.50	11.10	26.00		40.60		
				994,000	3,152,400	7,384,000		11,530,400	40.60	
02700.0	Aggregate Surfacing: Unload, Haul, Place, Compact Road Base	<b>28,000.0</b>	CY	2.05	4.30	23.00		29.35		
				57,400	120,400	644,000		821,800	29.35	
	<b>SITE CONSTRUCTION EMBANKMENT</b>	<b>5,957,500.0</b>	<b>CY</b>	<b>18,582,450</b>	<b>37,913,200</b>	<b>24,744,900</b>		<b>81,240,550</b>	<b>13.64</b>	

URS Corporation  
Engineer's Class 4 Design Construction Cost Estimate  
WEBB TRACT IN-DELTA STORAGE BENCH OPTION

---

**WEBB TRACT IN-DELTA STORAGE BENCH OPTION**

Integrated Storage Investigations Programs  
California Department of Water Resources  
San Joaquin River Delta Stockton, California

Prepared By: URS Corporation  
Denver, Colorado

The Estimated Construction Cost is calculated with Microsoft Excel software and presented in the following categories and sheets. The categories are Detail, Direct Summary and Indirect Summary containing 5 sheets each. All data is entered on the 5 sheets in the Detail Category. The Direct and Indirect Summary communicate with the Detail category sheets. Each feature is subtotaled on the respective sheet in the Direct and Indirect Summary. A total is presented on sheet 5 of the Direct and Indirect Summary. The Direct Summary summarizes all data entered on the Detail sheets and computes Unit Prices. The Indirect Summary adds General Requirements, General and Administrative, Profit and Bond costs to the Direct Summary and computes "marked up" Unit Prices.

# Cost Summary

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE BENCH OPTION**

<b>GENERAL REQUIREMENTS</b>			
Management	\$	2,918,708	
Administration		1,049,895	
Quality		1,224,878	
Facilities		524,948	
Mobilizaiton		657,934	
Engineering		<u>1,116,388</u>	7,492,751 6%
<b>SITE PREPARATION</b>			
Site Clearing: Clearing and Grubbing		482,112	
Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT USED			
Dewatering: Operate and Maintain Well Point System NOT USED			
Shoring and Underpinning: Barge Unloading Facility		<u>4,223,494</u>	4,705,606 4%
<b>SITE CONSTRUCTION EMBANKMENT</b>			
Excavation		39,156,417	
Embankment		41,575,842	
Erosion and Sediment Contol Filter Fabric		3,803,420	
Erosion and Sediment Contol Riprap		34,704,746	
Aggregate Surfacing		855,956	120,096,381 91%
<b>Subtotal:</b>	<b>\$</b>	<b><u>132,294,738</u></b>	<b>100%</b>

132294738
7492751
<u>124801987</u>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

**1 GENERAL REQUIREMENTS**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>DIRECT</i>	<i>GEN REQ</i>	<i>G &amp; A</i>	<i>PROFIT</i>	<i>BOND</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
01310.0	Management	60.0	MO	2,502,000		125,100	262,710	28,898	2,918,708	48,645.14
01320.0	Administration	60.0	MO	900,000		45,000	94,500	10,395	1,049,895	17,498.25
01430.0	Quality	60.0	MO	1,050,000		52,500	110,250	12,128	1,224,878	20,414.63
01520.0	Facilities	60.0	MO	450,000		22,500	47,250	5,198	524,948	8,749.13
01540.0	Mobilizaiton	50.0	EA	564,000		28,200	59,220	6,514	657,934	13,158.68
01720.0	Engineering	60.0	MO	957,000		47,850	100,485	11,053	1,116,388	18,606.47
<b>GENERAL REQUIREMENTS</b>		<b>10,749,000.0</b>	<b>CY</b>	<b>6,423,000</b>		<b>321,150</b>	<b>674,415</b>	<b>74,186</b>	<b>7,492,751</b>	<b>0.70</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

**2 SITE PREPARATION**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>DIRECT</i>	<i>GEN REQ</i>	<i>G &amp; A</i>	<i>PROFIT</i>	<i>BOND</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
02230.0	Site Clearing: Clearing and Grubbing	280.0	AC	413,280		20,664	43,394	4,773	482,112	1,721.83
02240.0	Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT US		MO							
02240.0	Dewatering: Construct Well Point System NOT USED		EA							
02240.0	Dewatering: Operate and Maintain Well Point System NO		MO							
02250.0	Shoring and Underpinning: Barge Unloading Facility	65,000.0	SF	3,620,500		181,025	380,153	41,817	4,223,494	64.98
<b>SITE PREPARATION</b>		<b>10,749,000.0</b>	<b>CY</b>	<b>4,033,780</b>		<b>201,689</b>	<b>423,547</b>	<b>46,590</b>	<b>4,705,606</b>	<b>0.44</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

**3 SITE CONSTRUCTION EMBANKMENT**

SPEC.	DESCRIPTION	QUANTITY	UOM	DIRECT	GEN REQ	G & A	PROFIT	BOND	TOTAL COST	UNIT PRICE
02315.0	Excavation and Fill: Haul Roads NOT USED		LF							
02315.0	Excavation and Fill: Sediment Traps NOT USED		EA							
02315.0	Excavation and Fill: Holding Ponds NOT USED		EA							
02315.0	Excavation: Exc., Load, Haul, Waste Overburden	15,600,000.0	CY	13,416,000		670,800	1,408,680	154,955	15,650,435	1.00
02315.0	Excavation: Exc., Load, Haul, Waste Bench	500,000.0	CY	1,670,000		83,500	175,350	19,289	1,948,139	3.90
02315.0	Excavation: Exc., Load, Haul, Stockpile Borrow	12,000,000.0	CY	18,480,000		924,000	1,940,400	213,444	21,557,844	1.80
02330.0	Embankment: Moisture Condition Borrow	12,000,000.0	CY	5,640,000		282,000	592,200	65,142	6,579,342	0.55
02330.0	Embankment: Load, Haul, Place, Compact Borrow	10,000,000.0	CY	30,000,000		1,500,000	3,150,000	346,500	34,996,500	3.50
02370.0	Erosion and Sed. Control: Geotex. Line Sed. Traps NOT U		EA							
02370.0	Erosion and Sed. Control: Geotex. Line Hold Ponds NOT L		EA							
02370.0	Erosion and Sed. Control: Filter Fabric Levee	7,400,000.0	SF	1,406,000		70,300	147,630	16,239	1,640,169	0.22
02370.0	Erosion and Sed. Control: Filter Fabric Reservoir	9,760,000.0	SF	1,854,400		92,720	194,712	21,418	2,163,250	0.22
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bed	55,000.0	CY	2,315,500		115,775	243,128	26,744	2,701,147	49.11
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	110,000.0	CY	4,961,000		248,050	520,905	57,300	5,787,255	52.61
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bed	74,000.0	CY	2,782,400		139,120	292,152	32,137	3,245,809	43.86
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	185,000.0	CY	7,511,000		375,550	788,655	86,752	8,761,957	47.36
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	300,000.0	CY	12,180,000		609,000	1,278,900	140,679	14,208,579	47.36
02700.0	Aggregate Surfacing: Unload, Haul, Place, Compact Roa	25,000.0	CY	733,750		36,688	77,044	8,475	855,956	34.24
<b>SITE CONSTRUCTION EMBANKMENT</b>		<b>10,749,000.0</b>	<b>CY</b>	<b>102,950,050</b>		<b>5,147,503</b>	<b>10,809,755</b>	<b>1,189,073</b>	<b>120,096,381</b>	<b>11.17</b>
<b>TOTAL DIRECT AND INDIRECT COST</b>		<b>10,749,000</b>	<b>CY</b>	<b>113,406,830</b>		<b>5,670,342</b>	<b>11,907,717</b>	<b>1,309,849</b>	<b>132,294,738</b>	<b>12.31</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

**1 GENERAL REQUIREMENTS**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
01310.0	Management	60.0	MO	2,190,000	312,000			2,502,000	41,700.00
01320.0	Administration	60.0	MO	750,000	150,000			900,000	15,000.00
01430.0	Quality	60.0	MO	750,000	300,000			1,050,000	17,500.00
01520.0	Facilities	60.0	MO	90,000	330,000	30,000		450,000	7,500.00
01540.0	Mobilizaiton	50.0	EA	189,000	375,000			564,000	11,280.00
01720.0	Engineering	60.0	MO	912,000	30,000	15,000		957,000	15,950.00
	<b>GENERAL REQUIREMENTS</b>	<b>10,749,000.0</b>	<b>CY</b>	<b>4,881,000</b>	<b>1,497,000</b>	<b>45,000</b>		<b>6,423,000</b>	<b>.60</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

**2 SITE PREPARATION**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
02230.0	Site Clearing: Clearing and Grubbing	280.0	AC	91,280	322,000			413,280	1,476.00
02240.0	Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT USED		MO						
02240.0	Dewatering: Construct Well Point System NOT USED		EA						
02240.0	Dewatering: Operate and Maintain Well Point System NOT USED		MO						
02250.0	Shoring and Underpinning: Barge Unloading Facility	65,000.0	SF	422,500	1,183,000	2,015,000		3,620,500	55.70
	<b>SITE PREPARATION</b>	<b>10,749,000.0</b>	<b>CY</b>	<b>513,780</b>	<b>1,505,000</b>	<b>2,015,000</b>		<b>4,033,780</b>	<b>.38</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

**3 SITE CONSTRUCTION EMBANKMENT**

SPEC.	DESCRIPTION	QUANTITY	UOM	LABOR	EQUIPMENT	MATERIAL	OTHER	TOTAL COST	UNIT PRICE
02315.0	Excavation and Fill: Haul Roads NOT USED		LF						
02315.0	Excavation and Fill: Sediment Traps NOT USED		EA						
02315.0	Excavation and Fill: Holding Ponds NOT USED		EA						
02315.0	Excavation: Exc., Load, Haul, Waste Overburden	15,600,000.0	CY	5,148,000	8,268,000			13,416,000	.86
02315.0	Excavation: Exc., Load, Haul, Waste Bench	500,000.0	CY	520,000	1,150,000			1,670,000	3.34
02315.0	Excavation: Exc., Load, Haul, Stockpile Borrow	12,000,000.0	CY	4,800,000	13,680,000			18,480,000	1.54
02330.0	Embankment: Moisture Condition Borrow	12,000,000.0	CY	2,520,000	3,120,000			5,640,000	.47
02330.0	Embankment: Load, Haul, Place, Compact Borrow	10,000,000.0	CY	9,500,000	20,500,000			30,000,000	3.00
02370.0	Erosion and Sed. Control: Geotex. Line Sed. Traps NOT USED		EA						
02370.0	Erosion and Sed. Control: Geotex. Line Hold Ponds NOT USED		EA						
02370.0	Erosion and Sed. Control: Filter Fabric Levee	7,400,000.0	SF	592,000	296,000	518,000		1,406,000	.19
02370.0	Erosion and Sed. Control: Filter Fabric Reservoir	9,760,000.0	SF	780,800	390,400	683,200		1,854,400	.19
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding	55,000.0	CY	324,500	726,000	1,265,000		2,315,500	42.10
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	110,000.0	CY	649,000	1,452,000	2,860,000		4,961,000	45.10
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding	74,000.0	CY	259,000	821,400	1,702,000		2,782,400	37.60
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	185,000.0	CY	647,500	2,053,500	4,810,000		7,511,000	40.60
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	300,000.0	CY	1,050,000	3,330,000	7,800,000		12,180,000	40.60
02700.0	Aggregate Surfacing: Unload, Haul, Place, Compact Road Base	25,000.0	CY	51,250	107,500	575,000		733,750	29.35
	<b>SITE CONSTRUCTION EMBANKMENT</b>	<b>10,749,000.0</b>	<b>CY</b>	<b>26,842,050</b>	<b>55,894,800</b>	<b>20,213,200</b>		<b>102,950,050</b>	<b>9.58</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

1 GENERAL REQUIREMENTS										
SPEC.	DESCRIPTION	QUANTITY	UOM	LABOR	EQUIPMENT	MATERIAL	OTHER	TOTAL COST	UNIT COST	
01310.0	Management	60.0	MO	36,500.00	5,200.00			41,700.00		
				2,190,000	312,000			2,502,000	41,700.00	
01320.0	Administration	60.0	MO	12,500.00	2,500.00			15,000.00		
				750,000	150,000			900,000	15,000.00	
01430.0	Quality	60.0	MO	12,500.00	5,000.00			17,500.00		
				750,000	300,000			1,050,000	17,500.00	
01520.0	Facilities	60.0	MO	1,500.00	5,500.00	500.00		7,500.00		
				90,000	330,000	30,000		450,000	7,500.00	
01540.0	Mobilizaiton	50.0	EA	3,780.00	7,500.00			11,280.00		
				189,000	375,000			564,000	11,280.00	
01720.0	Engineering	60.0	MO	15,200.00	500.00	250.00		15,950.00		
				912,000	30,000	15,000		957,000	15,950.00	
GENERAL REQUIREMENTS		10,749,000.0	CY	4,881,000	1,497,000	45,000		6,423,000	.60	

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

<b>2 SITE PREPARATION</b>									
<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT COST</i>
02230.0	Site Clearing: Clearing and Grubbing	<b>280.0</b>	AC	326.00	1,150.00			1,476.00	
				91,280	322,000			413,280	1,476.00
02240.0	Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT USED		MO					.00	
02240.0	Dewatering: Construct Well Point System NOT USED 3500 GPM Per Set		EA					.00	
02240.0	Dewatering: Operate and Maintain Well Point System NOT USED		MO					.00	
02250.0	Shoring and Underpinning: Barge Unloading Facility	65,000.0	SF	6.50	18.20	31.00		55.70	
				422,500	1,183,000	2,015,000		3,620,500	55.70
	SITE PREPARATION	10,749,000.0	CY	513,780	1,505,000	2,015,000		4,033,780	.38

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB TRACT IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

<b>3 SITE CONSTRUCTION EMBANKMENT</b>										
SPEC.	DESCRIPTION	QUANTITY	UOM	LABOR	EQUIPMENT	MATERIAL	OTHER	TOTAL COST	UNIT COST	
02315.0	Excavation and Fill: Haul Roads NOT USED		LF					.00		
02315.0	Excavation and Fill: Sediment Traps NOT USED		EA					.00		
02315.0	Excavation and Fill: Holding Ponds NOT USED		EA					.00		
02315.0	Excavation: Exc., Load, Haul, Waste Overburden	15,600,000.0	CY	.33	.53			.86		
				5,148,000	8,268,000			13,416,000	.86	
02315.0	Excavation: Exc., Load, Haul, Waste Bench	<b>500,000.0</b>	CY	1.04	2.30			3.34		
				520,000	1,150,000			1,670,000	3.34	
02315.0	Excavation: Exc., Load, Haul, Stockpile Borrow Assume Yield 70%	12,000,000.0	CY	.40	1.14			1.54		
				4,800,000	13,680,000			18,480,000	1.54	
02330.0	Embankment: Moisture Condition Borrow	12,000,000.0	CY	.21	.26			.47		
				2,520,000	3,120,000			5,640,000	.47	
02330.0	Embankment: Load, Haul, Place, Compact Borrow 7,500 LF Haul	<b>10,000,000.0</b>	CY	.95	2.05			3.00		
				9,500,000	20,500,000			30,000,000	3.00	
02370.0	Erosion and Sed. Control: Geotex. Line Sed. Traps NOT USED		EA					.00		
02370.0	Erosion and Sed. Control: Geotex. Line Hold Ponds NOT USED		EA					.00		
02370.0	Erosion and Sed. Control: Filter Fabric Levee	<b>7,400,000.0</b>	SF	.08	.04	.07		.19		
				592,000	296,000	518,000		1,406,000	.19	
02370.0	Erosion and Sed. Control: Filter Fabric Reservoir	<b>9,760,000.0</b>	SF	.08	.04	.07		.19		
				780,800	390,400	683,200		1,854,400	.19	
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding Slough	<b>55,000.0</b>	CY	5.90	13.20	23.00		42.10		
				324,500	726,000	1,265,000		2,315,500	42.10	
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap Slough	<b>110,000.0</b>	CY	5.90	13.20	26.00		45.10		
				649,000	1,452,000	2,860,000		4,961,000	45.10	
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding Reservoir	<b>74,000.0</b>	CY	3.50	11.10	23.00		37.60		
				259,000	821,400	1,702,000		2,782,400	37.60	
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap Reservoir	<b>185,000.0</b>	CY	3.50	11.10	26.00		40.60		
				647,500	2,053,500	4,810,000		7,511,000	40.60	
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap Reservoir 10:1 Slope	<b>300,000.0</b>	CY	3.50	11.10	26.00		40.60		
				1,050,000	3,330,000	7,800,000		12,180,000	40.60	
02700.0	Aggregate Surfacing: Unload, Haul, Place, Compact Road Base	<b>25,000.0</b>	CY	2.05	4.30	23.00		29.35		
				51,250	107,500	575,000		733,750	29.35	
	SITE CONSTRUCTION EMBANKMENT	10,749,000.0	CY	26,842,050	55,894,800	20,213,200		102,950,050	9.58	

URS Corporation  
Engineer's Class 4 Design Construction Cost Estimate  
BACON ISLAND IN-DELTA STORAGE BENCH OPTION

---

**BACON ISLAND IN-DELTA STORAGE BENCH OPTION**

Integrated Storage Investigations Programs  
California Department of Water Resources  
San Joaquin River Delta Stockton, California

Prepared By: URS Corporation  
Denver, Colorado

The Estimated Construction Cost is calculated with Microsoft Excel software and presented in the following categories and sheets. The categories are Detail, Direct Summary and Indirect Summary containing 5 sheets each. All data is entered on the 5 sheets in the Detail Category. The Direct and Indirect Summary communicate with the Detail category sheets. Each feature is subtotaled on the respective sheet in the Direct and Indirect Summary. A total is presented on sheet 5 of the Direct and Indirect Summary. The Direct Summary summarizes all data entered on the Detail sheets and computes Unit Prices. The Indirect Summary adds General Requirements, General and Administrative, Profit and Bond costs to the Direct Summary and computes "marked up" Unit Prices.

# Cost Summary

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE BENCH OPTION**

<b>GENERAL REQUIREMENTS</b>			
Management	\$	2,918,708	
Administration		1,049,895	
Quality		1,224,878	
Facilities		524,948	
Mobilizaiton		657,934	
Engineering		<u>1,116,388</u>	7,492,751 5%
<b>SITE PREPARATION</b>			
Site Clearing: Clearing and Grubbing		533,767	
Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT USED			
Dewatering: Operate and Maintain Well Point System NOT USED			
Shoring and Underpinning: Barge Unloading Facility		<u>4,223,494</u>	4,757,261 3%
<b>SITE CONSTRUCTION EMBANKMENT</b>			
Excavation		63,961,003	
Embankment		31,965,803	
Erosion and Sediment Contol Filter Fabric		4,304,336	
Erosion and Sediment Contol Riprap		36,463,903	
Aggregate Surfacing		958,671	137,653,717 92%
<b>Subtotal:</b>	<b>\$</b>		<b>149,903,728 100%</b>

149903728
7492751
142410977

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

**1 GENERAL REQUIREMENTS**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>DIRECT</i>	<i>GEN REQ</i>	<i>G &amp; A</i>	<i>PROFIT</i>	<i>BOND</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
01310.0	Management	60.0	MO	2,502,000		125,100	262,710	28,898	2,918,708	48,645.14
01320.0	Administration	60.0	MO	900,000		45,000	94,500	10,395	1,049,895	17,498.25
01430.0	Quality	60.0	MO	1,050,000		52,500	110,250	12,128	1,224,878	20,414.63
01520.0	Facilities	60.0	MO	450,000		22,500	47,250	5,198	524,948	8,749.13
01540.0	Mobilizaiton	50.0	EA	564,000		28,200	59,220	6,514	657,934	13,158.68
01720.0	Engineering	60.0	MO	957,000		47,850	100,485	11,053	1,116,388	18,606.47
<b>GENERAL REQUIREMENTS</b>		<b>10,887,000.0</b>	<b>CY</b>	<b>6,423,000</b>		<b>321,150</b>	<b>674,415</b>	<b>74,186</b>	<b>7,492,751</b>	<b>0.69</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

**2 SITE PREPARATION**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>DIRECT</i>	<i>GEN REQ</i>	<i>G &amp; A</i>	<i>PROFIT</i>	<i>BOND</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
02230.0	Site Clearing: Clearing and Grubbing	310.0	AC	457,560		22,878	48,044	5,285	533,767	1,721.83
02240.0	Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT		MO							
02240.0	Dewatering: Construct Well Point System NOT USED		EA							
02240.0	Dewatering: Operate and Maintain Well Point System N		MO							
02250.0	Shoring and Underpinning: Barge Unloading Facility	65,000.0	SF	3,620,500		181,025	380,153	41,817	4,223,494	64.98
<b>SITE PREPARATION</b>		<b>10,887,000.0</b>	<b>CY</b>	<b>4,078,060</b>		<b>203,903</b>	<b>428,196</b>	<b>47,102</b>	<b>4,757,261</b>	<b>0.44</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

**3 SITE CONSTRUCTION EMBANKMENT**

SPEC.	DESCRIPTION	QUANTITY	UOM	DIRECT	GEN REQ	G & A	PROFIT	BOND	TOTAL COST	UNIT PRICE
02315.0	Excavation and Fill: Haul Roads NOT USED		LF							
02315.0	Excavation and Fill: Sediment Traps NOT USED		EA							
02315.0	Excavation and Fill: Holding Ponds NOT USED		EA							
02315.0	Excavation: Exc., Load, Haul, Waste Overburden	43,600,000.0	CY	37,496,000		1,874,800	3,937,080	433,079	43,740,959	1.00
02315.0	Excavation: Exc., Load, Haul, Waste Bench	480,000.0	CY	1,603,200		80,160	168,336	18,517	1,870,213	3.90
02315.0	Excavation: Exc., Load, Haul, Stockpile Borrow	12,100,000.0	CY	15,730,000		786,500	1,651,650	181,682	18,349,832	1.52
02330.0	Embankment: Moisture Condition Borrow	12,100,000.0	CY	5,687,000		284,350	597,135	65,685	6,634,170	0.55
02330.0	Embankment: Load, Haul, Place, Compact Borrow	10,100,000.0	CY	21,715,000		1,085,750	2,280,075	250,808	25,331,633	2.51
02370.0	Erosion and Sed. Control: Geotex. Line Sed. Traps NOT		EA							
02370.0	Erosion and Sed. Control: Geotex. Line Hold Ponds NO		EA							
02370.0	Erosion and Sed. Control: Filter Fabric Levee	8,600,000.0	SF	1,634,000		81,700	171,570	18,873	1,906,143	0.22
02370.0	Erosion and Sed. Control: Filter Fabric Reservoir	10,820,000.0	SF	2,055,800		102,790	215,859	23,744	2,398,193	0.22
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap B	65,000.0	CY	2,736,500		136,825	287,333	31,607	3,192,264	49.11
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	130,000.0	CY	5,863,000		293,150	615,615	67,718	6,839,483	52.61
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap B	80,000.0	CY	3,008,000		150,400	315,840	34,742	3,508,982	43.86
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	200,000.0	CY	8,120,000		406,000	852,600	93,786	9,472,386	47.36
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	284,000.0	CY	11,530,400		576,520	1,210,692	133,176	13,450,788	47.36
02700.0	Aggregate Surfacing: Unload, Haul, Place, Compact R	28,000.0	CY	821,800		41,090	86,289	9,492	958,671	34.24
<b>SITE CONSTRUCTION EMBANKMENT</b>		<b>10,887,000.0</b>	<b>CY</b>	<b>118,000,700</b>		<b>5,900,035</b>	<b>12,390,074</b>	<b>1,362,908</b>	<b>137,653,717</b>	<b>12.64</b>
<b>TOTAL DIRECT AND INDIRECT COST</b>		<b>10,887,000</b>	<b>CY</b>	<b>128,501,760</b>		<b>6,425,088</b>	<b>13,492,685</b>	<b>1,484,195</b>	<b>149,903,728</b>	<b>13.77</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

**1 GENERAL REQUIREMENTS**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
01310.0	Management	60.0	MO	2,190,000	312,000			2,502,000	41,700.00
01320.0	Administration	60.0	MO	750,000	150,000			900,000	15,000.00
01430.0	Quality	60.0	MO	750,000	300,000			1,050,000	17,500.00
01520.0	Facilities	60.0	MO	90,000	330,000	30,000		450,000	7,500.00
01540.0	Mobilizaiton	50.0	EA	189,000	375,000			564,000	11,280.00
01720.0	Engineering	60.0	MO	912,000	30,000	15,000		957,000	15,950.00
	<b>GENERAL REQUIREMENTS</b>	<b>10,887,000.0</b>	<b>CY</b>	<b>4,881,000</b>	<b>1,497,000</b>	<b>45,000</b>		<b>6,423,000</b>	<b>.59</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

**2 SITE PREPARATION**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
02230.0	Site Clearing: Clearing and Grubbing	310.0	AC	101,060	356,500			457,560	1,476.00
02240.0	Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT USED		MO						
02240.0	Dewatering: Construct Well Point System NOT USED		EA						
02240.0	Dewatering: Operate and Maintain Well Point System NOT USED		MO						
02250.0	Shoring and Underpinning: Barge Unloading Facility	65,000.0	SF	422,500	1,183,000	2,015,000		3,620,500	55.70
	<b>SITE PREPARATION</b>	<b>10,887,000.0</b>	<b>CY</b>	<b>523,560</b>	<b>1,539,500</b>	<b>2,015,000</b>		<b>4,078,060</b>	<b>.37</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

**3 SITE CONSTRUCTION EMBANKMENT**

SPEC.	DESCRIPTION	QUANTITY	UOM	LABOR	EQUIPMENT	MATERIAL	OTHER	TOTAL COST	UNIT PRICE
02315.0	Excavation and Fill: Haul Roads NOT USED		LF						
02315.0	Excavation and Fill: Sediment Traps NOT USED		EA						
02315.0	Excavation and Fill: Holding Ponds NOT USED		EA						
02315.0	Excavation: Exc., Load, Haul, Waste Overburden	43,600,000.0	CY	14,388,000	23,108,000			37,496,000	.86
02315.0	Excavation: Exc., Load, Haul, Waste Bench	480,000.0	CY	499,200	1,104,000			1,603,200	3.34
02315.0	Excavation: Exc., Load, Haul, Stockpile Borrow	12,100,000.0	CY	3,630,000	12,100,000			15,730,000	1.30
02330.0	Embankment: Moisture Condition Borrow	12,100,000.0	CY	2,541,000	3,146,000			5,687,000	.47
02330.0	Embankment: Load, Haul, Place, Compact Borrow	10,100,000.0	CY	6,060,000	15,655,000			21,715,000	2.15
02370.0	Erosion and Sed. Control: Geotex. Line Sed. Traps NOT USED		EA						
02370.0	Erosion and Sed. Control: Geotex. Line Hold Ponds NOT USED		EA						
02370.0	Erosion and Sed. Control: Filter Fabric Levee	8,600,000.0	SF	688,000	344,000	602,000		1,634,000	.19
02370.0	Erosion and Sed. Control: Filter Fabric Reservoir	10,820,000.0	SF	865,600	432,800	757,400		2,055,800	.19
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding	65,000.0	CY	383,500	858,000	1,495,000		2,736,500	42.10
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	130,000.0	CY	767,000	1,716,000	3,380,000		5,863,000	45.10
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding	80,000.0	CY	280,000	888,000	1,840,000		3,008,000	37.60
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	200,000.0	CY	700,000	2,220,000	5,200,000		8,120,000	40.60
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap	284,000.0	CY	994,000	3,152,400	7,384,000		11,530,400	40.60
02700.0	Aggregate Surfacing: Unload, Haul, Place, Compact Road Base	28,000.0	CY	57,400	120,400	644,000		821,800	29.35
	<b>SITE CONSTRUCTION EMBANKMENT</b>	<b>10,887,000.0</b>	<b>CY</b>	<b>31,853,700</b>	<b>64,844,600</b>	<b>21,302,400</b>		<b>118,000,700</b>	<b>10.84</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California

**BACON ISLAND IN-DELTA STORAGE BENCH OPTION**

Effective Date: June, 2003

	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
<b>TOTAL DIRECT COST</b>	10,887,000.0	CY	37,258,260	67,881,100	23,362,400		128,501,760	11.80
GENERAL REQUIREMENTS								
SUBTOTAL							128,501,760	
GENERAL & ADMINISTRATIVE							6,425,088	
SUBTOTAL							134,926,848	
PROFIT							13,492,685	
SUBTOTAL							148,419,533	
BOND							1,484,195	
<b>TOTAL DIRECT AND INDIRECT COST</b>							<b>149,903,728</b>	<b>13.77</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

<b>1 GENERAL REQUIREMENTS</b>										
<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT COST</i>	
01310.0	Management	60.0	MO	36,500.00	5,200.00			41,700.00		
				2,190,000	312,000			2,502,000	41,700.00	
01320.0	Administration	60.0	MO	12,500.00	2,500.00			15,000.00		
				750,000	150,000			900,000	15,000.00	
01430.0	Quality	60.0	MO	12,500.00	5,000.00			17,500.00		
				750,000	300,000			1,050,000	17,500.00	
01520.0	Facilities	60.0	MO	1,500.00	5,500.00	500.00		7,500.00		
				90,000	330,000	30,000		450,000	7,500.00	
01540.0	Mobilizaiton	50.0	EA	3,780.00	7,500.00			11,280.00		
				189,000	375,000			564,000	11,280.00	
01720.0	Engineering	60.0	MO	15,200.00	500.00	250.00		15,950.00		
				912,000	30,000	15,000		957,000	15,950.00	
	<b>GENERAL REQUIREMENTS</b>	<b>10,887,000.0</b>	<b>CY</b>	<b>4,881,000</b>	<b>1,497,000</b>	<b>45,000</b>		<b>6,423,000</b>		<b>.59</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

<b>2 SITE PREPARATION</b>										
<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT COST</i>	
02230.0	Site Clearing: Clearing and Grubbing	<b>310.0</b>	AC	326.00	1,150.00			1,476.00		
				101,060	356,500			457,560	1,476.00	
02240.0	Dewatering: Oper. and Maint. Pump. & Drain. Sys. NOT USED		MO					.00		
02240.0	Dewatering: Construct Well Point System NOT USED 3500 GPM Per Set		EA					.00		
02240.0	Dewatering: Operate and Maintain Well Point System NOT USED		MO					.00		
02250.0	Shoring and Underpinning: Barge Unloading Facility	65,000.0	SF	6.50	18.20	31.00		55.70		
				422,500	1,183,000	2,015,000		3,620,500	55.70	
	SITE PREPARATION	10,887,000.0	CY	523,560	1,539,500	2,015,000		4,078,060		.37

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**BACON ISLAND IN-DELTA STORAGE BENCH OPTION**  
 Effective Date: June, 2003

<b>3 SITE CONSTRUCTION EMBANKMENT</b>									
SPEC.	DESCRIPTION	QUANTITY	UOM	LABOR	EQUIPMENT	MATERIAL	OTHER	TOTAL COST	UNIT COST
02315.0	Excavation and Fill: Haul Roads NOT USED		LF					.00	
02315.0	Excavation and Fill: Sediment Traps NOT USED		EA					.00	
02315.0	Excavation and Fill: Holding Ponds NOT USED		EA					.00	
02315.0	Excavation: Exc., Load, Haul, Waste Overburden	43,600,000.0	CY	.33	.53			.86	
				14,388,000	23,108,000			37,496,000	.86
02315.0	Excavation: Exc., Load, Haul, Waste Bench	<b>480,000.0</b>	CY	1.04	2.30			3.34	
				499,200	1,104,000			1,603,200	3.34
02315.0	Excavation: Exc., Load, Haul, Stockpile Borrow	12,100,000.0	CY	.30	1.00			1.30	
	Assume Yield 70%			3,630,000	12,100,000			15,730,000	1.30
02330.0	Embankment: Moisture Conditon Borrow	12,100,000.0	CY	.21	.26			.47	
				2,541,000	3,146,000			5,687,000	.47
02330.0	Embankment: Load, Haul, Place, Compact Borrow	<b>10,100,000.0</b>	CY	.60	1.55			2.15	
	4,000 LF Haul			6,060,000	15,655,000			21,715,000	2.15
02370.0	Erosion and Sed. Control: Geotex. Line Sed. Traps NOT USED		EA					.00	
02370.0	Erosion and Sed. Control: Geotex. Line Hold Ponds NOT USED		EA					.00	
02370.0	Erosion and Sed. Control: Filter Fabric Levee	<b>8,600,000.0</b>	SF	.08	.04	.07		.19	
				688,000	344,000	602,000		1,634,000	.19
02370.0	Erosion and Sed. Control: Filter Fabric Reservoir	<b>10,820,000.0</b>	SF	.08	.04	.07		.19	
				865,600	432,800	757,400		2,055,800	.19
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding Slough	<b>65,000.0</b>	CY	5.90	13.20	23.00		42.10	
				383,500	858,000	1,495,000		2,736,500	42.10
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap Slough	<b>130,000.0</b>	CY	5.90	13.20	26.00		45.10	
				767,000	1,716,000	3,380,000		5,863,000	45.10
02370.0	Erosion and Sed. Control : Unload, Haul, Place Riprap Bedding Reservoir	<b>80,000.0</b>	CY	3.50	11.10	23.00		37.60	
				280,000	888,000	1,840,000		3,008,000	37.60
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap Reservoir	<b>200,000.0</b>	CY	3.50	11.10	26.00		40.60	
				700,000	2,220,000	5,200,000		8,120,000	40.60
02370.0	Erosion and Sed. Control: Unload, Haul, Place Riprap Reservoir 10:1 Slope	<b>284,000.0</b>	CY	3.50	11.10	26.00		40.60	
				994,000	3,152,400	7,384,000		11,530,400	40.60
02700.0	Aggregate Surfacing: Unload, Haul, Place, Compact Road Base	<b>28,000.0</b>	CY	2.05	4.30	23.00		29.35	
				57,400	120,400	644,000		821,800	29.35
	SITE CONSTRUCTION EMBANKMENT	10,887,000.0	CY	31,853,700	64,844,600	21,302,400		118,000,700	10.84

URS Corporation  
Engineer's Class 4 Design Construction Cost Estimate  
WEBB/BACON TRACT IN-DELTA STORAGE SEEPAGE CONTROL SYSTEM

---

**WEBB/BACON TRACT IN-DELTA STORAGE SEEPAGE CONTROL SYSTEM**

Integrated Storage Investigations Programs  
California Department of Water Resources  
San Joaquin River Delta Stockton, California

Prepared By: URS Corporation  
Denver, Colorado

The Estimated Construction Cost is calculated with Microsoft Excel software and presented in the following categories and sheets. The categories are Detail, Direct Summary and Indirect Summary containing 1 sheet each. All data is entered on the sheets in the Detail Category. The Direct and Indirect Summary communicate with the Detail category sheets. Each feature is subtotaled on the respective sheet in the Direct and Indirect Summary. A total is presented on sheet 1 of the Direct and Indirect Summary. The Direct Summary summarizes all data entered on the Detail sheets and computes Unit Prices. The Indirect Summary adds General Requirements, General and Administrative, Profit and Bond costs to the Direct Summary and computes "marked up" Unit Prices.

# Cost Summary

Engineer's Class 4 Design Construction Cost Estimate  
Integrated Storage Investigations Programs  
California Department of Water Resources  
San Joaquin River Delta Stockton, California  
**WEBB/BACON TRACT IN-DELTA STORAGE SEEPAGE CONTROL SYSTEM**

<b>SITE CONSTRUCTION EMBANKMENT</b>	
Interceptor Wells	9,141,296
Monitor Wells	548,827
Electrical and Control Systems	<u>2,509,949</u>
<b>Subtotal:</b>	<b>\$ 12,200,072</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California

**WEBB/BACON TRACT IN-DELTA STORAGE SEEPAGE CONTROL SYSTEM**

Effective Date: June, 2003

**2 SITE CONSTRUCTION WELLS**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>DIRECT</i>	<i>GEN REQ</i>	<i>G &amp; A</i>	<i>PROFIT</i>	<i>BOND</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
02500.0	Wells: Drill and Case Interceptor Wells	31,000.0	LF	7,123,800	712,380	391,809	822,799	90,508	9,141,296	294.88
02500.0	Wells: Drill and Case Monitor Wells	6,500.0	LF	427,700	42,770	23,524	49,399	5,434	548,827	84.43
02500.0	Wells: Well Electrical and Control Systems	480.0	EA	1,956,000	195,600	107,580	225,918	24,851	2,509,949	5,229.06
	<b>SITE CONSTRUCTION WELLS</b>	<b>719.0</b>	<b>EA</b>	<b>9,507,500</b>	<b>950,750</b>	<b>522,913</b>	<b>1,098,116</b>	<b>120,793</b>	<b>12,200,072</b>	<b>16,968.11</b>
	<b>SITE CONSTRUCTION WELLS</b>	<b>719.0</b>	<b>EA</b>							
<b>TOTAL DIRECT AND INDIRECT COST</b>		<b>480</b>	<b>EA</b>	<b>9,507,500</b>	<b>950,750</b>	<b>522,913</b>	<b>1,098,116</b>	<b>120,793</b>	<b>12,200,072</b>	<b>25,416.82</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California

**WEBB/BACON TRACT IN-DELTA STORAGE SEEPAGE CONTROL SYSTEM**

Effective Date: June, 2003

**2 SITE CONSTRUCTION WELLS**

<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
02500.0	Wells: Drill and Case Interceptor Wells	31,000.0	LF	471,200	917,600	5,735,000		7,123,800	229.80
02500.0	Wells: Drill and Case Monitor Wells	6,500.0	LF	98,800	192,400	136,500		427,700	65.80
02500.0	Wells: Well Electrical and Control Systems	480.0	EA	552,000	60,000	1,344,000		1,956,000	4,075.00
		<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT PRICE</i>
TOTAL DIRECT COST		480.0	EA	1,122,000	1,170,000	7,215,500		9,507,500	19,807.29
GENERAL REQUIREMENTS								950,750	
SUBTOTAL								10,458,250	
GENERAL & ADMINISTRATIVE								522,913	
SUBTOTAL								10,981,163	
PROFIT								1,098,116	
SUBTOTAL								12,079,279	
BOND								120,793	
<b>TOTAL DIRECT AND INDIRECT COST</b>								<b>12,200,072</b>	<b>25,416.82</b>

Engineer's Class 4 Design Construction Cost Estimate  
 Integrated Storage Investigations Programs  
 California Department of Water Resources  
 San Joaquin River Delta Stockton, California  
**WEBB/BACON TRACT IN-DELTA STORAGE SEEPAGE CONTROL SYSTEM**  
 Effective Date: June, 2003

<b>2 SITE CONSTRUCTION WELLS</b>										
<i>SPEC.</i>	<i>DESCRIPTION</i>	<i>QUANTITY</i>	<i>UOM</i>	<i>LABOR</i>	<i>EQUIPMENT</i>	<i>MATERIAL</i>	<i>OTHER</i>	<i>TOTAL COST</i>	<i>UNIT COST</i>	
02500.0	Wells: Drill and Case Interceptor Wells	31,000.0	LF	15.20	29.60	185.00		229.80		
				471,200	917,600	5,735,000		7,123,800		229.80
02500.0	Wells: Drill and Case Monitor Wells	6,500.0	LF	15.20	29.60	21.00		65.80		
				98,800	192,400	136,500		427,700		65.80
02500.0	Wells: Well Electrical and Control Systems	480.0	EA	1,150.00	125.00	2,800.00		4,075.00		
				552,000	60,000	1,344,000		1,956,000		4,075.00

**Appendix C**  
**Integrated Facility Earthworks Construction Cost Estimate**  
**and Overall Project Construction Schedule**  
**(Prepared by DWR)**

## **Introduction**

The foundation materials at the integrated facility site locations are similar to those of the islands. The upper 5 to 25 feet of materials consist of peat soils and soft clays, which overly stiffer and denser interbedded sands and clays. Prior to constructing the integrated facility structures and embankments, the soft soils need to be removed and replaced with suitable materials. This will reduce problems associated with differential settlements between structural facilities and integrated facility embankments and improve the overall seismic performance of the facilities. This appendix describes the method of construction, including sheet piling installation, dewatering methods, excavation plan, and earthwork construction. Also included are construction costs to complete this work and an overall project construction schedule.

## **Scope of Work**

1. Furnish and install sheet piling around the pumping facilities and embankment area prior to excavation.
2. Dewater the area around the pumping facilities, gate structures and embankments prior to excavation.
3. Excavate the facility and embankment areas.
4. Utilizing materials from the borrow areas, place and compact the earthwork for the facilities and embankments.
5. Furnish and install the bedding material and rip-rap for the embankments surrounding the facilities.

## **Cost Estimate Assumptions**

1. Based on the latest information available, the ground water table is within 1 foot of the surface at Bacon Island and within 3.5 to 5 feet at Webb Tract. Predicated on this information, it will be necessary to place sheet piling and dewatering wells, 50 foot on center, around the perimeter of the embankment area prior to any excavation.
2. The Webb Tract integrated facilities will be built simultaneously, and before the Bacon Island integrated facilities.
3. Excavated material can be spread out over the islands (stockpiled) adjacent to the integrated facility embankments.
4. Docking, loading, and unloading facilities will be available at each island for handling materials and construction equipment.
5. Two crews for the sheet piling, excavation, and backfill operations.

## **Sequence of Integrated Facility Earthwork Construction**

1. Mobilization
2. Temporary access roads
3. Install sheet piles
4. Install dewatering wells
5. Excavation
6. Place and compact backfill to mid-bay floor
7. Place and compact backfill for gates
8. Place and compact interior embankment
9. Place and compact exterior embankment
10. Place and compact for access-bridge
11. Construct permanent access roads
12. Demobilization

## **Method of Construction**

### **Sheet Piling Installation**

The first phase of this work will include installing the sheet piling required for dewatering during excavation and backfill work. The sheet piling will surround the entire footprint of the excavation pits as shown on Figures C-1 through C-4. The sheet piling will extend from 5 feet above existing ground level to a depth of approximately 9 to 13 feet below the bottom of the excavation pit, depending on the site conditions. The sheet piling will be flush with the existing ground at the access ramp locations. The length and depth of sheet piling required at the Webb Tract and the Bacon Island integrated facilities is summarized in Table C-2.

The sheet piling will be driven into the ground by two crews utilizing 60 ton cranes with pile driving equipment, forklifts, and each labor crew consisting of a foreman, an operating engineer, an oiler, and three pile drivers. The steel sheet piling has been estimated as sacrificial and therefore will be left in place.

### **Dewatering Methods**

Dewatering during excavation and construction of the Integrated Facilities will consist of initially placing sheet piling approximately 40 feet beyond the outer limits of the excavation footprints. Dewatering wells will be placed on 50-foot centers between the sheet piling and the toe of the excavation pit. After excavation of the peat, drainage ditches and sump pumps will be installed adjacent to the toe of the excavation pits, which will help keep the foundation drier during initial embankment and foundation placement. The dewatering wells are shown on Figures C-1 through C-4.

It is assumed that water pumped out of the dewatering wells will not be pumped directly into the delta channels. It is likely that detention basins would need to be constructed so that sediments can settle before water is allowed to enter the delta.

## Excavation Plan

The basic excavation plan for the Integrated Facilities is to remove all peat soil and soft clays that overlie the denser and stiffer inter-bedded sands and clays. The extent of the excavation at each site, as shown in Figures C-1 through C-4, is generally just outside of the foundation footprint for the embankments and concrete structures. It is not necessary to excavate the soft soils within the transition pool area. The estimated peat depth for removal varies from 5 feet around the fish screen area to 25 feet around the gate structures, pumping plant and embankments. The final layout for all the embankments surrounding the transition pool, midbay, bypass channel, and other compacted fills for structures has been developed in conjunction with the required excavation. The average existing ground elevation and the estimated elevation of the top of the denser and stiffer inter-bedded sands and clays (bottom of excavation pit) at each facility are shown in Table C-1.

**Table C-1 – Integrated Facility Site Elevations**

Approximate Elevations	Webb Tract		Bacon Island	
	San Joaquin R.	False River	Middle River	Santa Fe Cut
Average Existing Ground Elevation	-16	-15	-14	-9
Bottom of Excavation Pit Elevation	-32	-28	-29	-21

Large excavators, weighing in the 150,000 to 200,000 pound range, and trucks will remove the peat and place it in a stock pile area (adjacent to the integrated facility embankments) for eventual placement into the borrow area excavation pits. Access ramps of 10% grade will be constructed along the sides of the excavation to provide access for construction equipment. The excavation quantities for each integrated facility site are shown in Table C-2.

## Earthwork Construction

Earthwork construction includes transporting borrow materials from stockpiles, placing, and compacting them at the integrated facility. The interior embankments are assumed to have a 35-foot wide crest with 3:1 rip-rapped side slopes. Borrow material for the embankments will come from the same borrow area utilized for embankment construction around the island perimeters. The compacted embankments will be placed up to the elevations of the facility structure foundations prior to construction of the structures. Embankment construction will then continue simultaneously with the structure construction. The embankment fill earthwork quantities for each integrated facility site are shown in Table C-2.

## Quantities

The cost estimate is predicated on the calculated quantities, shown in Table C-2, for the excavation of soft materials, embankment fill, riprap bedding and riprap along the embankment slopes, and temporary sheet piling at each of the integrated facilities.

**Table C-2 – Quantities for Integrated Facility Site Excavation and Earthwork**

Estimated Quantities	Webb Tract		Bacon Island	
	San Joaquin R.	False River	Middle River	Santa Fe Cut
Excavation (CY)	510,000	368,000	367,000	294,000
Embankments (CY)	534,000	487,000	579,000	356,000
Riprap Bedding (CY)	22,100	21,500	21,500	19,200
Riprap (CY)	44,200	43,000	43,100	38,400
Length of Sheet Piling	4,100	3,720	3,870	3,800
Depth of Sheet Piling	35	30	35	30

### **Cost Estimates**

Construction cost estimates for the earthworks construction at each integrated facility are provided in Table C-2. The cost estimates include the following:

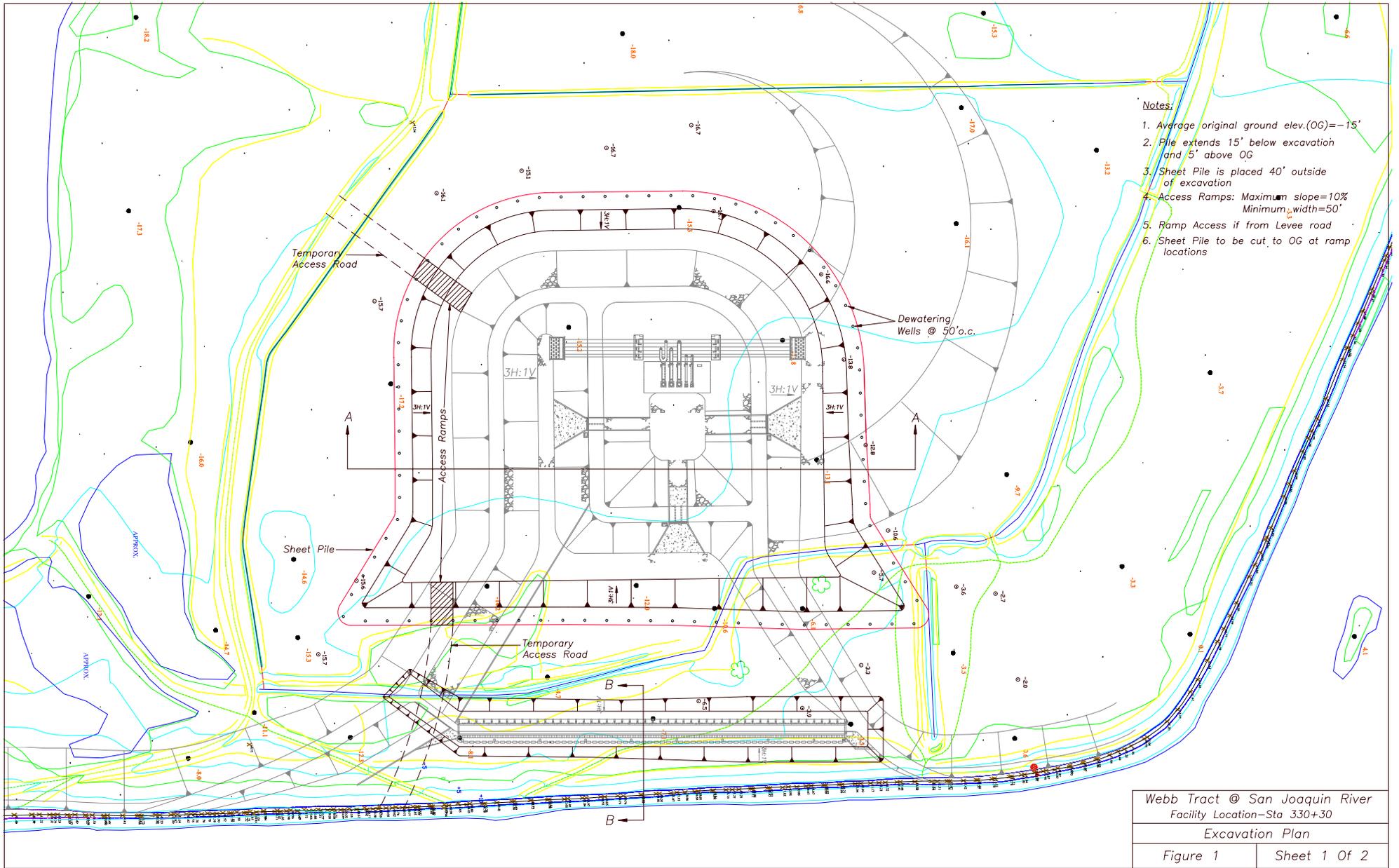
1. Project mobilization and demobilization costs.
2. Project indirect costs (project staff, jobsite facilities, utilities, equipment, bonds, and insurances)
3. Labor, materials, and equipment to furnish, install, and remove dewatering wells.
4. Labor, materials, and equipment to furnish, and install sheet piling.
5. Labor, and equipment to excavate integrated facilities site.
6. Labor, and equipment to relocate, place, and compact the embankment.
7. Labor, materials, and equipment to furnish and place the rip-rap and rip-rap bedding materials.

### **Project Construction Scheduling**

Construction schedules for island embankment construction, integrated facility embankment construction, and integrated facility structures construction were developed by URS, DWR, and CH2M Hill, respectively. DWR combined the individual schedules into one overall project construction schedule. The overall project construction schedule is attached to this Appendix.

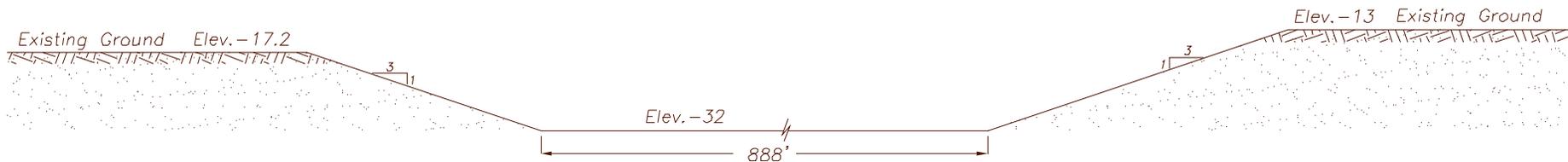
**Table C-3 – Integrated Facility Earthworks Construction Cost Estimate**

<b>Item</b>	<b>Total Quantity</b>	<b>Units</b>	<b>Unit Price</b>	<b>Amount</b>
<b><u>Webb Tract @ San Joaquin River</u></b>				
Mobilization and Demobilization	1	JOB	LUMP SUM	\$ 1,811,000
Dewatering	1	JOB	LUMP SUM	\$ 1,305,000
Sheet Piling	1	JOB	LUMP SUM	\$ 4,381,000
Excavation	510,000	CY	6.40	\$ 3,264,000
Embankment	534,000	CY	9.20	\$ 4,912,800
Rip Rap	70,800	TONS	39.00	\$ 2,761,200
Rip Rap Bedding	35,400	TONS	32.50	\$ 1,150,500
<b>Subtotal</b>				<b>\$ 19,585,500</b>
<b><u>Webb Tract @ False River</u></b>				
Mobilization and Demobilization	1	JOB	LUMP SUM	\$ 1,599,000
Dewatering	1	JOB	LUMP SUM	\$ 1,305,000
Sheet Piling	1	JOB	LUMP SUM	\$ 3,814,000
Excavation	368,000	CY	6.40	\$ 2,361,600
Embankment	487,000	CY	9.20	\$ 4,480,400
Rip Rap	68,700	TONS	39.00	\$ 2,679,300
Rip Rap Bedding	34,400	TONS	32.50	\$ 1,118,000
<b>Subtotal</b>				<b>\$ 17,357,300</b>
<b><u>Bacon Island @ Middle River</u></b>				
Mobilization and Demobilization	1	JOB	LUMP SUM	\$ 1,750,000
Dewatering	1	JOB	LUMP SUM	\$ 1,305,000
Sheet Piling	1	JOB	LUMP SUM	\$ 4,436,000
Excavation	367,000	CY	6.40	\$ 2,348,800
Embankment	579,000	CY	9.20	\$ 5,326,800
Rip Rap	68,900	TONS	39.00	\$ 2,687,100
Rip Rap Bedding	34,500	TONS	32.50	\$ 1,121,250
<b>Subtotal</b>				<b>\$ 18,974,950</b>
<b><u>Bacon Island @ Santa Fe Cut</u></b>				
Mobilization and Demobilization	1	JOB	LUMP SUM	\$ 1,389,000
Dewatering	1	JOB	LUMP SUM	\$ 1,305,000
Sheet Piling	1	JOB	LUMP SUM	\$ 4,007,000
Excavation	294,000	CY	6.40	\$ 1,881,600
Embankment	356,000	CY	9.20	\$ 3,275,200
Rip Rap	61,400	TONS	39.00	\$ 2,394,600
Rip Rap Bedding	30,700	TONS	32.50	\$ 997,750
<b>Subtotal</b>				<b>\$ 15,250,150</b>
<b>Subtotal (without contingency)</b>				<b>\$ 71,167,900</b>
<b>Say</b>				<b>\$ 71,200,000</b>



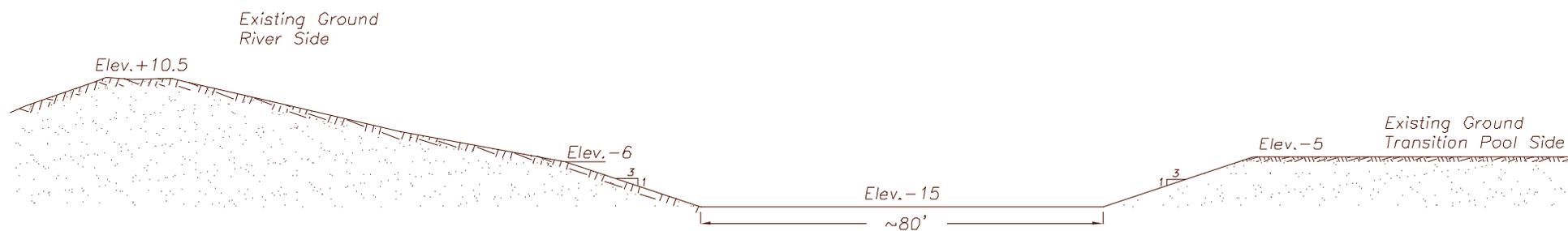
- Notes:
1. Average original ground elev.(OG)=-15'
  2. Pile extends 15' below excavation and 5' above OG
  3. Sheet Pile is placed 40' outside of excavation
  4. Access Ramps: Maximum slope=10%  
Minimum width=50'
  5. Ramp Access if from Levee road
  6. Sheet Pile to be cut to OG at ramp locations

Webb Tract @ San Joaquin River Facility Location—Sta 330+30	
Excavation Plan	
Figure 1	Sheet 1 Of 2



Section-AA

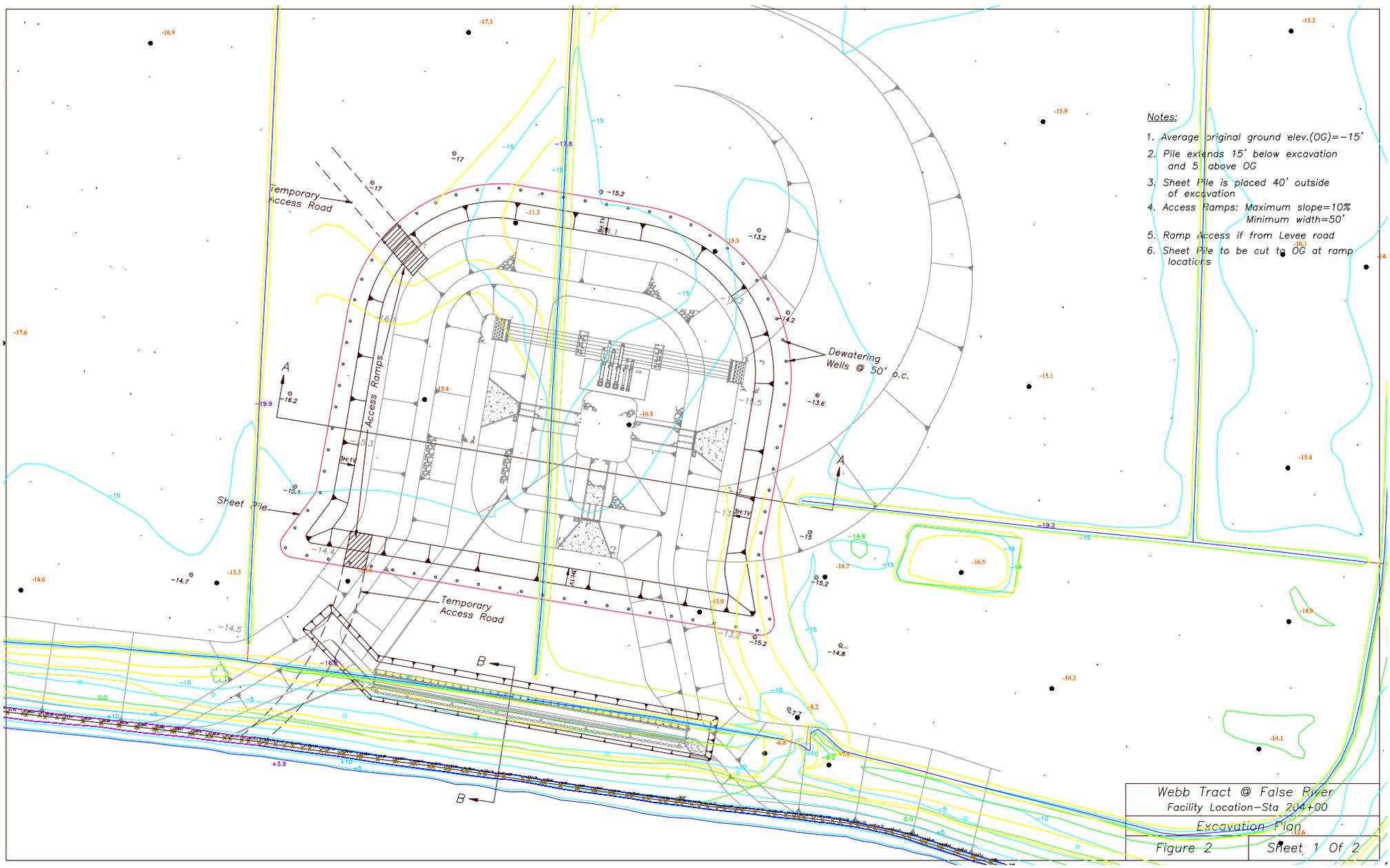
Scale: 1"=20'



Section-BB

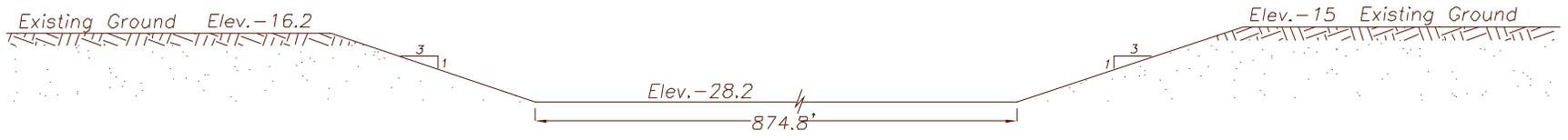
Scale: 1"=20'

Webb Tract @ San Joaquin River Facility Location - Sta 330+30	
Excavation Plan - Sections AA, BB	
Figure 1	Sheet 2 Of 2



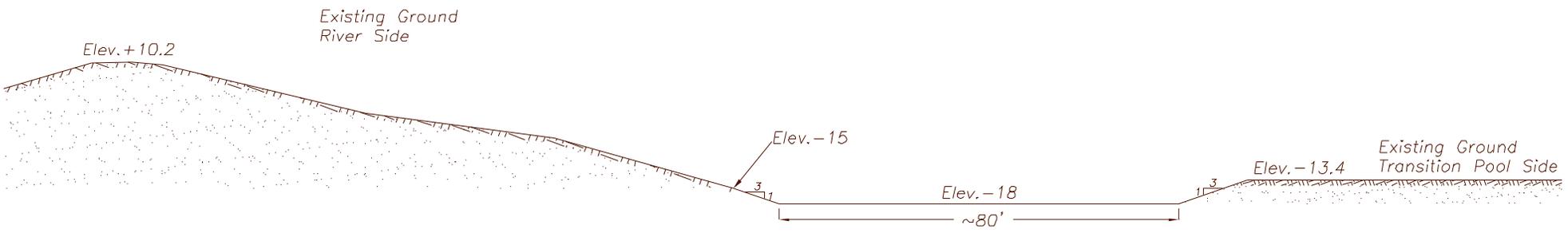
- Notes:**
1. Average original ground elev.(OG)=-15'
  2. Pile extends 15' below excavation and 5' above OG
  3. Sheet Pile is placed 40' outside of excavation
  4. Access Ramps: Maximum slope=10%  
Minimum width=50'
  5. Ramp Access if from Levee road
  6. Sheet Pile to be cut to OG at ramp locations

Webb Tract @ False River Facility Location-Sta 204+00	
Excavation Plan	
Figure 2	Sheet 1 Of 2



Section-AA

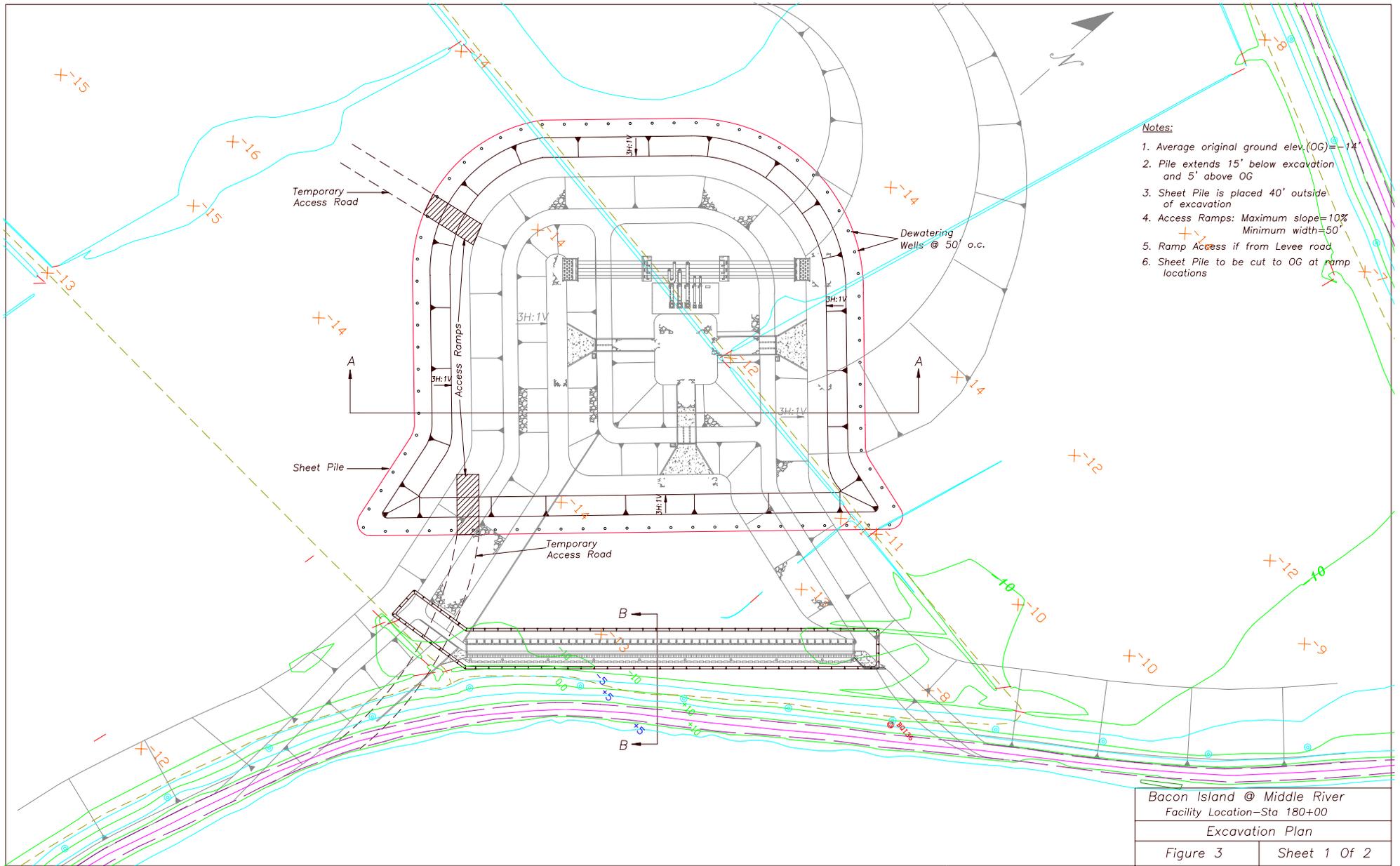
Scale: 1"=20'



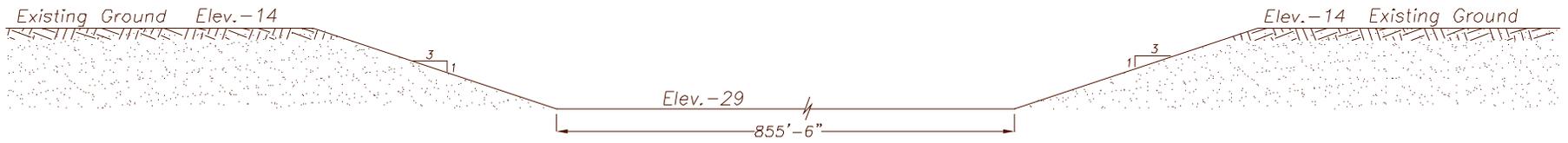
Section-BB

Scale: 1"=20'

Webb Tract @ False River Facility Location - Sta 204+00	
Excavation Plan-Sections AA, BB	
Figure 2	Sheet 2 of 2

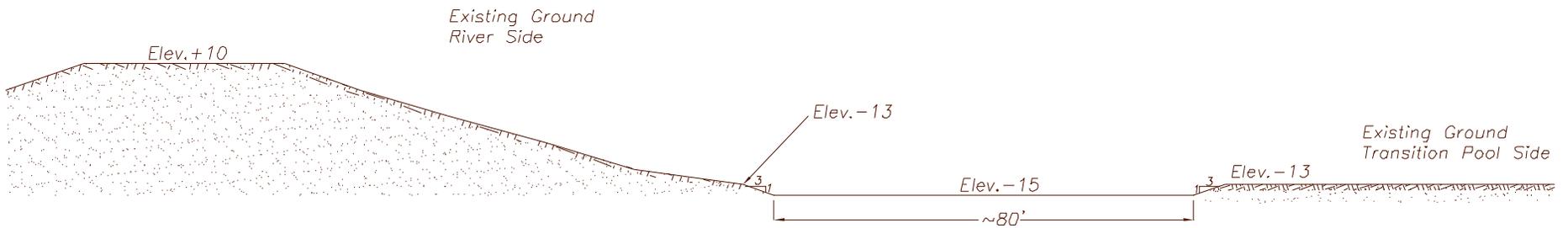


- Notes:**
1. Average original ground elev.(OG)=-14'
  2. Pile extends 15' below excavation and 5' above OG
  3. Sheet Pile is placed 40' outside of excavation
  4. Access Ramps: Maximum slope=10%  
Minimum width=50'
  5. Ramp Access if from Levee road
  6. Sheet Pile to be cut to OG at ramp locations



Section-AA

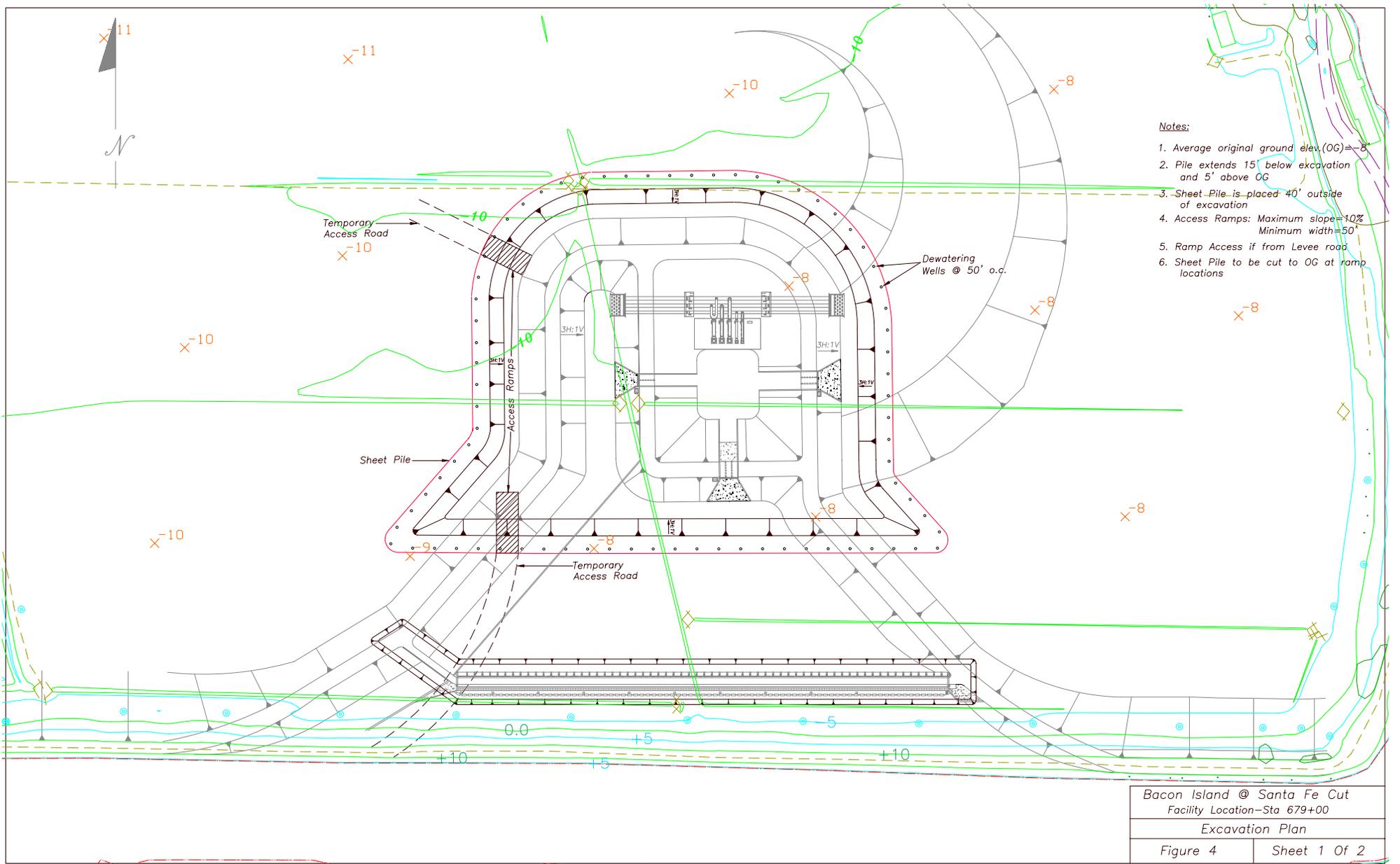
Scale: 1"=20'



Section-BB

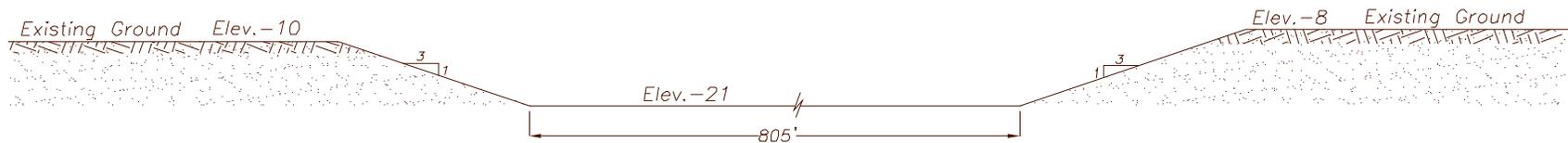
Scale: 1"=20'

Bacon Island @ Middle River	
Facility Location - Sta 180+00	
Excavation Plan - Sections AA, BB	
Figure 3	Sheet 2 Of 2



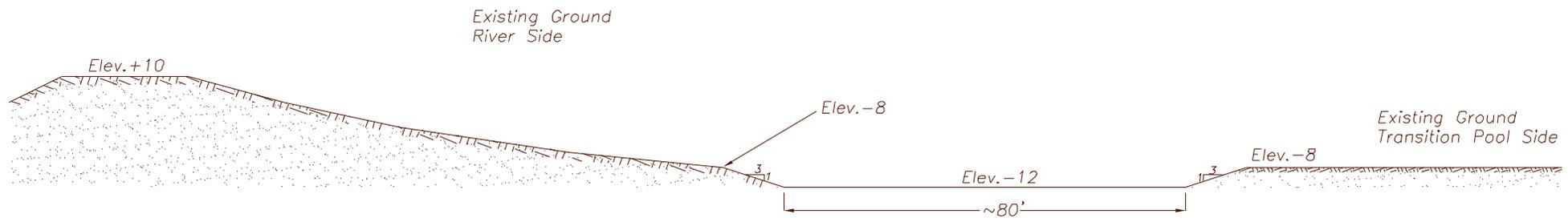
Bacon Island @ Santa Fe Cut  
 Facility Location-Sta 679+00

Excavation Plan



Section-AA

Scale: 1"=20'

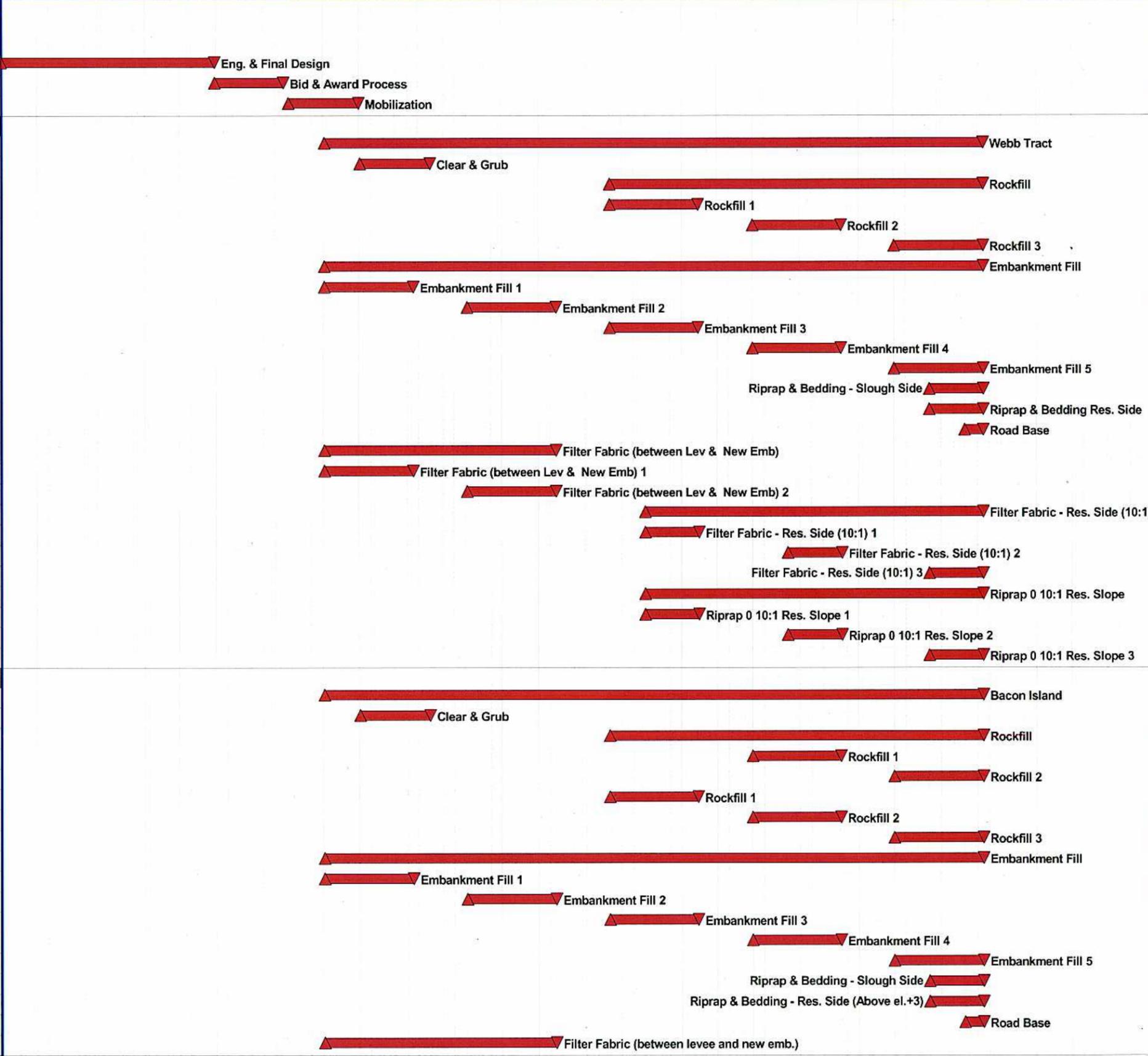


Section-BB

Scale: 1"=20'

Bacon Island @ Santa Fe Cut Facility Location - Sta 679+00	
Excavation Plan - Sections AA, BB	
Figure 4	Sheet 2 Of 2

In-Delta Storage Program						
URS - Levee Upgrade						
Engineering & Final Design						
URS-1.0	Eng. & Final Design	390	390	0	01JAN04*	29JUN05
URS-2.0	Bid & Award Process	125	125	0	30JUN05*	21DEC05
URS-3.0	Mobilization	130	130	0	02JAN06*	30JUN06
Webb Tract						
URS-4.0	Webb Tract	1,208	1,208	0	03APR06*	17NOV10
URS-4.1	Clear & Grub	130	130	0	03JUL06*	29DEC06
URS-4.2	Rockfill	685	685	0	01APR08*	15NOV10
URS-4.21	Rockfill 1	163	163	0	01APR08*	13NOV08
URS-4.22	Rockfill 2	163	163	0	01APR09*	13NOV09
URS-4.23	Rockfill 3	163	163	0	01APR10*	15NOV10
URS-4.3	Embankment Fill	1,206	1,206	0	03APR06*	15NOV10
URS-4.31	Embankment Fill 1	163	163	0	03APR06*	15NOV06
URS-4.32	Embankment Fill 2	163	163	0	02APR07*	14NOV07
URS-4.33	Embankment Fill 3	163	163	0	01APR08*	13NOV08
URS-4.34	Embankment Fill 4	163	163	0	01APR09*	13NOV09
URS-4.35	Embankment Fill 5	163	163	0	01APR10*	15NOV10
URS-4.4	Riprap & Bedding - Slough Side	100	100	0	01JUL10*	17NOV10
URS-4.5	Riprap & Bedding Res. Side	100	100	0	01JUL10*	17NOV10
URS-4.6	Road Base	34	34	0	01OCT10*	17NOV10
URS-4.7	Filter Fabric (between Lev & New Emb)	423	423	0	03APR06*	14NOV07
URS-4.71	Filter Fabric (between Lev & New Emb) 1	163	163	0	03APR06*	15NOV06
URS-4.72	Filter Fabric (between Lev & New Emb) 2	163	163	0	02APR07*	14NOV07
URS-4.8	Filter Fabric - Res. Side (10:1)	622	622	0	01JUL08*	17NOV10
URS-4.81	Filter Fabric - Res. Side (10:1) 1	100	100	0	01JUL08*	17NOV08
URS-4.82	Filter Fabric - Res. Side (10:1) 2	100	100	0	01JUL09*	17NOV09
URS-4.83	Filter Fabric - Res. Side (10:1) 3	100	100	0	01JUL10*	17NOV10
URS-4.9	Riprap 0 10:1 Res. Slope	622	622	0	01JUL08*	17NOV10
URS-4.91	Riprap 0 10:1 Res. Slope 1	100	100	0	01JUL08*	17NOV08
URS-4.92	Riprap 0 10:1 Res. Slope 2	100	100	0	01JUL09*	17NOV09
URS-4.93	Riprap 0 10:1 Res. Slope 3	100	100	0	01JUL10*	17NOV10
Bacon Island						
URS-5.0	Bacon Island	1,208	1,208	0	03APR06	17NOV10
URS-5.10	Clear & Grub	130	130	0	03JUL06*	29DEC06
URS-5.20	Rockfill	685	685	0	01APR08*	15NOV10
URS-5.2421	Rockfill 1	163	163	0	01APR09*	13NOV09
URS-5.2422	Rockfill 2	163	163	0	01APR10*	15NOV10
URS-5.2521	Rockfill 1	163	163	0	01APR08*	13NOV08
URS-5.2522	Rockfill 2	163	163	0	01APR09*	13NOV09
URS-5.2523	Rockfill 3	163	163	0	01APR10*	15NOV10
URS-5.30	Embankment Fill	1,206	1,206	0	03APR06*	15NOV10
URS-5.3431	Embankment Fill 1	163	163	0	03APR06*	15NOV06
URS-5.3432	Embankment Fill 2	163	163	0	02APR07*	14NOV07
URS-5.3433	Embankment Fill 3	163	163	0	01APR08*	13NOV08
URS-5.3434	Embankment Fill 4	163	163	0	01APR09*	13NOV09
URS-5.3435	Embankment Fill 5	163	163	0	01APR10*	15NOV10
URS-5.4	Riprap & Bedding - Slough Side	100	100	0	01JUL10*	17NOV10
URS-5.5	Riprap & Bedding - Res. Side (Above el.+3)	100	100	0	01JUL10*	17NOV10
URS-5.6	Road Base	34	34	0	01OCT10*	17NOV10
URS-5.7	Filter Fabric (between levee and new emb.)	423	423	0	03APR06*	14NOV07



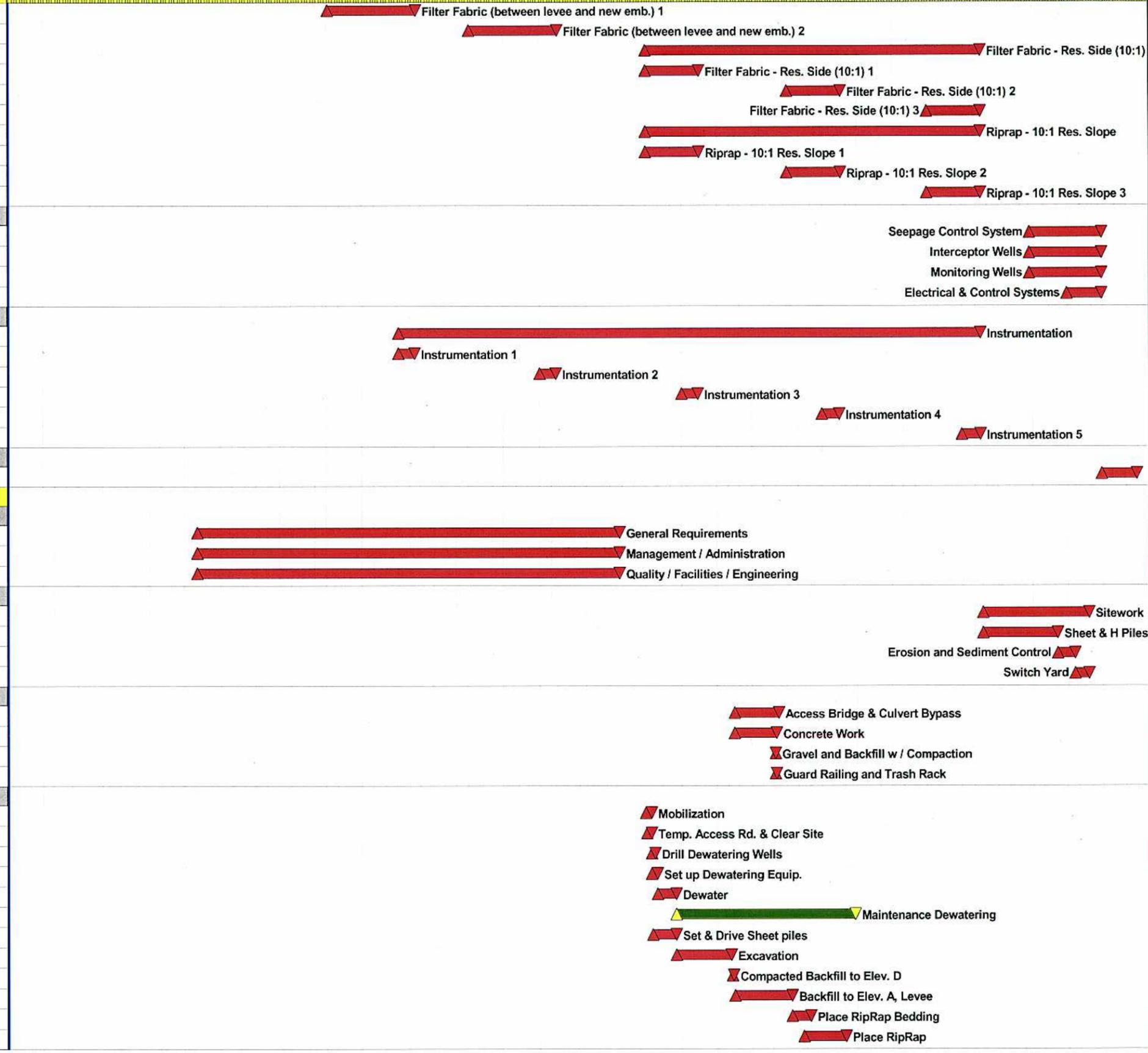
Start Date	01JAN04	Early Bar
Finish Date	28DEC11	Progress Bar
Data Date	01JAN04	Critical Activity
Run Date	03JUL03 10:28	

DEL2 Sheet 1 of 9

Date	Revision	Checked	Approved

In-Delta Storage Program  
Classic Schedule Layout

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
URS-5.71	Filter Fabric (between levee and new emb.) 1	163	163	0	03APR06*	15NOV06
URS-5.72	Filter Fabric (between levee and new emb.) 2	163	163	0	02APR07*	14NOV07
URS-5.8	Filter Fabric - Res. Side (10:1)	622	622	0	01JUL08*	17NOV10
URS-5.8481	Filter Fabric - Res. Side (10:1) 1	100	100	0	01JUL08*	17NOV08
URS-5.8482	Filter Fabric - Res. Side (10:1) 2	100	100	0	01JUL09*	17NOV09
URS-5.8483	Filter Fabric - Res. Side (10:1) 3	100	100	0	01JUL10*	17NOV10
URS-5.9	Riprap - 10:1 Res. Slope	622	622	0	01JUL08*	17NOV10
URS-5.9491	Riprap - 10:1 Res. Slope 1	100	100	0	01JUL08*	17NOV08
URS-5.9492	Riprap - 10:1 Res. Slope 2	100	100	0	01JUL09*	17NOV09
URS-5.9493	Riprap - 10:1 Res. Slope 3	100	100	0	01JUL10*	17NOV10
<b>Seepage Control System</b>						
URS-6.0	Seepage Control System	135	135	0	24MAR11	28SEP11
URS-6.10	Interceptor Wells	135	135	0	24MAR11*	28SEP11
URS-6.20	Monitoring Wells	135	135	0	24MAR11*	28SEP11
URS-6.30	Electrical & Control Systems	65	65	0	30JUN11*	28SEP11
<b>Instrumentation</b>						
URS-7.0	Instrumentation	1,076	1,076	0	02OCT06	15NOV10
URS-7.01	Instrumentation 1	32	32	0	02OCT06*	14NOV06
URS-7.02	Instrumentation 2	32	32	0	01OCT07*	13NOV07
URS-7.03	Instrumentation 3	32	32	0	01OCT08*	13NOV08
URS-7.04	Instrumentation 4	32	32	0	01OCT09*	13NOV09
URS-7.05	Instrumentation 5	32	32	0	01OCT10*	15NOV10
<b>Demobilization</b>						
URS-8.00		65	65	0	29SEP11*	28DEC11
<b>Facilities/Emb. Webb Tract at San Joaquin River</b>						
<b>General Requirements</b>						
WTSJ-10000	General Requirements	780*	780*	0	02MAY05	25APR08
WTSJ-10010	Management / Administration	780	780	0	02MAY05	25APR08
WTSJ-10020	Quality / Facilities / Engineering	780	780	0	02MAY05	25APR08
<b>Site Work</b>						
WTSJ-20000	Sitework	198*	198*	0	24NOV10	26AUG11
WTSJ-20010	Sheet & H Piles	138	138	0	24NOV10	03JUN11
WTSJ-20020	Erosion and Sediment Control	32	32	0	06JUN11	19JUL11
WTSJ-20035	Switch Yard	28	28	0	20JUL11	26AUG11
<b>Access Bridge &amp; Culvert Bypass</b>						
WTSJ-30000	Access Bridge & Culvert Bypass	83*	83*	0	16FEB09	10JUN09
WTSJ-30010	Concrete Work	78	78	0	16FEB09	03JUN09
WTSJ-30020	Gravel and Backfill w / Compaction	2	2	0	01JUN09	02JUN09
WTSJ-30030	Guard Railing and Trash Rack	3	3	0	03JUN09	05JUN09
<b>Webb Tract San Joaquin Embankment</b>						
WTSJ-30205	Mobilization	10	10	0	01JUL08	14JUL08
WTSJ-30210	Temp. Access Rd. & Clear Site	10	10	0	03JUL08	16JUL08
WTSJ-30220	Drill Dewatering Wells	5	5	0	17JUL08	23JUL08
WTSJ-30230	Set up Dewatering Equip.	10	10	0	17JUL08	30JUL08
WTSJ-30240	Dewater	33	33	0	31JUL08	15SEP08
WTSJ-30242	Maintenance Dewatering	333	333	0	16SEP08	24DEC09
WTSJ-30250	Set & Drive Sheet piles	42	42	0	18JUL08	15SEP08
WTSJ-30260	Excavation	104	104	0	16SEP08	06FEB09
WTSJ-30270	Compacted Backfill to Elev. D	5	5	0	09FEB09	13FEB09
WTSJ-30280	Backfill to Elev. A, Levee	106	106	0	16FEB09	13JUL09
WTSJ-30290	Place RipRap Bedding	36	36	0	14JUL09	01SEP09
WTSJ-30300	Place RipRap	79	79	0	12AUG09	30NOV09



Start Date 01JAN04  
 Finish Date 28DEC11  
 Data Date 01JAN04  
 Run Date 03JUL03 10:28

Early Bar  
 Progress Bar  
 Critical Activity

DEL2

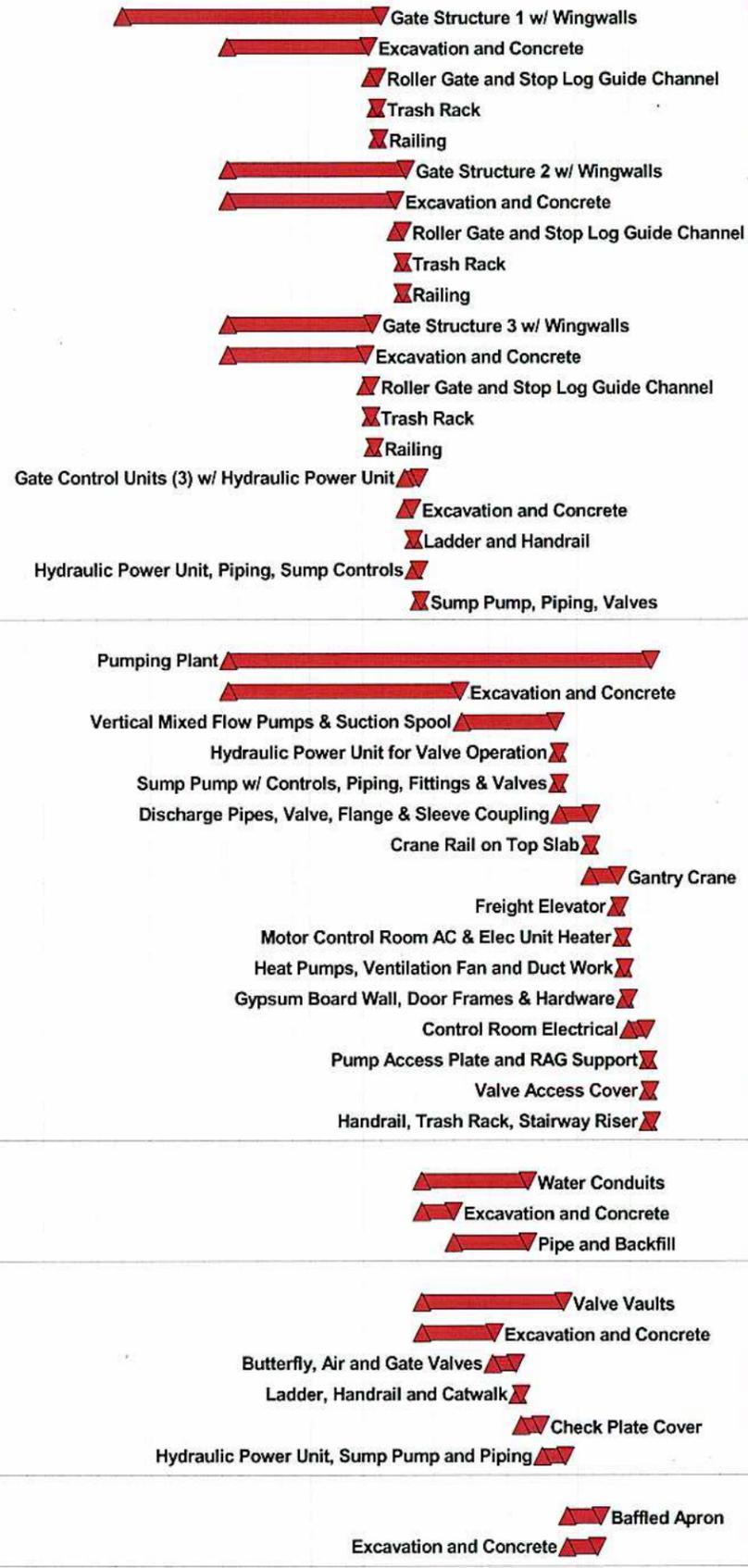
In-Delta Storage Program  
 Classic Schedule Layout

Date	Revision	Checked	Approved





Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
<b>Gate Structures</b>						
WTFR-51000	Gate Structure 1 w/ Wingwalls	317*	317*	0	16FEB09	04MAY10
WTFR-51010	Excavation and Concrete	173	173	0	14AUG09	13APR10
WTFR-51020	Roller Gate and Stop Log Guide Channel	8	8	0	15APR10	26APR10
WTFR-51030	Trash Rack	2	2	0	26APR10	27APR10
WTFR-51040	Railing	2	2	0	29APR10	30APR10
WTFR-52000	Gate Structure 2 w/ Wingwalls	217*	217*	0	14AUG09	14JUN10
WTFR-52010	Excavation and Concrete	205	205	0	14AUG09	27MAY10
WTFR-52020	Roller Gate and Stop Log Guide Channel	8	8	0	28MAY10	08JUN10
WTFR-52030	Trash Rack	2	2	0	09JUN10	10JUN10
WTFR-52040	Railing	2	2	0	09JUN10	10JUN10
WTFR-53000	Gate Structure 3 w/ Wingwalls	177*	177*	0	14AUG09	19APR10
WTFR-53010	Excavation and Concrete	169	169	0	14AUG09	07APR10
WTFR-53020	Roller Gate and Stop Log Guide Channel	5	5	0	08APR10	14APR10
WTFR-53030	Trash Rack	1	1	0	16APR10	16APR10
WTFR-53040	Railing	2	2	0	19APR10	20APR10
WTFR-54000	Gate Control Units (3) w/ Hydraulic Power Unit	18*	18*	0	14JUN10	07JUL10
WTFR-54010	Excavation and Concrete	9	9	0	14JUN10	24JUN10
WTFR-54020	Ladder and Handrail	1	1	0	28JUN10	28JUN10
WTFR-54030	Hydraulic Power Unit, Piping, Sump Controls	7	7	0	29JUN10	07JUL10
WTFR-54040	Sump Pump, Piping, Valves	1	1	0	08JUL10	08JUL10
<b>Pumping Plant</b>						
WTFR-60000	Pumping Plant	517*	517*	0	14AUG09	08AUG11
WTFR-60010	Excavation and Concrete	283	283	0	14AUG09	14SEP10
WTFR-60020	Vertical Mixed Flow Pumps & Suction Spool	116	116	0	16SEP10	24FEB11
WTFR-60030	Hydraulic Power Unit for Valve Operation	2	2	0	28FEB11	01MAR11
WTFR-60040	Sump Pump w/ Controls, Piping, Fittings & Valves	1	1	0	01MAR11	01MAR11
WTFR-60050	Discharge Pipes, Valve, Flange & Sleeve Coupling	39	39	0	02MAR11	25APR11
WTFR-60060	Crane Rail on Top Slab	1	1	0	25APR11	25APR11
WTFR-60070	Gantry Crane	34	34	0	25APR11	09JUN11
WTFR-60080	Freight Elevator	4	4	0	09JUN11	14JUN11
WTFR-60090	Motor Control Room AC & Elec Unit Heater	2	2	0	17JUN11	20JUN11
WTFR-60100	Heat Pumps, Ventilation Fan and Duct Work	3	3	0	20JUN11	22JUN11
WTFR-60110	Gypsum Board Wall, Door Frames & Hardware	3	3	0	24JUN11	28JUN11
WTFR-60120	Control Room Electrical	23	23	0	29JUN11	29JUL11
WTFR-60130	Pump Access Plate and RAG Support	2	2	0	01AUG11	02AUG11
WTFR-60140	Valve Access Cover	3	3	0	01AUG11	03AUG11
WTFR-60150	Handrail, Trash Rack, Stairway Riser	4	4	0	03AUG11	08AUG11
<b>Water Conduits</b>						
WTFR-70000	Water Conduits	131*	131*	0	09JUL10	07JAN11
WTFR-70010	Excavation and Concrete	39	39	0	09JUL10	01SEP10
WTFR-70020	Pipe and Backfill	92	92	0	02SEP10	07JAN11
<b>Valve Vaults</b>						
WTFR-80000	Valve Vaults	174*	174*	0	09JUL10	09MAR11
WTFR-80010	Excavation and Concrete	88	88	0	09JUL10	09NOV10
WTFR-80020	Butterfly, Air and Gate Valves	29	29	0	09NOV10	17DEC10
WTFR-80030	Ladder, Handrail and Catwalk	4	4	0	21DEC10	24DEC10
WTFR-80040	Check Plate Cover	24	24	0	27DEC10	27JAN11
WTFR-80050	Hydraulic Power Unit, Sump Pump and Piping	29	29	0	31JAN11	10MAR11
<b>Baffled Apron</b>						
WTFR-90000	Baffled Apron	43*	43*	0	14MAR11	11MAY11
WTFR-90010	Excavation and Concrete	40	40	0	14MAR11	06MAY11



Start Date: 01JAN04  
 Finish Date: 28DEC11  
 Data Date: 01JAN04  
 Run Date: 03JUL03 10:28



DEL2  
 Sheet 5 of 9  
 In-Delta Storage Program  
 Classic Schedule Layout

Date	Revision	Checked	Approved



Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish	2004												2005												2006												2007												2008												2009												2010												2011																																																																							
							J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D																																																
BIMR-53010	Excavation and Concrete	159	159	0	14AUG09	24MAR10																																																																																					Excavation and Concrete																																																																							
BIMR-53020	Roller Gate and Stop Log Guide Channel	5	5	0	25MAR10	31MAR10																																																																																																	Roller Gate and Stop Log Guide Channel																																																											
BIMR-53030	Trash Rack	1	1	0	01APR10	01APR10																																																																																																	Trash Rack																																																											
BIMR-53040	Railing	2	2	0	02APR10	05APR10																																																																																																	Railing																																																											
BIMR-54000	Gate Control Units (3) w/ Hydraulic Power Unit	19*	19*	0	18JUN10	14JUL10																																																																																																	Gate Control Units (3) w/ Hydraulic Power Unit																																																											
BIMR-54010	Excavation and Concrete	10	10	0	18JUN10	01JUL10																																																																																																	Excavation and Concrete																																																											
BIMR-54020	Ladder and Handrail	1	1	0	02JUL10	02JUL10																																																																																																	Ladder and Handrail																																																											
BIMR-54030	Hydraulic Power Unit, Piping, Sump Controls	7	7	0	05JUL10	13JUL10																																																																																																	Hydraulic Power Unit, Piping, Sump Controls																																																											
BIMR-54040	Sump Pump, Piping, Valves	1	1	0	14JUL10	14JUL10																																																																																																	Sump Pump, Piping, Valves																																																											
<b>Pumping Plant</b>																																																																																																																																																																		
BIMR-60000	Pumping Plant	523*	523*	0	14AUG09	16AUG11																																																																																																																									Pumping Plant																																			
BIMR-60010	Excavation and Concrete	289	289	0	14AUG09	22SEP10																																																																																																																									Excavation and Concrete																																			
BIMR-60020	Vertical Mixed Flow Pumps & Suction Spool	116	116	0	24SEP10	04MAR11																																																																																																													Vertical Mixed Flow Pumps & Suction Spool																																															
BIMR-60030	Hydraulic Power Unit for Valve Operation	2	2	0	07MAR11	08MAR11																																																																																																													Hydraulic Power Unit for Valve Operation																																															
BIMR-60040	Sump Pump w/ Controls, Piping, Fittings & Valves	1	1	0	09MAR11	09MAR11																																																																																																													Sump Pump w/ Controls, Piping, Fittings & Valves																																															
BIMR-60050	Discharge Pipes, Valve, Flange & Sleeve Coupling	39	39	0	14MAR11	05MAY11																																																																																																													Discharge Pipes, Valve, Flange & Sleeve Coupling																																															
BIMR-60060	Crane Rail on Top Slab	1	1	0	02MAY11	02MAY11																																																																																																													Crane Rail on Top Slab																																															
BIMR-60070	Gantry Crane	34	34	0	05MAY11	21JUN11																																																																																																													Gantry Crane																																															
BIMR-60080	Freight Elevator	4	4	0	20JUN11	23JUN11																																																																																																													Freight Elevator																																															
BIMR-60090	Motor Control Room AC & Elec Unit Heater	2	2	0	27JUN11	28JUN11																																																																																																													Motor Control Room AC & Elec Unit Heater																																															
BIMR-60100	Heat Pumps, Ventilation Fan and Duct Work	3	3	0	29JUN11	01JUL11																																																																																																													Heat Pumps, Ventilation Fan and Duct Work																																															
BIMR-60110	Gypsum Board Wall, Door Frames & Hardware	3	3	0	04JUL11	06JUL11																																																																																																													Gypsum Board Wall, Door Frames & Hardware																																															
BIMR-60120	Control Room Electrical	23	23	0	07JUL11	08AUG11																																																																																																													Control Room Electrical																																															
BIMR-60130	Pump Access Plate and RAG Support	2	2	0	08AUG11	09AUG11																																																																																																													Pump Access Plate and RAG Support																																															
BIMR-60140	Valve Access Cover	3	3	0	08AUG11	10AUG11																																																																																																													Valve Access Cover																																															
BIMR-60150	Handrail, Trash Rack, Stairway Riser	4	4	0	09AUG11	12AUG11																																																																																																													Handrail, Trash Rack, Stairway Riser																																															
<b>Water Conduits</b>																																																																																																																																																																		
BIMR-70000	Water Conduits	139*	139*	0	15JUL10	25JAN11																																																																																																																									Water Conduits																																			
BIMR-70010	Excavation and Concrete	48	48	0	15JUL10	20SEP10																																																																																																																									Excavation and Concrete																																			
BIMR-70020	Pipe and Backfill	91	91	0	20SEP10	24JAN11																																																																																																																									Pipe and Backfill																																			
<b>Valve Vaults</b>																																																																																																																																																																		
BIMR-80000	Valve Vaults	176*	176*	0	15JUL10	17MAR11																																																																																																																																					Valve Vaults																							
BIMR-80010	Excavation and Concrete	95	95	0	15JUL10	24NOV10																																																																																																																									Excavation and Concrete																																			
BIMR-80020	Butterfly, Air and Gate Valves	24	24	0	25NOV10	28DEC10																																																																																																																									Butterfly, Air and Gate Valves																																			
BIMR-80030	Ladder, Handrail and Catwalk	4	4	0	31DEC10	05JAN11																																																																																																																									Ladder, Handrail and Catwalk																																			
BIMR-80040	Check Plate Cover	24	24	0	04JAN11	04FEB11																																																																																																																									Check Plate Cover																																			
BIMR-80050	Hydraulic Power Unit, Sump Pump and Piping	29	29	0	07FEB11	17MAR11																																																																																																																									Hydraulic Power Unit, Sump Pump and Piping																																			
<b>Baffled Apron</b>																																																																																																																																																																		
BIMR-90000	Baffled Apron	43*	43*	0	18MAR11	17MAY11																																																																																																																																					Baffled Apron																							
BIMR-90010	Excavation and Concrete	40	40	0	18MAR11	12MAY11																																																																																																																																					Excavation and Concrete																							
BIMR-90020	Trash Rack and Stoplog	3	3	0	11MAY11	13MAY11																																																																																																																																					Trash Rack and Stoplog																							
<b>Basin Island at Santa Fe Cut</b>																																																																																																																																																																		
<b>General Requirements</b>																																																																																																																																																																		
BISF-10000	General Requirements	772*	772*	0	02MAY05	15APR08																																																																																																																																					General Requirements																							
BISF-10010	Management / Administration	772	772	0	02MAY05	15APR08																																																																																																																																					Management / Administration																							
BISF-10020	Quality / Facilities / Engineering	772	772	0	02MAY05	15APR08																																																																																																																																					Quality / Facilities / Engineering																							
<b>Site Work</b>																																																																																																																																																																		
BISF-20000	Sitework	205*	205*	0	01NOV10	12AUG11																																																																																																																																																	Sitework											
BISF-20010	Sheet & H Piles	114	114	0	01NOV10	07APR11																																																																																																																																					Sheet & H Piles																							
BISF-20020	Errrosion and Sediment Control	30	30	0	16MAY11	24JUN11																																																																																																																									Errrosion and Sediment Control																																			
BISF-20035	Switch Yard	23	23	0	06JUL11	05AUG11																																																																																																																																					Switch Yard																							

Start Date	01JAN04		Early Bar
Finish Date	28DEC11		Progress Bar
Data Date	01JAN04		Critical Activity
Run Date	03JUL03 10:28		

DEL2

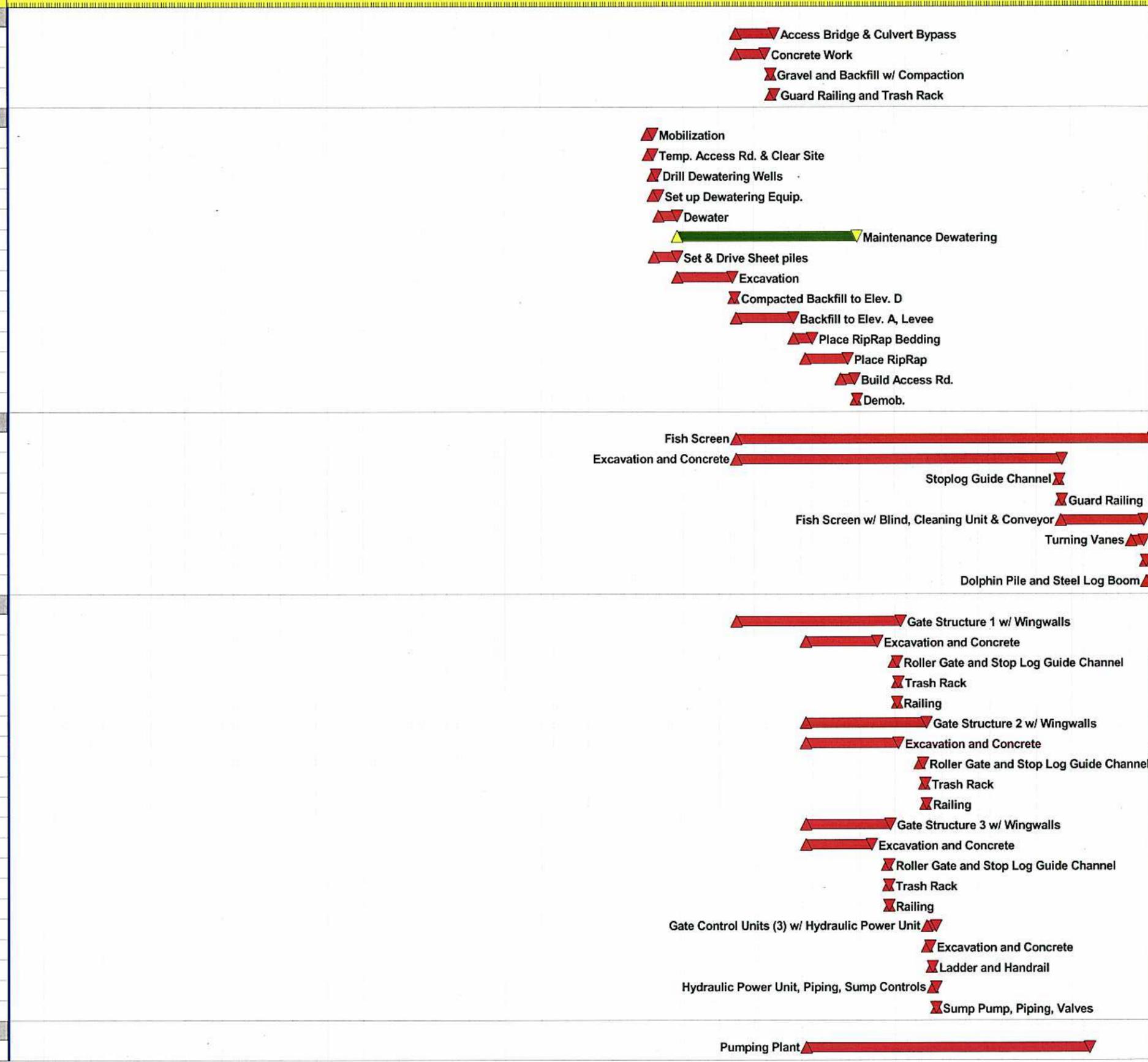
In-Delta Storage Program

Classic Schedule Layout

Sheet 7 of 9

Date	Revision	Checked	Approved

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
<b>Access Bridge &amp; Culvert Bypass</b>						
BISF-30000	Access Bridge & Culvert Bypass	73*	73*	0	16FEB09	27MAY09
BISF-30010	Concrete Work	55	55	0	16FEB09	01MAY09
BISF-30020	Gravel and Backfill w/ Compaction	1	1	0	18MAY09	18MAY09
BISF-30030	Guard Railing and Trash Rack	6	6	0	18MAY09	25MAY09
<b>Bacon Island at Santa Fe Cut</b>						
BISF-31000	Mobilization	10	10	0	01JUL08	14JUL08
BISF-31010	Temp. Access Rd. & Clear Site	10	10	0	03JUL08	16JUL08
BISF-31020	Drill Dewatering Wells	5	5	0	17JUL08	23JUL08
BISF-31030	Set up Dewatering Equip.	10	10	0	17JUL08	30JUL08
BISF-31040	Dewater	33	33	0	31JUL08	15SEP08
BISF-31042	Maintenance Dewatering	333	333	0	16SEP08	24DEC09
BISF-31050	Set & Drive Sheet piles	42	42	0	18JUL08	15SEP08
BISF-31060	Excavation	104	104	0	16SEP08	06FEB09
BISF-31070	Compacted Backfill to Elev. D	5	5	0	09FEB09	13FEB09
BISF-31080	Backfill to Elev. A, Levee	106	106	0	16FEB09	13JUL09
BISF-31090	Place RipRap Bedding	36	36	0	14JUL09	01SEP09
BISF-31100	Place RipRap	79	79	0	12AUG09	30NOV09
BISF-31110	Build Access Rd.	28	28	0	11NOV09	18DEC09
BISF-31120	Demob.	5	5	0	21DEC09	25DEC09
<b>Fish Screen</b>						
BISF-40000	Fish Screen	772*	772*	0	16FEB09	31JAN12
BISF-40010	Excavation and Concrete	603	603	0	16FEB09	08JUN11
BISF-40020	Stoplog Guide Channel	4	4	0	30MAY11	02JUN11
BISF-40030	Guard Railing	1	1	0	06JUN11	06JUN11
BISF-40040	Fish Screen w/ Blind, Cleaning Unit & Conveyor	154	154	0	06JUN11	05JAN12
BISF-40050	Turning Vanes	23	23	0	05DEC11	04JAN12
BISF-40060	Washdown Misc Piping, Fitting & Valves	3	3	0	09JAN12	11JAN12
BISF-40070	Dolphin Pile and Steel Log Boom	12	12	0	11JAN12	26JAN12
<b>Gate Structures</b>						
BISF-51000	Gate Structure 1 w/ Wingwalls	304*	304*	0	16FEB09	15APR10
BISF-51010	Excavation and Concrete	131	131	0	14AUG09	12FEB10
BISF-51020	Roller Gate and Stop Log Guide Channel	6	6	0	29MAR10	05APR10
BISF-51030	Trash Rack	2	2	0	07APR10	08APR10
BISF-51040	Railing	1	1	0	07APR10	07APR10
BISF-52000	Gate Structure 2 w/ Wingwalls	222*	222*	0	14AUG09	21JUN10
BISF-52010	Excavation and Concrete	171	171	0	14AUG09	09APR10
BISF-52020	Roller Gate and Stop Log Guide Channel	6	6	0	04JUN10	11JUN10
BISF-52030	Trash Rack	2	2	0	16JUN10	17JUN10
BISF-52040	Railing	2	2	0	18JUN10	21JUN10
BISF-53000	Gate Structure 3 w/ Wingwalls	155*	155*	0	14AUG09	18MAR10
BISF-53010	Excavation and Concrete	120	120	0	14AUG09	28JAN10
BISF-53020	Roller Gate and Stop Log Guide Channel	5	5	0	10MAR10	16MAR10
BISF-53030	Trash Rack	1	1	0	15MAR10	15MAR10
BISF-53040	Railing	1	1	0	17MAR10	17MAR10
BISF-54000	Gate Control Units (3) w/ Hydraulic Power Unit	19*	19*	0	21JUN10	15JUL10
BISF-54010	Excavation and Concrete	8	8	0	21JUN10	30JUN10
BISF-54020	Ladder and Handrail	1	1	0	05JUL10	05JUL10
BISF-54030	Hydraulic Power Unit, Piping, Sump Controls	6	6	0	07JUL10	14JUL10
BISF-54040	Sump Pump, Piping, Valves	1	1	0	16JUL10	16JUL10
<b>Pumping Plant</b>						
BISF-60000	Pumping Plant	522*	522*	0	14AUG09	15AUG11



Start Date: 01JAN04  
 Finish Date: 28DEC11  
 Data Date: 01JAN04  
 Run Date: 03JUL03 10:29

Legend:  
 Early Bar (Green)  
 Progress Bar (Blue)  
 Critical Activity (Red)

© Primavera Systems, Inc.

DEL2

In-Delta Storage Program  
 Classic Schedule Layout

Sheet 8 of 9

Date	Revision	Checked	Approved

