Attachment 3 - Budget Level Cost Estimates

Project Memorandum

To: Robert Ovadia

From: Blake Rothfuss

Job Number: 3957.1

Date: May 16, 2008

Subject: Vista Grande Drainage Basin Alternatives Analysis Project
Budget Level Cost Estimates, Revision 0

This memorandum summarizes the budget level cost estimates, conceptual construction timelines, and sequence of construction activities during the development of the project facilities.

The following pre-project conditions should be considered.

- The City and County of San Francisco should consider postponing the development of wetlands along John Muir Drive until the Vista Grande Canal improvements have been completed.
- All temporary and permanent easements have been secured by the City of Daly City.
- All right-of-ways have been secured by the City of Daly City and field surveyed.

The contractor who constructions the Recommended Vista Grande Preferred Alternative will develop the construction work plan based upon his experience and expertise, the scope of work, contracted release to operations date, expected weather conditions, and construction management risk.

The sequence developed below represents two approaches to constructing the project facilities. The Cost Estimate Basis assumes a linear construction sequence based on driving the tunnel from the Vista Grande Canal. An Alternative Cost Estimate constructs the tunnel from a temporary construction shaft at Fort Funston.

Cost Estimate Basis

1.0 PROVIDE PEAK STORMWATER STORAGE

Completing this work first provides a minimum level of flooding protection to the City during the project construction. Utilizing this storage capacity during construction could reduce weather/stormwater related construction delays and stormwater bypass requirements while the canal improvements are being completed. The work consists of:

- Developing the softball fields at Westlake Park for construction staging and access. The construction staging area will include: materials storage, excavation equipment, temporary spoils stockpile, dump truck staging area, and a crane.
- Constructing the underground Westlake stormwater storage tank, pump lift station, utilities, controls, connection with the existing 5’x8’ box culvert, and flow control devices.
- Constructing the Cliffside Drive connector culvert. This is a new stormwater culvert between the (E) stormwater culvert beneath Cliffside Drive and the underground

storage tank at Westlake Park. The culvert will be a cut and cover pipeline as it traverses the Westlake Park, and a jack-and-bore pipeline as it crosses beneath private property to Cliffside Drive. A receiving shaft will be constructed adjacent to an existing manhole to facilitate the culvert connection.

- Demobilizing from the site.

Once this work is completed, the stormwater storage facility can be placed in service.

2.0 IMPROVE VISTA GRANDE CANAL CAPACITY

Completing this work improves the hydraulic flow capacity of the Vista Grande Canal between the drop structure (the intersection of Lake Merced Blvd. and John Muir Drive) and the new tunnel inlet. When completed, the open canal will have been replaced by a buried precast concrete multi-channel box culvert. Completion of this task improves the water quality of stormwater flows reaching the Daly City Outfall and reduces the potential for canal overtopping along the John Muir Drive. The area above and adjacent to the buried box culvert could be available for future wetlands development. The work consists of:

- Developing the ground surface between the existing canal and John Muir Drive for construction staging and access. The construction staging area will include: the canal, box culvert segment storage, excavation equipment, temporary spoils stockpile, dump truck staging area, and a mobile crane.
- Constructing a new drop structure to combine flows from the existing stormwater culverts.
- Constructing debris screening chambers to remove debris larger than 5mm from the stormwater. As the screened stormwater exits the debris screens, it will pass through an underflow weir which will split flows between the new tunnel and the existing tunnel.
- Constructing a pump lift station for future wetlands development.
- Constructing the new buried multi-channel box culvert to the tunnel inlet.
- Installing water level transducers and RTUs for instrumentation and control.
- Restoring the remaining Vista Grande Canal to match the existing tunnel's hydraulic capacity.
- Demobilizing from the site.

As the box culvert is backfilled and completed, additional staging area will become available above the new canal. Once this work is completed, the canal can be returned to service until the outfall construction is commenced.

3.0 CONSTRUCT NEW 15-FOOT DIAMETER TUNNEL (Base Estimate)

Completing this work improves the hydraulic flow capacity between the canal and the outfall structure located beneath Fort Funston. The tunnel construction and outfall rehabilitation are interdependent. The canal construction should be substantially complete prior to beginning this task. The work consists of:

- Developing the ground surface between the existing canal and John Muir Drive for construction staging and access. The construction staging area will include: the portal area, water treatment plant, slurry separation plant, segment storage, machine shop, spare parts storage, grout plant, material storage, offices and dryhouse, crew parking, electrical substation, tunneling equipment, temporary spoils stockpile, dump truck

staging area, and a crane. Figure 1 presents a typical construction plant for a slurry TBM.

- Developing the ground surface and temporary construction roads for beach access at Fort Funston. The construction staging area will include: the cofferdam, the portal area, water treatment plant, grout plant, material storage, offices and dryhouse, crew parking, electrical substation, tunneling equipment, temporary spoils stockpile, dump truck staging area, and a crane.
- Excavating, supporting, and lining the tunnel between the canal and the outfall structure. The geotechnical investigation will provide information necessary to specify the most appropriate tunneling method. A pressure-balanced slurry or an earth pressure balanced TBM may be suitable for excavating and supporting the tunnel through dune sands, the Colma Formation, the Merced Formation, and anticipated fault splays. In some reaches, conventional tunneling methods will be utilized. The recommended tunneling approach is described below. Figure 2 presents a slurry TBM with its trailing gear.

  John Muir Heading

  - Up to 1,000-feet of the initial TBM driven tunnel reach will be a 15-foot diameter bolted-gasketed precast concrete segment lined tunnel. For Alternatives 5B and 6B, this reach begins in a low cover section beneath The Olympic Club golf course and will require ground modification to prevent settlement. The expected advancement rate in this reach is 10 feet-per-day.
  - The main tunnel reach length varies from 3,800-feet to 2,700-feet. This TBM driven tunnel will be a 15-foot diameter bolted-gasketed precast concrete segment lined tunnel. The expected advancement rate in this reach is 40 feet-per-day. The TBM will be walked through the combination and transition tunnels, and be removed at the outfall staging area.
  - To protect the existing 1896 brick lined tunnel from damage during construction, approximately 200-feet of the tunnel will require reinforcing prior to converging with the new tunnel. A cross-over tunnel will be constructed to connect the two tunnels. This work will be constructed from the outfall portal at an assumed rate of 25-feet-per-day.

  Funston East Heading

  - The 300-foot long combined tunnel will be a 15’ conventionally excavated horseshoe tunnel with a reinforced concrete lining. This reach begins with the cross-over tunnel from the existing tunnel and ends at the transition tunnel. This tunnel reach will be constructed from the outfall portal at an assumed rate of 16-feet-per-day.
  - The 200-foot long outfall transition tunnel will be a 15’ conventionally excavated horseshoe tunnel with a heavy reinforced concrete lining, terminating at the outfall portal. This tunnel reach will be constructed from the outfall portal at an assumed rate of 12-feet-per-day.
- Precast bolted-gasketed segments used as the tunnel’s primary support will serve as the final lining. The bolt pockets may be filled in to reduce the hydraulic roughness of the tunnel.
- Demobilizing from the site.

4.0 REHABILITATE THE EXISTING OUTFALL STRUCTURE
Completing this work improves the hydraulic flow capacity between the canal and the outfall structure located beneath Fort Funston. The tunnel construction and outfall rehabilitation are interdependent. The work consists of:

- Continuing to use the Fort Funston construction staging area and access developed in Task 3.
- Demolishing and removing the existing outfall structure to grade. Temporary stormwater diversion capacity will be required across the cofferdam.
- Preparing the portal face and constructing the transition and combined tunnels described in Task 3.
- Constructing the outfall structure after removing the TBM and lining the tunnels.
- Intercepting the existing WWTP 27-inch diameter effluent pipeline at Fort Funston and constructing a new connecting pipeline beneath Fort Funston to the existing sub-marine outfall pipeline.
- Demobilizing from the site.

Once this work is completed, the tunnel and outfall structure can be placed in service.

Alternative Estimate

1.0 Provide peak stormwater storage described above.

2.0 Improve vista grande canal capacity described above.

3.0 CONSTRUCT NEW 15-FOOT DIAMETER TUNNEL
Completing this work improves the hydraulic flow capacity between the canal and the outfall structure located beneath Fort Funston. The tunnel construction and outfall rehabilitation are interdependent. The work can commence upon Notice To Proceed and consists of:

- Developing the ground surface and beach access at Fort Funston for construction staging and access. Temporary construction access to the beach will be required for limited durations to construct the cofferdam, remove a portion of the existing outfall structure, and removing the cofferdam. All other construction activity will be worked through the shaft and tunnel. The construction staging area will include: the portal area, water treatment plant, slurry separation plant, segment storage, machine shop, spare parts storage, grout plant, material storage, offices and dryhouse, crew parking, electrical substation, tunneling equipment, temporary spoils stockpile, dump truck staging area, and a crane. Figure 1 presents a typical construction plant for a slurry TBM.
- Developing a 40-foot inside diameter by 160-feet deep temporary construction shaft at Fort Funston on the north side of the existing parking lot. Figure 3 presents a temporary construction shaft with a slurry TBM shown on the shaft floor.
- Excavating, supporting, and lining the tunnel between the canal and the outfall structure. Similarly, the geotechnical investigation will provide information necessary to specify the most appropriate tunneling method. A pressure-balanced slurry or an earth pressure balanced TBM may be suitable for excavating and supporting the tunnel through dune sands, the Colma Formation, the Merced Formation, and

anticipated fault splays. In some reaches, conventional tunneling methods will be utilized. The recommended tunneling approach is described below.

Funston West Heading

- The 800-foot long tunnel will be a 15' conventionally excavated horseshoe tunnel with a reinforced concrete lining. This reach begins with the shaft and ends at the cross-over tunnel. This tunnel reach will be constructed from the shaft at an assumed rate of 16-feet-per-day.
- To protect the existing 1896 brick lined tunnel from damage during construction, approximately 200-feet of the tunnel will require reinforcing prior to converging with the new tunnel. A cross-over tunnel will be constructed to connect the two tunnels. This work will be constructed from the outfall portal at an assumed rate of 25-feet-per-day.
- The 300-foot long combined tunnel will be a 15' conventionally excavated horseshoe tunnel with a reinforced concrete lining. This reach begins with the cross-over tunnel from the existing tunnel and ends at the transition tunnel. This tunnel reach will be constructed from the shaft at an assumed rate of 16-feet-per-day.
- The 200-foot long outfall transition tunnel will be a 15' conventionally excavated horseshoe tunnel with a heavy reinforced concrete lining, terminating at the outfall portal. This tunnel reach will be constructed from the shaft at an assumed rate of 12-feet-per-day and will hole-through into the cofferdam.

Funston East Heading

- The main tunnel reach length varies from 3,000-feet to 1,900-feet. This TBM driven tunnel will be a 15-foot diameter bolted-gasketed precast concrete segment lined tunnel. The expected advancement rate in this reach is 40 feet-per-day. The TBM will be removed at the inlet portal adjacent to John Muir Drive.
- Up to 1,000-feet of the last TBM driven tunnel reach will be a 15-foot diameter bolted-gasketed precast concrete segment lined tunnel. For Alternatives 5B and 6B, this reach begins in a low cover section beneath The Olympic Club golf course and will require ground modification to prevent settlement. The expected advancement rate in this reach is 10 feet-per-day.

- Precast bolted-gasketed segments used as the tunnel's primary support will serve as the final lining. The bolt pockets may be filled in to reduce the hydraulic roughness of the tunnel. For conventionally excavated tunnel reaches, a reinforced concrete lining will be constructed.
- Demobilizing from the site.

4.0 REHABILITATE THE EXISTING OUTFALL STRUCTURE

Completing this work improves the hydraulic flow capacity between the canal and the outfall structure located beneath Fort Funston. The tunnel construction and outfall rehabilitation are interdependent. The work consists of:

- Continuing to use the Fort Funston construction shaft developed in Task 3.
- Demolishing and removing the existing outfall structure to grade. Temporary stormwater diversion capacity will be required across the cofferdam.
- Preparing the portal face in support of the tunneling operation.

- Constructing the outfall structure via the construction shaft and tunnel.
- Intercepting the existing WWTP 27-inch diameter effluent pipeline at Fort Funston, construction a buried pipeline between the intercept and the Funston shaft, supporting the pipeline in the shaft, running the pipeline through the new tunnel, and constructing a new connecting pipeline beneath the beach to the existing sub-marine outfall pipeline.
- Demobilizing from the shoreline site.
- Backfill the construction shaft with CDLM (Controlled Density Low-strength Material), encasing the 27-inch diameter effluent line in the shaft.
- Restore the site.
- Demobilize.

Once this work is completed, the tunnel and outfall structure can be placed in service.

Summary

The contractor will develop the construction work plans based upon his experience and expertise, the scope of work, contracted release to operations date, expected weather conditions, and construction management risk. These estimates are intended to provide a budget level estimate which can be refined as the scope of work and design matures. The summaries of the cost estimates are provided in Tables 1 and 2. The detailed estimates are included as attachments.

Table 1 Opinion of Probable Project Costs (Budget Level Accuracy)
Base Estimate

Base Estimate- Tunnel staging from canal	Alternative 5B	Alternative 6B	Alternative 7
Estimated Construction Duration	24 months	25 months	25 months
Contractor's direct & indirect costs	$97,767,000	$101,793,000	$106,450,000
Professional services	26,397,000	27,484,000	28,741,000
Estimated. escalation	19,776,000	20,591,000	21,532,000
Design Contingency (40%)	$57,576,000	$59,947,000	$62,689,000
Total	$201,517,000	$209,815,000	$219,412,000

Table 2 Opinion of Probable Project Costs (Budget Level Accuracy)
Alternate Estimate

Alternative Estimate- Tunnel staging from Ft. Funston	Alternative 5B	Alternative 6B	Alternative 7
Estimated Construction Duration	19 months	20 months	23 months
Contractor's direct & indirect costs	$87,439,000	$91,933,000	$98,022,000
Professional services	23,608,000	24,822,000	26,466,000
Estimated. escalation	17,687,000	18,596,000	19,828,000
Design Contingency (40%)	$51,494,000	$54,141,000	$57,726,000
Total	$180,228,000	$189,492,000	$202,042,000

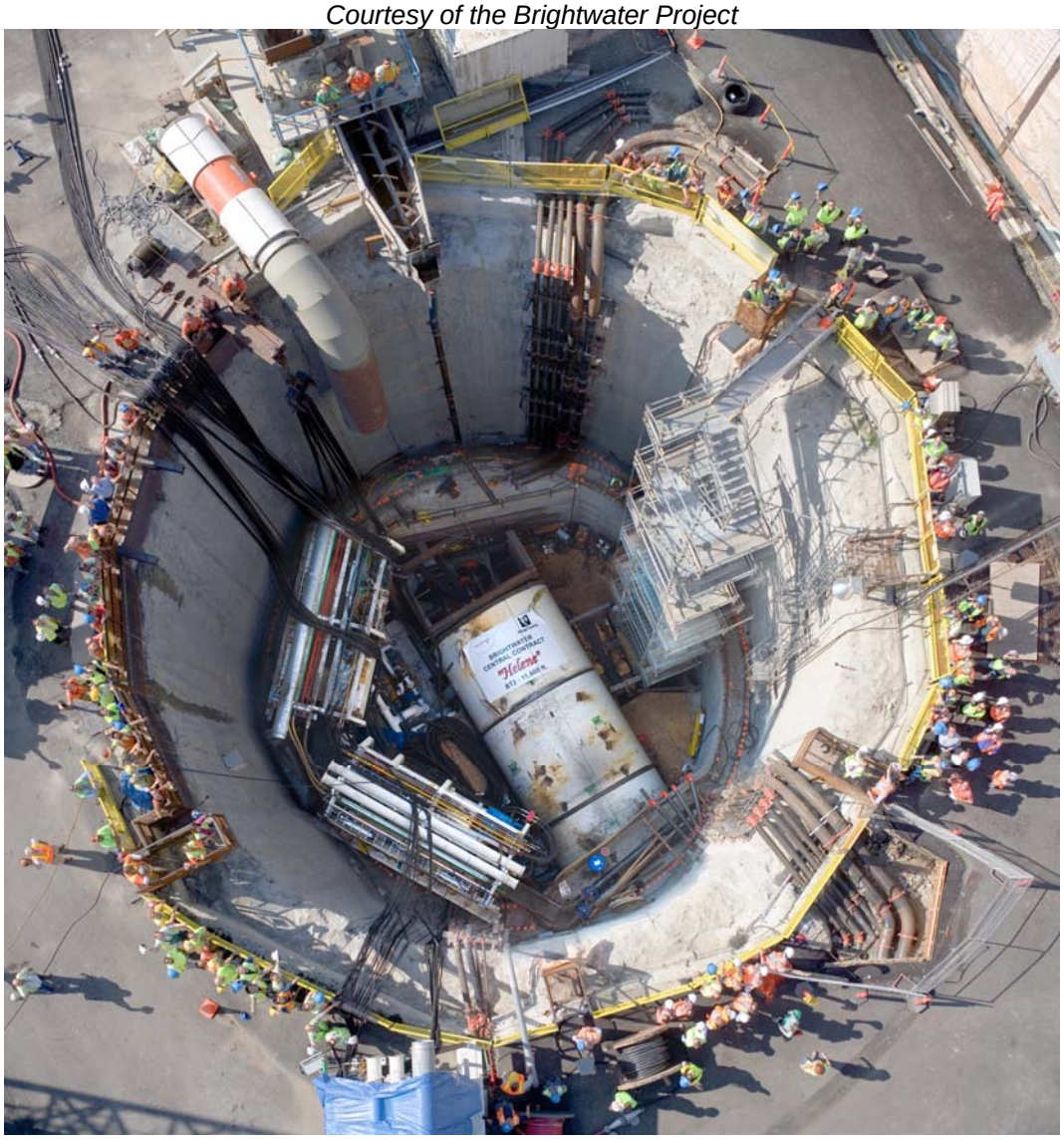
Attachments:

1. Vista Grande Drainage Basin AAR Cost Estimate Alt 5B Rev 03.pdf
2. Vista Grande Drainage Basin AAR Cost Estimate Alt 6B Rev 03.pdf
3. Vista Grande Drainage Basin AAR Cost Estimate Alt 7 Rev 03.pdf
4. Vista Grande Drainage Basin Conceptual Design Figures

Figure 1, Typical Construction Plant for a Slurry TBM
Courtesy of the Brightwater Project

Figure 2, Slurry TBM and Trailing Gear
Courtesy of the Brightwater Project

Figure 3, Temporary Construction Shaft
Courtesy of the Brightwater Project



Attachment 1

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
	Alternative 5B							
	Contractor's Direct Costs							
1.0	**PHASE I: PROVIDE PEAK STORMWATER STORAGE**							
1.1	**CONSTRUCT WESTLAKE STORMWATER STORAGE SITE**							
	**** Circular Storage Tank, 4.25 MG, inside diameter*	150	FT					
	**** Circular Storage Tank, 4.25 MG, outside diameter*	152	FT					
	**** Circular Storage Tank, 4.25 MG, excavated diameter*	160	FT					
	**** Excavation perimeter*	503	LF					
	**** Storage footprint*	20,106	SF					
	**** Storage top of ground elev.*	50	FASL					
	**** Storage top of concrete elev.*	46	FASL					
	**** Storage bottom of excavation, elev.*	16	FASL					
	**** Excavated depth*	34	VF					
	Mobilize & Provide security	1	Allow	$ 200,000	Allowance		$200,000	*included*
	Improve site access	1	Allow	$ 5,000	Allowance		$5,000	*included*
	Provide site survey & land controls	1	Allow	$ 10,000	Allowance		$10,000	*included*
	Provide groundwater control, treatment, & discharge	10	MO	$ 15,000	MOS		$150,000	*included*
	Drive soldier piles & support excavation	17,090	SF	$ 100	/SF		$1,709,026	*included*
	Excavate	25,319	CY	$ 10	/CY		$253,189	*included*
Green	Haul & dispose of spoils (incl 25% bulking)	31,649	CY	$ 55	/CY		$1,740,675	*included*
	Construct DYK Prestressed Concrete Tank	1	LS	$ 2,850,000	Allowance		$2,850,000	*included*
	Construct DYK Prestressed Concrete Tank Roof Reinf	7	VF	$ 60,000	/VF		$420,000	*included*
	Construct ROMTEC Utilities Modular Lift Station	1	LS	$ 340,163	Allowance		$340,163	*included*
	Construct debris screening chamber	1	Allow	$ 500,000	Allowance		$500,000	*included*
	Construct air handling bldg & compressor	1	Allow	$ 50,000	EA		$50,000	*included*
	Construct standby generator	1	Allow	$ 100,000	EA		$100,000	*included*
	Tie-in (N) culvert to main box culvert	1	Allow	$ 25,000	Allowance		$25,000	*included*
	Install debris screening equipment	1	Allow	$ 124,000	Allowance		$124,000	*included*
	Install inflatable water diversion device	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Place Low Density Concrete Backfill	73	CY	$ 20	/CY		$1,452	*included*
	Install electrical service, u/g	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Install logical control system	1	Allow	$ 500,000	Allowance		$500,000	*included*
	Restore site	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Subtotal						$9,278,506	$9,278,506

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost			Dur		Item Cost	Alt-1
1.2	**CONSTRUCT CLIFFSIDE CONNECTOR CULVERT**									
	**** Pilot Tube drive length*	140	LF							
	**** Bore exc. dia.*	60	IN							
	**** Carrier pipe dia.*	54	IN							
	**** Receiving shaft diameter*	8	FT							
	**** Cut-n-cover culvert*	380	LF							
	Construct driving shaft in Westlake Park- 10' dia.	1	Allow	$	20,000	Allowance			$20,000	*included*
	Excavate & place carrier pipe on line & grade.	140	LF	$	950	/LF			$133,000	*included*
	Haul & dispose of tunnel muck (25% bulking factor)	127	CY	$	55	/CY			$6,999	*included*
	Mark & locate utilities	1	Allow	$	5,000	Allowance			$5,000	*included*
	Construct receiving shaft on Cliffside Drive- 6' dia.	1	Allow	$	15,000	Allowance			$15,000	*included*
	Tie (N) culvert into (E) culvert	1	Allow	$	25,000	Allowance			$25,000	*included*
	Backfill & compact tie-in	102	CY	$	35	/CY			$3,563	*included*
	Patch AC paving on Cliffside Drive	10	SY	$	100	/SY			$1,000	*included*
	Excavate, place, & backfill (N) culvert	380	LF	$	750	/LF			$285,000	*included*
	Subtotal								$494,563	$494,563
	Subtotal Task 1.0								**$9,773,069**	**$9,773,069**
2.0	**PHASE II: IMPROVE VISTA GRANDE CANAL CAPACITY**									
2.1	**IMPROVE CANAL TO (N) TUNNEL CAPACITY**									
	**** Staging area size*	2.0	A							
	**** Drop structure*	25	LF							
	**** Debris separators*	250	LF							
	**** (N) box culvert length*	525	FT	@	20	fpd	27	d		
	**** (N) box culvert width*	20	FT							
	**** Total (N) canal*	**800**	LF							
	**** Remaining (E) canal*	2,800	LF							
	**** Usable construction corridor width*	100	FT							
	Improve Canal Site Access	2.0	Allow	$	5,000	Allowance			$10,000	*included*
	Develop Canal Site Staging Area	2.0	A	$	2,500	/ Acre			$5,000	*included*
	Provide site survey & land controls	1	Allow	$	10,000	Allowance			$10,000	*included*
	Relocate & Protect Utilities	1	Allow	$	50,000	Allowance			$50,000	*included*
	Divert Canal Flows	1	Allow	$	10,000	Allowance			$10,000	*included*
	Demo & remove (E) canal	800	LF	$	100	LF			$80,000	*included*
	Haul & dispose of canal debris (assume 0.5 CY/LF & 50% bulking)	600	CY	$	55	/CY			$33,000	*included*
	Excavate foundation, 27' wide x 2' deep	1,600	CY	$	10	/CY			$16,000	*included*

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
	Haul & dispose of spoil	2,400	CY	$ 55	/CY		$132,000	*included*
	Place mudslab, 27' wide x 1' thick	400	CY	$ 500	/CY		$200,000	*included*
	Develop tunnel portal	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Place foundation, 1' thick	800	CY	$ 750	/CY		$600,000	*included*
	Construct (N) drop structure	1	Allow	$ 200,000	Allowance		$200,000	*included*
	Construct (N) wetlands lift pump station	1	Allow	$ 5,000	/EA		$5,000	*included*
	Construct ROMTEC Utilities Modular Lift Station	1	LS	$ 100,000	/Allowance		$100,000	*included*
	Construct (N) debris screening culvert	250	LF	$ 3,000	/LF		$750,000	*included*
	Construct (N) precast box culvert	525	LF	$ 5,000	/LF		$2,625,000	*included*
	Construct (N) flow diverter @ tunnel inlet	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Construct (N) tunnel inlet	1	Allow	$ 250,000	Allowance		$250,000	*included*
	Backfill (N) canal sections, assume 4' cover	3,200	CY	$ 25	/CY		$80,000	*included*
	Install electrical service, u/g	1	Allow	$ 50,000	Allowance		$50,000	*included*
	Install water level I&C	1	Allow	$ 15,000	Allowance		$15,000	*included*
	Restore site	2.0	A	$ 350,000	/ Acre		$700,000	*included*
	Subtotal						$6,121,000	$6,121,000
2.2	**IMPROVE (E) CANAL TO (E) TUNNEL CAPACITY**							
	**** Remaining (E) canal*	2,800	LF					
	**** Usable construction corridor width*	0	FT					
	Divert Canal Flows	1	Allow	$ 2,500	Allowance		$2,500	*included*
	Remove vegetation from canal	52	CY	$ 10	/CY		$519	*included*
	Haul & dispose of canal debris (assume 50% bulking)	78	CY	$ 55	/CY		$4,278	*included*
	Reinforce (E) tunnel inlet structure	1	Allow	$ 10,000	Allowance		$10,000	*included*
	Install (N) trashrack	1	Allow	$ 25,000	Allowance		$25,000	*included*
	Install water level I&C	1	Allow	$ 15,000	Allowance		$15,000	*included*
	Restore site	1	Allow	$ 25,000	Allowance		$25,000	*included*
	Subtotal						$82,296	$82,296
	Subtotal Task 2.0						**$6,203,296**	**$6,203,296**

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
3.0	**PHASE III: CONSTRUCT (N) TUNNEL**							
	**** Tunnel length*	5,200	LF					
3.1	**JOHN MUIR STAGING AREA**- STAGING FOR TUNNEL CONSTRUCTION ACTIVITIES							
	**** Staging area size, incremental*	1.9	A					
	**** Construction perimeter, road side*	1,000	LF					
	**** Construction perimeter, golf course side*	1,000	LF					
	Clear vegetation	1.9	A	$ 5,000	/Acre		$9,500	*not included*
	Provide erosion control	1.9	A	$ 2,000	/Acre		$3,800	*not included*
	Provide site survey & land controls	1	Allow	$ 10,000	Allowance		$10,000	*not included*
	Mark, locate, & relocate utilities	1	Allow	$ 200,000	Allowance		$200,000	*not included*
	Provide traffic control	1	Allow	$ 300,000	Allowance		$300,000	*not included*
	Provide sound/ visual screening controls, 10' high screen	20,000	SF	$ 5	Allowance		$100,000	*not included*
	Provide water control & treatment	1	Allow	$ 1,000,000	Allowance		$1,000,000	*not included*
	Erect tunneling plant	1	Allow	$ 1,500,000	Allowance		$1,500,000	*not included*
	Remove Const. Plant	1	Allow	$ 500,000	Allowance		$500,000	*not included*
	Restore Site	1.9	Allow	$ 350,000	/Acre		$665,000	*not included*
	Subtotal						$4,288,300	
3.2	**PROVIDE GROUNDWATER CONTROL & TREATMENT @ SERRA FAULT CROSSING**							
	*****							
	Re-Occupy (E) SF Water Dept wells at Fort Funston	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Provide deep well pumps, 3 EA	12	MOS	$ 30,000	MO		$360,000	*included*
	Provide water collection & treatment	1	Allow	$ 500,000	Allowance		$500,000	*included*
	Subtotal						$960,000	$960,000
3.3	**ESTABLISH PORTAL**							
	*****							
	Excavate & Support portal cut	50	LF	$ 2,500	/LF		$125,000	*not included*
	Subtotal						$125,000	

No.	Item or Group Item Description	Item Quantity/Unit			Item Unit Cost		Dur		Item Cost	Alt-1
3.4	**EXCAVATE & SUPPORT TUNNEL**									
	**** Tunnel excavated diameter*	20	FT							
	**** Tunnel finished diameter*	15	FT							
	**** Total tunnel length*	**5,300**	LF							
	**** Tunnel length, John Muir Portal thru low cover reach, 20' Slurry TBM exc.circular.*	1,000	LF	@	10	fpd	100	d		
	**** Tunnel length, low cover to WP#1 reach, 20' Slurry TBM exc. circular.*	3,000	LF	@	40	fpd	75	d		
	**** Tunnel length, WP#1 to cross-over reach, 20' Slurry TBM exc. circular.*	800	LF	@	40	fpd	20	d		
	**** Reinforce (E) Tunnel Reinforing*	200	LF	@	25	fpd	8	d		
	**** Construct cross-over between (N) & (E) Tunnels*	50	LF	@	10	fpd	5	d		
	**** Tunnel length, Cross-over to transition tunnel, 20' conv. exc. horseshoe*	300	LF	@	10	fpd	30	d		
	**** Tunnel length, Transition tunnel to Outfall, 20' conv. exc. horseshoe*	200	LF	@	10	fpd	20	d		
	**** Tunnel lining length, 15' circular precast segment lining*	4,800	LF							
	**** Tunnel lining length, 10' horseshoe lining*	50	LF							
	**** Tunnel lining length, 15' horseshoe lining*	300	LF							
	**** Tunnel lining length, 15' heavy horseshoe lining*	200	LF							
	Provide pre-excavation ground improvement	1,000	LF	$	2,500	/LF			$2,500,000	$2,500,000
	Assemble EPB TBM	1	Allow	$	600,000	Allowance			$600,000	$600,000
	Excavate, Support, & Line-- P-B Slurry TBM w/ segments- low cover reach	1,000	LF	$	4,018	/LF			$4,018,000	$4,018,000
	Excavate, Support, & Line-- P-B Slurry TBM- to WP#1	3,000	LF	$	4,018	/LF			$12,054,000	$12,054,000
	Reinforce (E) Brick lined tunnel for excavation	200	LF	$	500	/LF			$100,000	$100,000
	Excavate, Support, & Line-- P-B Slurry TBM- WP#1 to cross-over	800	LF	$	4,018	/LF			$3,214,400	*not included*
	Remove TBM	1	Allow	$	1,000,000	Allowance			$1,000,000	$400,000
	Excavate & Support-- Conv. Exc.- Outfall portal to transition tunnel	200	LF	$	3,500	/LF				$700,000
	Excavate & Support-- Conv. Exc.- Transition tunnel to cross-over	300	LF	$	3,500	/LF				$1,050,000
	Excavate & Support-- Conv. Exc.- Cross-over	50	LF	$	3,500	/LF			$175,000	$175,000
	Fill (CDLM) & abandon (E) brick lined tunnel 1 cy/lf, $75/cy	500	LF	$	75	/LF			$37,500	$37,500
Green	Haul & dispose of spoils (25% bulking factor), TBM exc.	83,776	CY	$	55	/CY			$4,607,669	$4,607,669
Green	Haul & dispose of spoils (25% bulking factor)	10,911	CY	$	55	/CY			$600,092	$600,092
	Subtotal								$28,906,661	$26,842,261

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
3.5	**CONSTRUCT FORT FUNSTON 33" dia. Forced Main Shaft**							
	**** Pipe diameter*	33	IN					
	**** Shaft depth*	160	VF					
	**** Shaft diameter*	8	FT					
	**** MTBM length*	200	FT					
	Prepare Site	1	A	$ 6,000	/Acre		$6,000	*not included*
	Fit-out shaft plant	1	Allow	$ 50,000	Allowance		$50,000	*not included*
	Provide water control, collection, treatment, & disposal	1	Allow	$ 250,000	Allowance		$250,000	*not included*
	Excavate & support shaft	150	VF	$ 1,000	VF		$150,000	*not included*
Green	Haul & dispose of spoils (25% bulking factor)	372	CY	$ 55	/CY		$20,479	*not included*
	Fit-out Pilot Tube plant	1	Allow	$ 50,000	Allowance		$50,000	*not included*
	Drive, Ream, & Place (N) 18" dia carrier pipe to outfall	200	LF	$ 950	/LF		$190,000	*not included*
	Place 33" dia Forced Main (FM) Pipe-- shaft	160	VF	$ 1,000	VF		$160,000	*not included*
	Place Backfill concrete around pipe-- shaft	263	CY	$ 32	/CY		$8,406	*not included*
	Remove shaft Plant	1	Allow	$ 140,000	Allowance		$140,000	*not included*
	Place (N) 33" dia. Forced Main-- (N) outfall structure beneath beach	150	LF	$ 1,000	/LF		$150,000	$150,000
	Place (N) 33" dia. Forced Main-- set foundation piers	1	Allow	$ 135,000	Allowance		$135,000	$135,000
	Place (N) 33" dia. Forced Main-- set & secure pipe to (E) sub-marine pipe	50	LF	$ 500	/LF		$25,000	$25,000
	Tie-in (N) and (E) FM pipeline	1	Allow	$ 100,000	Allowance		$100,000	$100,000
	Restore Site (GGNRA)	1	A	$ 200,000	/Acre		$200,000	$200,000
	Subtotal						$1,634,884	$610,000
3.6	**LINE TUNNEL**							
	**** Cross over Tunnel length, 6-ft dia CIP lining*	50	LF	@ 10	fpd	5 d		
	**** Tunnel length, 15-ft dia*	500	LF	@ 100	fpd	5 d		
	**** Tunnel length, 15-ft dia + 33-inch dia forced main*	1,100	LF	@ 100	fpd	11 d		
	**** Tunnel length, 15-ft dia + 33-inch dia forced main, Heavy Wall*	200	LF	@ 80	fpd	3 d		
	Place CIP Concrete Lining							
	Set up Final Lining Spread	50	LF	$ 9	/LF		$454	*not included*
	Place monolithic CIP Lining	50	LF	$ 1,683	/LF		$84,150	*not included*
	Final Cleanup	50	LF	$ 3	/LF		$147	*not included*
	Place CIP Concrete Lining							
	Set up Final Lining Spread	500	LF	$ 10	/LF		$5,000	
	Place monolithic CIP Lining	500	LF	$ 1,700	/LF		$850,000	
	Final Cleanup	500	LF	$ 3	/LF		$1,465	
	(Alternate) Place CIP Concrete Lining-- incl 33" dia. forced main							
	Set 18" dia pipeline	1,300	LF	$ 180	/LF			$234,000
	Set up Final Lining Spread	1,300	LF	$ 10	/LF			$13,000
	Place monolithic CIP Lining	1,100	LF	$ 1,700	/LF			$1,870,000
	Place monolithic CIP Lining- Heavy wall	200	LF	$ 2,000	/LF			$400,000

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
	Final Cleanup	1,300	LF	$ 3	/LF			$3,809
	Subtotal						$941,215	$2,520,809
	Subtotal Task 3.0						**$36,731,061**	**$30,933,070**
4.0	**PHASE IV: REHABILITATE (E) OUTFALL STRUCTURE**							
4.1	**FORT FUNSTON STAGING AREA (Surface)**- STAGING FOR OUTFALL CONSTRUCTION ACTIVITIES							
	**** Provide temporary construction equipment access to beach length, 10% max grade*	160	LF					
	Prepare Site	3	A	$ 250,000	/Acre		$750,000	*not included*
	Provide erosion control	160	LF	$ 3	/LF		$480	*$480*
	Grade & surface (AC) beach access trail to beach, 10' wide	160	LF	$ 1,000	/LF		$160,000	*not included*
	(Alternate) Grade & surface (AC) beach access trail to beach, 10' wide	160	LF	$ 500	/LF			$80,000
	Provide drainage	1	Allow	$ 50,000	/LF		$50,000	$50,000
	Fit-out Outfall construction plant	1	Allow	$ 250,000	Allowance		$250,000	*not included*
	Remove Const. Plant	1	Allow	$ 100,000	Allowance		$100,000	*not included*
Mitig.	Restore Site	3	A	$ 350,000	/Acre		$1,050,000	*not included*
	Subtotal						$2,360,480	$130,480
4.2	**CONSTRUCT OUTFALL STRUCTURE**							
	**** Cofferdam perimeter*	280	FT					
	**** Cofferdam height*	30	FT					
	**** (Alternate) Cofferdam perimeter*	150	FT					
	**** (Alternate) Cofferdam height*	10	FT					
	Provide site survey & land controls	1	Allow	$ 10,000	Allowance		$10,000	$10,000
	Provide overhead rockfall protection	1	Allow	$ 25,000	Allowance		$25,000	$25,000
	Protect (E) 33" dia. forced main pipeline	1	Allow	$ 20,000	Allowance		$20,000	$20,000
	Provide tunnel discharge bypass	1	Allow	$ 25,000	Allowance		$25,000	$25,000
	Construct cofferdam footing	62	CY	$ 2,500	CY		$155,556	
	(Alternate) Construct cofferdam footing	33	CY	$ 2,500	CY			$83,333
	Install sheetpile cofferdam on footing	8,400	SF	$ 175	SF		$1,470,000	
	(Alternate) Install sheetpile cofferdam on footing	4,500	SF	$ 125	SF			$562,500
	Develop (N) tunnel portal (30' w x 100' h)	3,000	SF	$ 100	/SF		$300,000	$300,000
	Construct (N) Outfall, allow 50' w x 15' d x 20' h, w/ 18" thick conc walls	295	CY	$ 1,500	/CY		$442,500	$442,500
	Remove cofferdam	8,400	SF	$ 100	SF		$840,000	
	(Alternative) Remove cofferdam	4,500	SF	$ 100	SF			$450,000
	Place (N) 33" dia. Forced Main-- (N) outfall structure beneath beach	150	LF	$ 1,000	/LF		$150,000	$150,000
	Place (N) 33" dia. Forced Main-- set foundation piers	1	Allow	$ 135,000	Allowance		$135,000	$135,000
	Place (N) 33" dia. Forced Main-- set & secure pipe to (E) sub-marine pipe	50	LF	$ 500	/LF		$25,000	$25,000
	Tie-in (N) and (E) FM pipeline	1	Allow	$ 100,000	Allowance		$100,000	$100,000

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
	Restore site	1	Allow	$ 25,000	Allowance		$25,000	$25,000
	Subtotal						$3,723,056	$2,353,333

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
4.3	**REMOVE (E) OUTFALL STRUCTURE**							
	**** (E) outfall exposed tunnel length*	85	FT					
	**** (E) outfall exposed effluent pipeline length*	110	FT					
	**** (E) outfall abandoned effluent pipeline length*	500	FT					
	**** (E) structure dimensions: 20' x 20'*							
	**** Assume that demolision is down w/o a cofferdam*							
	Demo & remove (E) exposed outfall tunnel structure to footing, 30sf/lf	94	CY	$ 500	/CY		$47,222	*included*
	Demo & remove (E) outfall surface structure to footing,	50	CY	$ 500	/CY		$25,000	*included*
	Demo & remove (E) outfall surface footing, 36sf/lf	113	CY	$ 500	/CY		$56,667	*included*
	Haul & dispose of debris, allow 50% bulking of slab concrete	387	CY	$ 55	/CY		$21,267	*included*
	Demo & remove (E) effluent pipeline to sub-marine pipeline	110	LF	$ 250	/LF		$27,500	*included*
	Haul & dispose of pipeline	1	Allow	$ 25,000	Allowance		$25,000	*included*
	Fill (CDLM) & abandon (E) forced main pipeline, 0.15 cy/lf, $100/cy	500	LF	$ 25	/LF		$12,500	*included*
	Subtotal						$215,156	$215,156
	Subtotal Task 4.0						**$6,298,691**	**$2,698,969**
A-1	**FORT FUNSTON STAGING AREA (Shaft)**- STAGING FOR TUNNEL & OUTFALL CONSTRUCTION ACTIVITIES							
	**** Staging Area*	5	A					
	**** Shaft depth*	160	VF					
	**** Shaft diameter*	40	FT					
	Prepare Site	5	A	$ 6,000	/Acre		*not included*	$30,000
	Provide erosion control	5	A	$ 1,000	/Acre		*not included*	$5,000
	Fit-out construction shaft plant	1	Allow	$ 200,000	Allowance		*not included*	$200,000
	Excavate & Support shaft	160	VF	$ 7,000	VF		*not included*	$1,120,000
Green	Haul & dispose of spoils (25% bulking factor)	9,308	CY	$ 55	/CY		*not included*	$511,963
	Remove Const. Plant	1	Allow	$ 140,000	Allowance		*not included*	$140,000
	Hang 33" dia Forced Main (FM) Pipe	160	VF	$ 1,000	VF		*not included*	$160,000
	Backfill shaft w/ CDLM	7,412	CY	$ 75	/CY		*not included*	$555,866
	Tie-in (N) and (E) FM pipeline	1	Allow	$ 100,000	Allowance		*not included*	$100,000
	Restore Site	5	A	$ 200,000	/Acre		*not included*	$1,000,000
	Subtotal							$3,822,829
	Subtotal direct costs- base estimate						$59,006,117	
	Subtotal direct costs- base w/ Construction access via Funston Shaft							$53,431,233

No.	Item or Group Item Description	Item Quantity/Unit	Item Unit Cost		Dur	Item Cost	Alt-1
5.0	**Contractor's Indirect Costs**					Base	Atl-1
	**** Estimated construction duration, months*					24	19
	Equipment Ownership/Mobilization		15%	unesc.bid		$8,730,549	$7,905,689
	General Mobilization		1%	unesc.bid		$664,922	$602,101
	Demobilization		1%	unesc.bid		$663,184	$600,527
	General Plant Operation/Maintenance		$ 75,000	/mo		$1,804,932	$1,459,726
	Weekend Maintenance		$ 5,000	/day		$1,042,849	$843,397
	Field Supervision		$ 300,000	/mo		$7,219,726	$5,838,904
	Overhead Maintenance/Service		$ 50,000	/mo		$1,203,288	$973,151
	Bonds, Insurance, and Taxes		3%	unesc.bid		$1,766,307	$1,599,427
	Contractor Markup		15%	unesc.bid		$8,584,523	$7,773,459
	Financing Charges		2%	unesc.bid		$1,180,122	$1,068,625
	Contractor Contingency		10%	unesc.bid		$5,900,612	$5,343,123
	Subtotal indirect costs					$38,761,014	$34,008,128
	Subtotal construction direct & indirect costs					$97,767,131	$87,439,361
6.0	**Project Costs**						
	Design Services including geotechnical investigation, interpretation, & land engineering,		8%	const. est.		$7,821,370	$6,995,149
	Permit Acquisition & ROWs		3%	const. est.		$2,933,014	$2,623,181
	Legal & Administrative		3%	const. est.		$2,933,014	$2,623,181
	Construction Management Services		7%	const. est.		$6,843,699	$6,120,755
	Engineering Assistance during construction		3%	const. est.		$2,933,014	$2,623,181
	Construction Management Services		3%	const. est.		$2,933,014	$2,623,181
	Subtotal professional services					$26,397,125	$23,608,627
	Estimated escalation (assume 3% escalation per year, current economic climate)	5 YRS	16%	unesc.bid	-	$19,776,147	$17,687,066
	Subtotal contractor's direct & indirect costs, professional services & escalation costs					$143,940,403	$128,735,054
7.0	**Design Contingency**		40%	bid	-	$57,576,161	$51,494,022
8.0	**Opinion of Probable Project Costs**					$201,516,564	$180,229,076

Attachment 2

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
	Alternative 6B							
	Contractor's Direct Costs							
1.0	**PHASE I: PROVIDE PEAK STORMWATER STORAGE**							
1.1	**CONSTRUCT WESTLAKE STORMWATER STORAGE SITE**							
	**** Circular Storage Tank, 4.25 MG, inside diameter*	150	FT					
	**** Circular Storage Tank, 4.25 MG, outside diameter*	152	FT					
	**** Circular Storage Tank, 4.25 MG, excavated diameter*	160	FT					
	**** Excavation perimeter*	503	LF					
	**** Storage footprint*	20,106	SF					
	**** Storage top of ground elev.*	50	FASL					
	**** Storage top of concrete elev.*	46	FASL					
	**** Storage bottom of excavation, elev.*	16	FASL					
	**** Excavated depth*	34	VF					
	Mobilize & Provide security	1	Allow	$ 200,000	Allowance		$200,000	*included*
	Improve site access	1	Allow	$ 5,000	Allowance		$5,000	*included*
	Provide site survey & land controls	1	Allow	$ 10,000	Allowance		$10,000	*included*
	Provide groundwater control, treatment, & discharge	10	MO	$ 15,000	MOS		$150,000	*included*
	Drive soldier piles & support excavation	17,090	SF	$ 100	/SF		$1,709,026	*included*
	Excavate	25,319	CY	$ 10	/CY		$253,189	*included*
Green	Haul & dispose of spoils (incl 25% bulking)	31,649	CY	$ 55	/CY		$1,740,675	*included*
	Construct DYK Prestressed Concrete Tank	1	LS	$ 2,850,000	Allowance		$2,850,000	*included*
	Construct DYK Prestressed Concrete Tank Roof Reinf	7	VF	$ 60,000	/VF		$420,000	*included*
	Construct ROMTEC Utilities Modular Lift Station	1	LS	$ 340,163	Allowance		$340,163	*included*
	Construct debris screening chamber	1	Allow	$ 500,000	Allowance		$500,000	*included*
	Construct air handling bldg & compressor	1	Allow	$ 50,000	EA		$50,000	*included*
	Construct standby generator	1	Allow	$ 100,000	EA		$100,000	*included*
	Tie-in (N) culvert to main box culvert	1	Allow	$ 25,000	Allowance		$25,000	*included*
	Install debris screening equipment	1	Allow	$ 124,000	Allowance		$124,000	*included*
	Install inflatable water diversion device	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Place Low Density Concrete Backfill	73	CY	$ 20	/CY		$1,452	*included*
	Install electrical service, u/g	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Install logical control system	1	Allow	$ 500,000	Allowance		$500,000	*included*
	Restore site	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Subtotal						$9,278,506	$9,278,506

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost			Dur	Item Cost	Alt-1
1.2	**CONSTRUCT CLIFFSIDE CONNECTOR CULVERT**								
	**** Pilot Tube drive length*	140	LF						
	**** Bore exc. dia.*	60	IN						
	**** Carrier pipe dia.*	54	IN						
	**** Receiving shaft diameter*	8	FT						
	**** Cut-n-cover culvert*	380	LF						
	Construct driving shaft in Westlake Park- 10' dia.	1	Allow	$	20,000	Allowance		$20,000	*included*
	Excavate & place carrier pipe on line & grade.	140	LF	$	950	/LF		$133,000	*included*
	Haul & dispose of tunnel muck (25% bulking factor)	127	CY	$	55	/CY		$6,999	*included*
	Mark & locate utilities	1	Allow	$	5,000	Allowance		$5,000	*included*
	Construct receiving shaft on Cliffside Drive- 6' dia.	1	Allow	$	15,000	Allowance		$15,000	*included*
	Tie (N) culvert into (E) culvert	1	Allow	$	25,000	Allowance		$25,000	*included*
	Backfill & compact tie-in	102	CY	$	35	/CY		$3,563	*included*
	Patch AC paving on Cliffside Drive	10	SY	$	100	/SY		$1,000	*included*
	Excavate, place, & backfill (N) culvert	380	LF	$	750	/LF		$285,000	*included*
	Subtotal							$494,563	$494,563
	Subtotal Task 1.0							**$9,773,069**	**$9,773,069**
2.0	**PHASE II: IMPROVE VISTA GRANDE CANAL CAPACITY**								
2.1	**IMPROVE CANAL TO (N) TUNNEL CAPACITY**								
	**** Staging area size*	3.1	A						
	**** Drop structure*	25	LF						
	**** Debris separators*	250	LF						
	**** (N) box culvert length*	1,825	FT	@	20	fpd	92	d	
	**** (N) box culvert width*	20	FT						
	**** Total (N) canal*	**2,100**	LF						
	**** Remaining (E) canal*	1,500	LF						
	**** Usable construction corridor width*	100	FT						
	Improve Canal Site Access	3.1	Allow	$	5,000	Allowance		$15,500	*included*
	Develop Canal Site Staging Area	3.1	A	$	2,500	/ Acre		$7,750	*included*
	Provide site survey & land controls	1	Allow	$	10,000	Allowance		$10,000	*included*
	Relocate & Protect Utilities	1	Allow	$	50,000	Allowance		$50,000	*included*
	Divert Canal Flows	1	Allow	$	10,000	Allowance		$10,000	*included*
	Demo & remove (E) canal	2,100	LF	$	100	LF		$210,000	*included*
	Haul & dispose of canal debris (assume 0.5 CY/LF & 50% bulking)	1,575	CY	$	55	/CY		$86,625	*included*
	Excavate foundation, 27' wide x 2' deep	4,200	CY	$	10	/CY		$42,000	*included*

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
	Haul & dispose of spoil	6,300	CY	$ 55	/CY		$346,500	*included*
	Place mudslab, 27' wide x 1' thick	1,050	CY	$ 500	/CY		$525,000	*included*
	Develop tunnel portal	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Place foundation, 1' thick	2,100	CY	$ 750	/CY		$1,575,000	*included*
	Construct (N) drop structure	1	Allow	$ 200,000	Allowance		$200,000	*included*
	Construct (N) wetlands lift pump station	1	Allow	$ 5,000	/EA		$5,000	*included*
	Construct ROMTEC Utilities Modular Lift Station	1	LS	$ 100,000	/Allowance		$100,000	*included*
	Construct (N) debris screening culvert	250	LF	$ 3,000	/LF		$750,000	*included*
	Construct (N) precast box culvert	1,825	LF	$ 5,000	/LF		$9,125,000	*included*
	Construct (N) flow diverter @ tunnel inlet	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Construct (N) tunnel inlet	1	Allow	$ 250,000	Allowance		$250,000	*included*
	Backfill (N) canal sections, assume 4' cover	8,400	CY	$ 25	/CY		$210,000	*included*
	Install electrical service, u/g	1	Allow	$ 50,000	Allowance		$50,000	*included*
	Install water level I&C	1	Allow	$ 15,000	Allowance		$15,000	*included*
	Restore site	3.1	A	$ 350,000	/ Acre		$1,085,000	*included*
	Subtotal						$14,868,375	$14,868,375
2.2	**IMPROVE (E) CANAL TO (E) TUNNEL CAPACITY**							
	**** Remaining (E) canal*	1,500	LF					
	**** Usable construction corridor width*	0	FT					
	Divert Canal Flows	1	Allow	$ 2,500	Allowance		$2,500	*included*
	Remove vegetation from canal	28	CY	$ 10	/CY		$278	*included*
	Haul & dispose of canal debris (assume 50% bulking)	42	CY	$ 55	/CY		$2,292	*included*
	Reinforce (E) tunnel inlet structure	1	Allow	$ 10,000	Allowance		$10,000	*included*
	Install (N) trashrack	1	Allow	$ 25,000	Allowance		$25,000	*included*
	Install water level I&C	1	Allow	$ 15,000	Allowance		$15,000	*included*
	Restore site	1	Allow	$ 25,000	Allowance		$25,000	*included*
	Subtotal						$80,069	$80,069
	Subtotal Task 2.0						**$14,948,444**	**$14,948,444**

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
3.0	**PHASE III: CONSTRUCT (N) TUNNEL**							
	**** Tunnel length*	5,200	LF					
3.1	**JOHN MUIR STAGING AREA**- STAGING FOR TUNNEL CONSTRUCTION ACTIVITIES							
	**** Staging area size, incremental*	0.8	A					
	**** Construction perimeter, road side*	1,000	LF					
	**** Construction perimeter, golf course side*	1,000	LF					
	Clear vegetation	0.8	A	$ 5,000	/Acre		$4,000	*not included*
	Provide erosion control	0.8	A	$ 2,000	/Acre		$1,600	*not included*
	Provide site survey & land controls	1	Allow	$ 10,000	Allowance		$10,000	*not included*
	Mark, locate, & relocate utilities	1	Allow	$ 200,000	Allowance		$200,000	*not included*
	Provide traffic control	1	Allow	$ 300,000	Allowance		$300,000	*not included*
	Provide sound/ visual screening controls, 10' high screen	20,000	SF	$ 5	Allowance		$100,000	*not included*
	Provide water control & treatment	1	Allow	$ 1,000,000	Allowance		$1,000,000	*not included*
	Erect tunneling plant	1	Allow	$ 1,500,000	Allowance		$1,500,000	*not included*
	Remove Const. Plant	1	Allow	$ 500,000	Allowance		$500,000	*not included*
	Restore Site	0.8	Allow	$ 350,000	/Acre		$280,000	*not included*
	Subtotal						$3,895,600	
3.2	**PROVIDE GROUNDWATER CONTROL & TREATMENT @ SERRA FAULT CROSSING**							
	*****							
	Re-Occupy (E) SF Water Dept wells at Fort Funston	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Provide deep well pumps, 3 EA	12	MOS	$ 30,000	MO		$360,000	*included*
	Provide water collection & treatment	1	Allow	$ 500,000	Allowance		$500,000	*included*
	Subtotal						$960,000	$960,000
3.3	**ESTABLISH PORTAL**							
	*****							
	Excavate & Support portal cut	50	LF	$ 2,500	/LF		$125,000	*not included*
	Subtotal						$125,000	

No.	Item or Group Item Description	Item Quantity/Unit			Item Unit Cost		Dur		Item Cost	Alt-1
3.4	**EXCAVATE & SUPPORT TUNNEL**									
	**** Tunnel excavated diameter*	20	FT							
	**** Tunnel finished diameter*	15	FT							
	**** Total tunnel length*	**4,100**	LF							
	**** Tunnel length, John Muir Portal thru low cover reach, 20' Slurry TBM exc.circular.*	1,000	LF	@	10	fpd	100	d		
	**** Tunnel length, low cover to WP#1 reach, 20' Slurry TBM exc. circular.*	1,800	LF	@	40	fpd	45	d		
	**** Tunnel length, WP#1 to cross-over reach, 20' Slurry TBM exc. circular.*	800	LF	@	40	fpd	20	d		
	**** Reinforce (E) Tunnel Reinforing*	200	LF	@	25	fpd	8	d		
	**** Construct cross-over between (N) & (E) Tunnels*	50	LF	@	10	fpd	5	d		
	**** Tunnel length, Cross-over to transition tunnel, 20' conv. exc. horseshoe*	300	LF	@	10	fpd	30	d		
	**** Tunnel length, Transition tunnel to Outfall, 20' conv. exc. horseshoe*	200	LF	@	10	fpd	20	d		
	**** Tunnel lining length, 15' circular precast segment lining*	3,600	LF							
	**** Tunnel lining length, 10' horseshoe lining*	50	LF							
	**** Tunnel lining length, 15' horseshoe lining*	300	LF							
	**** Tunnel lining length, 15' heavy horseshoe lining*	200	LF							
	Provide pre-excavation ground improvement	1,000	LF		$ 2,500	/LF			$2,500,000	$2,500,000
	Assemble EPB TBM	1	Allow		$ 600,000	Allowance			$600,000	$600,000
	Excavate, Support, & Line-- P-B Slurry TBM w/ segments- low cover reach	1,000	LF		$ 4,018	/LF			$4,018,000	$4,018,000
	Excavate, Support, & Line-- P-B Slurry TBM- to WP#1	1,800	LF		$ 4,018	/LF			$7,232,400	$7,232,400
	Reinforce (E) Brick lined tunnel for excavation	200	LF		$ 500	/LF			$100,000	$100,000
	Excavate, Support, & Line-- P-B Slurry TBM- WP#1 to cross-over	800	LF		$ 4,018	/LF			$3,214,400	*not included*
	Remove TBM	1	Allow		$ 1,000,000	Allowance			$1,000,000	$400,000
	Excavate & Support-- Conv. Exc.- Outfall portal to transition tunnel	200	LF		$ 3,500	/LF				$700,000
	Excavate & Support-- Conv. Exc.- Transition tunnel to cross-over	300	LF		$ 3,500	/LF				$1,050,000
	Excavate & Support-- Conv. Exc.- Cross-over	50	LF		$ 3,500	/LF			$175,000	$175,000
	Fill (CDLM) & abandon (E) brick lined tunnel 1 cy/lf, $75/cy	500	LF		$ 75	/LF			$37,500	$37,500
Green	Haul & dispose of spoils (25% bulking factor), TBM exc.	62,832	CY		$ 55	/CY			$3,455,752	$3,455,752
Green	Haul & dispose of spoils (25% bulking factor)	10,911	CY		$ 55	/CY			$600,092	$600,092
	Subtotal								$22,933,144	$20,868,744

No.	Item or Group Item Description	Item Quantity/Unit			Item Unit Cost		Dur		Item Cost	Alt-1
3.5	**CONSTRUCT FORT FUNSTON 33" dia. Forced Main Shaft**									
	**** Pipe diameter*	33	IN							
	**** Shaft depth*	160	VF							
	**** Shaft diameter*	8	FT							
	**** MTBM length*	200	FT							
	Prepare Site	1	A	$	6,000	/Acre			$6,000	*not included*
	Fit-out shaft plant	1	Allow	$	50,000	Allowance			$50,000	*not included*
	Provide water control, collection, treatment, & disposal	1	Allow	$	250,000	Allowance			$250,000	*not included*
	Excavate & support shaft	150	VF	$	1,000	VF			$150,000	*not included*
Green	Haul & dispose of spoils (25% bulking factor)	372	CY	$	55	/CY			$20,479	*not included*
	Fit-out Pilot Tube plant	1	Allow	$	50,000	Allowance			$50,000	*not included*
	Drive, Ream, & Place (N) 18" dia carrier pipe to outfall	200	LF	$	950	/LF			$190,000	*not included*
	Place 33" dia Forced Main (FM) Pipe-- shaft	160	VF	$	1,000	VF			$160,000	*not included*
	Place Backfill concrete around pipe-- shaft	263	CY	$	32	/CY			$8,406	*not included*
	Remove shaft Plant	1	Allow	$	140,000	Allowance			$140,000	*not included*
	Place (N) 33" dia. Forced Main-- (N) outfall structure beneath beach	150	LF	$	1,000	/LF			$150,000	$150,000
	Place (N) 33" dia. Forced Main-- set foundation piers	1	Allow	$	135,000	Allowance			$135,000	$135,000
	Place (N) 33" dia. Forced Main-- set & secure pipe to (E) sub-marine pipe	50	LF	$	500	/LF			$25,000	$25,000
	Tie-in (N) and (E) FM pipeline	1	Allow	$	100,000	Allowance			$100,000	$100,000
	Restore Site (GGNRA)	1	A	$	200,000	/Acre			$200,000	$200,000
	Subtotal								$1,634,884	$610,000
3.6	**LINE TUNNEL**									
	**** Cross over Tunnel length, 6-ft dia CIP lining*	50	LF	@	10	fpd	5	d		
	**** Tunnel length, 15-ft dia*	500	LF	@	100	fpd	5	d		
	**** Tunnel length, 15-ft dia + 33-inch dia forced main*	1,100	LF	@	100	fpd	11	d		
	**** Tunnel length, 15-ft dia + 33-inch dia forced main, Heavy Wall*	200	LF	@	80	fpd	3	d		
	Place CIP Concrete Lining									
	Set up Final Lining Spread	50	LF	$	9	/LF			$454	*not included*
	Place monolithic CIP Lining	50	LF	$	1,683	/LF			$84,150	*not included*
	Final Cleanup	50	LF	$	3	/LF			$147	*not included*
	Place CIP Concrete Lining									
	Set up Final Lining Spread	500	LF	$	10	/LF			$5,000	
	Place monolithic CIP Lining	500	LF	$	1,700	/LF			$850,000	
	Final Cleanup	500	LF	$	3	/LF			$1,465	
	(Alternate) Place CIP Concrete Lining-- incl 33" dia. forced main									
	Set 18" dia pipeline	1,300	LF	$	180	/LF				$234,000
	Set up Final Lining Spread	1,300	LF	$	10	/LF				$13,000
	Place monolithic CIP Lining	1,100	LF	$	1,700	/LF				$1,870,000
	Place monolithic CIP Lining- Heavy wall	200	LF	$	2,000	/LF				$400,000
	Final Cleanup	1,300	LF	$	3	/LF				$3,809

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
	Subtotal						$941,215	$2,520,809
	Subtotal Task 3.0						**$30,364,843**	**$24,959,553**
4.0	**PHASE IV: REHABILITATE (E) OUTFALL STRUCTURE**							
4.1	**FORT FUNSTON STAGING AREA (Surface)**- STAGING FOR OUTFALL CONSTRUCTION ACTIVITIES							
	**** Provide temporary construction equipment access to beach length, 10% max grade*	160	LF					
	Prepare Site	3	A	$ 250,000	/Acre		$750,000	*not included*
	Provide erosion control	160	LF	$ 3	/LF		$480	*$480*
	Grade & surface (AC) beach access trail to beach, 10' wide	160	LF	$ 1,000	/LF		$160,000	*not included*
	(Alternate) Grade & surface (AC) beach access trail to beach, 10' wide	160	LF	$ 500	/LF			$80,000
	Provide drainage	1	Allow	$ 50,000	/LF		$50,000	$50,000
	Fit-out Outfall construction plant	1	Allow	$ 250,000	Allowance		$250,000	*not included*
	Remove Const. Plant	1	Allow	$ 100,000	Allowance		$100,000	*not included*
Mitig.	Restore Site	3	A	$ 350,000	/Acre		$1,050,000	*not included*
	Subtotal						$2,360,480	$130,480
4.2	**CONSTRUCT OUTFALL STRUCTURE**							
	**** Cofferdam perimeter*	280	FT					
	**** Cofferdam height*	30	FT					
	**** (Alternate) Cofferdam perimeter*	150	FT					
	**** (Alternate) Cofferdam height*	10	FT					
	Provide site survey & land controls	1	Allow	$ 10,000	Allowance		$10,000	$10,000
	Provide overhead rockfall protection	1	Allow	$ 25,000	Allowance		$25,000	$25,000
	Protect (E) 33" dia. forced main pipeline	1	Allow	$ 20,000	Allowance		$20,000	$20,000
	Provide tunnel discharge bypass	1	Allow	$ 25,000	Allowance		$25,000	$25,000
	Construct cofferdam footing	62	CY	$ 2,500	CY		$155,556	
	(Alternate) Construct cofferdam footing	33	CY	$ 2,500	CY			$83,333
	Install sheetpile cofferdam on footing	8,400	SF	$ 175	SF		$1,470,000	
	(Alternate) Install sheetpile cofferdam on footing	4,500	SF	$ 125	SF			$562,500
	Develop (N) tunnel portal (30' w x 100' h)	3,000	SF	$ 100	/SF		$300,000	$300,000
	Construct (N) Outfall, allow 50' w x 15' d x 20' h, w/ 18" thick conc walls	295	CY	$ 1,500	/CY		$442,500	$442,500
	Remove cofferdam	8,400	SF	$ 100	SF		$840,000	
	(Alternative) Remove cofferdam	4,500	SF	$ 100	SF			$450,000
	Place (N) 33" dia. Forced Main-- (N) outfall structure beneath beach	150	LF	$ 1,000	/LF		$150,000	$150,000
	Place (N) 33" dia. Forced Main-- set foundation piers	1	Allow	$ 135,000	Allowance		$135,000	$135,000
	Place (N) 33" dia. Forced Main-- set & secure pipe to (E) sub-marine pipe	50	LF	$ 500	/LF		$25,000	$25,000
	Tie-in (N) and (E) FM pipeline	1	Allow	$ 100,000	Allowance		$100,000	$100,000
	Restore site	1	Allow	$ 25,000	Allowance		$25,000	$25,000
	Subtotal						$3,723,056	$2,353,333

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
4.3	**REMOVE (E) OUTFALL STRUCTURE**							
	**** (E) outfall exposed tunnel length*	85	FT					
	**** (E) outfall exposed effluent pipeline length*	110	FT					
	**** (E) outfall abandoned effluent pipeline length*	500	FT					
	**** (E) structure dimensions: 20' x 20'*							
	**** Assume that demolision is down w/o a cofferdam*							
	Demo & remove (E) exposed outfall tunnel structure to footing, 30sf/lf	94	CY	$ 500	/CY		$47,222	*included*
	Demo & remove (E) outfall surface structure to footing,	50	CY	$ 500	/CY		$25,000	*included*
	Demo & remove (E) outfall surface footing, 36sf/lf	113	CY	$ 500	/CY		$56,667	*included*
	Haul & dispose of debris, allow 50% bulking of slab concrete	387	CY	$ 55	/CY		$21,267	*included*
	Demo & remove (E) effluent pipeline to sub-marine pipeline	110	LF	$ 250	/LF		$27,500	*included*
	Haul & dispose of pipeline	1	Allow	$ 25,000	Allowance		$25,000	*included*
	Fill (CDLM) & abandon (E) forced main pipeline, 0.15 cy/lf, $100/cy	500	LF	$ 25	/LF		$12,500	*included*
	Subtotal						$215,156	$215,156
	Subtotal Task 4.0						**$6,298,691**	**$2,698,969**
A-1	**FORT FUNSTON STAGING AREA (Shaft)**- STAGING FOR TUNNEL & OUTFALL CONSTRUCTION ACTIVITIES							
	**** Staging Area*	5	A					
	**** Shaft depth*	160	VF					
	**** Shaft diameter*	40	FT					
	Prepare Site	5	A	$ 6,000	/Acre		*not included*	$30,000
	Provide erosion control	5	A	$ 1,000	/Acre		*not included*	$5,000
	Fit-out construction shaft plant	1	Allow	$ 200,000	Allowance		*not included*	$200,000
	Excavate & Support shaft	160	VF	$ 7,000	VF		*not included*	$1,120,000
Green	Haul & dispose of spoils (25% bulking factor)	9,308	CY	$ 55	/CY		*not included*	$511,963
	Remove Const. Plant	1	Allow	$ 140,000	Allowance		*not included*	$140,000
	Hang 33" dia Forced Main (FM) Pipe	160	VF	$ 1,000	VF		*not included*	$160,000
	Backfill shaft w/ CDLM	7,412	CY	$ 75	/CY		*not included*	$555,866
	Tie-in (N) and (E) FM pipeline	1	Allow	$ 100,000	Allowance		*not included*	$100,000
	Restore Site	5	A	$ 200,000	/Acre		*not included*	$1,000,000
	Subtotal							$3,822,829
	Subtotal direct costs- base estimate						$61,385,047	
	Subtotal direct costs- base w/ Construction access via Funston Shaft							$56,202,864

No.	Item or Group Item Description	Item Quantity/Unit	Item Unit Cost		Dur	Item Cost	Alt-1
5.0	**Contractor's Indirect Costs**					Base	Atl-1
	**** Estimated construction duration, months*					25	20
	Equipment Ownership/Mobilization		15%	unesc.bid		$9,082,536	$8,315,780
	General Mobilization		1%	unesc.bid		$691,730	$633,333
	Demobilization		1%	unesc.bid		$689,922	$631,678
	General Plant Operation/Maintenance		$ 75,000	/mo		$1,891,233	$1,528,767
	Weekend Maintenance		$ 5,000	/day		$1,092,712	$883,288
	Field Supervision		$ 300,000	/mo		$7,564,932	$6,115,068
	Overhead Maintenance/Service		$ 50,000	/mo		$1,260,822	$1,019,178
	Bonds, Insurance, and Taxes		3%	unesc.bid		$1,837,519	$1,682,394
	Contractor Markup		15%	unesc.bid		$8,930,623	$8,176,691
	Financing Charges		2%	unesc.bid		$1,227,701	$1,124,057
	Contractor Contingency		10%	unesc.bid		$6,138,505	$5,620,286
	Subtotal indirect costs					$40,408,232	$35,730,520
	Subtotal construction direct & indirect costs					$101,793,280	$91,933,384
6.0	**Project Costs**						
	Design Services including geotechnical investigation, interpretation, & land engineering,		8%	const. est.		$8,143,462	$7,354,671
	Permit Acquisition & ROWs		3%	const. est.		$3,053,798	$2,758,002
	Legal & Administrative		3%	const. est.		$3,053,798	$2,758,002
	Construction Management Services		7%	const. est.		$7,125,530	$6,435,337
	Engineering Assistance during construction		3%	const. est.		$3,053,798	$2,758,002
	Construction Management Services		3%	const. est.		$3,053,798	$2,758,002
	Subtotal professional services					$27,484,186	$24,822,014
	Estimated escalation (assume 3% escalation per year, current economic climate)	5 YRS	16%	unesc.bid	-	$20,590,549	$18,596,108
	Subtotal contractor's direct & indirect costs, professional services & escalation costs					$149,868,014	$135,351,505
7.0	**Design Contingency**		40%	bid	-	$59,947,206	$54,140,602
8.0	**Opinion of Probable Project Costs**					$209,815,220	$189,492,107

Attachment 3

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
	Alternative 7							
	Contractor's Direct Costs							
1.0	**PHASE I: PROVIDE PEAK STORMWATER STORAGE**							
1.1	**CONSTRUCT WESTLAKE STORMWATER STORAGE SITE**							
	**** Circular Storage Tank, 4.25 MG, inside diameter*	150	FT					
	**** Circular Storage Tank, 4.25 MG, outside diameter*	152	FT					
	**** Circular Storage Tank, 4.25 MG, excavated diameter*	160	FT					
	**** Excavation perimeter*	503	LF					
	**** Storage footprint*	20,106	SF					
	**** Storage top of ground elev.*	50	FASL					
	**** Storage top of concrete elev.*	46	FASL					
	**** Storage bottom of excavation, elev.*	16	FASL					
	**** Excavated depth*	34	VF					
	Mobilize & Provide security	1	Allow	$ 200,000	Allowance		$200,000	*included*
	Improve site access	1	Allow	$ 5,000	Allowance		$5,000	*included*
	Provide site survey & land controls	1	Allow	$ 10,000	Allowance		$10,000	*included*
	Provide groundwater control, treatment, & discharge	10	MO	$ 15,000	MOS		$150,000	*included*
	Drive soldier piles & support excavation	17,090	SF	$ 100	/SF		$1,709,026	*included*
	Excavate	25,319	CY	$ 10	/CY		$253,189	*included*
Green	Haul & dispose of spoils (incl 25% bulking)	31,649	CY	$ 55	/CY		$1,740,675	*included*
	Construct DYK Prestressed Concrete Tank	1	LS	$ 2,850,000	Allowance		$2,850,000	*included*
	Construct DYK Prestressed Concrete Tank Roof Reinf	7	VF	$ 60,000	/VF		$420,000	*included*
	Construct ROMTEC Utilities Modular Lift Station	1	LS	$ 340,163	Allowance		$340,163	*included*
	Construct debris screening chamber	1	Allow	$ 500,000	Allowance		$500,000	*included*
	Construct air handling bldg & compressor	1	Allow	$ 50,000	EA		$50,000	*included*
	Construct standby generator	1	Allow	$ 100,000	EA		$100,000	*included*
	Tie-in (N) culvert to main box culvert	1	Allow	$ 25,000	Allowance		$25,000	*included*
	Install debris screening equipment	1	Allow	$ 124,000	Allowance		$124,000	*included*
	Install inflatable water diversion device	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Place Low Density Concrete Backfill	73	CY	$ 20	/CY		$1,452	*included*
	Install electrical service, u/g	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Install logical control system	1	Allow	$ 500,000	Allowance		$500,000	*included*
	Restore site	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Subtotal						$9,278,506	$9,278,506

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost			Dur	Item Cost	Alt-1
1.2	**CONSTRUCT CLIFFSIDE CONNECTOR CULVERT**								
	**** Pilot Tube drive length*	140	LF						
	**** Bore exc. dia.*	60	IN						
	**** Carrier pipe dia.*	54	IN						
	**** Receiving shaft diameter*	8	FT						
	**** Cut-n-cover culvert*	380	LF						
	Construct driving shaft in Westlake Park- 10' dia.	1	Allow	$	20,000	Allowance		$20,000	*included*
	Excavate & place carrier pipe on line & grade.	140	LF	$	950	/LF		$133,000	*included*
	Haul & dispose of tunnel muck (25% bulking factor)	127	CY	$	55	/CY		$6,999	*included*
	Mark & locate utilities	1	Allow	$	5,000	Allowance		$5,000	*included*
	Construct receiving shaft on Cliffside Drive- 6' dia.	1	Allow	$	15,000	Allowance		$15,000	*included*
	Tie (N) culvert into (E) culvert	1	Allow	$	25,000	Allowance		$25,000	*included*
	Backfill & compact tie-in	102	CY	$	35	/CY		$3,563	*included*
	Patch AC paving on Cliffside Drive	10	SY	$	100	/SY		$1,000	*included*
	Excavate, place, & backfill (N) culvert	380	LF	$	750	/LF		$285,000	*included*
	Subtotal							$494,563	$494,563
	Subtotal Task 1.0							**$9,773,069**	**$9,773,069**
2.0	**PHASE II: IMPROVE VISTA GRANDE CANAL CAPACITY**								
2.1	**IMPROVE CANAL TO (N) TUNNEL CAPACITY**								
	**** Staging area size*	4.4	A						
	**** Drop structure*	25	LF						
	**** Debris separators*	250	LF						
	**** (N) box culvert length*	3,225	FT	@	20	fpd	162	d	
	**** (N) box culvert width*	20	FT						
	**** Total (N) canal*	**3,500**	LF						
	**** Remaining (E) canal*	100	LF						
	**** Usable construction corridor width*	100	FT						
	Improve Canal Site Access	4.4	Allow	$	5,000	Allowance		$22,000	*included*
	Develop Canal Site Staging Area	4.4	A	$	2,500	/ Acre		$11,000	*included*
	Provide site survey & land controls	1	Allow	$	10,000	Allowance		$10,000	*included*
	Relocate & Protect Utilities	1	Allow	$	50,000	Allowance		$50,000	*included*
	Divert Canal Flows	1	Allow	$	10,000	Allowance		$10,000	*included*
	Demo & remove (E) canal	3,500	LF	$	100	LF		$350,000	*included*
	Haul & dispose of canal debris (assume 0.5 CY/LF & 50% bulking)	2,625	CY	$	55	/CY		$144,375	*included*
	Excavate foundation, 27' wide x 2' deep	7,000	CY	$	10	/CY		$70,000	*included*

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
	Haul & dispose of spoil	10,500	CY	$ 55	/CY		$577,500	*included*
	Place mudslab, 27' wide x 1' thick	1,750	CY	$ 500	/CY		$875,000	*included*
	Develop tunnel portal	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Place foundation, 1' thick	3,500	CY	$ 750	/CY		$2,625,000	*included*
	Construct (N) drop structure	1	Allow	$ 200,000	Allowance		$200,000	*included*
	Construct (N) wetlands lift pump station	1	Allow	$ 5,000	/EA		$5,000	*included*
	Construct ROMTEC Utilities Modular Lift Station	1	LS	$ 100,000	/Allowance		$100,000	*included*
	Construct (N) debris screening culvert	250	LF	$ 3,000	/LF		$750,000	*included*
	Construct (N) precast box culvert	3,225	LF	$ 5,000	/LF		$16,125,000	*included*
	Construct (N) flow diverter @ tunnel inlet	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Construct (N) tunnel inlet	1	Allow	$ 250,000	Allowance		$250,000	*included*
	Backfill (N) canal sections, assume 4' cover	14,000	CY	$ 25	/CY		$350,000	*included*
	Install electrical service, u/g	1	Allow	$ 50,000	Allowance		$50,000	*included*
	Install water level I&C	1	Allow	$ 15,000	Allowance		$15,000	*included*
	Restore site	4.4	A	$ 350,000	/ Acre		$1,540,000	*included*
	Subtotal						$24,329,875	$24,329,875
2.2	**IMPROVE (E) CANAL TO (E) TUNNEL CAPACITY**							
	**** Remaining (E) canal*	100	LF					
	**** Usable construction corridor width*	0	FT					
	Divert Canal Flows	1	Allow	$ 2,500	Allowance		$2,500	*included*
	Remove vegetation from canal	2	CY	$ 10	/CY		$19	*included*
	Haul & dispose of canal debris (assume 50% bulking)	3	CY	$ 55	/CY		$153	*included*
	Reinforce (E) tunnel inlet structure	1	Allow	$ 10,000	Allowance		$10,000	*included*
	Install (N) trashrack	1	Allow	$ 25,000	Allowance		$25,000	*included*
	Install water level I&C	1	Allow	$ 15,000	Allowance		$15,000	*included*
	Restore site	1	Allow	$ 25,000	Allowance		$25,000	*included*
	Subtotal						$77,671	$77,671
	Subtotal Task 2.0						**$24,407,546**	**$24,407,546**

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
3.0	**PHASE III: CONSTRUCT (N) TUNNEL**							
	**** Tunnel length*	5,200	LF					
3.1	**JOHN MUIR STAGING AREA**- STAGING FOR TUNNEL CONSTRUCTION ACTIVITIES							
	**** Staging area size, incremental*	0.8	A					
	**** Construction perimeter, road side*	1,000	LF					
	**** Construction perimeter, golf course side*	1,000	LF					
	Clear vegetation	0.8	A	$ 5,000	/Acre		$4,000	*not included*
	Provide erosion control	0.8	A	$ 2,000	/Acre		$1,600	*not included*
	Provide site survey & land controls	1	Allow	$ 10,000	Allowance		$10,000	*not included*
	Mark, locate, & relocate utilities	1	Allow	$ 200,000	Allowance		$200,000	*not included*
	Provide traffic control	1	Allow	$ 300,000	Allowance		$300,000	*not included*
	Provide sound/ visual screening controls, 10' high screen	20,000	SF	$ 5	Allowance		$100,000	*not included*
	Provide water control & treatment	1	Allow	$ 1,000,000	Allowance		$1,000,000	*not included*
	Erect tunneling plant	1	Allow	$ 1,500,000	Allowance		$1,500,000	*not included*
	Remove Const. Plant	1	Allow	$ 500,000	Allowance		$500,000	*not included*
	Restore Site	0.8	Allow	$ 350,000	/Acre		$280,000	*not included*
	Subtotal						$3,895,600	
3.2	**PROVIDE GROUNDWATER CONTROL & TREATMENT @ SERRA FAULT CROSSING**							
	*****							
	Re-Occupy (E) SF Water Dept wells at Fort Funston	1	Allow	$ 100,000	Allowance		$100,000	*included*
	Provide deep well pumps, 3 EA	12	MOS	$ 30,000	MO		$360,000	*included*
	Provide water collection & treatment	1	Allow	$ 500,000	Allowance		$500,000	*included*
	Subtotal						$960,000	$960,000
3.3	**ESTABLISH PORTAL**							
	*****							
	Excavate & Support portal cut	50	LF	$ 2,500	/LF		$125,000	*not included*
	Subtotal						$125,000	

No.	Item or Group Item Description	Item Quantity/Unit			Item Unit Cost		Dur		Item Cost	Alt-1
3.4	**EXCAVATE & SUPPORT TUNNEL**									
	**** Tunnel excavated diameter*	20	FT							
	**** Tunnel finished diameter*	15	FT							
	**** Total tunnel length*	**3,200**	LF							
	**** Tunnel length, John Muir Portal thru low cover reach, 20' Slurry TBM exc.circular.*	300	LF	@	10	fpd	30	d		
	**** Tunnel length, low cover to WP#1 reach, 20' Slurry TBM exc. circular.*	1,600	LF	@	40	fpd	40	d		
	**** Tunnel length, WP#1 to cross-over reach, 20' Slurry TBM exc. circular.*	800	LF	@	40	fpd	20	d		
	**** Reinforce (E) Tunnel Reinforing*	200	LF	@	25	fpd	8	d		
	**** Construct cross-over between (N) & (E) Tunnels*	50	LF	@	10	fpd	5	d		
	**** Tunnel length, Cross-over to transition tunnel, 20' conv. exc. horseshoe*	300	LF	@	10	fpd	30	d		
	**** Tunnel length, Transition tunnel to Outfall, 20' conv. exc. horseshoe*	200	LF	@	10	fpd	20	d		
	**** Tunnel lining length, 15' circular precast segment lining*	2,700	LF							
	**** Tunnel lining length, 10' horseshoe lining*	50	LF							
	**** Tunnel lining length, 15' horseshoe lining*	300	LF							
	**** Tunnel lining length, 15' heavy horseshoe lining*	200	LF							
	Provide pre-excavation ground improvement	300	LF		$ 2,500	/LF			$750,000	$750,000
	Assemble EPB TBM	1	Allow		$ 600,000	Allowance			$600,000	$600,000
	Excavate, Support, & Line-- P-B Slurry TBM w/ segments- low cover reach	300	LF		$ 4,018	/LF			$1,205,400	$1,205,400
	Excavate, Support, & Line-- P-B Slurry TBM- to WP#1	1,600	LF		$ 4,018	/LF			$6,428,800	$6,428,800
	Reinforce (E) Brick lined tunnel for excavation	200	LF		$ 500	/LF			$100,000	$100,000
	Excavate, Support, & Line-- P-B Slurry TBM- WP#1 to cross-over	800	LF		$ 4,018	/LF			$3,214,400	*not included*
	Remove TBM	1	Allow		$ 1,000,000	Allowance			$1,000,000	$400,000
	Excavate & Support-- Conv. Exc.- Outfall portal to transition tunnel	200	LF		$ 3,500	/LF				$700,000
	Excavate & Support-- Conv. Exc.- Transition tunnel to cross-over	300	LF		$ 3,500	/LF				$1,050,000
	Excavate & Support-- Conv. Exc.- Cross-over	50	LF		$ 3,500	/LF			$175,000	$175,000
	Fill (CDLM) & abandon (E) brick lined tunnel 1 cy/lf, $75/cy	500	LF		$ 75	/LF			$37,500	$37,500
Green	Haul & dispose of spoils (25% bulking factor), TBM exc.	47,124	CY		$ 55	/CY			$2,591,814	$2,591,814
Green	Haul & dispose of spoils (25% bulking factor)	10,911	CY		$ 55	/CY			$600,092	$600,092
	Subtotal								$16,703,006	$14,638,606

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
3.5	**CONSTRUCT FORT FUNSTON 33" dia. Forced Main Shaft**							
	**** Pipe diameter*	33	IN					
	**** Shaft depth*	160	VF					
	**** Shaft diameter*	8	FT					
	**** MTBM length*	200	FT					
	Prepare Site	1	A	$ 6,000	/Acre		$6,000	*not included*
	Fit-out shaft plant	1	Allow	$ 50,000	Allowance		$50,000	*not included*
	Provide water control, collection, treatment, & disposal	1	Allow	$ 250,000	Allowance		$250,000	*not included*
	Excavate & support shaft	150	VF	$ 1,000	VF		$150,000	*not included*
Green	Haul & dispose of spoils (25% bulking factor)	372	CY	$ 55	/CY		$20,479	*not included*
	Fit-out Pilot Tube plant	1	Allow	$ 50,000	Allowance		$50,000	*not included*
	Drive, Ream, & Place (N) 18" dia carrier pipe to outfall	200	LF	$ 950	/LF		$190,000	*not included*
	Place 33" dia Forced Main (FM) Pipe-- shaft	160	VF	$ 1,000	VF		$160,000	*not included*
	Place Backfill concrete around pipe-- shaft	263	CY	$ 32	/CY		$8,406	*not included*
	Remove shaft Plant	1	Allow	$ 140,000	Allowance		$140,000	*not included*
	Place (N) 33" dia. Forced Main-- (N) outfall structure beneath beach	150	LF	$ 1,000	/LF		$150,000	$150,000
	Place (N) 33" dia. Forced Main-- set foundation piers	1	Allow	$ 135,000	Allowance		$135,000	$135,000
	Place (N) 33" dia. Forced Main-- set & secure pipe to (E) sub-marine pipe	50	LF	$ 500	/LF		$25,000	$25,000
	Tie-in (N) and (E) FM pipeline	1	Allow	$ 100,000	Allowance		$100,000	$100,000
	Restore Site (GGNRA)	1	A	$ 200,000	/Acre		$200,000	$200,000
	Subtotal						$1,634,884	$610,000
3.6	**LINE TUNNEL**							
	**** Cross over Tunnel length, 6-ft dia CIP lining*	50	LF	@ 10	fpd	5 d		
	**** Tunnel length, 15-ft dia*	500	LF	@ 100	fpd	5 d		
	**** Tunnel length, 15-ft dia + 33-inch dia forced main*	1,100	LF	@ 100	fpd	11 d		
	**** Tunnel length, 15-ft dia + 33-inch dia forced main, Heavy Wall*	200	LF	@ 80	fpd	3 d		
	Place CIP Concrete Lining							
	Set up Final Lining Spread	50	LF	$ 9	/LF		$454	*not included*
	Place monolithic CIP Lining	50	LF	$ 1,683	/LF		$84,150	*not included*
	Final Cleanup	50	LF	$ 3	/LF		$147	*not included*
	Place CIP Concrete Lining							
	Set up Final Lining Spread	500	LF	$ 10	/LF		$5,000	
	Place monolithic CIP Lining	500	LF	$ 1,700	/LF		$850,000	
	Final Cleanup	500	LF	$ 3	/LF		$1,465	
	(Alternate) Place CIP Concrete Lining-- incl 33" dia. forced main							
	Set 18" dia pipeline	1,300	LF	$ 180	/LF			$234,000
	Set up Final Lining Spread	1,300	LF	$ 10	/LF			$13,000
	Place monolithic CIP Lining	1,100	LF	$ 1,700	/LF			$1,870,000
	Place monolithic CIP Lining- Heavy wall	200	LF	$ 2,000	/LF			$400,000
	Final Cleanup	1,300	LF	$ 3	/LF			$3,809

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
	Subtotal						$941,215	$2,520,809
	Subtotal Task 3.0						**$24,134,705**	**$18,729,415**
4.0	**PHASE IV: REHABILITATE (E) OUTFALL STRUCTURE**							
4.1	**FORT FUNSTON STAGING AREA (Surface)**- STAGING FOR OUTFALL CONSTRUCTION ACTIVITIES							
	**** Provide temporary construction equipment access to beach length, 10% max grade*	160	LF					
	Prepare Site	3	A	$ 250,000	/Acre		$750,000	*not included*
	Provide erosion control	160	LF	$ 3	/LF		$480	*$480*
	Grade & surface (AC) beach access trail to beach, 10' wide	160	LF	$ 1,000	/LF		$160,000	*not included*
	(Alternate) Grade & surface (AC) beach access trail to beach, 10' wide	160	LF	$ 500	/LF			$80,000
	Provide drainage	1	Allow	$ 50,000	/LF		$50,000	$50,000
	Fit-out Outfall construction plant	1	Allow	$ 250,000	Allowance		$250,000	*not included*
	Remove Const. Plant	1	Allow	$ 100,000	Allowance		$100,000	*not included*
Mitig.	Restore Site	3	A	$ 350,000	/Acre		$1,050,000	*not included*
	Subtotal						$2,360,480	$130,480
4.2	**CONSTRUCT OUTFALL STRUCTURE**							
	**** Cofferdam perimeter*	280	FT					
	**** Cofferdam height*	30	FT					
	**** (Alternate) Cofferdam perimeter*	150	FT					
	**** (Alternate) Cofferdam height*	10	FT					
	Provide site survey & land controls	1	Allow	$ 10,000	Allowance		$10,000	$10,000
	Provide overhead rockfall protection	1	Allow	$ 25,000	Allowance		$25,000	$25,000
	Protect (E) 33" dia. forced main pipeline	1	Allow	$ 20,000	Allowance		$20,000	$20,000
	Provide tunnel discharge bypass	1	Allow	$ 25,000	Allowance		$25,000	$25,000
	Construct cofferdam footing	62	CY	$ 2,500	CY		$155,556	
	(Alternate) Construct cofferdam footing	33	CY	$ 2,500	CY			$83,333
	Install sheetpile cofferdam on footing	8,400	SF	$ 175	SF		$1,470,000	
	(Alternate) Install sheetpile cofferdam on footing	4,500	SF	$ 125	SF			$562,500
	Develop (N) tunnel portal (30' w x 100' h)	3,000	SF	$ 100	/SF		$300,000	$300,000
	Construct (N) Outfall, allow 50' w x 15' d x 20' h, w/ 18" thick conc walls	295	CY	$ 1,500	/CY		$442,500	$442,500
	Remove cofferdam	8,400	SF	$ 100	SF		$840,000	
	(Alternative) Remove cofferdam	4,500	SF	$ 100	SF			$450,000
	Place (N) 33" dia. Forced Main-- (N) outfall structure beneath beach	150	LF	$ 1,000	/LF		$150,000	$150,000
	Place (N) 33" dia. Forced Main-- set foundation piers	1	Allow	$ 135,000	Allowance		$135,000	$135,000
	Place (N) 33" dia. Forced Main-- set & secure pipe to (E) sub-marine pipe	50	LF	$ 500	/LF		$25,000	$25,000
	Tie-in (N) and (E) FM pipeline	1	Allow	$ 100,000	Allowance		$100,000	$100,000
	Restore site	1	Allow	$ 25,000	Allowance		$25,000	$25,000
	Subtotal						$3,723,056	$2,353,333

No.	Item or Group Item Description	Item Quantity/Unit		Item Unit Cost		Dur	Item Cost	Alt-1
4.3	**REMOVE (E) OUTFALL STRUCTURE**							
	**** (E) outfall exposed tunnel length*	85	FT					
	**** (E) outfall exposed effluent pipeline length*	110	FT					
	**** (E) outfall abandoned effluent pipeline length*	500	FT					
	**** (E) structure dimensions: 20' x 20'*							
	**** Assume that demolision is down w/o a cofferdam*							
	Demo & remove (E) exposed outfall tunnel structure to footing, 30sf/lf	94	CY	$ 500	/CY		$47,222	*included*
	Demo & remove (E) outfall surface structure to footing,	50	CY	$ 500	/CY		$25,000	*included*
	Demo & remove (E) outfall surface footing, 36sf/lf	113	CY	$ 500	/CY		$56,667	*included*
	Haul & dispose of debris, allow 50% bulking of slab concrete	387	CY	$ 55	/CY		$21,267	*included*
	Demo & remove (E) effluent pipeline to sub-marine pipeline	110	LF	$ 250	/LF		$27,500	*included*
	Haul & dispose of pipeline	1	Allow	$ 25,000	Allowance		$25,000	*included*
	Fill (CDLM) & abandon (E) forced main pipeline, 0.15 cy/lf, $100/cy	500	LF	$ 25	/LF		$12,500	*included*
	Subtotal						$215,156	$215,156
	Subtotal Task 4.0						**$6,298,691**	**$2,698,969**
A-1	**FORT FUNSTON STAGING AREA (Shaft)**- STAGING FOR TUNNEL & OUTFALL CONSTRUCTION ACTIVITIES							
	**** Staging Area*	5	A					
	**** Shaft depth*	160	VF					
	**** Shaft diameter*	40	FT					
	Prepare Site	5	A	$ 6,000	/Acre		*not included*	$30,000
	Provide erosion control	5	A	$ 1,000	/Acre		*not included*	$5,000
	Fit-out construction shaft plant	1	Allow	$ 200,000	Allowance		*not included*	$200,000
	Excavate & Support shaft	160	VF	$ 7,000	VF		*not included*	$1,120,000
Green	Haul & dispose of spoils (25% bulking factor)	9,308	CY	$ 55	/CY		*not included*	$511,963
	Remove Const. Plant	1	Allow	$ 140,000	Allowance		*not included*	$140,000
	Hang 33" dia Forced Main (FM) Pipe	160	VF	$ 1,000	VF		*not included*	$160,000
	Backfill shaft w/ CDLM	7,412	CY	$ 75	/CY		*not included*	$555,866
	Tie-in (N) and (E) FM pipeline	1	Allow	$ 100,000	Allowance		*not included*	$100,000
	Restore Site	5	A	$ 200,000	/Acre		*not included*	$1,000,000
	Subtotal							$3,822,829
	Subtotal direct costs- base estimate						$64,614,011	
	Subtotal direct costs- base w/ Construction access via Funston Shaft							$59,431,828

No.	Item or Group Item Description	Item Quantity/Unit	Item Unit Cost		Dur	Item Cost	Alt-1
5.0	**Contractor's Indirect Costs**					Base	Atl-1
	**** Estimated construction duration, months*					25	23
	Equipment Ownership/Mobilization		15%	unesc.bid		$9,560,293	$8,793,537
	General Mobilization		1%	unesc.bid		$728,116	$669,719
	Demobilization		1%	unesc.bid		$726,213	$667,969
	General Plant Operation/Maintenance		$ 75,000	/mo		$1,878,904	$1,745,753
	Weekend Maintenance		$ 5,000	/day		$1,085,589	$1,008,658
	Field Supervision		$ 300,000	/mo		$7,515,616	$6,983,014
	Overhead Maintenance/Service		$ 50,000	/mo		$1,252,603	$1,163,836
	Bonds, Insurance, and Taxes		3%	unesc.bid		$1,934,175	$1,779,050
	Contractor Markup		15%	unesc.bid		$9,400,389	$8,646,458
	Financing Charges		2%	unesc.bid		$1,292,280	$1,188,637
	Contractor Contingency		10%	unesc.bid		$6,461,401	$5,943,183
	Subtotal indirect costs					$41,835,580	$38,589,813
	Subtotal construction direct & indirect costs					$106,449,592	$98,021,641
6.0	**Project Costs**						
	Design Services including geotechnical investigation, interpretation, & land engineering,		8%	const. est.		$8,515,967	$7,841,731
	Permit Acquisition & ROWs		3%	const. est.		$3,193,488	$2,940,649
	Legal & Administrative		3%	const. est.		$3,193,488	$2,940,649
	Construction Management Services		7%	const. est.		$7,451,471	$6,861,515
	Engineering Assistance during construction		3%	const. est.		$3,193,488	$2,940,649
	Construction Management Services		3%	const. est.		$3,193,488	$2,940,649
	Subtotal professional services					$28,741,390	$26,465,843
	Estimated escalation (assume 3% escalation per year, current economic climate)	5 YRS	16%	unesc.bid	-	$21,532,418	$19,827,629
	Subtotal contractor's direct & indirect costs, professional services & escalation costs					$156,723,400	$144,315,113
7.0	**Design Contingency**		40%	bid	-	$62,689,360	$57,726,045
8.0	**Opinion of Probable Project Costs**					$219,412,760	$202,041,158