

(2) Sistema de Entrenamiento para el Personal de Operación

El servicio de manejo de carga será privatizado, al mismo tiempo, el personal operacional de APN será trasladado al sector privado. Será importante continuar mejorando su habilidad técnica para salir adelante con la modernización de la operación de manejo de contenedores. APN deberá examinar el sistema de entrenamiento para los empleados operacionales para desarrollar su habilidad para arreglarselas con el manejo de carga más rápido y confiable.

10.5 Sistema de Compra y Sistema Financiero.

10.5.1 Sistema de Compra

(1) Necesidad de Modernización del Sistema de Compra

De acuerdo con nuestra observación, la APN toma mucho tiempo en la conclusión del proceso de compra el cual esta estrictamente regulado por ley. Dado que es muy importante en la operación de terminal de contenedores moderno, minimizar el tiempo de ocio del equipo de manejo de carga, se requiere una actividad de compra más efectiva para responder al trabajo de mantenimiento a fin de evitar posible retraso en el manejo de carga para naves de contenedores altamente concientizados con el tiempo.

(2) Sistema de Modernización de Compra

Es deseable que APN esté en condición de compra de repuesto para el equipo de manejo de carga mediante un procedimiento más simple, es urgente evitar una larga espera de la operación de manejo de carga.

APN debe apelar a los ministerios con respecto a la modernización del sistema de compra y ejecutarlo tan pronto como sea posible. En este caso, APN deberá señalar que si el manejo de la carga se paraliza por un largo tiempo, resultará en daño serio no sólo a este terminal, pero también a la economía panameña.

10.5.2 Sistema Financiero

(1) Sistema Financiero

APN utiliza los estados financieros normales y está financieramente independiente de otros ministerios. No existe defecto serio observado en el sistema financiero.

Sin embargo, si el personal operacional es trasladado al sector privado, el gasto de personal será reducido en consecuencia, pero el ingreso por manejo de la carga también disminuirá. Actualmente, el ingreso por manejo de carga es la mayor fuente de ingreso de APN, así que la situación financiera cambiaría drásticamente. El ingreso por concesión cubrirá parcialmente tal ingreso de manejo de carga.

Antes de la privatización del servicio de manejo de carga, para ejecutar una condición financiera sólida APN debería elaborar una estrategia con respecto a asuntos financieros. APN debe racionalizar su administración, mediante la simplificación de su organización. Por otro lado, APN deberá invertir agresivamente en trabajo de construcción de terminales de contenedores dado que serán sus más vitales fuentes de ingresos.

(2) Contribución al Gobierno

El estado financiero de APN ha mejorado gradualmente en años recientes. APN ha pagado una contribución anual al gobierno. APN paga su ingreso al gobierno en esta forma. Se considera inevitable que el gobierno cobre este tipo de contribución de instituciones lucrativas para el uso de sus instituciones no lucrativas.

Sin embargo, la cantidad de la contribución ha incrementado considerablemente comparado el presupuesto original de acuerdo con la condición financiera de la nación. Este sistema hace inestable la posición financiera de APN.

Los puertos son vitales para la economía nacional y su seguridad. Los puertos panameños, en particular el Puerto de Cristóbal puede obtener utilidad en el corto plazo gracias a la excelente ubicación de su infraestructura incluyendo las facilidades transferidas de los Estados Unidos. Pero, para estabilizar el ingreso en el futuro es necesario un nuevo terminal de contenedores.

APN deberá apelar a los ministerios con respecto a criterios definidos tan pronto como sea posible para decidir la cantidad de la contribución y de recursos de reserva financiera para proyectos importantes, tales como un nuevo terminal de contenedores.

10.6 Provisión de Servicios para Naves

10.6.1 Suministro de Agua y Combustible

El Puerto de Cristóbal para ser un puerto más atractivo para las naves debe continuar el servicio de suministro de agua o combustible, además del servicio de manejo de carga.

Un nuevo terminal del Puerto de Cristóbal, y facilidades del suministro de agua para los barcos debería ser instalado. Es deseable que APN sea propietaria de las facilidades de suministro de agua, pero la provisión de servicio se debe desempeñar a través de compañías privadas responsables.

El Puerto de Cristóbal es ahora el centro de suministro de combustible para barcos que pasan a través del Canal de Panamá y los cuales usan éste puerto. Se espera un incremento en el número de barcos que llegan al Puerto de Cristóbal. También incrementarán las naves que requieran servicios de combustible. El Puerto de Cristóbal debe mantener su servicio de suministro de combustible.

10.6.2 Servicios de Reparación de Naves

CCP (Comité de Canal de Panamá) tiene un pequeño taller de reparación en la entrada del Canal Francés. Este taller provee servicio de reparación principalmente para pequeñas naves tales como botes de remolque, las puertas de la esclusa del Canal de Panamá. Estos servicios son necesarios para la operación del Canal de Panamá. Este taller continuará brindando sus servicios en esta área.

Por otro lado, las naves de gran escala serán provistas con servicio de reparación principalmente en el patio de nave del Puerto de Balboa.

10.7 Promoción del Puerto

10.7.1 Necesidad de Promoción del Puerto

El Departamento de Mercadeo en la Dirección de Planificación esta encargada de la promoción del puerto, sin embargo, no parece proseguir con agresividad. El personal de mercadeo de APN rara vez llama a las compañías navieras, agencias navieras o navieros para venta.

Dado que la actual capacidad de manejo de contenedores del puerto es insuficiente, la posición para las actividades de venta de APN es considerada poco realista. Pero es recomendable que la promoción portuaria debiera desempeñarse con agresividad para las nuevas facilidades de contenedores. Deberán reconocer que aun cuando la capacidad es pequeña, habrá oportunidad de atraer compañías navieras mediante la presentación atractiva de los méritos del puerto. El personal del Departamento de Mercadeo deberá ser agresivo y acercarse a todas las compañías, quienes posiblemente traigan cargas a los puertos panameños en el futuro.

10.7.2 Estrategia de Promoción

Para el desempeño de promoción de actividades portuarias, sería efectivo dirigirse a metas específicas y diseñar estrategias para lograr estas metas. Estas estrategias deberán establecerse tan pronto como sean posible.

APN deberá apuntar a la carga de contenedores incluyendo trasbordo de carga para países del Caribe, Centro y Sur América en particular, y llamar para ventas en las compañías navieras y navieros que lleven carga de trasbordo.

En este caso, los puertos de venta deberán enfocarse no sólo en las facilidades portuarias pero sobre los méritos que tiene para las compañías de utilizar los puertos panameños. Sería necesario diseñar un atractivo panfleto para este propósito. En éste panfleto, debe describirse plenamente los méritos de los puertos panameños. Debería estar con un diseño bien elaborado que invita a todos a mirar.

También se considera efectiva la celebración de seminarios para introducir los puertos panameños a navieros de varios países.

10.7.3 Mejoramiento del Sistema de Estadística Portuaria

Para formular una estrategia de promoción portuaria es necesario un análisis de la rotación de la carga. Pero, la presente estadística portuaria es insuficiente para analizar la condición actual.

La Estadística de carga no está ordenada por destino y origen de cada mercadería como se menciona 10.3.5.

También es necesario proveer al usuario del puerto de información portuaria fácil y accesible. Este servicio hará más atractivos a los puertos.

El servicio de información adecuada es obligatorio para sobrevivir la competencia de los puertos rivales.

Es necesario mejorar el sistema de estadística para apoyar la formulación de la estrategia. También es deseable para establecer un rápido y adecuado sistema de servicio de información. Los puertos panameños están en capacidad de liderizar a los puertos rivales en la implementación de estos sistemas.

APÉNDICE

Apéndice II-A-1 Costo Comparativo de Sitios Altencos

TABLE P14 B1 CRISTOBAL PORT COST ESTIMATION - Summary

Work Category	Works	Unit Rate		Unit	Cost
		Unit	Rate		
A. General Works					1,387,500
B. Marine Works					1,732,540
C. On-land Works					5,790,670
D. Building					423,300
E. Utilities					540,720
F. Supplemental Works					383,000
G. Others					0
H. Subtotal					10,221,720
I. Contingency	Physical (15 % of H)				1,533,260
J. Engineering	(10 % of H)				1,022,170
K. Total	(H + I + J)				12,777,160
Land Use					
Total Area		13.30+0.25		ha	100.0%
Back apron		1.50		ha	11.1
Inner access		2.13		ha	15.7
Yard pavement	(1) Gravel pavement	0		ha	0
Yard pavement	(2) Light pavement	0		ha	0
Yard pavement	(3) Normal pavement	6.61		ha	48.8
Yard pavement	(4) Heavy pavement C2	0		ha	0
Yard pavement	(5) Heavy pavement C3	0.78		ha	5.8
Building		0.20		ha	1.5
Parks		1.14		ha	8.4
Reserves		1.19		ha	8.7
Multi-Purpose Area					
A. General Works	Mobilization/Demobilization Mobilization/Demobilization Site Common Works				200,000 0 1,187,500
B. Marine Works	Subtotal				1,387,500
	Scabed Clearance	\$/B		B	0
	Dredging and reclamation	\$/m ³	101,000	m ³	0
	Dredging and reclamation	\$/m ³	1.80	m ³	0
	Dredging and reclamation	\$/m ³	5.40	m ³	0
	Dredging and disposal	\$/m ³	54.0	m ³	0
	Dredging and disposal	\$/m ³	2.76	m ³	0
	Borrowing and reclamation	\$/m ³	9.96	m ³	0
	Borrowing and reclamation	\$/m ³	4.80	m ³	0
	Scallow (1) +3.6 m--±0.0m	\$/m	1,280	m	310
	Scallow (2) ±0.0 -- -5.0	\$/m	2,454	m	310
	Scallow (3) -5.0 -- -10.0	\$/m	7,987	m	0
	Scallow (4) -10.0 -- -15.0	\$/m	15,375	m	0
	Wharf (1) -10.0 m	\$/m		m	0
	Wharf (2) -12.0 m	\$/m		m	0

Este apéndice muestra el resumen del costo de construcción. Refiérase a Capítulo 8 de Parte II.

** Leyenda **

Caso : SITIO -P14 B1

P : Muelle Existente y Terminal de Contenedor Existente

C : Oeste Colón

T : Telfers

F : Canal Francés

CS : Coco Solo

14 : Profundidad de agua y profundidad del plano de desembarcadero

12 : -idem-

B1 : Atracadero en el Muelle No. 9

B2 : Nuevo atracadero para el desarrollo a Corto Plazo

B3/B4 : Etapa de Plan Maestro para nuevo atracadero

Nota : Costo en caso de cambio de profundidad también se muestra en la última página de cada caso.

Work Category	Works	Unit Rate		Works		Cost	
		Unit	\$/m	Unit	Cost		
C. On-land Works	Ro-Ro System	\$/m	575,000	m	0	0	
		LS		set	1	575,000	
	Subtotal	Soil Improvement	\$/ha	700,000	ha	0	0
		Inner access	\$/m ²	69.6	m ²	0	0
		Back apron	\$/m ²	131.5	m ²	(15,000)	0
		Pavement Repairing	\$/m ²	100.0	m ²	1,848	184,800
		Pavement (1) Gravel pave.	\$/m ²	39.0	m ²	0	0
		(2) Light pave.	\$/m ²	69.6	m ²	0	0
		(3) Normal pave.	\$/m ²	105.3	m ²	49,800	5,243,940
		(4) Heavy pave. C2	\$/m ²	150.0	m ²	0	0
		(5) Heave pave. C3	\$/m ²	411.6	m ²	0	0
		Storm water Drainage	\$/ha	53,000	ha	5.19	275,070
		Pavement Marking	\$/m ²	20.0	m ²	4,300	86,860
		Subtotal					5,790,670
		D. Building	Main Gate	\$/m ²	567	m ²	(7,850)
Control House	\$/m ²		1,170	m ²	(800)	0	
Maintenance Shops	\$/m ²		1,042	m ²	(1,000)	0	
CFS	\$/m ²		846	m ²	(4,400)	0	
Substation/Power station	\$/m ²		602	m ²	(700)	0	
Passenger Terminal	\$/m ²		450	m ²	500	285,000	
Misc., buildings	\$/m ²		570	m ²	0	0	
Weigh bridge	\$/set		76,300	set	0	0	
Over-head passenger bridge	\$/m		3,000	m	0	0	
Fence	\$/m		123	m	200	24,600	
Part	\$/m ²		35	m ²	2,000	70,000	
Landscaping	\$/m ²		19	m ²	2,300	43,700	
Subtotal						423,300	
E. Utilities	Water Supply (Main)		\$/B	175,000	B	0	0
	Water Supply (Dis.)		\$/ha	20,000	ha	0	0
	Fire fighting	\$/ha	2,000	ha	0	0	
	Sewerage	\$/ha	9,300	ha	0	0	
	Power Supply (Dist.)	\$/B	1,020,000	B	0.2	204,000	
	Power Supply (P. Plant)	\$/B	530,000	B	0	0	
	Power Supply (W. Crane)	\$/B	455,000	B	0	0	
	Lighting (Yard)	\$/B	240,000	B	0.2	120,000	
	Lighting (Road)	\$/ha	24,000	ha	1.28	30,720	
	Telecommunication	\$/B	42,000	B	0	0	
	Reef System	\$/B	100,000	B	0	0	
	Bunker System	\$/m	1,000	m	0	0	
	Misc., utilities	\$/m ²		LS	1	150,000	
	Subtotal					540,720	
	F. Supplemental Works	Navigation aid	\$/B	500,000	B	0	0
Outer access (new)		\$/m ²	105.3	m ²	0	0	
Outer access (improve)		\$/m ²	34.8	m ²	2,500	87,000	
Demolishing (Pier No. 16)		\$/m ³	40	m ³	0	0	

Work Category	Works	Unit Rate		Works		Cost		
		Unit	\$/m	Unit	Cost			
G. Others	Demolishing (Small pier)	\$/pier	10,000	pier	0	0		
		\$/m ²	3	m ²	32,000	96,000		
	Demolishing (Building)	\$/m ²	100	m ²	2,000	200,000		
		LS		LS	0	0		
	Environmental protection	LS		LS	0	0		
		Misc. works					383,000	
	Subtotal	Flyover	\$/m ²	2,500	m ²	0	0	
		Bunker pier reinstallation	\$/set	11,000,000	set	0	0	
		Loading arms	\$/set	440,000	set	0	0	
		Bunker lines	\$/m	2,000	m	0	0	
		Breakwater Improvement	\$/m	4,000	m	0	0	
		Subtotal					10,221,730	
		Cost by Wharf Depth	B1					10,221,730
			Cost P-14/12					
			Cost P-12					

TABLE C14 B2 CRISTOBAL PORT COST ESTIMATION - Summary

Work Category		Works		Unit Rate		Works		Cost
		Unit		Unit		Unit		
A. General Works								4,500,000
B. Marine Works								20,787,600
C. On-land Works								14,434,540
D. Building								6,241,530
E. Utilities								3,232,500
F. Supplemental Works								2,884,090
G. Others								0
H. Contingency	Subtotal							52,080,260
I. Engineering	Physical (15 % of H)							7,812,040
J. Reserves	(10 % of H)							5,208,020
K. Land Use	Total (H + I + J)							65,100,320
	Total Area			10.50	ha	100.0 %		
	Back apron			0.50	ha	4.8		
	Inner access			2.63	ha	25.0		
	Yard pavement			0.22	ha	2.2		
	Yard pavement			1.05	ha	10.0		
	Yard pavement			3.78	ha	36.0		
	Yard pavement C2			0.47	ha	4.4		
	Yard pavement C3			0.47	ha	4.4		
	Building			0.70	ha	6.7		
	Parks			0.21	ha	2.0		
	Reserves			0.47	ha	4.5		
A. General Works	Mobilization/Demobilization							500,000
	Mobilization/Demobilization							1,625,000
	Site Common Works							2,375,000
	Subtotal							4,500,000
B. Marine Works	Seabed Clearance	S/B	101,000	B	1	101,000		101,000
	Dredging and reclamation	S/m ³	1.80	m ³	0	0		0
	Dredging and reclamation	S/m ³	5.40	m ³	0	0		0
	Dredging and reclamation	S/m ³	54.0	m ³	0	0		0
	Dredging and disposal	S/m ³	2.76	m ³	819,000	2,260,440		2,260,440
	Dredging and disposal	S/m ³	9.96	m ³	0	0		0
	Borrowing and reclamation	S/m ³	4.80	m ³	1,785,000	8,568,000		8,568,000
	Seawall (1) +3.6 m -+0.0m	S/m	3,466	m	50	173,300		173,300
	(2) -5.0 -+5.0	S/m	5,814	m	100	581,400		581,400
	(3) -5.0 -+10.0	S/m	8,894	m	440	3,913,360		3,913,360
	(4) -10.0 -+15.0	S/m	16,282	m	150	2,442,300		2,442,300
	Wharf (1) -10.0 m	S/m		m	0	0		0
	(2) -12.0 m	S/m	61,700	m	0	0		0

Case: SITE - C14 B2

Work Category		Works		Unit Rate		Works		Cost
		Unit		Unit		Unit		
	(3) -14.0 m	S/m	67,900	m	32	2,172,800		2,172,800
	Re-Ro System	LS	575,000	set	1	575,000		575,000
	Subtotal							20,787,600
C. On-land Works	Soil Improvement	S/ha	700,000	ha	5.25	3,675,000		3,675,000
	Inner access	S/m ²	69.6	m ²	26,300	1,830,480		1,830,480
	Back apron	S/m ²	131.5	m ²	(5,100)	0		0
	Side apron	S/m ²	131.5	m ²	7,000	920,500		920,500
	Pavement (1) Gravel pave.	S/m ²	39.0	m ²	2,600	101,400		101,400
	(2) Light pave.	S/m ²	69.6	m ²	10,500	730,800		730,800
	(3) Normal pave.	S/m ²	105.3	m ²	37,800	3,980,340		3,980,340
	(4) Heavy pave. C2	S/m ²	150.0	m ²	4,700	705,000		705,000
	(5) Heavy pave. C3	S/m ²	411.6	m ²	4,700	1,934,520		1,934,520
	Storm water Drainage	S/ha	53,000	ha	10.5	556,500		556,500
	Subtotal							14,434,540
D. Building	Main Gate	S/m ²	567	m ²	650	368,550		368,550
	Control House	S/m ²	1,170	m ²	1,000	1,170,000		1,170,000
	Maintenance Shops	S/m ²	1,042	m ²	1,000	1,042,000		1,042,000
	CFS	S/m ²	846	m ²	2,500	2,115,000		2,115,000
	Substation/Power station	S/m ²	602	m ²	1,050	632,100		632,100
	Passenger Terminal	S/m ²	450	m ²	0	0		0
	Misc., buildings	S/m ²	570	m ²	800	456,000		456,000
	Weigh bridge	S/set	76,300	set	2	152,600		152,600
	Over-head passenger bridge	S/m	3,000	m	0	0		0
	Fence	S/m	123	m	1,560	191,880		191,880
	Park	S/m ²	35	m ²	2,100	73,500		73,500
	Landscaping	S/m ²	19	m ²	2,100	39,900		39,900
	Subtotal							6,241,530
E. Utilities	Water Supply (Main)	S/B	175,000	B	1	175,500		175,500
	Water Supply (Dis.)	S/ha	20,000	ha	10.50	210,000		210,000
	Fire fighting	S/ha	2,000	ha	10.50	21,000		21,000
	Sewerage	S/ha	9,300	ha	10.50	97,650		97,650
	Power Supply (Distr.)	S/B	1,020,000	B	1	1,020,000		1,020,000
	Power Supply (P. Plant)	S/B	530,000	B	1	530,000		530,000
	Power Supply (W. Crane)	S/B	455,000	B	1	455,000		455,000
	Lighting (Yard)	S/B	240,000	B	1	240,000		240,000
	Lighting (Road)	S/ha	24,000	ha	3.68	88,320		88,320
	Telecommunication	S/B	42,000	B	1	42,000		42,000
	Reef System	S/B	100,000	B	1	100,000		100,000
	Bunker System	S/B	1,000	B	0	0		0
	Misc., utilities	S/m		LS	1	253,530		253,530
	Subtotal							3,232,500
F. Supplemental Works	Navigational aid	S/B	500,000	B	0	0		0
	Outer access (new)	S/m ²	105.3	m ²	2,500	263,250		263,250
	Outer access (improve)	S/m ²	34.8	m ²	7,500	261,000		261,000
	Demolishing							

TABLE C14 B3/4 CRISTOBAL PORT COST ESTIMATION - Summary

Case: SITE - C14 B3/4

Work Category	Works	Unit Rate		Works		Cost
		Unit	Unit	Unit	Unit	
A. General Works						7,312,500
B. Marine Works						79,607,520
C. On-land Works						30,486,280
D. Building						16,567,060
E. Utilities						7,215,000
F. Supplemental Works						4,737,950
G. Others						0
H. Subtotal						145,926,310
I. Contingency	Physical (15 % of H)					21,888,950
J. Engineering	(10 % of H)					14,592,630
K. Total	(H + I + J)					182,407,890
Land Use						
Total Area			21.00	ha	100 %	
Back apron			1.00	ha	4.8	
Inner access			5.26	ha	25.0	
Yard pavement			0.44	ha	2.1	
Yard pavement	(1) Gravel pavement		2.10	ha	10.0	
Yard pavement	(2) Light pavement		7.56	ha	36.0	
Yard pavement	(3) Normal pavement		0.94	ha	4.5	
Yard pavement	(4) Heavy pavement C2		0.94	ha	4.5	
Yard pavement	(5) Heavy pavement C3		2.00	ha	9.5	
Building			0.42	ha	2.0	
Parks			0.34	ha	1.6	
Reserves						
A. General Works	Mobilization/Demobilization Mobilization/Demobilization Site Common Works					500,000 3,250,000 3,562,500
B. Marine Works	Subtotal					7,312,500
	Seabed Clearance		101,000	\$/B	2	202,000
	Dredging and reclamation		1.80	\$/m ³	0	0
	Dredging and reclamation		5.40	\$/m ³	0	0
	Dredging and reclamation		54.0	\$/m ³	0	0
	Dredging and disposal		2.76	\$/m ³	4,824,000	13,314,240
	Dredging and disposal		9.96	\$/m ³	0	0
	Borrowing and reclamation		4.80	\$/m ³	3,990,000	19,152,000
	Seawall (1) +3.6 m -10.0m		2,559	\$/m	50	127,950
	(2) ±0.0 - -5.0		4,507	\$/m	100	450,700
	(3) -5.0 - -10.0		7,987	\$/m	240	1,916,880
	(4) -10.0 - -15.0		15,375	\$/m	90	1,383,750
	Wharf (1) -10.0 m			\$/m	0	0
	(2) -12.0 m		61,700	\$/m	0	0

Case: SITE - C14 B2

Work Category	Works	Unit Rate		Works		Cost	
		Unit	Unit	Unit	Unit		
G. Others	Demolishing (Pier No. 7 shed)	\$/m ²	80	m ²	7,900	632,000	
	Demolishing (Pier No. 16)	\$/m ³	40	m ³	0	0	
	Demolishing (Small pier)	\$/pier	10,000	pier	0	0	
	Demolishing (Onland civil)	\$/m ²	3	m ²	10,000	30,000	
	Demolishing (Building)	\$/m ²	100	m ²	1,000	100,000	
	Environmental protection			LS	1	324,850	
	Misc. works			LS	1	353,340	
	Pavement after P7 shed	\$/m ²	66.0	m ²	7,900	521,400	
	Mole yard pavement	\$/m ²	69.6	m ²	4,860	338,250	
	Mole road repair	\$/m ²	100.0	m ²	600	60,000	
	Subtotal					2,884,090	
	G. Others	Flyover	\$/m ²	2,500	m ²	0	0
		Bunker pier reinstallation	\$/set	11,000,000	set	0	0
		Loading arms	\$/set	440,000	set	0	0
		Bunker lines	\$/m	2,000	m	0	0
Breakwater improvement		\$/m	4,000	m	0	0	
Subtotal						0	
Cost by Wharf Detail							
Cost C-14/12	B2					\$2,080,260	
Cost C-14	B2					\$2,080,260	

Case: SITE - C14 B3/4

Work Category	Works	Unit Rate		Unit	Works	Cost		
		Unit	Rate					
C. On-land Works	Ro-Ro System	\$/m	67,900	m	600	40,740,000		
		LS	2,280,000	set	1	2,280,000		
	Subtotal	Soil Improvement	\$/ha	700,000	ha	14.70	10,290,000	
		Inner access	\$/m ²	69.6	m ²	52,600	3,660,960	
		Back apron	\$/m ²	131.5	m ²	(10,200)	0	
		Side apron	\$/m ²	131.5	m ²	4,000	526,000	
		Pavement (1) Gravel pave.	\$/m ²	39.0	m ²	5,000	195,000	
			\$/m ²	69.6	m ²	21,000	1,461,600	
		Pavement (2) Light pave.	\$/m ²	105.3	m ²	75,600	7,960,680	
			\$/m ²	150.0	m ²	9,400	1,410,000	
		(4) Heavy pave. C2	\$/m ²	411.6	m ²	9,400	3,869,040	
			\$/m ²	53,000	ha	21.0	1,113,000	
		(5) Heave pave. C3	\$/m ²					
			\$/ha					30,486,280
		D. Building	Subtotal	\$/m ²	567	m ²	(20,000 m ²)	737,100
\$/m ²	1,170			m ²	1,300	2,340,000		
\$/m ²	1,042			m ²	3,000	3,126,000		
\$/m ²	846			m ²	7,000	5,922,000		
\$/m ²	602			m ²	2,100	1,264,200		
\$/m ²	450			m ²	3,000	1,350,000		
\$/m ²	570			m ²	1,600	912,000		
\$/set	76,300			set	4	305,200		
\$/m	3,000			m	0	0		
\$/m	123			m	3,120	383,760		
\$/m ²	35			m ²	4,200	147,000		
\$/m ²	19			m ²	4,200	79,800		
E. Utilities	Subtotal			\$/B	175,000	B	2	350,000
				\$/ha	20,000	ha	21.00	420,000
				\$/ha	2,000	ha	21.00	42,000
		\$/ha	9,300	ha	21.00	195,300		
		\$/B	1,020,000	B	2	2,040,000		
		\$/B	530,000	B	2	1,060,000		
		\$/B	455,000	B	2	910,000		
		\$/B	240,000	B	2	480,000		
		\$/ha	24,000	ha	7.36	176,640		
		\$/B	42,000	B	2	84,000		
		\$/B	100,000	B	2	200,000		
		\$/m	1,000	m	750	750,000		
		\$/m		m	2	507,060		
		F. Supplemental Works	Subtotal	\$/B	500,000	B	2	1,000,000
				\$/m ²	105.3	m ²	0	0
\$/m ²	34.8			m ²	0	0		
\$/m ²				m ²	0	0		
\$/m ²	40			m ²	0	0		

Case: SITE - C14 B3/4

Work Category	Works	Unit Rate		Unit	Works	Cost		
		Unit	Rate					
G. Others	Subtotal	\$/pier	10,000	pier	0	0		
		\$/m ²	3	m ²	0	0		
		\$/m ²	100	m ²	1,500	150,000		
		\$/m ²		LS	1	973,990		
		\$/m ²	69.6	LS	1	754,020		
		\$/m ²	105.3	m ²	24,000	1,670,400		
		\$/m ²		m ²	1,800	189,540		
		\$/m ²		m ²		4,737,950		
		Costs	Subtotal	\$/m ²	2,500	m ²	0	0
				\$/set	11,000,000	set	0	0
				\$/set	440,000	set	0	0
				\$/m	2,000	m	0	0
				\$/m	4,000	m	0	0
				\$/m ³		m ³	2.76	1,625,000
				\$/m ³		LS	0	0
\$/m ³				m ³		145,926,310		
\$/m ³				m ³		-4,485,000		
\$/m ³				m ³		-4,485,000		
\$/m				m		141,441,310		
\$/m				m		145,926,310		
\$/m				m		-4,485,000		
\$/m				m		-3,720,000		
Costs	Subtotal			\$/m	6,200	m	600	-8,205,000
		\$/m		LS	0	0		
		\$/m		m		137,721,310		

TABLE T14 B2 CRISTOBAL PORT COST ESTIMATION Summary

Work Category	Works	Unit Rate		Works	Cost
		Unit	Rate		
A. General Works					5,250,000
B. Marine Works					29,403,020
C. On-land Works					9,913,140
D. Building					6,172,650
E. Utilities					3,732,500
F. Supplemental Works					4,847,790
G. Others					0
H. Contingency	Subtotal				59,319,100
I. Engineering	Physical (15% of H)				8,897,860
J. Reserves	(10% of H)				5,931,910
K. Total	(H + I + J)				74,148,870
Land Use					
Total Area		10.50	ha	100.0%	
Back apron		0.50	ha	4.8	
Inner access		2.63	ha	25.0	
Yard pavement		0.22	ha	2.2	
Yard pavement		1.05	ha	10.0	
Yard pavement		3.78	ha	36.0	
Yard pavement		0.47	ha	4.4	
Yard pavement		0.70	ha	6.7	
Building		0.21	ha	2.0	
Parks		0.47	ha	4.5	
Reserves					
A. General Works	Mobilization/Demobilization				500,000
	Mobilization/Demobilization				1,625,000
	Site Common Works				3,125,000
	Subtotal				5,250,000
B. Marine Works	Seabed Clearance	101,000	B	1	101,000
	Dredging and reclamation	\$/m ³	m ³	90,000	162,000
	Dredging and reclamation	\$/m ³	m ³	90,000	486,000
	Dredging and disposal	\$/m ³	m ³	0	0
	Dredging and disposal	\$/m ³	m ³	722,500	1,594,100
	Borrowing and reclamation	\$/m ³	m ³	0	0
	Seawall (1) +3.6 m -±0.0m	\$/m	m	607,000	2,913,600
	(2) ±0.0 - -5.0	\$/m	m	0	0
	(3) -5.0 - -10.0	\$/m	m	300	1,472,100
	(4) -10.0 - -15.0	\$/m	m	60	479,220
	Wharf (1) -10.0 m	\$/m	m	40	615,000
	(2) -12.0 m	\$/m	m	0	0

Case: SITE - T14 B2

Work Category	Works	Unit Rate		Works	Cost
		Unit	Rate		
C. On-land Works	(3) -14.0 m	\$/m	m	300	18,900,000
	Ro-Ro System	LS	sec	1	2,280,000
	Subtotal				29,403,020
	Soil Improvement	\$/ha	ha	0	0
	Inner access	\$/m ²	m ²	26,300	1,830,480
	Back apron	\$/m ²	m ²	(5,100)	0
	Side apron	\$/m ²	m ²	0	0
	Pavement (1) Gravel pave.	\$/m ²	m ²	4,500	175,500
	(2) Light pave.	\$/m ²	m ²	10,500	730,800
	(3) Normal pave.	\$/m ²	m ²	37,800	3,980,340
(4) Heavy pave. C2	\$/m ²	m ²	4,700	705,000	
(5) Heavy pave. C3	\$/m ²	m ²	4,700	1,934,520	
Storm water Drainage	\$/ha	ha	10.5	556,500	
Subtotal				9,913,140	
D. Building	Main Gate	\$/m ²	m ²	(7,000 m ²)	368,550
	Control House	\$/m ²	m ²	650	1,170,000
	Maintenance Shops	\$/m ²	m ²	1,000	1,042,000
	CFS	\$/m ²	m ²	846	2,115,000
	Substation/Power station	\$/m ²	m ²	1,050	632,100
	Passenger Terminal	\$/m ²	m ²	0	0
	Misc., buildings	\$/m ²	m ²	800	456,000
	Weigh bridge	\$/set	set	2	152,600
	Over-head passenger bridge	\$/m	m	0	0
	Fence	\$/m	m	1,000	123,000
	Park	\$/m ²	m ²	2,100	73,500
	Landscaping	\$/m ²	m ²	2,100	39,900
	Subtotal				6,172,650
E. Utilities	Water Supply (Main)	\$/B	B	1	175,000
	Water Supply (Dis.)	\$/ha	ha	10.50	210,000
	Fire fighting	\$/ha	ha	10.50	21,000
	Sewerage	\$/ha	ha	10.50	97,650
	Power Supply (Distr.)	\$/B	B	1	1,020,000
	Power Supply (P. Plant)	\$/B	B	1	530,000
	Power Supply (W. Crane)	\$/B	B	1	455,000
	Lighting (Yard)	\$/B	B	1	240,000
	Lighting (Road)	\$/ha	ha	3.68	88,320
	Telecommunication	\$/B	B	1	42,000
	Radar System	\$/B	B	1	100,000
	Bunker System	\$/B	B	500	500,000
	Misc., utilities	\$/m	m	1	253,530
	Subtotal				3,732,500
F. Supplemental Works	Navigation aid	\$/B	B	1	500,000
	Outer access (new)	\$/m ²	m ²	20,900	2,106,000
	Outer access (improve)	\$/m ²	m ²	7,200	250,560
	Demolishing				

TABLE T14 B3/4 CRISTOBAL PORT COST ESTIMATION - Summary

Work Category		Works		Unit Rate		Works		Cost
		Unit		Unit		Unit		
A.	General Works							6,437,500
B.	Marine Works							52,021,120
C.	On-land Works							19,826,280
D.	Building							16,429,300
E.	Utilities							7,065,000
F.	Supplemental Works							6,851,940
G.	Others							0
H.	Subtotal							108,631,140
I.	Contingency							16,294,670
J.	Engineering							10,863,110
K.	Total							135,788,920
	Land Use							
	Total Area							100.0 %
	Back apron							4.8
	Inner access							25.0
	Yard pavement							2.1
	Yard pavement							10.0
	Yard pavement							36.0
	Yard pavement							4.5
	Yard pavement							4.5
	Building							9.5
	Parks							2.0
	Reserves							0.34
A.	General Works							500,000
	Mobilization/Demobilization							1,625,000
	Site Common Works							4,312,500
	Subtotal							6,437,500
B.	Marine Works							202,000
	Scrubbed Clearance							72,900
	Dredging and reclamation							218,700
	Dredging and reclamation							0
	Dredging and disposal							894,240
	Dredging and reclamation							0
	Borrowing and reclamation							7,516,800
	Seawall (1) +3.6 m -0.0m							511,800
	(2) +0.0 - -5.0							1,472,100
	(3) -5.0 - -10.0							718,830
	(4) -10.0 - -15.0							2,613,750
	Wharf (1) -10.0 m							0
	(2) -12.0 m							0

Case: SITE - T14 B2

Work Category	Works	Unit Rate		Works		Cost
		Unit		Unit		
G. Others	Demolishing (Pier No. 7 shed)	\$/m ²	80	m ²	7,900	632,000
	Demolishing (Pier No. 16)	\$/m ³	40	m ³	0	0
	Demolishing (Small pier)	\$/pier	10,000	pier	0	0
	Demolishing (Onland civil)	\$/m ²	3	m ²	0	0
	Demolishing (Building)	\$/m ²	100	m ²	0	0
	Environmental protection			LS	1	166,670
	Misc. works			LS	1	272,910
	Pavement after P7 shed	\$/m ²	66.0	m ²	7,900	521,400
	Mole yard pavement	\$/m ²	69.6	m ²	4,860	338,250
	Mole road repair	\$/m ²	100.0	m ²	600	60,000
	Subtotal					4,847,790
G. Others	Flyover	\$/m ²	2,500	m ²	0	0
	Bunker pier reinstatement	\$/set	11,000,000	set	0	0
	Loading arms	\$/set	440,000	set	0	0
	Bunker lines	\$/m	2,000	m	0	0
	Breakwater improvement	\$/m	4,000	m	0	0
	Subtotal					0
Cost by Wharf Depth						
Cost T-14	B2	\$/m ³	2.76	m ³	800,000	59,319,100
Marine Works	Dredging reduction				0	-2,208,000
	Supplemental reduction				0	-2,208,000
	Total reduction					0
Cost T-14/12	B2					57,111,100
Cost T-14						59,319,100
Marine Works	Reduction 14/12	\$/m	4,300	m	300	-2,208,000
	Wharf cost reduction				0	-1,290,000
	Supplemental reduction				0	-3,498,000
	Total reduction					0
Cost T-12	B2					55,821,100

Case: SITE - T14 B3/4

Work Category	Works	Unit Rate		Unit	Works	Cost	
		Unit	Rate				
C. On-land Works	Ro-Ro System	\$/m	63,000	m	600	37,800,000	
		LS	2,280,000	set	0	0	
	Subtotal	Soil Improvement	\$/ha	700,000	ha	0	0
		Inner access	\$/m ²	69.6	m ²	52,600	3,660,960
		Back apron	\$/m ²	131.5	m ²	(10,200)	0
		Side apron	\$/m ²	131.5	m ²	0	0
		Pavement (1)	\$/m ²	39.0	m ²	9,000	351,000
		(2)	\$/m ²	69.6	m ²	21,000	1,461,600
		(3) Normal pave.	\$/m ²	105.3	m ²	75,600	7,960,680
		(4) Heavy pave. C2	\$/m ²	150.0	m ²	9,400	1,410,000
		(5) Heavy pave. C3	\$/m ²	411.6	m ²	9,400	3,869,040
		Storm water Drainage	\$/ha	53,000	ha	21.0	1,113,000
	Subtotal					19,826,280	
D. Building	Main Gate	\$/m ²	567	m ²	1,300	737,100	
		\$/m ²	1,170	m ²	2,000	2,340,000	
	Control House	\$/m ²	1,042	m ²	3,000	3,126,000	
		\$/m ²	846	m ²	7,000	5,922,000	
	Maintenance Shops	\$/m ²	602	m ²	2,100	1,264,200	
		\$/m ²	450	m ²	3,000	1,350,000	
	Substation/Power station	\$/m ²	570	m ²	1,600	912,000	
		\$/set	76,300	set	4	305,200	
	Passenger Terminal	\$/m ²	3,000	m ²	0	0	
		\$/m	123	m	2,000	246,000	
	Misc., buildings	\$/m ²	35	m ²	4,200	147,000	
		\$/m ²	19	m ²	4,200	79,800	
	Weigh bridge	\$/m		m			
\$/m			m				
Over-head passenger bridge	\$/m		m				
	\$/m		m				
Fence	\$/m		m				
	\$/m		m				
Park	\$/m ²		m ²				
	\$/m ²		m ²				
Landscaping	\$/m ²		m ²				
	\$/m ²		m ²				
Subtotal					16,429,300		
E. Utilities	Water Supply (Main)	\$/B	175,000	B	2	350,000	
		\$/ha	20,000	ha	21.00	420,000	
	Water Supply (Dis.)	\$/ha	2,000	ha	21.00	42,000	
		\$/ha	9,300	ha	21.00	195,300	
	Sewerage	\$/B	1,020,000	B	2	2,040,000	
		\$/B	530,000	B	2	1,060,000	
	Power Supply (Distr.)	\$/B	455,000	B	2	910,000	
		\$/B	280,000	B	2	560,000	
	Power Supply (P. Plant)	\$/B	24,000	B	7.36	176,640	
		\$/B	42,000	B	2	84,000	
	Lighting (Road)	\$/B	100,000	B	2	200,000	
		\$/B	1,000	B	600	600,000	
	Telecommunication	\$/m		m			
\$/m			m				
Refer System	\$/m		m				
	\$/m		m				
Bunker System	\$/m		m				
	\$/m		m				
Misc., utilities	\$/m		m				
	\$/m		m				
Subtotal					7,065,000		
F. Supplemental Works	Navigation aid	\$/B	500,000	B	1	500,000	
	Outer access (to Bolivar)	\$/m ²	105.3	m ²	27,000	2,843,100	
	Outer access (bridge)	\$/m ²	700,000	ca	1	700,000	

Case: SITE - T14 B3/4

Work Category	Works	Unit Rate		Unit	Works	Cost	
		Unit	Rate				
G. Others	Demolishing (Pier No. 16)	\$/m ²	40	m ²	0	0	
		\$/pier	10,000	pier	0	0	
	Demolishing (Small pier)	\$/m ²	3	m ²	0	0	
		\$/m ²	100	m ²	1,500	150,000	
	Demolishing (Onland civil)	LS		LS	1	261,080	
		\$/m ²	69.6	m ²	1	69,600	
	Demolishing (Building)	LS		LS	1	537,820	
		\$/m ²	165.3	m ²	24,000	1,670,400	
	Environmental protection	\$/m ²		m ²			
		\$/m ²		m ²			
	Misc. works	\$/m ²		m ²			
		\$/m ²		m ²			
	Mole yard pavement	\$/m ²		m ²			
\$/m ²			m ²				
Mole road pavement	\$/m ²		m ²				
	\$/m ²		m ²				
Subtotal					6,851,940		
Others	Flyover	\$/m ²	2,500	m ²	0	0	
		\$/set	11,000,000	set	0	0	
	Bunker pier reinstatement	\$/set	440,000	set	0	0	
		\$/m	2,000	m	0	0	
	Loading arms	\$/m		m			
		\$/m		m			
	Bunker lines	\$/m		m			
		\$/m		m			
	Break-water improvement	\$/m		m			
		\$/m		m			
	Subtotal					0	
	Cost by Wharf Depth						
Cost T-14						108,631,140	
Marine Works Supplemental	\$/m ³	2.76	m ³	170,000	0	-469,200	
	LS		LS	0	0	-469,200	
	Total reduction						
Cost T-14/12						108,161,940	
Cost T-14						108,631,140	
Marine Works	\$/m	4,300	m	600	0	-469,200	
	LS		LS	0	0	-2,580,000	
	Supplemental reduction						
Cost T-12						-3,049,200	
Subtotal						105,581,940	

TABLE T14 B6 CRISTORAL PORT COST ESTIMATION - Summary

Work Category	Works	Unit Rate		Unit	Works	Cost
		Unit	Rate			
A. General Works						5,250,000
B. Marine Works						25,744,040
C. On-land Works						9,913,140
D. Building						6,129,600
E. Utilities						3,532,500
F. Supplemental Works						3,997,810
G. Others						0
H.	Subtotal					54,567,090
I. Contingency	Physical (15 % of H)					8,185,060
J. Engineering	(10 % of H)					5,456,710
K.	Total (H + I + J)					68,208,860
Land Use						
Total Area		10.50		ha	100.0 %	
Back apron		0.50		ha	4.8	
Yard pavement	(1) gravel pavement	2.63		ha	25.0	
Yard pavement	(2) Light pavement	0.22		ha	2.2	
Yard pavement	(3) Normal pavement	1.05		ha	10.0	
Yard pavement	(4) Heavy pavement C2	3.78		ha	36.0	
Yard pavement	(5) Heavy pavement C3	0.47		ha	4.4	
Building		0.47		ha	4.4	
Parks		0.70		ha	6.7	
Reserves		0.21		ha	2.0	
		0.47		ha	4.5	
A. General Works	Mobilization/Demobilization Mobilization/Demobilization Site Common Works					500,000
	Subtotal					1,625,000
						3,125,000
B. Marine Works	Seabed Clearance	101,000		B	1	101,000
	Dredging and reclamation	S/m ³				36,000
	Dredging and reclamation	S/m ³	1.80	m ³	20,000	108,000
	Dredging and reclamation	S/m ³	5.40	m ³	20,000	108,000
	Dredging and disposal	S/m ³	54.0	m ³	0	0
	Dredging and disposal	S/m ³	2.76	m ³	162,000	447,120
	Dredging and reclamation	S/m ³	9.96	m ³	0	0
	Borrowing and reclamation	S/m ³	4.80	m ³	747,000	3,585,600
	Seawall (1) +3.6 m to -10.0m	S/m	2,559	m	0	0
	(2) ±0.0 to -5.0	S/m	4,907	m	300	1,472,100
	(3) -5.0 to -10.0	S/m	7,987	m	60	479,220
	(4) -10.0 to -15.0	S/m	15,375	m	40	615,000
	Wharf (1) -10.0 m	S/m		m	0	0
	(2) -12.0 m	S/m	58,700	m	0	0

Case: SITE - T14 B6

Work Category	Works	Unit Rate		Unit	Works	Cost
		Unit	Rate			
	Ro-Ro System	S/m	63,000	m	300	18,900,000
	Subtotal	LS	2,280,000	sq	0	0
C. On-land Works						25,744,040
	Soil Improvement	S/ha	700,000	ha	0	0
	Inner access	S/m ²	69.6	m ²	26,300	1,830,480
	Back apron	S/m ²	131.5	m ²	(5,100)	0
	Side apron	S/m ²	131.5	m ²	0	0
	Pavement (1) Gravel pave.	S/m ²	39.0	m ²	4,500	175,500
	(2) Light pave.	S/m ²	69.6	m ²	10,500	730,800
	(3) Normal pave.	S/m ²	105.3	m ²	37,800	3,980,340
	(4) Heavy pave. C2	S/m ²	150.0	m ²	4,700	705,000
	(5) Heavy pave. C3	S/m ²	411.6	m ²	4,700	1,934,520
	Storm water Drainage	S/ha	53,000	ha	10.5	556,500
	Subtotal					9,913,140
D. Building						368,550
	Main Gate	S/m ²	567	m ²	650	368,550
	Control House	S/m ²	1,170	m ²	1,000	1,170,000
	Maintenance Shops	S/m ²	1,042	m ²	1,000	1,042,000
	CFS	S/m ²	846	m ²	2,500	2,115,000
	Substation/Power station	S/m ²	602	m ²	1,050	632,100
	Passenger Terminal	S/m ²	450	m ²	0	0
	Misc. buildings	S/m ²	570	m ²	800	456,000
	Weigh bridge	S/lot	76,300	lot	2	152,600
	Over-head passenger bridge	S/m	3,000	m	0	0
	Fence	S/m	123	m	650	79,950
	Park	S/m ²	35	m ²	2,100	73,500
	Landscaping	S/m ²	19	m ²	2,100	39,900
	Subtotal					6,129,600
E. Utilities						175,000
	Water Supply (Main)	S/B	175,000	B	1	175,000
	Water Supply (Dis.)	S/ha	20,000	ha	10.50	210,000
	Fire Fighting	S/ha	2,000	ha	10.50	21,000
	Sewerage	S/ha	9,300	ha	10.50	97,650
	Power Supply (Dist.)	S/B	1,020,000	B	1	1,020,000
	Power Supply (P. Plant)	S/B	530,000	B	1	530,000
	Power Supply (W. Crane)	S/B	455,000	B	1	455,000
	Lighting (Yard)	S/B	240,000	B	1	240,000
	Lighting (Road)	S/ha	24,000	ha	3.68	88,320
	Telecommunication	S/B	42,000	B	1	42,000
	Reef System	S/B	100,000	B	1	100,000
	Bunker System	S/B	1,000	m	300	300,000
	Misc. utilities	S/m		LS	1	253,530
	Subtotal					3,532,500
F. Supplemental Works						0
	Navigational aid	S/B	500,000	B	0	0
	Outer access (new)	S/m ²	105.3	m ²	12,000	1,263,600
	Outer access (interland)	S/m ²	39.0	m ²	60,000	2,340,000
	Demolishing					

TABLE F-14 (I) B5/6 CRISTOBAL PORT COST ESTIMATION - Summary

Work Category		Unit Rate		Works	Unit Rate	Unit	Cost
A.	General Works						6,437,500
B.	Marine Works						62,499,460
C.	On-land Works						22,766,280
D.	Building						14,998,120
E.	Utilities						7,265,000
F.	Supplemental Works						4,086,300
G.	Others						16,040,000
H.	Subtotal						134,092,660
I.	Contingency (15 % of H)						20,113,900
J.	Engineering (10 % of H)						13,409,270
K.	Total (H + I + J)						167,615,830
Lard Use							
	Total Area	55/6					100.0 %
	Back apron	21.00			ha		4.8
	Inner access	1.00			ha		25.0
	Yard pavement	5.26			ha		2.1
	Yard pavement	0.44			ha		10.0
	Yard pavement	2.10			ha		36.0
	Yard pavement	7.56			ha		4.5
	Yard pavement	0.94			ha		8.1
	Building	1.70			ha		2.0
	Parks	0.42			ha		3.0
	Reserves	0.64			ha		
A.	General Works						500,000
	Mobilization/Demobilization						1,625,000
	Site Common Works						4,312,500
	Subtotal						6,437,500
B.	Marine Works						202,000
	Seabed Clearance	\$/B			B		2
	Dredging and reclamation	\$/m ³	101,000		m ³		0
	Dredging and reclamation	\$/m ³	1.80		m ³		0
	Dredging and reclamation	\$/m ³	5.40		m ³		0
	Dredging and disposal	\$/m ³	54.0		m ³		0
	Dredging and disposal	\$/m ³	2.76		m ³		735,000
	Dredging and disposal	\$/m ³	9.96		m ³		0
	Borrowing and reclamation	\$/m ³	4.80		m ³		3,780,000
	Seawall (1) +3.6 m -±0.0m	\$/m	2,559		m		0
	(2) ±0.0 - -5.0	\$/m	4,907		m		260
	(3) -5.0 - -10.0	\$/m	7,987		m		170
	(4) -10.0 - -15.0	\$/m	15,375		m		110
	Wharf (1) -10.0 m	\$/m			m		0
	(2) -12.0 m	\$/m	58,700		m		0

Case: SITE - T-14 B6

Work Category	Works	Unit Rate		Unit	Works	Cost
		Unit	Unit			
G. Others	Demolishing (Pier No. 16)	\$/m ³	40	m ³	0	0
	Demolishing (Small pier)	\$/pier	10,000	0	0	0
	Demolishing (Onland civil)	\$/m ²	3	m ²	0	0
	Demolishing (Building)	\$/m ²	100	m ²	1	125,300
	Environmental protection			LS	1	268,910
	Misc. works			LS		
	Subtotal					3,997,810
	Flyover	\$/m ²	2,500	m ²	0	0
	Bunker pier reinstatement	\$/set	11,000,000	set	0	0
	Loading arms	\$/set	440,000	set	0	0
Bunker lines	\$/m	2,000	m	0	0	
Breakwater improvement	\$/m	4,000	m	0	0	
Subtotal					0	
Cost be Wharf/Depth						
Cost T-14	B6					54,567,090
Marine Works	Dredging reduction	\$/m ³	2.76	m ³	50,000	-138,000
	Supplemental reduction			LS	0	0
	Total reduction					-138,000
Cost T-14/12	B6					54,429,090
Cost T-14	Reduction 14/12	\$/m	4,300	m	300	-138,000
Marine Works	Wharf cost reduction			LS	0	-1,290,000
	Supplemental reduction					0
	Total reduction					-1,428,000
Cost T-12	B6					53,139,090

Case: SITE - F14 (a) B5/6

Work Category	Works	Unit Rate		Unit	Works	Cost	
		Unit	Rate				
C. On-land Works	Ro-Ro System	\$/m	65,000	m	600	37,800,000	
		LS	2,280,000	set	0	0	
	Subtotal	Soil Improvement	\$/ha	700,000	ha	4.20	2,940,000
		Inner access	\$/m ²	69.6	m ²	52,600	3,660,960
		Back apron	\$/m ²	131.5	m ²	(10,200)	0
		Side apron	\$/m ²	131.5	m ²	0	0
		Pavement: (1) Gravel pave.	\$/m ²	39.0	m ²	9,000	351,000
		(2) Light pave.	\$/m ²	69.6	m ²	21,000	1,461,600
		(3) Normal pave.	\$/m ²	105.3	m ²	75,600	7,960,680
		(4) Heavy pave. C2	\$/m ²	150.0	m ²	9,400	1,410,000
		(5) Heavy pave. C3	\$/m ²	411.6	m ²	9,400	3,869,040
		Storm water Drainage	\$/ha	53,000	ha	21.0	1,113,000
		Subtotal					22,766,280
D. Building	Main Gate	\$/m ²	567	m ²	1,300	737,100	
	Control House	\$/m ²	1,170	m ²	2,000	2,340,000	
	Maintenance Shops	\$/m ²	1,042	m ²	3,000	3,126,000	
	CFS	\$/m ²	846	m ²	7,000	5,922,000	
	Substation/Power station	\$/m ²	602	m ²	2,100	1,264,200	
	Passenger Terminal	\$/m ²	450	m ²	0	0	
	Misc. buildings	\$/m ²	570	m ²	1,600	912,000	
	Weigh bridge	\$/set	76,300	set	4	305,200	
	Over-head passenger bridge	\$/m	3,000	m	0	0	
	Fence	\$/m	123	m	1,340	164,820	
	Park	\$/m ²	35	m ²	4,200	147,000	
	Landscaping	\$/m ²	19	m ²	4,200	79,800	
	Subtotal					14,998,120	
	E. Utilities	Water Supply (Main)	\$/B	175,000	B	2	350,000
		Water Supply (Dis.)	\$/ha	20,000	ha	21.00	420,000
		Fire fighting	\$/ha	2,000	ha	21.00	42,000
		Sewerage	\$/ha	9,300	ha	21.00	195,300
Power Supply (Disur.)		\$/B	1,020,000	B	2	2,040,000	
Power Supply (P. Plant)		\$/B	530,000	B	2	1,060,000	
Power Supply (V. Cranc)		\$/B	455,000	B	2	910,000	
Lighting (Yard)		\$/B	240,000	B	2	480,000	
Lighting (Road)		\$/ha	24,000	ha	7.36	176,640	
Telecommunication		\$/B	42,000	B	2	84,000	
Reeler System		\$/B	100,000	B	2	200,000	
Bunker System		\$/m	1,000	m	800	800,000	
Misc., utilities		\$/m	1,000	LS	2	507,060	
Subtotal						7,265,000	
F. Supplemental Works		Navigation aid	\$/B	500,000	B	1	500,000
	Outer access (new)	\$/m ²	105.3	m ²	15,000	1,579,500	
	Outer access (improve)	\$/m ²	34.8	m ²	0	0	
Demolishing							

Case: SITE - F14 (a) B5/6

Work Category	Works	Unit Rate		Unit	Works	Cost	
		Unit	Rate				
G. Others	Demolishing (Pier No. 16)	\$/m ³	40	m ³	17,500	700,000	
		\$/pier	10,000	pier	5	50,000	
	Demolishing (Small pier)	\$/m ²	3	m ²	7,000	21,000	
		\$/m ²	100	m ²	300	30,000	
	Demolishing (Building)	\$/m ²				605,180	
		Environmental protection				600,620	
	Misc. works	LS			1	4,086,300	
		Subtotal					
	B5/6	Flyover	\$/m ²	2,500	m ²	0	0
		Bunker pier reinstalation	\$/set	11,000,000	set	1	11,000,000
		Leading arms	\$/set	440,000	set	6	2,640,000
		Bunker lines	\$/m	2,000	m	1,200	2,400,000
		Breakwater improvement	\$/m	4,000	m	0	0
Subtotal					16,040,000		
Cost by Wharf Describ							
						134,092,660	
Cost F-14 (f)							
						0	
Marine Works	Dredging reduction	\$/m ³	2.76	m ³	0	0	
	Supplemental reduction					0	
Total reduction						0	
Cost F-14 (f)/12							
						134,092,660	
Cost F-14 (f)							
						134,092,660	
Marine Works	Reduction 14/12	\$/m	4,300	m	600	-2,580,000	
	Wharf cost reduction				0	0	
Supplemental reduction						-2,580,000	
	Total reduction					0	
Cost F-12 (f)							
						131,512,660	

TABLE F14 (1) B5/6 CRITICAL PORT COST ESTIMATION - Summary

Work Category	Works	Unit Rate		Unit	Works	Cost	
		Unit	Unit				
A. General Works						6,437,500	
B. Marine Works						85,664,410	
C. On-land Works						22,766,280	
D. Building						14,998,120	
E. Utilities						8,475,000	
F. Supplemental Works						4,595,440	
G. Others						14,440,000	
H.	Subtotal					157,376,750	
I. Contingency	Physical (15 % of H)					23,606,510	
J. Engineering	(10 % of H)					15,737,670	
K.	Total (H + I + J)					196,720,930	
Land Use	Total Area	B5/6		ha	100.0 %		
	Back apron	21.00		ha	4.8		
	Inner access	1.00		ha	25.0		
	Yard pavement	5.26		ha	2.1		
	Yard pavement	0.44		ha	10.0		
	Yard pavement	2.10		ha	36.0		
	Yard pavement	7.56		ha	4.5		
	Yard pavement	0.94		ha	8.1		
	Yard pavement	0.94		ha	2.0		
	Building	1.70		ha	3.0		
	Parks	0.42		ha			
	Reserves	0.54		ha			
	A. General Works	Mobilization/Demobilization					500,000
Mobilization/Demobilization						1,625,000	
Site Common Works						4,312,500	
Subtotal						6,437,500	
B. Marine Works		Seabed Clearance	\$/B	101,000	B	2	202,000
		Dredging and reclamation	\$/m³	1.80	m³	893,000	1,607,400
		Dredging and reclamation	\$/m³	5.40	m³	0	0
		Dredging and reclamation	\$/m³	54.0	m³	383,000	20,682,000
		Dredging and disposal	\$/m³	2.76	m³	735,000	2,028,600
		Dredging and disposal	\$/m³	9.96	m³	0	0
		Borrowing and reclamation	\$/m³	4.80	m³	2,504,000	12,019,200
		Scallow (1) +3.6 m-±0.0m	\$/m	2,559	m	0	0
		(2) ±0.0 - -5.0	\$/m	4,907	m	710	3,483,970
	(3) -5.0 - -10.0	\$/m	7,987	m	770	6,149,990	
	(4) -10.0 - -15.0	\$/m	15,375	m	110	1,691,250	
	Wharf (1) -10.0 m	\$/m		m	0	0	
	(2) -12.0 m	\$/m	58,700	m	0	0	

Case: SITE - F14 (b) B5/6

Work Category	Works	Unit Rate		Unit	Works	Cost
		Unit	Unit			
C. On-land Works	Ro-Ro System	\$/m	63,000	m	600	37,800,000
	Subtotal	LS	2,280,000	set	0	0
	Soil Improvement	\$/ha	700,000	ha	4.20	2,940,000
	Inner access	\$/m²	69.6	m²	52,600	3,660,960
	Back apron	\$/m²	131.5	m²	(10,200)	0
	Side apron	\$/m²	131.5	m²	0	0
	Pavement (1) Gravel pave.	\$/m²	39.0	m²	9,000	351,000
	(2) Light pave.	\$/m²	69.6	m²	21,000	1,461,600
	(3) Normal pave.	\$/m²	105.3	m²	75,600	7,950,680
	(4) Heavy pave. C2	\$/m²	150.0	m²	9,400	1,410,000
	(5) Heavy pave. C3	\$/m²	411.6	m²	9,400	3,869,040
	Storm water Drainage	\$/ha	53,000	ha	21.0	1,113,000
	Subtotal					22,766,280
D. Building	Main Gate	\$/m²	567	m²	(17,000 m²)	737,100
	Control House	\$/m²	1,170	m²	2,000	2,340,000
	Maintenance Shops	\$/m²	1,042	m²	3,000	3,126,000
	CFS	\$/m³	846	m³	7,000	5,922,000
	Substation/Power station	\$/m²	602	m²	2,100	1,264,200
	Passenger Terminal	\$/m²	450	m²	0	0
	Misc. buildings	\$/m²	570	m²	1,600	912,000
	Wweigh bridge	\$/set	76,300	set	4	305,200
	Over-head passenger bridge	\$/m	3,000	m	0	0
	Fence	\$/m	123	m	1,340	164,820
	Park	\$/m²	35	m²	4,200	147,000
	Landscaping	\$/m²	19	m²	4,200	79,800
	Subtotal					14,998,120
E. Utilities	Water Supply (Main)	\$/B	175,000	B	2	350,000
	Water Supply (Dis.)	\$/ha	20,000	ha	21.00	420,000
	Fire fighting	\$/ha	2,000	ha	21.00	42,000
	Sewerage	\$/ha	9,300	ha	21.00	195,300
	Power Supply (Distur.)	\$/B	1,020,000	B	2	2,040,000
	Power Supply (P. Plant)	\$/B	530,000	B	2	1,060,000
	Power Supply (W. Crane)	\$/B	455,000	B	2	910,000
	Lighting (Yard)	\$/B	240,000	B	2	480,000
	Lighting (Road)	\$/ha	24,000	ha	7.36	176,640
	Telecommunication	\$/B	42,000	B	2	84,000
	Reef System	\$/B	100,000	B	2	200,000
	Bunker System	\$/B	1,000	m	2,010	2,010,000
	Misc., utilities	\$/m		LS	2	507,060
Subtotal					8,475,000	
F. Supplemental Works	Navigation aid	\$/B	500,000	B	1	500,000
	Outer access (new)	\$/m²	105.3	m²	15,000	1,579,500
	Outer access (improve)	\$/m²	34.8	m²	0	0
	Demolishing					0

TABLE F-14 (III) B3/4 CRISTOBAL PORT COST ESTIMATION - Summary

Work Category	Works	Unit Rate		Works	Unit Rate		Cost
		Unit	Unit		Unit	Unit	
A. General Works							6,437,500
B. Marine Works							87,788,010
C. On-land Works							23,501,280
D. Building							16,319,830
E. Utilities							9,415,000
F. Supplemental Works							6,028,630
G. Others							14,440,000
H. Subtotal							163,930,250
I. Contingency (15 % of H)							24,589,540
J. Engineering (10 % of H)							16,393,020
K. Total (H + I + J)							204,912,810
Land Use							
Total Area							100.0 %
Back apron							4.8
Inner access							25.0
Yard pavement							2.1
Yard pavement							10.0
Yard pavement							36.0
Yard pavement							4.5
Yard pavement							4.5
Building							9.5
Parks							2.0
Reserves							0.34
A. General Works							
Mobilization/Demobilization							
Mobilization/Demobilization							
Site Common Works							
Subtotal							
B. Marine Works							
Scabed Clearance							2
Dredging and reclamation							3,172,000
Dredging and reclamation							0
Dredging and reclamation							620,000
Dredging and disposal							913,800
Dredging and disposal							0
Borrowing and reclamation							0
Seawall (1) +3.6 m -50.0m							0
(2) ±0.0 -5.0							30
(3) -5.0 -10.0							30
(4) -10.0 -15.0							500
Wharf (1) -10.0 m							0
(2) -12.0 m							0

Case: SITE - F-14 (b) B5/6

Work Category	Works	Unit Rate		Works	Cost
		Unit	Unit		
G. Others	Demolishing (Pier No. 16)	\$/m ²	40	17,500	700,000
	Demolishing (Small pier)	\$/pier	10,000	5	50,000
	Demolishing (Onland civil)	\$/m ²	3	7,000	21,000
	Demolishing (Building)	\$/m ²	100	300	30,000
	Environmental protection	LS		1	1,090,120
	Misc. works	LS		1	624,820
	Subtotal				4,595,440
	Flyover	\$/m ²	2,500	0	0
	Bunker pier reinstatement	\$/set	11,000,000	1	11,000,000
	Loading arms	\$/set	440,000	6	2,640,000
Bunker lines	\$/m	2,000	400	800,000	
Breakwater improvement	\$/m	4,000	0	0	
Subtotal				14,440,000	
Cost by Wharf Depth					
Cost F-14 (II)				157,376,750	
Marine Works				-2,484,000	
Reduction				-12,474,000	
Supplemental reduction				0	
Total reduction				-14,958,000	
Cost F-14 (IF)/12				142,418,750	
Cost F-14 (II)				157,376,750	
Marine Works				-14,958,000	
Reduction 14/12				-2,580,000	
Wharf cost reduction				600	
Supplemental reduction				0	
Total reduction				-17,538,000	
Cost F-12 (II)				139,838,750	

Case: SITE - F14 (G) B3/4

Work Category	Works	Unit Rate		Works		Cost	
		Unit	\$/m	Unit	\$/m		
C. On-land Works	Ro-Ro System (3) - 14.0 m	\$/m	63,000	m	600	37,800,000	
		LS	2,280,000	set	0	0	
	Subtotal						87,789,010
		Soil Improvement	\$/ha	700,000	ha	5.25	3,675,000
		Inner access	\$/m ²	69.6	m ²	52,600	3,660,960
		Back apron	\$/m ²	131.5	m ²	(10,200)	0
		Side apron	\$/m ²	131.5	m ²	0	0
		Pavement (1) Gravel pave.	\$/m ²	39.0	m ²	9,000	351,000
		(2) Light pave.	\$/m ²	69.6	m ²	21,000	1,461,600
		(3) Normal pave.	\$/m ²	105.3	m ²	75,600	7,960,680
(4) Heavy pave. C2	\$/m ²	150.0	m ²	9,400	1,410,000		
(5) Heavy pave. C3	\$/m ²	411.6	m ²	9,400	3,869,040		
Storm water Drainage	\$/ha	53,000	ha	21.0	1,113,000		
D. Building	Subtotal					23,501,280	
	Main Gate	\$/m ²	567	m ²	1,300	737,100	
	Control House	\$/m ²	1,170	m ²	2,000	2,340,000	
	Maintenance Shops	\$/m ²	1,042	m ²	3,000	3,126,000	
	CFS	\$/m ²	846	m ²	7,000	5,922,000	
	Substation/Power station	\$/m ²	602	m ²	2,100	1,264,200	
	Passenger Terminal	\$/m ²	450	m ²	3,000	1,350,000	
	Misc., buildings	\$/m ²	570	m ²	1,600	912,000	
	Weight bridge	\$/set	76,300	set	4	305,200	
Over-head passenger bridge	\$/m	3,000	m	0	0		
Fence	\$/m	123	m	1,110	136,530		
Park	\$/m ²	35	m ²	4,200	147,000		
Landscaping	\$/m ²	19	m ²	4,200	79,800		
E. Utilities	Subtotal					16,319,830	
	Water Supply (Main)	\$/B	175,000	B	2	350,000	
	Water Supply (Dis.)	\$/ha	20,000	ha	21.00	420,000	
	Fire fighting	\$/ha	2,000	ha	21.00	42,000	
	Sewerage	\$/ha	9,300	ha	21.00	195,300	
	Power Supply (Distr.)	\$/B	1,020,000	B	2	2,040,000	
	Power Supply (P. Plant)	\$/B	530,000	B	2	1,060,000	
	Power Supply (W. Crane)	\$/B	455,000	B	2	910,000	
	Lighting (Yard)	\$/ha	240,000	ha	2	480,000	
Lighting (Road)	\$/ha	24,000	ha	7.36	176,640		
Telecommunication	\$/B	42,000	B	2	84,000		
Radar System	\$/B	100,000	B	2	200,000		
Bunker System	\$/m	1,000	m	2,950	2,950,000		
Misc. utilities	\$/m	1,000	m	2	507,060		
F. Supplemental Works	Subtotal					9,415,000	
	Navigation aid	\$/B	500,000	B	1	500,000	
	Outer access (new)	\$/m ²	105.3	m ²	3,400	358,020	
	Outer access (improve)	\$/m ²	34.8	m ²	0	0	
Demolishing							

Case: SITE - F14 (G) B3/4

Work Category	Works	Unit Rate		Works		Cost	
		Unit	\$/m	Unit	\$/m		
G. Others	Demolishing (Pier No. 16)	\$/m ³	40	m ³	17,500	700,000	
		\$/pier	10,000	pier	5	50,000	
	Demolishing (Small pier)	\$/m ²	3	m ²	7,000	21,000	
		\$/m ²	100	m ²	6,300	630,000	
	Demolishing (Building)	\$/m ²					
	Environmental protection					1,251,350	
	Misc. works	\$/m ²	69.6	LS	1	69.6	
	Mole yard pavement	\$/m ²	105.3	m ²	24,000	1,670,400	
	Mole road pavement	\$/m ²		m ²	1,800	189,540	
Subtotal					6,028,630		
B3/4	Flyover	\$/m ²	2,500	m ²	0	0	
		\$/set	11,000,000	set	1	11,000,000	
	Bunker pier reinstatement	\$/set	440,000	set	6	2,640,000	
	Loading arms	\$/m	2,000	m	400	800,000	
	Bunker lines	\$/m	4,000	m	0	0	
	Breakwater Improvement					14,440,000	
	Subtotal					163,930,250	
	Marine Works	Dredging reduction	\$/m ³	2.76	m ³	900,000	-2,484,000
		Reduction	\$/m ³	54.00	m ³	264,000	-14,256,000
		Supplemental reduction			LS	0	0
Total reduction						-16,740,000	
Marine Works	Reduction 14/12	\$/m	4,300	m	600	-2,580,000	
	Wharf cost reduction			LS	0	0	
	Supplemental reduction					-19,320,000	
	Total reduction					144,610,250	
B3/4						163,930,250	

TABLE F14 (III) B5 CRISTOBAL PORT COST ESTIMATION - Summary

Work Category	Works	Unit Rate		Works	Unit Rate		Cost
		Unit	Rate		Unit	Rate	
A. General Works							3,625,000
B. Marine Works							18,900,000
C. On-land Works							9,913,140
D. Building							6,130,210
E. Utilities							3,532,500
F. Supplemental Works							1,545,410
G. Others							0
H. Subtotal							43,646,260
I. Contingency (15% of H)							6,546,940
J. Engineering (10% of H)							4,364,630
K. Total (H + I + J)							54,557,830
Land Use							
Total Area		10.50	ha	100.0 %			
Back apron		0.50	ha	4.8			
Inner access		2.63	ha	25.0			
Yard pavement		0.22	ha	2.2			
Yard pavement (1) gravel pavement		1.05	ha	10.0			
Yard pavement (2) Light pavement		3.78	ha	36.0			
Yard pavement (3) Normal pavement		0.47	ha	4.4			
Yard pavement (4) Heavy pavement C2		0.47	ha	4.4			
Yard pavement (5) Heavy pavement C3		0.21	ha	6.7			
Building		0.21	ha	2.0			
Parks		0.47	ha	4.5			
Reserves							
A. General Works	Mobilization/Demobilization Mobilization/Demobilization Site Common Works						500,000
B. Marine Works	Subtotal						3,125,000
	Scrub Clearance	101,000	B	0			0
	Dredging and reclamation	\$/m ³	m ³	0			0
	Dredging and reclamation	\$/m ³	m ³	0			0
	Dredging and reclamation	\$/m ³	m ³	0			0
	Dredging and disposal	\$/m ³	m ³	0			0
	Dredging and disposal	\$/m ³	m ³	0			0
	Borrowing and reclamation	\$/m ³	m ³	0			0
	Seawall (1) +3.6 m -+0.0m	2,559	\$/m	0			0
	(2) +0.0 m -+5.0	4,907	\$/m	0			0
	(3) -5.0 m -+10.0	7,987	\$/m	0			0
	(4) -10.0 m -+15.0	15,375	\$/m	0			0
	Wharf (1) -10.0 m		\$/m	0			0
	(2) -12.0 m	58,700	\$/m	0			0

Case: SITE - F14 (c) B5

Work Category	Works	Unit Rate		Works	Unit Rate		Cost
		Unit	Rate		Unit	Rate	
C. On-land Works	Ro-Ro System (3) -14.0 m Subtotal	\$/m LS	300 0				18,900,000 0
	Soil Improvement	\$/ha	700,000	ha	0		0
	Inner access	\$/m ²	69.6	m ²	26,300		1,830,480
	Back apron	\$/m ²	131.5	m ²	(5,100)		0
	Side apron	\$/m ²	131.5	m ²	0		0
	Pavement (1) Gravel pave.	\$/m ²	39.0	m ²	4,500		175,500
	(2) Light pave.	\$/m ²	69.6	m ²	10,500		730,800
	(3) Normal pave.	\$/m ²	105.3	m ²	37,800		3,980,340
	(4) Heavy pave. C2	\$/m ²	150.0	m ²	4,700		705,000
	(5) Heavy pave. C3	\$/m ²	411.6	m ²	4,700		1,934,520
	Storm water Drainage	\$/ha	53,000	ha	10.5		556,500
	Subtotal						9,913,140
D. Building	Main Gate	\$/m ²	567	m ²	(7,000)		368,550
	Control House	\$/m ²	1,170	m ²	1,000		1,170,000
	Maintenance Shops	\$/m ²	1,042	m ²	1,000		1,042,000
	CFS	\$/m ²	846	m ²	2,500		2,115,000
	Substation/Power station	\$/m ²	602	m ²	1,050		632,100
	Passenger Terminal	\$/m ²	450	m ²	0		0
	Misc. buildings	\$/m ²	570	m ²	800		456,000
	Weigh bridge	\$/set	76,300	set	2		152,600
	Over-head passenger bridge	\$/m	3,000	m	0		0
	Fence	\$/m	123	m	655		80,560
	Park	\$/m ²	35	m ²	2,100		73,500
	Landscaping	\$/m ²	19	m ²	2,100		39,900
	Subtotal						6,130,210
E. Utilities	Water Supply (Main)	\$/B	175,000	B	1		175,000
	Water Supply (Dist.)	\$/ha	20,000	ha	10.50		210,000
	Fire fighting	\$/ha	2,000	ha	10.50		21,000
	Sewerage	\$/ha	9,300	ha	10.50		97,650
	Power Supply (Dist.)	\$/B	1,020,000	B	1		1,020,000
	Power Supply (P. Plant)	\$/B	530,000	B	1		530,000
	Power Supply (W. Crane)	\$/B	455,000	B	1		455,000
	Lighting (Yard)	\$/B	240,000	B	1		240,000
	Lighting (Road)	\$/ha	24,000	ha	3.68		88,320
	Telecommunication	\$/B	42,000	B	1		42,000
	Reefe System	\$/B	100,000	B	1		100,000
	Bunker System	\$/m	1,000	m	300		300,000
	Misc. utilities			LS	1		253,530
	Subtotal						3,532,500
F. Supplemental Works	Navigation aid	\$/B	500,000	B	1		500,000
	Outer access (new)	\$/m ²	105.3	m ²	5,000		526,500
	Outer access (improve)	\$/m ²	34.8	m ²	0		0
	Demolishing						0

TABLE F14 (IV) B5 CRISTORAL PORT COST ESTIMATION - Summary

		Case: SITE - F14 (c) B5				Case: SITE - F14 (d) B5			
Work Category	Works	Unit Rate		Works	Unit Rate		Works	Cost	
		Unit	Unit		Unit	Unit			
A. General Works								5,250,000	
B. Marine Works								28,929,050	
C. On-land Works								11,383,140	
D. Building								6,180,030	
E. Utilities								4,382,500	
F. Supplemental Works								1,827,850	
G. Others								11,290,000	
H.	Subtotal							69,242,570	
I. Contingency	Physical (15% of H)							10,386,380	
J. Engineering	(10% of H)							6,924,260	
K.	Total (H + I + J)							86,553,210	
Land Use									
Total Area								100.0 %	
Back apron								4.8	
Inner access								25.0	
Yard pavement								2.2	
Yard pavement	(1) gravel pavement							10.0	
Yard pavement	(2) Light pavement							36.0	
Yard pavement	(3) Normal pavement							4.4	
Yard pavement	(4) Heavy pavement C2							4.4	
Yard pavement	(5) Heavy pavement C3							6.7	
Building								0.21	
Parks								0.47	
Reserves								0.47	
A. General Works								500,000	
	Mobilization/Demobilization							1,625,000	
	Site Common Works							3,125,000	
B. Marine Works								5,250,000	
	Subtotal							101,000	
	Seabed Clearance							800,000	
	Dredging and reclamation							0	
	Dredging and reclamation							0	
	Dredging and reclamation							0	
	Dredging and disposal							924,600	
	Dredging and disposal							0	
	Borrowing and reclamation							0	
	Seawall (1) +3.6 m -+0.0m							0	
	Seawall (2) +0.0 - -5.0							0	
	Seawall (3) -5.0 - -10.0							245,350	
	Seawall (4) -10.0 - -15.0							399,350	
	Wharf (1) -10.0 m							6,918,750	
	Wharf (2) -12.0 m							0	

Case: SITE - F14 (c) B5

Work Category	Works	Unit Rate		Unit	Works	Cost
		Unit	Unit			
G. Others	Demolishing (Pier No. 16)	\$/m ³	40	m ³	0	0
	Demolishing (Small pier)	\$/pier	10,000	0	0	0
	Demolishing (Onland civil)	\$/m ²	3	m ²	50,000	150,000
	Demolishing (Building)	\$/m ²	100	m ²	1,000	100,000
	Environmental protection	LS		LS	0	0
	Misc. works	LS		LS	1	268,910
	Subtotal					1,545,410
	Flyover	\$/m ²	2,500	m ²	0	0
	Bunker pier reinstallation	\$/set	11,000,000	set	0	0
	Loading arms	\$/set	440,000	set	0	0
Bunker lines	\$/m	2,000	m	0	0	
Breakwater improvement	\$/m	4,000	m	0	0	
Subtotal					0	
Cost by Wharf Depth						
Cost F-14 (III)	B5					43,646,260
Marine Works	Dredging reduction	\$/m ³	2.76	m ³	0	0
	Supplemental reduction					0
	Total reduction					0
Cost F-14 (III)/12	B5					43,646,260
Cost F-14 (III)	Reduction 14/12					43,646,260
Marine Works	Wharf cost reduction	\$/m	4,300	m	300	-1,290,000
	Supplemental reduction					0
	Total reduction					-1,290,000
Cost F-12 (III)	B5					42,356,260

Case: SITE - F14 (d) B5		Works		Unit Rate		Cost	
Work Category	Works	Unit	Unit Rate	Unit	Works	Cost	
C. On-land Works	Ro-Ro System	(3) - 14.0 m	\$/m	63,000	m	300	18,900,000
	Subtotal		LS	2,280,000	set	0	0
	Soil Improvement		\$/ha	700,000	ha	2.10	1,470,000
	Inner access		\$/m ²	69.6	m ²	26,300	1,830,480
	Back apron		\$/m ²	131.5	m ²	(5,100)	0
	Side apron		\$/m ²	131.5	m ²	0	0
	Pavement (1) Gravel pave.		\$/m ²	39.0	m ²	4,500	175,500
	(2) Light pave.		\$/m ²	69.6	m ²	10,500	730,800
	(3) Normal pave.		\$/m ²	105.3	m ²	37,800	3,980,340
	(4) Heavy pave. C2		\$/m ²	150.0	m ²	4,700	705,000
	(5) Heavy pave. C3		\$/m ²	411.6	m ²	4,700	1,934,520
	Storm water Drainage		\$/ha	53,000	ha	10.5	556,500
	Subtotal						11,383,140
D. Building	Main Gate		\$/m ²	567	m ²	(7,000 m ²)	3,981,000
	Control House		\$/m ²	1,170	m ²	650	760,500
	Maintenance Sheds		\$/m ²	1,042	m ²	1,000	1,042,000
	CFS		\$/m ²	846	m ²	2,500	2,115,000
	Substation/Power station		\$/m ²	602	m ²	1,050	632,100
	Passenger Terminal		\$/m ²	450	m ²	0	0
	Misc., buildings		\$/m ²	570	m ²	800	456,000
	Weight bridge		\$/set	76,300	set	2	152,600
	Over-head passenger bridge		\$/m	3,000	m	0	0
	Fence		\$/m	123	m	1,060	130,380
	Park		\$/m ²	35	m ²	2,100	73,500
	Landscaping		\$/m ²	19	m ²	2,100	39,900
	Subtotal						6,180,030
E. Utilities	Water Supply (Main)		\$/B	175,000	B	1	175,000
	Water Supply (Dis.)		\$/ha	20,000	ha	10.50	210,000
	Fire fighting		\$/ha	2,000	ha	10.50	21,000
	Sewerage		\$/ha	9,300	ha	10.50	97,650
	Power Supply (Dist.)		\$/B	1,020,000	B	1	1,020,000
	Power Supply (P. Plant)		\$/B	530,000	B	1	530,000
	Power Supply (W. Crane)		\$/B	455,000	B	1	455,000
	Lighting (Yard)		\$/B	240,000	B	1	240,000
	Lighting (Road)		\$/ha	24,000	ha	3.68	88,320
	Telecommunication		\$/B	42,000	B	1	42,000
	Radar System		\$/B	100,000	B	1	100,000
	Bunker System		\$/m	1,150	m	1,150	1,150,000
	Misc., utilities		\$/m ²	1,000	m ²	1	253,530
Subtotal						4,382,500	
F. Supplemental Works	Navigational aid		\$/B	500,000	B	0	500,000
	Outer access (new)		\$/m ²	103.3	m ²	2,000	210,600
	Outer access (improve)		\$/m ²	34.8	m ²	0	0
Demolishing							

Case: SITE - F14 (d) B5		Works		Unit Rate		Cost	
Work Category	Works	Unit	Unit Rate	Unit	Works	Cost	
G. Others	Demolishing (Pier No. 16)		\$/m ³	40	m ³	15,750	630,000
	Demolishing (Small pier)		\$/pier	10,000	pier	5	50,000
	Demolishing (Onland civil)		\$/m ²	3	m ²	7,000	21,000
	Demolishing (Building)		\$/m ²	100	m ²	300	30,000
	Environmental protection		LS		LS	1	70,940
	Misc. works		LS		LS	1	315,310
	Subtotal						1,827,850
	Flyover		\$/m ²	2,500	m ²	0	0
	Bunker pier reinstatement		\$/set	11,000,000	set	0.75	8,250,000
	Loading arms		\$/set	440,000	set	6	2,640,000
	Bunker lines		\$/m	2,000	m	200	400,000
	Breakwater Improvement		\$/m	4,000	m	0	0
	Subtotal						11,290,000
Cost by Wharf/Detail							
Cost F-14 (IV)	B5					69,242,570	
Marine Works	Dredging reduction	\$/m ³	2.76	m ³	0	0	
	Supplemental reduction	LS		LS	0	0	
	Total reduction					0	
Cost F-14 (IV)/12	B5					69,242,570	
Cost F-14 (IV)	Marine Works	\$/m	4,300	m	300	-1,290,000	
	Reduction 14/12	LS		LS	0	0	
	Wharf cost reduction					-1,290,000	
	Supplemental reduction					-1,290,000	
	Total reduction					67,952,570	
Cost F-12 (IV)	B5						

TABLE CS14 B2 CRISTOBAL PORT COST ESTIMATION - Summary

Case: SITE - CS14 B2		Works		Unit Rate		Cost	
Work Category	Works	Unit	Unit	Unit	Unit	Unit	Unit
A. General Works							6,875,000
B. Marine Works							49,642,800
C. On-land Works							9,913,140
D. Building							6,172,650
E. Utilities							9,232,500
F. Supplemental Works							5,664,540
G. Others							0
H.	Subtotal						87,500,630
I. Contingency	Physical (15 % of H)						13,125,090
J. Engineering	(10 % of H)						8,750,060
K.	Total (H + I + J)						109,375,780
Land Use							
Total Area		100.0 %	ha	10.50			
Back apron		4.8	ha	0.50			
Inner access		25.0	ha	2.63			
Yard pavement		2.2	ha	0.22			
Yard pavement		10.0	ha	1.05			
Yard pavement	(1) Gravel pavement	36.0	ha	3.78			
Yard pavement	(2) Light pavement	4.4	ha	0.47			
Yard pavement	(3) Normal pavement	4.4	ha	0.47			
Yard pavement	(4) Heavy pavement C2	6.7	ha	0.70			
Building	(5) Heavy pavement C3	2.0	ha	0.21			
Parks		4.5	ha	0.47			
Reserves							
A. General Works	Mobilization/Demobilization						500,000
	Mobilization/Demobilization						3,250,000
	Site Common Works						3,125,000
B. Marine Works	Subtotal						6,875,000
	Sealed Clearance		B	101,000			303,000
	Dredging and reclamation		m³	1.80			0
	Dredging and reclamation		m³	5.40			661,500
	Dredging and reclamation		m³	54.0			0
	Dredging and disposal		m³	2.76			19,449,720
	Dredging and disposal		m³	9.96			6,578,580
	Borrowing and reclamation		m³	4.80			0
	Seawall (1) +3.6 m-40.0m		m	2,559			0
	(2) ±0.0 - -5.0		m	4,907			0
	(3) -5.0 - -10.0		m	7,987			0
	(4) -10.0 - -15.0		m	15,375			0
	Wharf (1) -10.0 m		m				0
	(2) -12.0 m		m	61,700			0

Case: SITE - CS14 B2		Works		Unit Rate		Cost	
Work Category	Works	Unit	Unit	Unit	Unit	Unit	Unit
C. On-land Works	Ro-Ro System	(3) -14.0 m	m	67,900			20,370,000
	Subtotal		sq	228,000			2,280,000
	Soil Improvements		ha	700,000			0
	Inner access		m²	69.6			1,830,480
	Back apron		m²	131.5			0
	Side apron		m²	131.5			0
	Pavement (1) Gravel pave.		m²	39.0			4,500
	(2) Light pave.		m²	69.6			175,500
	(3) Normal pave.		m²	105.3			750,800
	(4) Heavy pave. C2		m²	150.0			3,980,340
	(5) Heavy pave. C3		m²	411.6			705,000
	Storm water Drainage		ha	53,000			1,934,520
	Subtotal						556,500
D. Building	Main Gate		m²	567			368,550
	Control House		m²	1,170			1,170,000
	Maintenance Shops		m²	1,042			1,042,000
	CFS		m²	846			2,115,000
	Substation/Power station		m²	602			632,100
	Passenger Terminal		m²	450			0
	Misc., buildings		m²	570			456,000
	Weight bridge		sa	76,300			152,600
	Over-head passenger bridge		m	3,000			0
	Fence		m	123			123,000
	Park		m²	35			73,500
	Landscaping		m²	19			39,900
	Subtotal						6,172,650
E. Utilities	Water Supply (Main)		B	175,000			175,000
	Water Supply (Dis.)		ha	20,000			210,000
	Fire fighting		ha	2,000			21,000
	Sewerage		ha	9,300			97,650
	Power Supply (Distr.)		B	1,020,000			1,020,000
	Power Supply (P. Plant)		B	530,000			530,000
	Power Supply (W. Crane)		B	455,000			455,000
	Lighting (Road)		B	240,000			240,000
	Lighting (Yard)		ha	24,000			88,320
	Telecommunication		B	42,000			42,000
	Reefers System		B	100,000			100,000
	Bunker System		m	1,000			6,000,000
	Misc., utilities		LS	253,530			253,530
	Subtotal						9,232,500
F. Supplemental Works	Navigation aid		B	500,000			2,000,000
	Outer access (new)		m²	105.3			0
	Outer access (improve)		m²	34.8			315,200
	Demolishing		m³	40			440,000

TABLE CS14 B3/4 CRISTORAL PORT COST ESTIMATION - Summary

Work Category	Works	Unit Rate		Works	Unit Rate		Cost
		Unit	Unit		Unit	Unit	
A. General Works							8,062,500
B. Marine Works							61,732,710
C. On-land Works							19,826,280
D. Building							16,429,300
E. Utilities							7,065,000
F. Supplemental Works							3,139,590
G. Others							0
H. Subtotal							116,256,380
I. Contingency	Physical (15 % of H)						17,438,460
J. Engineering	(10 % of H)						11,625,640
K. Total	(H + I + J)						145,320,480
Land Use							
Total Area							100 %
Back apron							4.8
Inner access							25.0
Yard pavement							2.1
Yard pavement	(1) Gravel pavement						10.0
Yard pavement	(2) Light pavement						36.0
Yard pavement	(3) Normal pavement						4.5
Yard pavement	(4) Heavy pavement C2						4.5
Yard pavement	(5) Heavy pavement C3						9.5
Building							2.0
Parks							0.42
Reserves							0.34
A. General Works	Mobilization/Demobilization Mobilization/Demobilization Site Clearance Works						500,000 3,250,000 4,312,500
B. Marine Works	Subtotal						8,062,500
	Seabed Clearance						202,000
	Dredging and reclamation						283,500
	Dredging and reclamation						0
	Dredging and reclamation						0
	Dredging and disposal						1,304,100
	Dredging and reclamation						0
	Borrowing and reclamation						11,340,000
	Seawall (1) +3.6 m-±0.0m						0
	(2) ±0.0 - -5.0						0
	(3) -5.0 - -10.0						392,560
	(4) -10.0 - -15.0						0
	Wharf (1) -10.0 m						0
	(2) -12.0 m						0

Case: SITE - CS14 B2

Work Category	Works	Unit Rate		Unit	Cost
		Unit	Unit		
G. Others	Demolishing (Pier No. 7 shed)	\$/m ²	80	m ²	7,900
	Demolishing (Pier No. 16)	\$/m ²	40	m ²	0
	Demolishing (Small pier)	\$/pier	10,000	0	0
	Demolishing (Onland civil)	\$/m ²	3	42,000	126,000
	Demolishing (Building)	\$/m ²	100	500	50,000
	Environmental protection				800,600
	Misc. works				382,910
	Pavement after P7 shed	\$/m ²	66.0	7,900	521,400
	Mole yard pavement	\$/m ²	69.6	4,860	338,250
	Mole road repair	\$/m ²	100.0	600	60,000
	Subtotal			5,664,540	
G. Others	Flyover	\$/m ²	2,500	m ²	0
	Bunker pier reinstallation	\$/set	11,000,000	0	0
	Loading arms	\$/set	440,000	0	0
	Bunker lines	\$/m	2,000	0	0
	Break-water Improvement	\$/m	4,000	0	0
	Subtotal			0	
Cost by Wharf Depth					
Cost CS-14	B2				87,500,630
Marine Works	Dredging Reduction	\$/m ³	2.76	m ³	2,519,000
	Supplemental reduction				0
	Total reduction				-6,952,440
Cost CS-14/12	B2				80,548,190
Cost CS-14	Reduction 14/12				87,500,630
Marine Works	Wharf cost reduction	\$/m	6,200	m	300
	Supplemental reduction				0
	Total reduction				-1,860,000
Cost CS-12	B2				-8,812,440
					78,698,190

Work Category	Works	Unit Rate		Works	Cost		
		Unit	Unit				
C. On-land Works	Ro-Ro System	\$/m	67,900	600	40,740,000		
		LS	2,280,000	1	2,280,000		
	Subtotal					61,733,710	
		Soil Improvement	\$/ha	700,000	0	0	
		Inner access	\$/m ²	69.6	52,600	3,660,960	
		Back apron	\$/m ²	131.5	(10,200)	0	
		Side apron	\$/m ²	131.5	0	0	
		Pavement (1) Gravel pave.	\$/m ²	39.0	9,000	351,000	
		(2) Light pave.	\$/m ²	69.6	21,000	1,461,600	
		(3) Normal pave.	\$/m ²	105.3	75,600	7,960,680	
		(4) Heavy pave. C2	\$/m ²	150.0	9,400	1,410,000	
		(5) Heavy pave. C3	\$/m ²	411.6	9,400	3,869,040	
		Storm water Drainage	\$/ha	53,000	21.0	1,113,000	
		Subtotal					19,826,280
		D. Building	Main Gate	\$/m ²	567	1,300	737,100
Control House	\$/m ²		1,170	2,000	2,340,000		
Maintenance Shops	\$/m ²		1,042	3,000	3,126,000		
CFS	\$/m ²		846	7,000	5,922,000		
Substation/Power station	\$/m ²		602	2,100	1,264,200		
Passenger Terminal	\$/m ²		450	3,000	1,350,000		
Misc. buildings	\$/m ²		570	1,600	912,000		
Weight bridge	\$/set		76,300	4	305,200		
Over-head passenger bridge	\$/m		3,000	0	0		
Fence	\$/m		123	2,000	246,000		
Park	\$/m ²		35	4,200	147,000		
Landscaping	\$/m ²		19	4,200	79,800		
Subtotal						16,429,300	
E. Utilities	Water Supply (Main)		\$/B	175,000	2	350,000	
	Water Supply (Dis.)		\$/ha	20,000	21.00	420,000	
	Fire fighting	\$/ha	2,000	21.00	42,000		
	Sewerage	\$/ha	9,300	21.00	195,300		
	Power Supply (Disur.)	\$/B	1,020,000	2	2,040,000		
	Power Supply (P. Plant)	\$/B	530,000	2	1,060,000		
	Power Supply (W. Crane)	\$/B	455,000	2	910,000		
	Lighting (Yard)	\$/B	240,000	2	480,000		
	Lighting (Road)	\$/ha	24,000	7.36	176,640		
	Telecommunication	\$/B	42,000	2	84,000		
	Radar System	\$/B	100,000	2	200,000		
	Bunker System	\$/m	1,000	600	600,000		
	Misc. utilities	\$/m	1,000	2	507,060		
	Subtotal					7,065,000	
	F. Supplemental Works	Navigation aid	\$/B	500,000	0	0	
Outer access (new)		\$/m ²	105.3	0	0		
Outer access (improve)		\$/m ²	34.8	0	0		
Demolishing (Pier No. 16)		\$/m ²	40	700	28,000		

Work Category	Works	Unit Rate		Works	Cost	
		Unit	Unit			
G. Others	Demolishing (Small pier)	\$/pier	10,000	0	0	
		\$/m ²	3	42,000	126,000	
	Demolishing (Building)	\$/m ²	100	2,000	200,000	
		LS	1	1	387,830	
	Environmental protection	\$/m ²	69.6	24,000	1,670,400	
		\$/m ²	105.3	1,800	189,540	
	Subtotal					3,139,590
	Flyover	Flyover	\$/m ²	2,500	0	0
			\$/set	11,000,000	0	0
		Bunker pier reinstallation	\$/set	440,000	0	0
			\$/m	2,000	0	0
		Loading arms	\$/m	4,000	0	0
			\$/m	4,000	0	0
		Bunker lines	\$/m	4,000	0	0
			\$/m	4,000	0	0
Breakwater Improvement		\$/m	4,000	0	0	
		\$/m	4,000	0	0	
Subtotal						0
Cost by Wharf Depth		B 3/4	\$/m ²	2,500	0	0
			\$/set	11,000,000	0	0
		Reduction	\$/m	6,300	6M	3,720,000
			LS	0	0	-3,720,000
	B 3/4	\$/m	6,300	6M	3,720,000	
		LS	0	0	-3,720,000	
	Subtotal	\$/m	6,300	6M	3,720,000	
		LS	0	0	-3,720,000	
	Cost CS12	Reduction 14/12	\$/m	6,300	6M	3,720,000
			Wharf cost reduction	\$/m	6,300	6M
		Supplemental reduction	\$/m	6,300	6M	3,720,000
			Total reduction	\$/m	6,300	6M
		B 3/4	\$/m	6,300	6M	3,720,000
			LS	0	0	-3,720,000
		Subtotal	\$/m	6,300	6M	3,720,000
LS			0	0	-3,720,000	

Apéndice II-A-2 Costo de Muelle por el Tipo Estructural

TABLE UNIT COST STUDY SHEET WHARF -12.0 m SITE - C

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Unit	Unit	Unit	Unit	Unit
Open Structure Type	Batter Pile Type	m/m	m ³	7.56	\$/m	1,451.5	\$/m
Dredging and Replacing Pile, Line-1, 2, 3, 4, 5	Preboring, Material, Ø900 L=32.6	m/m	0	1,084.0	\$/m	0	\$/m
Pile, Line-2, 3, 4, 5 Ø600	Driving	m/m	2.31	1,282.0	\$/m	2,961.4	\$/m
	Preboring, Material, Ø600 L=32.6	m/m	6.52	162.0	\$/m	1,056.2	\$/m
Pile, Line-1, 2, Ø600	Driving	m/m	0	1,084.0	\$/m	0	\$/m
	Preboring, Material, Ø600 L=32.6	m/m	5.00	1,282.0	\$/m	6,410.0	\$/m
Crane foundation pile	Driving	m/m	26.08	108.0	\$/m	2,816.6	\$/m
	Preboring, Material, Ø900 L=32.1	m/m	7.78	1,282.0	\$/m	9,974.0	\$/m
Cathodic protection	Selected fill	m ³	40.6	108.0	\$/m	4,384.8	\$/m
	Rubble back-fill	m ³	1.52	1,282.0	\$/m	1,948.6	\$/m
Armor rock	Concrete deck	m ²	4.28	54.0	\$/m	231.1	\$/m
	L-shaped wall	m ²	36.4	65.0	\$/m	2,366.0	\$/m
Apron pavement	Sheet	m ²	237.1	25.0	\$/m	5,927.5	\$/m
	Pile protection	m ²	11.4	56.4	\$/m	643.0	\$/m
Sheet	Fender	ea/m	49.3	70.5	\$/m	3,475.7	\$/m
	Bollard	ea/m	20.8	440.0	\$/m	9,152.0	\$/m
Fittings, etc.	Subtotal		2.2	440.0	\$/m	968.0	\$/m
	Construction Equipment		2.8	440.0	\$/m	1,232.0	\$/m
Pile driving fleet mobilization	Subtotal		19.3	131.5	\$/m	2,538.0	\$/m
	Pile Yard		14.88	100.0	\$/m	1,488.0	\$/m
Grand Total	Subtotal		71.0	20.0	\$/m	1,420.0	\$/m
	Grand Total		0.1	20,000.0	\$/m	2,000.0	\$/m
			0.02	2,000.0	\$/m	40.0	\$/m
			1	1,600.0	\$/m	1,600.0	\$/m
			0	810.0	\$/m	0	\$/m
			1	1,304.0	\$/m	1,304.0	\$/m
			1	400.0	\$/m	400.0	\$/m
					\$/m	1,704.0	\$/m
					\$/m	65,788.4	\$/m

TABLE UNIT COST STUDY SHEET
WHARF -12.0 m SITE - T

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Unit	Unit	Unit	Unit	Unit
Open Structure Type	Vertical Piles	m ³ /m					
Dredging	Preboring, Ø1,300	0	5.4	\$/m	0	\$/m	0
Pile, Line - 1/2, Ø1,100	Material, Ø1,100 (t=1.6 L=25.1)	1.23	1,300.0	\$/m	1,599.0	\$/m	1,599.0
	Driving	4.35	1,282.0	\$/m	5,576.7	\$/m	5,576.7
	Preboring	10.04	198.0	\$/m	1,987.9	\$/m	1,987.9
Pile, Line - 3/5, Ø1,100	Material, Ø1,100 (t=1.6 L=22.6)	1.85	1,300.0	\$/m	2,405	\$/m	2,405
	Driving	5.87	1,282.0	\$/m	7,525.3	\$/m	7,525.3
		13.56	198.0	\$/m	2,684.9	\$/m	2,684.9
Crane foundation pile	Material, Ø900 (t=1.6 L=22.1)	1.04	1,282.0	\$/m	1,333.3	\$/m	1,333.3
	Driving	2.95	54.0	\$/m	159.3	\$/m	159.3
Cathodic protection		16.7	65.0	\$/m ²	1,085.5	\$/m ²	1,085.5
Selected fill		237.1	25.0	\$/m ³	5,927.5	\$/m ³	5,927.5
Rubble back-fill		11.4	56.4	\$/m ³	643.0	\$/m ³	643.0
Armor rock		49.3	70.5	\$/m ³	3,475.7	\$/m ³	3,475.7
Concrete deck		20.8	440.0	\$/m ³	9,152.0	\$/m ³	9,152.0
L-shaped wall		2.2	440.0	\$/m ³	968.0	\$/m ³	968.0
Crane beam		2.8	440.0	\$/m ³	1,232.0	\$/m ³	1,232.0
Apron pavement		19.3	131.5	\$/m ²	2,538.0	\$/m ²	2,538.0
Pile protection	FRP covering - 1.0 m	11.74	100.0	\$/m ²	1,174.0	\$/m ²	1,174.0
Sheet	t = 5 mm	71.0	20.0	\$/m ²	1,420.0	\$/m ²	1,420.0
Fender		0.1	20,000.0	\$/ea	2,000.0	\$/ea	2,000.0
Bollard		0.02	2,000.0	\$/ea	40.0	\$/ea	40.0
Fittings, etc.	Misc. fittings, Utilities, Crane Rail	1	1,600.0	\$/m	1,600.0	\$/m	1,600.0
	Subtotal			\$/m	54,527.1	\$/m	54,527.1
Construction Equipment	Boring fleet mobilization	1	1,265.0	\$/m	1,265.0	\$/m	1,265.0
	Pile driving fleet mobilization	1	1,304.0	\$/m	1,304.0	\$/m	1,304.0
	Pile Yard	1	280.0	\$/m	280.0	\$/m	280.0
	Subtotal			\$/m	2,849.0	\$/m	2,849.0
	Grand Total			\$/m	57,376.1	\$/m	57,376.1

TABLE UNIT COST STUDY SHEET
WHARF -14.0 m SITE - C

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Unit	Unit	Unit	Unit	Unit
Open Structure Type	Batter Pile Type	m ³ /m					
Dredging and Replacing Pile, Line-1, Ø600	Preboring	216.0	7.56	\$/m ³	1,633.0	\$/m ³	1,633.0
	Material, Ø600 (t=1.6 L=32.6)	0	1,084.0	\$/m	0	\$/m	0
	Driving Vertical	2.31	1,282.0	\$/m	2,961.4	\$/m	2,961.4
Pile, Line-2, 3, 4, 5 Ø600	Material, Ø600 (t=1.3 L=33.6)	6.52	1,084.0	\$/m	7,056.2	\$/m	7,056.2
	Driving Vertical	5.00	1,282.0	\$/m	6,410.0	\$/m	6,410.0
	Material, Ø600 (t=1.3 L=33.8)	26.1	108.0	\$/m	2,818.8	\$/m	2,818.8
	Driving Vertical	7.78	1,282.0	\$/m	9,974.0	\$/m	9,974.0
Pile, Line-1, 2, Ø600	Material, Ø900 (t=1.6 L=32.1)	40.6	108.0	\$/m	4,384.8	\$/m	4,384.8
	Driving	1.52	1,282.0	\$/m	1,948.6	\$/m	1,948.6
Crane foundation pile		4.28	54.0	\$/m	231.1	\$/m	231.1
Cathodic protection		36.4	65.0	\$/m ²	2,366.0	\$/m ²	2,366.0
Selected fill		254.7	25.0	\$/m ³	6,367.5	\$/m ³	6,367.5
Rubble back-fill		11.4	56.4	\$/m ³	643.0	\$/m ³	643.0
Armor rock		46.7	70.5	\$/m ³	3,292.4	\$/m ³	3,292.4
Concrete deck		20.8	440.0	\$/m ³	9,152.0	\$/m ³	9,152.0
L-shaped wall		2.2	440.0	\$/m ³	968.0	\$/m ³	968.0
Crane beam		2.8	440.0	\$/m ³	1,232.0	\$/m ³	1,232.0
Apron pavement		19.3	131.5	\$/m ²	2,538.0	\$/m ²	2,538.0
Pile protection	FRP covering - 1.0 m	14.88	100.0	\$/m ²	1,488.0	\$/m ²	1,488.0
Sheet	t = 5 mm	76.0	20.0	\$/m ²	1,520.0	\$/m ²	1,520.0
Fender		0.1	20,000.0	\$/ea	2,000.0	\$/ea	2,000.0
Bollard		0.02	2,000.0	\$/ea	40.0	\$/ea	40.0
Fittings, etc.	Misc. fittings, Utilities, Crane Rail	1	1,600.0	\$/m	1,600.0	\$/m	1,600.0
	Subtotal			\$/m	64,524.8	\$/m	64,524.8
Construction Equipment	Boring fleet mobilization	0	810	\$/m	0	\$/m	0
	Pile driving fleet mobilization	1	1,304.0	\$/m	1,304.0	\$/m	1,304.0
	Pile Yard	1	400.0	\$/m	400.0	\$/m	400.0
	Subtotal			\$/m	1,704.0	\$/m	1,704.0
	Grand Total			\$/m	66,328.8	\$/m	66,328.8

TABLE UNIT COST STUDY SHEET
WHARF -14.0 m SITE - C

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Quantity	Unit	Unit Rate	Unit	Unit Cost
Open Structure Type	Vertical Pile Type	m ³ /m	216.0	\$/m ³	7.56	\$/m	1,633.0
Dredging and Replacing	Preboring, Ø1,300	m ³ /m	0	\$/m	1,084.0	\$/m	0
Pile, Line-1, 2, 3, 4, 5	Material, Ø1,100 (e=2.1 L=32.6)	\$/t	18.53	\$/t	1,282.0	\$/m	23,755.5
Ø1,100	Driving	m ³ /m	32.6	\$/m	198.0	\$/m	6,454.8
		m ³ /m		\$/m		\$/m	
		\$/t		\$/t		\$/m	
		m ³ /m		\$/m		\$/m	
		\$/t		\$/t		\$/m	
		m ³ /m		\$/m		\$/m	
Crane foundation pile	Material, Ø900 (e=1.6 L=22.1)	\$/t	1.52	\$/t	1,282.0	\$/m	1,948.6
	Driving	m ³ /m	4.28	\$/m	54.0	\$/m	231.1
		m ² /m	27.4	\$/m ²	65.0	\$/m	1,781.0
Cathodic protection	Selected fill	m ³ /m	253.9	\$/m ³	25.0	\$/m	6,347.5
	Rubble back-fill	m ³ /m	11.4	\$/m ³	56.4	\$/m	643.0
	Armor rock	m ³ /m	46.7	\$/m ³	70.5	\$/m	3,292.4
	Concrete deck	m ³ /m	20.8	\$/m ³	440.0	\$/m	9,152.0
	L-shaped wall	m ³ /m	2.2	\$/m ³	440.0	\$/m	968.0
	Crane beam	m ³ /m	2.8	\$/m ³	440.0	\$/m	1,232.0
	Apron pavement	m ² /m	19.3	\$/m ²	131.5	\$/m	2,538.0
	Pile protection	m ² /m	11.74	\$/m ²	100.0	\$/m	1,174.0
	Sheet	m ² /m	76.0	\$/m ²	20.0	\$/m	1,520.0
	Fender	ea/m	0.1	\$/ea	20,000.0	\$/m	2,000.0
	Bollard	ea/m	0.02	\$/ea	2,000.0	\$/m	40.0
	Fittings, etc.		1	LS	1,600.0	\$/m	1,600.0
	Misc. fittings, Utilities, Crane Rail					\$/m	66,310.9
	Subtotal					\$/m	0
Construction Equipment	Boring fleet mobilization		0	LS	810.0	\$/m	0
	Pile driving fleet mobilization		1	LS	1,304.0	\$/m	1,304.0
	Pile Yard		1	LS	280.0	\$/m	280.0
	Subtotal					\$/m	1,584.0
	Grand Total					\$/m	67,894.9

TABLE UNIT COST STUDY SHEET
WHARF -14.0 m SITE - T

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Quantity	Unit	Unit Rate	Unit	Unit Cost
Open Structure Type	Vertical Pile Type	m ³ /m	0	\$/m ³	5.4	\$/m	0
Dredging and Replacing	Preboring, Ø1,300	m ³ /m	2.20	\$/m	1,300.0	\$/m	2,860.0
Pile, Line - 1/3, Ø1,100	Material, Ø1,100 (e=2.1 L=25.1)	\$/t	8.56	\$/t	1,282.0	\$/m	10,973.9
	Driving	m ³ /m	15.06	\$/m	198.0	\$/m	2,981.9
		m ³ /m	3.30	\$/m	1,300.0	\$/m	4,290
Pile, Line - 3/4, Ø1,100	Material, Ø1,100 (e=2.1 L=22.6)	\$/t	5.14	\$/t	1,282.0	\$/m	6,589.5
	Driving	m ³ /m	9.00	\$/m	198.0	\$/m	1,782.0
		\$/t		\$/t		\$/m	
		m ³ /m		\$/m		\$/m	
		\$/t		\$/t		\$/m	
		m ³ /m		\$/m		\$/m	
Crane foundation pile	Material, Ø900 (e=1.6 L=22.1)	\$/t	1.04	\$/t	1,282.0	\$/m	1,333.3
	Driving	m ³ /m	2.95	\$/m	54.0	\$/m	159.3
		m ² /m	25.77	\$/m ²	65.0	\$/m	1,675.1
Cathodic protection	Selected fill	m ³ /m	230.9	\$/m ³	25.0	\$/m	5,772.5
	Rubble back-fill	m ³ /m	11.4	\$/m ³	56.4	\$/m	643.0
	Armor rock	m ³ /m	46.7	\$/m ³	70.5	\$/m	3,292.4
	Concrete deck	m ³ /m	20.8	\$/m ³	440.0	\$/m	9,152.0
	L-shaped wall	m ³ /m	2.2	\$/m ³	440.0	\$/m	968.0
	Crane beam	m ³ /m	2.8	\$/m ³	440.0	\$/m	1,232.0
	Apron pavement	m ² /m	19.3	\$/m ²	131.5	\$/m	2,538.0
	Pile protection	m ² /m	11.74	\$/m ²	100.0	\$/m	1,174.0
	Sheet	m ² /m	76.0	\$/m ²	20.0	\$/m	1,520.0
	Fender	ea/m	0.1	\$/ea	20,000.0	\$/m	2,000.0
	Bollard	ea/m	0.02	\$/ea	2,000.0	\$/m	40.0
	Fittings, etc.		1	LS	1,600.0	\$/m	1,600.0
	Misc. fittings, Utilities, Crane Rail					\$/m	65,576.9
	Subtotal					\$/m	1,265.0
Construction Equipment	Boring fleet mobilization		1	LS	1,265.0	\$/m	1,265.0
	Pile driving fleet mobilization		1	LS	1,304.0	\$/m	1,304.0
	Pile Yard		1	LS	280.0	\$/m	280.0
	Subtotal					\$/m	2,849.0
	Grand Total					\$/m	65,425.9

TABLE UNIT COST STUDY SHEET
WHARF -12.0 m SITE - C

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit		Unit		Unit	
Caisson Type		m ³ /m		\$/m ³		\$/m	
Dredging and Replacing		192.0		7.56		1,451.5	
Base rock mound		m ³ /m		\$/m ³		\$/m	
		35.0		70.5		2,467.5	
Caisson	Prefabrication	m ³ /m		\$/m ³		\$/m	
		40.6		440.0		17,864.0	
Caisson	Towing and setting	ca/m		\$/ca		\$/m	
		0.05		50,400.0		2,520.0	
Sand fill		m ³ /m		\$/m ³		\$/m	
		86.4		9.6		829.4	
Concrete capping		m ³ /m		\$/m ³		\$/m	
		3.4		300.0		1,020.0	
Head beam		m ³ /m		\$/m ³		\$/m	
		7.4		330.0		2,442.0	
Rubble back fill		m ³ /m		\$/m ³		\$/m	
	+ 1.0 ~ -14.0	117.2		56.4		6,610.1	
Rubble back fill		m ³ /m		\$/m ³		\$/m	
	+ 3.3 ~ +1.0	5.6		47.0		263.2	
Sheet	t = 5 mm	m ² /m		\$/m ²		\$/m	
		48.1		20.0		962.0	
Crane beam		m ³ /m		\$/m ³		\$/m	
		2.8		440.0		1,232.0	
Piles, material		m		\$/t		\$/m	
	Steel, Ø900 t=1.6 L=32.1 etc 7.5	1.52		1,282.0		1,948.6	
Pile driving		m/m		\$/m		\$/m	
		4.28		54.0		231.1	
Apron pavement		m ² /m		\$/m ²		\$/m	
		41.0		131.5		5,391.5	
Fender		ca/m		\$/ca		\$/m	
		0.1		20,000.0		2,000.0	
Bollard		ca/m		\$/ca		\$/m	
		0.02		2,000.0		40.0	
Fittings, etc.	Misc. fittings, Utilities, Crane Rail			LS		\$/m	
		1		1,600.0		1,600.0	
Construction Equipment	Subtotal			LS		\$/m	
		1		3,023.0		48,872.9	
	Floating dock mobilization			LS		\$/m	
		1		3,023.0		3,023.0	
	Floating dock operation			LS		\$/m	
		1		8,389.5		8,389.5	
	Subtotal					\$/m	
						11,412.5	
	Grand total					\$/m	
						60,285.4	

TABLE UNIT COST STUDY SHEET
WHARF -12.0 m SITE - T

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit		Unit		Unit	
Caisson Type		m ³ /m		\$/m ³		\$/m	
Dredging and Replacing		0		5.4		0	
Base rock mound		m ³ /m		\$/m ³		\$/m	
		40.6		70.5		2,862.3	
Caisson	Prefabrication	m ³ /m		\$/m ³		\$/m	
		40.6		440.0		17,864.0	
Caisson	Towing and setting	ca/m		\$/ca		\$/m	
		0.05		50,400.0		2,520.0	
Sand fill		m ³ /m		\$/m ³		\$/m	
		86.4		9.6		829.4	
Concrete capping		m ³ /m		\$/m ³		\$/m	
		3.4		300.0		1,020.0	
Head beam		m ³ /m		\$/m ³		\$/m	
		7.4		330.0		2,442.0	
Rubble back fill		m ³ /m		\$/m ³		\$/m	
	+ 1.0 ~ -14.0	117.2		56.4		6,610.1	
Rubble back fill		m ³ /m		\$/m ³		\$/m	
	+ 3.3 ~ +1.0	5.6		47.0		263.2	
Sheet	t = 5 mm	m ² /m		\$/m ²		\$/m	
		48.1		20.0		962.0	
Crane beam		m ³ /m		\$/m ³		\$/m	
		2.8		440.0		1,232.0	
Piles, material		m		\$/t		\$/m	
	Steel, Ø900 t=1.6 L=22.1 etc 7.5	1.04		1,282.0		1,333.3	
Pile driving		m/m		\$/m		\$/m	
		6.14		54.0		331.6	
Apron pavement		m ² /m		\$/m ²		\$/m	
		41.0		131.5		5,391.5	
Fender		ca/m		\$/ca		\$/m	
		0.1		20,000.0		2,000.0	
Bollard		ca/m		\$/ca		\$/m	
		0.02		2,000.0		40.0	
Fittings, etc.	Misc. fittings, Utilities, Crane Rail			LS		\$/m	
		1		1,600.0		1,600.0	
Construction Equipment	Subtotal			LS		\$/m	
		1		3,023.0		47,301.4	
	Floating dock mobilization			LS		\$/m	
		1		3,023.0		3,023.0	
	Floating dock operation			LS		\$/m	
		1		8,389.5		8,389.5	
	Subtotal					\$/m	
						11,412.5	
	Grand total					\$/m	
						58,713.9	

TABLE UNIT COST STUDY SHEET
WHARF -14.0 m SITE - C

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Unit	Unit	Unit	Unit	Unit
Caisson Type		m ² /m	m ³	7.56	\$/m	1,633.0	
Dredging and Replacing		m ² /m	m ³	49.4	\$/m	3,482.7	
Base rock mound		m ² /m	m ³	440.0	\$/m	21,208.0	
Caisson	Prefabrication	ea/m	\$/ea	50,400.0	\$/m	2,520.0	
Caisson	Towing and setting	m ² /m	\$/m ²	9.6	\$/m	1,150.1	
Sand fill		m ² /m	m ³	3.7	\$/m	1,110.0	
Concrete capping		m ² /m	m ³	7.4	\$/m	2,442.0	
Head beam		m ² /m	m ³	127.2	\$/m	7,174.1	
Rubble back fill	+ 1.0 ~ -14.0	m ² /m	m ³	56.4	\$/m	263.2	
Rubble back fill	+ 3.3 ~ +1.0	m ² /m	m ³	47.0	\$/m	263.2	
Sheet	t = 5 mm	m ² /m	\$/m ²	20.0	\$/m	1,202.0	
Crane beam		m ² /m	\$/m ²	440.0	\$/m	1,232.0	
Piles, material	Steel, Ø900 (e=1.6 L=32.1 c/c 7.5	Øm	\$/t	1,282.0	\$/m	1,948.6	
Pile driving		m/m	\$/m	54.0	\$/m	231.1	
Apron pavement		m ² /m	\$/m ²	131.5	\$/m	5,391.5	
Fender		ea/m	\$/ea	20,000.0	\$/m	2,000.0	
Bollard		ea/m	\$/ea	2,000.0	\$/m	40.0	
Fittings, etc.	Misc. fittings, Utilities, Crane Rail	1	LS	1,600.0	\$/m	1,600.0	
	Subtotal				\$/m	54,628.3	
Construction Equipment	Floating dock mobilization	1	LS	3,023.0	\$/m	3,023.0	
	Floating dock operation	1	LS	9,870.0	\$/m	9,870.0	
	Subtotal				\$/m	12,893.0	
	Grand total				\$/m	67,521.3	

TABLE UNIT COST STUDY SHEET
WHARF -14.0 m SITE - T

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Unit	Unit	Unit	Unit	Unit
Caisson Type		m ² /m	\$/m ²	5.4	\$/m	0	
Dredging	Hard/weathered rock	m ² /m	\$/m ²	70.5	\$/m	1,233.8	
Base rock mound		m ² /m	\$/m ²	440.0	\$/m	21,208.0	
Caisson	Prefabrication	ea/m	\$/ea	50,400.0	\$/m	2,520.0	
Caisson	Towing and setting	m ² /m	\$/m ²	9.6	\$/m	1,150.1	
Sand fill		m ² /m	m ³	3.7	\$/m	1,110.0	
Concrete capping		m ² /m	m ³	7.4	\$/m	2,442.0	
Head beam		m ² /m	m ³	127.2	\$/m	7,174.1	
Rubble back fill	+ 1.0 ~ -14.0	m ² /m	m ³	56.4	\$/m	263.2	
Rubble back fill	+ 3.3 ~ +1.0	m ² /m	m ³	47.0	\$/m	263.2	
Sheet	t = 5 mm	m ² /m	\$/m ²	20.0	\$/m	1,202.0	
Crane beam		m ² /m	\$/m ²	440.0	\$/m	1,232.0	
Piles, material	Steel, Ø900 (e=1.6 L=22.1 c/c 7.5	Øm	\$/t	1,282.0	\$/m	1,333.3	
Pile driving		m/m	\$/m	54.0	\$/m	159.3	
Apron pavement		m ² /m	\$/m ²	131.5	\$/m	5,391.5	
Fender		ea/m	\$/ea	20,000.0	\$/m	2,000.0	
Bollard		ea/m	\$/ea	2,000.0	\$/m	40.0	
Fittings, etc.	Misc. fittings, Utilities, Crane Rail	1	LS	1,600.0	\$/m	1,600.0	
	Subtotal				\$/m	50,059.3	
Construction Equipment	Floating dock mobilization	1	LS	3,023.0	\$/m	3,023.0	
	Floating dock operation	1	LS	9,870.0	\$/m	9,870.0	
	Subtotal				\$/m	12,893.0	
	Grand total				\$/m	62,952.3	

TABLE UNIT COST STUDY SHEET
WHARF -12.0 m SITE - C

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Unit	Unit	Unit		
Sheet Pile Wall Type		m ² /m	\$/m ²			\$/m	\$/m
Dredging and Replacing	Preboring, Ø1,200	192.0	7.56			1,451.5	
Sheet Pile	Material, Ø1,000 t=1.3 L=29.0	0	1,084.0			0	
Sheet Pile	Material, Ø1,000 t=1.3 L=29.0	7.73	1,282.0			9,909.9	
Sheet Pile	Material	13.3	114.4			1,521.5	
Sheet Pile	Driving	24.2	216.0			5,227.2	
Anchor pile	Steel pile, Ø900 t=1.6 L=25.2	1.49	1,282.0			1,910.2	
Anchor pile	Driving	4.2	198.0			831.6	
Wale		0.26	798.0			207.5	
Tie-ropes	86 ton, (2,117 mm ²)	0.42	6,178.0			2,594.8	
Selected fill		237.5	25.0			5,937.5	
Rubble back-fill		118.2	56.4			6,666.5	
Anchor capping		4.8	440.0			2,112.0	
Concrete capping		7.2	440.0			3,168.0	
Crane beam		5.6	440.0			2,464.0	
Pile material	Steel Ø900 t=1.6 L=32.1 etc=7.5	3.03	1,282.0			3,884.5	
Pile driving		8.56	54.0			462.2	
Cathodic protection		21.2	65.0			1,378.0	
Apron pavement		42.0	131.5			5,523.0	
Fender		0.1	20,000.0			2,000.0	
Bollard		0.02	2,000.0			40.0	
Fittings, etc.	Misc. fittings, Utilities, Crane Rail	1	1,600.0			1,600.0	
	Subtotal					38,289.9	
Construction Equipment	Boring fleet mobilization	0	810.0			0	
	Pile driving fleet mobilization	1	1,304.0			1,304.0	
	Pile Yard	1	440.0			440.0	
	Subtotal					1,744.0	
	Grand Total					60,633.9	

TABLE UNIT COST STUDY SHEET
WHARF -12.0 m SITE - T

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Unit	Unit	Unit		
Sheet Pile Wall Type		m ² /m				\$/m	\$/m
Dredging		0	5.4			0	
Sheet Pile	Preboring, Ø1,200	3.06	1,300.0			3,978	
Sheet Pile	Material, Ø1,000 t=1.3 L=21.5	5.73	1,282.0			7,345.9	
Sheet Pile	Material	13.3	114.4			1,521.5	
Sheet Pile	Driving	17.9	216.0			3,866.4	
Anchor pile	Steel pile, Ø900 t=1.3 L=17.4	1.03	1,282.0			1,320.5	
Anchor pile	Driving	1.2	198.0			237.6	
Wale		0.26	798.0			207.5	
Tie-ropes	86 ton, (2,117 mm ²)	0.42	6,178.0			2,594.8	
Foot protection		11.4	70.5			803.7	
Selected fill		192.4	25.0			4,810.0	
Rubble back fill		118.2	56.4			6,666.5	
Anchor capping		4.8	440.0			2,112.0	
Concrete capping		7.2	440.0			3,168.0	
Crane beam		5.6	440.0			2,464.0	
Pile material	Steel Ø900 t=1.6 L=17.4 etc=6.0	2.05	1,282.0			2,628.1	
Pile driving		5.80	54.0			313.2	
Cathodic protection		21.2	65.0			1,378.0	
Apron pavement		42.0	131.5			5,523.0	
Fender		0.1	20,000.0			2,000.0	
Bollard		0.02	2,000.0			40.0	
Fittings, etc.	Misc. fittings, Utilities, Crane Rail	1	1,600.0			1,600.0	
	Subtotal					54,578.7	
Construction Equipment	Boring fleet mobilization	1	1,265.0			1,265.0	
	Pile driving fleet mobilization	1	1,304.0			1,304.0	
	Pile Yard	1	440.0			440.0	
	Subtotal					3,009.0	
	Grand Total					57,587.7	

TABLE UNIT COST STUDY SHEET

WHARF -14.0 m SITE - C

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Quantity	Unit	Unit Rate	Unit	Unit Cost
Sheet Pile Wall Type		m ² /m	216.0	\$/m ²	7.56	\$/m	1,633.0
Dredging and Replacing		m ³ /m	0	\$/m	1,084.0	\$/m	0
Sheet Pile	Preboring, Ø1,200	Ø/m	10.63	\$/Ø	1,282.0	\$/m	13,627.7
Sheet Pile	Material, Ø1,000 t=1.7 L=30.5	m ² /m	15.0	\$/m	114.4	\$/m	1,716.0
Sheet Pile	Material	m ² /m	25.4	\$/m	216.0	\$/m	5,486.4
Sheet Pile	Driving	Ø/m	2.50	\$/Ø	1,282.0	\$/m	3,205.0
Anchor pile	Steel pile, Ø900 t=1.6 L=25.4	m ² /m	7.1	\$/m	198.0	\$/m	1,405.8
Anchor pile	Driving	Ø/m	0.26	\$/Ø	798.0	\$/m	207.5
Wale	86 ton, (2,117 mm ²)	ea/m	0.50	\$/ea	6,178.0	\$/m	3,089.0
Tie-ropes		m ³ /m	302.4	\$/m ³	25.0	\$/m	7,560.0
Selected fill	Coral and sand	m ³ /m	118.2	\$/m ³	56.4	\$/m	6,666.5
Rubble back fill	+ 1.0 -- -14.0	m ³ /m	2.8	\$/m ³	440.0	\$/m	1,232.0
Anchor capping		m ² /m	7.2	\$/m ²	440.0	\$/m	3,168.0
Concrete capping		m ² /m	5.6	\$/m ²	440.0	\$/m	2,464.0
Crane beam		Ø/m	3.03	\$/Ø	1,282.0	\$/m	3,884.5
Pile, material	Steel Ø900 t=1.6 L=32.1 cte=7.5	m ² /m	8.6	\$/m	54.0	\$/m	464.4
Pile driving		m ² /m	21.2	\$/m ²	65.0	\$/m	1,378.0
Cathodic protection		m ² /m	42.0	\$/m ²	131.5	\$/m	5,523.0
Apron pavement		ea/m	0.1	\$/ea	20,000.0	\$/m	2,000.0
Fender		ea/m	0.02	\$/ea	2,000.0	\$/m	40.0
Bollard		LS	1	LS	1,600.0	\$/m	1,600.0
Fittings, etc.	Misc. fittings, Utilities, Crane Rail						66,350.8
	Subtotal						0
Construction Equipment	Boring fleet mobilization	LS	1	LS	1,304.0	\$/m	1,304.0
	Pile driving fleet mobilization	LS	1	LS	440.0	\$/m	440.0
	Pile Yard	LS	1	LS	1,744.0	\$/m	1,744.0
	Subtotal						68,094.8
	Grand Total						

TABLE UNIT COST STUDY SHEET

WHARF -14.0 m SITE - T

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Quantity	Unit	Unit Rate	Unit	Unit Cost
Sheet Pile Wall Type		m ² /m	0	\$/m ²	5.4	\$/m	0
Dredging		m ³ /m	5.67	\$/m	1,300.0	\$/m	7,371.0
Sheet Pile	Preboring, Ø1,200	Ø/m	8.36	\$/Ø	1,282.0	\$/m	10,717.5
Sheet Pile	Material, Ø1,000 t=1.7 L=24.0	m ² /m	15.0	\$/m	114.4	\$/m	1,716.0
Sheet Pile	Material	m ² /m	20.0	\$/m	216.0	\$/m	4,320.0
Sheet Pile	Driving	Ø/m	1.39	\$/Ø	1,282.0	\$/m	1,782.0
Anchor pile	Steel pile, Ø900 t=1.3 L=17.4	m ² /m	4.83	\$/m	198.0	\$/m	956.3
Anchor pile	Driving	Ø/m	0.26	\$/Ø	798.0	\$/m	207.5
Wale	86 ton, (2,117 mm ²)	ea/m	0.50	\$/ea	6,178.0	\$/m	3,089.0
Tie-ropes		m ³ /m	235.7	\$/m ³	25.0	\$/m	5,892.5
Selected fill	Coral and sand	m ³ /m	118.2	\$/m ³	56.4	\$/m	6,666.5
Rubble back fill	+ 1.0 -- -14.0	m ³ /m	4.8	\$/m ³	440.0	\$/m	2,112.0
Anchor capping		m ² /m	6.3	\$/m ²	440.0	\$/m	2,772.0
Concrete capping		m ² /m	5.6	\$/m ²	440.0	\$/m	2,464.0
Crane beam		Ø/m	2.09	\$/Ø	1,282.0	\$/m	2,679.4
Pile, material	Steel Ø900 t=1.6 L=22.1 cte=7.5	m ² /m	5.89	\$/m	54.0	\$/m	318.1
Pile driving		m ² /m	21.2	\$/m ²	65.0	\$/m	1,378.0
Cathodic protection		m ² /m	42.0	\$/m ²	131.5	\$/m	5,523.0
Apron pavement		ea/m	0.1	\$/ea	20,000.0	\$/m	2,000.0
Fender		ea/m	0.02	\$/ea	2,000.0	\$/m	40.0
Bollard		LS	1	LS	1,600.0	\$/m	1,600.0
Fittings, etc.	Misc. fittings, Utilities, Crane Rail						63,604.8
	Subtotal						1,265.0
Construction Equipment	Boring fleet mobilization	LS	1	LS	1,304.0	\$/m	1,304.0
	Pile driving fleet mobilization	LS	1	LS	440.0	\$/m	440.0
	Pile Yard	LS	1	LS	1,744.0	\$/m	1,744.0
	Subtotal						3,009.0
	Grand Total						66,613.8

TABLE UNIT COST STUDY SHEET
WHARF -12.0 m SITE - C

TABLE UNIT COST STUDY SHEET
WHARF -12.0 m SITE - T

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Unit	Unit	Unit	Unit	Unit
Concrete Block Type							
Dredging and replacing		m ³ /m	282.0	\$/m ³	7.56	\$/m	2,131.9
Base rock mound		m ³ /m	39.5	\$/m ³	70.5	\$/m	2,784.8
Concrete blocks	Prefabrication and storage	m ³ /m	104.0	\$/m ³	350.0	\$/m	36,400.0
Concrete blocks	Transp. Tem. Storage and setting	ca/m	2.33	\$/ca	2,357.5	\$/m	5,493.0
Head beam		m ³ /m	7.4	\$/m ³	330.0	\$/m	2,442.0
Rubble back fill	+ 1.0 - -14.0	m ³ /m	133.6	\$/m ³	56.4	\$/m	7,535.0
Rubble back fill	+ 3.3 ~ +1.0	m ³ /m	5.6	\$/m ³	47.0	\$/m	263.2
Sheet	t = 5 mm	m ² /m	88.0	\$/m ²	20.0	\$/m	1,760.0
Crane beam		m ³ /m	2.8	\$/m ³	440.0	\$/m	1,232.0
Piles, material	Steel, Ø900 t=1.6 t=32.1 etc=7.5	tm	1.52	\$/t	1,282.0	\$/m	1,948.6
Pile, driving		m/m	4.28	\$/m	54.0	\$/m	231.1
Apron pavement		m ² /m	41.0	\$/m ²	131.5	\$/m	5,391.5
Fender		ca/m	0.1	\$/ca	20,000.0	\$/m	2,000.0
Bollard		ca/m	0.02	\$/ca	2,000.0	\$/m	40.0
Fittings, etc.	Misc. fittings, Utilities, Crane Rail		1	LS	1,600.0	\$/m	1,600.0
Construction Equipment	Subtotal					\$/m	71,253.1
	Block yard installation		1	LS	2,805.0	\$/m	2,805.0
	Block yard operation		1	LS	1,360.0	\$/m	1,360.0
	Floating crane mobilization		1	LS	1,109.0	\$/m	1,109.0
	Subtotal					\$/m	5,274.0
	Grand Total					\$/m	76,527.1

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Unit	Unit	Unit	Unit	Unit
Concrete Block Type							
Dredging		m ³ /m	0	\$/m ³	5.4	\$/m	0
Base rock mound		m ³ /m	49.4	\$/m ³	70.5	\$/m	3,482.7
Concrete blocks	Prefabrication and storage	m ³ /m	104.0	\$/m ³	350.0	\$/m	36,400.0
Concrete blocks	Transp. Tem. Storage and setting	ca/m	2.33	\$/ca	2,357.5	\$/m	5,493.0
Head beam		m ³ /m	7.4	\$/m ³	330.0	\$/m	2,442.0
Rubble back fill	+ 1.0 - -14.0	m ³ /m	133.6	\$/m ³	56.4	\$/m	7,535.0
Rubble back fill	+ 3.3 ~ +1.0	m ³ /m	5.6	\$/m ³	47.0	\$/m	263.2
Sheet	t = 5 mm	m ² /m	88.0	\$/m ²	20.0	\$/m	1,760.0
Crane beam		m ³ /m	2.8	\$/m ³	440.0	\$/m	1,232.0
Piles, material	Steel, Ø900 t=1.6 t=22.1 etc=7.5	tm	1.04	\$/t	1,282.0	\$/m	1,333.3
Pile, driving		m/m	2.95	\$/m	54.0	\$/m	159.3
Apron pavement		m ² /m	41.0	\$/m ²	131.5	\$/m	5,391.5
Fender		ca/m	0.1	\$/ca	20,000.0	\$/m	2,000.0
Bollard		ca/m	0.02	\$/ca	2,000.0	\$/m	40.0
Fittings, etc.	Misc. fittings, Utilities, Crane Rail		1	LS	1,600.0	\$/m	1,600.0
Construction Equipment	Subtotal					\$/m	69,132.0
	Block yard installation		1	LS	2,805.0	\$/m	2,805.0
	Block yard operation		1	LS	1,360.0	\$/m	1,360.0
	Floating crane mobilization		1	LS	1,109.0	\$/m	1,109.0
	Subtotal					\$/m	5,274.0
	Grand Total					\$/m	74,406.0

TABLE UNIT COST STUDY SHEET
WHARF -14.0 m SITE - C

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Quantity	Unit	Unit Rate	Unit	Unit Cost
Concrete Block Type		m ³ /m	246.0	\$/m ³	7.56	\$/m	1,859.8
Dredging and replacing		m ³ /m	70.5	\$/m ³	70.5	\$/m	4,970.3
Base rock mound		m ³ /m	129.6	\$/m ³	350.0	\$/m	45,360.0
Concrete blocks	Prefabrication and storage	ea/m	2.67	\$/ea	2,357.5	\$/m	6,294.5
Concrete blocks	Transp. Tem. Storage and setting	m ³ /m	7.4	\$/m ³	330.0	\$/m	2,442.0
Head beam		m ³ /m	162.7	\$/m ³	56.4	\$/m	9,176.3
Rubble back fill	+ 1.0 ~ -14.0	m ³ /m	5.6	\$/m ³	47.0	\$/m	263.2
Rubble back fill	+ 3.3 ~ +1.0	m ³ /m	86.5	\$/m ²	20.0	\$/m	1,730.0
Sheet	l = 5 mm	m ³ /m	2.8	\$/m ³	440.0	\$/m	1,232.0
Crane beam		ltm	1.52	\$/lt	1,282.0	\$/m	1,948.6
Piles, material	Steel, Ø900 (e=1.6 L=32.1 c/c=7.5	m/m	4.28	\$/m	54.0	\$/m	231.1
Pile, driving		m ³ /m	41.0	\$/m ²	131.5	\$/m	5,391.5
Apron pavement		ea/m	0.1	\$/ea	20,000.0	\$/m	2,000.0
Fender		ea/m	0.02	\$/ea	2,000.0	\$/m	40.0
Bollard		LS	1	LS	1,600.0	\$/m	1,600.0
Fittings, etc.	Misc. fittings, Utilities, Crane Rail						
	Subtotal					\$/m	84,539.0
Construction Equipment	Block yard installation		1	LS	3,300.0	\$/m	3,300.0
	Block yard operation		1	LS	1,600.0	\$/m	1,600.0
	Floating crane mobilization		1	LS	1,109.0	\$/m	1,109.0
	Subtotal					\$/m	6,009.0
	Grand Total					\$/m	90,548.3

TABLE UNIT COST STUDY SHEET
WHARF -14.0 m SITE - T

Works	Specifications	Quantity		Unit Rate		Unit Cost	
		Unit	Quantity	Unit	Unit Rate	Unit	Unit Cost
Concrete Block Type		m ³ /m	0	\$/m ³	5.4	\$/m	0
Dredging and replacing		m ³ /m	20.5	\$/m ³	70.5	\$/m	1,445.3
Base rock mound		m ³ /m	129.6	\$/m ³	350.0	\$/m	45,360.0
Concrete blocks	Prefabrication and storage	ea/m	2.67	\$/ea	2,357.5	\$/m	6,294.5
Concrete blocks	Transp. Tem. Storage and setting	m ³ /m	7.4	\$/m ³	330.0	\$/m	2,442.0
Head beam		m ³ /m	162.7	\$/m ³	56.4	\$/m	9,176.3
Rubble back fill	+ 1.0 ~ -14.0	m ³ /m	5.6	\$/m ³	47.0	\$/m	263.2
Rubble back fill	+ 3.3 ~ +1.0	m ³ /m	86.5	\$/m ²	20.0	\$/m	1,730.0
Sheet	l = 5 mm	m ³ /m	2.8	\$/m ³	440.0	\$/m	1,232.0
Crane beam		ltm	2.09	\$/lt	1,282.0	\$/m	2,679.4
Piles, material	Steel, Ø900 (e=1.6 L=72.1 c/c=7.5	m/m	2.95	\$/m	54.0	\$/m	159.3
Pile, driving		m ³ /m	41.0	\$/m ²	131.5	\$/m	5,391.5
Apron pavement		ea/m	0.1	\$/ea	20,000.0	\$/m	2,000.0
Fender		ea/m	0.02	\$/ea	2,000.0	\$/m	40.0
Bollard		LS	1	LS	1,600.0	\$/m	1,600.0
Fittings, etc.	Misc. fittings, Utilities, Crane Rai						
	Subtotal					\$/m	79,813.5
Construction Equipment	Block yard installation		1	LS	3,300.0	\$/m	3,300.0
	Block yard operation		1	LS	1,600.0	\$/m	1,600.0
	Floating crane mobilization		1	LS	1,109.0	\$/m	1,109.0
	Subtotal					\$/m	6,009.0
	Grand Total					\$/m	85,822.5

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