

Alternatives Cost Analysis*Projected Costs Summary Table**EE/CA - Caneel Bay Resort Site*

	Alternative 2	
	Remove Soil and Landfill Debris	
	Undiscounted	Net Present Value (NPV)
Projected Capital Cost	\$ 4,496,000	\$ 4,496,000
<i>Capital Scope Contingency</i>	<i>\$ 674,000</i>	<i>\$ 674,000</i>
<i>Capital Bid Contingency</i>	<i>\$ 674,000</i>	<i>\$ 674,000</i>
Projected O&M Cost	\$ 123,000	\$ 129,000
<i>O&M Scope Contingency</i>	<i>\$ 9,000</i>	<i>\$ 10,000</i>
<i>O&M Bid Contingency</i>	<i>\$ 18,000</i>	<i>\$ 19,000</i>
Projected Remediation Total	\$ 5,996,000	\$ 6,004,000

1.1. Alternative 2 - Remove Surface Soil in Area 2 & Soil and Landfill Debris from Area 3

Detailed Cost Projection
EE/CA - Caneel Bay Resort Site

Present Value Year	2021
Start Year	2021
Discount Rate	-1.6%

M-21-09, 2021 Discount Rates for OMB Circular No. A-94 (5-yr real rate)

Task	Quant.	Unit	Occurrence	Daily Output	Estimated Duration (d)	Unit Cost	Mark-up	Total Projected Cost	Total Projected Cost - Net Present Value	Net Present Value Calculations						Notes/Source	
										Cost Type (F/A)	Recurrence Frequency (yr)	Eff. Rate for Recurrence Period	Start Year	Duration	Start-Year Value of Annual Costs		
Remediation Capital Total								\$ 4,496,322	\$ 4,496,322								
Capital Scope Contingency	15%							\$ 674,448	\$ 674,448								EPA 540-R-00-002, Section 5.4
Capital Bid Contingency	15%							\$ 674,448	\$ 674,448								EPA 540-R-00-002, Section 5.4
Remediation O&M Total								\$ 123,099	\$ 129,236								
O&M Scope Contingency	7.5%							\$ 9,232	\$ 9,693								EPA 540-R-00-002, Section 5.4
O&M Bid Contingency	15%							\$ 18,465	\$ 19,385								EPA 540-R-00-002, Section 5.4
Remediation Total + Contingencies								\$ 5,996,014	\$ 6,003,532								

1 Professional/Technical Services Capital Costs

Professional/Technical Services Capital Costs										\$ 717,900	\$ 717,900							
Professional/Technical Services										\$ 717,900	\$ 717,900							
Project Management			5%							\$ 188,921	\$ 188,921							EPA 540-R-00-002, Exhibit 5-8. Includes planning, reporting, community relations, bid/contract administration, permitting.
Remedial Design			8%							\$ 302,274	\$ 302,274							EPA 540-R-00-002, Exhibit 5-8. Includes pre-design collection & analysis of field data, engineering survey, design analysis, plans, specification, cost estimating, scheduling.
Construction Management			6%							\$ 226,705	\$ 226,705							EPA 540-R-00-002, Exhibit 5-8. Includes submittal review, design modifications, construction oversight, engineering survey, O&M manual preparation, QC/QA, record drawings.

2 Remedy Construction

Contractor Costs										\$ 3,778,421	\$ 3,778,421							
Contractor - Site Preparation		Estimated Duration		7		d												
Erosion & Sedimentation Controls	Synthetic erosion control, silt fence, install and maintain, remove, 3' high	500	LF	1	650	1	\$ 25.00	1	\$ 12,500	\$ 12,500	F	1	-1.60%	1	1		Daily Output Based on RSMMeans 2021, 312514161000. Rate based on 2015 bids for construction on St. John Island.	
Clearing & grubbing site	Clearing & grubbing, medium trees, to 12" diameter, cut and chip	2	ac	1	0.35	6	\$ 18,000	1	\$ 36,000	\$ 36,000	F	1	-1.60%	1	1		Daily Output Based on RSMMeans 2020, 311110100200. Output halved due to site access complexity.	
Waste characterization sampling	Sampling by TCLP for metals, pesticides + total PCBs	100	samples	1	50	2	\$ 350	1.1	\$ 38,500	\$ 38,500	F	1	-1.60%	1	1		Rate based on 2015 bids for construction on St. John Island. Rate based on one excavator collecting samples	
Contractor - Excavation		Estimated Duration		32		d												
Mob/Demob 700 HP Dozer	Mobilization, Equipment hauled on 40-ton capacity towed trailer	2	ea	1	NA	NA	\$ 1,845.20	1	\$ 3,690	\$ 3,690	F	1	-1.60%	1	1		RSMMeans 2021, 015436501500 x 1.63 (DoD Area Cost Factor for VI) + \$150 for barge.	
Mob/Demob FEL	Mobilization, Equipment hauled on 40-ton capacity towed trailer	2	ea	1	NA	NA	\$ 1,845.20	1	\$ 3,690	\$ 3,690	F	1	-1.60%	1	1		RSMMeans 2021, 015436501500 x 1.63 (DoD Area Cost Factor for VI) + \$150 for barge.	
Excavation, bulldozer	Excavating, Bulk, Dozer, Open Site, 700 HP, 150' Haul, common earth	19,594	BCY	1	615	32	\$ 6.19	1	\$ 121,365	\$ 121,365	F	1	-1.60%	1	1		Daily Output Limited by Transportation to Bovoni Landfill (Assumes ten 20 CY trucks making four roundtrips) Rate based on RSMMeans 2021, 312316466040 x 1.63 (DoD Area Cost Factor for VI)	
Excavation, soil on-Site transport/stockpiling, & loading on trucks	Excavating, Bulk Bank Measure, Common Earth Piled, Front end loader, wheel mounted, 5 CY	25,472	LCY	1	800	NA	\$ 2.23	1	\$ 56,882	\$ 56,882	F	1	-1.60%	1	1		Daily Output Limited by Transportation to Bovoni Landfill (Assumes ten 20 CY trucks making four roundtrips) Rate based on RSMMeans 2021, 312316421650 x 1.63 (DoD Area Cost Factor for VI)	
Dust Control	Dust Control, Light	32	d	1	NA	NA	\$ 1,833.75	1	\$ 58,680	\$ 58,680	F	1	-1.60%	1	1		RSMMeans 2021, 312323202500 x 1.63 (DoD Area Cost Factor for VI)	
Excavated Material Hauling	Transportation to Bovoni Landfill on St. Thomas	1,372	Loads	1	NA	NA	\$ 1,000.00	1	\$ 1,372,000	\$ 1,372,000	F	1	-1.60%	1	1		Based on estimates provided by two waste haulers (\$600 + \$300 = \$900/trip; \$800 - \$1200/trip).	
Excavated Material Hauling - Haz	Transportation to Hazardous Landfill	210	Tons	1	NA	NA	\$ 350.00	1	\$ 73,448	\$ 73,448	F	1	-1.60%	1	1		Off-island estimate	
Truck Liners	Disposable plastic truck liners, per load	14	Loads	1	NA	NA	\$ 25.00	1	\$ 350	\$ 350	F	1	-1.60%	1	1			
Material Disposal	Off-Site Disposal of Soil/material at Bovoni Landfill on St. Thomas	27,432	Tons	1	NA	NA	\$ 65.26	1	\$ 1,790,186	\$ 1,790,186	F	1	-1.60%	1	1		Based on mixed waste VIWMA Tipping Fee (see http://www.viwma.org/index.php/businessinfo/tipping-fee)	
Material Disposal - Haz	Off-Site Disposal of Soil/material at Hazardous Landfill	210	Tons	1	NA	NA	\$ 720.00	1	\$ 151,093	\$ 151,093	F	1	-1.60%	1	1		Based on prior experience, disposal may range from \$150-\$220/ton, depending on characterization, assume \$500/ton for transportation	
Contractor - Grading/Seeding		Estimated Duration		8		d												
Rough Grading Slope Surface	Rough Grade sites 8,100 - 10,000 SF, dozer	4	10,000 SF	1	1	4	\$ 2,306.45	1	\$ 9,226	\$ 9,226	F	1	-1.60%	1	1		RSMMeans 2021, 312213200170 x 1.63 (DoD Area Cost Factor for VI)	
Topsoil Placement and Grading	Topsoil Placement and Grading, Loam or Topsoil, Screened, 4" Deep, Furnish and Place, Truck Dumped	3872	SY	1	1300	3	\$ 8.43	1	\$ 32,630	\$ 32,630	F	1	-1.60%	1	1		RSMMeans 2021, 329119130700 x 1.63 (DoD Area Cost Factor for VI)	
Dust Control	Dust Control, Light	8	d	1	NA	NA	\$ 1,833.75	1	\$ 14,670	\$ 14,670	F	1	-1.60%	1	1		RSMMeans 2021, 312323202500 x 1.63 (DoD Area Cost Factor for VI)	
Seeding	Seeding, Slope mix, 6#/MSF, hydro seeding with mulch and fertilizer	34,848	Thousand SF	1	80	1	\$ 100.73	1	\$ 3,510	\$ 3,510	F	1	-1.60%	1	1		RSMMeans 2021, 329219144600 x 1.63 (DoD Area Cost Factor for VI)	

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Detailed Cost Projection

EE/CA - Caneel Bay Resort Site

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M-21-09, 2021 Discount Rates for OMB Circular No. A-94 (5-yr real rate)

Task	Quant.	Unit	Occurrence	Daily Output	Estimated Duration (d)	Unit Cost	Mark-up	Total Projected Cost	Total Projected Cost - Net Present Value	Net Present Value Calculations					Notes/Source
										Cost Type (F/A)	Recurrence Frequency (yr)	Eff. Rate for Recurrence Period	Start Year	Duration	

3 O&M

										\$	123,099	\$	129,236								
										\$	60,439	\$	63,451								
Site Inspection																					
Professional/Technical Services - O&M																					
Project Management		10%								\$	5,494	\$	5,768				EPA 540-R-00-002				
Annual Inspection (Years 2-6)																					
Site Civil Engineer Specialist Level 8	Support and Planning	8	hr/trip	5		\$	248.10	1	\$	9,924	\$	10,419	A	1	-1.60%	2	5	\$	10,252		
Site Civil Engineer Specialist Level 6	Travel, Prep	16	hr/trip	5		\$	199.68	1	\$	15,974	\$	16,771	A	1	-1.60%	2	5	\$	16,502		
Site Civil Engineer Specialist Level 6	Site Inspection	6	hr/trip	5		\$	199.68	1	\$	5,990	\$	6,289	A	1	-1.60%	2	5	\$	6,188		
Travel Costs	Parking	3	d	5		\$	24.00	1	\$	360	\$	378	A	1	-1.60%	2	5	\$	372		
	POV mileage	70	mi/trip	5		\$	0.56	1	\$	196	\$	206	A	1	-1.60%	2	5	\$	202		
	Airfare	1	ea/trip	5		\$	1,000.00	1	\$	5,000	\$	5,249	A	1	-1.60%	2	5	\$	5,165		
	Per Diem	2.5	ea/trip	5		\$	123.00	1	\$	1,538	\$	1,614	A	1	-1.60%	2	5	\$	1,588		
	Lodging	2	ea/trip	5		\$	230.00	1	\$	2,300	\$	2,415	A	1	-1.60%	2	5	\$	2,376		
	Rental Car	2	ea/trip	5		\$	200.00	1	\$	2,000	\$	2,100	A	1	-1.60%	2	5	\$	2,066		
Supplies	Misc. Supplies, Equipment	1	ea/trip	5		\$	250.00	1	\$	1,250	\$	1,312	A	1	-1.60%	2	5	\$	1,291		
Site Civil Engineer Specialist Level 8	Inspection Reporting	4	hr/trip	5		\$	248.10	1	\$	4,962	\$	5,209	A	1	-1.60%	2	5	\$	5,126		
Site Civil Engineer Specialist Level 6	Inspection Reporting	4	hr/trip	5		\$	199.68	1	\$	3,994	\$	4,193	A	1	-1.60%	2	5	\$	4,126		
Practice Area Leader	Inspection Reporting	1	hr/trip	5		\$	291.25	1	\$	1,456	\$	1,529	A	1	-1.60%	2	5	\$	1,504		
										\$	62,660	\$	65,784								
Area O&M																					
Professional/Technical Services - O&M																					
Project Management		10%								\$	5,696	\$	5,980							EPA 540-R-00-002	
Annual Repair (Years 2-6)																					
		Estimated Duration	1	d																	
Erosion Repair - grading	Rough grading Sites, 400 SF or less, hand labor	1	ea	5	1.5	0.67	\$	1,312.15	1	\$	6,561	\$	6,888	A	1	-1.60%	2	5	\$	6,778	RSMMeans 2021, 312213200100 x 1.63 (DoD Area Cost Factor for VI), assume 400 SF repaired
Erosion Repair - topsoil	Top dress by hand, 1 CY for 600 SF	1	ea	5	11.5	0.09	\$	127.96	1	\$	640	\$	672	A	1	-1.60%	2	5	\$	661	RSMMeans 2021, 329119130600 x 1.63 (DoD Area Cost Factor for VI)
Re-seeding	Seeding, Slope mix, 6#/MSF, push spreader	0.6	Thousand SF	5	8	0.08	\$	128.61	1	\$	386	\$	405	A	1	-1.60%	2	5	\$	399	RSMMeans 2021, 329219144400 x 1.63 (DoD Area Cost Factor for VI)
Mulching	Mulching, Hay, 1" deep, hand spread	67	SY	5	475	0.14	\$	2.54	1	\$	852	\$	894	A	1	-1.60%	2	5	\$	880	RSMMeans 2021, 329113160200 x 1.63 (DoD Area Cost Factor for VI)
Annual Repair Oversight (Years 2-6)																					
Site Civil Engineer Specialist Level 8	Support and Planning	8	hr/trip	5		\$	248.10	1	\$	9,924	\$	10,419	A	1	-1.60%	2	5	\$	10,252		
Site Civil Engineer Specialist Level 6	Travel, Prep	16	hr/trip	5		\$	199.68	1	\$	15,974	\$	16,771	A	1	-1.60%	2	5	\$	16,502		
Site Civil Engineer Specialist Level 6	Oversight	10	hr/trip	5		\$	199.68	1	\$	9,984	\$	10,482	A	1	-1.60%	2	5	\$	10,314		
Travel Costs	Parking	3	d	5		\$	24.00	1	\$	360	\$	378	A	1	-1.60%	2	5	\$	372		
	POV mileage	70	mi/trip	5		\$	0.56	1	\$	196	\$	206	A	1	-1.60%	2	5	\$	202		
	Airfare	1	ea/trip	5		\$	1,000.00	1	\$	5,000	\$	5,249	A	1	-1.60%	2	5	\$	5,165		
	Per Diem	2.5	ea/trip	5		\$	123.00	1	\$	1,538	\$	1,614	A	1	-1.60%	2	5	\$	1,588		
	Lodging	2	ea/trip	5		\$	230.00	1	\$	2,300	\$	2,415	A	1	-1.60%	2	5	\$	2,376		
	Rental Car	2	ea/trip	5		\$	200.00	1	\$	2,000	\$	2,100	A	1	-1.60%	2	5	\$	2,066		
Supplies	Misc. Supplies, Equipment	1	ea/trip	5		\$	250.00	1	\$	1,250	\$	1,312	A	1	-1.60%	2	5	\$	1,291		

Notes

- RSMMeans unit rates adopted from RSMMeans 2021 Heavy Construction cost database, National Average. Rates include contractor overhead and profit.
- LF = Linear Foot, SF = Square Foot, SY = Square Yard, ac = Acre, BCY = Bank Cubic Yards, LCY = Loose Cubic Yards, hr = hour, d = Day

2.0 Remediation Schedule*Alternatives Cost Evaluation**EE/CA - Caneel Bay Resort Site*

Year	Remedy Construction	Annual Inspection/ Repairs
1	x	
2		x
3		x
4		x
5		x
6		x
Count	1	5

3.0 Alternatives Areas & Volumes

Alternatives Cost Evaluation

EE/CA - Caneel Bay Resort Site

Global Parameters

Parameter	Value	Unit	Notes/Source
Assumed Bulking Factor	1.3	LCY/BCY	RSMMeans R312316-45 for Common Earth
Assumed Material Bulk Density	1.4	ton/BCY	RSMMeans R312316-45 for Common Earth
Assumed Material Loose Density	1.08	ton/LCY	RSMMeans R312316-45 for Common Earth
BMP Length	500	ft	Estimated based on Site topography
Area for Clearing	2	Ac	Area 2: 0.5 Ac Area 3: 1.5 Ac
Excavation Volume	19,594	BCY	Area 2: 327 BCY Area 3: 19,267 BCY
Percent Characteristic Hazardous Waste	0.765%	%	Estimated
Excavation Volume - Non-Haz	19444	BCY	Calculated
Excavation Volume - Haz	150	BCY	Calculated
Area for grading, revegetation	0.8	Ac	
Area for grading, revegetation	3,872	SY	
Area for grading, revegetation	34.8	Thousand SF	

4.0 Technical/Professional Labor Rates*Alternatives Cost Evaluation**EE/CA - Caneel Bay Resort Site*

Position	Rate
Practice Area Leader	291.25
Site Civil Engineer Specialist Level 8	248.1
Site Civil Engineer Specialist Level 6	199.68
Site Civil Engineer Specialist Level 3	90.77
Environmental Scientist Level 7	150.99
Environmental Scientist Level 3	73.67
Project Assistant Level 3	66.56
CADD Civil Engineer Specialist	90.77

5.0 References

Alternatives Cost Evaluation

EE/CA - Caneel Bay Resort Site

EPA 540-R-00-002

<https://semspub.epa.gov/work/HQ/174890.pdf>

Accessed: 2021-04-22

Exhibit 5-6 Example FS-Level Scope Contingency Percentages	
Remedial Technology	Scope Contingency (%)
Soil Excavation	15-55
Groundwater Treatment (Multiple)	15-35
On-Site Incineration	15-35
Extraction Wells	10-30
Vertical Barriers	10-30
Synthetic Cap	10-20
Sludge Stabilization	10-20
Off-Site Disposal	5-15
Off-Site Incineration	5-15
Drum Processing	5-15
Bulk Liquid Processing	5-15
Groundwater Treatment (Single)	5-10
Clay Cap	5-10
Surface Grading/Diking	5-10
Revegetation	5-10

Exhibit 5-8 Example Percentages for Professional/Technical Services Capital Costs					
Capital Cost Element	< \$100K (%)	\$100K-\$500K (%)	\$500K-\$2M (%)	\$2M-\$10M (%)	> \$10M (%)
Project Management	10	8	6	5	5
Remedial Design	20	15	12	8	6
Construction Management	15	10	8	6	6

M-21-09, 2021 Discount Rates for OMB Circular No. A-94

<https://www.whitehouse.gov/wp-content/uploads/2020/12/M-21-09.pdf>

Accessed: 2021-04-22

Real Discount Rates. A forecast of real interest rates from which the inflation premium has been removed and based on the economic assumptions from the 2022 Budget is presented below. These real rates are to be used for discounting constant-dollar flows, as is often required in cost-effectiveness analysis.

**Real Interest Rates on Treasury Notes and Bonds
of Specified Maturities (in percent)**

<u>3-Year</u>	<u>5-Year</u>	<u>7-Year</u>	<u>10-Year</u>	<u>20-Year</u>	<u>30-Year</u>
-1.8	-1.6	-1.4	-1.1	-0.5	-0.3

Analyses of programs with terms different from those presented above may use a linear interpolation. For example, a four-year project can be evaluated with a rate equal to the average of the three-year and five-year rates. Programs with durations longer than 30 years may use the 30-year interest rate.

5.1 References

Alternatives Cost Evaluation

EE/CA - Caneel Bay Resort Site

VIWMA Tipping Fees

<http://www.viwma.org/index.php/businessinfo/tipping-fee>

Accessed: 2021-03-31

WASTE TYPE (WT)	DESCRIPTION	UNIT RATE
		(\$/TON)
MSW	Municipal Solid Waste (typical waste from households and businesses)	\$52.13
C&D	Construction and Demolition Waste (asphalt, concrete, building, materials, etc.)	\$65.26
GW	Green Waste (trees, shrubs, leaves, grass)	\$52.13
FILL	Fill Waste (soil, sand, spoils, domestic sewage sludge)	\$31.28
SM	Scrap Metal (vehicles, steel, aluminum, metal appliances)	\$39.15
MIXED	Mixed Waste (co-mingled load of previous Waste Types)	\$65.26

MSW	\$52.13
C&D	\$65.26
GW	\$52.13
FILL	\$31.28
SM	\$39.15
MIXED	\$65.26

5.2 References

Alternatives Cost Evaluation

EE/CA - Caneel Bay Resort Site

Rates

<https://www.defensetravel.dod.mil/site/perdiemCalc.cfm>

Accessed: 2021-04-13

* All rates are in US Dollars

Locality	Seasons (Beg-End)	Maximum Lodging	Local Meals	Proportional Meals	Local Incidental	Footnote	Footnote Rate	Maximum Per Diem	Effective Date
ST. CROIX	04/15-12/14	247	96	56	24			367	04/01/2021
ST. CROIX	12/15-04/14	299	96	56	24			419	04/01/2021
ST. JOHN	05/01-12/03	170	98	57	25			293	04/01/2021
ST. JOHN	12/04-04/30	230	98	57	25			353	04/01/2021
ST. THOMAS	04/15-12/15	249	95	55	23			367	04/01/2021
ST. THOMAS	12/16-04/14	339	95	55	23			457	04/01/2021

*Use the OTHER rate if neither the CITY, PLACE, ISLAND, nor MILITARY INSTALLATION is listed.