List of Appendices

Appendix A:

Estimated Costs

Appendix B:

Design Concepts & Standards

Appendix C:

Honolulu Bikeways

Estimated Costs

This appendix provides a breakdown of total costs for each of the projects described in Chapter 3.

A.1 Methodology for Estimating Costs

Each construction project is unique and actual costs will vary according to the specific project. This section outlines the method used to estimate total project costs, based on a preliminary construction cost estimate. More precise estimates should be developed after preliminary engineering has been completed.

Three types of costs comprise the total project cost. These are:

- design and engineering costs;
- construction costs; and
- inspection costs.

Design and engineering costs are often considered "soft" costs. These costs include monies to cover environmental documentation, such as permit applications and environmental assessments, site surveys, design, and engineering of the proposed facility. Experience has shown that some of these costs may be reduced by grouping projects together. For the purposes of this report and unless otherwise indicated, the following assumptions have been made:

- Environmental Documentation (assessments and permits): 10-15% of construction costs; 15% for projects less than $250,000; 10% for projects greater than $250,000.
- Design and Engineering: 10-15% of construction costs; 15% for projects less than $1 million; 10% for projects greater than $1 million.

Construction costs are those costs incurred for the construction of the facility. These costs include, but are not limited to, pavement markings, signage, and in some cases, roadway widening. Construction cost estimates are preliminary, order-of-magnitude estimates for budget purposes only, and include a 25% contingency factor.

During construction, inspection of the construction site is required to ensure that the new facility meets the roadway design standards for each jurisdiction. For federally funded projects, a federally certified inspector is required to inspect

the project during construction.

- Construction Engineering (Inspection costs): 10-15% of construction costs; 15% for projects less than $1 million; 10% for projects greater than $1 million.
- Supervision Costs: 40% of Construction Engineering (Inspection) costs.

Costs do not include right-of way acquisition which may be required in some areas.

Examples:

Scenario I: Construction cost less than $250,000

Example: LP 2 - Waterfont Park to Ala Moana Park

	Cost Description	Formula	Est. Cost
A	Construction:		$ 50,000
B	Environmental Documentation:	(15% * A)	7,500
C	Design and Engineering:	(15% * A)	7,500
D	Inspection:	(15% * A)	7,500
E	Supervision:	(40% * D)	3,000
	Total cost of project	(A+B+C+D+E)	$75,500

Scenario II: Construction cost between $250,000 and $1,000,000

Example: CA 7 - McCully Street Bike Lanes (Ala Wai to Wilder)

	Cost Description	Formula	Est. Cost
A	Construction:		$355,000
B	Environmental Documentation:	(10% * A)	35,500
C	Design and Engineering:	(15% * A)	53,300
D	Inspection:	(15% * A)	53,300
E	Supervision:	(40% * D)	21,300
	Total cost of project	(A+B+C+D+E)	$518,400

Scenario III: Construction cost greater than $1,000,000

Example: LP 13 - Young Street Park Boulevard

	Cost Description	Formula	Est. Cost
A	Construction:		$5,000,000
B	Environmental Documentation:	(10% * A)	500,000
C	Design and Engineering:	(10% * A)	500,000
D	Inspection:	(10% * A)	500,000
E	Supervision:	(40% * D)	200,000
	Total cost of project	(A+B+C+D+E)	$6,700,000

A.2 Cost Summary Tables

The tables below provide a break out of the costs for each project. The *total* project cost, rounded to the nearest $5,000.00, for each project are also reported in Chapter 2 and summarized in Chapter 3 of this report. (Due to this rounding factor, costs in these tables will be slightly less.)

Table A.1: Lei of Parks - Priority One Park Links ($1,000)

		Routes	Engin., Env., & Design	Cons-truction	Inspect. & Operation	Total Project Cost
LP	1	Aloha Tower to Waterfront Park	$118.8	$475.0	$99.8	$693.6
LP	2	Waterfront Park to Ala Moana Park	15.0	50.0	10.5	75.5
LP	3	Ala Moana Park to Ala Wai Canal	21.0	70.0	14.7	105.7
LP	4	Kalākaua Ave. Bridge	61.5	205.0	43.1	309.6
LP	5	Kalākaua Ave. to McCully St.	66.0	220.0	46.2	332.2
LP	6	McCully St. Bridge (over Ala Wai)	61.5	205.0	43.1	309.6
LP	7	McCully St. to Date St.	51.0	170.0	35.7	256.7
LP	8	Date St. (Lāʻau-Kapahulu)	46.5	155.0	32.6	234.1
LP	9	Pākī Ave. (Kapahulu-Monsarrat)	92.5	370.0	77.7	540.2
LP	9a	Pākī Ave. (Monsarrat-Diamond Head Rd.)	157.5	630.0	132.3	919.8
LP	10	Diamond Head Rd. (Ponimōʻī-Ruger Pk.)	280.0	2,800.0	392.0	3,472.0
LP	11	Ala Wai Blvd.	713.0	3,565.0	499.1	4,777.1
LP	13	Young St.	1,000.0	5,000.0	700.0	6,700.0
		Subtotal				**$18,726.1**

Table A.2: Lei of Parks - Priority Two Park Links ($1,000)

		Routes	Engin., Env., & Design	Cons-truction	Inspect. & Operation	Total Project Cost
LP	12	Fort St. Mall	$15.0	$50.0	$10.5	$75.5
LP	14	Isenberg St. (Coyne-King)	80.0	320.0	67.2	467.2
LP	15	Kuilei St.	75.0	300.0	63.0	438.0
LP	16	Kapiʻolani Blvd. (Kuilei-S. King)	46.5	155.0	32.6	234.1
LP	17	Mānoa-Pālolo Stream (Date-Kapiʻolani)	123.8	495.0	104.0	722.8
LP	18	Diamond Head Rd. (Makapuʻu-Ruger Pk.)	13.5	45.0	9.5	68.0
LP	20	Holomoana St. (Yacht Harbor)	19.5	65.0	13.7	98.2
LP	21	Ala Moana Blvd. (Holomoana-Kālia)	12.0	40.0	8.4	60.4
LP	22	Kālia Rd. (Ala Moana-Saratoga)	107.5	430.0	90.3	627.8
LP	23	Saratoga Rd. (Kālia-Kalākaua)	108.8	435.0	91.4	635.2
LP	24	Kalākaua Ave. (Beretania-Kapahulu)	62.5	250.0	52.5	365.0
		Subtotal				**$3,792.2**

Table A.3: Bike-Friendly Route No. 1 ($1,000)

		Routes	Engin., Env., & Design	Cons-truction	Inspect. & Operation	Total Project Cost
FR	1	Pearl Harbor Bike Path Gateway (@ Lehua Ave.)	$12.0	$40.0	$8.4	$60.4
FR	2	Pearl Harbor Bike Path Gateway (@ Blaisdell Park)	4.5	15.0	3.2	22.7
FR	3	Pearl Harbor Bike Path Gateway (@ Kanuku St.)	27.0	90.0	18.9	135.9
FR	4	Pearl Harbor Bike Path Gateway (@ Pearl Kai Center)	27.0	90.0	18.9	135.9
FR	4a	Pearl Harbor Bike Path Gateway (@McGrew Point)	1.5	5.0	1.1	7.6
FR	5	Kamehameha Hwy. (Valkenburgh-Aloha Stadium)	133.8	535.0	112.4	781.2
FR	6	Radford Dr. (Bougainville-Kamehameha)	16.5	55.0	11.6	83.1
FR	7	Nimitz Hwy. (H-1 Viaduct)	58.5	195.0	41.0	294.5
FR	8	Nimitz Hwy. (Waiakamilo Detour)	25.5	85.0	17.9	128.4
FR	9	Nimitz Hwy. (H-1 Viaduct to Waiakamilo)	162.5	650.0	136.5	949.0
FR	10	River St. (Nimitz-Beretania)	16.5	55.0	11.6	83.1
FR	11	Hotel St. (River-Richards)	24.0	80.0	16.8	120.8
FR	12	Hotel St. (Alapaʻi-Ward)	46.5	155.0	32.6	234.1
FR	13	South King St.	300.0	1,500.0	210.0	2,010.0
FR	15	Beretania St.	300.0	1,500.0	210.0	2,010.0
FR	16	Old Waiʻalae Rd. (Waiʻalae to UH Quarry)	24.0	80.0	16.8	120.8
FR	16a	Old Waiʻalae Rd. Bridge (over H-1)	7.5	25.0	5.3	37.8
FR	17	Waiʻalae Ave. (Old Waiʻalae-17th)	76.3	305.0	64.1	445.4
FR	18	Waiʻalae Ave. (17th-Kalanianaʻole)	66.0	220.0	46.2	332.2
		Subtotal				**$7,992.9**

Table A.4: College Access Projects ($1,000)

		Routes	Engin., Env., & Design	Cons-truction	Inspect. & Operation	Total Project Cost
CA	1	Mānoa-Pālolo Stream (Kapiʻolani-Dole)	$123.8	$495.0	$104.0	$722.8
CA	2	St. Louis Hts. Dr. (Waiʻalae -Dole)	24.0	80.0	16.8	120.8
CA	3	Kapahulu Ave. (Kalākaua-Ala Wai)	19.5	65.0	13.7	98.2
CA	4	Kapahulu Ave. (Ala Wai-Campbell)	15.0	50.0	10.5	75.5
CA	5	Kapahulu Ave. (Campbell-Charles)	33.0	110.0	23.1	166.1
CA	6	Kapahulu Ave. (Charles-Waiʻalae)	27.0	90.0	18.9	135.9
CA	7	McCully St. (Ala Wai-Wilder)	88.8	355.0	74.6	518.4
CA	8	McCully St. (Bridge over H-1)	417.0	2,085.0	291.9	2,793.9
CA	9	Metcalf St. (Wilder-University)	16.5	55.0	11.6	83.1
CA	10	University Lower Quarry (Old Waiʻalae-Varsity)	9.0	30.0	6.3	45.3
CA	11	Varsity Pl. (Univ.-UH Lower Quarry)	9.0	30.0	6.3	45.3
CA	12	Coyne St. (University-Isenberg)	3.0	10.0	2.1	15.1
CA	13	Dole St. (University-EW Rd.)	21.0	70.0	14.7	105.7
CA	14	Dole St. (EW Rd.-St. Louis)	18.0	60.0	12.6	90.6
CA	15	University-Dole Intersection Improvements	27.0	90.0	18.9	135.9
CA	16	University Ave. (Varsity Pl.-Dole) (mauka direction only)	27.0	90.0	18.9	135.9
CA	17	University Ave. (Dole-Maile Way)	25.5	85.0	17.9	128.4
CA	18	University Upper Fire Rd. (EW Rd.-Pāmoa)	37.5	125.0	26.3	188.8
CA	19	Makapuʻu Ave.	6.0	20.0	4.2	30.2
CA	20	Alohea St.	9.0	30.0	6.3	45.3
CA	21	10th Ave. (Alohea-Waiʻalae)	12.0	40.0	8.4	60.4
CA	22	16th Ave. (Waiʻalae-Kīlauea)	12.0	40.0	8.4	60.4
CA	23	Monsarrat Ave. (Kalākaua-Pākī)	13.5	45.0	9.5	68.0
CA	24	Monsarrat Ave. (Pākī-Makapuʻu)	77.5	310.0	65.1	452.6
CA	25	Kīlauea Ave. (Waiʻalae-18th)	55.5	185.0	38.9	279.4
CA	26	Kapālama Stream (Nimitz-N. King)	205.0	1,025.0	143.5	1,373.5
CA	27	Alakawa St. (Nimitz-Dillingham)	15.0	50.0	10.5	75.5
CA	28	Pearl Harbor Bike Path LLC Connection	27.0	90.0	18.9	135.9
		Subtotal				**$8,186.9**

Table A.5: Priority 2 Projects ($1,000)

	Routes	Engin., Env., & Design	Cons-truction	Inspect. & Operation	Total Project Cost
1	Waimano Home Rd. (Kam Hwy.-Komo Mai)	$60.0	$200.0	$42.0	$302.0
2	Ka‘ahumanu St. (Kamehameha-Komo Mai)	18.0	60.0	12.6	90.6
3	Ka‘ōnohi St. (Kamehameha-Laelua)	19.5	65.0	13.7	98.2
4	Ka‘amilo St. (Kulawai-Honomanū)	25.5	85.0	17.9	128.4
4a	Honomanū St. (Moanalua-Kam.)	85.0	340.0	71.4	496.4
5	Kamehameha Hwy. (H-2 to Aloha Stadium)	1,941.0	9,705.0	1,358.7	13,004.7
6	Noelani St. (Ka‘ahumanu-Waimano Home)	24.0	80.0	16.8	120.8
7	Moanalua Rd. (‘Aiea Hts.-Ka‘ahumanu)	58.5	195.0	41.0	294.5
8	‘Aiea Hts. Dr. (Ulune-Moanalua)	9.0	30.0	6.3	45.3
9	Ulune St. (Hālawa Valley Rd.-‘Aiea Hts.)	19.5	65.0	13.7	98.2
10	Āliamanu Dr. (Moanalua-Bougainville)	15.0	50.0	10.5	75.5
11	Bougainville (Āliamanu-Radford)	12.0	40.0	8.4	60.4
12	Pu‘uloa Rd. (Nimitz-Moanalua)	54.0	180.0	37.8	271.8
13	Kikowaena St. (Pūkōloa-Kaua)	21.0	70.0	14.7	105.7
14	Āhua St. (Pūkōloa-Kikowaena)	7.5	25.0	5.3	37.8
15	Pūkōloa (Āhua-Salt Lake Blvd.)	21.0	70.0	14.7	105.7
16	Moanalua Gardens	62.5	250.0	52.5	365.0
17	Moanalua Rd. (Moanalua Gardens-Icarus)	242.5	970.0	203.7	1,416.2
18	Kaua St. (Middle-Moanalua Gardens)	90.0	360.0	75.6	525.6
19	Middle St. (Nimitz-N. King)	18.0	60.0	12.6	90.6
20	Middle St. (Bridge over H-1)	1.5	5.0	1.1	7.6
21	Middle St. (Kaua-N. School)	12.0	40.0	8.4	60.4
22	Salt Lake Blvd. (Kamehameha Hwy.-Pu‘uloa)	72.0	240.0	50.4	362.4
23	Sand Island Bridge	13.5	45.0	9.5	68.0
24	North King St. (Beretania-Middle)	209.0	1,045.0	146.3	1,400.3
25	Ala Moana Blvd. (Nimitz-Kalākaua)	1,423.0	7,115.0	996.1	9,534.1
26	Cooke St. (Ilalo-Hotel)	25.5	85.0	17.9	128.4
27	Pensacola St. (Waimanu-Wilder)	46.5	155.0	32.6	234.1
28	Pi‘ikoi St. (Ala Moana-Wilder)	48.0	160.0	33.6	241.6
	Subtotal				**$29,770**
	Lei of Parks, Priority Two Park Links (Table A.2)				$3,792
	Subtotal				**$33,562**

Table A.6: Priority 3 Projects ($1,000)

	Routes	Engin., Env., & Design	Cons-truction	Inspect. & Operation	Total Project Cost
1	Red Hill (Icarus Way-Ulune)	$221.3	$885.0	$185.9	$1,292.2
2	Lagoon Dr.	28.5	95.0	20.0	143.5
3	Sand Island SUP (Ke‘ehi Lagoon to Sand Island)	180.0	720.0	151.2	1,051.2
4	Liliha St. (N. King-Wyllie)	62.5	250.0	52.5	365.0
5	Nu‘uanu Stream (Nimitz-Kuakini)	228.0	1,140.0	159.6	1,527.6
6	Kamehameha IV Rd. (N. School-Likelike Hwy.)	21.0	70.0	14.7	105.7
7	North School St. (‘Iolani-Middle)	276.0	1,380.0	193.2	1,849.2
8	‘Iolani Ave. (Alapa‘i-N. School)	69.0	230.0	48.3	347.3
9	Alapa‘i St. (‘Iolani-Spencer)	7.5	25.0	5.3	37.8
10	Spencer St. (Alapa‘i-Wilder)	24.0	80.0	16.8	120.8
11	Wilder Ave. (Dole-Spencer)	65.0	260.0	54.6	379.6
12	10th Ave. (Wai‘ōma‘o-Wai‘alae)	21.0	70.0	14.7	105.7
13	Lusitana St. (‘Iolani-Pauoa)	68.8	275.0	57.8	401.5
14	Pauoa Rd. (Lusitana-Kapalu)	57.0	190.0	39.9	286.9
15	Kāneali‘i Ave. (Lusitana to Kapalu)	57.0	190.0	39.9	286.9
16	Kapalu St. (Pauoa-Kāneali‘i)	18.0	60.0	12.6	90.6
	Subtotal				**$8,391.5**