SINCE 1959
J.E. ANDERSON & ASSOCIATES
SURVEYORS - ENGINEERS

LEGAL SURVEYS
MUNICIPIAL ENGINEERING
LAND DEVELOPMENT AND MANAGEMENT

BIKING AND WALKING FEASIBILITY STUDY

FULFORD GANGES HILL - SEAVIEW AVE. TO BEDDIS ROAD

GANGES, SALT SPRING ISLAND, BC

Prepared For:
Capital Regional District Regional Parks
Facilities and Capital Development
490 Atkins Road
Victoria, BC, V9B 2Z8

JEA Project No.87613

April 17, 2013

1A – 3411 SHENTON RD
NANAIMO, BC
V9T 2H1

4212 GLANFORD AVENUE
VICTORIA, BC
V8Z 4B7

#203 – 177 WELD ST
PARKSVILLE, BC
V9P 1A0

RE: Biking and Walking Feasibility Study
Fulford Ganges Hill – Seaview Avenue to Beddis Road
Ganges, Salt Spring Island, BC

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April 17, 2013

File No. 87613

CRD Regional Parks
Facilities and Capital Development
490 Atkins Avenue
Victoria, BC
V9B 2Z8

Attention: Brad Drew, Planner

RE: Biking and Walking Feasibility Study
Fulford Ganges Hill – Seaview Avenue to Beddis Road
Ganges, Salt Spring Island, BC

1.0 INTROUCTION

The Capital Regional District Regional Parks (CRD Parks) Department retained JE Anderson and Associates (JEA) to complete a feasibility study regarding biking and walking on the Fulford Ganges Road hill south of Ganges on Salt Spring Island. The early goal of this feasibility review was to select two options and prepare Class D cost estimates for both options. Class D estimates provide a rough order of magnitude project cost as identified and qualified in the estimate. These estimates will provide an indication of probable costs, and allow for ranking of all options being considered.

Based on draft cost estimate, sketches, and a site visit, an additional option was requested for inclusion in the feasibility study.

2.0 PROJECT BACKGROUND

Fulford Ganges Road extends from Ganges, the largest village on Salt Spring Island to Fulford Harbour on the south end of the island. The ferry from Swartz Bay to Salt Spring Island stops at Fulford Harbour, so the road is subject to pulses of traffic around the times the ferry is running. The Fulford Ganges hill is the busiest section of Fulford Ganges Road since traffic converges from intersecting roads as it approaches Ganges.

The existing road includes approximately 3.5m wide asphalt lanes, painted white lines each side, with variable width asphalt shoulders and generally a minimum 0.6m wide gravel shoulder. The road has not been designed to accommodate bicycles or pedestrians. Bicycles are expected to use the vehicle lanes or the shoulders beyond the white paint lines. Pedestrians are expected to walk on the shoulders beyond the white paint lines.

There are presently safety concerns with both pedestrians and bicyclists using the road, particularly due to the narrow asphalt and gravel shoulders and the steep curving hill.

During the site visits, cyclists were observed travelling with traffic flows in the downhill lane and walking their bikes up the uphill shoulder. Pedestrians were noted walking on the paved shoulder and using the gravel shoulder where it was sufficiently wide to do so.

In 2008, the Salt Spring Island Local Trust Committee developed a community vision for cycling and walking on Salt Spring Island. The Islands Trust Official Community Plan for SSI identifies a bicycle route along the full extent of Fulford Ganges Road and a roadside walkway on both sides of the road from Ganges to Bittancourt Road (Appendix A, Islands Trust Correspondence).

Since the early 1990's, the Capital Regional District has supported cycling and pedestrian use of regional trails throughout the region as exemplified by the success of both the Galloping Goose and Lochside Regional Trail systems. Where possible and primarily at pinch points, CRD Parks has facilitated the development of cycling, pedestrian and limited equestrian opportunities within road corridors that meet regional route criteria. Fulford Ganges Road is a regional route with significantly challenging terrain. This feasibility study provides a basis for determining next steps in considering future options for the subject section of Fulford Ganges Road.

3.0 EXISTING ROAD CONSIDERATIONS AND COST ESTIMATE PARAMETERS

This section includes a list of considerations that are applicable to the dedicated bike lanes and pedestrian sidewalk.

Sketches of the existing road and the options are provided in Appendix B. The sketches are based on a survey of Fulford Ganges Road from Seaview Avenue to Beddis Road prepared by Richard J Wey and Associates Land Surveying Inc.

3.1 General Conditions – Challenges and Assumptions

- There are property restrictions on both sides of the road. In some cases, the road right of way is only 15 metres wide.
- It may be difficult to encroach onto adjacent properties, or to obtain right of ways.
- Retaining walls will be required.
- There are utility poles on both sides of the road.
- There are ditches along the entire west side of the road, and some on the east side of the road.
- Must assume that ditches can be infilled without causing requirements to detain drainage flows.
- The watermain is on the east side of the road, and any storm drain should be located minimum 3 metres clear from the watermain.
- The existing road edges are in poor condition. Assume average 1.0m asphalt removal on each side of the road, more or less.
- Water was surfacing from the underside of the west side of the road north of Drake Road. This should be repaired via perforated drains along with bike lane installation.
- Ice was forming as water surfaced through the driveway at 324 Fulford Ganges Road. A perforated drain will be required under the driveway.
- 281 Fulford Ganges Road has historical concerns regarding drainage on her lot (from comments over 5 years ago).
- Where storm drains are installed on the uphill side of the road, a perforated drain should also be installed in a common trench over a portion of the length.
- Storm drains would best be installed in the existing ditch alignment where there is an existing depression, and where services may be located well below the ditch line.
- Undersized drains should be upsized when the work is done (600 CSP crossing road to 800mm drain on opposite side of the road).
- Where underground drains are installed to fill in the ditch, storm drain services, tie ins, and catch basins will be required.
- Some retaining walls on the lower side of the road will have nowhere to direct drainage.

Photo 1: Damaged Asphalt

Photo 2: Postal Kiosk, Power Pole, and Hydrant

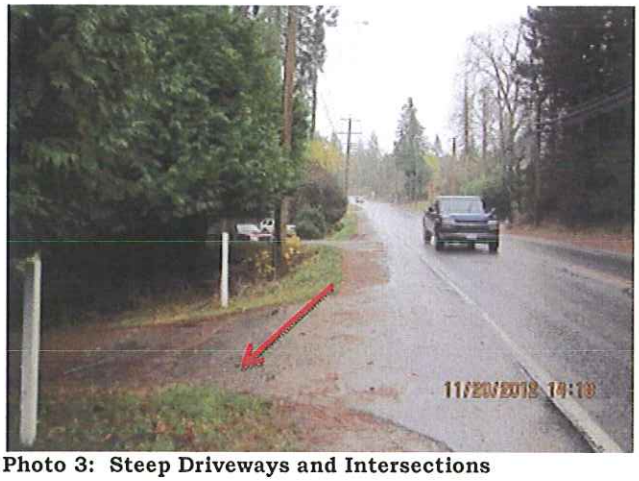

Photo 3: Steep Driveways and Intersections

Photo 4: Steep Fill Slopes

Photo 5: Close Building Proximity

Photo 6: Ditches and Utility Poles

3.2 Bike Lanes

- Assume 3.35m wide vehicle lanes and 1.8m wide asphalt bike lanes, and 0.6m gravel shoulders. 3.5m wide left turn lanes.
- It may be possible to reduce the downhill bike lane width to 1.5m, but not on curves in consideration of tracking of trucks. Consider 3.65m lanes on tight radius curves to reduce utility pole relocation requirements.
- Assume MoTI road structure for the bike lanes (300mm SGSB – Suitably Graded Sub Base, 300mm CBC – Crushed Base Course, 100mm asphalt).
- Some existing storm drains will require replacement (not the 800mm concrete culvert).
- Assume that 50% of the driveways and cross roads will not be re-graded to reduce the cross slopes on the bike lanes or the paths due to the high costs.
- When the road is widened on the downhill side, adjacent property owners may request a curb (along with catch basins) to direct drainage away from their properties.
- Where retaining walls are placed on the downhill side of the road, there will be difficulty directing any perimeter drains back to a suitable drain. Ideally, retaining walls would be located high up the slope, where possible, to minimize disturbance and height. Deltalok walls (geogrid reinforced landscape bags) with bike fences may be suitable where widening is minimal, subject to MoTI and geotechnical review. One of the benefits of Deltalok would be that the top could probably follow the road elevation due to its installation method.
- A Geotechnical Engineer should review the road related to potentially locating retaining walls high up the steep slopes. The slopes must be very stable in order to do this.
- The slopes on the downhill side of the road are presently too steep to meet clear zone requirements. A bike lane with bike fence will generally improve the safety. Any requirement for MoTI no post barriers that are not presently in place should be determined by MoTI.

3.3 Asphalt Sidewalks

- Assume 1.8m asphalt pedestrian sidewalk and 0.2m shoulder, with width increased to 2.4m at intervals to allow wheelchairs to pass, one side of the road only.
- A treatment will be required between the bike lanes and the path. We will assume a 150mm high asphalt curb as this minimizes the space required (relative to a gravel shoulder) between bike lane and sidewalk).
- Sidewalk should be wide enough to accommodate a bobcat for maintenance.
- There is generally insufficient width within the right of way to consider meandering the sidewalk due to the limited right of way width, although some meandering will be required to avoid obstacles.
- The sidewalk will generally have to be routed behind the utility poles.
- Consideration will have to be given to installing a swale on the uphill side of the asphalt path c/w catch basins.
- The curb installation will require catch basins along the gutterline.

3.4 Gravel Shoulder

- Assume a 2.3m gravel shoulder beyond the existing edge of asphalt over a length of 850 metres. The area in front of Bishop's Green and Embe Bakery would not be worked on. These areas should be checked to see if the existing structure meets MoTI standards.
- This option is provided as the cost of the other options are high, and provides a wide area for walking in both directions and for bicycling up the hill.
- The new widening would be completed to full MoTI road structure, not including asphalt. This would allow existing asphalt on the road to be widened at some point in the future. This could be done when MoTI does an asphalt overlay.
- There is an area around Station 1+220 where the path would extend beyond the property line. The width could be narrowed in this area.
- In the future, it may be determined to locate the edge of the new shoulder relative to the existing white lane – perhaps 2.8m beyond the white lane line. The gravel shoulder may also extend all the way to the existing cut slopes, except for a shallow swale at the toe of the slope.

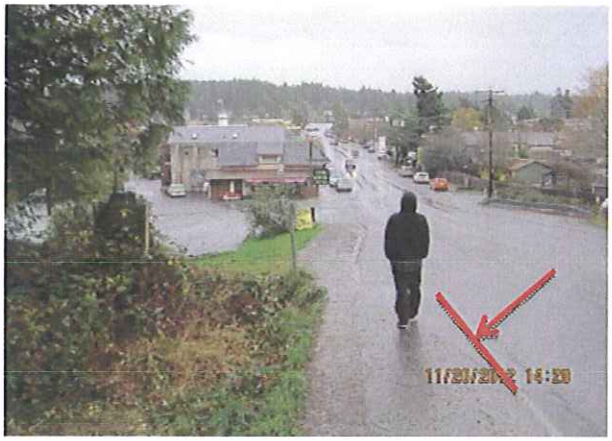

Photo 7: Pedestrian Close to Lane Line

Photo 8: Widened Gravel Shoulder at Bishop's Green

4.0 OPTIONS REVIEWED

The two options originally considered were:

1. Bike lanes on each side of Fulford Ganges Road, and the sidewalk on the west side of the road.
2. Bike lanes on each side of Fulford Ganges Road and the sidewalk on the east side of the road.

On the subject section of Fulford Ganges Road, there does not seem to be any easy areas for works to be done, so the cost of moving the road centerline is expected to outweigh the benefits that could be obtained. In particular, there will be more utility poles to move if the road centerline is moved. As such, moving the road centerline has not been considered in this review.

The long term plan for Salt Spring Island as identified in their 2008 Official Community Plan is to have sidewalks on both sides of the road. The JEA options considered in this report considers a sidewalk on one side only due to cost and property issues. Constructing sidewalks on both sides of the road now would be more cost effective than doing it after the bike lanes are constructed. Constructing the sidewalk on one side now may mean that a sidewalk on the other side of the road is never constructed.

The option of a combined pedestrian/bicycle path was not considered due to safety concerns of conflict between pedestrians and bicyclists speeding down a combined pedestrian/bike path. At some point, a speeding bicyclist could hit and injure a pedestrian using the same path. There would also be conflicts that would require the re-location of some utility poles.

Following preparation of draft cost estimates, draft sketches, and a site visit, a third option was added for review as follows:

3. A widened gravel shoulder on the west side of Fulford Ganges Road generally created by installing a storm drain and infilling the existing ditch. This would provide a flat area for pedestrians to get well off the road, and would increase safety. This is seen as an important consideration when observing how this section of road is presently being used by residents and visitors to the area.

5.0 COST ESTIMATE UNIT RATES

Cost estimate unit rates are generally based on the Lower Ganges Road Upgrade Project unit rates. Some unit rates have been increased where they are low, and to also allow for the tax changes from HST to GST / PST.

Utility pole re-location costs are assumed to be $15,000 each.

Costs for the dedicated bike lane options would be reduced slightly if MoTI paid for some of the work that they could be considered responsible for (by 6%), and slightly more if the work was done in conjunction with an asphalt overlay by MoTI (by 12%).

6.0 OTHER COST CONSIDERATIONS

Property acquisitions and right of ways will be required. Property issues may be more critical on this section of road than actual construction costs, and we recommend that these be resolved early on in the project.

Property acquisition and rights of ways may not be required for the widened gravel shoulder.
Vegetation removal will be significant for the dedicated bike lane options, but minimal for the gravel shoulder option.

7.0 CONCLUSION

Cost estimates and Sketches for the three options are provided in Appendix B.

Cost Estimate Summary

Option #	Description	Construction Cost	Property Cost
Option 1	Bike Lanes on both sides, sidewalk on west side	$2,350,000.00	Significant
Option 2	Bike Lanes on both sides, sidewalk on east side	$2,650,000.00	Significant
Option 3	Widened Gravel Shoulder (1.8m to 2.5m) on west side	$700,000.00	Low

When considering Options 1 and 2, Option 1 (sidewalk on west side) will be best for the following reasons:

1. The storm drain on the west side of the road has to be installed for both options.
2. The retaining walls on the west side option will not be as high.
3. Curbs with catch basins on the east side are less likely to be required.
4. There will be less impact on existing buildings as the buildings are set back farther on the west side of the road.

We trust that this report is sufficient at this time. If you have any questions or comments, please do not hesitate to contact the undersigned.

Yours truly,

J.E. Anderson and Associates

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
W. J. BUCHANAN

Jim Buchanan, P. Eng.
JB/ac

APPENDIX A

- Correspondence with Islands Trust RE: Salt Spring Island OCP

Jim Buchanan

From: Kristin Aasen [kaasen@islandstrust.bc.ca]
Sent: September 26, 2012 11:28 AM
To: jim@jeanderson.com
Subject: RE: Bike lane and sidewalk, Ganges Hill

Hi Jim,

The associated Official Community Plan policies for the two maps (bicycle routes and urban trails) are as follows:

> C.2.2.2.5 The Ministry of Transportation and Infrastructure and the Salt Spring Island Transportation Commission should be encouraged to develop a bicycle and pedestrian network to be developed as part of the Ganges Public Pathway System, the island's public trail system and as part of the CRD's Regional Trail Network. This network should consist of off-road trails as well as on-road bicycle lanes. Roads that should be given priority for the development of bicycle routes are included on Map 4. All other roads on the island should also be considered bicycle routes, although lower traffic speeds mean that separate paths may not be required. The construction of those bicycle lanes that provide a safe route to public schools is identified as a priority in development of island bicycle paths. Bicycle lanes should be developed in consultation with the Salt Spring Island Transportation Commission, in coordination with Salt Spring's overall transportation strategy.
>
> C.2.2.2.18 The Ministry of Transportation and Infrastructure, the Salt Spring Island Parks and Recreation Commission, Salt Spring Island Transportation Commission, and the local bicycling community are encouraged to cooperate with the Local Trust Committee to develop the roadside bicycle lanes shown on Map 4.
>
> B.5.2.2.10 The Local Trust Committee will support continued development of the Ganges Public Pathway System as shown on Map 17 and proposed pathways and trails in the Urban Trails Task Force Report for Ganges Village.

In the context of subdivision applications within the Island's villages, the Land Use Bylaw outlines limited construction specifications – please refer to page 114 in http://www.islandstrust.bc.ca/ltc/ss/pdf/ssbylbaselu0355.pdf.

Please feel free to contact me for further information – many apologies for the delayed response.

Best regards,

Kristin Aasen
Planner, Salt Spring Team
Islands Trust

1-500 Lower Ganges Road
Salt Spring Island BC V8K 2N8
Direct: 250.538.5611
Office: 250.537.9144 Fax: 250.537.9116
Email: kaasen@islandstrust.bc.ca
Web: www.islandstrust.bc.ca

From: Leah Hartley
Sent: Tuesday, September 18, 2012 3:16 PM
To: jim@jeanderson.com
Cc: Kristin Aasen
Subject: Bike lane and sidewalk, Ganges Hill

Hello Jim Buchanan

26/09/2012

Thank you for your call last week concerning bike lane and sidewalk plans along Fulford Ganges Road, from Ganges (Embee Bakery) to Beddis Road. As I mentioned by phone, the Official Community Plan proposes both, as follows:

Map 4 bicycle route along full extent of Fulford Ganges Road, and
Map 17 "Ganges Public Pathway System" which shows a "Roadside Walkway" on both sides from Centennial Park to Bittancourt Road.

I'll ask our planner Kristin Aasen to send along the policies that relate to these two maps, particularly any policies that speak to the width for the two routes. Kristin will also be a good contact as JE Anderson continues this work for Capital Regional District.

Leah Hartley, MCIP, RPP
Regional Planning Manager
1 – 500 Lower Ganges Road
Salt Spring Island BC V8K 2N8
Phone: 250-538-5607
Office: 250-537-9144
www.islandstrust.bc.ca
Preserving Island communities, culture and environment

APPENDIX B

- Cost Estimates and Sketches

OPTION 1

CRD REGIONAL PARKS

FULFORD GANGES HILL BIKING AND WALKING

SEAVIEW AVENUE TO BEDDIS ROAD

BIKE LANES PLUS SIDEWALK ON WEST (UPHILL) SIDE OF ROAD

PREPARED BY JE ANDERSON AND ASSOCIATES, PROJECT 87613

JEA J.E. ANDERSON & ASSOCIATES SURVEYORS - ENGINEERS SINCE 1959

OPTION 1

April 10, 2013

	Description	Unit	Quantity	Rate	Cost
Roadworks & Bike Lanes	Subgrade Preparation	m^2	3500	$15	$52,500
	Sawcut / Grind Asphalt	l.m.	2000	$25	$50,000
	300mm of SGSB	m^2	3700	$18	$66,600
	150mm of 75mm CBC	m^2	3700	$11	$40,700
	150mm of 25mm CBC	m^2	4300	$11	$47,300
	100mm Asphalt	m^2	4500	$75	$337,500
	Asphalt Curb	l.m.	1000	$30	$30,000
	Gravel Shoulders	l.m.	1800	$15	$27,000
	Driveways Allowance	ea .	20	$2,000	$40,000
	Retaining Wall Allowance	l.m.	450	$400	$180,000
	Canada post Widening	ea .	2	$15,200	$30,400
				Sub-total Roadworks and Bike Lanes	$902,000
Sidewalks					
	Subgrade Preparation	l.m.	950	$40	$38,000
	150mm of 75mm Subbase Gravel (driveways)	l.m.	200	$30	$6,000
	150mm of 25mm Base Gravel	l.m.	960	$30	$28,800
	50mm of 1.8m wide asphalt	l.m.	950	$80	$76,000
	Access Complication Allowance	l.s.	20	$2,000	$40,000
	Gravel Shoulders	l.m.	1000	$5	$5,000
				Sub-total Sidewalks	$193,800
Drainage					
	Culverts	ea	5	$2,000	$10,000
	Storm Drains	l.m.	800	$200	$160,000
	Perforated Drains	l.m.	500	$60	$30,000
	Manholes	ea	10	$3,500	$35,000
	Road Crossing Allowance	ea	10	$3,000	$30,000
	Services	ea.	20	$1,500	$30,000
	Catch Basins	ea.	40	$2,000	$80,000
	Headwalls	ea.	20	$300	$6,000
	Ditches	l.m.	300	$30	$9,000
	Riprap	l.m.	200	$30	$6,000
				Sub-total Drainage	$396,000
Sewer and Water	Service Adjustment Allowances	ea.	40	$500	$20,000
				Sub-total Sewer and Water	$20,000
Utilities					
	Power Pole Relocations	ea	1	$15,000	$15,000
	Anchor Relocations Allowance	ea	6	$500	$3,000
				Sub-total Utilities	$18,000
Other					
	Mobilization / Demobilization	l.s.	1	$50,000	$50,000
	Traffic Control Allowance	l.s.	1	$80,000	$80,000
	Painting and Signage Allowance	l.s.	1	$20,200	$20,200
	Landscaping Allowance	l.m.	2000	$30	$60,000
	Quality Management	l.s.	1	$40,000	$40,000
	Survey Layout	l.s.	1	$15,000	$15,000
	Fences	l.m.	700	$100	$70,000
	MoTI No Post Barriers Allowance	l.m.	100	$250	$25,000
	Erosion and Sediment Control	l.s.	1	$20,000	$20,000
	Bulk Rock BlastingAllowance	l.s.	0	$10,000	$0
	Trench Blasting Allowance	l.s.	1	$10,000	$10,000
	Property / SRW Purchase Additional				Additional
				Sub-total Other	$340,200
				Sub-total	**$1,870,000**
				Contingency @ +/-20%	**$370,000**
				Sub-total	**$2,240,000**
				GST @ +/-5%	**$110,000**
				TOTAL	**$2,350,000**

Note:
The cost estimate does not include property purchase.
The cost estimate does not include administration, engineering, consultant fees, legal surveyor fees, lawyer fees, etc.

OPTION 2

CRD REGIONAL PARKS
FULFORD GANGES HILL BIKING AND WALKING
SEAVIEW AVENUE TO BEDDIS ROAD
BIKE LANES AND SIDEWALK ON EAST (DOWNHILL) SIDE OF ROAD
PREPARED BY JE ANDERSON AND ASSOCIATES, PROJECT 87613
April 10, 2013

OPTION 2

	Description	Unit	Quantity	Rate	Cost
Roadworks & Bike Lanes					
	Subgrade Preparation	m^2	3600	$15	$54,000
	Sawcut / Grind Asphalt	l.m.	2000	$25	$50,000
	300mm of SGSB	m^2	3700	$18	$66,600
	150mm of 75mm CBC	m^2	3700	$11	$40,700
	150mm of 25mm CBC	m^2	4300	$11	$47,300
	100mm Asphalt	m^2	4500	$75	$337,500
	Asphalt Curb	l.m.	1000	$30	$30,000
	Gravel Shoulders	l.m.	1800	$15	$27,000
	Driveways Allowance	ea .	20	$2,000	$40,000
	Retaining Wall Allowance	l.m.	570	$650	$370,500
	Canada post Widening	ea .	2	$15,000	$30,000
				Sub-total Roadworks and Bike Lanes	$1,093,600
Sidewalks					
	Subgrade Preparation	l.m.	950	$40	$38,000
	150mm of 75mm Subbase Gravel (driveways)	l.m.	200	$30	$6,000
	150mm of 25mm Base Gravel	l.m.	960	$30	$28,800
	50mm of 1.8m wide asphalt	l.m.	950	$80	$76,000
	Access Complication Allowance	l.s.	20	$2,000	$40,000
	Gravel Shoulders	l.m.	1000	$5	$5,000
				Sub-total Sidewalks	$193,800
Drainage					
	Culverts	ea	5	$2,000	$10,000
	Storm Drains	l.m.	950	$200	$190,000
	Perforated Drains	l.m.	500	$60	$30,000
	Manholes	ea	11	$3,500	$38,500
	Road Crossing Allowance	ea	16	$3,000	$48,000
	Services	ea.	20	$1,500	$30,000
	Catch Basins	ea.	40	$2,000	$80,000
	Headwalls	ea.	20	$300	$6,000
	Ditches	l.m.	600	$30	$18,000
	Riprap	l.m.	200	$30	$6,000
				Sub-total Drainage	$456,500
Sewer and Water	Service Adjustment Allowances	ea.	38	$500	$19,000
				Sub-total Sewer and Water	$19,000
Utilities					
	Power Pole Relocations	ea	1	$15,000	$15,000
	Anchor Relocations Allowance	ea	6	$500	$3,000
				Sub-total Utilities	$18,000
Other					
	Mobilization / Demobilization	l.s.	1	$50,000	$50,000
	Traffic Control Allowance	l.s.	1	$80,000	$80,000
	Painting and Signage Allowance	l.s.	1	$20,000	$20,000
	Landscaping Allowance	l.m.	2000	$30	$60,000
	Quality Management	l.s.	1	$40,000	$40,000
	Survey Layout	l.s.	1	$15,000	$15,000
	Fences	l.m.	700	$100	$70,000
	MoTI No Post Barriers Allowance	l.m.	0	$250	$0
	Erosion and Sediment Control	l.s.	1	$25,000	$25,000
	Bulk Rock BlastingAllowance	l.s.	0	$20,000	$0
	Trench Blasting Allowance	l.s.	1	$10,100	$10,100
	Property / SRW Purchase Additional				Additional
				Sub-total Other	$320,100
				Sub-total	**$2,101,000**
				Contingency @ +/-20%	**$419,000**
				Sub-total	**$2,520,000**
				GST @ +/-5%	**$130,000**
				TOTAL	**$2,650,000**

Note:
The cost estimate does not include property purchase.
The cost estimate does not include administration, engineering, consultant fees, legal surveyor fees, lawyer fees, etc.

OPTION 3

CRD REGIONAL PARKS
FULFORD GANGES HILL BIKING AND WALKING
SEAVIEW AVENUE TO BEDDIS ROAD
GRAVEL SHOULDER ON WEST (UPHILL) SIDE OF ROAD
PREPARED BY JE ANDERSON AND ASSOCIATES, PROJECT 87613
April 10, 2013

OPTION 3

	Description	Unit	Quantity	Rate	Cost
Roadworks					
	Subgrade Preparation	m^2	1000	$15	$15,000
	Sawcut / Grind Asphalt	l.m.	200	$25	$5,000
	300mm of SGSB	m^2	1800	$18	$32,400
	150mm of 75mm CBC	m^2	1800	$11	$19,800
	150mm of 25mm CBC	m^2	1800	$11	$19,800
	50mm Asphalt	m^2	120	$60	$7,200
	Asphalt Curb	l.m.	0	$30	$0
	Gravel Shoulders	l.m.	800	$20	$16,000
	Driveways Allowance	ea .	20	$1,000	$20,000
	Retaining Wall Allowance	l.m.	0	$700	$0
	Canada post Widening	ea .	0	$15,000	$0
				Sub-total Roadworks and Bike Lanes	$135,200
Sidewalks					
	Subgrade Preparation	l.m.	0	$40	$0
	150mm of 75mm Subbase Gravel (driveways)	l.m.	0	$30	$0
	150mm of 25mm Base Gravel	l.m.	0	$30	$0
	50mm of 1.8m wide asphalt	l.m.	0	$80	$0
	Access Complication Allowance	l.s.	0	$2,000	$0
	Gravel Shoulders	l.m.	0	$5	$0
				Sub-total Sidewalks	$0
Drainage					
	Culverts	ea	0	$2,000	$0
	Storm Drains	l.m.	800	$200	$160,000
	Perforated Drains	l.m.	400	$60	$24,000
	Manholes	ea	10	$3,500	$35,000
	Road Crossing Allowance	ea	2	$5,000	$10,000
	Services	ea.	10	$1,500	$15,000
	Catch Basins	ea.	18	$2,000	$36,000
	Headwalls	ea.	10	$750	$7,500
	Ditches	l.m.	800	$10	$8,000
	Riprap	l.m.	42	$50	$2,100
				Sub-total Drainage	$297,600
Sewer and Water	Service Adjustment Allowances	ea.	20	$500	$10,000
				Sub-total Sewer and Water	$10,000
Utilities					
	Power Pole Relocations	ea	0	$15,000	$0
	Anchor Relocations Allowance	ea	2	$500	$1,000
				Sub-total Utilities	$1,000
Other					
	Mobilization / Demobilization	l.s.	1	$20,000	$20,000
	Traffic Control Allowance	l.s.	1	$30,000	$30,000
	Painting and Signage Allowance	l.s.	1	$2,000	$2,000
	Landscaping Allowance	l.m.	800	$10	$8,000
	Quality Management	l.s.	1	$10,000	$10,000
	Survey Layout	l.s.	1	$5,000	$5,000
	Fences	l.m.	100	$100	$10,000
	MoTI No Post Barriers Allowance	l.m.	0	$250	$0
	Erosion and Sediment Control	l.s.	1	$11,200	$11,200
	Bulk Rock BlastingAllowance	l.s.	0	$10,000	$0
	Trench Blasting Allowance	l.s.	1	$10,000	$10,000
	Property / SRW Purchase Additional				Additional
				Sub-total Other	$106,200
				Sub-total	**$550,000**
				Contingency @ +/-20%	**$110,000**
				Sub-total	**$660,000**
				GST @ +/-5%	**$40,000**
				TOTAL	**$700,000**

Note:
The cost estimate does not include property purchase.
The cost estimate does not include administration, engineering, consultant fees, legal surveyor fees, lawyer fees, etc.