

TECHNICAL MEMO

To
Adam Pitcher, ASct, PMP Manager of Capital Projects
City of Courtenay

From
Destry Glover, P.Eng.
McElhanney Ltd.

Re
McPhee Meadows Access Options Analysis

Date
June 20, 2024

1. Introduction

The 3rd Street access route to the McPhee Meadows presents challenges to design based on site topography and environmentally sensitive areas. To address and balance these challenges in conjunction with accepted accessibility standards, three access route options have been prepared for the City's consideration.

To assist City staff in evaluating the options alongside the range of stakeholder needs, McElhanney has prepared an options analysis for the three proposed McPhee Meadow Access designs. This memo offers a high-level review of each option from the following perspectives:

- Accessibility (Compliance with BC Active Transportation Design Guide (BCAT))
- Environmental impact and approvals
- Archeological permitting and monitoring
- Geotechnical impacts
- Construction Cost (Class D)
- Connections to the City of Courtenay's Official Community Plan

Note that the focus of this memo is limited to the McPhee Meadow Access only. The Access route is defined as the section of trail/path that extends from 3rd Street to the intersection with the meadow loop. The implications to each option are summarized in table format in Section 3.

2. McPhee Meadows Access Options

The three access options to the McPhee meadows are as follows:

2.1. OPTION 1 – REFURBISHMENT TO EXISTING ACCESS RD. OFF 3RD ST. (15% SLOPE)

Option 1 includes re-surfacing and minor widening of the existing access road off 3rd. St. This option was presented as a low-impact, low-cost option. The existing access would be re-graveled and widened to 3.0m with 0.5m shoulders to allow maintenance vehicle and ambulance access, however the existing road grades would not be altered, and as such would remain at 12%-15%. See Sketch C1-200, overleaf.

2.2. OPTION 2 – 8% GRADE

To address accessibility concerns brought forth due to the steep slope of Option 1, the access road profile from 3rd Street to the Meadows was adjusted to a maximum grade of 8% to align with BC Active Transportation Guidelines for accessibility. To reduce the grade to 8% from 15%, and provide landings spaced to meet accessibility standards, additional cut and import fill are required along the access profile. Retaining walls have been added in some areas to reduce fill requirements and lessen the impact on the surrounding environmentally sensitive areas. The Option 2 trail is designed with an overall width of 3.5m to accommodate ambulance and maintenance vehicle. See Sketch SK11, double overleaf.

2.3. OPTION 3 – 5% GRADE

To contemplate the possibility of a Universally Accessible design, a 5% maximum slope option was considered. To achieve a maximum of 5% grade, a modified trail alignment was required to increase the length of the access thereby reducing slope. Option 3 involves adding a switch-back and nearly doubling the length of the access road. Retaining walls have been added in some areas where dictated by topography, and to reduce fill requirements, however significant areas of fill remain. The Option 3 trail is designed with an overall width of 3.5m to accommodate ambulance and maintenance vehicle. See Sketch SK13, triple overleaf. See Table 1 below for a summary of access options.

Table 1 - Access Option Properties

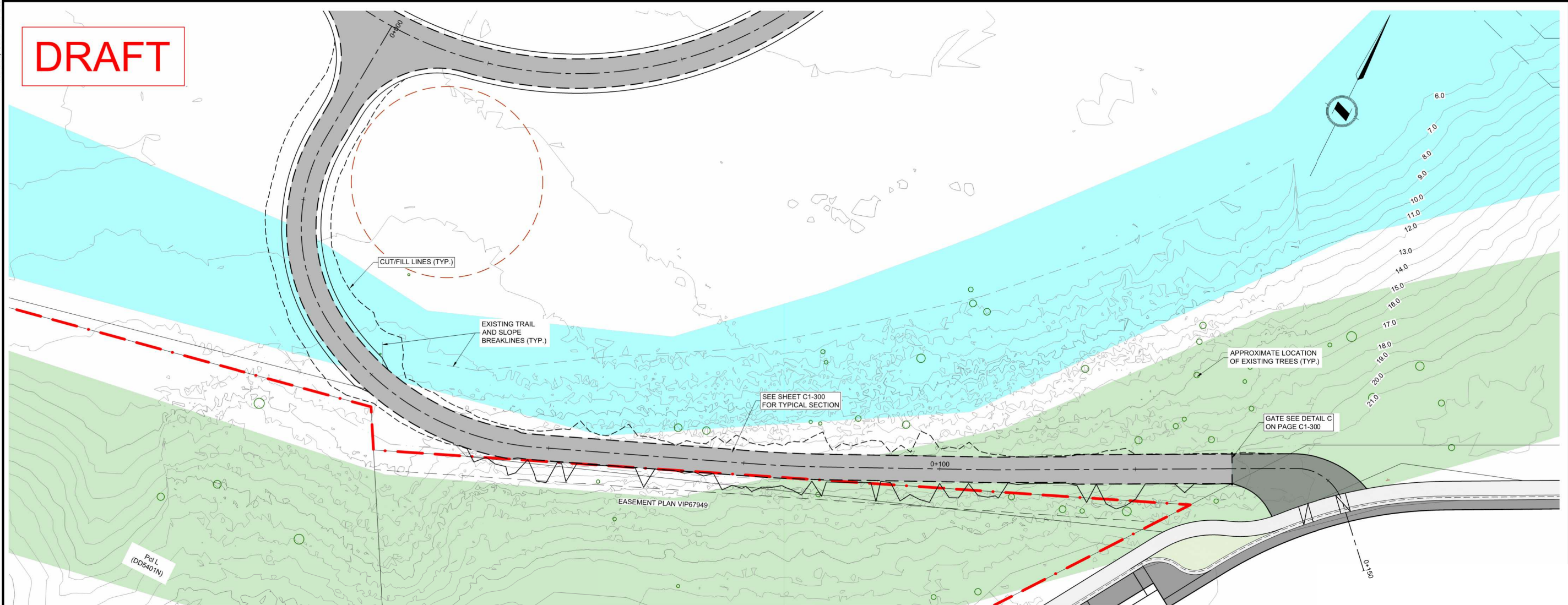
	Option 1	Option 2	Option 3
Maximum Slope	15%	8%	5%
Overall width	4.0m	3.5m	3.5m
Length	130m	200m	300m
Volume of Fill Required	200m ³	3385m ³	9495m ³
Area of impact with Environmentally Sensitive Zones	360m ²	1250m ²	1550m ²



DRAFT

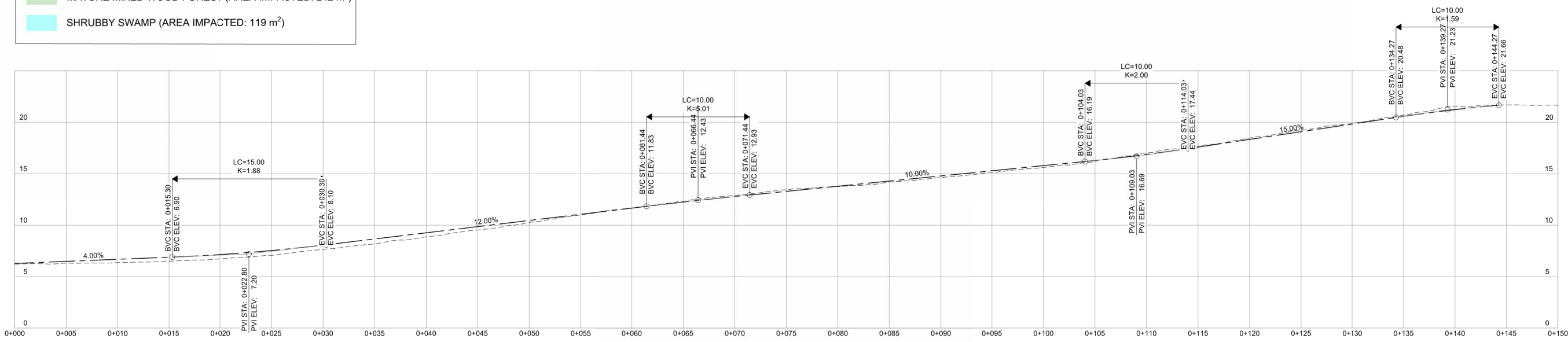
McElhanney ISO A1 - 2021-13-06

DATE: 2024-06-21 08:01 FILE: X:\221110-PROJECTS\47600-7699\7614-18-COC-McPhee Meadows\10.0 Drawings\10.1.1 Sheet\C1-200-ACCESS PROFILE.dwg



ENVIRONMENTAL AREAS

■	MATURE MIXED WOOD FOREST (AREA IMPACTED: 242 m ²)
■	SHRUBBY SWAMP (AREA IMPACTED: 119 m ²)

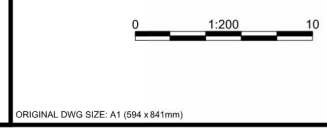


Rev	Date	Description	Drawn	Design	App'd
PC	2024-06-20	ISSUED FOR OPTIONS ANALYSIS	ER	ER	DG
PB	2023-10-20	DRAFT - ISSUED FOR INFORMATION	ER	ER	MS
PA	2023-05-05	ISSUED FOR REVIEW	ER	ER	DG

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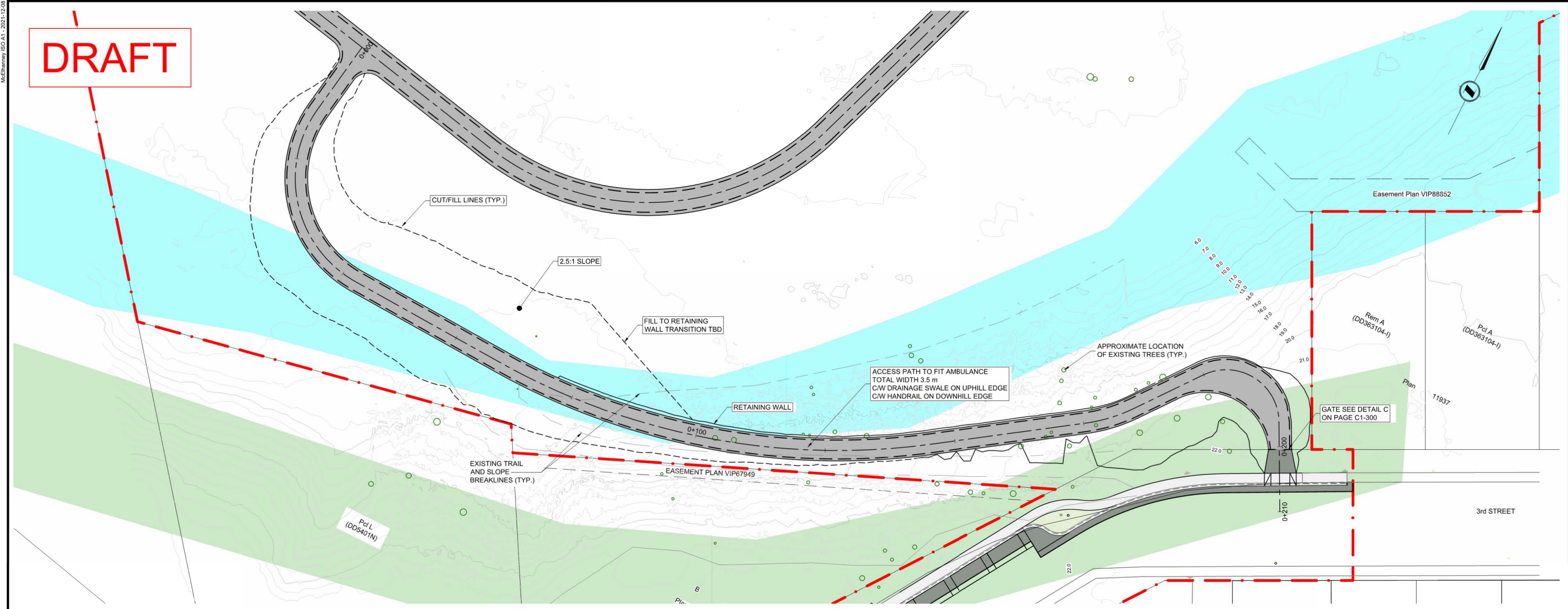
MCPHEE MEADOWS - PHASE 1
ACCESS PROFILE

Option 1 - 15% Grade

Drawing No.	
C1-200	
Project Number	Rev.
2211-47614-16	PC

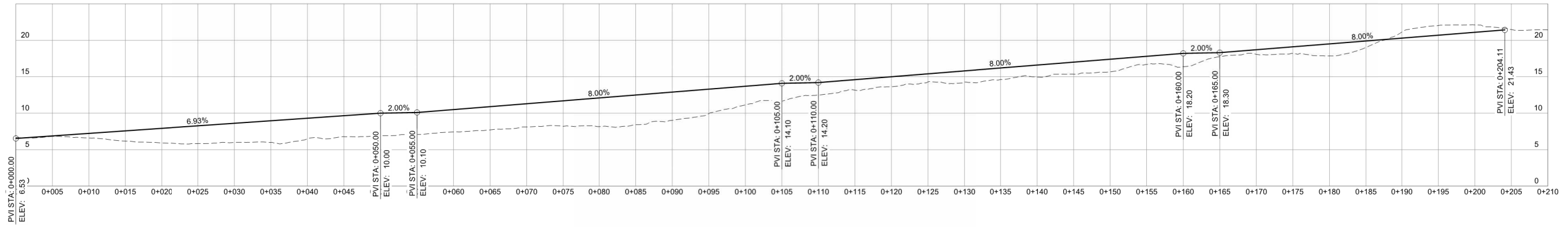
DESTROY ALL PRINTS BEHIND PREVIOUS REVISION

DRAFT



ENVIRONMENTAL AREAS

	MATURE MIXED WOOD FOREST (AREA IMPACTED: 539 m ²)
	SHRUBBY SWAMP (AREA IMPACTED: 716 m ²)



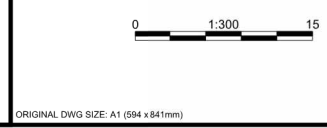
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Rev	Date	Description	Drawn	Design	App'd
PB	2024-06-20	ISSUED FOR OPTIONS ANALYSIS	ER	ER	DG
PA	2023-11-03	ISSUED FOR REVIEW	ER	ER	DG

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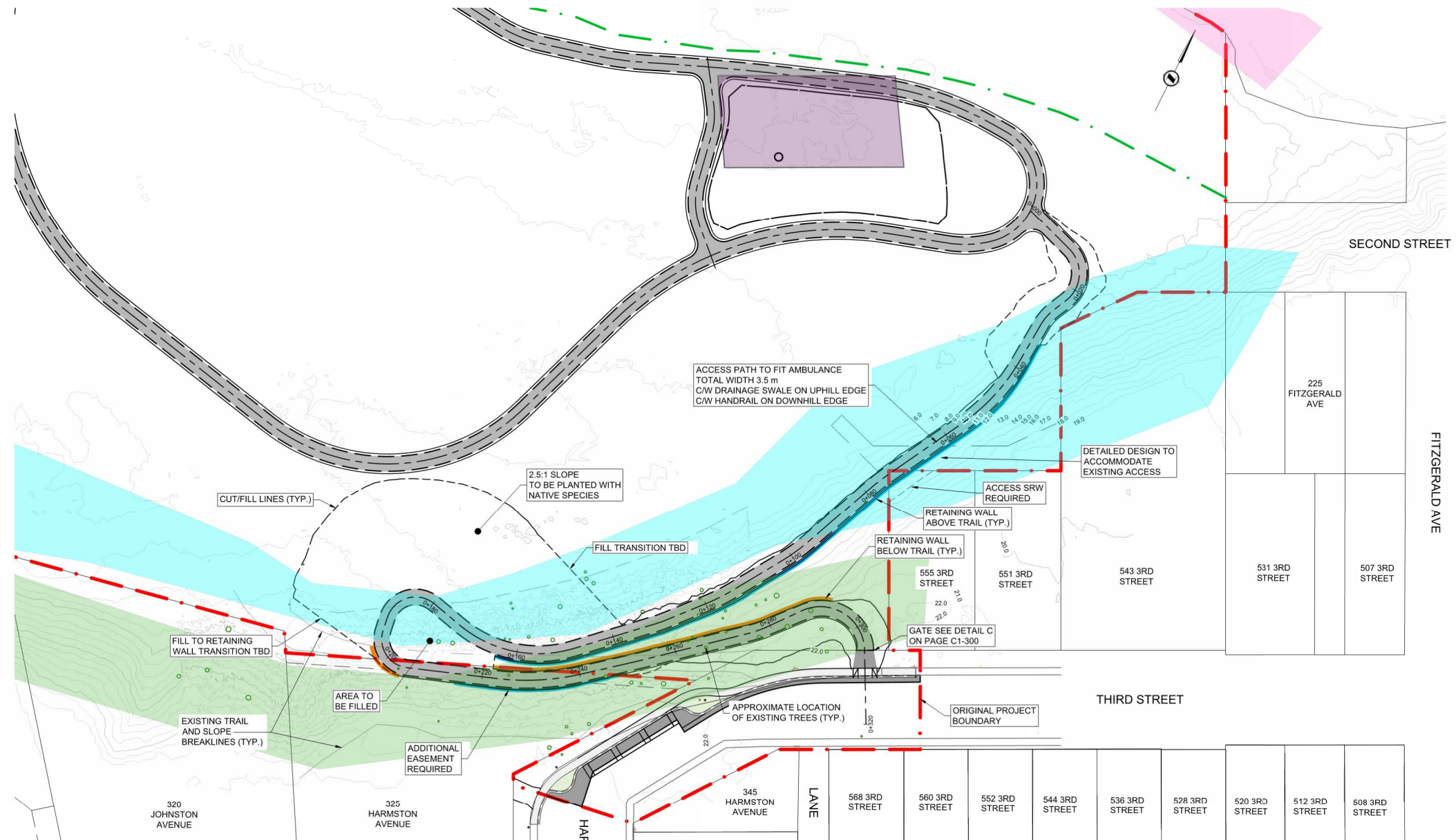
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CITY OF COURTENAY
**MCPHEE MEADOWS - PHASE 1
ACCESS PROFILE**
Option 2 - 8% Grade

Drawing No.	
SK-11	
Project Number	Rev.
2211-47614-16	PB

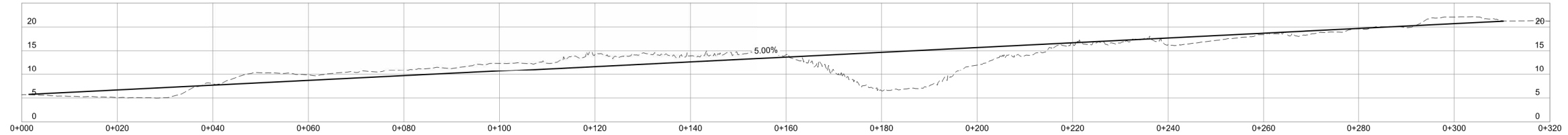
- DESTROY ALL PRINTS BEHIND PREVIOUS REVISION

DRAFT



ENVIRONMENTAL AREAS

	FRAGMENTED RIPARIAN FOREST
	MATURE MIXED WOOD FOREST (AREA IMPACTED: 630 m ²)
	SHRUBBY SWAMP (AREA IMPACTED: 916 m ²)
	HISTORIC ORCHARD



DATE: 2024-06-21 09:57	FILE: X:\22113_PROJECTS\47600-47699\7614-16_COC\up\Phase_Meadows\10.0_Drawings\10.1_Engineering\10.1.2_Sheet\sk13-5%PERCENT_PROFILE.dwg	THIS DRAWING AND DESIGN IS THE PROPERTY OF McElhanney AND SHALL NOT BE USED, REUSED OR REPRODUCED WITHOUT THE CONSENT OF McELHANNEY. McELHANNEY WILL NOT BE HELD RESPONSIBLE FOR THE IMPROPER OR UNAUTHORIZED USE OF THIS DRAWING AND DESIGN.
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PB 2024-06-20	ISSUED FOR OPTIONS ANALYSIS	ER ER DG
PA 2023-11-17	ISSUED FOR REVIEW	ER ER MS
Rev	Date	Description
		Drawn
		Design
		App'd

0 1:500 25

ORIGINAL DWG SIZE: A1 (594 x 841mm)

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CITY OF COURTENAY

MCPHEE MEADOWS - PHASE 1
ACCESS PROFILE
5% SLOPE
Option 3 - 5% Grade

Drawing No.	SK-13
Project Number	2211-47614-16
Rev.	PB

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3. Evaluation Matrix

The evaluation matrix, overleaf, outlines the implications of each access option given the considerations outlined above. Options 1 through 3 are ranked for each consideration with a colour code as follows:

- Green – meets all requirements / low impact
- Yellow – meets all requirements / medium impact
- Red – Does not meet requirements / highest impact

This evaluation matrix is intended to provide technical information to support City staff as they consider the best option for the McPhee Meadows access.



Table 2 - Evaluation of Options

Consideration	Option 1 – Existing Access	Option 2 – 8% Access	Option 3 – 5% Access
Compliance with BC Active Transportation Design Guide (BCAT) (See section 4.1)	Grade exceeds 8.3% slope recommended in the BCAT design guideline. The BCAT guide notes strategies for mitigating the effects of steep topography, including Consistent maintenance, Rest areas, and Railings.	Grades of up to 8.3% meet BCAT accessibility standards if intermittent landings are provided at intervals of no more than 9.0m. (BCAT p.C16)	5% slope complies with “Universally Accessible” standards. (BCAT p.C16) No intermittent landings required.
Emergency and Maintenance Vehicle Access	Yes – width requirement met	Yes – width requirement met	Yes – width requirement met
Environmental Regulatory Approvals (See section 4.2)	Inferred to need an approval under the WSA. Potential for offsetting however the smallest area for replacement would be required.	Option 2 requires an approval under the WSA. Relatively large offsetting requirements. Replacement ratio requirements should be discussed with regulator but inferred to be a minimum of 2:1.	Option 3 requires an approval under the WSA. Offsetting area inferred to be the largest for this option and may be difficult to accommodate on-site to obtain permits.
Environmental Impact (See section 4.2)	This is the preferred option from a reduction of environmental impact perspective because it minimizes impacts to the wetlands and cross the wetland in a relatively perpendicular, linear way, which is easy to maintain the existing drainage patterns.	Large area of wetland infilling proposed with the potential to negatively impact the adjacent property which drains through the Site. Potential for direct and indirect impacts to the wetland. Changes to site hydrology and changes to drainage patterns can cause negative impacts to portions of wetland that are retained onsite.	Largest area of wetland infilling proposed with the potential to negatively impact the adjacent property which drains through the Site. There are also potential impacts to the wetland footprint downstream on-site based on changes to flow regime which could impact ground and surface water levels and make the remaining wetland area non viable.
Archeological Permitting	AIA will be conducted. KFN will be consulted (CHIP permit), we will align with provincial regulations. Details to be confirmed in detailed design. Based on a review of the options, it does not appear that there is a significant difference in archeology permitting requirements between Options 1 to 3.	AIA will be conducted. KFN will be consulted (CHIP permit), we will align with provincial regulations. Details to be confirmed in detailed design. Based on a review of the options, it does not appear that there is a significant difference in archeology permitting requirements between Options 1 to 3.	AIA will be conducted. KFN will be consulted (CHIP permit), we will align with provincial regulations. Details to be confirmed in detailed design. Based on a review of the options, it does not appear that there is a significant difference in archeology permitting requirements between Options 1 to 3.
Archeological Monitoring	While monitoring will be required for all construction, Option 1 involves only minor ground disturbance in and around an existing roadway. Archeological potential is low.	Additional areas of cut required for Option 2 will increase the potential for archaeological findings during construction.	The increase in pathway length and increased ground disturbance areas required in Option 3 will increase the potential for archaeological findings during construction. Longer construction duration will also increase archeological monitoring requirements.
Geotechnical	Geotechnically this option would have lower risk, with limited modification of existing conditions and no soil retention requirements. Geotechnical scope would include some field work to characterize slope conditions, and limited slope analysis to verify path stability.	Moderate risk due to stripping, placement of engineered fill and installation of 130m of retaining wall on a steep slope. Requires additional field work, stability analyses, geotechnical design effort, as well as additional engineering effort for construction phase monitoring and testing for fill placement and retaining wall construction. Details to be confirmed during detailed design.	Increased design complexity and risk due to approximately 200m of retaining wall in a terraced switchback configuration on a steep slope. Significant engineered fill embankment required to support shallower graded access road. Details to be confirmed during detailed design following comprehensive field investigation.
Class D Cost Estimate (For Access Pathway Only) (See section 4.3)	Class D Estimate: \$ 115,000 (See detailed cost estimate Appendix A)	Class D Estimate: \$1,200,000 (See detailed cost estimate Appendix A)	Class D Estimate: \$2,200,000 (See detailed cost estimate Appendix A)
Connection to OCP – Alignment with the OCP’s Four Cardinal Directions.	<ul style="list-style-type: none"> Reconciliation – All three options have shown a commitment to reconciliation with thorough Archaeological assessments and encouraging K’ómoks First Nation perspective and guidance through all stages and facets of the project. Climate Action – Protecting to sensitive natural spaces is critical to reducing our impact on climate change. Option 1 involves the lowest impact to sensitive natural features. Equity – Option 1 does not provide an access route accessible to all abilities in line with the BCAT guide. Community Well-Being – The OCP notes that our access to green space has a tremendous impact on our physical and mental health. All three options provide access to green space. 	<ul style="list-style-type: none"> Reconciliation – All three options have shown a commitment to reconciliation with thorough Archaeological assessments and encouraging K’ómoks First Nation perspective and guidance through all stages and facets of the project. Climate Action – Protecting to sensitive natural spaces is critical to reducing our impact on climate change. Option 2 requires the second lowest impact to sensitive natural features. Equity – Option 2 provides an access route accessible to all abilities in line with the BCAT guide. Community Well-Being – The OCP notes that our access to green space has a tremendous impact on our physical and mental health. All three options provide access to green space. 	<ul style="list-style-type: none"> Reconciliation – All three options have shown a commitment to reconciliation with thorough Archaeological assessments and encouraging K’ómoks First Nation perspective and guidance through all stages and facets of the project. Climate Action – Protecting to sensitive natural spaces is critical to reducing our impact on climate change. Option 3 involves the greatest impact to sensitive natural features. Equity – Option 3 provides an access in line with Universal Accessible Design Community Well-Being – The OCP notes that our access to green space has a tremendous impact on our physical and mental health. All three options provide access to green space.

4. Key Considerations

The following additional background information has been provided for two key considerations, Compliance with BC Active Transportation Guidelines, and Environmental Impacts and Permitting.

4.1. COMPLIANCE WITH BC ACTIVE TRANSPORTATION GUIDELINES

Recommended longitudinal grades for pedestrian facilities are noted in the BC Active Transportation Guideline document. Longitudinal slopes of up to 8.3% are acceptable under the BCAT guide so long as landings are provided at 9.0m intervals (min.). A maximum grade of 5% is required for a pedestrian pathway to be considered Universally Accessible. For pedestrian routes with grades greater than 8.3%, the BCAT guide recommends alternative accommodations, such as:

- Regular maintenance to ensure pathways are clear of ice, snow, debris, and other slipping or tripping hazards,
- Frequent rest areas with benches or seating,
- Railings to assist those requiring extra support.

4.2. ENVIRONMENTAL IMPACTS AND PERMITTING

McElhanney has conducted a preliminary environmental site assessment, and a Qualified Environmental Professional conducted a site visit on January 3, 2023. Note that the completion of the environmental assessment report was put on hold while the City determined the appropriate design for access and use of the park.

At the base of the steep slope is a wet depression in which lies a shrubby swamp wetland. Mineral wetlands such as marshes and swamps are associated with dynamic water tables. Community composition in marshes and swamps are defined by the length and depth of flooding and the degree of waterflow. There is evidence that this area may have been a historic side channel to the river, however the full assessment of the wetland feature identified has not yet been completed.

The *BC Guide to Wetland Identification* defines wetlands as follows:

Wetlands are areas where soils are water-saturated for a sufficient length of time such that excess water and resulting low soil oxygen levels are principal determinants of vegetation and soil development.

Wetlands will have a relative abundance of hydrophytes in the vegetation community and/or soils featuring “hydric” characters (MacKenzie and Moran 2004).

The wetland extends to the west onto neighbouring property in which large open ponds of water were observed during the 2023 site visit when the QEP was granted access to adjacent property. The drainage of the ponds through the swamp on-site was observed in a channel which flowed through a culvert under



the existing pathway (flow direction was video recorded in the 2023 site visit). Changes to the drainage patterns on-site can negatively impact offsite conditions which could result in flooding due and property damage. Additional assessments may be required to drainage volumes and hydrology both on-site and off-site.

This feature meets the definition of a “stream” under the *Water Sustainability Act* (WSA). Under the WSA a stream is defined as:

- A natural watercourse, including a natural glacier course, or a natural body of water, whether or not the stream channel of the stream has been modified, or
- A natural source of water supply, including, without limitation, a lake, pond, river, creek, spring, ravine, gulch, wetland, or glacier, whether or not usually containing water, including ice, but does not include an aquifer.

Therefore, changes in and about a stream require either Notification or Approval from the Province under Section 11 of the WSA, depending on the design selected. Avoidance and minimization of impacts to naturally occurring wetlands are recommended for this project. Replacement compensation or offsetting may be required to obtain an Approval under the *Water Sustainability Act*. Habitat compensation is considered the third element of the mitigation hierarchy, following avoidance and minimization of adverse effects (Lynch-Stewart *et al.* 1996).

A replacement ratio of 2:1 is often recommended for habitat compensation for impacts to wetlands. Some jurisdictions (i.e. Alberta) adjust the replacement ratio to be relative to the existing function and value of the wetland. For example, undisturbed wetlands that provide high value nesting and breeding habitat for birds and amphibians would use a 4:1 replacement ratio, whereas low value wetlands with substantial historic modification would use a 1:1 replacement ratio. It is recommended that the client meet with the regulator in the early stages of planning to determine the project requirements and potential additional assessments that may be required to infill wetlands on the Site and verify replacement ratios.

It is inferred that all options will require similar permitting pathways, however as the accessibility increases through grade change in the pathway, impacts to the wetland feature also increase. Therefore, habitat offsetting requirements and engineering to maintain drainage patterns will become more onerous with each option presented. Option 1 is the preferred option from an environmental impact perspective.

4.3. CONSTRUCTION COST

Class D cost estimates have been prepared for all three options. The cost estimates reflect **only** the construction of the access path from 3rd Street to the meadow loop trail, and does not include the meadow loop trail, other meadow improvement works, furnishings, signage, or 3rd. Street improvements. Class D cost estimates for the three options are included in Appendix A.



5. Closing

We trust that the information provided will assist the City in determining the best path forward for the McPhee Meadows access pathway. Please don't hesitate to contact the undersigned if you have any further questions.

Sincerely,

Prepared by:



Destry Glover, P.Eng.
dglover@mcelhanney.com
250-338-5495

Reviewed by:



Matt Sanderson, P.L.Eng
msanderson@mcelhanney.com
778-225-0210

Cc: City of Courtenay, Chris Davidson, P.Eng.
McElhanney, Chantal Richard, P.Eng.

REVISION HISTORY

Date	Status	Revision	Author
June 20, 2024	Final	0	DG

LIMITATION

This report has been prepared for the exclusive use of the City of Courtenay. The material in it reflects the best judgement of the Consultant in light of the information available to the Consultant at the time of preparation. As such, McElhanney, its employees, sub-consultants and agents will not be liable for any losses or other consequences resulting from the use or reliance on the report by any third party.



APPENDIX A

Class D Cost Estimates

COST ESTIMATE - Class D
McPHEE MEADOWS - Alternate Access
CITY OF COURTENAY
OPTION #1 (15% Grade)

2211-47614-16
 Rev. 0, 2023-06-07
 Prepared by DG/ER
 Checked by DG
 Reviewed by __

ACCESSIBLE ALIGNMENT [EXCLUDES WORKS IN MEADOW]

<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Amount</u>
<u>CLEARING AND REMOVALS</u>				
1.01	Clearing and Grubbing	Lump Sum	1	\$ 10,000.00 \$ 10,000.00
1.03	Tree removals and pruning	Each	10	\$ 750.00 \$ 7,500.00
Sub Total				\$ 17,500.00
<u>PHASE 1 TRAIL WORKS - ACCESS TO MEADOW ONLY</u>				
3.01	Common excavation (off-site disposal)	Cubic Metres	200	\$ 55.00 \$ 11,000.00
3.02	Imported Fill (pit-run - assume 300mm thick in all areas except access/loop junction)	Cubic Metres	200	\$ 55.00 \$ 11,000.00
3.03	Surface preparation	Square Metres	470	\$ 5.00 \$ 2,350.00
3.04	Gravel path - 150 mm thickness	Square Metres	470	\$ 35.00 \$ 16,450.00
3.05	Granular Base 200 mm thickness	Square Metres	470	\$ 40.00 \$ 18,800.00
3.06	Geotextile	Square Metres	470	\$ 10.00 \$ 4,700.00
Sub Total				\$ 71,600.00
Sub Total				\$ 89,100.00
CONTINGENCY (30%)				\$ 26,730.00
TOTAL				\$ 115,830.00

Notes:

- *Common Excavation and Imported Fill quantities are listed as 10% more than calculated volumes

This estimate is:

- does not include engineering and design services
- based on recent tender pricing in the Comox Valley.
- based on McElhanney dwg. 2211-47614-16, sheet C1-100 to C1-300
- assuming no subsurface rock is encountered.
- 3rd Party utilities including BC Hydro, Telus, Shaw, or FortisBC. Not included
- internally rounded.

This construction cost has been prepared using the design and technical information currently available. The Consulting team cannot predict the market conditions, competitive environment, weather, or other unforeseen conditions that will prevail at the time that contractors will prepare their bids. The cost estimate is therefore subject to factors over which the Consulting team has no control, and its accuracy cannot be guaranteed

COST ESTIMATE - Class C
McPHEE MEADOWS - Alternate Access
CITY OF COURTENAY
OPTION #2 (8% Grade)

2211-47614-16
 Rev. 0, 2023-11-06
 Prepared by DG/ER
 Checked by DG
 Reviewed by ___

ACCESSIBLE ALIGNMENT [EXCLUDES WORKS IN MEADOW]

<u>Item</u>		<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Amount</u>
<u>CLEARING AND REMOVALS</u>					
1.01	Clearing and Grubbing	Lump Sum	1	\$ 15,000.00	\$ 15,000.00
1.03	Tree removals and pruning	Each	25	\$ 1,500.00	\$ 37,500.00
Sub Total					\$ 52,500.00
<u>PHASE 1 TRAIL WORKS - ACCESSIBLE ALIGNMENT</u>					
3.01	Common excavation (off-site disposal)	Cubic Metres	785	\$ 55.00	\$ 43,175.00
3.02	Imported Fill (pit-run - assume 300mm thick under trail plus fill under raised path)	Cubic Metres	3385	\$ 55.00	\$ 186,175.00
3.04	Gravel path - 150 mm thickness	Square Metres	715	\$ 35.00	\$ 25,025.00
3.05	Granular Base 200 mm thickness	Square Metres	715	\$ 40.00	\$ 28,600.00
3.06	Geotextile	Square Metres	715	\$ 10.00	\$ 7,150.00
3.07	4ft chainlink fence (one side through wooded area, two sides on berm)	Lineal Meter	305	\$ 175.00	\$ 53,375.00
3.08	Re-plant native species on former meadow access	Lump Sum	1	\$ 15,000.00	\$ 15,000.00
Sub Total					\$ 358,500.00
<u>CONCRETE & STRUCTURAL STEEL</u>					
	Retaining wall - (measured by sq.m of wall face)	<i>Low end cost</i>	Square Metres	425	\$ 800.00 \$ 340,000.00
	Retaining wall - (measured by sq.m of wall face)	<i>High end cost</i>	Square Metres	425	\$ 1,500.00 \$ 637,500.00

Sub Total	\$ 751,000.00
<i>Low end range for retaining wall cost</i> CONTINGENCY (30%)	\$ 225,300.00
TOTAL	\$ 976,300.00

Sub Total	\$ 1,048,500.00
<i>High end range for retaining wall cost</i> CONTINGENCY (30%)	\$ 314,550.00
TOTAL	\$ 1,363,050.00

Notes:

- *Common Excavation and Imported Fill quantities are listed as 10% more than calculated volumes

This estimate is:

- does not include engineering and design services
- based on recent tender pricing in the Comox Valley.
- based on McElhanney dwg. 2211-47614-16 SK11
- assuming no subsurface rock is encountered.
- 3rd Party utilities including BC Hydro, Telus, Shaw, or FortisBC. Not included
- internally rounded.

This construction cost has been prepared using the design and technical information currently available. The Consulting team cannot predict the market conditions, competitive environment, weather, or other unforeseen conditions that will prevail at the time that contractors will prepare their bids. The cost estimate is therefore subject to factors over which the Consulting team has no control, and its accuracy cannot be guaranteed

COST ESTIMATE - Class D
McPHEE MEADOWS - Alternate Access
CITY OF COURTENAY
OPTION #3 (5% Grade)

2211-47614-16
 Rev. 0, 2023-11-22
 Prepared by DG/ER
 Checked by DG
 Reviewed by DG

ACCESSIBLE ALIGNMENT [EXCLUDES WORKS IN MEADOW]

<u>Item</u>		<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Amount</u>
<u>CLEARING AND REMOVALS</u>					
1.01	Clearing and Grubbing	Lump Sum	1	\$ 30,000.00	\$ 30,000.00
1.03	Tree removals and pruning	Lump Sum	1	\$ 90,000.00	\$ 90,000.00
					Sub Total \$ 120,000.00
<u>PHASE 1 TRAIL WORKS - ACCESSIBLE ALIGNMENT</u>					
3.01	Common excavation (off-site disposal)*	Cubic Metres	2180	\$ 55.00	\$ 119,900.00
3.02	Imported Fill (pit-run - assume 300mm thick under trail plus fill under raised path)*	Cubic Metres	9495	\$ 55.00	\$ 522,225.00
3.04	Gravel path - 150 mm thickness	Square Metres	1140	\$ 35.00	\$ 39,900.00
3.05	Granular Base 200 mm thickness	Square Metres	1140	\$ 40.00	\$ 45,600.00
3.06	Geotextile	Square Metres	1140	\$ 10.00	\$ 11,400.00
3.07	4ft chainlink fence (one side through wooded area, two sides on berms)	Lineal Meter	350	\$ 175.00	\$ 61,250.00
3.08	Re-plant native species on former meadow access	Lump Sum	1	\$ 15,000.00	\$ 15,000.00
					Sub Total \$ 815,275.00
<u>CONCRETE & STRUCTURAL STEEL</u>					
	Retaining wall - (measured by sq.m of wall face)	<i>Low end cost</i>	Square Metres	635	\$ 800.00 \$ 508,000.00
	Retaining wall - (measured by sq.m of wall face)	<i>High end cost</i>	Square Metres	635	\$ 1,500.00 \$ 952,500.00

	Sub Total \$ 1,443,275.00
<i>Low end range for retaining wall cost</i>	CONTINGENCY (30%) \$ 432,982.50
	TOTAL \$ 1,876,257.50

	Sub Total \$ 1,887,775.00
<i>High end range for retaining wall cost</i>	CONTINGENCY (30%) \$ 566,332.50
	TOTAL \$ 2,454,107.50

Notes:

- *Common Excavation and Imported Fill quantities are listed as 10% more than calculated volumes

This estimate is:

- does not include engineering and design services
- based on recent tender pricing in the Comox Valley.
- based on McElhanney dwg. 2211-47614-16 SK13
- assuming no subsurface rock is encountered.
- 3rd Party utilities including BC Hydro, Telus, Shaw, or FortisBC not included
- internally rounded.

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\$ 2,165,182.50