

Considered at the May 23, 2017 Council meeting

Council Agenda Information
☒ Regular Council May 23, 2017

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City of Port Moody Report/Recommendation to Council

Date: March 10, 2017

File No. 11-5215-01

Submitted by: Engineering and Operations Department – Engineering Division

Subject: Rail Crossing and Whistle Cessation Assessment

Purpose / Introduction

This report summarizes the findings of a recent at grade rail crossing and whistle cessation assessment.

Recommended Resolution

THAT the report dated March 10, 2017 from Engineering and Operations Department – Engineering Division regarding Rail Crossing and Whistle Cessation Assessment be received for information.

Background

In 2014, Transport Canada approved new *Grade Crossing Regulations* that established new safety standards for federally regulated grade crossings. Under the authority of the *Railway Safety Act*, the Regulations are expected to improve safety by helping to reduce the frequency and severity of collisions, thereby saving lives and preventing injuries and derailments.

The *Regulations* required road authorities to assess rail crossings and submit the findings to the rail company by November 27, 2016. Additionally, road authorities must immediately make upgrades to meet basic safety requirements, and make additional improvements by November 27, 2021.

An assessment of the City's rail crossings was part of the City's 2016 work plan. Additionally, at the April 12, 2016 Regular Council meeting, the following motion was passed:

RC16/152

THAT an initial engineering review regarding train whistle cessation at the Murray Street crossing be undertaken as soon as possible.

Following the Council resolution, the whistle cessation assessment was added to the 2016 rail crossing evaluation.

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Discussion

The City issued a Request for Proposals (RFP) in October 2016 to undertake an evaluation of Port Moody's ten rail crossings. The scope of work was to determine whether the crossings comply with applicable legislation, regulations, and best practices, and to confirm what upgrades are required to bring the crossings into compliance. Vehicle safety, pedestrian safety, and sightline assessments were important elements of the study.

Additionally, a whistle cessation assessment for the Murray Street crossing was part of the scope of work.

Rail Crossing Assessment

The rail crossings assessed as part of this study were located as follows:

Table 1 – Rail Crossings

Crossing Name	Spur	Spur Mile
Murray Street	loco	0.28
Along San Remo Drive at Campbell Road	loco	0.85
Along San Remo Drive at Old Orchard Park	loco	1.1
Alderside Road at Old Orchard Drive	loco	1.32
Alderside Road at Benson Drive	loco	1.66
Along Alderside Road at Barber Street	loco	1.79
Along Alderside Road	loco	1.98
April Road	loco	2.29
Beach Avenue	loco	2.60
First Avenue	loco	2.78
Reed Point Way	--	--

The rail crossing assessment examined the following criteria:

Table 2 – Rail Crossing Assessment Criteria

Criteria	Description
Collision History	This is the number of collisions that have been reported at the crossings over the past five years.
Pedestrian Activity	Pedestrians and cyclists are vulnerable crossing users. This is the sum of number of pedestrians and cyclists using the crossing on a typical day.
Sight Lines	Adequate sight distance is critical to reducing, if not eliminating, the probability of a pedestrian being struck by a train. This criterion is a measure of whether adequate sight distance is available at the crossing.
Train Speed	The severity of an incident will likely increase with train speed. This is the maximum speed of trains traveling through the crossing.
Roadway Speed	The severity of an incident will likely increase with roadway speed. This is the posted speed on the roadway.
Basic Requirements	Improvements may need to be implemented to meet the basic requirements.

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Class D Cost Estimate	Large capital outlays may require additional time to secure funding than less expensive ones. This is the Class D Cost Estimate for the improvements needed to meet the basic requirements.
Cross Product	Higher cross product would imply higher potential for road/rail conflicts. This is the product of the annual average daily railway movements and the average annual daily traffic of vehicles on the road that pass across the grade crossing.
Number of Tracks	Additional railway tracks would imply higher potential for road/rail conflicts.

In November 2016, the City completed its assessment of the rail crossings and submitted the information to CP Rail, as required under the *Transport Canada Grade Crossing Regulations*.

The final report from the consultant includes a Maintenance Plan that identifies the remedial work and costs necessary to:

- Meet the Basic Requirements pursuant to section 58 of the *Grade Crossing Regulations* or are safety related. These remedial works must be implemented forthwith; and
- Meet the Additional Requirements pursuant to section 59 of the *Grade Crossing Regulations* and must be implemented by November 27, 2021.

The assessment confirmed the rail crossing currently meets the Basic Requirements; however, there are some signage improvements that should be made as soon as possible. The work required to meet the Additional Requirements are summarized in Table 3.

Table 3 – Rail Crossing Upgrades (Estimated Budget) +/- 30%

Location	2017	2018	2019	2020	2021	Description
System Wide	\$7,600					Signage improvements
Murray Street		\$3,200				Clear vegetation
Along San Remo Drive at Campbell Road						
Along San Remo Drive at Old Orchard Park						
Alderside Road at Old Orchard Drive		\$1,000				Clear vegetation
Alderside Road at Benson Drive		\$1,000				Clear vegetation
Along Alderside Road at Barber Street						
Along Alderside Road						
April Road		\$500				Trim vegetation
Beach Avenue				\$500		Trim trees
First Avenue						
Reed Point Way			\$50,000			Install a "PREPARE TO STOP AT RAILWAY CROSSING" overhead sign on the south approach.

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A copy of the Grade Crossing Upgrades report, dated January 17, 2017, is included as **Attachment 1**. The above recommendations can be completed with the current budget in the approved five-year capital plan.

Murray Street – Whistle Cessation

Pursuant to Transport Canada's *Grade Crossing Regulations Section 104 – Audible Warning*, the following requirements are prescribed for an area that prohibits whistling:

- 1) The area must be:
 - a) Within a railway right-of-way, on each side of a public grade crossing, and within 0.4km from the outer edge of the crossing surface; and
 - b) Within the road approach;
- 2) The area must have a public grade crossing that has the applicable protection referred to in the *Grade Crossing Regulations*;
- 3) The area must not have repeated incidents of unauthorized access to the line of railway; and
- 4) The area must not require whistling for a grade crossing located outside the area.

The current warning system (RAILWAY CROSSING signs, side-mounted flashing lights, and bells) meets the requirement for whistle cessation. However, sightlines requirements are not met. According to the whistle cessation assessment, clear sightline areas for car drivers stopped at the crossing cannot be provided or maintained on the west approach due to vegetation on the northwest and southwest corners of the crossing. In addition, there is evidence of routine unauthorized access (trespassing) on the rail in the area of the crossing.

In order to deal with the deficiencies, it is necessary to clear bush, trees, and other vegetation from the area to improve sightlines. Also, a 400m long fence is required to deal with the trespassing issue. The fence would be located along the right of way on both approaches to discourage trespassing along the line of rail within the quiet zone. The budget to install the fence, clear vegetation, acquire permits, and pay applicable fees is \$200,000 (+/- 30%).

The full impacts of the proposed upgrades, such as the impact to trees, habitat, and public realm in the corridor, have not been identified. Considering the unassessed impacts, contingency, project management, engagement, and consultant costs, staff recommend that a budget estimate of \$300,000 be established should Council wish to pursue whistle cessation to full implementation.

Subject to approval from CP Rail, and agreement to the technical scope and implementation of the works noted above, whistle cessation could be implemented at Murray Street.

A copy of the Whistle Cessation Requirements report, dated January 17, 2017 is attached as **Attachment 2**.

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In addition to the Murray Street rail crossing, it should be noted that there are several crossings on the loco Spur where whistling occurs. Implementing whistle cessation at Murray Street will not prevent trains from whistling for their approach at the next crossing to Shoreline trail, behind Trasolini Field, leaving the train whistle audible through Murray Street.

At this time, a detailed assessment of whistle cessation for the loco Spur has not been undertaken. However, in addition to Murray Street, a high-level assessment of these crossings suggest that the cost would be at least \$1.5 million to bring the crossings into compliance with Transport Canada's *Grade Crossing Regulations Section 104 – Audible Warning* standards.

Other Options

Council may choose to investigate in more detail the possibility of achieving whistle cessation along the entire loco Spur line. The anticipated budget to undertake this work is \$50,000.

It should be noted, per the Discussion section, that if staff were to pursue the whistle cessation, an order of magnitude budget of \$2,000,000 should be considered for the complete line, with \$300,000 anticipated for Murray Street if reviewed stand-alone.

The following resolution would enable a whistle cessation assessment of the loco Spur line:

That staff be directed to undertake a whistle cessation study of the loco Spur line at a cost of up to \$50,000.

Financial Implications

The cost to complete the proposed safety upgrades is included in the City's current annual five-year capital plan process for Council's consideration and will be completed with the following funding levels outlined in Table 4.

Table 4 – Existing Five-Year 2017-2021 Planned Budget

Funding Source	2017	2018	2019	2020
Asset Reserve – Transportation	~ \$20,000 carry over from 2016	\$50,000	\$50,000	\$50,000

Future work and consultation for whistle cessation is not currently budgeted. As recommended in the Discussion section of this report, if staff are directed to further pursue whistle cessation, staff recommend of a total project budget of \$300,000 be established for the Murray Street crossing.

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Communications / Civic Engagement

The City/CPR Community Advisory Panel has been interested in whistle cessation at the Murray Street crossing for some time. At the meeting held on November 30, 2015, the Advisory Panel passed the following resolution:

CPR15/002

THAT a recommendation be made to Council that an initial engineering review regarding train whistle cessation at the Murray Street crossing be undertaken as soon as possible.

Given the interest from the City/CPR Community Advisory Panel, staff recommend that, following receipt of this report, staff will meet with the Advisory Panel and share the Whistle Cessation report.

Council Strategic Plan Objectives

The proposed rail crossing safety upgrades directly support the City's Vision:

Port Moody, City of the Arts, is a unique, safe and vibrant waterfront city of strong neighbourhoods; a complete community that is socially, economically, and environmentally sustainable and values its natural environment and heritage character.

The above recommendation to engage the City/CPR Community Advisory Panel supports the following Council strategic priorities:

- Community Planning: Proactive regional, city, and neighbourhood planning for the short and long term that engages neighbourhoods to create a livable, vibrant, sustainable, orderly, and coordinated community; and
- Service Excellence: Develop responsive and sustainable service excellence, community engagement, and a culture of transparency.

Attachments:

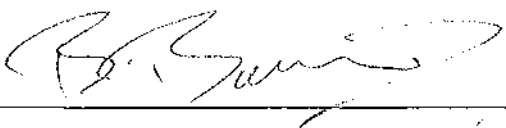
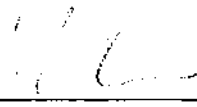
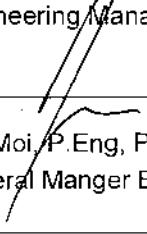
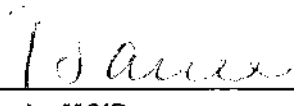
1. Grade Crossing Upgrades, by the MMM Group, January 17, 2017.
2. Whistle Cessation Requirements, by the MMM Group, March 7, 2017.

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Prepared by:	Reviewed by:
 Brian Barnett, P.Eng. Senior Project Engineer	 James Chandler, P.Eng., PMP, LEED AP Engineering Manager  Jeff Moi, P.Eng, PMP General Manager Engineering and Operations
Reviewed for Form and Content / Approved for Submission to Council:	
City Manager's Comments  Tim Savoie, MCIP City Manager	

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January 17, 2017

File: 5016254-001

City of Port Moody
100 Newport Drive
Port Moody, BC, V3H 5C3

Attention: Mr. Brian Barnett, P.Eng

Dear Mr. Barnett,

Reference: Report 2: Grade Crossing Upgrades
At Grade Rail Crossing Assessment – Port Moody, BC

As requested, MMM Group has prepared this draft Maintenance Plan that lists remedial work required at each of the 11 crossings and the associated costs, prioritizes the improvements, and presents a Five Year Capital Plan.

MAINTENANCE PLAN

The Maintenance Plan identifies the remedial works / costs necessary to:

- ✓ Meet the **Basic Requirements** as per Section 58 of the *Grade Crossing Regulations* or are safety related. Remedial works must be implemented forthwith; and
- ✓ Meet the **Additional Requirements** as per Section 59 of the *Grade Crossing Regulations* and must be implemented by November 27, 2021, i.e. within five years.

A multi-criteria decision matrix model was used to prioritize the remedial works given the agreed upon Priority Algorithm, which is attached as **Appendix A**.

The list of remedial work required at each of the 11 crossings and the associated costs are presented in **Appendix B**.

Given the desire for the pavement marking and signage at railway crossings to be consistent across the City of Port Moody, there is an opportunity to address this as a single city-wide project. There is also an opportunity to address the Basic Requirements plus the system-wide signage within the first year. The Additional Requirements at the 11 crossings could be addressed within four years. As a

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result, the 11 at-grade railway crossings could be brought into compliance within the five year timeline. Note that the costs are subject to the cost-sharing arrangements specified in each of the Grade Crossing Agreements.

The priority levels of each crossing with the associated cost to address the Requirements are presented in Table 1.

Table 1 – Railway Crossing Requirements (Prioritized by Crossing)

Priority	Subdivision	Milepost	Name	Order of Magnitude Cost (H/30%)	Year
Basic Requirements (System-Wide) *				\$0	1
Signage (System-Wide)				\$7,600	
1	loco Spur	0.28	Murray Street	\$3,200	2
2	loco Spur	2.29	April Road	\$500	
3	loco Spur	1.32	Alderside Road	\$1,000	
4	loco Spur	1.66	Alderside Road Slip	\$1,000	
5	Cascade	117.66	Reed Point Marina	\$50,000	3
6	loco Spur	2.60	Beach Avenue	\$500	4
7	loco Spur	2.78	First Avenue	\$0	
8	loco Spur	0.85	San Remo Drive at Campbell Rd	\$0	
9	loco Spur	1.79	Alderside Road at Barber Street	\$0	
10	loco Spur	1.09	San Remo Drive	\$0	
11	loco Spur	1.98	Alderside Road	\$0	
Total:				\$63,800	

Notes: * - Subject to cost-sharing arrangements specified in the respective Grade Crossing Agreements.
Does not include improvements deemed Low priority, i.e. improvements not required to meet the 2021 deadline.

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FIVE YEAR CAPITAL PLAN

Table 2 presents how the remedial works could be incorporated over a five year period into an upcoming version of the City of Port Moody's budget so that the works can be completed by 2021.

Table 2 – Five-Year Capital Plan

Year	Project Name	Budget
1	Railway Crossings - Basic Requirements (System-Wide)	\$0
	Railway Crossings - Signage (System-Wide)	\$7,600
	Subtotal	\$7,600
2	Railway Crossings - Additional Requirements (4 crossings)	\$5,700
3	Railway Crossings - Additional Requirements (1 crossing)	\$50,000
4	Railway Crossings - Additional Requirements (1 crossing)	\$500
	TOTAL	\$63,800

* * * * *

Should you have any questions, please contact me at (604) 685-9381 or vanweelderenf@mmm.ca.

Yours truly,

MMM Group Limited

Floris van Weelderren, P.Eng., PTOE
Manager, Transportation Planning
5016254-001-REP-02-Rev1 (Grade Xing Upgrades)



Attachments:
Appendix A – Priority Algorithm
Appendix B – Remedial Works and Associated Costs

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APPENDIX A - PRIORITY ALGORITHM

Given that the 11 grade crossings need to meet the basic requirements within seven years (November 27, 2021) of the date that the Regulations came into force (November 27, 2014), MMM used its Grade Crossing Implementation System (G-CIS) to recommend what improvements should be implemented and when these improvements should take place. This spreadsheet-based multi-criteria decision matrix model with user-friendly interface was developed using data collected during the field investigations.

G-CIS uses an algorithm for prioritizing the implementation of the future grade crossing improvements which would be based on a points ranking system ranging from a maximum of 100 Points (Highest Priority) to a minimum of Zero Points (Lowest Priority). As described in **Table A-1** (shown overleaf) points are proposed to be allocated based on three main categories and nine sub-criteria.

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Table A-1 - Proposed Priority Algorithm

Category	Criteria	Description	Weighting
Safety (40 Points)	Collision History	This is number of collisions that have been reported at the crossing over the past five years.	Ranges between a maximum of 10 Points (crossing with highest number of collisions) to Zero Points (crossing with lowest number of collisions)
	Pedestrian Activity	Pedestrians and cyclists are vulnerable crossing users. This is the sum of the number of pedestrians and cyclists using the crossing on a typical day.	Ranges between a maximum of 10 Points (crossing with highest number of users) to Zero Points (crossing with lowest number of users)
	Sight Lines	Adequate sight distance is critical to reducing, if not eliminating the probability of a pedestrian being struck by a train. This criterion is a measure of whether adequate sight distance ($D_{STOPPED-PED}$) is available at the crossing.	Yes – 10 Points No – Zero Points
	Train Speed (mph)	The severity of an incident will likely increase with train speed. This is the maximum speed of trains traveling through the crossing.	50 mph – 5 Points 40 mph – 4 Points 30 mph – 3 Points 20 mph – 2 Points 10 mph – 1 Points
	Roadway Speed (km/h)	The severity of an incident will likely increase with roadway speed. This is the posted speed on the roadway.	50 km/h – 5 Points 40 km/h – 3 Points 30 km/h – 1 Points
Policy (30 Points)	Basic Requirements	Improvements may need to be implemented to meet the basic requirements.	Yes – 15 Points No – Zero Points
	Class D Cost Estimates	Large capital outlays may require additional time to secure funding than less expensive ones. This is the Class D Cost Estimate for the improvements needed to meet the basic requirements.	Ranges between a maximum of 15 Points (crossing with lowest cost estimate) to Zero Points (crossing with highest cost estimate)
Operations (30 Points)	Cross Product	Higher cross product would imply higher potential for road/rail conflicts. This is the product of the annual average daily railway movements and the average annual daily traffic of vehicles on the road that pass across the grade crossing.	Ranges between a maximum of 20 Points (crossing with highest cross product) to Zero Points (crossing with lowest cross product)
	Number of Tracks Present	Additional railway tracks would imply higher potential for road/rail conflicts.	3 Tracks – 10 Points 2 Tracks – 6 Points 1 Track – 3 Points

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APPENDIX B - REMEDIAL WORKS AND ASSOCIATED COSTS (ROAD AUTHORITY)

Table B-1 - CPR, Spur Mile 0.28 loco Spur (Murray Street) – Port Moody, BC

Item	Recommended Action	Order of Magnitude Cost	High	Medium	Low
	Signage				
1	Relocate the RAILWAY CROSSING AHEAD signs on both approaches so that they are 45 m +/- 10 m in advance of the stopping location.	\$600		✓	
2	Paint pavement markings as per the Transportation Association of Canada's <i>Manual of Uniform Traffic Control Devices in Canada</i> (2014).	\$1,000			✓
3	Reorient the CYCLIST DISMOUNT AND WALK sign to face multi-use pathway users approaching the crossing from the west.	\$300			✓
	Cost Estimate (+/- 30%):	--	\$0	\$600	\$1,300
4	Clear area of bush, trees, and other vegetation within the sight triangle.	\$2,000	✓		
5	Install NO STOPPING ON TRACKS (4) signs on both approaches.	\$1,200	✓		
6	Reconstruct both road approaches such that the difference in the road approach grade and the crossing surface is 0%. *	\$80,000			✓
7	Reconstruct the sidewalk on both approaches such that the grade within 5m of the crossing is less than 1%. *	\$10,000			✓
	Cost Estimate (+/- 30%):	--	\$3,200	\$0	\$90,000

Notes: * - this action should be undertaken as soon as practicable or when the road authority or railway company alter the road geometry and/or approach of the crossing (see sections 88 and 90 of the regulations).

1. Cost estimation based on information in MMM Group files.

2. All costs related to rail replacements or improvements must be confirmed by the railway company.

3. Price does not include cost for any permits or fees associated with railway work.

4. Price does not include any soft engineering costs (i.e. Geotechnical engineering or environmental engineering).

High – Basic Requirement as per Section 58 of the Grade Crossing Regulations or safety related. Improvement must be implemented forthwith.

Medium - Additional Requirement as per Section 59 of the Grade Crossing Regulations and must be implemented by November 27, 2021.

Low – Improvement must be implemented as soon as practicable.

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Table B-2 - CPR, Spur Mile 0.85 loco Spur (San Remo Drive at Campbell Road) – Port Moody, BC

Item	Recommended Action	Order of Magnitude Cost	High	Medium	Low
1	Reconstruct both the north and south approaches leading to the crossing such that the slope of the trail within 5m of the nearest rail is less than 2%*	\$50,000			✓
	Cost Estimate (+/- 30%):	--	\$0	\$0	\$50,000

Notes: * - this action should be undertaken as soon as practicable or when the road authority or railway company alter the road geometry and/or approach of the crossing (see sections 88 and 90 of the regulations).

1. Cost estimation based on information in MMM Group files.
 2. All costs related to rail replacements or improvements must be confirmed by the railway company.
 3. Price does not include cost for any permits or fees associated with railway work.
 4. Price does not include any soft engineering costs (i.e. Geotechnical engineering or environmental engineering).
- High – Basic Requirement as per Section 58 of the Grade Crossing Regulations or safety related. Improvement must be implemented forthwith.
- Medium - Additional Requirement as per Section 59 of the Grade Crossing Regulations and must be implemented by November 27, 2021.
- Low – Improvement must be implemented as soon as practicable.

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Table B-3 - CPR, Spur Mile 1.09 loco Spur (San Remo Drive) – Port Moody, BC

Item	Recommended Action	Order of Magnitude Cost	High	Medium	Low
	Signage				
1	Install STOP signs on both approaches such that service vehicles are required to stop.	\$600	✓		
	Cost Estimate (+/- 30%):	--	\$600	\$0	\$150,000
2	Reconstruct both approaches such that the slope of the trail approach within 5 m to the nearest track is no more than 2 percent.*	\$50,000			✓
3	Provide illumination for trail such that pedestrians and cyclists will be able to see the crossing at night. *	\$100,000			✓
	Cost Estimate (+/- 30%):	--	\$0	\$0	\$150,000

Notes: * - this action should be undertaken as soon as practicable.

1. Cost estimation based on information in MMM Group files.

2. All costs related to rail replacements or improvements must be confirmed by the railway company.

3. Price does not include cost for any permits or fees associated with railway work.

4. Price does not include any soft engineering costs (i.e. geotechnical engineering or environmental engineering).

High – Basic Requirement as per Section 58 of the Grade Crossing Regulations or safety related. Improvement must be implemented forthwith.

Medium - Additional Requirement as per Section 59 of the Grade Crossing Regulations and must be implemented by November 27, 2021.

Low – Improvement must be implemented as soon as practicable.

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Table B-4 - CPR, Spur Mile 1.32 loco Spur (Alderside Road) – Port Moody, BC

Item	Recommended Action	Order of Magnitude Cost	High	Medium	Low
	Signage				
1	Replace the RAILWAY CROSSING AHEAD sign on the north approach.	\$300		✓	
2	Install a RAILWAY CROSSING AHEAD sign on the south approach	\$300		✓	
3	Install LOW BED TRUCK WARNING signs on both approaches.	\$600			✓
4	Mount both the STOP sign and RAILWAY CROSSING sign on the same supporting post on the both approaches	\$600		✓	
5	Paint pavement markings as per the guidelines in the Transportation Association of Canada's <i>Manual of Uniform Traffic Control Devices for Canada</i> (2014).	\$1000			✓
	Cost Estimate (+/- 30%):		\$0	\$1,200	\$1,600
6	Clear area of bush, trees, and other vegetation within the sight triangle. If sightlines cannot be provided or maintained then an active warning system with gates is required.	\$1,000	✓		
7	Reconstruct both road approaches such that the difference in the road approach grade and the crossing surface is 2%.*	\$20,000			✓
8	Reconstruct both road approaches such that the grade does not exceed 2% within 8 m of the crossing and 5% within 18 m of the crossing.*	\$80,000			✓
9	Reconstruct the sidewalk on the south approach such that the grade is less than 2% within 5m of the crossing.*	\$10,000			✓
	Cost Estimate (+/- 30%):	--	\$1,000	\$0	\$110,000

Notes: * - this action should be undertaken as soon as practicable or when the road authority or railway company alter the road geometry and/or approach of the crossing (see sections 88 and 90 of the regulations).

1. Cost estimation based on information in MMM Group files.

2. All costs related to rail replacements or improvements must be confirmed by the railway company.

3. Price does not include cost for any permits or fees associated with railway work.

4. Price does not include any soft engineering costs (i.e. Geotechnical engineering or environmental engineering).

High – Basic Requirement as per Section 58 of the Grade Crossing Regulations or safety related. Improvement must be implemented forthwith.

Medium - Additional Requirement as per Section 59 of the Grade Crossing Regulations and must be implemented by November 27, 2021.

Low – Improvement must be implemented as soon as practicable.

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Table B-5 - CPR, Spur Mile 1.66 loco Spur (Alderside Road Slip) – Port Moody, BC

Item	Recommended Action	Order of Magnitude Cost	High	Medium	Low
Signage					
1	Install RAILWAY CROSSING AHEAD sign on both approaches so that they are 45 m +/- 10 m in advance of the stopping location.	\$600		✓	
2	Install LOW BED TRUCK WARNING signs on both approaches.	\$600			✓
3	Relocate STOP sign on the east approach so that it is at least 3m from the nearest rail.	\$300		✓	
Cost Estimate (+/- 30%):		--	\$0	\$900	\$600
4	Clear area of bush, trees, and other vegetation within the sight triangle.	\$1,000	✓		
5	Paint pavement markings as per the guidelines in the Transportation Association of Canada's Manual of Uniform Traffic Control Devices for Canada (2014). *	\$800			✓
6	Reconstruct both road approach such that that the grade within 18 m of the crossing does not exceed 5%. *	\$80,000			✓
Cost Estimate (+/- 30%):		--	\$1,000	\$0	\$900

Notes: * - this action should be undertaken as soon as practicable or when the road authority or railway company alter the road geometry and/or approach of the crossing (see sections 88 and 90 of the regulations).

1. Cost estimation based on information in MMM Group files.

2. All costs related to rail replacements or improvements must be confirmed by the railway company.

3. Price does not include cost for any permits or fees associated with railway work.

4. Price does not include any soft engineering costs (i.e. Geotechnical engineering or environmental engineering).

High – Basic Requirement as per Section 58 of the Grade Crossing Regulations or safety related. Improvement must be implemented forthwith.

Medium - Additional Requirement as per Section 59 of the Grade Crossing Regulations and must be implemented by November 27, 2021.

Low -- Improvement must be implemented as soon as practicable.

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Table B-6 - CPR, Spur Mile 1.79 loco Spur (Alderside Road at Barber Street) – Port Moody, BC

Item	Recommended Action	Order of Magnitude Cost	High	Medium	Low
1	Repave the pavement on the north approach such that it is smooth and continuous and that weeds and overgrown vegetation are removed on the pathway and at the stairs.*	\$4,000			✓
2	Reconstruct the south approach so that a level surface (<2% gradient) is provided for 5m beyond the nearest track. *	\$50,000			✓
	Cost Estimate (+/- 30%):	--	\$0	\$0	\$54,000

Notes: * - Improvement should be implemented as soon as practicable.

1. Cost estimation based on information in MMM Group files.

2. All costs related to rail replacements or improvements must be confirmed by the railway company.

3. Price does not include cost for any permits or fees associated with railway work.

4. Price does not include any soft engineering costs (i.e. Geotechnical engineering or environmental engineering).

High – Basic Requirement as per Section 58 of the Grade Crossing Regulations or safety related. Improvement must be implemented forthwith.

Medium - Additional Requirement as per Section 59 of the Grade Crossing Regulations and must be implemented by November 27, 2021.

Low – Improvement must be implemented as soon as practicable.

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Mr. Brian Barnett, P.Eng

Table B-7 - CPR, Spur Mile 1.98 loco Spur (Alderside Road) – Port Moody, BC

Item	Recommended Action	Order of Magnitude Cost	High	Medium	Low
1	Reconstruct both approaches such that the slope of the path approach within 5 m to the nearest track is no more than 2 percent.*	\$50,000			✓
2	Provide illumination for trail such that pedestrians and cyclists will be able to see the crossing at night.*	\$100,000			✓
	Cost Estimate (+/- 30%):	--	\$0	\$0	\$150,000

Notes: * - Improvement should be implemented as soon as practicable.

1. Cost estimation based on information in MMM Group files.
 2. All costs related to rail replacements or improvements must be confirmed by the railway company.
 3. Price does not include cost for any permits or fees associated with railway work.
 4. Price does not include any soft engineering costs (i.e. Geotechnical engineering or environmental engineering).
- High – Basic Requirement as per Section 58 of the Grade Crossing Regulations or safety related. Improvement must be implemented forthwith.
- Medium - Additional Requirement as per Section 59 of the Grade Crossing Regulations and must be implemented by November 27, 2021.
- Low – Improvement must be implemented as soon as practicable.

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Mr. Brian Barnett, P.Eng

Table B-8 - CPR, Spur Mile 2.29 loco Road (April Road) – Port Moody, BC

Item	Recommended Action	Order of Magnitude Cost	High	Medium	Low
	Signage				
1	Install RAILWAY CROSSING AHEAD signs on both approaches.	\$600		✓	
2	Install ADVISORY SPEED TAB (30 km/h) sign on the south approach.	\$300		✓	
3	Adjust the height of the STOP sign on the north approach to meet the urban requirement of 1.8 m.	\$200		✓	
4	Paint double stop bars, and RAILWAY CROSSING symbol and yellow double centerline pavement markings on both road approaches for vehicles.	\$5,000			✓
	Cost Estimate (+/- 30%):	--	\$0	\$1,100	\$5,000
5	Trim vegetation on berm at SE corner to improve sightline in order to meet the D _{stopped Ped} requirement for pedestrians and cyclists.	\$500		✓	
6	Reconstruct both approaches such that the slope of the travelled way for both approaches within 5 m and 8 m to the nearest track is no more than 2 percent.*	\$50,000			✓
7	Consider relocating the mailbox away from the crossing.	\$1,000			✓
	Cost Estimate (+/- 30%):	--	\$0	\$500	\$51,000

Notes:

- * - Improvement should be implemented as soon as practicable.
- 1. Cost estimation based on information in MMM Group files.
- 2. All costs related to rail replacements or improvements must be confirmed by the railway company.
- 3. Price does not include cost for any permits or fees associated with railway work.
- 4. Price does not include any soft engineering costs (i.e. Geotechnical engineering or environmental engineering).

High – Basic Requirement as per Section 58 of the Grade Crossing Regulations or safety related. Improvement must be implemented forthwith.

Medium - Additional Requirement as per Section 59 of the Grade Crossing Regulations and must be implemented by November 27, 2021.

Low – Improvement must be implemented as soon as practicable.

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Table B-9 - CPR, Spur Mile 2.60 loco Spur (Beach Avenue) – Port Moody, BC

Item	Recommended Action	Order of Magnitude Cost	High	Medium	Low
	Signage				
1	Install RAILWAY CROSSING AHEAD signs on both approaches.	\$600		✓	
2	Install ADVISORY SPEED TAB (30 km/h) sign on both approaches.	\$300		✓	
3	Adjust the height of the STOP signs on the both approaches to meet the urban requirement of 1.8 m	\$200		✓	
4	Paint double stop bars, and RAILWAY CROSSING symbol and yellow double centerline pavement markings on both road approaches for vehicles.	\$5,000			✓
	Cost Estimate (+/- 30%):	--	\$0	\$1,100	\$5,000
5	Trim trees on embankment at SE corner to improve sightline in order to meet the D _{stopped} requirement for vehicles.	\$500		✓	
6	Reconstruct the south approach such that the slope of the travelled way within 8 m to the nearest track is no more than 2 percent. *	\$50,000			✓
	Cost Estimate (+/- 30%):	--	\$0	\$500	\$50,000

Notes: * - this action should be undertaken as soon as practicable or when the road authority or railway company alter the road geometry and/or approach of the crossing (see sections 88 and 90 of the regulations).

1. Cost estimation based on information in MMM Group files.

2. All costs related to rail replacements or improvements must be confirmed by the railway company.

3. Price does not include cost for any permits or fees associated with railway work.

4. Price does not include any soft engineering costs (i.e. geotechnical engineering or environmental engineering).

High – Basic Requirement as per Section 58 of the Grade Crossing Regulations or safety related. Improvement must be implemented forthwith.

Medium - Additional Requirement as per Section 59 of the Grade Crossing Regulations and must be implemented by November 27, 2021.

Low – Improvement must be implemented as soon as practicable.

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Table B-10 - CPR, Spur Mile 2.78 loco Spur (First Avenue) – Port Moody, BC

Item	Recommended Action	Order of Magnitude Cost	High	Medium	Low
Signage					
1	Install RAILWAY CROSSING AHEAD signs on both approaches.	\$600		✓	
2	Install ADVISORY SPEED TAB (30 km/h) sign on both approaches.	\$300		✓	
3	Re-locate the STOP sign for the south approach such that its distance to the nearest rail is at least 3 m.	\$100		✓	
4	Paint double stop bars, and RAILWAY CROSSING symbol and yellow double centerline pavement markings on both road approaches for vehicles.	\$5,000			✓
	Cost Estimate (+/- 30%):	--	\$0	\$1,000	\$5,000
5	Reconstruct the north approach such that the slope of the travelled way between 8 m to 18 m to the nearest track is no more than 5 percent. *	\$50,000			✓
6	Provide roadway illumination such that the railway tracks are visible to approaching traffic at night. *	\$150,000			✓
7	Reconstruct the general road approach grades for both approaches such that the maximum slope does not exceed 5 percent. *	See 5.			✓
	Cost Estimate (+/- 30%):	--	\$0	\$0	\$150,000

Notes: * - this action should be undertaken as soon as practicable or when the road authority or railway company alter the road geometry and/or approach of the crossing (see sections 88 and 90 of the regulations).

1. Cost estimation based on information in MMM Group files.

2. All costs related to rail replacements or improvements must be confirmed by the railway company.

3. Price does not include cost for any permits or fees associated with railway work.

4. Price does not include any soft engineering costs (i.e. geotechnical engineering or environmental engineering).

High – Basic Requirement as per Section 58 of the Grade Crossing Regulations or safety related. Improvement must be implemented forthwith.

Medium – Additional Requirement as per Section 59 of the Grade Crossing Regulations and must be implemented by November 27, 2021.

Low – Improvement must be implemented as soon as practicable.

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Table B-11 - CPR, Mile 117.7 (Reed Point Way), Cascade Subdivision – Port Moody, BC

Item	Recommended Action	Order of Magnitude Cost	High	Medium	Low
	Signage				
1	Install RAILWAY CROSSING AHEAD sign on the north approach.	\$300		✓	
2	Relocate the RAILWAY CROSSING AHEAD sign on the south approach.	\$200		✓	
3	Install ADVISORY SPEED TAB (30 km/h) sign on both approaches.	\$600		✓	
4	Install SECOND TRAIN EVENT WARNING signs sign on both approaches. *	\$600			✓
5	Paint double stop bars, and RAILWAY CROSSING symbol and yellow double centerline pavement markings on both road approaches for vehicles. *	\$5,000			✓
	Cost Estimate (+/- 30%):	--	\$0	\$1,100	\$5,600
6	Install PREPARE TO STOP AT RAILWAY CROSSING sign on the south approach.	\$50,000		✓	
7	Reconstruct the general road approach grades for the north approach such that the maximum slope does not exceed 5 percent. *	\$50,000			✓
	Cost Estimate (+/- 30%):	--	\$0	\$50,000	\$50,000

Notes: * - this action should be undertaken as soon as practicable or when the road authority or railway company alter the road geometry and/or approach of the crossing (see sections 88 and 90 of the regulations).

1. Cost estimation based on information in MMM Group files.

2. All costs related to rail replacements or improvements must be confirmed by the railway company.

3. Price does not include cost for any permits or fees associated with railway work.

4. Price does not include any soft engineering costs (i.e. geotechnical engineering or environmental engineering).

High – Basic Requirement as per Section 58 of the Grade Crossing Regulations or safety related. Improvement must be implemented forthwith.

Medium - Additional Requirement as per Section 59 of the Grade Crossing Regulations and must be implemented by November 27, 2021.

Low – Improvement must be implemented as soon as practicable.

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MMM Group Limited
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March 7, 2017

File: 5016254-001

City of Port Moody
100 Newport Drive
Port Moody, BC, V3H 5C3

Attention: Mr. Brian Barnett, P.Eng

Dear Mr. Barnett,

Reference: Report 3: Whistle Cessation Requirements
At Grade Rail Crossing Assessment – Port Moody, BC

As requested, MMM Group has prepared this report that identifies remedial work required at the Murray Street crossing and the associated costs necessary to facilitate whistle cessation. Figure 1 shows the location of the grade crossing.

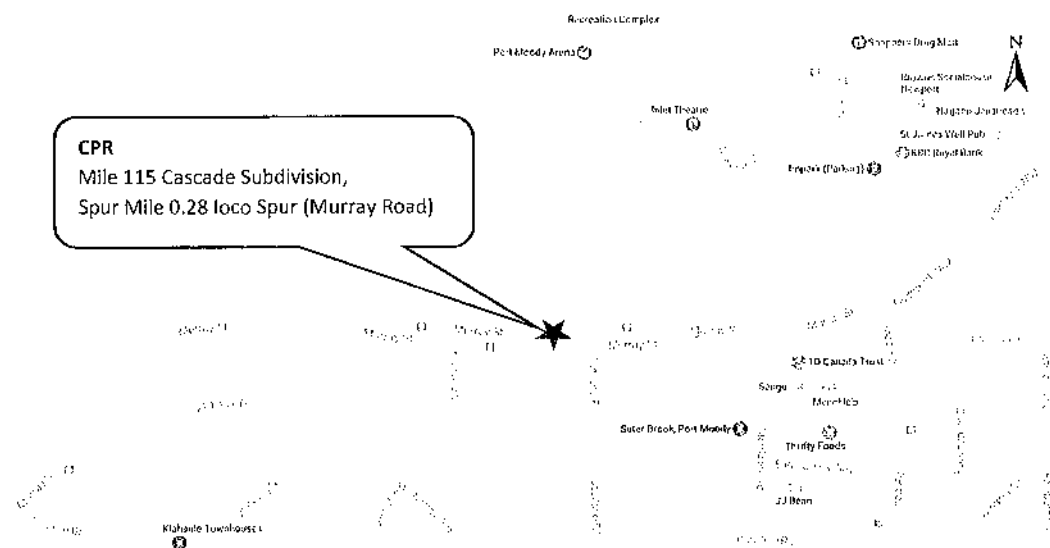


Figure 1 – Site Location (source: Google Maps)

COMMUNITIES
TRANSPORTATION
BUILDINGS
INFRASTRUCTURE

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FINDINGS

Existing Condition

For the purposes of this report, Murray Street is described in an east-west orientation while the rail line is described in a north-south orientation. This active crossing is equipped with RAILWAY CROSSING signs, side mounted flashing lights and bells. Murray Street is part of TransLink's Major Road Network (MRN), which links major areas of the community and region. It is also a bus and truck route. The crossing is located between two signalized intersections (Murray Street / Capilano Road and Murray Street / Klahanie Drive) and a multi-use pathway is provided along the north side of Murray Street. Part of the multi-use pathway forms part of the Trans Canada Trail that runs parallel west of the track.

General Information

• Railway Authority:	Canadian Pacific Railway (CPR)
• Track Type:	Class 2
• Mile:	115
• Subdivision:	Cascade
• Spur Mile:	0.28
• Spur:	loco
• Road Authority:	City of Port Moody
• Road Name:	Murray Street
• Road Classification:	Urban Arterial Divided
• Type of Grade Crossing:	Active

Existing and Proposed Rail Operations

• Maximum Railway Operating Speed	10 mph for freight trains 15 mph for passenger trains
• Daily Train Volume	2 freight trains per day

Existing Road Operations

• Posted Speed Limit	50 km/h
• General Approach Grade	-1% (East Approach); 2.5% (West Approach)
• Average Annual Daily Traffic (AADT)	18,000 vehicles per day (2015)
• Pedestrian Traffic	500 pedestrians per day (2016)
• School Bus Route	Yes
• Bicycle Route	Yes
• Dangerous Goods truck route	Yes
• Vehicle types using the crossing	WB-20 Semi-Tractor Trailer

Existing Warning Devices

- This active crossing is equipped with RAILWAY CROSSING signs, side mounted flashing lights and bells

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Existing Fencing

- None within 400m (1/4 mile) each side of the crossing.

Trespassing

- There is evidence of unauthorized access (trespassing) on the rail line in the area of the crossing in that pedestrians were observed to walk along the railway right-of-way.

Whistle Cessation Requirements

Per Transport Canada's *Grade Crossing Regulations* Section 104 – Audible Warning, the following requirements are prescribed for an area that prohibits whistling on any railway equipment:

- The area must be located:
 - Within a railway right-of-way, on each side of a public grade crossing, and within 0.4 km from the outer edge of the crossing surface, as shown in Figure D-1 of the *Grade Crossing Standards*, and
 - Within the road approach;
- The area must have a public grade crossing that has the applicable protection referred to in **Table 1**;
- The area must not have repeated incidents of unauthorized access to the line of railway; and
- The area must not require whistling for a grade crossing located outside the area.

Table 1 refers to Table D-1 of Transport Canada's *Grade Crossings Standards* in Appendix D – Whistling Cessation, which summarizes the requirements for warning systems at public grade crossings within an area without whistling.

Table 1 – Railway Crossing Whistle Cessation Requirements

	Column A		Column B	
Railway Design Speed	Grade Crossings for Vehicle Use		Grade Crossings For Sidewalks, Paths, or Trails with the centreline no closer than 3.6 m (12 ft) to a warning signal for vehicles	
	No. of Tracks		No. of Tracks	
	1	2 or more	1	2 or more
Column 1	Column 2	Column 3	Column 4	Column 5
1 – 25 km/h (15 mph)	FLB	FLB	No warning system requirement	No warning system requirements
25 – 81 km/h (16 – 50 mph)	FLB	FLB & G	FLB	FLB & G
Over 81 km/h (50 mph)	FLB & G	FLB & G	FLB & G	FLB & G
Legend : FLB is a warning system consisting of flashing lights and a bell. FLB & G is a warning system consisting of flashing lights, a bell and gates				

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Murray Street Grade Crossing Whistle Cessation Evaluation

The current warning system (RAILWAY CROSSINGS signs, side mounted flashing lights and bells) meets the requirement for whistle cessation. However, sightline requirements are not met. According to the At-Grade Rail Crossing Assessment conducted for Murray Street¹, clear sightlines areas where drivers stopped at the crossing cannot be provided or maintained on the west approach due to vegetation on the northwest and southwest corners of the crossing. In addition, there is evidence of routine unauthorized access (trespassing) on the rail in in the area of the crossing in that pedestrians were observed to walk along the railway right-of-way. As such, in addition to the existing warning system (RAILWAY CROSSINGS signs, side mounted flashing lights and bells), the following must be provided to meet the whistle cessation requirements:

- Clear area of bush, trees, and other vegetation within the sight triangle so as to ensure that sight line requirements are met; and
- Install fencing (400m) along the railway right of way on both approaches to discourage trespassing along the line of rail within the quiet zone.

Table 2 summarizes the associated costs necessary to facilitate whistle cessation at the Murray Street grade crossing.

Table 2 – Murray Street Grade Crossing Whistle Cessation Requirements

CPR, Mile 115 Cascade Subdivision, Spur Mile 0.28 loco Spur (Murray Street) – Port Moody, BC

Item	Recommended Action	Estimated Requirement
1	Clear area of bush, trees, and other vegetation within the sight triangle.	\$2,000
2	Install fencing (400 m) along the railway right of way on both approaches.	<u>\$160,000</u>
Cost Estimate (+/- 30%):		\$162,000

- Notes:
1. Cost estimation based on information in MMM Group files.
 2. All costs related to rail replacements or improvements must be confirmed by the railway company.
 3. Price does not include cost for any permits or fees associated with railway work.
 4. Price does not include any soft engineering costs (i.e. Geotechnical engineering or environmental engineering).

Should you have any questions, please contact me at (604) 685-9381 or vanweelderenf@mmm.ca.

Yours truly,

MMM Group Limited


Floris van Weelder, P.Eng, PTOE
Manager, Transportation Planning
5016254-001-REP-03-Rev1 (Whistle Cessation)



¹ At-Grade Rail Crossing Assessment – Canadian Pacific Railway, Mile 115 Cascade Subdivision, Spur Mile 0.28 loco Spur (Murray Street) – Port Moody, BC (MMM Group Limited: Vancouver, BC, January 2017)