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DP WORLD
PORTS & TERMINALS
FRASER SURREY

Project Environmental Review (PER) Application for a S.82 *Impact Assessment Act* Permit
Vancouver Fraser Port Authority PER No. 22-017

Prepared for:

DP World Fraser Surrey
c/o DP World Canada
Suite 1500, Metrotower II
4720 Kingsway,
Burnaby, BC, V5H 4N2

APPENDIX C: DP World Canola Oil Transload Facility – 5 -Track Road/Rail Crossing Assessment

Stantec **Memo**

To:	Hamish Fairweather	From:	Jay Sze
			Burnaby
Project/File:	12322054	Date:	September 30, 2022

Reference: DP World Canola Oil Transload Facility – 5-Track Road/Rail Crossing Assessment

1 Introduction

DP World Canada Inc. (DP World) is proposing to develop a canola oil transload facility (the Project) at DP World's Fraser Surrey Terminal (Figure 1) located at 11060 Elevator Road, Surrey, British Columbia (the site). The Project includes development of new marine infrastructure to support vessel mooring and loading at the existing Berth 10, and the development of canola oil storage facilities and supporting transfer infrastructure on a parcel of land within the leased DP World Fraser Surrey terminal area. The Project site is fully located on federal lands and waters managed by the Vancouver Fraser Port Authority (VFPA).

The Project is subject to a full application review under VFPA's Project Environmental Review (process intended to satisfy Section 82 of the Impact Assessment Act. DP World requested Stantec to prepare a Traffic Impact Study (TIS) during June 2022 to support the PER Application submission (PER No 22-017). At the follow up meeting held with VFPA on September 1, 2022, Stantec was requested to conduct further analysis to supplement the findings from the earlier TIS submission. The intent for this further analysis is to assess the impact that the Project will have on the 5-track road/rail crossing on Timberland Road due to the associated increase in rail traffic. To conduct this analysis, a micro-simulation traffic model was developed to assess the traffic operations during multiple horizon scenarios. The purpose of this memo is to document the analysis methodology, analysis assumptions, and present the analysis findings.

2 Background and Study Area

Detailed information pertaining to the Project's proposed works and supporting documents can be found in the previously submitted report titled *DP World Canola Oil Transload Facility – Traffic Impact Study*. The study area for the 5-Track Road/Rail Crossing Assessment (see **Figure 1**) is much smaller than the study area used in the previous analyses conducted for the TIS as the present analysis is focused primarily on the road/rail crossing on Timberland Road.

As shown in **Figure 1**, the study area includes both directions of the new Timberland Road/Robson Road alignment between the Wye intersection and the container terminal access. The new realigned Timberland Road/Robson Road alignment is expected to open to traffic in 2023. For the purposes of this study, Timberland Road/Robson Road is considered an east-west corridor. Similar to existing conditions, the future Timberland Road/Robson Road alignment will remain the main east-west road in the study area, connecting the port lands to the Highway 17/Tannery Road interchange, and the City of Surrey. Timberland

Road/Robson Road will also be used by businesses and residents along Alaska Way as the previous Elevator Road connection to Highway 17 is now permanently closed. Timberland Road North (not included in the scope of this study) provides access to/from Catalyst Paper Corporation, Topco Pallet Recycling and Mainland Sand & Gravel.

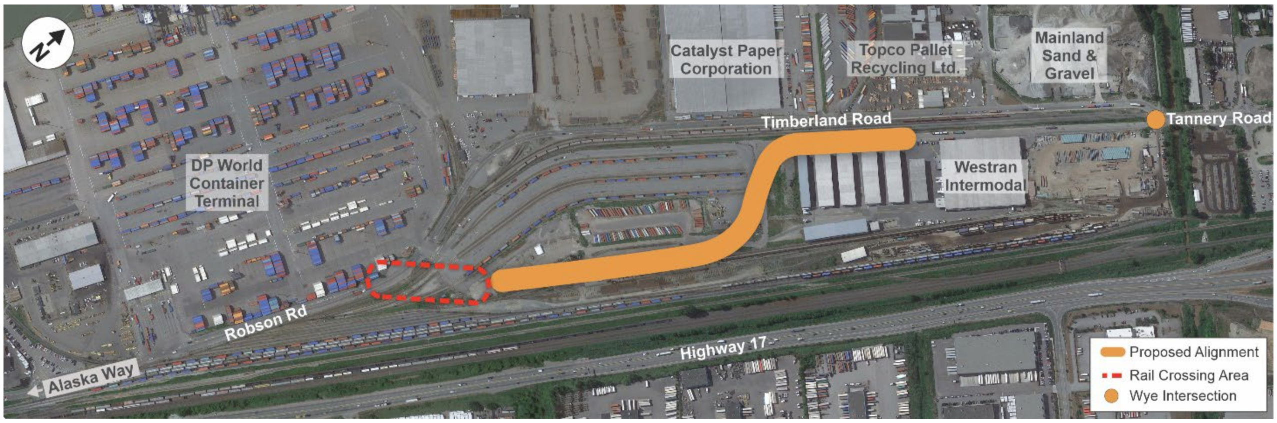


Figure 1: Study Area

Design drawings produced by WSP for the new Timberland Road alignment are provided in **Appendix A**. An overview of the key elements of the Timberland Road/Robson Road alignment is provided below. It is noted that the road layout in the WSP drawings was assumed to be open to traffic prior to the Project opening day.

Between Timberland Wye and VACS Gates – Timberland Road will be a three-lane road between the Timberland Road/Wye intersection and VACS gates. There will be two westbound lanes and one eastbound lane. The westbound curb lane will be used by container truck traffic only as it leads directly to the VACS gates, where it becomes physically separated from the second westbound lane. The second westbound lane will be used by privately owned vehicles (POV's) and trucks that are not destined to the container terminal. This includes employee traffic, customer/visitor traffic, and trucks destined to the steel terminal and other areas such as Alaska Way. Eastbound Timberland Road will be a continuous single lane road from the VACS gates to the Timberland Wye intersection.

Between VACS Gates and Road/Rail Crossing – The westbound container truck lane (curb lane) will widen to two lanes with a VACS gate provided in each lane to process incoming container trucks. Downstream of the VACS gates, the curb lane will continue towards the container terminal. It was assumed that all container truck traffic would make a lane change and use the curb lane to enter the container terminal. The second container truck lane will become a truck rejection lane that will merge with the westbound lane carrying non-container truck traffic. The truck rejection lane was not included in the traffic analysis. The eastbound lane and westbound lane carrying non-container traffic will intersect with an access road on the southeast side near the location of the VACS gates. Traffic movements accessing/egressing from this access road were not included in the analysis. Eastbound Timberland Road will be a continuous single lane road from the road / rail crossing to the VACS gate.

Between 5 Track Road / Rail Crossing and Container Terminal Access – The two westbound lanes and single eastbound lane will intersect with five rail tracks at an at-grade road / rail crossing. It is assumed that flashing lights, bells and gates will be provided to control traffic during a rail crossing event as per WSP design drawings. West of the road / rail crossing, Timberland Road becomes Robson Road. All three lanes will be continuous between the road / rail crossing and the container terminal access. At the container terminal access, the westbound right lane will become a drop lane exit, serving seven controlled terminal entry lanes. There will be five lanes exiting the container terminal, all of which enter the single eastbound lane on Robson Road. The western extent of the study area has been defined as immediately west of the container terminal access.

3 Analysis Methodology

This section provides documentation for the overall analysis methodology. Traffic micro-simulation models of the study area were developed to conduct the assessment of the potential road/rail interactions. Three analysis scenarios were developed in the traffic model, each representing a specific horizon year and build-out scenario. Details regarding the model assumptions are provided in this section. Key performance metrics were then extracted from the models for each scenario to assess traffic operations and identify potential deficiencies.

3.1 Scenario Development

Three scenarios were developed and considered in the analysis. Key assumptions pertaining to each scenario are provided in this section. All three analyzed scenarios have the following common assumptions:

- New Timberland Road/Robson Road alignment was assumed to be completed and operational;
- All other road-based network elements were assumed to remained as per the existing conditions;
- Container truck volumes were assumed to be the same as existing conditions (see Section 3.3.4);
- Privately Owned Vehicle (POV) and non-container truck traffic demands were based on existing demands with a 2% annually compounded growth rate;
- A common three-hour PM peak period was analyzed for each scenario.

The major differences between the scenarios are detailed below. Further information regarding the network and demand assumptions are provided in Section 3.2 and Section 3.3.

Scenario 1: Base Case 2027 without Project

The horizon year of this scenario is 2027. This horizon year was selected as it matched the 2027 horizon in the Port Authority Rail Yard (PARY) masterplan horizons (2027, 2033 and 2040). The Project is assumed to be not implemented. This scenario therefore represents the model Base Case. Rail traffic parameters such as arrival patterns and crossing duration times are therefore the same as existing conditions. Traffic volumes were estimated as discussed later.

Scenario 2: 2027 with Project

The horizon year of this scenario is 2027, and the Project is assumed to be implemented. Rail traffic parameters such as arrival patterns and crossing duration times were updated. Traffic volumes were estimated as discussed later.

Scenario 3: Future Horizon

The horizon year of this scenario is 2033 as it matched the 2033 horizon in the PARY masterplan horizons (2027, 2033 and 2040). The Project is assumed to be implemented. Rail traffic parameters such as arrival patterns and crossing duration times were updated. Traffic volumes were estimated as discussed later.

3.2 Model Network Development

This section documents the assumptions that were used during the model network development process. Three types of assumptions are discussed in this subsection: General Network Coding Conventions; Timberland Road/Robson Road Assumptions; and Rail Crossing Assumptions.

3.2.1 GENERAL NETWORK CODING ASSUMPTIONS

Under most circumstances, the following conventions were used while coding the network:

- Assume Timberland Road/Robson Road is east-west. Therefore, project north is perpendicular to Timberland Road/Robson Road.
- Posted Speed Limit/Speed Decision Average: 50 km/h
- Truck operating speed: 30 km/h
- Reduced Speed Areas: Right turns – 15km, Left turns – 25 km
- Lane Widths: Assume standard 3.6 m width
- Vehicle Dynamics: VISSIM defaults
- Vehicle Types and Classes:
    - All trucks: 23 m long
    - POV: 3.7 – 4.7 m
- Lane Markings: In the study area, solid lines are generally used to separate westbound container trucks entering the terminal and other traffic. For ease of modelling, these lanes were coded as two physically separated links rather than a single two-lane link.

3.2.2 TIMBERLAND ROAD/ROBSON ROAD ASSUMPTIONS

The model includes all of Timberland Road/Robson Road between the Timberland Wye and approximately 100 m west of the container terminal access. The network is divided into three main areas, as described in Section 2: Eastern Extent to VACS Gate; VACS Gate to Railway Crossings; and Railway Crossings to Western Extent. Notes and assumptions specific to each segment are provided below. The coding assumptions were primarily based on the latest design drawings produced by WSP. Some specific operational assumptions were based on two Parsons reports: *Brownsville Transportation Options Study – Study Report,* and *Brownsville Transportation Options Study – Traffic Operations Micro-simulation Model Scoping and Development*.

Between Timberland Wye and VACS Gates

- Timberland Road was coded primarily as three parallel single-lane links that are physically separated from each other (two westbound lanes, and 1 eastbound lane). This was done to ensure container vehicles and POV's will travel only in their respective lanes in the westbound direction.
- No access to/egress from the Westran site were included in the coding. Only traffic that would cross the rail crossing were included in the model.

Between VACS Gates and Road/Rail Crossing

- Differences between the WSP design drawings and ultimate option shown in the Parsons reports were observed. It was assumed that the WSP design supersedes the older Parsons reports, and was used as the primary reference for the proposed Timberland Road/Robson Road alignment.
- From the east, Timberland Road starts as three parallel single-lane links (two westbound, one eastbound).
- The westbound container truck lane (curb lane) widens to two lanes with a VACS gate provided in each lane to process incoming container trucks. Each truck was assumed to be stopped for 30 seconds at VACS gate, as per the Parsons reports.
- The second westbound lane that is used by POVs and non-container trucks bypasses the VACS gates.
- As noted in Section 2, the truck rejection lane was excluded from the analysis. It was assumed that no container vehicles would be rejected from entry to the terminal.
- The eastbound lane and the westbound lane carrying non-container traffic intersects an access road near the location of the VACS gates. Traffic movements accessing/egressing from this access road were not included in the analysis.

Between Road/Rail Crossing and Container Terminal Access

- The Road/Rail crossing was coded as a four-legged signalized intersection with no southbound movements. Each train track is modelled individually as northbound movements. The purpose of this coding is to demonstrate that the full width of the intersection has been considered in the traffic model.
- All train movements were coded as northbound movements direction, occurring on a single track (more details are provided in subsequent sections).
- West of the rail crossing, Robson Road was coded as three parallel one-lane links to the container terminal access.
- The curb lane was coded as a drop-lane exit to the container terminal. In the micro-simulation environment, coding a multi-lane entry into the terminal with extended processing delays on each individual lane requires additional model calibration effort. The entry into the container terminal was coded as a single-entry lane in the model to simplify the model development process.
- The processing rate of this single virtual lane into the container terminal was modified to represent a processing rate that is equivalent to the cumulative processing rate of all active inbound lanes. As noted by DPW staff, the observed operational maximum processing rate of the container terminal is approximately 60 trucks per hour, or approximately 1 truck/minute. Therefore, each modelled container truck was stopped for 60 seconds before entering the container terminal.
- In reality, container trucks also exit the container terminal via multiple southbound lanes. However, the southbound approach is stop controlled, and there is only a single receiving lane in the eastbound and westbound directions. Model simulation issues may occur if the intersection was coded exactly as per existing as multiple trucks may attempt to complete their turning movements simultaneously. Instead, a single outbound lane was coded. The traffic volumes are relatively low (max of 60 veh/hr) and as such unlikely to be affected by this assumption. Furthermore, as there is only a single receiving lane in each direction, trucks can only be processed one at a time.

3.2.3 RAIL CROSSING ASSUMPTIONS

It should first be noted that the traffic model was developed to simulate individual train events and not actual train movements. Each train event was triggered by the arrival of a train in the traffic model for visualization purposes. The specific parameters of each train (length, size, weight, direction of travel) were not included in the model. The traffic model is focused primarily on the frequency of train events at the rail crossing and the duration of these train events in terms of their impact to the east-west traffic on Timberland Road/Robson Road.

The train movements were modelled as a series of sequential occupations at specific times during each model run. To simplify the coding in VISSIM, the railway crossing was coded as a transit priority signal. Each train event was modelled as an individual public transit vehicle route that arrives on the road network at a precise time. All train events were modelled as northbound, one-car trains to simplify the model development process. The general sequence of events that was modelled is summarized in the list below:

- A train arrives on the model network and is detected at a virtual VISSIM detector coded on the model railway tracks to trigger the transit priority signal at the rail crossing.
- The intergreen time at the intersection is used to represent the flashing-light-and-gate-closing time at the rail crossing.
- Each train event has a specific intersection occupation time representing the time required to fully clear the intersection. To model this duration, a virtual transit stop was coded on the rail line. This virtual transit stop causes each arriving train to stop momentarily, representing the duration of the train event.
- When the duration of the train event elapses, the modelled train continues travelling on the coded railway link until it is detected at a second virtual VISSIM detector. The travel time between the virtual transit stop and this second virtual detector represents the gate opening time at the rail crossing.
- This second detector ends the transit priority signal request, restoring priority to the east west vehicle movements along Timberland Road/Robson Road.

Multiple assumptions and calculations were required to estimate the duration of the events discussed above, as well as the placement of the virtual detectors and bus stop. These assumptions and calculations are documented in Table 1. It is noted that some of the assumptions included in Table 1 are based on preliminary engineering judgment and are not entirely reflective of Transport Canada Grade Crossing Regulations and Grade Crossing Standards.

Table 1: Rail Crossing Assumptions and Calculations

Parameter	Value	Notes
Advance Flashing Light Time	15 s	• Sufficient time must be provided for a container truck to fully clear all 5 rail lines • Stop-bar-to-stop-bar distance is approximately 100 m • Length of truck is approximately 20 m • Assuming an operational speed of 30 km/hr for a container truck, 14.4 seconds is required to travel 120 m.
Gate Closing/Opening Time	10 s	• Based on engineering judgment
Train Arrival Buffer Time	10 s	• Based on engineering judgment
Total Advanced Warning Time	35 s	• Summation of Advance Flashing Light Time, Gate Closing Time and Train Arrival Buffer Time • 15 + 10 + 10 = 35 seconds
Location of First VISSIM Virtual Detector	145 m south of rail crossing	• Based on the Total Advanced Warning Time calculation above, an approaching train must be detected at least 35 seconds before it arrives at the rail crossing • Based on an assumed train operating speed of 15 km/hr, the first virtual detector must be located 145 m south of the rail crossing
Location of VISSIM Virtual Transit Stop	Immediately north of rail crossing	• Virtual transit stop is located immediately north of the rail crossing
VISSIM Virtual Transit Stop Dwell Time	Varies	• Dwell time is based on provided rail event durations (see Section 3.3.1) • Length of rail section at crossing is approximately 25 m – 30m • Assuming an operating speed of 15 km/hr, total travel time is approximately 6.5 seconds • Total dwell time at each virtual transit stop is equal to the provided rail event durations less 6.5 seconds.
Location of Second VISSIM Virtual Detector	~40 m north of rail crossing	• Assuming operating speed of 15 km/hr and gate opening time of 10 seconds • Second virtual detector should be located approximately 40 m away.

3.3 Model Demand Development

This section documents the analysis conducted to develop the traffic demands used in the micro-simulation model. Stantec conducted analysis to forecast the anticipated train crossing occupations for each analysis scenario to estimate the rail-based traffic demand. A review of the *Brownsville Transportation Options Study – Study Report (Parsons)*, and data collected for that report was conducted as a starting point for the development of road-based traffic demand. The traffic profile of the study area was then assessed to identify a peak period, and hourly volumes were estimated. As most of the traffic data used in the Parsons report was collected in 2018, a growth factor was needed to be applied to estimate volumes for the 2027 and 2033 horizons. Further details are provided in this section.

3.3.1 RAIL-BASED TRAFFIC DEMAND DEVELOPMENT

The assumptions relating to the anticipated rail crossing occupations (for switching operations) for Canola Oil, Intermodal and Rotainer rail traffic are provided in this subsection. Reference was made to a separate Stantec report titled *Rail Operations Plan R1 – Fraser Surrey Canola Oil Transload Facility Project*

As shown in Table 2, the total TEU/tonnage moved varies by scenario.

Table 2: Canola Oil/Intermodal/Rotainer Traffic by Scenario

Traffic	Scenario 1	Scenario 2	Scenario 3
Intermodal	125,000 TEU	80,000 TEU	25,000 TEU
Canola Oil	0 Tonnes	300,000 Tonnes	1,000,000 Tonnes
Rotainer	0 Tonnes	0 Tonnes	250,000 Tones

The frequency of Canola Oil and Rotainer switching operations at the crossing will also vary by scenario as shown Table 3.

Table 3: Canola Oil/Intermodal/Rotainer Frequency of Switching Operations by Scenario

Traffic	Scenario 1	Scenario 2	Scenario 3
Intermodal	Daily	Daily	Daily
Canola Oil	N/A	Every 90.8 hours	Every 27.2 hours
Rotainer	N/A	N/A	Daily

There is no set schedule that specifies when a switching operation would occur. Switching operations can occur at any hour. For example, Canola Oil switching operations occur on average every 90.8 hours in Scenario 2. The switching operations for Canola Oil and Intermodal could therefore occur at completely different times of day, or one after another. However, switching operations cannot occur at the same time.

From an analysis point of view, the worst-case sequence of events within each scenario would be situations where switching operations for Intermodal, Canola Oil, and Rotainer occur one after another. As shown above, the worst-case could occur daily in Scenario 1, every 90.8 hours in Scenario 2 and every 27.2 hours in Scenario 3. Based on this assumption, schedules of crossing occupations were developed for each scenario as shown in Table 4, Table 5, and Table 6. The crossing occupations are assumed to begin in arbitrary hour "X" as shown. The crossing occupation time shown below also includes a 35 second advance warning time.

In all three scenarios, nearly all of the switching operations are completed within a two-hour period. Furthermore, most of the occupations are initiated during the first hour of each schedule as shown by the orange highlighted cells.

Table 4: Scenario 1 Crossing Occupations

Rail Traffic	Crossing Occupation	
	From	To
Intermodal	[X]:03:01	[X]:03:54
	[X]:04:49	[X]:08:10
	[X]:08:49	[X]:16:40
	[X]:36:43	[X]:44:23
	[X]:44:51	[X]:48:12
	[X]:49:07	[X]:50:00
	[X]:51:19	[X]:52:12
	[X]:54:01	[X]:56:45
	[X]:57:10	[X+1]:03:53
	[X+1]:22:36	[X+1]:29:31
	[X+1]:29:56	[X+1]:32:54
	[X+1]:33:52	[X+1]:34:45
	[X+1]:36:04	[X+1]:36:57
	[X+1]:38:46	[X+1]:41:41
	[X+1]:59:43	[X+2]:02:38
	[X+2]:03:33	[X+2]:04:26

Table 5: Scenario 2 Crossing Occupations

Rail Traffic	Crossing Occupation	
	From	To
Canola	[X]:03:10	[X]:04:03
	[X]:04:58	[X]:07:40
	[X]:08:31	[X]:15:16
	[X]:33:31	[X]:40:11
	[X]:40:36	[X]:43:18
	[X]:44:33	[X]:45:26
Intermodal	[X]:46:57	[X]:47:50
	[X]:50:24	[X]:53:46
	[X]:54:26	[X+1]:02:19
	[X+1]:22:54	[X+1]:30:36
	[X+1]:31:04	[X+1]:34:26
	[X+1]:35:21	[X+1]:36:14
	[X+1]:37:33	[X+1]:38:27
	[X+1]:40:16	[X+1]:43:18
	[X+2]:02:11	[X+2]:07:02

Table 6: Scenario 3 Crossing Occupations

Rail Traffic	Crossing Occupation	
	From	To
Canola	[X]:03:10	[X]:04:03
	[X]:04:58	[X]:07:40
	[X]:08:31	[X]:15:16
	[X]:33:31	[X]:40:11
	[X]:40:36	[X]:43:18
	[X]:44:33	[X]:45:26
Intermodal/ Rotainer	[X]:48:36	[X]:49:29
	[X]:50:24	[X]:53:31
	[X]:55:13	[X+1]:01:42
	[X+1]:20:59	[X+1]:27:39
	[X+1]:28:04	[X+1]:29:57
	[X+1]:30:52	[X+1]:31:45

3.3.2 ROAD-BASED TRAFFIC DEMAND DEVELOPMENT

Volumes and demands for road-based traffic were primarily sourced from the Parsons report *Brownsville Transportation Options Study – Study Report*. The volume assumptions presented in this subsection reflect 2018 traffic patterns to be consistent with the 2018 data collected in the Parsons report. A growth factor will be applied to these volumes to estimate the scenario demands (see Section 3.3.4). Traffic volume assumptions pertaining to each vehicle type of interest are provided below.

Container Trucks

The Parsons report assumed a maximum daily volume of 430 container trucks per day entering and exiting the container terminal in 2018.

Non-Container Trucks

According to the Parsons report, 410-480 non-container trucks entered and exited the area each day via Timberland Road east of Wye Road. However, this figure also includes truck volumes for Westran and Catalyst Paper (and other tenants) which will not cross the rail crossing of Timberland Road on opening day. The report does not indicate how many trucks were distributed to each site. Non-container trucks that are relevant to the present analysis are: steel trucks, FGT trucks, and Acorn Forest Products (Alaska Way) trucks. Assumptions regarding steel and FGT trucks were provided in the Parsons report: 100 trucks per day and 82 trucks per day, respectively. No information was available for Acorn Forest Products. Noting the relative magnitudes of the daily non-container trucks volumes, it was assumed that the daily non-container truck traffic associated with Acorn Forest products is in the vicinity of 50 trucks per day in each direction. Non-container truck volume assumptions that were used for the analysis are summarized in Table 7.

Table 7: Non-Container Truck Daily Volume Assumptions (2018)

Tenant	Truck Volume (veh/d)	Notes
Steel Trucks	100 inbound 100 outbound	Per Parsons report
FGT Trucks	82 inbound 82 outbound	Per Parsons report
Acorn Forest Products (Alaska Way)	50 inbound 50 outbound	High-level estimate
TOTAL	**232 inbound** **232 outbound**	

Privately Owned Vehicles (POVs)

The Parsons report suggests 1200 inbound POV trips and 1200 outbound POV were observed on typical weekdays, at Timberland Road east of the Wye intersection. These figures include trips made by employees and visitors. The Parsons report indicated that the number of daily employee trips were estimated based on the number of parking stalls in the area, but the actual estimated volume was not provided. For the present analysis, employee POV volumes were estimated based on parking stalls located within the terminals and at each tenant site visible on Google Earth ©. Inbound/outbound Employee POV daily volume assumptions that were used for the analysis are summarized in Table 8.

Table 8: Privately Owned Vehicles (Employees) Daily Volume Assumptions (2018)

Origin/Destination	Terminal/Tenant	POV Volume (veh/d)	Notes
Robson Road	Container Terminal	210 inbound 210 outbound	Estimate based on number of employee parking stalls from aerial imagery
	Steel Terminal	40 inbound 40 outbound	Estimate based on number of employee parking stalls from aerial imagery
	FGT	55 inbound 55 outbound	Per Parsons report
Alaska Way	Acorn Forest Products	60 inbound 60 outbound	Estimate based on number of employee parking stalls from aerial imagery
	Seaspan	15 inbound 15 outbound	Estimate based on number of employee parking stalls from aerial imagery
Timberland North	*Catalyst*	*60 inbound* *60 outbound*	*Estimate based on number of employee parking stalls from aerial imagery*
	Other	*10 inbound* *10 outbound*	*Estimate based on number of employee parking stalls from aerial imagery*
Timberland South	*TMS*	*20 inbound* *20 outbound*	*Estimate based on number of employee parking stalls from aerial imagery*
	Westran	*10 inbound* *10 outbound*	*Estimate based on number of employee parking stalls from aerial imagery*
Total		***480 inbound*** ***480 outbound***	

As shown in Table 8, it was estimated that there are 480 daily employee trips into the study area. Of these 480 trips, it was estimated that 380 employees trips that would pass through the rail crossing on a daily basis to access Robson Road and Alaska Way. The remaining 100 employee trips would arrive at their place of work via Timberland North or Timberland South.

Based on the existing traffic profile, it was estimated that approximately 50% of all employees leave/re-enter the study area during their lunch break. As such, approximately 240 POV daily inbound trips and 240 daily outbound trips are related to employee lunch break trips. These assumptions are summarized in Table 9.

Table 9: Privately Owned Vehicles (Employees Lunch Break) Volume Assumptions (2018)

Origin/Destination	Terminal/Tenant	POV Volume (veh/d)
Robson Road	Container Terminal	105 inbound 105 outbound
	Steel Terminal	20 inbound 20 outbound
	FGT	28 inbound 28 outbound
Alaska Way	Acorn Forest Products	30 inbound 30 outbound
	Seaspan	7 inbound 7 outbound
Timberland North	*Catalyst*	*30 inbound 30 outbound*
	Other	*5 inbound 5 outbound*
Timberland South	*TMS*	*10 inbound 10 outbound*
	Westran	*5 inbound 5 outbound*
Total		***240 inbound 240 outbound***

Assuming 1200 daily POV trips each way (per Parsons report), and 720 trips are associated with employees, the remaining 480 POV daily trips each way can be associated with visitors going to/leaving from the area. Approximately 80% of the employee parking stalls are located on Robson Road and Alaska Way. Therefore, it was assumed that 400 (~80% of 480) visitor POV daily trips each way are originating from or destined to Robson Road and Alaska Way. These assumptions are summarized in Table 10.

Table 10: Privately Owned Vehicles (Visitor) Volume Assumptions (2018)

Origin/Destination	POV Volume (veh/d)
Robson Road	400 inbound 400 outbound
Timberland North	*65 inbound* *65 outbound*
Timberland South	*15 inbound* *15 outbound*
Total	***480 inbound*** ***480 outbound***

Daily Volume on Timberland Road at the Rail Crossing

Timberland Road has a three-lane cross section at the rail crossing: two lanes westbound and one lane eastbound. Based on the volume assumptions presented above, the following 2018 daily volumes are assumed in each travel lane at the rail crossing.

- Westbound Lane 1 (shoulder lane) traffic volumes:
  - Only used by the 430 container trucks entering the terminal
- Westbound Lane 2 traffic volumes:
  - 230 non-container trucks (Steel, FGT, Acorn Lumber)
  - 250 POV trips to container/steel terminals (employees)
  - 75 POV trips to Alaska Way (employees)
  - 55 POV trips to FGT (employees)
  - 190 POV trips during lunch/break times (employees)
  - 400 other POV trips to Alaska Way/other visitors
- Eastbound Lane 1 traffic volumes:
  - Return/reciprocal trips for westbound movements listed above

The assumed 2018 daily volumes on Timberland Road at the rail crossing are summarized in Table 10.

Table 11: Estimated Daily Traffic Volumes on Timberland Road Daily at Rail Crossing (2018)

	Vehicle Type			
Lane	**Container Trucks**	**Other Trucks**	**POV**	**Total**
< Westbound Lane 1	430	0	0	430
< Westbound Lane 2	0	230	970	1200
Eastbound Lane 1 >	430	230	970	1630

3.3.3 2018 TRAFFIC PROFILE

The traffic profile of the study area was assessed to identify a critical three-hour peak period that would be simulated in the traffic model. As noted in Section 3.3.1, there is no set hour for rail switching operations to occur. Therefore, the worst-case scenario would be situations where the switching operations occur during the road traffic peak period. A traffic profile was generated using the data in the Parsons report to identify the peak period of analysis, as shown in Figure 2.

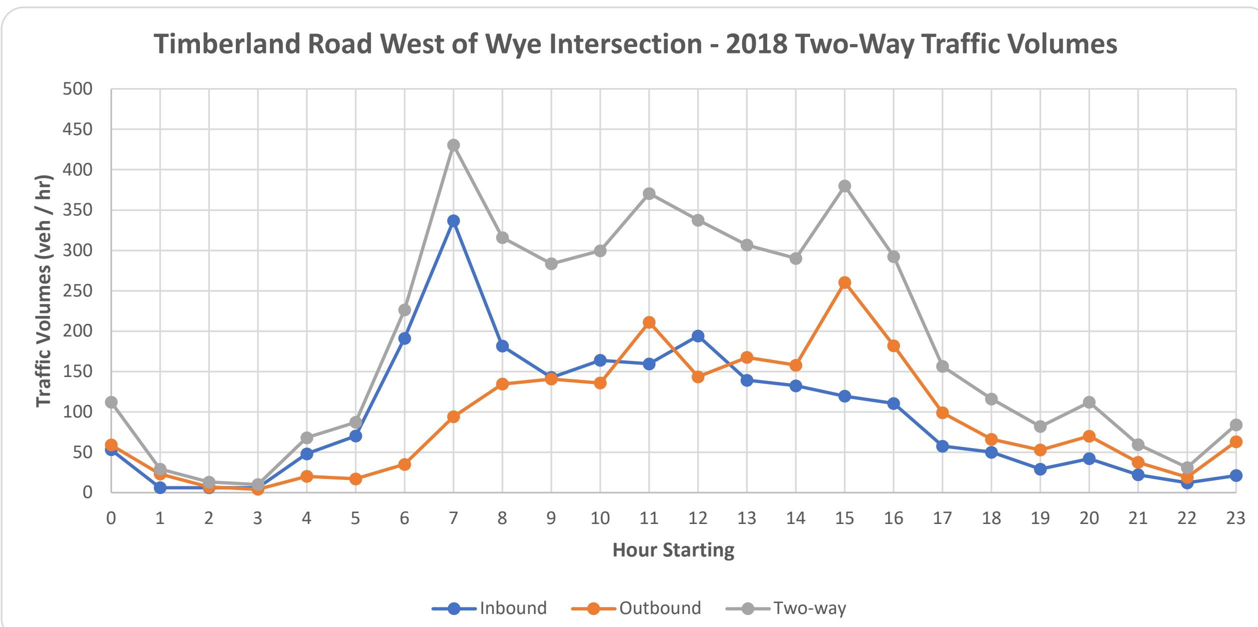


Figure 2: Study Area Traffic Profile

As shown, there are three distinct peaks in the daily profile: 6 to 9 AM; 10 AM to 1 PM; and 2 to 5 PM. The two-way volumes during all three of these periods are relatively similar. However, the inbound and outbound volumes vary considerably. The AM peak is driven primarily by a high inbound volume, caused by employee trips arriving for their morning shift. By contrast, the PM peak is driven primarily by a high outbound volume, caused by employee trips heading towards home. The midday inbound and outbound volumes are very similar and is attributed to employees leaving the area for lunch and returning to work shortly after.

It was assumed that if an operational issue were to occur, it would be more apparent during a peak period with higher directional flows. For this reason, the midday peak period was not chosen for the traffic simulation as the magnitude of the inbound and outbound volumes are relatively low. Between the AM and the PM peak periods, the AM peak period has higher two-way volumes and the AM inbound volumes are higher than the PM outbound volumes. However, potential constraints of the proposed roadway alignment should be considered.

The inbound (westbound) traffic is served by two lanes: the curb lane will be used by container trucks, and the median lane will be used by non-container trucks and all other POV's. By contrast, the outbound (eastbound) traffic will be served by a single lane that is used by all vehicles. If an extended delay occurs at the rail crossing, inbound traffic queues could extend considerably before impeding an opposing movement. In the outbound direction, a 350 m long queue could potentially impede outbound movements at the container terminal, which could in turn impact terminal operations. For these reasons, the PM peak period (2 to 5 PM) was selected to be analyzed in the traffic model. The peak hour of the PM peak period is 3 to 4 PM.

3.3.4 SCENARIO DEMANDS

A summary of the rail-based traffic and road-base traffic demands used in the traffic model is provided in this section.

Rail-Based Traffic Demand

As discussed in Section 3.3.1, nearly all of the train movements are completed in the first two hours, and the first hour is the peak hour of train movements. It was assumed that the most critical scenario would be one where the peak hour of train movements coincides with the peak hour road-based traffic. As per Section 3.3.3, the peak hour of analysis is 3 to 4 PM. Therefore, the arbitrary hour "X" identified previously in Table 4, Table 5, and Table 6 is 3 PM. These train arrival times were used in the VISSIM model.

Road-Based Traffic Demand

As noted previously, the volumes presented in Section 3.3.2 and Section 3.3.3 reflect 2018 conditions. Growth factors must be applied to estimate traffic demands for the 2027 and 2033 horizon years identified in Section 3.1.

It was assumed that the container terminal is operating at its maximum capacity. Therefore, the daily container truck volume of 430 vehicles per day is expected to remain constant for the 2027 and 2033 horizon years. The Parsons report quoted a study titled *Fraser Surrey Port Lands Area-wide Transportation Study* with regards to potential growth of tenant employee and truck volumes. However, specific values and figures were not provided. To account for these increases, a conservative 2% compounded growth rate was applied to all POV's and non-container truck traffic in the study area.

As noted in the previously submitted *DP World Canola Oil Transload Facility – Traffic Impact Study*, the vehicular traffic generated by the Project is expected to be approximately 10 veh/hr during the AM/PM shift changes. During previous correspondences with the Vancouver Fraser Port Authority (VFPA), it was confirmed that this minimal increase in vehicular traffic can be ignored.

Road traffic demands for Scenario 1, Scenario 2, and Scenario 3 were developed based on the assumptions outlined in Section 3.3.2, the traffic profile provided in Section 3.3.3, and the growth assumptions noted above. The demands are summarized in Table 11 and Table 12.

Table 12: Scenario 1 and Scenario 2 Volumes (2027 Horizon Year)

Hour Starting	Westbound Lane 1	Westbound Lane 2		Eastbound Lane		
	Container Trucks	Other Trucks	POV	Container Trucks	Other Trucks	POV
14	28	15	65	35	22	76
15	9	15	71	47	24	155
16	20	15	53	6	20	127

Table 13: Scenario 3 Volumes (2033 Horizon Year)

Hour Starting	Westbound Lane 1	Westbound Lane 2		Eastbound Lane 1		
	Container Trucks	Other Trucks	POV	Container Trucks	Other Trucks	POV
14	28	17	73	35	25	85
15	9	17	80	47	27	174
16	20	17	59	6	23	144

3.4 Model Simulation Runs and Key Metrics

Real-world traffic arrival patterns vary on a daily basis. These variations were accounted for in the traffic model by running multiple simulations with different seed values. Each scenario was simulated nine times. Key metrics were extracted for each model run, and an average value was calculated for each scenario using the results.

Two metrics were extracted from each modelled scenario in the VISSIM model to assess the impact of the rail crossing on Timberland Road traffic. These metrics are discussed in this section.

Queue Lengths at Rail Crossing

Queue lengths data was extracted at the rail crossing at 5-minute intervals. The reported queue length was the maximum queue length experienced within each 5-minute interval within each of the three travel lanes (two westbound, one eastbound). This reporting method captures the impact of the rail crossing on east-west traffic. This metric provides a localized measure of the rail crossing's impact on traffic operations.

Approach Delays at Rail Crossing

Average vehicle delays at the rail crossing were extracted at 5-minute intervals. The average delays were extracted for each of the three travel lanes (two westbound lanes, one eastbound lane). This metric provides a localized measure of the rail crossing's impact on traffic operations.

4 Analysis Results

For each scenario, nine simulations runs were completed. Each run modelled a three-hour period. As noted in Section 3.3.4, the model assumed train events occur in the second and third hour only. Therefore, the first hour of each model run was utilized as a "warm-up" period to initialize the model network with ambient traffic. The metrics identified in Section 3.4 were extracted from the second and third hours of each model run and analyzed. The analysis assumptions and results are summarized in this section.

4.1 Queue Lengths at Rail Crossing

Modelled vehicle queue lengths were recorded at the rail crossing in five-minute intervals starting at 3:00 PM. However, it should be noted that the modelled train events do not necessarily occur within the defined five-minute data collection intervals. Within any given five-minute interval, it is possible that a queue exists for a portion of that time interval and no queue is detected in the other portion of the time interval. To better understand the full impact of the modelled train events, the queue length analysis was conducted using the Maximum Queue that was detected within each five-minute interval. The queue lengths were also recorded individually for each travel lane at the Timberland Road/Robson Road rail crossing (two westbound lanes and one eastbound lane).

For each scenario, outputs from the nine completed simulation runs were used to calculate an average of the maximum queue length for each five-minute interval, within each travel lane. The analysis findings for each individual travel lane are presented below.

Westbound Curb Lane (Container Truck Traffic)

The average of the maximum queue lengths in the westbound curb lane are shown in Figure 3.

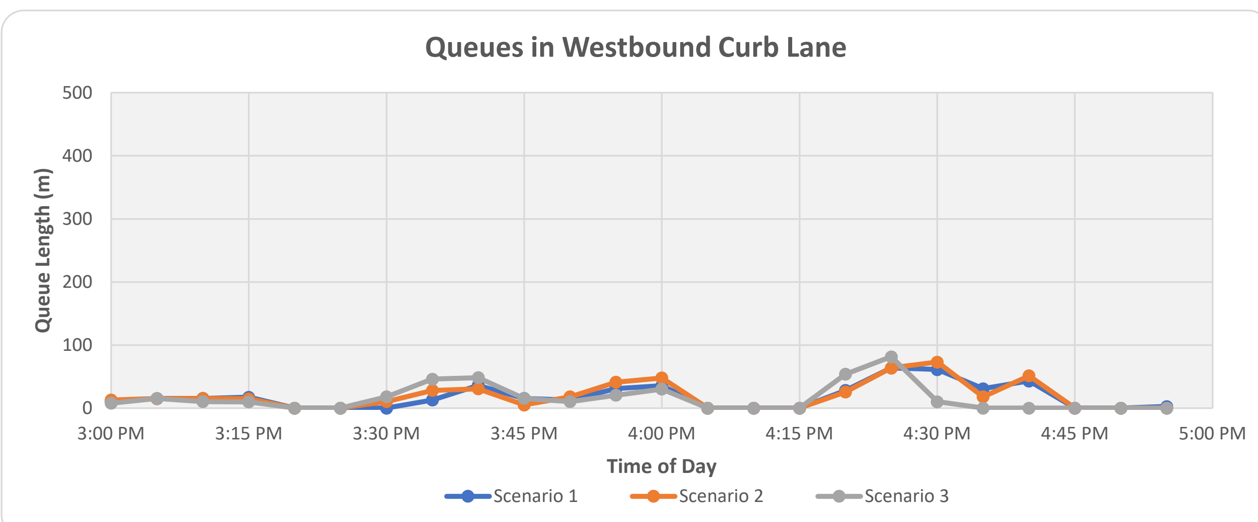


Figure 3: Queues in Westbound Curb Lane

As shown in Figure 3, queues are formed periodically due to rail crossing events. More significant queues coincide with the longer rail crossing events (6 to 7 minutes). Overall, the modelled queue lengths in this lane are relatively short in all three scenarios. Building the project (Scenario 2 and Scenario 3) does not appear to result in more significant queues. Notably, no queues are observed past 4:30 PM in Scenario 3 due to changes in the rail event schedule. The model results suggest that the queues in this lane would be typically less than 100 m long. As each container truck is approximately 20 m, the queues would involve fewer than five container trucks. These relatively short queues can likely be attributed to the lower inbound container truck demand in the PM peak period. The minor differences in modelled queue length between the scenarios is likely due to the differences in the assumed train event schedule and randomness in container truck arrivals.

Westbound Median Lane (POV's and Non-Container Truck Traffic)

The average of the maximum queue lengths in the westbound median lane are shown in Figure 4.

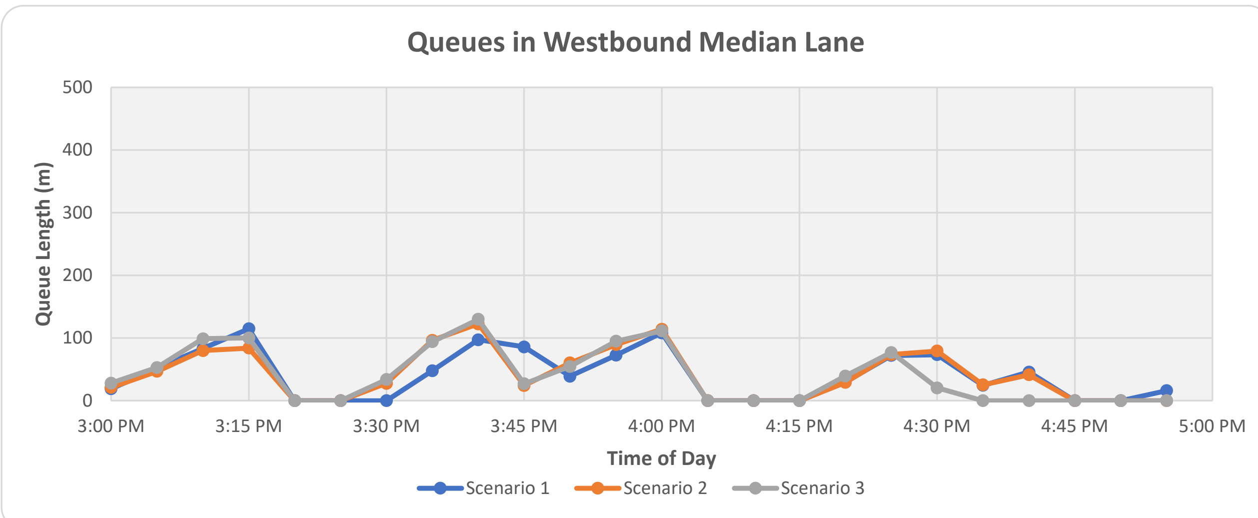


Figure 4: Queues in Westbound Median Lane

As shown in Figure 4, queues are formed periodically due to rail crossing events. More significant queues coincide with the longer rail crossing events (6 to 7 minutes). Slightly longer queues are observed in Scenario 3 (130 m). This is likely due to the increased traffic demand that is expected in the 2033 horizon year. However, the modelled queue lengths are also dependent on the modelled train schedule. For example, the modelled queue (115 m) in Scenario 1 at 3:15 PM is longer than modelled queue (100 m) in Scenario 3 despite the lower road-based traffic demand. In Scenario 3, no queues are observed past 4:30 PM.

Eastbound Lane (All Traffic)

The modelled queue lengths in the eastbound lane are shown in Figure 5.

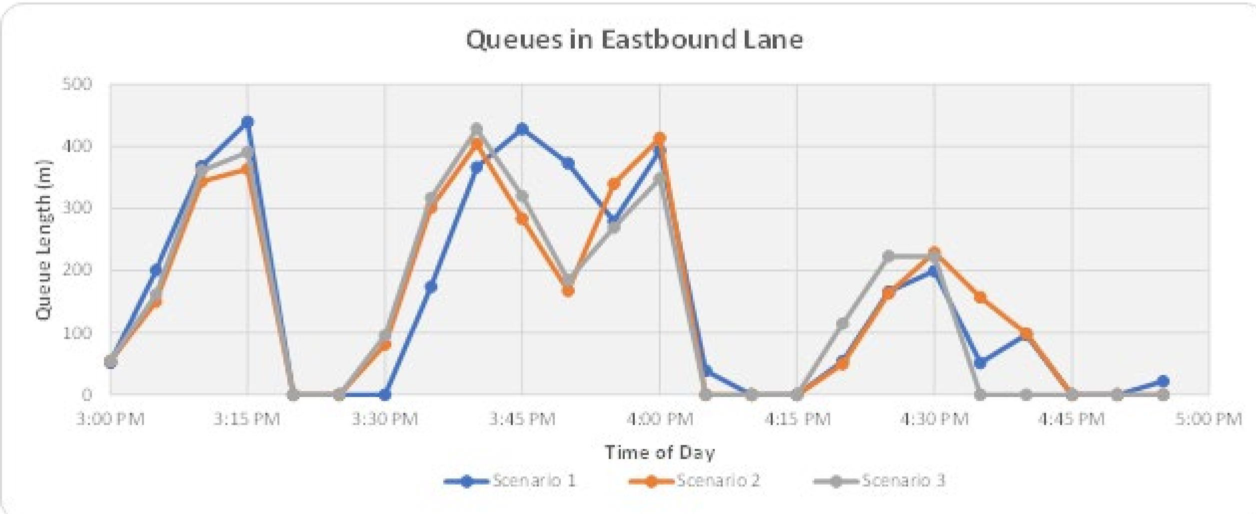


Figure 5: Queues in Eastbound Lane

As shown in Figure 5, queues are formed periodically due to rail crossing events. More significant queues coincide with the longer rail crossing events (6 to 7 minutes). In all three scenarios, the modelled queue exceeds 400 m at least once during the modelled peak period. Between 3:00 PM and 3:30 PM, the modelled queue is longer in Scenario 1 than the other two scenarios at any other time in the analysis period. This is likely due to the assumed train schedule. The train events in Scenario 1 have a longer duration than the train events in the other two scenarios. This appears to cause more eastbound (outbound) traffic to be queued at the rail crossing at 3:15 PM, even though Scenario 3 has higher road-based traffic demands. Between 3:35 PM and 4:00 PM, the eastbound queue does not drop below 150 m in length. The queue is fully dissipated between 4:05 PM and 4:15 PM in all scenarios. However, rail events between 4:20 PM and 4:30 PM results in the formation of a 200 m queue in all scenarios.

It is noted that the container terminal gate is located approximately 400 m west of the Timberland Road/Robson Road rail crossing. Based on the operating parameters used in this analysis, potential operational issues may be encountered in all three scenarios, at some point during the peak period with queues extending from the rail crossing back to the container terminal exit. For reference, a screenshot of the Scenario 1 at 3:45 PM is provided below in Figure 6.

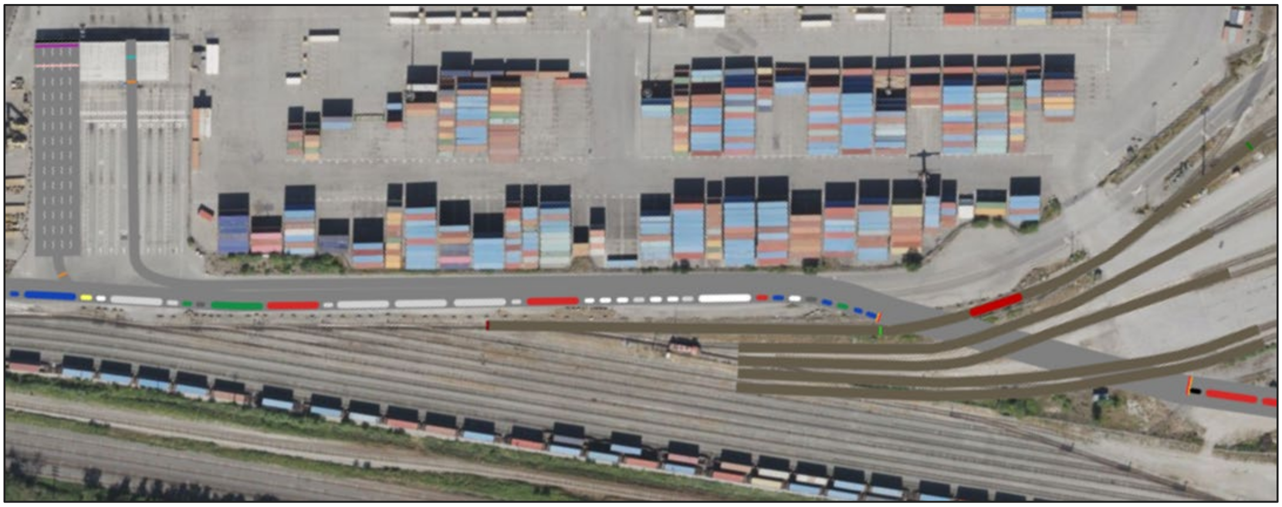


Figure 6: Scenario 1 Eastbound Queues – 3:45 PM

4.2 Approach Delays at Rail Crossing

Modelled vehicle delays were recorded at the rail crossing in five-minute intervals starting at 3:00 PM. The average delay that was detected within each five-minute interval was used in the analysis. The queue lengths were also recorded individually for each travel lane at the Timberland Road/Robson Road rail crossing (two westbound lanes and one eastbound lane).

For each scenario, outputs from the nine completed simulation runs were used to calculate the average delay for each five-minute interval, within each travel lane. The traffic model was unable to report delays during some of the five-minute data collection intervals. During these time intervals, the rail crossing experienced a rail event that prohibited east-west movements for more than five minutes. The traffic model is only able to estimate travel delays if vehicles are processed at an intersection. Since no vehicles were processed, delay estimates could not be calculated by the model. Therefore, it can be assumed that any time intervals without a reported delay value experienced a complete rail occupation in excess of five minutes. These time intervals are indicated with red lines in their respective figures.

The analysis findings for each individual travel lane are presented below.

Westbound Curb Lane (Container Truck Traffic)

The modelled approach delays in the westbound median lane are shown in Figure 7.

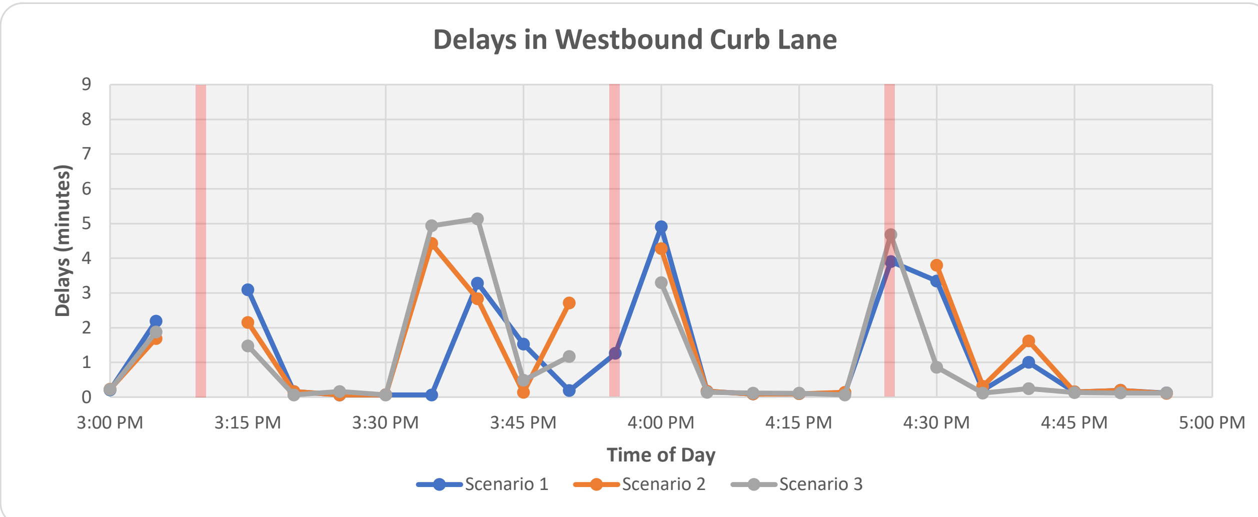


Figure 7: Delays in Westbound Curb Lane

As shown in Figure 7, delays are experienced periodically due to rail crossing events. The duration of the most significant rail events in each scenario are in the order of six to seven minutes. Other than the time intervals where delays could not be calculated, the modelled delays in the westbound curb lane were typically less than six minutes in duration. This is likely because of the low westbound container truck arrival rate. There may not be a truck waiting to cross the intersection for the full duration of the train event. These results also suggest the queues in this lane are typically dissipated between rail crossing events.

Westbound Median Lane (POV's and Non-Container Truck Traffic)

The modelled approach delays in the westbound median lane are shown in Figure 8.

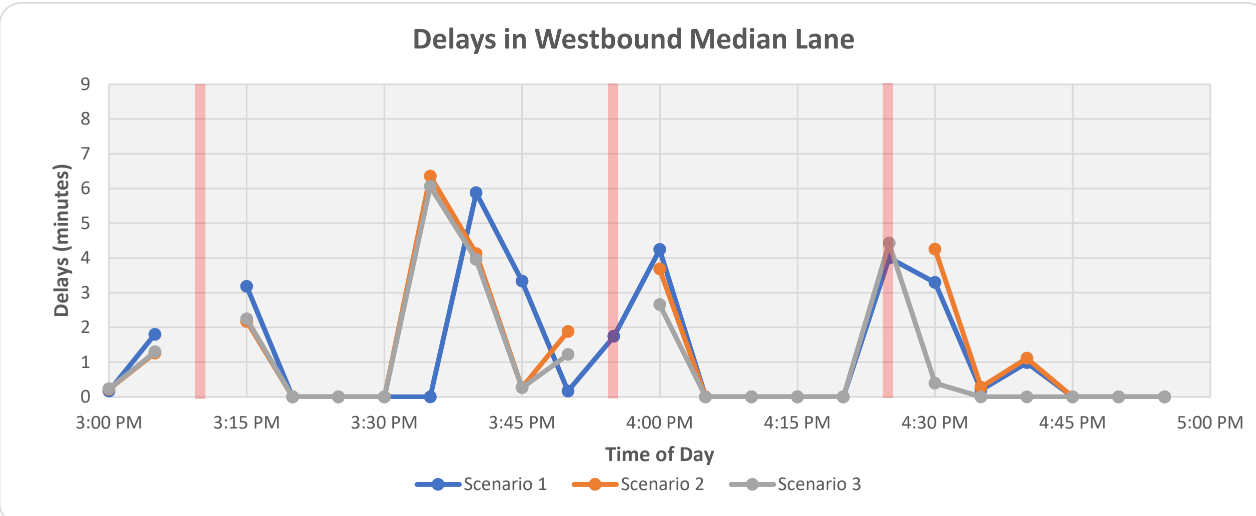


Figure 8: Delays in Westbound Median Lane

As shown in Figure 8, delays are experienced periodically due to rail crossing events. The modelled delay patterns are similar to the westbound curb lane. The duration of the most significant rail events in each scenario are in the order of six to seven minutes. Other than the time intervals where delays could not be calculated, the modelled delays in the westbound median lane were typically less than six minutes in duration. This is likely because of the relatively low westbound POV and non-container truck arrival rate. These results also suggest the queues in this lane are typically dissipated between rail crossing events.

Eastbound Lane (All Traffic)

The modelled approach delays in the eastbound lane are shown in Figure 9.

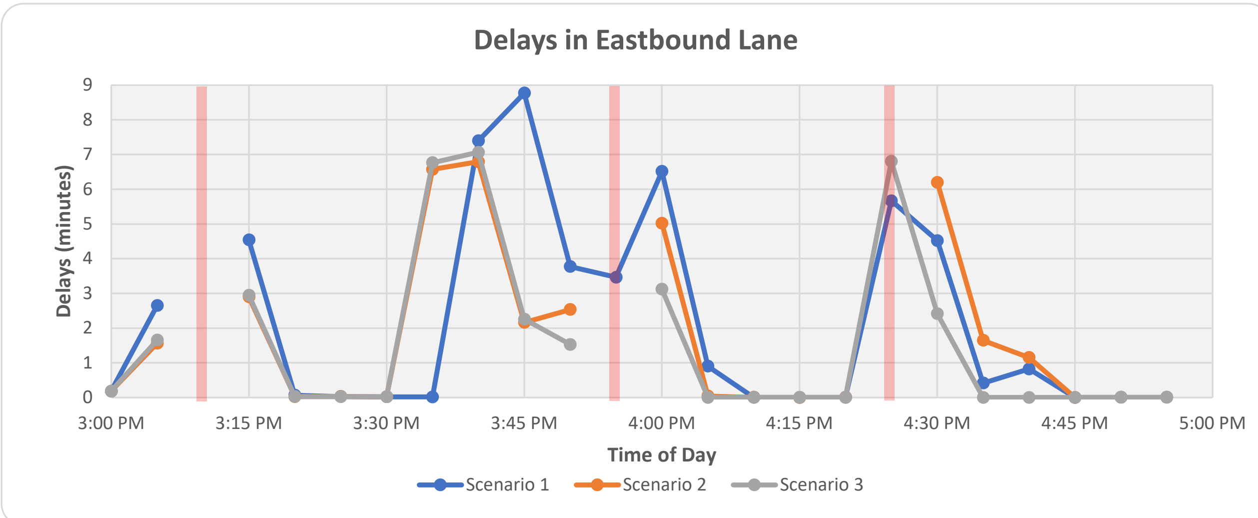


Figure 9: Queues in Eastbound Lane

As shown in Figure 9, delays are experienced periodically due to rail crossing events. The modelled delays in the eastbound lane are greater than the westbound movements. The duration of the most significant rail events in each scenario is in the order of six to seven minutes. There are at least two time intervals in each scenario where the delays exceed 6.5 minutes: 3:40 PM/3:45 PM/4:00 PM in Scenario 1, 3:35 PM/3:40 PM in Scenario 2 and 3:35 PM/3:40 PM/4:25 PM in Scenario 3. These results suggest the queues created by one rail crossing event may not be completely dissipated before the next rail event occurs. All three scenarios also experience an extended period of time during which the modelled delay is generally greater than two minutes: 3:40 PM to 4:00 PM for Scenario 1, and 3:35 PM to 4:00 PM for Scenario 2 and Scenario 3. There appears to be more travel delays in Scenario 1 compared to Scenario 2 and Scenario 3.

5 Findings

This section summarizes the findings from the analysis.

Scenario Analysis Findings

The traffic model assumed a worst-case sequence of events for all scenarios, where all required rail occupations would occur on the same day one after another. However, as discussed in Section 3.3.1 the number and frequency of switching operations varies by train movement and by scenario, as listed below:

- Scenario 1, 16 rail occupations expected daily.
- Scenario 2, 9 rail occupations expected daily, 6 rail occupations expected every 90.8 hours
- Scenario 3, 6 rail occupations expected daily, 6 rail occupations expected every 27.2 hours

Therefore, the modelled worst-case conditions for Scenario 2 and Scenario 3 are less likely to occur than Scenario 1.

The analysis suggests the daily east-west traffic operations do not worsen significantly in Scenario 2 or Scenario 3 when compared to Scenario 1. In the westbound direction PM peak period volumes are relatively low. As such, queues and travel delays dissipate soon after the rail event ends in all three scenarios. In the eastbound direction, the most significant queues and delays are observed in Scenario 1, even though Scenario 3 has higher road-based traffic demands. The primary reason for this is because there are more daily rail occupations in Scenario 1 and they also tend to be longer in duration.

The modelled worst-case conditions in Scenario 2 and Scenario 3 are less likely to occur compared to Scenario 1, and longer delays and queues are expected in Scenario 1. Therefore, implementation of the Project is not expected to worsen traffic conditions on Timberland Road/Robson Road at the rail crossing.

In Scenario 3, fewer daily rail occupations are expected compared to Scenario 2. However, rail occupations associated with the Project are required more frequently (every 27.2 hours) compared to Scenario 2 (90.8 hours). Because of this, the modelled worst-case conditions are more likely to occur in Scenario 3. This is to be expected noting Scenario 3 represents a later horizon year compared to Scenario 2. However, the traffic analysis shows only minor differences in queues and delays on the road network.

Other Findings and Observations

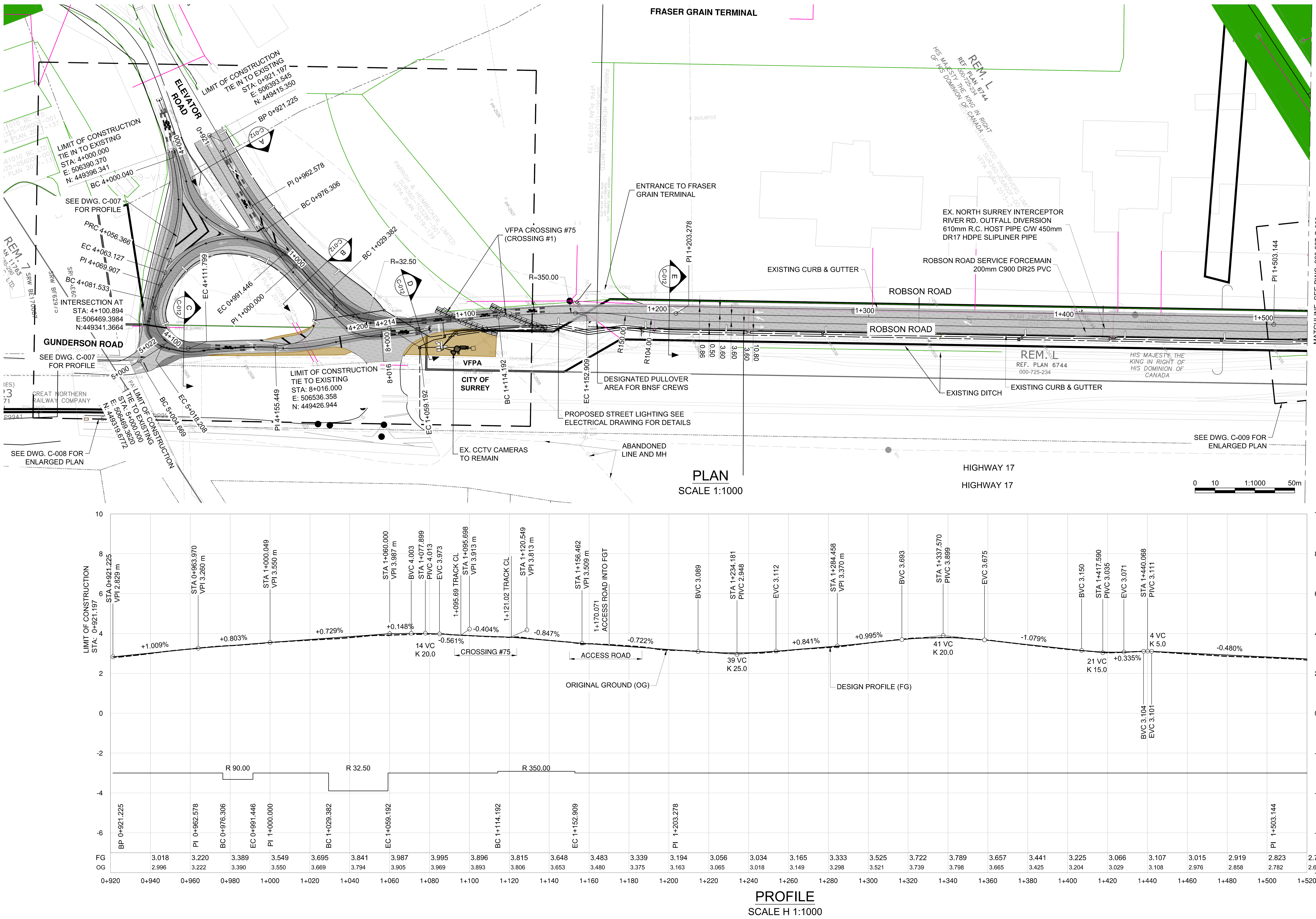
The traffic analysis suggests that conducting switching operations during the PM peak period may result in extensive queues on Robson Road in the outbound (eastbound) direction. The extent of the queueing is estimated to be in the order of 450 m, which could potentially block outbound container truck movements at the container terminal gate. Based on the specific operating parameters assumed in the analysis, queues could persist for approximately 25 minutes as shown in Figure 5. No significant issues were observed in the inbound (westbound) direction in either lane as the road-based traffic demands for this direction are relatively low.

Although the AM peak period was not analyzed, there is potential for some issues to occur due to significant inbound employee POV volumes during that time. However, the issues would likely be less significant in the westbound direction as there are two inbound lanes and significant storage is provided.

For the reasons outlined above, it is not recommended to conduct train switching operations during the PM peak period.

It should be noted that the analysis only considered the traffic impacts within the three-hour PM peak period identified in Section 3.3.3. As such, queues created by unprocessed POV or container truck demands from the previous hours of the day would not be reflected in the analysis. In essence, the analysis assumes the container truck arrival rate does not exceed the maximum processing rate of the VACS gates or the container terminal.

APPENDIX A – WSP DESIGN DRAWINGS



LEGEND

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ROBSON ROAD / ELEVATOR RD (INCLUDING ROUNDABOUT WITH GUNDERSON RD) NEW PAVEMENT CONSTRUCTION	40mm SUPERPAVE 12.5, 70mm SUPERPAVE 19, 90mm SUPERPAVE 19, 300mm GRANULAR BASE (19mm MINUS), 300mm GRANULAR SUBBASE (75mm MINUS)

- REGRADE EX. GRAVEL
- PROPOSED CONCRETE
- CONCRETE ROADSIDE / MEDIAN BARRIER
- PROPOSED TUFF CURB & FLEXIBLE DELINEATORS
- PROPOSED FENCING
- EXISTING FENCING
- PROPOSED CURB
- PROPOSED GUTTER
- ROAD BUFFER
- PROPOSED SIDEWALK
- PROPERTY LINE
- LICENSE/EASEMENT LINE
- STORM & SEWER PIPE
- MAIN WATER PIPE
- EXISTING ROAD CENTERLINE
- EXISTING ROAD
- FINISHED GRADE OUTLINE (INCLUDING DITCH AND EMBANKMENT GRADING)
- EXISTING BOTTOM OF DITCH (FROM SURVEY)
- DRIVEWAY ACCESS
- SECTION MARKER
- PROPOSED LIGHT POLE
- PROPOSED POWER AND COMMUNICATIONS CONDUITS

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0 1 V 1:100 5m

Ref.No.	REFERENCE
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1	WSP PROJECT NO. 20M-00758-00

NOT FOR CONSTRUCTION
March 25, 2022

wsp

No.	Date	REVISION	Dr'n	Ch'd
E	2022/05/13	ISSUED FOR 99% DESIGN	RC	MJ
D	2022/03/25	ISSUED FOR 90% DESIGN	RC	MJ
C	2021/11/15	ISSUED FOR 60% DESIGN	RC	MJ
B	2021/01/07	ISSUED FOR METRO VANCOUVER	KY	VT
A	2020/12/18	ISSUED FOR 30% DESIGN	IL	VT

PORT of vancouver
VANCOUVER FRASER PORT AUTHORITY
ENGINEERING DEPARTMENT

DESIGN BY	R.CHANG
DRAWN BY	I.LOZADA
APPROVED	M.JACKSON
DATE	2022/05/13
SCALE	1:1000
PMV SITE	----

GREATER VANCOUVER GATEWAY 2030
FSPL TRANSPORTATION IMPROVEMENTS
PLAN & PROFILE
STA. 1+000.000 TO STA. 1+520.000

SIZE D | DWG. 360-067-C-002 | SHEET 2 of 69 | REV. E

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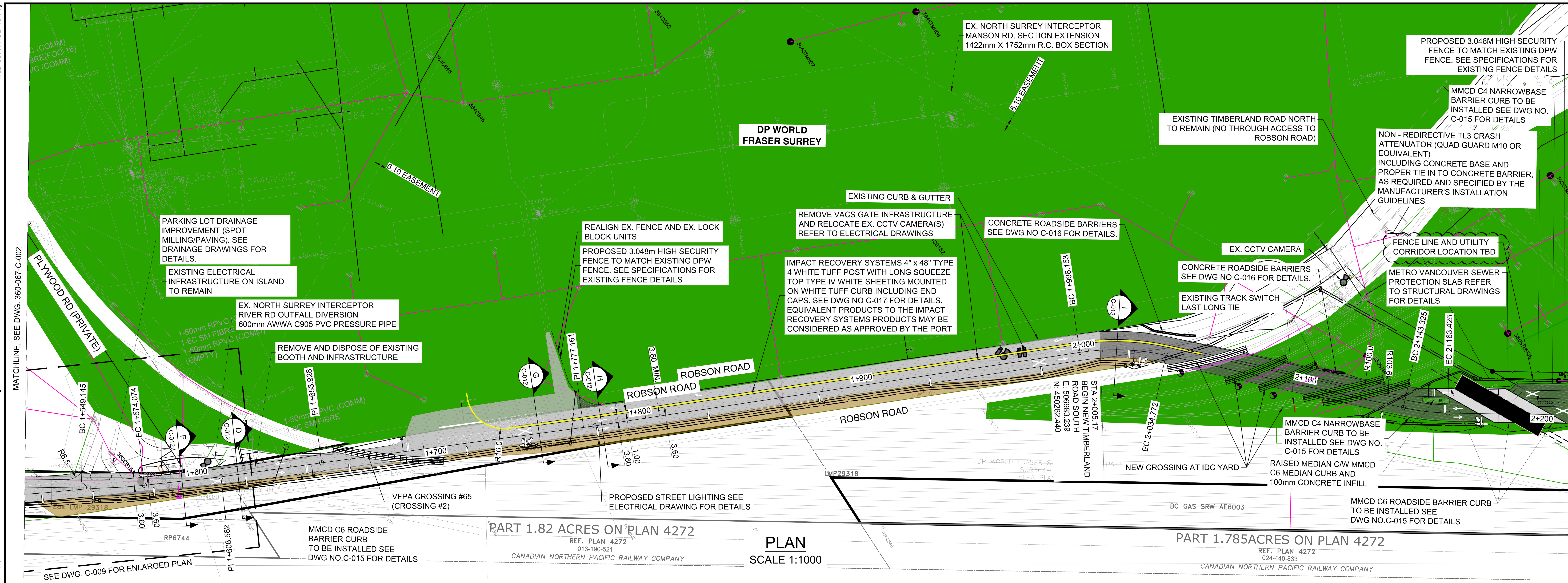

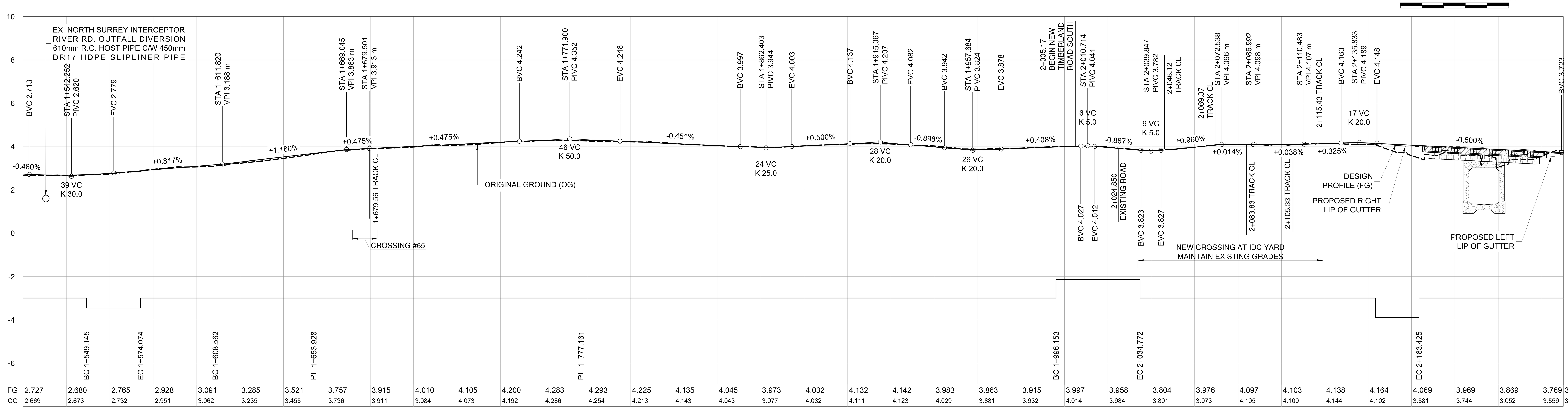

LEGEND

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ROBSON ROAD / ELEVATOR RD (INCLUDING ROUNDABOUT WITH GUNDERSON RD) NEW PAVEMENT CONSTRUCTION	40mm SUPERPAVE 12.5 70mm SUPERPAVE 19 90mm SUPERPAVE 19 300mm GRANULAR BASE (19mm MINUS) 300mm GRANULAR SUBBASE (75mm MINUS)
IDC YARD NEW PAVEMENT CONSTRUCTION	50mm SUPERPAVE 12.5 70mm SUPERPAVE 19 50mm SUPERPAVE 19 300mm GRANULAR BASE (19mm MINUS) TRIAXIAL GEOGRID 300mm GRANULAR SUBBASE (75mm MINUS)
CONCRETE APPROACH SLAB	50mm SUPERPAVE 12.5 70mm SUPERPAVE 19 CONCRETE APPROACH SLAB

- REGRADE EX. GRAVEL
- PROPOSED CONCRETE
- CONCRETE ROADSIDE / MEDIAN BARRIER
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B	2021/01/07	ISSUED FOR METRO VANCOUVER	KY	VT
F	2022/05/13	ISSUED FOR 99% DESIGN	RC	MJ

PORT of vancouver
VANCOUVER FRASER PORT AUTHORITY
ENGINEERING DEPARTMENT

DESIGN BY	R.CHANG
DRAWN BY	I.LOZADA
APPROVED	M.JACKSON
DATE	2022/05/13
SCALE	1:1000
PMV SITE	----

GREATER VANCOUVER GATEWAY 2030
FSPL TRANSPORTATION IMPROVEMENTS
PLAN & PROFILE
STA. 1+520.000 TO STA. 2+220.000

SIZE: D | DWG. 360-067-C-003 | SHEET 3 of 69 | REV. F

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March 25, 2022

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VANCOUVER FRASER PORT AUTHORITY
ENGINEERING DEPARTMENT

DESIGN BY: R.CHANG
DRAWN BY: I.LOZADA
APPROVED: M.JACKSON
DATE: 2022/05/13
SCALE: 1:1000
PMV SITE: ----

GREATER VANCOUVER GATEWAY 2030 FSPL TRANSPORTATION IMPROVEMENTS PLAN & PROFILE STA. 2+220.000 TO STA. 2+920.000

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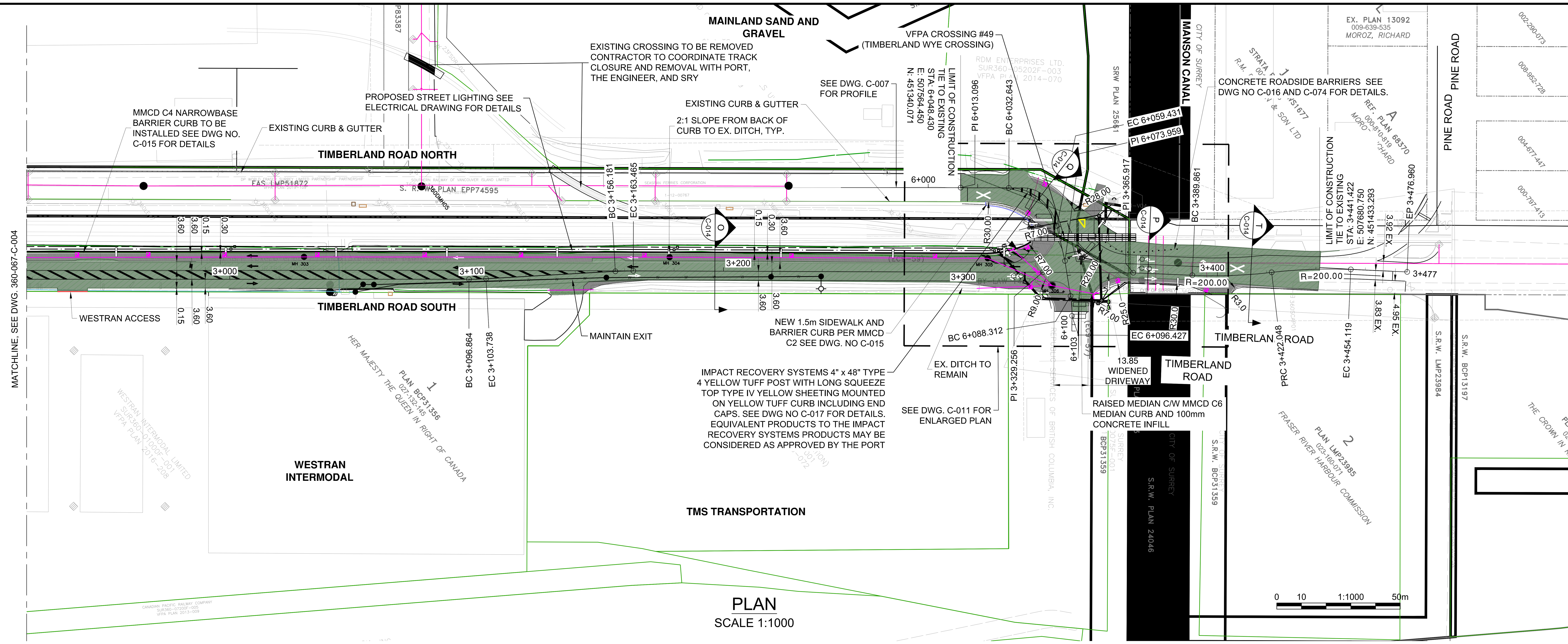

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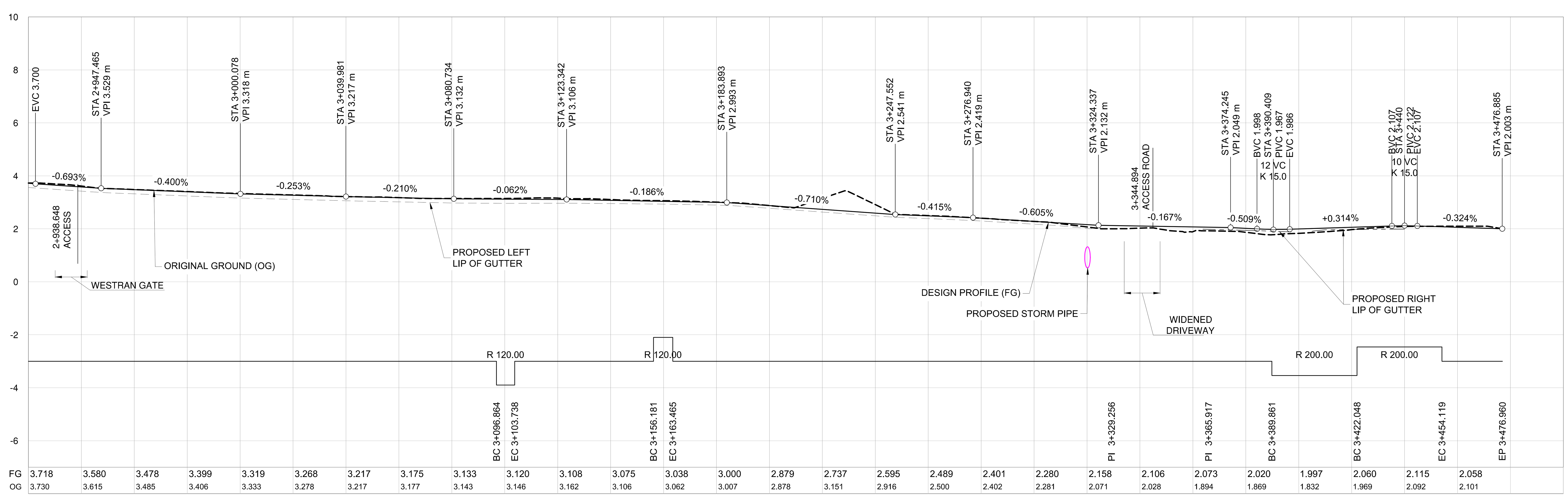

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V 1:100

0 10 H 1:1000 50m
0 1 V 1:100 5m

LEGEND

TIMBERLAND RD S. & TIMBERLAND RD N. & WYE INTERSECTION PAVEMENT REHABILITATION	50mm SUPERPAVE 12.5 90mm SUPERPAVE 19 90mm SUPERPAVE 19 70mm SUPERPAVE 19 REMOVE +/- 230mm OF EX. PAVEMENT STRUCTURE
TIMBERLAND RD S. & TIMBERLAND RD N. & WYE INTERSECTION NEW PAVEMENT CONSTRUCTION	50mm SUPERPAVE 12.5 90mm SUPERPAVE 19 90mm SUPERPAVE 19 70mm SUPERPAVE 19 300mm GRANULAR BASE (19mm MINUS) 300mm GRANULAR SUBBASE (75mm MINUS)
SURFACE RESTORATION FOR CROSSING REMOVAL (TIMBERLAND N.)	50mm SUPERPAVE 12.5 50mm SUPERPAVE 19 50mm SUPERPAVE 19 300mm GRANULAR BASE (19mm MINUS)
SURFACE RESTORATION FOR CROSSING REMOVAL (DOCK ROAD)	40MM SUPERPAVE 12.5 40MM SUPERPAVE 19 50MM SUPERPAVE 19 300MM GRANULAR BASE (19MM MINUS)

REGRADE EX. GRAVEL
PROPOSED CONCRETE
CONCRETE ROADSIDE / MEDIAN BARRIER
PROPOSED TUFF CURB & FLEXIBLE DELINEATORS
PROPOSED FENCING
EXISTING FENCING
PROPOSED CURB
PROPOSED GUTTER
ROAD BUFFER
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LICENSE/EASEMENT LINE
STORM & SEWER PIPE
MAIN WATER PIPE
EXISTING ROAD CENTERLINE
EXISTING ROAD
FINISHED GRADE OUTLINE (INCLUDING DITCH AND EMBANKMENT GRADING)
EXISTING BOTTOM OF DITCH (FROM SURVEY)
DRIVEWAY ACCESS
SECTION MARKER
PROPOSED LIGHT POLE
PROPOSED POWER AND COMMUNICATIONS CONDUITS

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C	2021/11/15	ISSUED FOR 60% DESIGN	RC	MJ
B	2021/01/07	ISSUED FOR METRO VANCOUVER	KY	VT
A	2020/12/18	ISSUED FOR 30% DESIGN	IL	VT

PORT of vancouver
VANCOUVER FRASER PORT AUTHORITY
ENGINEERING DEPARTMENT

DESIGN BY	R.CHANG
DRAWN BY	I.LOZADA
APPROVED	M.JACKSON
DATE	2022/05/13
SCALE	1:1000
PMV SITE	----

GREATER VANCOUVER GATEWAY 2030
FSPL TRANSPORTATION IMPROVEMENTS
PLAN & PROFILE
STA. 2+920.000 TO STA. 3+476.885

SIZE D | DWG. 360-067-C-005 | SHEET 5 of 69 | REV. E

DATE: 2022/04/25 - 2:10pm
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PLAN
SCALE 1:500

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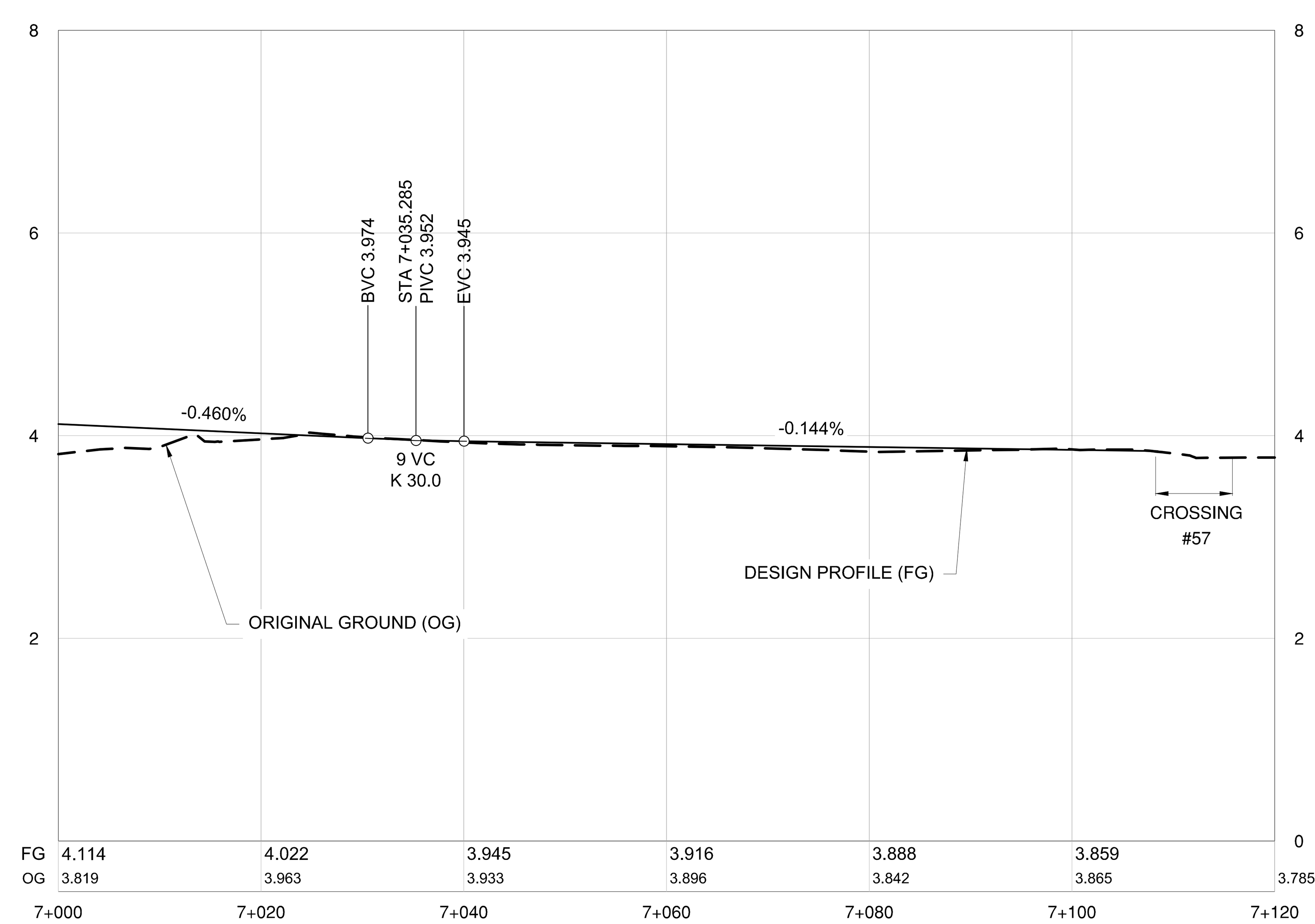

PROFILE
SCALE H 1:500
V 1:100

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LEGEND

BULB (TIMBERLAND N.) PAVEMENT REHABILITATION	50mm SUPERPAVE 12.5, 90mm SUPERPAVE 19, 70mm SUPERPAVE 19, REMOVE +/- 230mm OF EX. PAVEMENT STRUCTURE
BULB (TIMBERLAND N.) NEW PAVEMENT CONSTRUCTION	50mm SUPERPAVE 12.5, 80mm SUPERPAVE 19, 40mm SUPERPAVE 19, 300mm GRANULAR BASE (19mm MINUS), 300mm GRANULAR SUBBASE (75mm MINUS)

- REGRADE EX. GRAVEL
- PROPOSED CONCRETE
- CONCRETE ROADSIDE / MEDIAN BARRIER
- PROPOSED TUFF CURB & FLEXIBLE DELINEATORS
- PROPOSED FENCING
- EXISTING FENCING
- PROPOSED CURB
- PROPOSED GUTTER
- ROAD BUFFER
- PROPOSED SIDEWALK
- PROPERTY LINE
- LICENSE/EASEMENT LINE
- STORM & SEWER PIPE
- MAIN WATER PIPE
- EXISTING ROAD CENTERLINE
- EXISTING ROAD
- FINISHED GRADE OUTLINE (INCLUDING DITCH AND EMBANKMENT GRADING)
- EXISTING BOTTOM OF DITCH (FROM SURVEY)
- DRIVEWAY ACCESS
- SECTION MARKER
- PROPOSED LIGHT POLE
- PROPOSED POWER AND COMMUNICATIONS CONDUITS

Ref.No.	REFERENCE
2	VFPA PROJECT NO. 360-067
1	WSP PROJECT NO. 20M-00758-00

NOT FOR CONSTRUCTION
March 25, 2022

wsp

No.	Date	REVISION	Dr'n	Ch'd
B	2022/05/13	ISSUED FOR 99% DESIGN	RC	MJ
A	2022/03/25	ISSUED FOR 90% DESIGN	RC	MJ

PORT of vancouver
VANCOUVER FRASER PORT AUTHORITY
ENGINEERING DEPARTMENT

DESIGN BY	R.CHANG
DRAWN BY	I.LOZADA
APPROVED	M.JACKSON
DATE	2022/03/25
SCALE	1:500
PMV SITE	----

GREATER VANCOUVER GATEWAY 2030
FSPL TRANSPORTATION IMPROVEMENTS
PLAN & PROFILE
CUL-DE-SAC

SIZE	DWG.	SHEET	REV.
D	360-067-C-006	6 of 69	B

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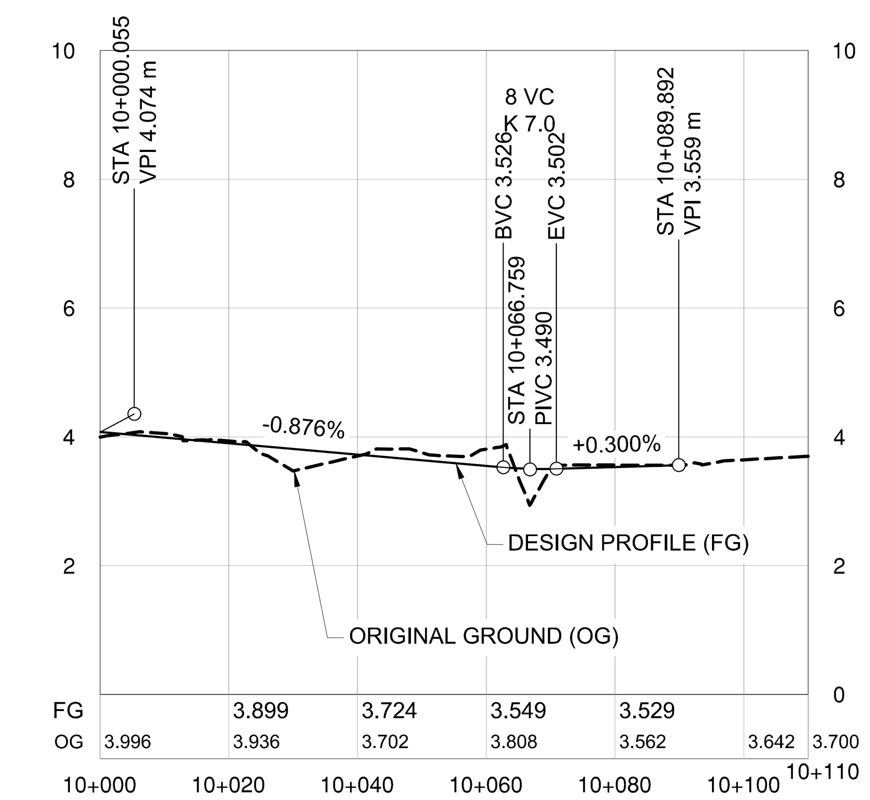
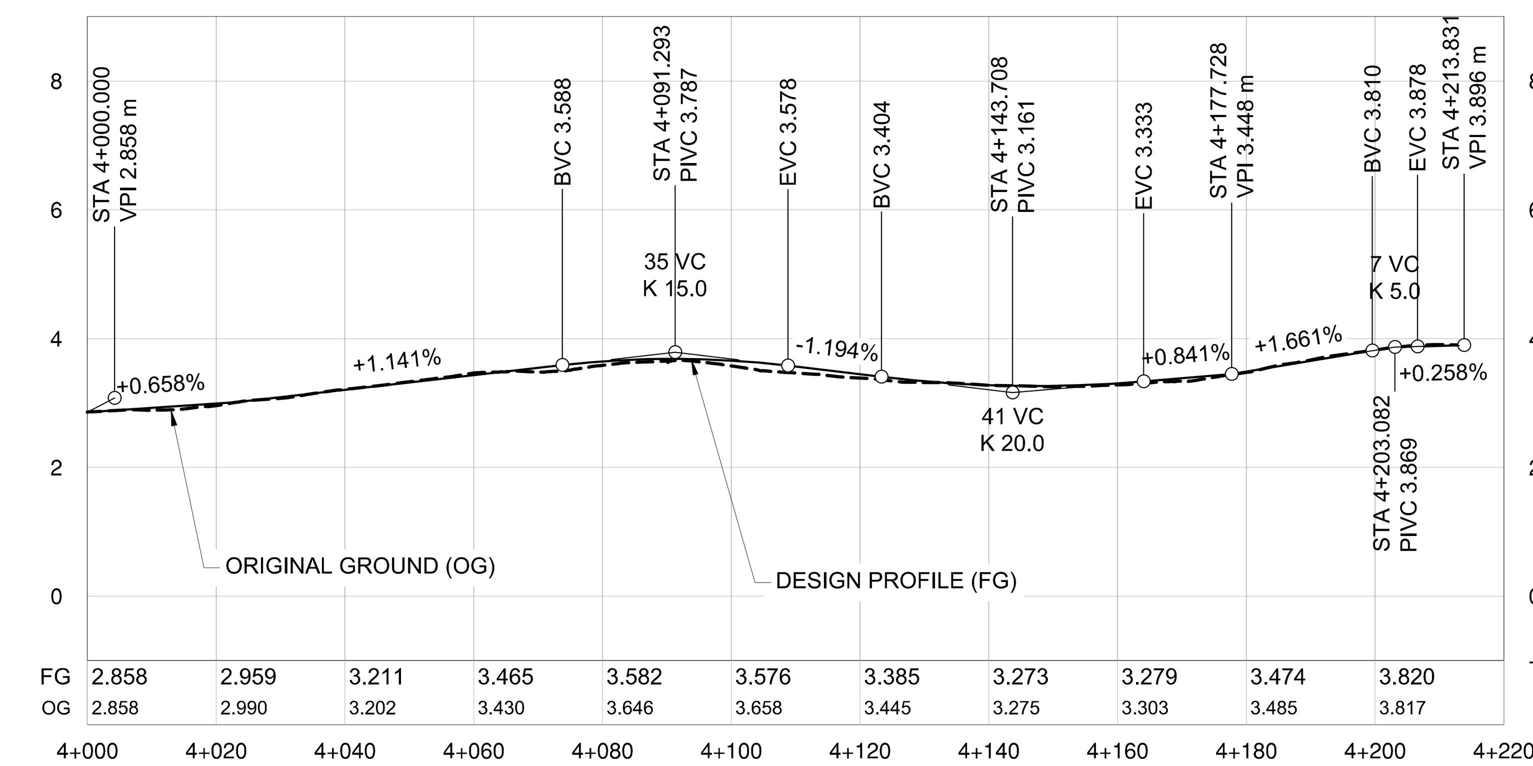


WESTERN BACK ACCESS

FOR ROAD PLAN SEE DWG.C-003

PROFILE

SCALE H 1:1000 V 1:100

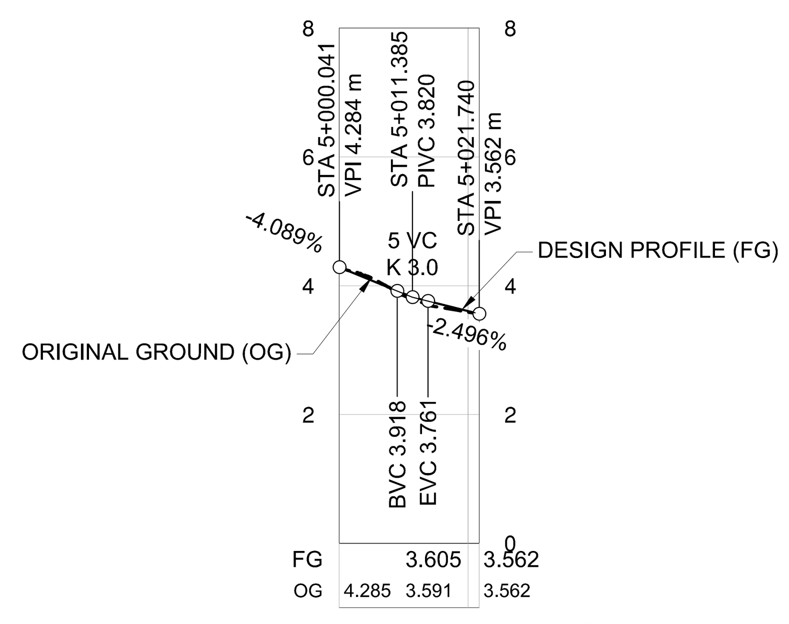


ELEVATOR SOUTH BOUND ROAD

FOR ROAD PLAN SEE DWG .C-002

PROFILE

SCALE H 1:1000 V 1:100

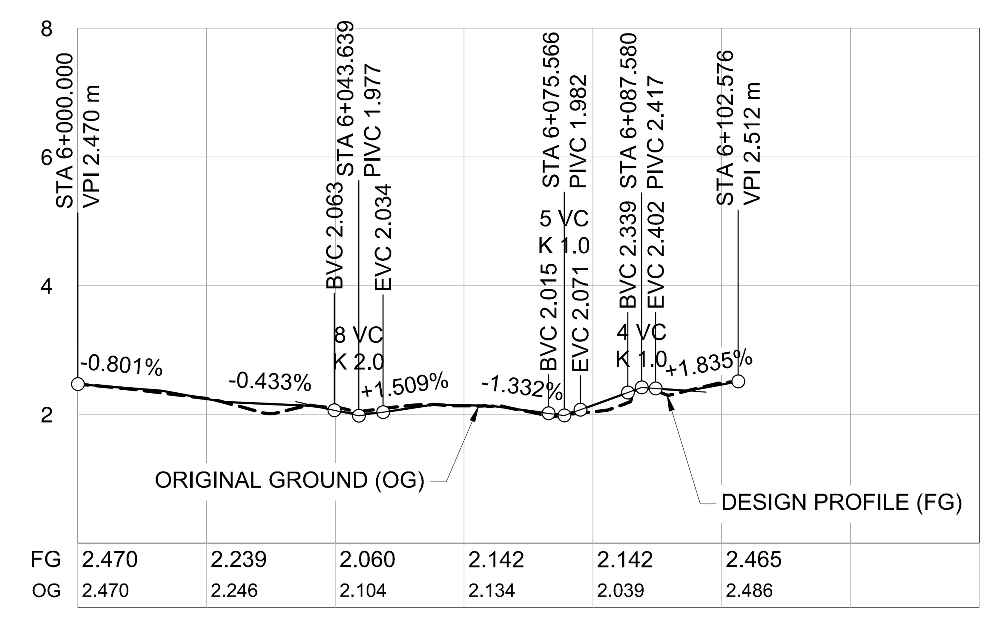


GUNDERSON ROAD

FOR ROAD PLAN SEE DWG .C-002

PROFILE

SCALE H 1:1000 V 1:100



WYE JUNCTION

FOR ROAD PLAN SEE DWG .C-004

PROFILE

SCALE H 1:1000 V 1:100

0 10 1:1000 50m

Ref.No.	REFERENCE
2	VFPA PROJECT NO. 360-067
1	WSP PROJECT NO. 20M-00758-00

NOT FOR CONSTRUCTION

March 25, 2022

wsp

No.	Date	REVISION	Dr'n	Ch'd
B	2022/05/13	ISSUED FOR 99% DESIGN	RC	MJ
A	2022/03/25	ISSUED FOR 90% DESIGN	RC	MJ

PORT of vancouver

VANCOUVER FRASER PORT AUTHORITY

ENGINEERING DEPARTMENT

DESIGN BY	R.CHANG
DRAWN BY	I.LOZADA
APPROVED	M.JACKSON
DATE	2022/05/13
SCALE	1:1000
PMV SITE	----

GREATER VANCOUVER GATEWAY 2030

FSPL TRANSPORTATION IMPROVEMENTS

PROFILE FOR WESTRAN ACCESS, ELEVATOR SOUTH BOUND ROAD, GUNDERSON ROAD & WYE JUNCTION

SIZE	DWG.	SHEET	REV.
D	360-067-C-007	7 of 69	B

DATE: 2022/04/25 - 2:11pm
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