

June 23, 2022

File: 1451-21B-R03

Lauren Services
1000, 700 West Pender St.
Vancouver, BC V6C 1G8

Attention: David Reid

Dear David:

**Re: Pacific Coast Terminals Glycol Unloading System Expansion
Review of Potential for Community Noise Impacts**

Thank you for meeting with me at the project site last Friday and explaining what the above project will involve in detail. As requested, you subsequently provided BKL with relevant project drawings, information on historic noise complaints and other relevant information. We have reviewed all of this information as well as the noise assessment that BKL prepared for the PCT Potash Handling and Storage System Project in December 3, 2014. Our review of potential noise impacts from the currently proposed project is detailed in this letter.

Project Description

Our review is based on our understanding of the project, as summarized below.

- Tracks L and M will be extended and additional unloading equipment similar to the existing equipment, will be added as shown in Figure 1 (extracted from your Drawing 37-1000-C-001).
- Existing track F will be moved and extended slightly to permit storage of more rail cars but the change will not significantly change its distance from community receptors.
- Aside from rail car deliveries and pickups, the only new noise sources of significance will be two 150 HP pumps which will be located at ground level on the northwest side of the loading area.
- Typically, CP breaks out the cars destined for the PCT liquids unloading area on their tracks then drives them down PCT's Track F, where they are stored. The locomotive breaks off and assembles the empty cars from the liquids unloading area (Tracks H, I, J & K) on Track G. The incoming cars are then broken up and pulled off of Track F and placed onto tracks H, I, J & K. Lastly the locomotive collects the empty cars before pulling them out of PCT's lease area and back onto the mainline.
- After the expansion, CP will break out the cars destined for the PCT liquids unloading area on their tracks then drive them down PCT's new Track E, where all 50 will be stored. The locomotive will break off and assemble the empty cars from the liquids unloading area (Tracks H, I, J, K, L & M) onto Tracks F & G. The incoming cars are then broken up and pulled off of

Track E and placed onto tracks H, I, J, K, L & M. Lastly the locomotive collects the empty cars before pulling them out of PCT’s lease area and back onto the mainline.

- The purpose of the Project is to increase the capacity of the unloading system but it will not increase the number of train deliveries/pickups. However, it is expected that there will be an increase in rail car shunting events due to spotting of cars on the extended L and M tracks as well as using Track F to store empty cars.
- The time of arrival, departure, method of shunting and placement of cars is entirely up to CP but there is no reason to expect their timing to change as a result of the Project. Hence, rail activity associated with the Project is expected to occur during both daytime and nighttime.

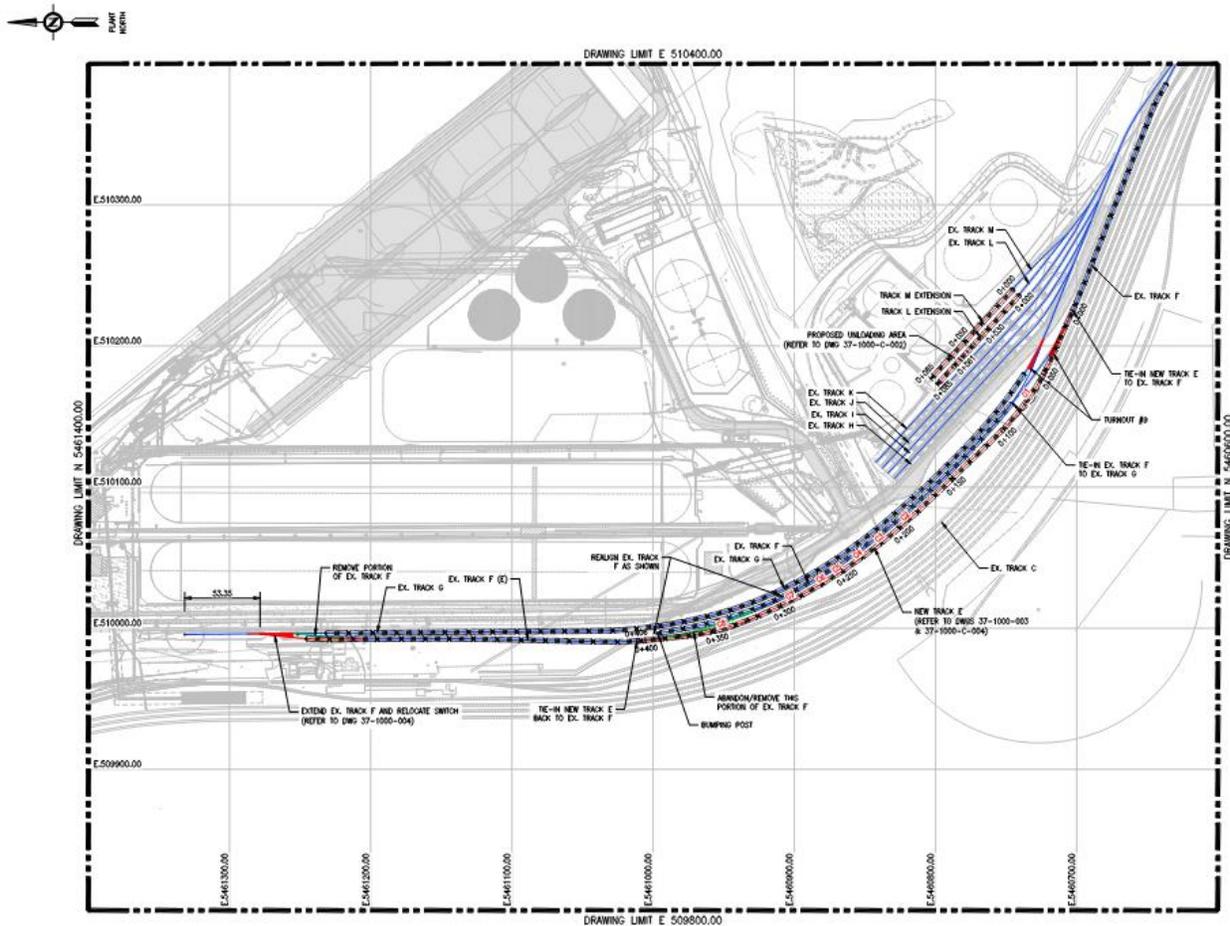


Figure 1: Unloading Area Track Layout

Review of PCT Complaint History

Since November 2020, PCT has received (12) noise complaints. As indicated in Table 1, none of these were directly attributable to the Liquids operations, where the currently proposed expansion is to occur.

Table 1: Noise Complaints Received from PCT

Noise Complaint Source	# Received	Notes
Vessel Noise - Liquids loading	4	2 complaints from 1 incident
Conveyor noise (solids)	3	
Train Noise - Solids	3	
CP Mainline Activity	1	
PCT General Operations	1	
Train Noise - Liquids	0	
Vessel Noise - Solids loading	0	
TOTAL	12	

Review of Potential Noise Impacts

Noise Metric

Noise has been quantified using the annual average day-night sound level, or L_{dn} , which follows our 2014 noise assessment for PCT. The adjusted annual average daily sound level is the recommended metric to predict the long-term annoyance response of a community discussed in the VFPA PER Guidelines – Environmental Noise Assessment. The predicted L_{dn} includes adjustments for night and weekend noise and any necessary adjustments for tonal or impulsive noise as recommended by the ANSI standard. The purpose of applying these adjustments is to reflect the fact that people are more disturbed by noise during nights and weekends, compared to weekday daytime hours, and to impulsive (e.g., railcar shunting), tonal (e.g., backup alarms on mobile equipment, rail squeal) and excessive low frequency noise sources (e.g., some shipboard generators) compared to a more neutral noise source like steady road traffic noise.

Existing Noise Environment

As a part of the 2014 noise assessment, BKL developed a Cadna/A noise model of the “2020 with-project” scenario which represents the current situation and includes the glycol unloading area as a unique group of noise sources (including pumps, rail car spotting and rail car shunting). Table 2 lists the predicted annual average noise contribution from the key noise sources of the glycol system and the from the glycol system as a whole at the nearest noise sensitive receptors to the glycol unloading area. The nearest receptors are shown by the orange “clouds” in Figure 2.

Table 2: Significance of Various Existing PCT Noise Sources at Nearest Receptors to Glycol Unloading Area

Glycol Area Noise Sources	Predicted Partial Noise Levels Contributing to Overall Ldn Noise Level	
	View St. Receptors	Clarke St. Receptors
150HP Glycol Pump P-1	38 dBA	40 dBA
150 HP Glycol Pump P-2	38 dBA	40 dBA
Glycol Rail Car Spotting/Retrieving outside Glycol unloading area	62 dBA	62 dBA
Glycol Rail Car Spotting/Retrieving inside Glycol unloading area (i.e., Tracks F to M)	46 dBA	53 dBA
All Glycol Noise Sources Combined	62 dBA	62 dBA
All PCT Noise Sources Combined	67 dBA *	67 dBA *

* Total PCT Noise Levels of 67 dBA are primarily governed by rail spotting and retrieving and shunting for Sulphur/Potash/Canola



Figure 2: Nearest Noise Sensitive Receptors

All of the partial levels shown in Table 2 include the necessary adjustments for tonal or impulsive noise as required by the ANSI standard S12.9-2005 to reflect the fact that highly impulsive noise (e.g., railcar shunting) and tonal noise is more intrusive and potentially more annoying than other types of noise. They also include a 10 dB adjustment for noise that occurs at night. It is apparent from the table, that noise from the existing glycol unloading area is not the predominant source of noise from PCT operations.

Potential Changes due to Project

The Port's Noise Assessment Guidelines quantifies noise using the annual average Day-Evening-Night Sound Level, or L_{den} to predict the long-term annoyance response of a community (ANSI 2005). The predicted L_{den} includes adjustments for tonal or impulsive noise and for the time of day and day of week on which it occurs, as recommended by the ANSI standard. This metric is an energy average but since relatively loud events contain the most acoustic energy, the energy average is strongly influenced by the loudest noise events. Since the decibel is a logarithmic unit, doubling the sound energy would increase the L_{den} by $10\log(2) = 3$ dB although subjectively, a change of 3 dB would be barely perceptible. A 50% increase in sound energy would increase the L_{den} by $10\log(1.5) \approx 2$ dB.

Pumps

There are currently three 150 HP pumps in the glycol unloading area and two more similar pumps will be added as part of the expansion. Assuming similar operating hours, this will increase the total noise emission from pumps by approximately 2 dB (i.e., $10\log(5/3)$). However, noise from the pumps is currently insignificant at the nearest receptors relative to other sources (see Table 2) and they will continue to be insignificant, even though total pump noise will increase by approximately 2 dB.

Rail Deliveries and Pickups

The number of trains delivering and picking up glycol rail cars will not increase due to the project but the number of shunting events will increase due to spotting of rail cars on the new extended tracks L and M and because Track F will be used in addition to Track G, to store empty cars. The 2014 noise assessment assumed that in the year 2020, there would be 400 trains delivering and retrieving glycol rail cars (see Table 6.3 in 2014 report). As stated on page 18 of the 2014 report, based on data acquired during baseline monitoring, an average of 12 shunting events per train was assumed. For any given glycol train (delivery + pickup), these can be broken down as follows:

- 2 events to deliver full cars and then pick up empty cars on existing Track G
- 2 events to deliver full cars and then pick up empty cars on each of existing Tracks H, I, J & K
- 2 additional events randomly located

With the proposed expansion, we can expect that there will be additional shunting events for each glycol train as follows:

- 2 more events since train deliveries will utilize Tracks F & G rather than just Track G
- 2 more events for each of the new extended Tracks L & M

Therefore, instead of 12 shunting events per train, we should expect $12 + 6 = 18$ events per train. Hence, noise from rail car shunting associated with the Glycol operations is expected to increase by about 50%. Assuming that the day/night distribution will remain the same, the Day-Night Equivalent Sound Level (L_{dn}) will increase by approximately 2 dB (i.e., $10\log(18/12)$).

Potential Effect of Project on Nearest Noise Sensitive Receptors

Based on the above review, no significant increase in noise from glycol pumps or from glycol rail car spotting/retrieving is expected at any community receptor locations but noise from rail car shunting associated with glycol operations is likely to increase by 2 dB. The overall effect of these changes is summarized in Table 3.

Table 3: Predicted Effects of Expansion on Community Noise Environment

Glycol Area Noise Sources	Predicted Partial Noise Levels Contributing to Overall Ldn Noise Level			
	View St. Receptors		Clarke St. Receptors	
	Existing	Future	Existing	Future
Glycol Pumps (all combined)	41 dBA	41 + 2 = 43 dBA	43 dBA	43 + 2 = 45 dBA
Glycol Rail Car Spotting/Retrieving outside Glycol unloading area	62 dBA	62 dBA	62 dBA	62 dBA
Glycol Rail Car Shunting inside Glycol unloading area (i.e., Tracks F to M)	46 dBA	46 + 2 = 48 dBA	53 dBA	53 + 2 = 55 dBA
All Glycol Noise Sources Combined	62 dBA	62 dBA	62 dBA	63 dBA
All PCT Noise Sources Combined	67 dBA	67 dBA	67 dBA	67 dBA

The results predicted above are explained by the fact that noise levels at the nearest community receptors are controlled by rail car deliveries/pickups for PCT operations apart from glycol and, for View Street receptors, by road traffic on Barnett Highway.

Please note the noise levels mentioned in this report are predicted at the nearest noise sensitive receptors (i.e., worst case locations for noise) to the glycol unloading area. Noise levels from the glycol area noise sources would be lower at other receptors further away from the area.

In conclusion, it is our professional opinion that the proposed expansion is unlikely to result in any increase in total noise levels within the neighbouring community.

Sincerely,

BKL Consultants Ltd.

per:


 Gary Mak, P.Eng., PMP
 Acoustical Consultant
mak@bkl.ca



PTP 1001651