Proposed Low Level Road Improvement Project Response to Community Consultation

TECHNICAL MEMORANDUM : APRIL 29, 2011
Project Overview

Port Metro Vancouver is Canada’s largest and busiest port, and a significant contributor to the economy of the entire Country. Port facilities within Metro Vancouver’s North Shore alone generate approximately 19,400 direct and indirect jobs in Canada and $1.2 billion in gross domestic product.

Recognizing the importance of port and industrial activity along the north shore of Burrard Inlet, collectively known as the North Shore Trade Area, Port Metro Vancouver, the Government of Canada, the Province of British Columbia, TransLink, the City and District of North Vancouver and the private sector have collaborated to fund $225 million in road and rail projects that will enhance rail and port operations, reduce traffic congestion and improve the livability of communities adjacent to port facilities. This includes the proposed Low Level Road Improvement Project – a proposed $100 million upgrade to the existing Low Level Road in North Vancouver including realigning the existing road between Cotton Street and St. Andrews and constructing two new overpasses (at St. Patricks Avenue and the entrance to Neptune and Cargill terminals).

The Proposed Low Level Road Improvement Project is designed to address long-standing community safety and traffic congestion challenges, while also enhancing rail and port operations as international trade continues to grow. Key Project benefits include:

- Reduced community noise, by eliminating three at-grade rail crossings and reducing noise from rail car switching;
- Safety improvements through improved slope stability along the existing escarpment, improved traffic flow and enhanced emergency response capability;
- Reduced vehicle idling;
- New sidewalk and bike lanes along the Low Level Road; and,
- Spirit Trail multi-use pathway enhancements.
Consultation Overview

Port Metro Vancouver operates on 2500 acres of land, 40,000 acres of water, and has assets along more than 600 kilometres of shoreline. We offer 28 deep-sea marine cargo terminals, two cruise terminals, a comprehensive network of service providers and industry partners, and three Class I railroad partners. Our terminal operators have invested in some of the most advanced handling equipment in North America. The Port is committed to making best use of our network of resources, including applying best management practices and minimizing our environmental footprint as we work to remain a best in class example around the world.

Recognizing our geographic footprint, the Port is committed to working hand-in-hand with host communities to provide amenities and lasting community legacies as another positive result of port development. This includes dynamic community relations and community engagement programs that are defined by strong relationships, with a view of building a sustainable future together. Port Metro Vancouver’s community engagement approach is based on open two-way communication and meaningful public participation.

Development of the proposed Low Level Road Improvement Project reflects the Port’s community engagement approach. As the lead agency for the Project, Port Metro Vancouver developed a comprehensive community consultation program working closely with TransLink and the City of North Vancouver. The consultation program was approved by City of North Vancouver Council in December 2010 and took place between January 31 and February 21, 2011. The program included inviting residents, stakeholders and businesses, to share Project designs and planning information and to obtain community feedback to assist in developing and refining the Project. Community notifications to support the consultation included:

- 2 advertisements were placed in the North Shore News, reaching over 60,000 readers on the North Shore (26 Jan and 6 Feb)
- 40 letters were sent to stakeholder groups (17 Jan)
- 12 letters were sent to immediately adjacent property owners (13 Jan)
- A postcard was sent to 1700 businesses and residents in the general vicinity of the proposed realigned road (17 Jan)
- A letter was sent to the North Vancouver Chamber of Commerce, and forwarded to their members (20 Jan).

Community input and feedback gathered through the consultation program was documented in a Consultation Summary Report, which was posted to the Port’s website on April 1, 2011. The Project team is considering this input together with technical and financial information to develop a refined conceptual design for the proposed Low Level Road Improvement Project.
Consultation Participation

In total, more than 200 people participated in the community consultation for the proposed Low Level Road Improvement Project.

- Approximately 49 people attended six small group meetings
- More than 170 people attended the Community Open House
- 9 residents participated in two meetings with Port Metro Vancouver and City of Vancouver staff
- A total of 97 people returned feedback forms at small group meetings (16), the community open house (49), by e-mail (11), mail (3) and fax (9)
- 4 submissions were received, on behalf of organizations and individuals

Consideration of Consultation Input

On behalf of all the funding partners, Port Metro Vancouver is working with the City of North Vancouver and TransLink to consider and appropriately address the feedback provided as part of the consultation program. Key design modifications undertaken as a result of consultations to date are as follows:

- Maintaining the existing Spirit Trail alignment between St. Patricks and St. Davids Avenues, which provides an enhanced buffer for nearby homes;
- Retaining access between East 3rd Street and Heywood Street;
- Reducing the elevation of the proposed road between the intersection with Esplanade and to a point just beyond St. Patricks Avenue;
- Use of concrete/acrylic noise walls from west of St. Patricks Avenue to east of St. Davids Avenue to address traffic noise in the area while maintaining views – in other areas of the Project, noise levels are not projected to increase because the new road will be below the existing escarpment.

This following table provides a comprehensive response to key themes that emerged from the consultation summary report. For consistency, topics are discussed in the same order that they were presented during consultation and summarized in the Consultation Report.
## Road Interface with the Community

### Consultation Input | Response and Action

#### Noise Mitigation

| 63% of respondents rated noise reduction effectiveness as the most important factor to consider when designing noise mitigation; 24% selected maintaining existing viewscapes as most important. | Port Metro Vancouver has engaged an independent consulting firm with expertise in noise assessments to assist in understanding existing and future noise conditions. The scope of work includes:
- Conduct surveys of the existing acoustic environment throughout the Project footprint to establish a baseline;
- Model future noise conditions, reflecting changes in rail and road traffic made possible by the Project; and,
- Model the change in noise levels with noise mitigation (e.g. noise walls) in place.

The noise consultant will work with the engineering team to ensure modeling reflects actual conditions such as including geography and traffic mix.

The noise assessment findings will be used to confirm the most effective location and technically appropriate length of noise mitigation along the corridor.

Refined noise mitigation options will be shared with the community during Detailed Design consultation. |

#### Noise Walls

| The majority (46%) of respondents support combination concrete/acrylic noise barriers, with 28% supporting the traditional concrete noise wall with attractive design. | As part of the noise assessment, the effectiveness and placement of noise walls will be assessed (see above).

The Project budget includes funding for noise walls, where appropriate. This includes funding for walls that contain acrylic (transparent) panels, to help maintain viewscapes.

Based on the consultation findings, for budgeting purposes, the Project team has assumed use of concrete/acrylic walls. However, further consultation on the placement and type of noise walls is planned during the Detailed Design phase. |

#### Landscaping

| The majority of respondents (66%) selected landscaping along the entire road as their preferred option. Respondents’ comments related to landscaping include suggestions for landscaping plans such as using a mix of deciduous and evergreen trees, plantings that will not obstruct views and landscaping that is non-invasive and native to the local area. | A landscape architecture firm was engaged to develop preliminary landscaping options for landscaping treatments along the proposed road as well as along the Spirit Trail in the vicinity of the road.

Detailed landscaping options will be developed based on community input and brought forward for further consultation during the Detailed Design phase.

Landscaping options will be developed in accordance with best practices, including use of native species. |
## Road Interface with the Community

<table>
<thead>
<tr>
<th>Consultation Input</th>
<th>Response and Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lighting</strong></td>
<td>Lighting is an important safety component for vehicles, cyclists and pedestrians. To ensure this important roadway improvement does not indirectly create negative effects for residents, directional lighting and hoods will be used to shield road light from residences.</td>
</tr>
<tr>
<td>A number of consultation participants expressed concerns about increased light as a result of the proposed new Low Level Road.</td>
<td>Lighting options will be developed and brought forward for consultation at the Detailed Design stage.</td>
</tr>
</tbody>
</table>

### Alternative Designs

Consultation participants expressed concerns about the proposed elevated roadway, including proximity to residential properties, particularly near the proposed St. Patricks Overpass.

Some respondents asked if alternate designs were possible.

The proposed design concept – built into the existing escarpment using retaining walls – represents the most appropriate technically feasible design concept given the constraints imposed.

As a result of consultation and recently completed geotechnical work, Port Metro Vancouver and City of North Vancouver staff have worked to optimize the proposed road design so that the elevation of the road is as low as it can be, within technical constraints for safety and accessibility to connections at either end.

In response to feedback from residents, Port Metro Vancouver has determined that it is feasible to maintain the existing Spirit Trail alignment between St. Davids and St. Patricks Avenues, providing an enhanced buffer for nearby homes.

Please see Appendix A for the consultation alignment at the Western End of the Project as well as the refined design concept, which maintains the existing Spirit Trail location.

In addition, renderings have been prepared for a number of key locations along the alignment to provide a graphical representation of the re-aligned road. Please see Appendix B to view preliminary view assessments.

An alternative to the St. Patricks overpass was considered at St. Andrews; although this would have resulted in a slightly lower road elevation, the associated grades required between the foot of St. Andrews & Esplanade to clear the rail tracks would have been unacceptable (15%-20%) for safety reasons.

Throughout the early stages of design, other options were considered, including a tunnel, an elevated structure (like a bridge or viaduct) and keeping the road at its current low elevation. Following completion of technical analysis, none of these options were found to be feasible. Please see Appendix C for a summary of this analysis.
### Road Interface with the Community

<table>
<thead>
<tr>
<th>Consultation Input</th>
<th>Response and Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Noise Analysis</strong></td>
<td>The preliminary findings of the noise baseline and future noise modeling were presented at the City of North Vancouver Council Workshop on April 4th. These findings suggest that, based on average noise levels, even without noise walls, noise levels along the escarpment are not expected to increase significantly, and there is no increase for any residences north of Alder Street. When the planned noise walls are included in the noise model, a reduction in average noise is achieved for many residents along the escarpment. See Appendix D for more information about the location and current readings for noise monitoring stations as well as forecast future noise levels with and without noise mitigation in place.</td>
</tr>
</tbody>
</table>

| **Environmental Analysis** | An independent environmental consultant was engaged to conduct a number of environmental studies including: **Soil and Groundwater Investigations** - The selected environmental consultant has conducted sampling and is reviewing this data along with other recent soil/groundwater surveys. The consultant’s report will inform Port Metro Vancouver’s Project environmental assessment report and will be used to determine what, if any, mitigations will be required during Project implementation. **Biological Investigations** - The Environmental Consultant’s investigations include assessment of the one existing eagles’ nest within the Project area as well as other factors such as species-at-risk. The eagles’ nest will not be physically disturbed by the road construction, and monitoring will be in place to ensure that nesting eagles will not be adversely affected during construction. Environmental studies are expected to take five-to-six months to complete and findings will be made available to the public when complete. Port Metro Vancouver is also consulting with local First Nations and has initiated an Archaeological Impact Assessment and a Traditional Knowledge Study of the area. |

Some respondents indicated concerns about potential impacts to wildlife and also asked for additional information about environmental assessment work underway.
Improving Community Connections

<table>
<thead>
<tr>
<th>Consultation Input</th>
<th>Response and Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cycling and Pedestrian Improvements</strong></td>
<td>Port Metro Vancouver is committed to cycling and pedestrian improvements as part of the proposed Low Level Road Project. In addition to being a requirement for TransLink’s portion of the Project funding, these improvements are expected to help make cycling and walking a more attractive means of transportation along this route.</td>
</tr>
<tr>
<td>General support for safety and efficiency improvements proposed as part of the Project.</td>
<td><strong>Cycling Lanes</strong></td>
</tr>
<tr>
<td>Several respondents commented that bicycle lanes should be physically separated from vehicle traffic.</td>
<td>The concept of physically separated bicycle lanes was discussed at a number of stakeholder meetings.</td>
</tr>
<tr>
<td></td>
<td>Although physical separation was supported by a number of cycling and recreation groups, First Responders indicated that for safety and emergency response purposes, it would be better to instead keep the bicycle lanes connected to the roadway. This would allow vehicles to safely pull into the bike lane and allow emergency response personnel to pass in the event of an emergency. To protect pedestrian safety, a “roll-over” curb was proposed.</td>
</tr>
<tr>
<td></td>
<td>It is important to note that the upgraded bicycle lanes will be 2.0 metres wide as compared with the 1.5 metre wide standard elsewhere in the City and District of North Vancouver.</td>
</tr>
<tr>
<td></td>
<td>Bike lanes will be demarked with a painted white line that will meet or exceed prevailing City of North Vancouver standards.</td>
</tr>
<tr>
<td></td>
<td>See Appendix E for an artist’s rendering of the design concept, depicting the sidewalk and cycling lanes.</td>
</tr>
<tr>
<td>Accessibility</td>
<td>It was noted that the design must consider accessibility issues and should follow ACDI, DNV-TPAC and JPAC guidelines.</td>
</tr>
<tr>
<td></td>
<td>During the Detailed Design phase, the Project team will meet with the various advisory committees to ensure accessibility issues are addressed in the design.</td>
</tr>
<tr>
<td></td>
<td>Additionally, City of North Vancouver Planning and Engineering staff will contribute to developing detailed Project designs to ensure consistency with city standards.</td>
</tr>
<tr>
<td>Safety</td>
<td>General support for safety improvements, specifically with regard to cycling and pedestrian safety.</td>
</tr>
<tr>
<td></td>
<td>Please refer to information about accessibility and cycling lanes above as well as information about lighting under the “community interface” section above.</td>
</tr>
</tbody>
</table>
### Spirit Trail Implementation

#### Consultation Input

| Western End – Proposed Alignment | 
|----------------------------------|---|

More than 53% of respondents agreed with the proposed alignment; 22% disagreed, while 24% indicated they have no opinion.

Some respondents indicated a preference to maintain the existing Spirit Trail in its current location.

#### Response and Action

A technical and environmental analysis was undertaken concurrent with the consultation program and determined that maintaining the existing Spirit Trail alignment at the west end of the new road could be possible. This detailed information was not available prior to the consultation.

Working with the City of North Vancouver and in consideration of community feedback, Port Metro Vancouver developed a refined alignment that maintains the existing Spirit Trail location – see “Alternative Designs” in the “Community Interface” section above.

#### Eastern End Alignment – Design Criteria

Factors that respondents selected as most important when finalizing designs for the crossing include (in order of preference):

- Accessibility;
- Visibility and Sightlines;
- Grade/Steepness; and,
- Location of Access Points.

#### Eastern End Alignment - Design

Of the 33 respondents who provided additional comments, six noted a preference for an underpass and nine noted a preference for an overpass.

Reasons provided for favouring an underpass include cost, reduced noise/pollution and grade. The primary reason provided for favouring an overpass was the perception of improved safety on an overpass.

As a result of further consultation, discussions with City of North Vancouver staff and supplemental analysis and design refinements, an overpass is the recommended design for the Spirit Trail crossing of East 3rd Street.

Detailed Design of this overpass will be completed in conjunction with City staff and to City standards as part of future phases of design.

#### Potential Trailheads and other Enhancements

Participants commented they would like Port Metro Vancouver to consider including interpretive signs along the Trail that provide historical and cultural information about the area.

Some respondents noted that local artwork could be included in the design.

During Detailed Design consultation, concepts for Spirit Trail interpretative signage and other amenities will be presented for community feedback.

Options will be developed jointly with City staff to ensure that they appropriately reflect the culture and history of the area.
### Construction Staging

<table>
<thead>
<tr>
<th>Consultation Input</th>
<th>Response and Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Timing</strong></td>
<td></td>
</tr>
<tr>
<td>The majority of respondents indicated a preference for longer traffic delays knowing that construction could end sooner.</td>
<td>A Traffic Management Plan will be developed to minimize traffic delays and maximize predictability.</td>
</tr>
<tr>
<td>Many participants also commented that the Project should be completed as quickly as possible, noting also that everything should be done to complete the Project quickly while avoiding the peak commuting times.</td>
<td>As a result of further value-engineering analysis, it may be possible to construct a significant portion of the new Low Level Road without closing the existing road (i.e. from the existing Neptune-Cargill at-grade crossing to just west of Cargill terminal). This will help reduce the amount of time the existing Low Level Road needs to be closed for construction.</td>
</tr>
</tbody>
</table>

**Communication and Information Sharing**

| The majority of respondents selected website and email updates as the preferred source of receiving information during construction. | Port Metro Vancouver’s web site (www.portmetrovancouver.com) has been updated to provide additional information about consultation results and ongoing work. Additionally, the site has been updated so that it is easier to navigate. Consultation information and links to the PMV web site are also available on the City of North Vancouver’s web site at [www.cnv.org](http://www.cnv.org). |
| | For those who wish to receive Project updates, we encourage you to email public_affairs@portmetrovancouver.com to be added to our database. |

**Communication and Information Sharing**

<table>
<thead>
<tr>
<th>Communication Methods</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The majority of respondents indicated that they would like to receive information about the proposed Low Level Road Project through email updates, City of North Vancouver Website and community newspapers.</td>
<td>Port Metro Vancouver has developed an email database for follow up communications. Everyone who signed up as part of the small group meetings or the February 10 open house is already on this list.</td>
</tr>
<tr>
<td></td>
<td>For those who wish to receive Project updates, we encourage you to email <a href="mailto:public_affairs@portmetrovancouver.com">public_affairs@portmetrovancouver.com</a> to be added to our database.</td>
</tr>
</tbody>
</table>
## Future Consultation Program Development

### Preferred Consultation Activities

<table>
<thead>
<tr>
<th>Consultation Input</th>
<th>Response and Action</th>
</tr>
</thead>
</table>
| The majority of respondents indicated that they would like to participate in future consultation events in the format of a community open house, smaller format meetings, informal displays at local venues and online feedback tools. | Two public information meetings have been planned as follows to share updated Project information with the community:  
- May 4 – informal open house  
- May 25 – Town Hall Meeting  
City of North Vancouver Council and the Port Metro Vancouver Board will determine whether to approve the Project to proceed in June 2011.  
Subject to approval to proceed, additional consultation is planned during Detailed Design in (currently anticipated for Fall-Winter 2011).  
See Appendix F for advertisements and community notices to inform local residents and businesses of additional information sessions. |

### Other

#### Traffic Pattern Changes – Heywood Street

| Consultation participants noted the importance of maintaining access between Heywood Street and East 3rd Street. | As a result of consultation and further analysis, the Project design has been refined to provide for “right-out” and “right-in” turns at the junction of East 3rd Street and Heywood Street (i.e. westbound vehicles on East 3rd Street will be able to turn right onto Heywood; southbound vehicles on Heywood will be able to turn right (west) onto East 3rd Street). |
| Several consultation participants noted concerns regarding existing port-related noise levels, particularly resulting from train whistles and shunting. | Road-related noise is addressed in the “Road Interface Considerations” above.  
Some of these respondents noted their support for the improvements as a means of reducing train-related noise.  
The removal of three at-grade crossings will eliminate train whistling in the Project area.  
The additional tracks will accommodate longer “unit trains” which require less disassembly/assembly and therefore less noise from train switching (shunting) operations. In addition, the removal of the crossings also removes the requirement for the rail companies to split trains over the crossings. The removal of the crossings will therefore allow trains to remain attached and therefore reduce shunting noise.  
Noise from terminal operations not related to road or rail operations is not expected to change as a result of the Project. Additionally, no significant increase in port-related truck volumes is expected, since North Shore terminals are bulk terminals, served by rail, not container trucks. |
Appendix A

Refined Design Concept – Western End of Proposed Low Level Road

A technical and environmental analysis was undertaken concurrent with the consultation program and determined that maintaining the existing Spirit Trail alignment at the west end of the new road could be possible. This detailed information was not available prior to the consultation.

Working with the City of North Vancouver and in consideration of community feedback, Port Metro Vancouver developed a refined alignment that maintains the existing Spirit Trail location and also:

- Addresses proximity concerns of directly adjacent residents,
- Maintains, to the extent possible, the City’s plan for the Waterfront Escarpment section of the Spirit Trail.

Please see below for the proposed design concept for the western portion of the Low Level Road near St. Patricks Street in proximity to the Spirit Trail.

Initial Design Concept (Jan/Feb 2011)

<table>
<thead>
<tr>
<th>BENEFITS</th>
<th>CONSIDERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Views of the Port and South Shore are maintained to preserve the Spirit Trail user experience</td>
<td>• Requires CNV Property [2 vacant parcels] for placement of noise mitigation walls and Trailhead</td>
</tr>
<tr>
<td>✓ New Trailhead provides opportunity for interpretive kiosk and additional green space for the community</td>
<td>• Requires re-alignment of existing Spirit Trail, which is not consistent with Spirit Trail Implementation Plan</td>
</tr>
<tr>
<td>✓ Majority of consultation participants agreed with realigned option</td>
<td>• Residents’ desire to retain existing Spirit Trail alignment is not possible</td>
</tr>
</tbody>
</table>
Refined Design Concept (April 2011)

<table>
<thead>
<tr>
<th>BENEFITS</th>
<th>CONSIDERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Provides increased buffer between residential area and elevated road</td>
<td>• Requires CNV property, including one rental property, for Spirit Trail alignment east of St Patricks</td>
</tr>
<tr>
<td>✓ Maintains current Spirit Trail alignment</td>
<td>• User experience changes as a result of wall along south side of Spirit Trail, however use of acrylic noise wall (transparent) could mitigate this</td>
</tr>
<tr>
<td>✓ Road is, on average, further from residential properties</td>
<td>• Additional mid-block pedestrian crossing required, which could create potential safety and future capacity challenges</td>
</tr>
</tbody>
</table>

**ST. PATRICKS AVENUE**
**EXISTING ALIGNMENT MAINTAINED**

**ST. PATRICKS OVERPASS**
**EXISTING ALIGNMENT MAINTAINED**
Appendix B
Visual Assessments

In response to community input and as part of ongoing design refinements, a high level visual assessment of the proposed new Low Level Road was conducted in March/April 2011. This included developing future viewscape images with the Low Level Road in place at locations where the road or traffic may be visible from the escarpment between St. Patricks and St. Davids Streets. Following are renderings of viewscape images for the road with noise walls in place on or near the Spirit Trail at St. Patricks Avenue, the 400-block of Alder Street, St. Davids Avenue and the 500-block of East 1st Avenue.
Simulated view of the Spirit Trail at St. Davids Avenue and Alder Street

Simulated view from a private property in the 500 Block East 1st Street
Appendix C

Summary of Alternative Alignments Explored

Throughout the early stages of design for the proposed Low Level Road Improvement Project, a number of alignment options were considered and found to be technically infeasible. A summary of each option that was considered and reasons for rejection is provided below. Key factors in determining technical feasibility were:

- Construction methodology and construction staging;
- Effect on slope stability;
- Risk to private property;
- Achievement of Project objectives/requirements;
- Cost.

1. Lower Elevation

During the conceptual design development both an elevated and low level alignment were considered. A primary consideration for maintaining the existing elevation is the stability of the bluff that runs along the Low Level Road. The unstable slope of the bluff poses a number of challenges for the existing road, and maintaining the road on a lower alignment introduces additional challenges for construction.

Construction of a new Low Level Road at the existing elevation would require use of retaining walls to maintain slope stability. Two retaining wall alternatives were considered:

- Shotcrete wall with ground anchors and reinforced facing. Typically these walls are constructed in 1-to-3 metre high sections, excavating a 5-metre-wide strip, then installing anchors followed by applying a sprayed-concrete facing. Once the full height of the wall is anchored and the facing applied, another reinforced facing is cast over the top of the shotcrete walls along its full height. These structures tend to be rather large in order to provide sufficient ground stabilization. A similar wall currently under construction can be found in the Cape Horn area in Coquitlam, B.C.

  The horizontal alignment or position of the existing Low Level Road is heavily constrained, particularly in the vicinity of Richardson Terminal at the end of St. Davids Avenue. As a result, anchors for the shotcrete wall could potentially extend into or under private property, resulting in additional risk and liability concerns. Additionally, shotcrete walls tend to be expensive due to the required complex construction staging. For cost and liability reasons, this option was determined to be infeasible.

- Soldier pile and lagging wall, also known as a “king post” wall. These walls comprise of piles driven into the ground at 1-to-2 metre spacing, with the ground excavated between, followed by installation of panels (or lagging) between the piles. Soldier pile walls involve fewer construction activities; however, piling can be costly and require temporary construction staging. Depending on the final height of the wall, the piles can get very large or require additional anchors to provide adequate support.

  Due to the height of this wall in the area of St. Davids Avenue, it was found that supporting anchors also would be required, and that these anchors likely would extend into or under private property. As such, for cost and liability reasons, this option was determined to be infeasible.

2. Tunnel

Two tunnelling options were considered: one following the existing road alignment and the other following a more direct alignment.

- The direct alignment tunnel begins near Heywood Street, where Low Level Road separates from Esplanade and follows a straight alignment straight, emerging just west of St. Davids Avenue. This alignment
provides the shortest underground section, but passes under a number of private residences. To avoid impact to these residences, the tunnel would need to be at roughly the same elevation as the existing Low Level Road, with ramps down providing access to the tunnel. This would result in drainage considerations, potentially requiring a pump station. Geological conditions in this area are not ideal for tunnels and it is anticipated that specialized equipment and construction techniques would be required. Additionally, tunnelling helps but does not fully address existing slope stability, which would necessitate additional work to shore up the existing slope. The closed environment of the tunnel requires additional safety systems to be provided, such as sprinkler systems and air movement systems, to ensure the tunnel is safe for road users. These requirements make this option the least technically feasible and significantly more costly.

- The existing alignment tunnel follows the existing road, but set in the hillside directly to the north. Due to its proximity to the surface, a “cut and cover” construction technique would be required. This would involve constructing a wall on the northern side of the alignment, which would need to be either a shotcrete or king post wall, as described above. This construction does not offer any significant engineering advantages over the lower elevation option with retaining walls described earlier, but requires more structure to create the tunnel. Additionally, cut and cover requires removal and replacement of a significant amount of existing fill, which would require additional safety systems to be provided, such as sprinkler systems and air movement systems, to ensure the tunnel is safe for road users. These additional requirements combined with the increased construction costs were the basis for rejecting this option.

3. Elevated Structure

- Elevated “Half Bridge” Structure. This would comprise of support piers spaced 20-to-30 metres apart, supported on piles and columns, and carrying beams to support the road. The cost of this structure is comparable to that of the retaining walls and can be constructed more quickly. However, it does nothing to address existing slope stability, which would require a separate set of works at additional cost. Additionally, increased ongoing maintenance would be required at the City of North Vancouver’s expense. The ongoing maintenance costs, combined with the fact that City does not have expertise in this area (no such structure exists within the City limits), eliminated this option from further consideration.
Appendix D

Baseline and Predicted Future Noise Levels Along Low Level Road

BKL Consultants of North Vancouver conducted a preliminary noise assessment of the proposed Low Level Road in Spring 2011. The assessment considered current noise levels, as measured at temporary noise monitoring stations installed at key locations along the existing Low Level Road, and predicted future noise conditions in 2031. The assessment considered future projected noise levels from increased road traffic, port operations and other ambient noise.

Results from the noise analysis indicate that the proposed elevation of the Low Level Road will help to mitigate noise from port-related railway activities. The design of the proposed road will allow the removal of three at-grade rail crossings which will result in reduced noise in the community. However, the realignment and elevation of the road will result in increased road-related noise where the road is at or near the top of the escarpment. In these areas, noise walls can be used to effectively reduce traffic noise.

The following table illustrates the net noise reduction benefit of noise walls at key locations along the route on opening day (2014) and in 2031:

<table>
<thead>
<tr>
<th>Approximate Geographic Location</th>
<th>Average Total Noise Reduction Benefit (2014)</th>
<th>Average Total Noise Reduction Benefit (2031)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First row of 400 Block of Alder Street (between St. Patricks and St. Davids Avenues)</td>
<td>3 dB</td>
<td>3 dB</td>
</tr>
<tr>
<td>First row of 500 Block of East 1st Street (east of St. Davids Avenue)</td>
<td>1 dB</td>
<td>1 dB</td>
</tr>
<tr>
<td>All other residential properties</td>
<td>0 dB</td>
<td>0 dB</td>
</tr>
</tbody>
</table>

It is important to note that the noise reduction benefit considers noise from all sources, not just road noise. This means where a benefit is noted, noise levels are expected to be lower than they are today.

No noise reduction benefit from noise walls is anticipated north of East 1st Street or east of Moody Avenue in part due to the topography of the area and in part due to the distance of residential areas from the road.
Appendix E

Artist’s Rendering of Pedestrian and Cycling Facilities

The design concept for the proposed new Low Level Road includes provisions for cycling and pedestrians. The proposed bicycle lanes are 2.0 metres wide as compared with the 1.5 metre wide standard elsewhere in the City and District of North Vancouver, and the sidewalk is 2.0 metres wide.

Bike lanes will be demarked with a painted white line that will meet or exceed prevailing City of North Vancouver standards.

Appendix F

Public Notices for Additional Information Sessions in Spring 2011

IMPORTANT COMMUNITY INFORMATION
PROPOSED LOW LEVEL ROAD IMPROVEMENT PROJECT

What is the Proposed Low Level Road Improvement Project?
The proposed Low Level Road Improvement Project is designed to address long-standing community safety and traffic congestion challenges in this area of the North Shore, while also enhancing rail and port operations.

Key Project Facts
• The proposed project would realign the existing Low Level Road between Cotton Road/East 3rd Street and Esplanade/St. Andrews Avenue.
• Safety and capacity improvements include dedicated bike lanes and pedestrian sidewalks on the Low Level Road and drainage and slope stability improvements.
• Two overpasses – at Neptune/Cargill and at St. Patricks Avenue – will eliminate three at-grade rail crossings, significantly reducing train whistle noise in the community.
• The proposed new road is not a freeway. No additional through-traffic lanes are proposed. The two lane road will have three signalized intersections, which will be coordinated to ensure safe and efficient traffic flow and a pedestrian controlled crossing for the Spirit Trail.
• Overpasses and dedicated turning lanes will improve traffic safety and efficiency.
• No significant increase in port-related truck traffic is expected because North Shore Port facilities will continue to be served primarily by trains.
• Most residents who cannot see or hear the Low Level Road today will not see or hear it in the future, with the exception of the western end, where transparent noise walls are proposed to address changes in road noise, while also maintaining views.

Addressing Community Considerations Through Consultation

As the lead agency among a number of funding partners, Port Metro Vancouver conducted a community consultation process in January and February 2011. This included an open house attended by more than 200 people – including residents living in close proximity to the road. Community feedback confirmed support for the project and the benefits it will provide. However, a number of potential concerns were also raised. As a result of discussions with City of North Vancouver staff, meetings with property owners and community feedback, we are considering the following design refinements to help maximize community benefits and minimize effects on nearby properties:
• Maintaining the existing Spirit Trail alignment between St. Davids and St. Patricks Avenues which provides an enhanced buffer for nearby homes.
• Retaining access between East 3rd Street and Heywood Street.
• The elevation of the proposed road will be lower than the original concept.
• Noise walls will be included in the design from west of St. Patricks Avenue to east of St. Davids Avenue to minimize traffic noise in the area.

All feedback has been summarized in a consultation summary report which is available at www.portmetrovancouver.com or www.cnv.org.

Upcoming Public Information Meetings - Additional Meeting Date
Port Metro Vancouver is continuing to meet with and talk to interested members of the community and residents.

In addition, Port Metro Vancouver and the City of North Vancouver invite the community to attend public information meetings about the proposed Low Level Road Improvement Project. These meetings are an opportunity to learn about updated project information, ask questions and share perspectives.

COMMUNITY OPEN HOUSE – Please note that the Town Hall Meeting has been moved to May 25 at a larger venue.
Date: Wednesday, May 4, 2011
Time: 5:30pm to 8:30pm – drop in anytime
Location: Fraternal Order of Eagles, 170 West 3rd St.

TOWN HALL MEETING – Note New Date
Date: Wednesday, May 25, 2011
Time: 5:30pm to 8:30pm – Town Hall Meeting will start at 6:30pm
Location: Pinnacle at the Pier Hotel, 138 Victory Ship Way

Learn More:
Visit: www.portmetrovancouver.com or www.cnv.org
Call: 604-665-9066
Email: public_affairs@portmetrovancouver.com

If you would like to sign up to receive project updates please email us at public_affairs@portmetrovancouver.com
Port Metro Vancouver and the City of North Vancouver invite the community to attend public information meetings about the proposed Low Level Road Improvement Project. These meetings are an opportunity to learn about updated project information, ask questions and share perspectives.

COMMUNITY OPEN HOUSE – Please note that the Town Hall Meeting has been moved to May 25 at a larger venue.
Date: Wednesday, May 4, 2011
Time: 5:30pm to 8:30pm – drop in anytime
Location: Fraternal Order of Eagles Hall, 170 West 3rd Street, North Vancouver

TOWN HALL MEETING – Note New Date
Date: Wednesday, May 25, 2011
Time: 5:30pm to 8:30pm – Town Hall Meeting will start at 6:30pm
Location: Pinnacle at the Pier Hotel, 138 Victory Ship Way

The proposed project includes realigning the 2-lane road to address long-standing community safety and traffic congestion challenges in this area of the North Shore, while also enhancing rail and port operations. The proposed project will:
• Significantly reduce port and train-related noise in the community
• Improve safety and traffic congestion along the Low Level Road
• Improve slope stability through use of retaining walls
• Provide enhanced emergency response capabilities
• Have dedicated bike lanes and sidewalks
• Accelerate completion of the Spirit Trail multi-use pathway

FOR MORE INFORMATION:
Web: www.portmetrovancouver.com
Email: public_affairs@portmetrovancouver.com
Tel: 604-665-9066

If you would like to sign up to receive project updates, please email public_affairs@portmetrovancouver.com