

Harbour Road Pre-Design Study
For the
City of Port Alberni
FINAL
SEPTEMBER 2, 2004



Stantec





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September 2, 2004

Prepared by:
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Project No. 1120 60456

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1.0 Executive Summary

This Pre-Design Draft Report was prepared at the request of the City of Port Alberni in order to identify new possible roadway alignments for Harbour Road between Ship Creek Road and Redford Road. The existing roadway passes through property adjacent to the Inlet, which includes industrial areas owned by Weyerhuaser, NorskeCanada and the Port Authority, and the Harbour Quay Tourist Hub.

Present industrial operations and the loss of train service have generated an increased level of truck traffic, which results in an adverse impact on the City Centre.

This report includes several Harbour Road route options starting at Ship Creek Road and continuing through to various exit alternatives located at Athol Street, Strathern Street and Redford Road.

Objectives of the new alignments are to:

- Focus the existing traffic flow through this area.
- Minimize conflicts in the industrial areas.
- Encourage heavy trucks to bypass the City Centre.
- Create a safer route for public vehicles, cyclists, and pedestrians.

2.0 Introduction

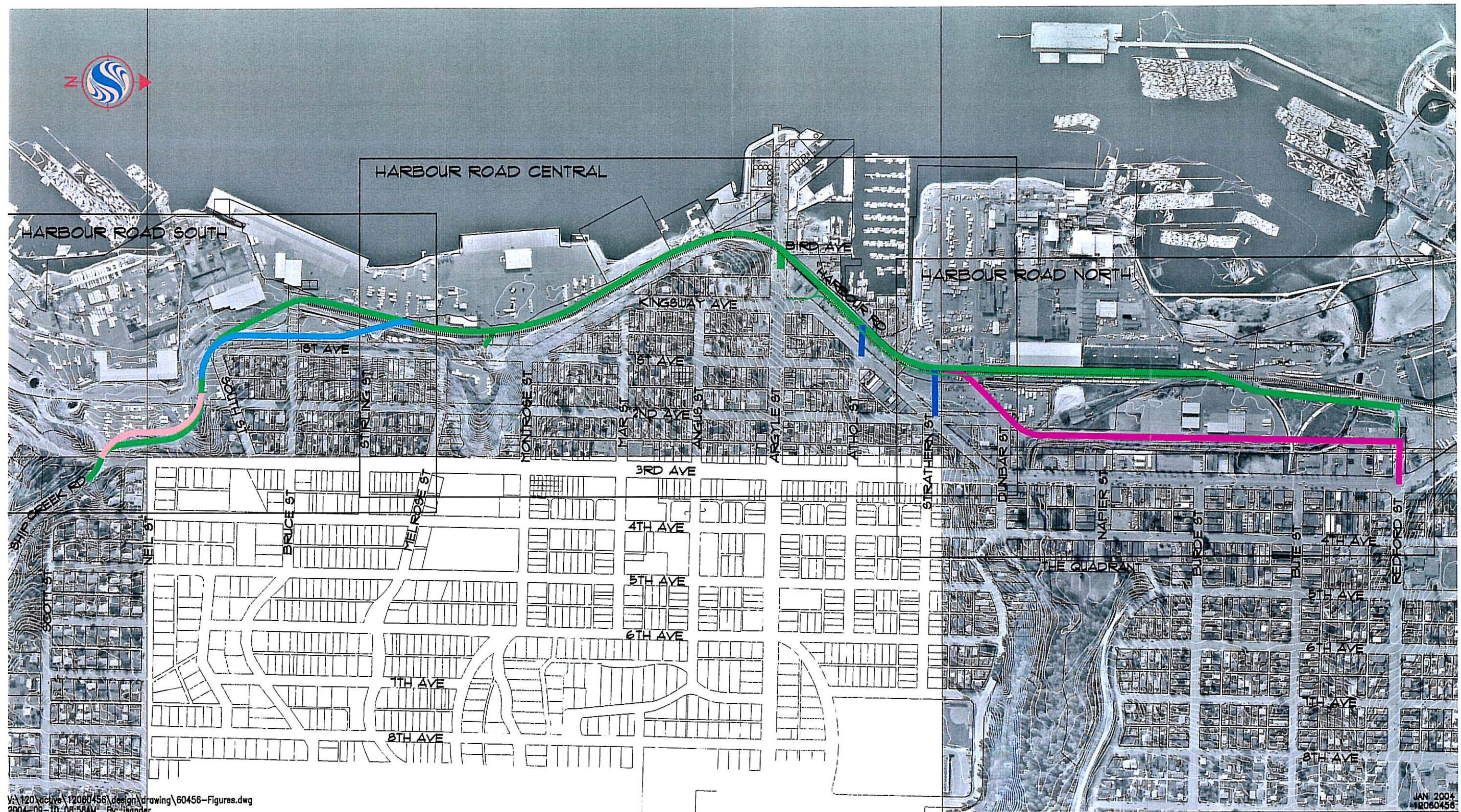
The City of Port Alberni requested a proposal from Stantec Consulting Ltd. for the preparation of a Pre-Design Study for the improvements to Harbour Road between Ship Creek Road and Redford Road through the primarily industrial lands adjacent to Alberni Inlet. In August 2003 Stantec were commissioned to prepare the study and work commenced in the September. The purpose of this study is to provide options for Harbour Road to focus traffic flow and to reduce the impact of Industrial Traffic through the downtown core. The study area is indicated on Figure 1.

The industrial mill users of Weyerhaeuser and NorskeCanada, located along the east side of Alberni Inlet and in the area of Harbour Road, generate a significant amount of truck traffic impacting various streets in the City Center. In recent years, the truck traffic has also increased due to loss of rail service to the industrial users. The present alignment traverses private land, owned by the industrial users, and is used by heavy truck traffic, over-weight and over size vehicles, and the public. The present routing is vague and passes through some industrial yards used for truck loading and general operations creating traffic hazards to the road users.

Other users in the area include the Port Authority and its associated users, and the tourism and commercial activities at the Quay. There are traffic conflicts between the public and tourist users at Argyle Street and potentially throughout the length of Harbour Road between the public and the industrial owners and users.

The City has expressed a desire to remove as much as possible of the truck traffic that presently uses the downtown routes, in particular 3rd Avenue, Anderson Avenue, 10th Avenue, and cross streets between Ship Creek Road and Athol Street.

The pre-design study is to provide optional alignments for Harbour Road considering the land ownership issues, safety, public access, pedestrian and bicycle use while bearing in mind that the primary function of the road is an industrial access for the mills. It is recognized that there are conflicting demands on the road from the general public, tourism opportunities and truck traffic.



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FIGURE 1
STUDY AREA

3.0 Information Sources

The following references and information sources were used in the preparation of this report.

- City of Port Alberni Engineering Specifications (PAES)
- City of Port Alberni Land Use Plan
- Geometric Design Guide For Canadian Roads (TAC)
- Traffic Counts
- Digital Mapping and Record Drawing Information
- Visual Site Inspection
- Stakeholder Meetings and Discussions
- City of Port Alberni Official Community Plan

3.1 GEOTECHNICAL

The original scope of the study included a desktop geotechnical review to identify potential problem areas that could impact the cost estimates. As directed by the City, this input has been delayed until the concepts are sufficiently advanced and a more meaningful analysis can be completed. The general terrain is relatively consistent although there are areas of uncertainty closer to the mills due to filling activities over the years and the use of organic materials in the fills. However, a contingency has been added to the cost estimates for the concepts to allow for any uncertainty of material. When a concept has been decided upon by the City it will be critical that a geotechnical investigation is completed to confirm design and costing. This geotechnical assessment must address specifically unsuitable sub grade conditions, retaining wall construction and high ground water table.

3.2 TRAFFIC COUNTS

Truck traffic counts were taken by the staff at Weyerhaeuser to assist in identifying the truck volumes using Harbour Road during the normal business day. The numbers shown below indicate that although significant, they are not the driving factor in the development of the concepts, as the operational geometry of large trucks is the controlling factor. The following truck volumes were estimated in stakeholder meetings held prior to the preparation of this draft report.

Weyerhaeuser	30 + This count only includes large trucks, not smaller maintenance and operations vehicles
Norske	At the moment, 90+ trucks per day are outgoing onto Redford Road. Incoming are 15 logging trucks, 30 chip trucks and 25 hog fuel trucks that use the scales and enter NorskeCanada site. All movements are during normal business hours.

More detailed traffic counts were not undertaken as part of this draft report. The original study by Hamilton Associates includes one-day traffic counts taken in 1988. The numbers are low and it is suspected that this is still the case. These numbers indicate that the design will be driven by the geometric requirements for the design vehicles, and not by traffic volumes. However, the establishment of a new by-pass to the downtown may generate additional traffic and a more up to date count would be desirable. The OCP quotes the "South Bypass Design" calling for "A bypass linking Ship Creek Road to Redford Street shall be planned and developed along the east side of the City, to accommodate traffic increases anticipated within the next 20 years".

- Traffic counts will be required to confirm the design for the proposed years of 2010 and 2025 horizon years, and in particular the traffic signal warrants and timing. The original proposal suggests that the counts will be taken by the City under the direction of the consultant. The specific locations will be identified during the formal review process of this draft report.

Traffic counts should be completed on a week day – typically Tuesday, Wednesday or Thursday during AM peak – 7 to 9; PM peak 4 to 6 and at mid day. Counts will be required on all approaches to the major intersections and in each direction NB, SB, EB, WB for every 15 minutes classifying the vehicles plus movement type e.g. through and turning movements.

Based on the traffic counts, signals will be designed using a computer model such as Synchro. Synchro has the capability of design, optimization, co-ordination and simulation. Should it be considered valid, further traffic modeling could be carried out creating numbers for traffic generation, distribution and forecasting. A traffic model such as TransCAD or EMME/2 could be used for analyses to predict traffic numbers in design horizon years more accurately. However, with the projected numbers it is unlikely that this activity will change the concept designs in the provision of additional lanes etc. This activity could become a component of a wider traffic study when the City feels it is required.

Traffic modeling will be a requirement of future planning and design if the redeveloped Harbour Road is proposed as a more formal city by-pass and an agreement can be reached with the landowners for this activity. At that time the most suitable computer model, scope and design horizon year can be determined.

One significant factor that would affect the design concepts would be the reactivation of the use of the rail lines. If this should occur, the recommendations in this draft report will require reconsideration.

3.3 MAPPING AND RECORD INFORMATION

Digital mapping and record drawing information was provided by the City of Port Alberni. Digital files included contour information, orthographic photos, cadastral

mapping and approximate utility location and configuration. This information is considered accurate for the level of pre-design required for this study. The terrain models used to produce profile drawings were based on digital contour information provided by the City.

3.4 SITE VISITS

Two site visits have been conducted. The first introduced the study to the major stakeholders and solicited their input and use requirements. During this visit the study team met with the following:

- Guy Cicon, Deputy Engineer / Director of Public Works of the City of Port Alberni,
- Joe Holmes, Unit Manager for Weyerhaeuser,
- Kathy Gomez, Director, Human Resources NorskeCanada,
- Denis White, President of the Port Alberni Port Authority.

In summary both the Port Authority and Weyerhaeuser were supportive of the concept but had specific operational needs for Harbour Road. NorskeCanada had serious reservations over the increased activity that would result from the upgrade on their lands, the impact on their operations, and in particular at the Redford Road junction. A copy of the minutes of meetings with the major stakeholders is included in Appendix A.

The second site visit was conducted to field test the various options under consideration. Observations and photographs are included throughout the text of this draft report.

4.0 Design Criteria

4.1 LAND OWNERSHIP AND LIABILITY

Figure 2 indicates approximate land ownership boundaries.

The Harbour Road alignment and options under consideration traverse lands owned by Weyerhaeuser, NorskeCanada, the Port Authority, and to a lesser extent the City of Port Alberni.

4.1.1 City of Port Alberni

The land holdings of the City are shown on the attached plan and are primarily concentrated at the Quay at the inlet end of Argyle Street. Various components of these holdings are leased to private businesses and comprise a significant and developing tourism activity area.

4.1.2 Weyerhaeuser

Weyerhaeuser is one of the two major mill owners accessing Harbour Road. The Alberni Pacific Division (APD) of Weyerhaeuser is located at the southern end of Harbour Road with their access from Ship Creek Road. Harbour Road crosses through their storage area, and relocation to the east would free up usable land and reduce conflicts.

Weyerhaeuser also owns property used for industrial operations north of Athol Street.

4.1.3 Port Alberni Port Authority

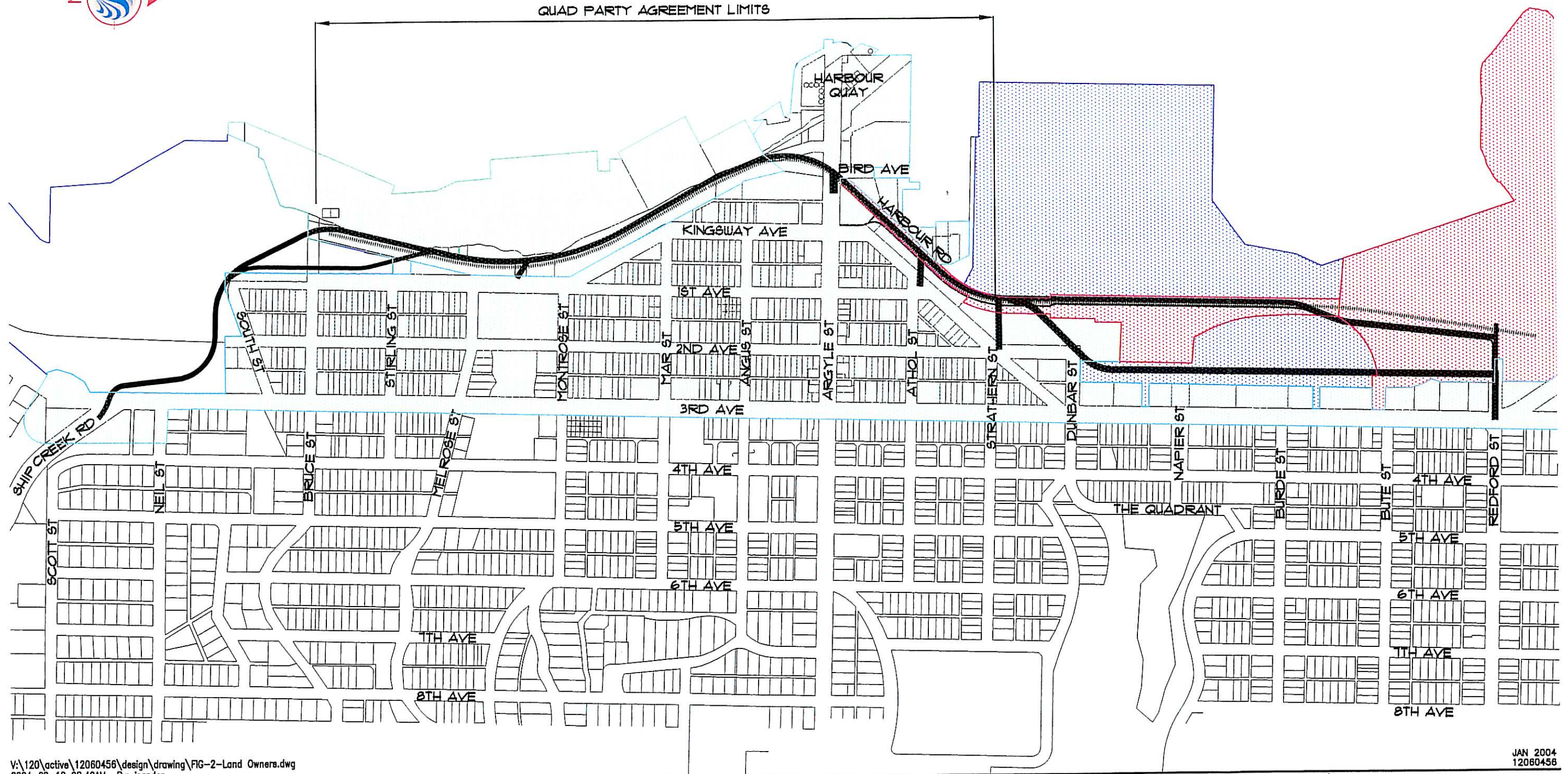
The Port Alberni Port Authority is responsible for the management of a large yard and wharf area between Stirling Street and the Quay, on both sides of Harbour Road. The primary activities are ship related and include the maintenance of a secure yard, which is presently fenced. The integrity of this fencing, the safe operation of the gate and access are major considerations in the design.

4.1.4 NorskeCanada

The NorskeCanada mill operates at the northern end of the study area. The truck weigh scale is located on the NorskeCanada property south of Redford Road as shown in Figure 8. This scale is used by both mills and is a source of major operational traffic conflict. Weyerhaeuser is proposing to relocate this onto their land. Discussion with stakeholders to determine an optimum location should be held after review of this draft report.



QUAD PARTY AGREEMENT LIMITS



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OWNERS:



PORT ALBERNI
PORT AUTHORITY

WEYERHAEUSER



CITY OF
PORT ALBERNI

NORSKECANADA

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FIGURE 2
LAND OWNERSHIP

4.1.5 Liability

Although this is not a component of the study scope, it is important to stress that the present and proposed Harbour Road crosses privately held lands, and the cooperation and agreement of the landowners will be critical to the success of the project. In order for the road to be constructed, land will be required either by acquisition for a public right of way or a crossing agreement. Critical items for the City to evaluate will be the potential for cost sharing for both construction and ongoing maintenance.

An existing agreement (Quad Party Agreement) is in place between the Port Authority, the City of Port Alberni, Norske and Weyerhaeuser that outlines liability and maintenance responsibilities for the existing Harbour Road beginning at the Bruce Street intersection extending northward to the southerly limit of the Somas Plant. We have shown the approximate agreement boundaries in Figure 2. Presently maintenance duties are shared between the owners listed above as described in the agreement. This agreement states that the commission (Port Authority) is to obtain liability insurance to indemnify and save harmless all parties from road user claims, but the premium is to be shared by all parties.

"Private Roadway - Use at Own Risk" signs are located at entrances to private roadway sections.

Land ownership boundaries shown in Figure 2 are approximate and we intend to define the boundaries in greater detail from information collected in future stakeholder meetings and presentations.

4.2 ALIGNMENT

The City of Port Alberni Engineering Specifications (PAES) and Geometric Design Guide for Canadian Roads (TAC) criteria were used for concept designs. A collector road classification with a design speed of 50 km has been used for all options.

Criteria	Value
Minimum Radius	75m
Maximum Grade	6.0%
Maximum Super Elevation	0.4 m/m

The minimum radius of 100m as established in the PAES could not be met in certain locations due to constraints in topography, natural features, land use or combinations thereof. In these situations, good engineering practice coupled with design domains established in the TAC manual were used. Deviations from Port Alberni Standards will be discussed in the relevant option segments in this study.

The PAES sets the maximum grade for a collector road at 10%. The grade of roadways has a more significant effect on trucks than on passenger cars. Some

authorities have mandated lower speeds for long down grades to help avoid runaway trucks. As the majority of traffic on the proposed route will be heavy trucks, a maximum grade of 6.0% was used. This grade may be revised in future detail design stages where the, size and type of vehicles, horizontal and vertical alignments can be reviewed in detail.

Maximum super elevation on curves was set at 0.4m/m for this study. High super-elevation combined with steep gradient is undesirable, particularly in areas of considerable truck traffic.

4.3 ROADWAY USE

At present heavy truck traffic, oversize and overweight vehicles, and the public use the existing roadway. The routing is vague and passes through various adjacent land uses that vary from industrial yards, used for truck loading and general operations, to the City Centre and tourist areas. There are traffic conflicts at Argyle Street and potentially through out the length of Harbour Road between the public and the industrial users. The roadway use will vary as a function of the adjacent properties, operations and possible projected uses. Certain sections may permit vehicular traffic only, while other sections combine industrial and public traffic with pedestrians and cyclists. The following refers to the cross sections noted on Figure 3 – Typical Sections.

4.4 CROSS SECTION ELEMENTS

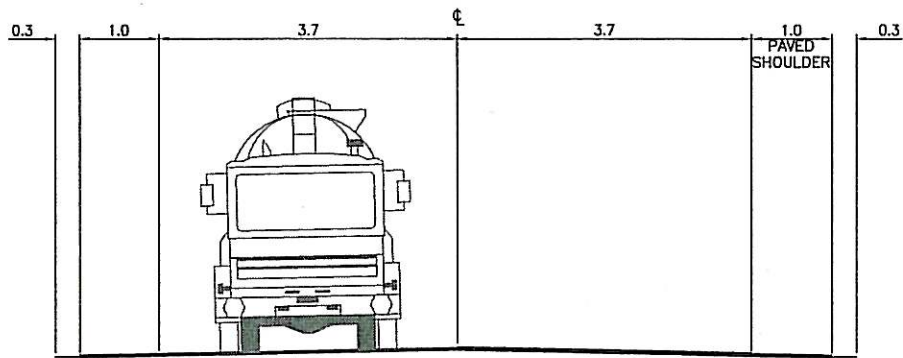
The proposed lane width remains constant through all options but conceptual treatment of shoulders, bicycle lanes and sidewalks will vary with expected use. We have selected a traveled lane width of 3.7m to be used in this study.

The TAC manual recommends a lane width of 3.3m to 3.7m for a collector road with a design speed of 50km/h and a volume of less than 450 vehicles per hour. We have opted for the high end of this range due to the considerable volume of heavy trucks. The TAC manual states that there is no further increase in safety for lane widths beyond this point widening and may be a detriment to safety. A previous Stantec letter report addressing the issue of lane width and associated design elements with specific reference to the City of Port Alberni is attached in Appendix B for reference.

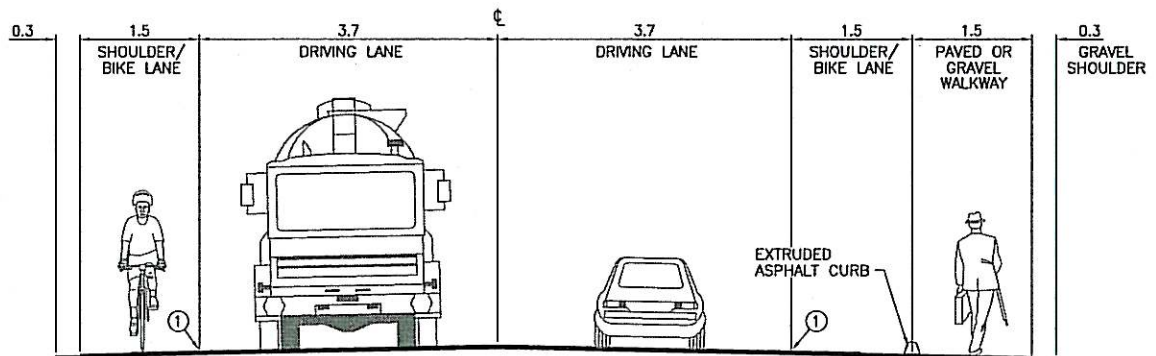
Figure 3 shows typical cross sections applied to the Harbour Road alignment concepts. The application of cross sections to Harbour Road alignment options will be discussed in the following sections.

4.4.1 Mixed Use Cross Section

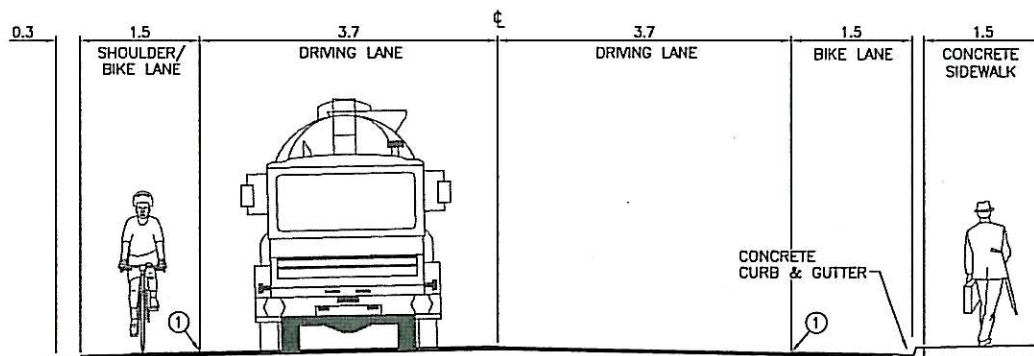
The City of Port Alberni desires that the mixed used cross section be used wherever width is available. All stakeholders have raised concerns regarding the safety of pedestrian and cyclists as the proposed road will be a designated truck route. This



VEHICULAR USE



MIXED USE
(WITH PAVED SHOULDER)



MIXED USE
(WITH CONCRETE SIDEWALK)

① WIDE (150mm) SOLID PAINTLINE
DELINEATING BIKE LANES TYP.

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FIGURE 3
Title
TYPICAL SECTIONS

cross-section addresses this concern through additional roadway width, delineated bicycle lanes, and a separated pedestrian walkway.

This cross-section can have varying themes on the treatment of sidewalks depending on how the city wishes to deal pedestrian traffic and roadway aesthetics.

4.4.2 Vehicular Use Cross Section

Where the width available for the upgraded Harbour Road is limited, we are proposing the use of a cross section that does not facilitate bicycle or pedestrian travel. As these areas are generally used for industrial practices, it may not be desirable or safe for pedestrians and cyclists to share the roadway with industrial traffic. These sections of Harbour Road include:

- Harbour Road Central - Argyle Street and North
- Harbour Road North – Option 1 - Strathern Street Railway Crossing #2

In sections where roadway width is inadequate for shared use, a conceptual alignment for a separated pathway to accommodate pedestrian and cyclist traffic has been shown.

The TAC manual recommends shoulder widths varying from 1.0m for low speed for local or rural roads to 3.0m for high-speed arterials. A 1.0m wide shoulder has been selected, as anticipated traffic volumes will be low, and pedestrian and cyclist traffic may be prohibited or discouraged in areas where this section will be applied. A paved shoulder is recommended, as this cross section will be applied in areas of increased slope and tighter centerline radius where a large truck turning radius will likely result in the vehicle crossing into the shoulder. A gravel shoulder will degrade more rapidly than a paved shoulder and could result in increased maintenance costs.

4.5 CYCLISTS

Cyclist traffic can be dealt with in three different ways depending on cyclist volume, vehicle volume and vehicle type.

- Cyclists and vehicle traffic can share a widened (non-delineated) roadway lane. Low traffic volumes warrant the use of a shared bike vehicle lane but due to the significant volume of heavy truck traffic on Harbour Road, we recommend that they be separated for improved safety.
- Cyclists can have their own lane shared with the roadway shoulder delineated through paint markings or a physical barrier (plastic tubular markers, protective bollards, rumble strips, or concrete barriers). Physical barriers are usually recommended in areas with high traffic volume and high speed. Physical delineators can introduce problems for snow clearing and other maintenance operations and are not recommended for Harbour Road.

- Cyclists can have their own bike path separated by a median or landscaped area. This option is used for areas of significant bicycle commuter traffic.

We recommend that 1.5m separated bicycle lanes delineated through pavement markings be used.

4.6 PEDESTRIANS

The cross sections on Figure 3 show variations for handling pedestrian traffic. Options include a simple widening of the cross section to include a pedestrian walkway delineated through a paint line, or extruded asphalt curb, to complete curb, gutter and sidewalk construction. Concrete sidewalk construction is expensive and requires added drainage works to collect storm water blocked from entering existing ditch lines. However, concrete sidewalks may be warranted in areas of high pedestrian traffic where improved aesthetics may be desired. The sidewalk section shown is a simple representation and may vary dramatically depending on desired landscaping features including boulevards, trees, ornamental lighting and a wide range of other features.

4.7 PEDESTRIAN AND CYCLIST CONNECTIVITY

Observed existing use patterns show a desire for access of Harbour Road between residential areas and the City Centre for recreational and work access. Connectivity of bicycle lanes, pedestrian walkways, and pedestrian crossings will have to be addressed. The use of a future formalized bicycle and or pedestrian route through the city and other recreational areas (including sections of Harbour Road) should be discussed during stakeholder meetings following examination of this draft report.

A review of pedestrian crossings should be undertaken as part of the traffic analysis to determine optimum location and crossing type. Pedestrian crossings may be delineated through simple pavement markings or can be pedestrian activated lights for sections with high pedestrian volumes.

5.0 Alignment Options

5.1 GENERAL

Several alignment options for Harbour Road were developed during this study using design parameters and information sources discussed in the previous sections. Harbour Road has been divided into three geographic regions based on roadway options and potential users.

- Harbour Road South extends from the Ship Creek Road / 3rd Avenue intersection to the projected intersection of Stirling Street and Harbour Road. Four options are discussed in this section.

Harbour Road Central extends from the projected intersection of Stirling Street and Harbour Road to Strathern Street including the intersection of Argyle Street. This concept is common to all alignments and includes options linking traffic to Kingsway Avenue.

Harbour Road North extends from Strathern Street to Redford Street and includes two options connecting traffic to Redford Street.

6.0 Harbour Road South – Figure 4

6.1 GENERAL

Harbour Road South extends between the intersection of Ship Creek Road and 3rd Avenue to slightly north of Stirling Street. See Figure 4.

This section of Harbour road lies within land owned by Weyerhaeuser and the Port Authority and includes the Ship Creek and 3rd Avenue intersection. The existing roadway follows a steep grade through the Weyerhaeuser industrial area and cuts off a significant portion of useable land on the east side of the existing road. Goals of this alignment include shifting the roadway east freeing up unused land, and the reduction of the existing steep roadway grade for ease of truck movements.

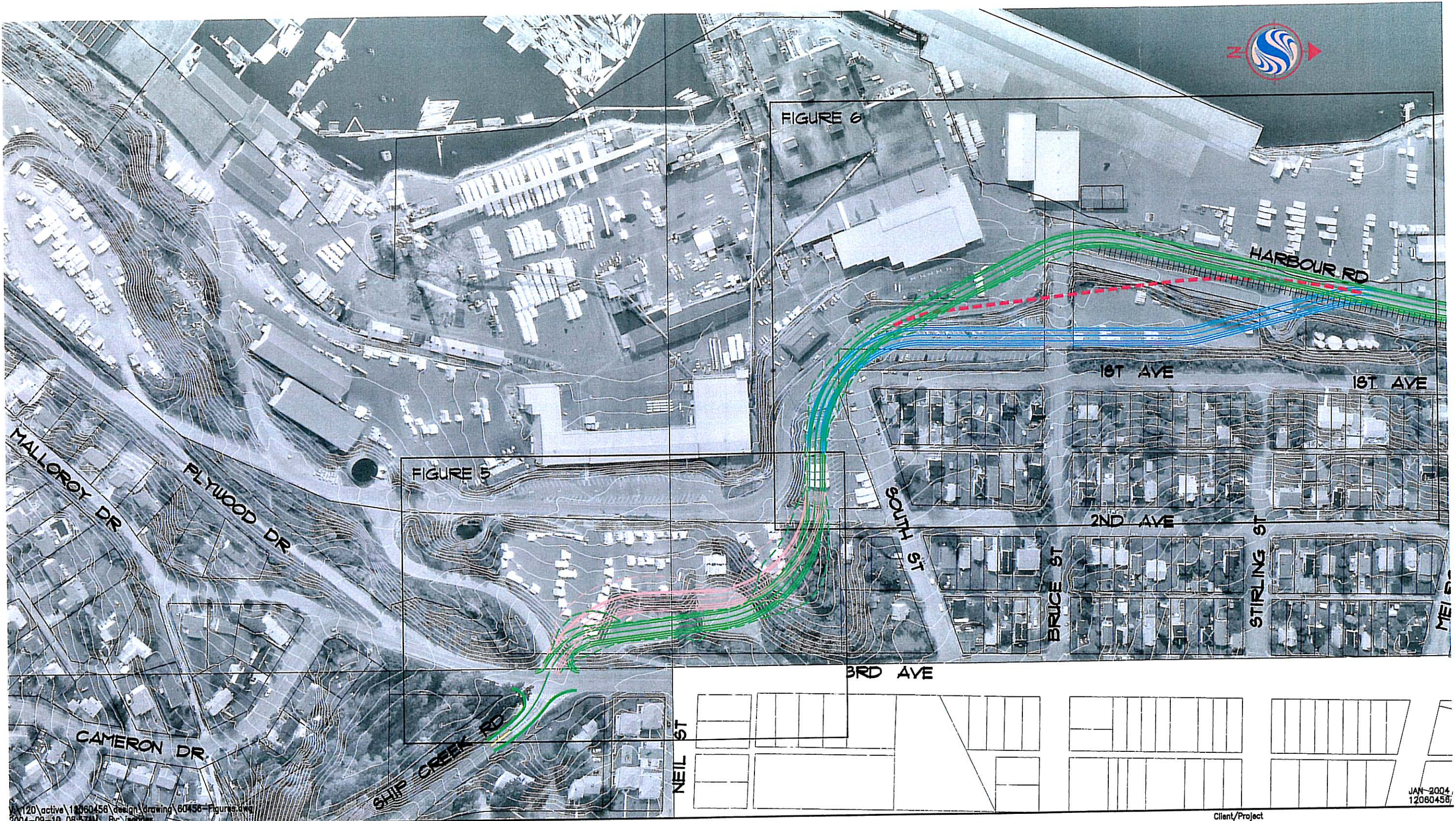
The mixed use cross section has been applied to this section of road.

6.2 SHIP CREEK ROAD TO SOUTH STREET - FIGURES 5 AND 5A

6.2.1 Ship Creek Road and 3rd Avenue Intersection

At present, the intersection angle is near perpendicular. Traffic traveling north and south is unobstructed while the east to west flow controlled by stop signs.

- **Sight Distance:** The primary factor defining the orientation and control of this intersection will be sight distance. Sight distance is limited to approximately 90m northward along 3rd Avenue to the hillcrest at the Neil Street Intersection. Calculations suggest that the stopping sight distance required will be in excess of 250m for a stop-controlled intersection.
- **Intersection control:** Due to limited sight distance northward along 3rd Avenue a signalized intersection is recommended. It will be desirable to have an actuated signal light to accommodate free passage of east and westbound large oversize and overweight vehicles to make operation of trucks climbing from Harbour Road easier.
- **Crossing Angle:** The proposed alignment is forced westward as the intersection angle approaches perpendicular. This results in increased earthwork volumes, and subsequent costs, and a corresponding reduction of useable land desired by Weyerhaeuser. A skew angle of 70 degrees was used for both options shown.



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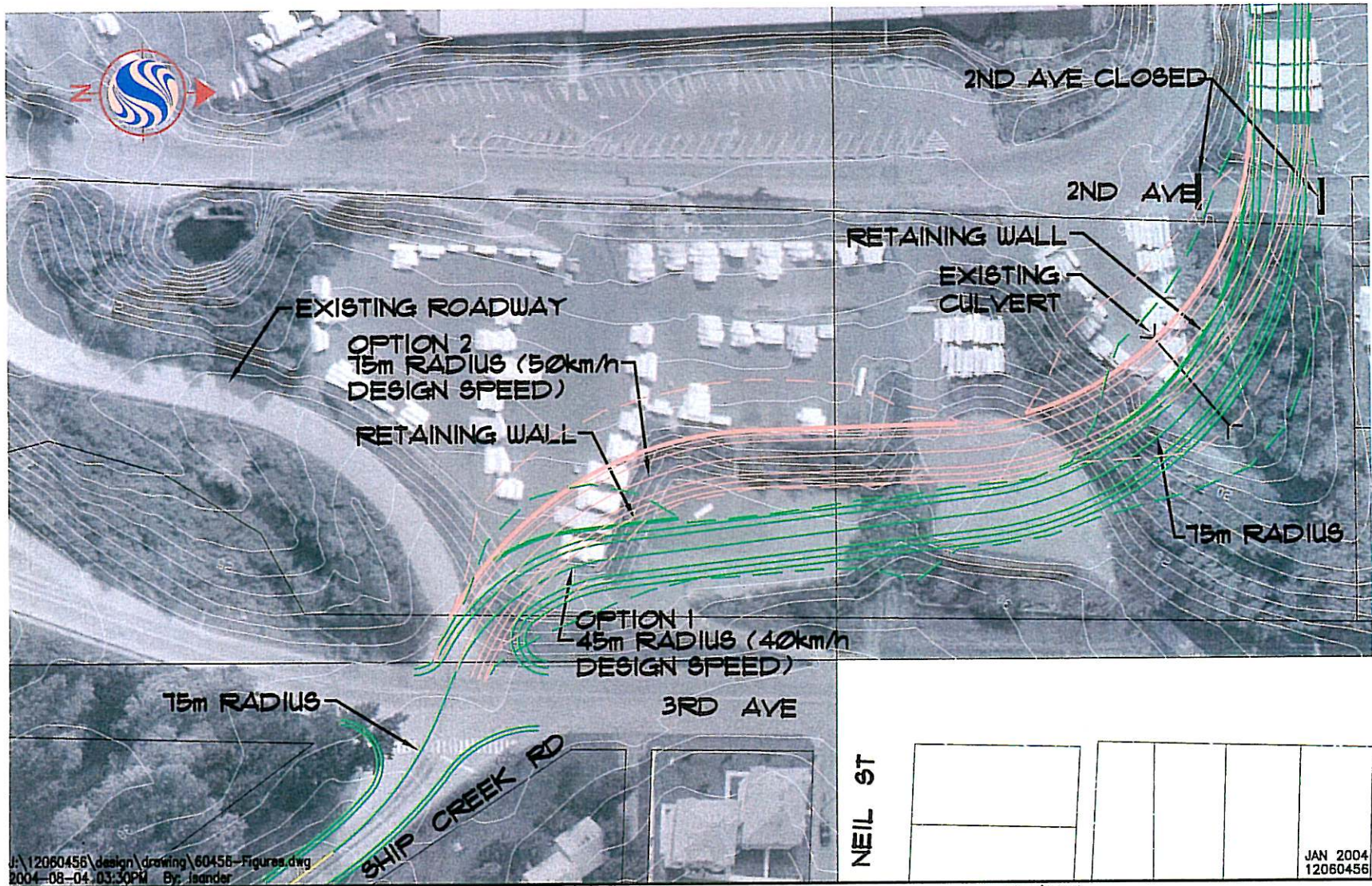
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FIGURE 4
HARBOUR ROAD SOUTH

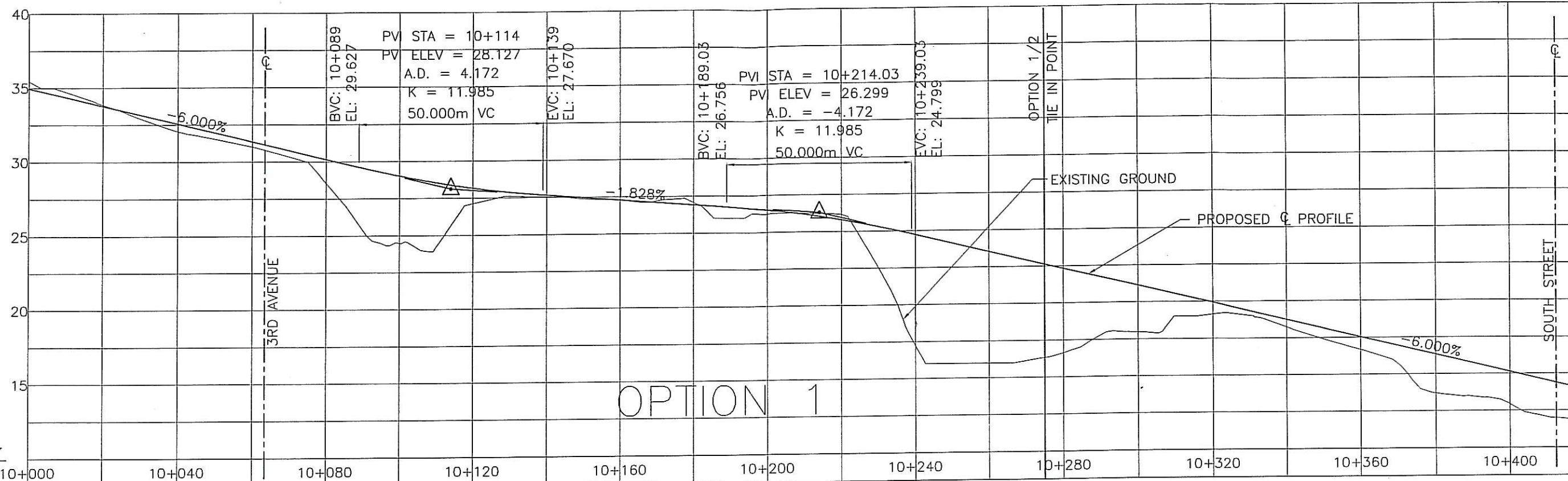


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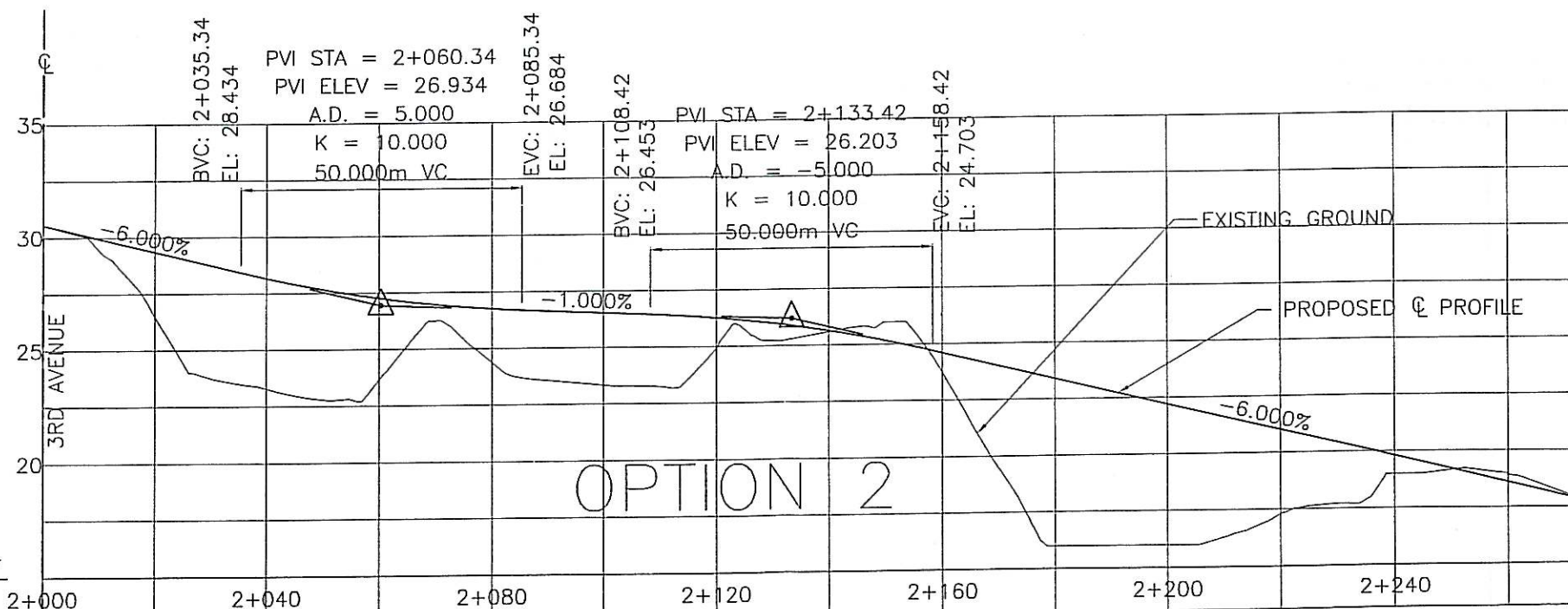
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FIGURE 5
Title
HARBOUR ROAD SOUTH
SHIP CREEK RD TO 2ND AVE

DATUM ELEV
10.000



DATUM ELEV
15.000



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FIGURE 5A
OPTION 1 & 2 PROFILES

6.2.2 Alignment Options

With a signalized intersection, it must be assumed that the vehicles will cross 3rd Avenue without slowing. Minimum radii adjacent to the intersection must be used to permit safe passage for the proposed design speed. We have generated two options for this section of Harbour Road to show the effect of proposed centerline radius on horizontal alignment and to define associated cost. We have generated profiles for both options showing the approximate existing ground elevations and conceptual vertical alignments. A 6.0% maximum grade was used for the conceptual design.

Option 1 - Optimize Land Area and Earthwork Volumes

To reduce earthwork volumes and impact to land area the proposed alignment is located on top of the existing embankment. This can be achieved by reducing the design speed to 40 km/h, and corresponding centerline radius to 45m.

Large vehicles will not be able to make a right turn onto Harbour Road from 3rd Avenue with the 45m-radius option shown. For right turn in and left turn out access, the west leg of the intersection must be extended. This can be achieved by increasing the radius of the first horizontal curve to the west, or rotating the tangent portion along the existing bank top westward. Both options will shift the proposed roadway centerline westward reducing useable land area and increasing earthwork volumes.

Option 2 – 50km/h Design Speed and Truck Access

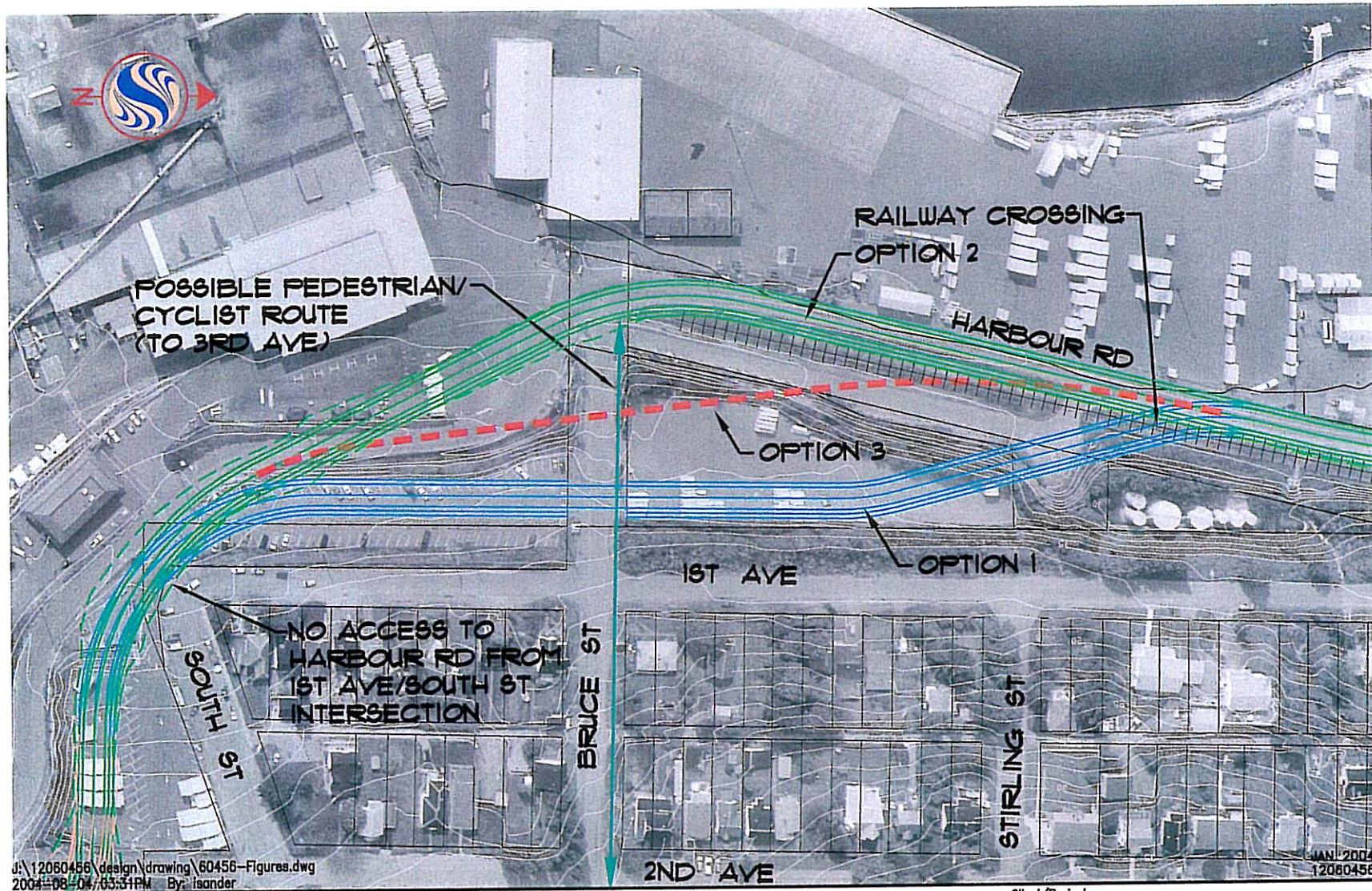
This option is the preferred route of Harbour Road South. The centerline radius has been increased to 75m and permits a continuous 50km/h design speed, and turning access for large trucks from 3rd Avenue. Option 2 does not limit intersection movements or reduce design speed; however, the impact to land area and earthwork volumes are increased.

6.2.3 2nd Avenue and Harbour Road Intersection

The steep grade of 2nd Avenue and its intersection with Harbour Road, and the proximity of the horizontal curve, creates difficult intersection geometry. We recommend that 2nd Avenue be closed as indicated on Figure 5.

6.3 SOUTH STREET TO HARBOUR ROAD CENTRAL - FIGURE 6

This section of Harbour Road traverses land owned by Weyerhaeuser and the Port Authority. The existing routing through the Weyerhaeuser industrial area is vague; land use and industrial practices obscure the alignment and roadway edges. Access is almost uncontrolled from the west side. Goals of this alignment include creation of a distinct roadway, make existing land available, and to remove and reduce conflicts. Two alignments have been generated for this section. See Figure 6.



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+++++ EXISTING RAILWAY
 --- TOE OF SLOPE

Client/Project
 CITY OF PORT ALBERNI
 HARBOUR ROAD
 PREDESIGN STUDY

FIGURE 6
 TITLE
 HARBOUR ROAD SOUTH
 2ND AVE TO HARBOUR RD
 CENTRAL BOUNDARY

The mixed use cross section has applied to this section of road.

South Street and 1st Avenue

No access to Harbour Road will be provided at the 1st Avenue and South Street intersection.

6.3.1 Option 1

The east alignment follows the existing bank top through a parking area prior to connecting to Harbour Road. Moving the proposed road eastward will locate the roadway farther away from industrial operations and may create useable land for Weyerhaeuser.

Harbour Road and Bruce Street Intersection

The TAC manual recommends a minimum intersection spacing of 60m for along local roads and 40m if adjacent intersections are three legged. The distance between intersections is inadequate for this option, and Bruce Street should be closed between 1st Avenue and Harbour Road. If Bruce Street is closed, pedestrian and cyclist access to Bruce Street still will be required. Pedestrians and cyclist facilities will need to be provided along Bruce Street to provide connectivity between Harbour Road and the City Centre.

The proposed Option 1 alignment crosses the existing railway line. At present, this section of railway is not in use, and will remain inactive for the near future. The skew angle, as shown, exceeds values set out in the TAC manual. The maximum skew allowed is 70 to 110 degrees with a minimum tangent distance of 65m. Automatic warning devices will be required if the railway becomes active in the future.

6.3.2 Option 2

Option 2 follows the existing roadway more closely than Option 1. The proposed roadway will be closer to industrial operations and may be deemed undesirable by land users. Intersection spacing is adequate for this alignment. The proposed roadway passes beyond the existing railway terminus. A railway crossing for this option is not required.

6.3.3 Option 3

An intersection at Bruce Street may be desired by public users to access the residential area or to avoid traveling through the industrial district. The impact of traffic on this area should be reviewed if an intersection is to be provided. Figure 6 shows an alternate proposed centerline alignment using a 60m offset from the 1st Avenue and Bruce Street Intersection. Due to minor traffic on Bruce Street, a stop-controlled intersection would be appropriate at this Intersection.

6.4 UTILITIES

For both alignment options, modification to existing utilities may be required as part of the new alignment. Items included for cost estimation include:

- Power Poles: Several power poles may need to be relocated as part of this option. Weyerhaeuser owns the power poles in this area.
- Culvert Construction: New culvert construction will be required at the Bruce Street Intersection.
- Street Lighting

It is assumed drainage for this section of road will be collected in roadside ditches and directed to the existing storm system. Collected run-off will require treatment prior to connection to the existing storm drainage system.

7.0 Harbour Road Central – Figure 7

7.1 GENERAL

The proposed road follows the existing road alignment through the Harbour Road Central area and traverses land owned by the Port Authority, the City of Port Alberni and NorskeCanada. It includes existing intersections at 1st Avenue and Argyle Street and two options for linking traffic to Kingsway Avenue. The Harbour Quay located at the west end of Argyle Street is a tourist area. Aesthetics and connectivity issues for pedestrians should be discussed at stakeholder meetings. This alignment is common to all options and has been designed as a mixed-use roadway, as shown on Figure 3.

7.2 HARBOUR ROAD SOUTH OF ARGYLE

Port Alberni Port Authority Site Access

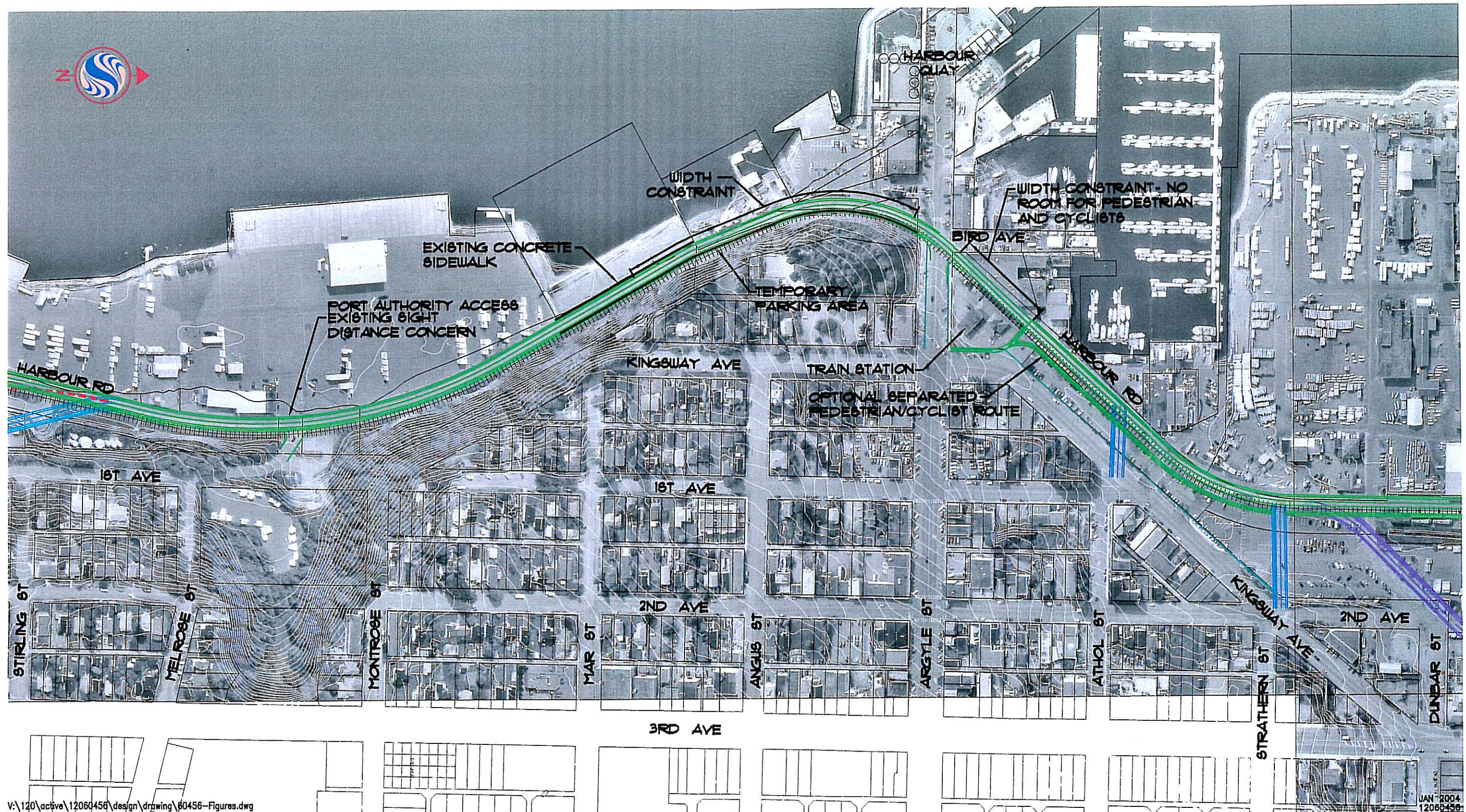
Access to the Port Authority land is located opposite the 1st Avenue intersection. It has been noted that sight distance to the north is limited due to the existing storage and fence line location. The roadway alignment has been shifted eastward to improve sight distance.

Width Constraints

Width constraints govern the options available for the proposed roadway alignment through this section. The Port Authority fence line causes some visibility problems, and power poles bound the west side of Harbour Road. Existing train tracks and a steep bank beginning north of the 1st Avenue intersection parallel the east side. It is understood that the railway through this section is inactive and will remain inactive in the near future. The Port Authority has expressed interest in temporary parking on the east side of Harbour Road between Argyle and Mar for special events.

South of 1st Avenue there is sufficient width to allow the mixed use cross section, see Figure 3, without impact to the Port Authority fence line or existing railway. The available roadway width decreases north of 1st Avenue and is insufficient to allow the mixed use cross section without impact. To accommodate the mixed use cross section the existing railway must be covered or removed, or encroachment on the Port Authority property will be required.

- **Railway Track Removal or Burial:** This option will not be viable if the railway is required in the future. The bike lane and walkway have been located on the east side of the proposed road to provide a temporary parking area as requested by the Port Authority. Adequate width to provide a separate parking area is not available. Detailed survey will be required to determine the extent of railway to be buried or removed.



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2004-09-10 08:56AM By: isander

JAN 2004
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CITY OF PORT ALBERNI
HARBOUR ROAD
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FIGURE 7

Title

HARBOUR ROAD CENTRAL

- **Port Authority Encroachment:** If the railway will be used in the future, the proposed alignment will have to be shifted westward encroaching on the Port Authority property. The shift would require removal and relocation of a significant portion of the existing fence line and power poles. Figure 7 shows the approximate extent of Port Authority property impact.

7.3 ARGYLE STREET INTERSECTION

The Argyle Street intersection should be configured to efficiently pass the heavy truck traffic. Heavy truck traffic should be limited to the North and Southbound direction while public traffic should be free to travel all movements.

This intersection is a major hub for pedestrian access to the Quay. The City and Business Community should develop formalized pedestrian and cyclist routing plan for the Argyle Street intersection and surrounding area. This plan would include designated routes to reduce pedestrian and large truck traffic conflicts, crossing locations and types, and possible esthetic features reflecting the Quay activities. This plan could also include an optional pedestrian route directing cruise ship traffic to the Harbour Quay, possibly bypassing the Argyle Street Intersection. Pedestrian traffic should not be allowed along Harbour Road north of the intersection as width constraints will not provided adequate room for safe pedestrian traffic. This is discussed in greater detail in the following section.

7.4 NORTH OF ARGYLE

- **Width Constraints**

Width constraints in this section are imposed by the existing railway paralleling Harbour Road's east side and buildings and business operations along the west. A daily passenger train currently uses this section of railway in the summer months, starting from the station and traveling north. The clear width between the existing station and opposite building is only sufficient to permit vehicle access. Pedestrians and cyclists should be discouraged from using this section of roadway and directed to Kingsway north of the train station. North of the station there is only adequate width to provide bicycle access along the west side.

- A separate bicycle and pedestrian pathway could be constructed on the east side of the existing railway to provided connectivity. The pathway would reduce conflicts, and may be a desired beautification project for the downtown core area. If a separated pathway is not preferred, or deemed impractical, pedestrians and cyclists could be directed to Kingsway Avenue. Facilities for pedestrians and cyclists through this area should be discussed between the business community and the City. The use of a formalized route or pathway could be advantageous to direct public to the Harbour Quay.

▪ **Intersections**

Two options directing traffic back to 3rd Avenue via Kingsway are proposed, an extension of Athol Street between Kingsway Avenue and Harbour Road, and the extension of Strathern Street to Harbour Road. Both options will require new intersections on Harbour Road and intersection modification on Kingsway Avenue. Both options direct traffic to 3rd Avenue and Kingsway Avenue. The following highlights key features of each intersection location.

Athol Street / Harbour Road

- T intersection design
- North and South bound traffic will be uncontrolled, eastbound traffic will be stop controlled with signage
- Railway crossing point must be automatic. Perpendicular distances do not allow for an uncontrolled crossing.

Athol Street/Kingsway Avenue

- Presently a four-way intersection with the Kingsway Avenue legs skewed at 45 degrees. There are no restrictions to traffic movements through the intersection.
- An additional leg to the west is required.
- A signal would be required for this intersection. Signal staging and configuration would be determined after traffic analysis.
- To reduce traffic conflict associated with a five-way intersection the possibility of closing Athol east of Kingsway Avenue should be reviewed. The consequences of closing Athol Street east of this intersection will be discussed with the City and business community.

Strathern Street / Harbour Road

- T intersection design
- North and South bound traffic will be uncontrolled, eastbound traffic will be stop controlled with signage
- Railway crossing point must be automatic. Perpendicular distances do not allow for an uncontrolled crossing.

Strathern Street / Kingsway Avenue

- Presently a five-way intersection with the Kingsway Avenue legs skewed at 45 degrees. Dunbar Street is one-way only permitting traffic east to west.
- An additional leg to the west is required.
- A signal would be required for this intersection. Signal staging and configuration would be determined after traffic analysis.
- Dunbar Street cannot be closed, as the Strathern Street intersection is the only exit point.
- To reduce traffic conflict associated with a six-way intersection the possibility of closing Strathern east of Kingsway Avenue should be reviewed. The consequences of closing Strathern Street east of this intersection will be discussed with the City and business community.

3rd Avenue and Kingsway Avenue

- A merge lane is provided at this intersection specifically for northbound traffic from Kingsway Avenue to access 3rd Avenue.
- Traffic north bound along 3rd Avenue will remain uncontrolled
- Provision of a stoplight may be warranted controlling southbound traffic on 3rd Avenue. Necessity can be determined after detailed traffic volumes are calculated.

7.5 UTILITIES**Utilities**

Modification to existing utilities may be required as part of the new alignment. Major Items included for cost estimation include:

- Power Poles: Several power poles may need to be relocated as part of this option.
- Culvert Construction
- Storm drain system construction including catch basins, mainline and connecting to the City System
- Street Lighting

It is assumed drainage for this section of road will be collected in roadside ditches and catch basins and directed to the existing storm system. Collected run-off will require treatment prior to connection to the existing storm drainage system.

8.0 Harbour Road North – Figure 8

8.1 GENERAL

Harbour Road North begins north of Strathern Street and provides options linking to Redford Road. Proposed alignment options traverse land owned by the City of Port Alberni, Weyerhaeuser and NorskeCanada. The two options through this section have been designed for vehicle use only, as indicated on Figure 3. The road is used predominantly by industrial users. The existing route is vague and connection to the Redford Street and 3rd Avenue intersection is difficult. Goals of these alignments are to direct traffic to the Redford Street and 3rd Avenue intersection and to by-pass the majority of the downtown area.

A day train still uses the existing railway line but the majority of the train storage yard and turnaround area are no longer in use.

The truck weigh scale is located on the NorskeCanada property south of Redford Road as shown in figure 8. This scale is used by both NorskeCanada and Weyerhaeuser mills and is a source of major operational traffic conflict. Weyerhaeuser is proposing to relocate this onto their land. Discussion with stakeholders to determine an optimum location should be held after review of this study.

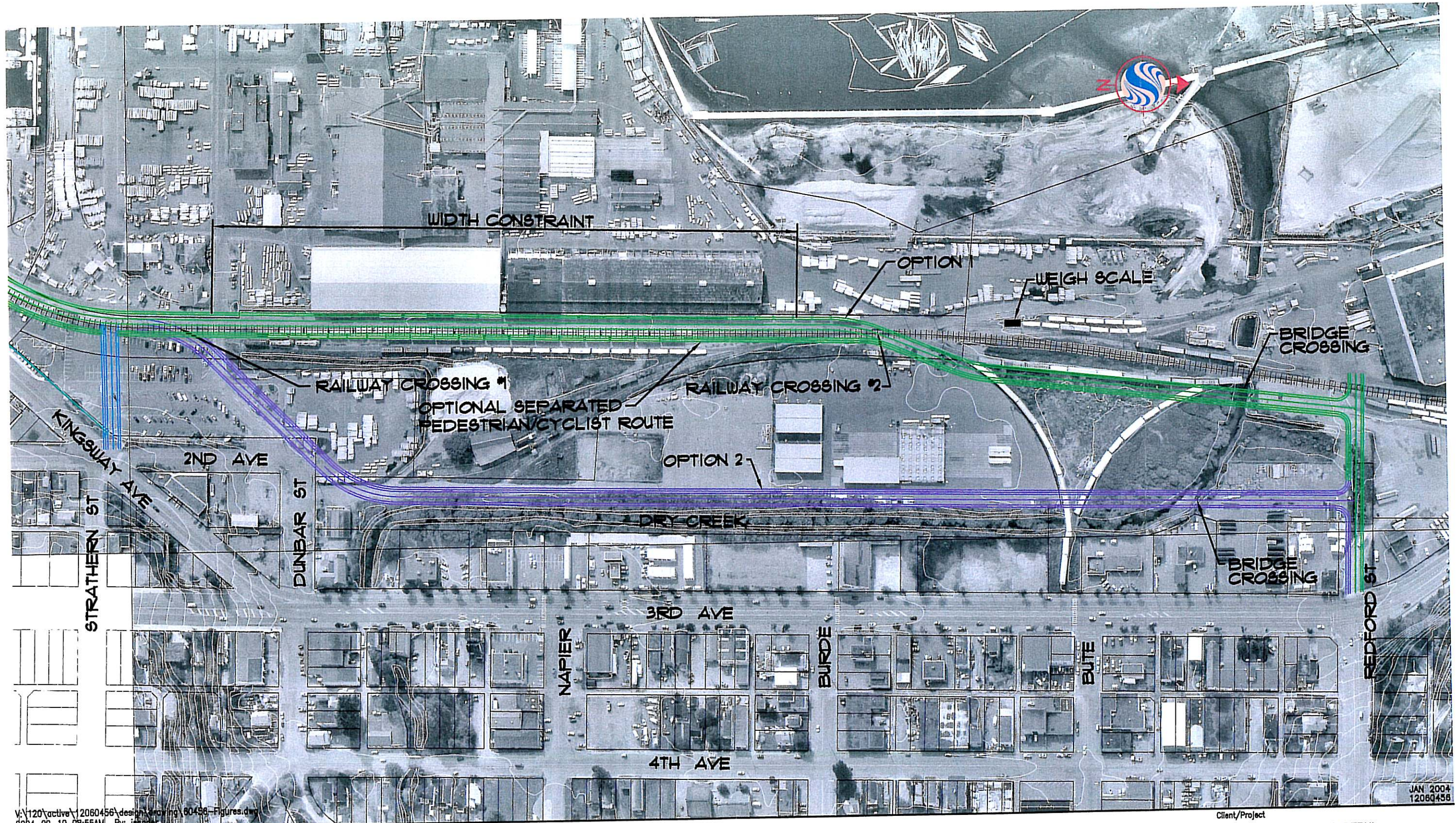
8.2 OPTION 1

This option follows the existing roadway through the NorskeCanada Right of Way and extends to the projected intersection of Redford Street.

The roadway width is constrained by existing buildings on the west and the railway paralleling the east. To facilitate the vehicular use cross section along the building frontage shown in Figure 8 will require rail removal and possibility of redirection of the day train route. If this section of road is to be open to the public, access to Harbour Road should be limited. Efficient points of entry should be determined through consultation with industrial users.

We have included a conceptual alignment for a pedestrian and cyclist separated pathway that parallels the proposed roadway on the east side of the existing railway. We have shown the separated trail to merge with Harbour Road north of Railway Crossing #2 as width for the mixed used cross section becomes available after this point. Automated signals will be required for both rail-crossing locations, as sight distance requirements cannot be met.

A T intersection has been shown for the Harbour Road Option 1 alignment and Redford Street South intersection to permit traffic flow from Weyerhaeuser west of



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2004-09-10 08:55AM By: isander

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FIGURE 8

Title

HARBOUR ROAD NORTH

Harbour Road. Intersection geometry and type can be discussed after stakeholder review of this study. Vehicle volume and type will determine intersection design.

8.3 OPTION 2

This option diverges from the existing roadway and follows Dry Creek to the projected intersection of Redford Street. A significant offset distance from Dry Creek may be required by environmental authorities and may preclude this option, as sufficient width may not be available to accommodate a roadway. An environmental assessment will be required to determine the feasibility of this option.

Train rail would not have to be removed or relocated for this option; however, an automated signal would be required at the point of crossing near Strathern Street.

A T intersection has been shown for the Harbour Road Option 2 alignment and Redford Street intersection to permit traffic flow from Weyerhaeuser west of Harbour Road. Intersection geometry and type can be discussed after stakeholder review of this study. Vehicle volume and type will determine intersection design.

8.4 DRY CREEK BRIDGE

Each Harbour Road North alignment option requires new bridge construction at Dry Creek. The bridge would have to be designed to meet loading imposed by overweight and oversize vehicles such as logging trucks and paper trains. Environmental restrictions may exclude the use of a simple culvert bridge crossing, and an assessment should be undertaken to determine crossing requirements.

8.5 REDFORD STREET AND 3RD AVENUE INTERSECTION

The Redford Street and 3rd Avenue intersection would not require significant modification with exception of westerly approach construction. Signal timing and lane configuration can be reviewed in the following stage when traffic data is collected.

8.6 UTILITIES

Modification to existing utilities may be required as part of the new alignment. Major items included for cost estimation include:

- Power Poles: Several power poles may need to be relocated as part of this option.
- Culvert Construction
- Ditch construction
- Street Lighting

It is assumed drainage for this section of road will be collected in roadside ditches and directed to the existing storm system. Collected run-off will require treatment prior to connection to the existing storm drainage system.

9.0 STORM WATER TREATMENT

Storm water collection and treatment will be required prior to discharge into the Inlet or Dry Creek. Environmental restrictions may not allow for discharge into Dry Creek, as such, the inlet may be the only viable receiving body. Options for storm water collection and discharge include a combination of best management practices and treatment facilities.

Best management practices can be designed by users to improve storm water quality prior to entering the system. Best management practices include options that may reduce or prevent the introduction of contaminants onto the proposed roadway from industrial use. Practices include regular vehicle maintenance to reduce leaks, increased street sweeping operations, and wash down areas in industrial yards.

Green stormwater management facilities include infiltration basins and infiltration trenches, bio-swales or bio-retention ponds. These facilities collect storm water, remove contaminants using specific vegetation, and can direct storm water back to the groundwater table. Green facilities can be used in areas where sufficient land is available.

Other facilities include traditional oil and grit separation and vortex separation devices such as the Downstream Defender. These devices are non-mechanical tanks that use simple gravity settling for contaminant and sediment removal. These facilities can be used in urban areas where land for green facilities is unavailable.

Choice of treatment facility can be reviewed in future stages of design. An environmental review will need to be undertaken at that time to determine the appropriate stormwater practice and the outfall location.

10.0 Conceptual Cost Estimate

The table on the following page summarizes order-of-magnitude conceptual costs for proposed Harbour Road sections. These roadway sections have been added together to provide a total conceptual cost for each alignment option using the Ship Creek Road intersection as the starting point. A breakdown for each roadway section including calculated quantities can be found in Appendix C.

Quantities used in this estimate were based on the conceptual design as provided in this draft report. Fill quantities were calculated without the advantage of a soils investigation. Calculated amounts for unsuitable subgrade replacement, rock blasting and excavation, and contaminated soil removal and disposal are not included. As the proposed roadway passes through several industrialized areas, contaminated soil is likely to be a concern. No allowance for the cost of land acquisition, rights-of-way acquisition or City administration costs was made in preparation of this estimate.

Cost estimates include 30% for Engineering and Contingency.



Stantec

Concept Estimate Summary Harbour Road Pre-Design Study

PREPARED BY: Ian G. Sander, EIT.

FILE #: 120-60456

REV #: 1

DATE: August 04, 2004

Harbour Road South	1.1	Ship Creek Intersection to South Street - Option 1 - 45m radius				\$1,329,471.00
	1.2	Ship Creek Intersection to South Street - Option 2 - 75m radius				\$1,442,922.00
	2.1	South Street to Harbour Road Central - Option 1				\$556,985.00
	2.2	South Street to Harbour Road Central - Option 2				\$451,880.00
Harbour Road Central	3.0	Harbour Road Central to Argyle				\$501,345.00
	4.2	Argyle Street to Kingsway Via Athol Street				\$861,386.50
	5.2	Athol Street to Kingsway Via Strathern Street				\$703,092.00
Harbour Road North	6.1	Strathern Street To Redford Option 1				\$2,187,055.00
	6.2	Strathern Street To Redford Option 2				\$2,090,335.00

1. Estimates based on conceptual design.
2. Costs for land and City administration not included.
3. Costs for Landscaping are allowances for soil and seed only (no plantings or irrigation).
4. Existing Sections of Harbour Road Central will only require overlay.
5. Costs include 30% engineering and contingency allowance.

Limits of Commission:

Whereas any opinions of probable cost prepared by Stantec Consulting Ltd. ("the Engineer") will be based on incomplete or preliminary information, and will also be based on factors over which the Engineer has no control, the Engineer does not guarantee the accuracy of these opinions of probable cost and shall have no liability where the probable costs are exceeded.

Checked By: _____

11.0 Recommendation Summary

The section contains summarized recommendations for each of the three sections of Harbour Road.

11.1 HARBOUR ROAD SOUTH

- Install a signalized intersection at Harbour Road and Ship Creek Road. Sight distance northward along 3rd Avenue is limited.
- Construct an Intersection with 3rd street that will not prohibit large truck movements or reduce roadway design speed.
- Do not permit access from or to 2nd Avenue. Steep grades and the proximity of horizontal curves would create a difficult and possibly un-safe intersection.
- Do not provide access to Harbour Road from the South Street and 1st Avenue intersection.
- The estimated conceptual costs for Harbour Road – South Street to Harbour Road Central options 1 and 2 are similar, as such; option recommendation will depend on potential user benefit. Option 1 can free up land for Weyerhaeuser but will not permit adequate distance from 1st Avenue to include an intersection with Bruce Street. Option 2 provides adequate intersection spacing but may conflict or disrupt Weyerhaeuser industrial operations. For both options limiting access to Harbour Road recommended. A final recommendation can be given after stakeholder review and discussion.

11.2 HARBOUR ROAD CENTRAL

- Shift the proposed alignment eastward at 1st Avenue. Increased sight distance is required for vehicles exiting the Port Authority yard.
- Provide room to permit the Mixed Use cross section between Mar Street and Argyle Street. Use of this section will require the removal of existing unused railway tracks or will impact the Port Authority property. Advantages and disadvantages to users and landowners should be reviewed following examination of this report.
- Harbour Road South has insufficient width to provide additional parking along the east side between Mar and Argyle. If the bicycle and pedestrian lanes are provided on the east side of the road this may provide room for temporary parking limited to special events.

- Use the Vehicle Use Only section starting at Argyle and extending along the frontage of the train station property. Insufficient width is available for safe pedestrian and cyclist access.
- Use a separated bike and pedestrian lane north of Argyle or provide designated routes along Kingsway Road to maintain connectivity through the City and direct pedestrians to the tourist areas. The train rail following the east side of Harbour Road is still operational and confines the road width.
- A detailed review of Athol Street and Strathern Street Intersections should be undertaken to determine which exit point would be most advantageous. Both connection points will require an automated train crossing at Harbour Road, modification and signalization at Kingsway, and modification to the Kingsway and 3rd Avenue intersection. Closing of one of the leg at each intersection location should be reviewed to reduce traffic conflicts. The Athol Street extension will be shorter than Stathern Street extension and will provide less vehicle storage prior to the intersections or the train rail crossing.

11.3 HARBOUR ROAD NORTH

- Both Harbour Road North options add considerable expense to the proposed roadway. 3rd Avenue is a viable route north of Argyle Street and construction of a paralleling road may be unwarranted unless there were significant increases in traffic volumes.
- The relocation of the weigh scale should be reviewed with Weyerhaeuser and NorskeCanda to determine optimum location.
- If Option 1 is determined to be the desirable route, removal of train rail will be required and the feasibility of re-directing the day train along one of the paralleling tracks will need to be determined.
- If Option 2 is determined to be the desired route, an environmental assessment should be undertaken to determine if roadway construction will be permitted along Dry Creek.

APPENDIX A

MINUTES OF STAKEHOLDER'S MEETING

Meeting Notes



Stantec

Norske

PORT ALBERNI – HARBOUR ROAD CONCEPT PLANNING / FILE 120-604-56

Date: 30 September, 2003
Place/Time: Norske Offices, 2pm
Attendees: Kathy Gomez, Ray Dyer, Norske, Guy Cicon, City of Port Alberni, Paul Agate, Stantec
Distribution: Guy Cicon, Andre Fillion

Item:	Action:
Reviewed the scope of the project as looking to define the harbour road as an industrial road to extend from Ship Creek Road to Redford Road in the north.	Info
Norske question why the project is being considered and are reluctant to permit any more formalized use of their lands. The particular problem is the north end and the loading and unloading of the warehouse area. Suggested that 3 rd Ave is still the best route	Info
At the moment they have 90+ trucks per day outgoing onto Redford Road. Incoming are 15 logging trucks, 30 chip trucks and 25 hog fuel trucks that use the scales and enter Norske site. All movements during daylight hours.	Info
A copy of their land holdings was provided. There is a section owned by Weyerhauser. The E&N rail track is owned by Norske north of Argyle and Weyerhauser south of Argyle.	Info

The meeting adjourned at .3 pm

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Reference: Norske

STANTEC CONSULTING LTD.

Paul Agate
Associate
pagate@stantec.com

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Meeting Notes



Stantec

Port Alberni Port Authority

PORT ALBERNI – HARBOUR ROAD CONCEPT PLANNING / FILE 120-604-56

Date: 30 September, 2003

Place/Time: Port Authority Offices

Attendees: Denis White, Port Authority, Guy Cicon, City of Port Alberni, Paul Agate, Stantec

Distribution: Attendees

Item:	Action:
Reviewed the scope of the project as looking to define the harbour road as an industrial road to extend from Ship Creek Road to Redford Road in the north.	Info
The Port Authority (PA) paved the road from Bruce St to Strathern. This was built and administered by the Port Authority and is covered for O & M by PA/Norske/Weyerhauser/City	Info
Property Ownership. Harbour Road is owned by the PA from Bruce to Strathern with the exception of the E&N rail lands which are owned by Weyerhauser, excluding the Quay which is administered by the City.	Info
The PA is purchasing the old Esso site and some lands would be available for roadworks. Site will be contaminated	Info
Pedestrian access required along waterfront specifically from the Harbour Quay to the new marina on the west side of the road (1.5m min concrete sidewalk). Discussion on bike use and separating from industrial traffic.	Info
PA requested temporary (gravel) parking at the tracks adjacent to the Quay for special events from Argyle to Mar.	Info
The tracks should be retained for the future in case industrial use returns. The land could be used but retain rails.	Info
There is a major concern over safety of public users ie pedestrian and bikes. Trucks tend to speed.	Info
Accesses to the PA lands require definition. PA yard must be able to be fenced for security.	Info
The majority of the power poles are private with Weyerhauser	Info
The meeting adjourned at 12 noon.	

Reference: Port Alberni Port Authority

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

STANTEC CONSULTING LTD.

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pagate@stantec.com

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Meeting Notes



Stantec

Weyerhaeuser

PORT ALBERNI – HARBOUR ROAD CONCEPT PLANNING / FILE 120-604-56

Date: 30 September, 2003

Place/Time: Weyerhaeuser Offices, 1pm

Attendees: Joe Holmes, Jan Carter Weyerhaeuser, Guy Cicon, City of Port Alberni, Paul Agate, Stantec

Distribution: Guy Cicon, Andre Fillion

Item:	Action:
Reviewed the scope of the project as looking to define the harbour road as an industrial road to extend from Ship Creek Road to Redford Road in the north.	Info
Weyerhaeuser wish to establish a road that is easier for the truck movements and will permit them to fence and secure their facility with limited accesses.	Info
At the moment they have 30+ trucks per day using their yard. Weyerhaeuser will be carrying out a traffic count in the next week or so. We requested that they include passenger vehicles (pick ups and smaller) and loaded and empty trucks.	Info
Weyerhaeuser trucks are 98% from and to the north. There is minimal traffic turning south. Configuration of yard entrance can be set for this movement with some facility for south bound outside of the main entrance if required.	Info
They are very concerned about encouraging pedestrian and bike use in the area of their operations for safety reasons. Proposed lane widths of 3.7m with shoulders will be acceptable. Design speed 50-60km/hr	Info
Weyerhaeuser are not aware of any subgrade problems in the area of the suggested revised route to Ship Creek Road. Care must be taken with the creeks.	Info
Requested any recent air photos of the site. Contact is Allan Ladouceur for a 2001 digital. Phone 604-661-8186	Info
3 rd Ave intersection may be signalized. This is acceptable with sensors for truck movements.	Info

Reference: Weyerhaeuser

Wyerhaeuser use of the weigh scales may be revised as they are intending to build a scale and tarping operation in their yard. Info
This would permit the trucks to access the City streets at Argyle.
The City is not in favour of increased traffic on Argyle. An option could be Harbour Road/ Argyle/Kingsway the intersection at Kingsway will require analysis for increased truck movements

The majority of the power poles on site are private. There may be relocation with a revised road route and revised grades to maintain clearances. Info

The meeting adjourned at .2pm

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

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APPENDIX B

STANTEC LETTER REPORT – STREET CROSS SECTION ISSUES

September 25, 1998
File: 1 20 88000

City of Port Alberni
4850 Argyle Street
Port Alberni, BC V9Y 1V8

Attention: Guy Cicon, P.Eng.

Dear Guy

Reference: Street Cross Section Issues

I must apologize for taking so long to respond to you regarding the referenced topic. A number of priority projects required my attention and thus I was unable to respond.

You asked that I comment on the merits and safety issues associated with wide streets. This can not be addressed in isolation from other design features; therefore, I will begin by providing an overview of geometric design as related to roadways.

Geometric design is aimed at integrating the vehicle, driver, and road with the goal of achieving a safe and efficient facility. Road geometry is a three dimensional problem, which must account for driver behavior and vehicle performance. Typically, geometric design is broken into the following major features:

- ♦ Longitudinal (e.g. vertical and horizontal alignment)
- ♦ Cross Sectional (e.g. lane widths, slopes, curb and gutter, streetscape)
- ♦ Intersections (e.g. turning radius, channelization, auxiliary lanes)
- ♦ Interchanges (a form of intersection)
- ♦ Roadside (e.g. pullouts, bus shelters)

There are other features such as transit and landscaping requirements.

Each of the basic design features is further broken into design elements. An important aspect of road design is to ensure there is an acceptable balance between the design elements incorporated into a facility. Any one design element should not be considered in isolation from the rest. Another important aspect is the design element "standard" to be considered. Both of these issues are, in part, directly related to the road classification being considered. For example, a rural freeway facility would incorporate design element "standards", which would be significantly different than for an urban local street.

City of Port Alberni
Guy Cicon
22 September 1998

One of the most important considerations when establishing road classification is to consider service function. For example, arterial roads are intended to provide a high level of mobility with land access as a low priority. On the other hand, local streets are intended to provide land access with mobility as a secondary consideration. One attribute of mobility is speed. An urban road, which incorporates access control and design element "standards" suited to high speed (e.g. 80 km/h) will provide superior mobility than a street, which allows direct access and incorporates design element "standards" suited to lower speeds. Once a service function is known and the design speed is selected, then the design objective is to balance all design elements accordingly.

If the design elements are not balanced then potentially unsafe conditions can arise. For example, the cross section may be designed for (or good for) 110 km/h and the vertical and horizontal alignment designed for 80 km/h. There has been a recent problem on the Nanaimo Parkway where the local drivers felt that the Parkway was posted at too low of a speed (i.e. 80 km/h). This is partly due to the wide cross section (upgradable to six lanes) and yet the alignments were designed at 90 km/h (some places to 80 km/h). More importantly, drivers tend to speed due to the false sense of comfort resulting from the cross section. These same phenomena can occur in an urban setting where driving lanes and shoulders (or curb lanes) are too wide and incompatible with the intended service function and design speed.

Driving lane widths are one of the most important design elements of the cross section. Drivers must be able to see the driving lane in order to navigate. Also drivers must be afforded a "shy distance" from adjacent vehicles. A greater proportion of the driving task load must be dedicated to navigation as the width of a driving lane is decreased for a given speed. For example most jurisdictions use a 3.7 m lane width on high speed, high mobility roads. Whereas 3.5 m lanes are often used on lower speed, lower mobility roads. Some jurisdictions may use 3.0 m lanes widths on retrofitting projects where severe property constraints exist. The point is that if all other design elements were equal, one would expect drivers to travel faster on wider lanes.

Mid block cross section design elements should not be confused with intersection design elements. These are different features of the road network. The driver task load increases at an intersection; therefore, it is prudent to simplify intersection geometry and provide positive guidance where possible. Normal travel paths should not be violated. Therefore, it may be acceptable to maintain wide lane widths between intersections (e.g. between the yellow line and a gravel area near the curb as may be typical in Port Alberni). However, this cross section is not desirable at intersections where traveled paths should be more accurately defined. This is the reason that "bulbs" are often used at intersections to reduce the area of intersection.

Wide mid block driving lanes will encourage drivers to travel faster. This is somewhat dependent upon perceived interference to the driver from the side of the road (e.g. parked cars, accesses, cross walks). Narrower lanes will encourage the driver to slow down. Port Alberni's practice of narrowing streets through the use of boulevards (a cross section design element) would be considered desirable along roads where their service function is oriented towards adjacent land access (e.g. local and collector roads). There are other methods available to give the driver the perception of narrow lanes, wide pavement markings delineating the lane, textured pavements, tall trees, to name a few. Narrow lanes along an arterial, expressway, or freeway would be undesirable.

City of Port Alberni
Guy Cicon
22 September 1998

Driving lanes should not exceed 4.0-m width. If driving lanes become too wide, drivers begin to experience difficulty with navigation, especially at slower speeds. For example, a driver travelling at slow speed would find it difficult to travel a straight line in the middle of an airport runway. The driver may also experience disorientation due to a lack of normal guidance devices such as a yellow line. The difficulty would decrease as the travel speed increases. These phenomena can also be experienced along an urban street where the distance between the yellow line (assuming it is marked) and the curb is excessive. Corrective measures include narrowing the street with boulevards, marking white lane lines, texturing pavement etc.

The actual volume of traffic versus the theoretical saturation volume also effects travel speed. As the flow rate increases the travel speed will begin to decrease. Therefore, lane width becomes a secondary issue for the driver. Navigation requirements become less important than avoiding the vehicle ahead.

Another important point is to assess the design vehicle type. For example, emergency fire equipment must be able to access a local residential street. It is acceptable to facilitate this by allowing encroachment into opposing travel lanes at turns or curves. This, however, would be undesirable along a major arterial due to potential blockage.

The overall safety of a road facility may be compromised in certain situations. The following are some examples:

- ◆ Driving lanes too narrow for posted speed and traffic volume – sideswipe accidents are known to occur along arterial roads where lanes are too narrow;
- ◆ Driving lanes too wide for intended service function. If wide driving lanes are used along a local residential street, travel speed may become unacceptable to residents and the potential for accidents at residential street intersections increases; and
- ◆ The cross section elements are not balanced with other design elements. Drivers may obtain a false sense of security.

As I understand it, Port Alberni does adopt a policy of narrowing certain streets to better define the traveled lanes. The most important aspect of this is that the City has the opportunity to choose appropriate cross section elements for various road classes. Many City's do not have sufficient right-of-way and are faced with large capital expenditures to increase capacity or improve the streetscape. From a planning point of view, Port Alberni has the luxury of wide rights-of-way, which affords maximum flexibility to meet future traffic demands.

It is desirable for a City to adopt a road classification strategy for their road network. The classification system must be coordinated with Regional and Provincial road networks. Ultimate design element guidelines for each design feature are then adopted for each of the road classes. This is usually done through establishment of City policy and practice. A planning strategy is also adopted for intermediate design stages. The idea would be to upgrade from intermediate stages as growth takes place in the community. Road authorities may also implement programs to upgrade streets to meet adopted standards (either intermediate or ultimate design guidelines as deemed appropriate).

City of Port Alberni
Guy Cicon
22 September 1998

There are many stakeholders who have an interest in City policy regarding road standards. Not all design elements are driven by traffic demand (traffic includes vehicles, cyclists, transit, and pedestrians). For example, boulevards may be considered for improving streetscape as well as a means of staging the cross section. Border areas behind the sidewalk may be used as a utility corridor.

In summation, one can not characterize a certain street width as safe or unsafe. A more appropriate approach is to characterize a street as meeting or not meeting design guidelines for its intended service function. Service function must include all road users. Inherently, one can draw a conclusion that streets, which do not conform to appropriate design guidelines, are likely to exhibit higher accident rates. The guidelines are established to optimize safety and efficiency for a given road class or intermediate stage.

I hope the forgoing is useful to you. The development and acceptance of Design Guidelines is always a contentious issue primarily because of competing interests between stakeholders. Also note, I have been advised that the Transportation Association of Canada (TAC) will be issuing a new design manual next year, which will incorporate the Urban Supplement manual. A good approach is to establish City supplements similar to Alberta Transportation and Utilities supplements.

Sincerely,

STANLEY CONSULTING GROUP LTD.

David Stearns, P.Eng.
Senior Transportation Engineer

cc: Ken Watson, City Engineer, Port Alberni

pa/i:\port alberni, city of\street cross section issues\cross sections.doc

APPENDIX C

CONCEPTUAL COST ESTIMATES



Stantec

Concept Estimate Summary Harbour Road Pre-Design Study

PREPARED BY: Ian G. Sander, EIT.

FILE #: 120-60456

REV #: 1

DATE: August 04, 2004

Harbour Road South	1.1	Ship Creek Intersection to South Street - Option 1 - 45m radius				\$1,329,471.00
	1.2	Ship Creek Intersection to South Street - Option 2 - 75m radius				\$1,442,922.00
	2.1	South Street to Harbour Road Central - Option 1				\$556,985.00
	2.2	South Street to Harbour Road Central - Option 2				\$451,880.00
Harbour Road Central	3.0	Harbour Road Central to Argyle				\$501,345.00
	4.2	Argyle Street to Kingsway Via Athol Street				\$861,386.50
	5.2	Athol Street to Kingsway Via Strathern Street				\$703,092.00
Harbour Road North	6.1	Strathern Street To Redford Option 1				\$2,187,055.00
	6.2	Strathern Street To Redford Option 2				\$2,090,335.00

1. Estimates based on conceptual design.
2. Costs for land and City administration not included.
3. Costs for Landscaping are allowances for soil and seed only (no plantings or irrigation).
4. Existing Sections of Harbour Road Central will only require overlay.
5. Costs include 30% engineering and contingency allowance.

Limits of Commission:

Whereas any opinions of probable cost prepared by Stantec Consulting Ltd. ("the Engineer") will be based on incomplete or preliminary information, and will also be based on factors over which the Engineer has no control, the Engineer does not guarantee the accuracy of these opinions of probable cost and shall have no liability where the probable costs are exceeded.

Checked By: _____



Stantec

FILE #: 120-60456

REV #: 1

Harbour Road Pre-Design Study

DATE : August 04, 2004

PREPARED BY: Ian G. Sander, EIT.

ITEM		UNITS	QUANTITY	UNIT COST	TOTAL COST
CODE	DESCRIPTION			(\$)	(\$)
1.1	Harbour Road South - Ship Creek Intersection to South Street - Option 1 - 45m radius				
.1	Clearing & Grubbing	ha	0.5	\$15,000.00	\$7,500.00
.2	Asphalt Removal and Disposal	m ²	100	\$4.50	\$450.00
.3	Subgrade Preparation	m ²	5,000	\$2.00	\$10,000.00
.4	Excavation and Disposal	m ³	400	\$25.00	\$10,000.00
.5	Excavation and Re-use	m ³	200	\$15.00	\$3,000.00
.6	Engineered Fill	m ³	8,600	\$35.00	\$301,000.00
.7	Base Course (300mm thickness)	m ³		\$35.00	
.8	Gravel Surfacing (100mm thickness)	m ³	340	\$38.00	\$12,920.00
.9	Asphalt (80mm thickness)	Tonne	670	\$110.00	\$73,700.00
.10	Ditching	m	660	\$25.00	\$16,500.00
.11	Topsoil and Seed	m ²	3,300	\$12.00	\$39,600.00
.12	Retaining Wall	m ²	620	\$500.00	\$310,000.00
.13	Street lighting	each	10	\$3,200.00	\$32,000.00
.14	Utility Pole Relocation	each	5	\$2,200.00	\$11,000.00
.15	Culvert Construction	allowance	1	\$ 10,000.00	\$10,000.00
.16	Intersection realignment	allowance	1	\$ 35,000.00	\$35,000.00
.17	Signal Lighting	allowance	1	\$ 150,000.00	\$150,000.00
	SUB TOTAL Ship Creek Intersection to South Street - Option 1				\$1,022,670.00
	30% Engineering and Contingency				\$306,801.00
	Total Ship Creek Intersection to South Street - Option 1				\$1,329,471.00

Checked By: _____



Stantec

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Harbour Road Pre-Design Study

DATE : August 04, 2004

PREPARED BY: Ian G. Sander, EIT.

ITEM		UNITS	QUANTITY	UNIT COST	TOTAL COST
CODE	DESCRIPTION			(\$)	(\$)
1.2	Harbour Road South - Ship Creek Intersection to South Street - Option 2 - 75m radius				
.1	Clearing & Grubbing	ha	0.5	\$15,000.00	\$7,500.00
.2	Asphalt Removal and Disposal	m ²	100	\$4.50	\$450.00
.3	Subgrade Preparation	m ²	5,000	\$2.00	\$10,000.00
.4	Excavation and Disposal	m ³	480	\$25.00	\$12,000.00
.5	Excavation and Re-use	m ³	280	\$15.00	\$4,200.00
.6	Engineered Fill	m ³	9,330	\$35.00	\$326,550.00
.7	Base Course (300mm thickness)	m ³		\$35.00	
.8	Gravel Surfacing (100mm thickness)	m ³	330	\$38.00	\$12,540.00
.9	Asphalt (80mm thickness)	Tonne	660	\$110.00	\$72,600.00
.10	Ditching	m	660	\$25.00	\$16,500.00
.11	Topsoil and Seed	m ²	3,300	\$12.00	\$39,600.00
.12	Retaining Wall	m ²	740	\$500.00	\$370,000.00
.13	Street lighting	each	10	\$3,200.00	\$32,000.00
.14	Utility Pole Relocation	each	5	\$2,200.00	\$11,000.00
.15	Culvert Construction	allowance	1	\$ 10,000.00	\$10,000.00
.16	Intersection realignment	allowance	1	\$ 35,000.00	\$35,000.00
.17	Signal Lighting	allowance	1	\$ 150,000.00	\$150,000.00
	SUB TOTAL Ship Creek Intersection to South Street - Option 2				\$1,109,940.00
	30% Engineering and Contingency				\$332,982.00
	Total Ship Creek Intersection to South Street- Option 2				\$1,442,922.00

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Harbour Road Pre-Design Study

DATE : August 04, 2004

PREPARED BY: Ian G. Sander, EIT.

ITEM		UNITS	QUANTITY	UNIT COST	TOTAL COST
CODE	DESCRIPTION			(\$)	(\$)
2.1	Harbour Road South - South Street to Harbour Road Central - Option 1				
.1	Clearing & Grubbing	ha	0.15	\$15,000.00	\$2,250.00
.2	Asphalt Removal and Disposal	m ²	3,600	\$4.50	\$16,200.00
.3	Subgrade Preparation	m ²	6,000	\$2.00	\$12,000.00
.4	Excavation and Disposal	m ³		\$25.00	
.5	Excavation and Re-use	m ³	2,000	\$15.00	\$30,000.00
.6	Engineered Fill	m ³	2,500	\$35.00	\$87,500.00
.7	Base Course (300mm thickness)	m ³		\$35.00	
.8	Gravel Surfacing (100mm thickness)	m ³	700	\$35.00	\$24,500.00
.9	Asphalt (80mm thickness)	Tonne	1,450	\$110.00	\$159,500.00
.10	Ditching	m	900	\$15.00	\$13,500.00
.11	Topsoil and Seed	m ²	700	\$12.00	\$8,400.00
.12	Retaining Wall	m ²	50	\$500.00	\$25,000.00
.13	Street lighting	each	7	\$3,200.00	\$22,400.00
.14	Utility Pole Relocation	each	4	\$2,000.00	\$8,000.00
.15	Culvert Construction	allowance	1	\$2,000.00	\$2,000.00
.16	Intersection realignment	allowance	1	\$15,000.00	\$15,000.00
.17	Automated Train Crossing	allowance		\$75,000.00	
.19	Extruded Asphalt Curb	m	220	\$10.00	\$2,200.00
	SUB TOTAL Harbour Road South Option 1				\$428,450.00
	30% Engineering and Contingency				\$128,535.00
	Total Harbour Road South Option 1				\$556,985.00

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Harbour Road Pre-Design Study

DATE : August 04, 2004

PREPARED BY: Ian G. Sander, EIT.

ITEM		UNITS	QUANTITY	UNIT COST	TOTAL COST
CODE	DESCRIPTION			(\$)	(\$)
2.2	Harbour Road South - South Street to Harbour Road Central - Option 2				
.1	Clearing & Grubbing	ha	0.1	\$15,000.00	\$1,500.00
.2	Asphalt Removal and Disposal	m ²	3,000	\$4.50	\$13,500.00
.3	Subgrade Preparation	m ²	1,200	\$2.00	\$2,400.00
.4	Excavation and Disposal	m ³	500	\$25.00	\$12,500.00
.5	Excavation and Re-use	m ³	400	\$15.00	\$6,000.00
.6	Engineered Fill	m ³	2,400	\$35.00	\$84,000.00
.7	Base Course (300mm thickness)	m ³	350	\$35.00	\$12,250.00
.8	Gravel Surfacing (100mm thickness)	m ³	500	\$38.00	\$19,000.00
.9	Asphalt (80mm thickness)	Tonne	900	\$110.00	\$99,000.00
.10	Ditching	m	1,000	\$15.00	\$15,000.00
.11	Topsoil and Seed	m ²	250	\$12.00	\$3,000.00
.12	Retaining Wall	m ²		\$500.00	
.13	Street lighting	each	8	\$3,200.00	\$25,600.00
.14	Utility Pole Relocation	each	4	\$2,000.00	\$8,000.00
.15	Culvert Construction	allowance	1	\$2,000.00	\$2,000.00
.16	Intersection realignment	allowance	1	\$25,000.00	\$25,000.00
.17	Automated Train Crossing	allowance		\$75,000.00	
.19	Asphalt Overlay (40mm Thickness)	Tonnes	165	\$110.00	\$18,150.00
.20	Extruded Asphalt Curb	m	220	\$10.00	\$2,200.00
	SUB TOTAL Harbour Road South Option 2				\$347,600.00
	30% Engineering and Contingency				\$104,280.00
	Total Harbour Road South Option 2				\$451,880.00

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Harbour Road Pre-Design Study

DATE : August 04, 2004

PREPARED BY: Ian G. Sander, EIT.

ITEM		UNITS	QUANTITY	UNIT COST	TOTAL COST
CODE	DESCRIPTION			(\$)	(\$)
3.0	Harbour Road Central to Argyle				
.1	Clearing & Grubbing	ha	0.15	\$15,000.00	\$2,250.00
.2	Trail Rail Removal	m	250.00	\$40.00	\$10,000.00
.3	Asphalt Removal and Disposal	m ²	700	\$4.50	\$3,150.00
.4	Subgrade Preparation	m ²	4,000	\$2.00	\$8,000.00
.5	Excavation and Disposal	m ³	2,000	\$25.00	\$50,000.00
.6	Excavation and Re-use	m ³			
.7	Engineered Fill	m ³			
.8	Base Course (300mm thickness)	m ³	1,100	\$35.00	\$38,500.00
.9	Gravel Surfacing (100mm thickness)	m ³	400	\$38.00	\$15,200.00
1.0	Asphalt (80mm thickness)	Tonne	675	\$110.00	\$74,250.00
1.1	Ditching	m	1,400	\$15.00	\$21,000.00
1.2	Topsoil and Seed	m ²	700	\$12.00	\$8,400.00
1.3	Retaining Wall	m ²		\$500.00	
1.4	Street lighting	each	20	\$3,200.00	\$64,000.00
1.5	Utility Pole Relocation	each	5	\$2,000.00	\$10,000.00
1.6	Culvert Construction	allowance	1	\$4,000.00	\$4,000.00
1.7	Intersection realignment	allowance	1	\$10,000.00	\$10,000.00
1.8	Automated Train Crossing	allowance			
1.9	Asphalt Overlay (40mm Thickness)	Tonne	540	\$110.00	\$59,400.00
2.0	Extruded Asphalt Curb	m	750	\$10.00	\$7,500.00
	SUB TOTAL Harbour Road South Boundary to Argyle Street				\$385,650.00
	30% Engineering and Contingency				\$115,695.00
	Total Harbour Road South Boundary to Argyle Street				\$501,345.00

Checked By: _____



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Harbour Road Pre-Design Study

DATE : August 04, 2004

PREPARED BY: Ian G. Sander, EIT.

ITEM		UNITS	QUANTITY	UNIT COST	TOTAL COST
CODE	DESCRIPTION			(\$)	(\$)
4.1	Harbour Road Central - Argyle St to Athol St				
.1	Clearing & Grubbing	m ²			
.2	Asphalt Removal and Disposal	m ²	1,000	\$4.50	\$4,500.00
.3	Subgrade Preparation	m ²	1,500	\$2.00	\$3,000.00
.4	Excavation and Disposal	m ³	700	\$25.00	\$17,500.00
.5	Excavation and Re-use	m ³		\$15.00	
.6	Engineered Fill	m ³		\$35.00	
.7	Base Course (300mm thickness)	m ³	450	\$35.00	\$15,750.00
.8	Gravel Surfacing (100mm thickness)	m ³	160	\$38.00	\$6,080.00
.9	Asphalt (80mm thickness)	Tonne	250	\$110.00	\$27,500.00
.9	Concrete Curb and Gutter (Both Sides)	m	380	\$35.00	\$13,300.00
1.0	Separated Bike Path	m	220	\$100.00	\$22,000.00
1.1	Asphalt Overlay (40mm Thickness)	Tonne	210	\$110.00	\$23,100.00
1.2	Ditching	m		\$15.00	
1.3	Topsoil and Seed	m ²	80	\$12.00	\$960.00
1.4	Retaining Wall	m ²		\$500.00	
1.5	Street lighting	each	7	\$3,200.00	\$22,400.00
1.6	Utility Pole Relocation	each	3	\$2,000.00	\$6,000.00
1.7	Culvert Construction	allowance	1	\$4,000.00	\$4,000.00
1.8	Storm Sewer	m	210	\$150.00	\$31,500.00
1.9	Catch basins	each	10	\$600.00	\$6,000.00
2.0	Connection to Existing System	allowance	1	\$15,000.00	\$15,000.00
2.1	Argyle Intersection realignment	allowance	1	\$35,000.00	\$35,000.00
2.2	Argyle Street Signal Lighting Modification	allowance	1	\$50,000.00	\$50,000.00
	SUB TOTAL Argyle St to Athol St				\$303,590.00
	30% Engineering and Contingency				\$91,077.00
	Total Argyle St to Athol St				\$394,667.00

Checked By: _____



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Harbour Road Pre-Design Study

DATE: August 04, 2004

PREPARED BY: Ian G. Sander, EIT.

ITEM		UNITS	QUANTITY	UNIT COST	TOTAL COST
CODE	DESCRIPTION			(\$)	(\$)
4.2	Harbour Road Central - Athol St to Kingsway				
.1	Asphalt Removal and Disposal	m ²	450	\$4.50	\$2,025.00
.2	Subgrade Preparation	m ²	500	\$2.00	\$1,000.00
.3	Excavation and Disposal	m ³	200	\$25.00	\$5,000.00
.4	Base Course (300mm thickness)	m ³	150	\$35.00	\$5,250.00
.5	Gravel Surfacing (100mm thickness)	m ³	50	\$38.00	\$1,900.00
.6	Asphalt (80mm thickness)	Tonne	100	\$110.00	\$11,000.00
.7	Concrete Curb and Gutter (Both Sides)	m	120	\$35.00	\$4,200.00
.8	Topsoil and Seed	m ²	20	\$12.00	\$240.00
.9	Street lighting	each	1	\$3,200.00	\$3,200.00
1.0	Storm Sewer	m	60	\$150.00	\$9,000.00
1.1	Catch basin	each	2	\$600.00	\$1,200.00
1.2	Athol Street Intersection	allowance	1	\$10,000.00	\$10,000.00
1.3	Automated Train Crossing	allowance	1	\$75,000.00	\$75,000.00
1.4	Athol and Kingsway Intersection	allowance	1	\$30,000.00	\$30,000.00
1.5	Athol and Kingsway Signal Lighting	allowance	1	\$150,000.00	\$150,000.00
1.6	Kingsway and Third Avenue modification	allowance	1	\$50,000.00	\$50,000.00
	SUB TOTAL Athol St to Kingsway				\$359,015.00
	30% Engineering and Contingency				\$107,704.50
	Total Athol St to Kingsway				\$466,719.50
	Total Argyle St to Kingsway				\$861,386.50

Checked By: _____



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Harbour Road Pre-Design Study

DATE: August 04, 2004

PREPARED BY: Ian G. Sander, EIT.

ITEM		UNITS	QUANTITY	UNIT COST	TOTAL COST
CODE	DESCRIPTION			(\$)	(\$)
5.1	Harbour Road Central - Athol St to Strathern St				
.1	Clearing & Grubbing	m ²	0.15	\$15,000.00	\$2,250.00
.2	Asphalt Removal and Disposal	m ²	400	\$4.50	\$1,800.00
.3	Subgrade Preparation	m ²	600	\$2.00	\$1,200.00
.4	Excavation and Disposal	m ³	280	\$25.00	\$7,000.00
.5	Excavation and Re-use	m ³		\$15.00	
.6	Engineered Fill	m ³		\$35.00	
.7	Base Course (300mm thickness)	m ³	170	\$35.00	\$5,950.00
.8	Gravel Surfacing (100mm thickness)	m ³	60	\$38.00	\$2,280.00
.9	Asphalt (80mm thickness)	Tonnes	75	\$110.00	\$8,250.00
1.8	Asphalt Overlay (40mm Thickness)	Tonnes	83	\$110.00	\$9,130.00
1.0	Storm Sewer	m	225	\$150.00	\$33,750.00
1.1	Catch Basins	each	6	\$600.00	\$3,600.00
1.2	Connection To System	allowance	1	\$10,000.00	\$10,000.00
1.3	Topsoil and Seed	m ²	75	\$12.00	\$900.00
1.4	Retaining Wall	m ²		\$450.00	
1.5	Street lighting	each	7	\$3,200.00	\$22,400.00
1.6	Utility Pole Relocation	each	3	\$2,000.00	\$6,000.00
1.7	Culvert Construction	allowance	1	\$5,000.00	\$5,000.00
1.8	Concrete Curb and Gutter (Both Sides)	m	450	\$35.00	\$15,750.00
1.8	Separated Bike Path	m	150	\$100.00	\$15,000.00
	SUB TOTAL Athol St to Strathern St				\$150,260.00
	30% Engineering and Contingency				\$45,078.00
	Total Athol St to Strathern St				\$195,338.00

Checked By: _____



Stantec

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Harbour Road Pre-Design Study

DATE : August 04, 2004

PREPARED BY: Ian G. Sander, EIT.

ITEM		UNITS	QUANTITY	UNIT COST	TOTAL COST
CODE	DESCRIPTION			(\$)	(\$)
5.2	Strathern St to Kingsway				
.1	Asphalt Removal and Disposal	m ²	1,100	\$4.50	\$4,950.00
.2	Subgrade Preparation	m ²	1,100	\$2.00	\$2,200.00
.3	Excavation and Disposal	m ³	470	\$25.00	\$11,750.00
.4	Base Course (300mm thickness)	m ³	330	\$35.00	\$11,550.00
.5	Gravel Surfacing (100mm thickness)	m ³	110	\$38.00	\$4,180.00
.6	Asphalt (80mm thickness)	Tonne	225	\$110.00	\$24,750.00
.7	Concrete Curb and Gutter (Both Sides)	m	150	\$35.00	\$5,250.00
.8	Topsoil and Seed	m ²	25	\$12.00	\$300.00
.9	Street lighting	each	1	\$3,200.00	\$3,200.00
1.0	Storm Sewer	m	75	\$150.00	\$11,250.00
1.1	Catch basins	each	2	\$600.00	\$1,200.00
1.2	Strathern Intersection realignment	allowance	1	\$10,000.00	\$10,000.00
1.3	Automated Train Crossing	allowance	1	\$75,000.00	\$75,000.00
1.4	Kingsway Intersection Realignment	allowance	1	\$25,000.00	\$25,000.00
1.5	Kingsway Intersection Signal	allowance	1	\$150,000.00	\$150,000.00
1.6	Kingsway and Third Avenue Modification	allowance	1	\$50,000.00	\$50,000.00
	SUB TOTAL Strathern St to Kingsway				\$390,580.00
	30% Engineering and Contingency				\$117,174.00
	Total Strathern St to Kingsway				\$507,754.00
	Total Athol St to Kingsway				\$703,092.00

Checked By: _____



Stantec

FILE #: 120-60456

REV #: 1

Harbour Road Pre-Design Study

DATE : August 04, 2004

PREPARED BY: Ian G. Sander, EIT.

ITEM		UNITS	QUANTITY	UNIT COST	TOTAL COST
CODE	DESCRIPTION			(\$)	(\$)
6.1	Harbour Road North - Strathern St to Redford Opt 1				
.1	Clearing & Grubbing	ha	0.40	\$15,000.00	\$6,000.00
.2	Asphalt Removal and Disposal	m ²	6700	\$4.50	\$30,150.00
.3	Subgrade Preparation	m ²	10,200	\$2.00	\$20,400.00
.4	Excavation and Disposal	m ³	3,500	\$25.00	\$87,500.00
.5	Excavation and Re-use	m ³		\$15.00	
.6	Engineered Fill	m ³		\$35.00	
.7	Base Course (300mm thickness)	m ³	3,300	\$35.00	\$115,500.00
.8	Gravel Surfacing (100mm thickness)	m ³	1,200	\$38.00	\$45,600.00
.9	Asphalt (80mm thickness)	Tonne	2,000	\$110.00	\$220,000.00
1.0	Separated Bike Path	m	500	\$100.00	\$50,000.00
1.0	Ditching	m	2,000	\$15.00	\$30,000.00
1.1	Topsoil and Seed	m ²	2,000	\$12.00	\$24,000.00
1.2	Retaining Wall	m ²		\$500.00	
1.3	Street lighting	each	26	\$3,200.00	\$83,200.00
1.4	Utility Pole Relocation	each	5	\$2,000.00	\$10,000.00
1.5	Culvert Construction	allowance	1	\$5,000.00	\$5,000.00
1.6	Train Rail Removal	m	500	\$40.00	\$20,000.00
1.6	Redford Intersection West	allowance	1	\$10,000.00	\$10,000.00
1.7	Automated Train Crossing	allowance	1	\$75,000.00	\$75,000.00
1.8	Dry Creek Bridge	m ²	400	\$2,000.00	\$800,000.00
1.9	Redford Street East Intersection	m ²	1	\$50,000.00	\$50,000.00
	SUB TOTAL Strathern St to Redford Option 1				\$1,682,350.00
	30% Engineering and Contingency				\$504,705.00
	Total Strathern St to Redford Option 1				\$2,187,055.00

Checked By: _____



Stantec

FILE #: 120-60456

REV #: 1

Harbour Road Pre-Design Study

DATE : August 04, 2004

PREPARED BY: Ian G. Sander, EIT.

ITEM		UNITS	QUANTITY	UNIT COST	TOTAL COST
CODE	DESCRIPTION			(\$)	(\$)
6.2	Harbour Road North - Strathern St to Redford Opt 2				
.1	Clearing & Grubbing	ha	0.50	\$15,000.00	\$7,500.00
.2	Asphalt Removal and Disposal	m ²	500	\$4.50	\$2,250.00
.3	Subgrade Preparation	m ²	11,500	\$2.00	\$23,000.00
.4	Excavation and Disposal	m ³	3,500	\$25.00	\$87,500.00
.5	Excavation and Re-use	m ³		\$15.00	
.6	Engineered Fill	m ³		\$35.00	
.7	Base Course (300mm thickness)	m ³	2,800	\$35.00	\$98,000.00
.8	Gravel Surfacing (100mm thickness)	m ³	1,500	\$38.00	\$57,000.00
.9	Asphalt (80mm thickness)	Tonne	2,300	\$110.00	\$253,000.00
1.0	Ditching	m	1,900	\$15.00	\$28,500.00
1.1	Topsoil and Seed	m ²	2,000	\$12.00	\$24,000.00
1.2	Retaining Wall	m ²		\$500.00	
1.3	Street lighting	each	26	\$3,200.00	\$83,200.00
1.4	Utility Pole Relocation	each	2	\$2,000.00	\$4,000.00
1.5	Culvert Construction	allowance	1	\$5,000.00	\$5,000.00
1.6	Train Rail Removal	m		\$40.00	
1.6	Redford Intersection West	allowance	1	\$10,000.00	\$10,000.00
1.7	Automated Train Crossing	allowance	1	\$75,000.00	\$75,000.00
1.8	Dry Creek Bridge	m ²	400	\$2,000.00	\$800,000.00
1.9	Redford Street East Intersection	m ²	1	\$50,000.00	\$50,000.00
	SUB TOTAL Strathern St to Redford Option 2				\$1,607,950.00
	30% Engineering and Contingency				\$482,385.00
	Total Strathern St to Redford Option 2				\$2,090,335.00

Checked By: _____

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1. Opinion of cost is based on assumptions and design only.
2. Costs for land not included.
3. Costs for Landscaping are allowances for soil only (no plantings or irrigation) and are subject to wide variation.
4. Raynor Avenue assumed to require complete asphalt removal and repaving.
5. Alston Avenue priced to have asphalt and pavement gravels (if any) removed & reconstructed in full
6. Tyee Road constructed as indicated to limits of construction.
7. Price for hydro is quoted price, and subject to time constraints.
8. COSTS FOR TELUS NOT INCLUDED & TO BE INSERTED ONCE PROVIDED BY TELUS. (incl. Bay St. upgra
9. Centra Gas considered to provide service including piping at no cost to developer.
10. Hydro / Tel / Cable considered to provide service at no cost to developer except for costs of conduit / boxes
11. Costs for earthworks on-site, I.e. building up roads to subgrade are not included and should be allocated appropriately to each of the phases.
12. Phase 1 housing development civil costs not included in estimate (attached under separate cover).

Limits of Commission:

Whereas any opinions of probable cost prepared by Stantec Consulting Ltd. ("the Engineer") will be based on incomplete or preliminary information, and will also be based on factors over which the Engineer has no control, the Engineer does not guarantee the accuracy of these opinions of probable cost and shall have no liability where the probable costs are exceeded.

Checked By: _____