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July 30, 2021

Ms. Kattia Woloshyniuk
A/ Senior Development Officer
Ministry of Transportation and Infrastructure
Howe Sound | Sunshine Coast
310 -1500 Woolridge Street
Coquitlam, BC, V3K 0B8

Dear Kattia

Re: Lot 1, Main Street, Mount Currie, BC – Traffic Impact Assessment

This letter is a response to the request from the Ministry of Transportation and Infrastructure (MoTI) for a Traffic Impact Assessment for the proposed development by the Lílwat Nation (Lílwat) on Lot 1, Main Street in Mount Currie, BC.

Understanding and Scope:

The scope of the assessment was discussed with MoTI and an adjusted terms of reference was agreed to based on work already completed and relevance to the development proposed.

There are two main aspects that have been considered in the scope development which are:

1. *The size and type of development proposed:* The development is proposed as 53 residential units of affordable housing. The housing type is subsidised housing. The units will all be rental, and applicants will need to qualify based on income thresholds. Car ownership will be low, and the site is located close to employment and within walking distance of some amenities. In addition, 7,110 ft² of commercial space is planned which includes artisan use and will complement uses on the site.
2. *Previous traffic impact assessment undertaken:* A TIA¹ was completed for the redevelopment of the northeast corner of the intersection of Highway 99 and Main Street. This work was undertaken in 2017 and updated in 2019. The analysis included background growth of 2% per annum and future trips were projected to 2034. As the 2017 analysis accounted for the Lot 1 development in the background growth, no further traffic intersection analysis is required for this development.

As a result, the adjusted scope includes the development description, definition of the study area, description of the transportation system, site access review, assessment of access points, site generated traffic demand, active transportation facilities, summary of key findings and recommendations.

¹ Traffic Impact Study Report for Proposed Mixed Use Development in the Lílwat Nation, May 19, 2017 and October 18, 2019, ISL

Development Description:

The current site layout and typical streetscape are shown in **Appendix A**. There are two buildings proposed, referred to as the North and South Buildings. The full development includes the following:

- *North Building:* Apartments: 17 units; CRU 3,450 ft²
- *South Building:* Apartments: 36 units; CRU 3,660 ft²
- *Parking:* 90 stalls are proposed with two loading bays

MoTI have requested an additional 5m dedication fronting the property for future active transportation facilities and possibly utilities.

Study Area:

The study area includes the site and two access points on Highway 99 as shown in **Figure 1**. The access points are shown with red arrows. The northern access connects into the intersection of Highway 99/Main Street/Duffy Lake Road and a southern access is adjacent to the southern property line. The site has been cleared for redevelopment at this time and there are no occupied buildings on the site.

The latest site plan is attached in **Attachment A**.



Figure 1: Study Area (SLRD GeoWeb)

Transportation System:

The site fronts Highway 99 and is also named Main Street in this section. This is a two-lane provincial highway with shoulders on both sides – refer to **Figure 2**. This section of the highway has a speed limit of 30km/h.

Main Street is the primary entrance road to the Lílwat Nation. Highway 99/Main St connects to the Duffy Lake Road at the northern end of the site as a three-way intersection with Main Street. This intersection is stop controlled for Duffy Lake Road.

A bus route operated by Pacific Western Transportation for BC Transit provides service between Pemberton Village and the Xit'olacw Subdivision via Mount Currie. There are seven round trips a day. There is a bus stop on eastbound Duffy Lake Road east of the Main Street intersection, with a bus pullout and a shelter. There is another bus stop southbound on Main Street at the south end of the site with a gravel shoulder and shelter.

There are marked pedestrian crosswalks on the north and east legs of the Main Street/Duffy Lake Road intersection. The paved shoulder on Main Street is used by pedestrians and cyclists and is identified as a bicycle facility with bicycle symbols in some locations.

Refer to **Figure 3**, **Figure 4**, **Figure 5** and **Figure 6**.



Figure 2: Highway 99/Main Street – Fronting site looking north



Figure 3: Intersection of Highway 99/Main Street/Duffy Lake Rd – Looking north



Figure 4: Intersection of Highway 99/Main Street/Duffy Lake Rd – Looking south



Figure 5: Intersection of Highway 99/Main Street/Duffy Lake Rd – Looking west



Figure 6: Intersection of Highway 99/Main Street/Duffy Lake Rd – Looking east

Site Access Review:

Site visit and observations:

A site visit was undertaken on May 5, 2021. Observations are listed below together with photographs. Measurements were taken on site as an approximate measure and were not surveyed. The measurements are shown on an aerial base and are included in **Appendix B**.

Northern Access:

- This is proposed as the main access to the site and will form the west leg of the existing Highway 99/Main St/Duffy Lake Road intersection. See **Figure 7**.
- The grade is mainly flat through this section and the intersection.
- Geometry:
 - The three existing roads connect at right angles.
 - Main Street curves slightly to the west north of the intersection.
- Traffic control and regulations:
 - Duffy Lake Road is stop controlled at Main Street.
 - The speed limit on Highway 99/Main Street is 30km/h.
- Sightlines:
 - Looking left from northern access – sight distance is ~ 85m. See **Figure 8**.
 - Looking right from northern access – sight distance is ~ 115m. See **Figure 9**.



Figure 7: Proposed Northern Access – Location shown with orange arrow



Figure 8: Proposed Northern Access - Looking left



Figure 9: Proposed Northern Access – Looking right

Southern Access:

- This is proposed as the secondary access to the site and will be located on the southern property line – See **Figure 10**.
- The road grade is mainly flat through this section.
- There is an existing bus stop which will be relocated north of the southern access.
- Geometry:
 - The access is proposed to connect at right angles with Highway 99.
 - Highway 99 has a curve to the west south of this access point.
- Traffic control and regulations:
 - The speed limit is 30km/h on Highway 99/Main Street.
- Sightlines:
 - Looking left from southern access – sight distance is ~ 110m. See **Figure 11**.
 - Looking right from southern access – sight distance is ~ 75m. See **Figure 12**.



Figure 10: Proposed Southern Access – location shown with orange arrow



Figure 11: Proposed Southern Access - Looking left



Figure 12: Proposed Southern Access – Looking right

Geometric and Safety Assessment of Access Points

This assessment summarizes the observations on site, feedback received from staff and reference to previous work in the vicinity. This assessment includes the sightlines and operation only.

The recent MoTI corridor review of this area “Speed and Safety Review – Highway 99, from Pemberton to Mount Currie”² (MoTI Corridor Study) was referenced for speed data.

Although there is a regulated speed limit is 30km/h, the data collected in the corridor study found that the average speed was 33km/h and the 85-percentile speed was 40km/h. Therefore 40km/h has been used as the operating speed for the sightline analysis.

The reference for this analysis is the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads³. The TAC guideline reference is for Intersections with Stop Control on the Minor Road – Table 9.9.4 and Table 9.9.6.

Northern Access:

1. Sightlines:

- a. Vehicle exiting the driveway turning left:
 - i. The design intersection sight distance for a vehicle turning left is 85m.
 - ii. For a vehicle approaching from the south, the existing sightline is 115m which exceeds this standard.
 - iii. For a vehicle approaching from the north, the existing sightline is 85m which meets the standard.
- b. Vehicle exiting the driveway turning right or crossing the road:
 - i. The design intersection sight distance for a vehicle turning right or crossing the road is 75m.
 - ii. For a vehicle approaching from the north, the existing sightline is 85m which exceeds this standard.
 - iii. For a vehicle approaching from the south, the existing sightline is 115m which exceeds this standard.

2. Assessment:

- a. The sightlines for this access meet the standards.
- b. There is some shrubbery on the west side of the north leg that needs to be removed to improve visibility of vehicles, pedestrians and cyclists approaching from the north. In addition, the existing wayfinding signage should be relocated outside of the sightline area.
- c. This access will have a stop control with a pedestrian crossing linking to the proposed new pathway on the site frontage.

Southern Access:

1. Sightlines:

- a. Vehicle exiting the driveway turning left:
 - i. The design intersection sight distance for a vehicle turning left is 85m.

² Speed and Safety Review – Highway 99, from Pemberton to Mount Currie – April 29, 2021, Final Draft Report, McElhanney

³ Transportation Association of Canada Geometric Design Guide for Canadian Road, June 2017, Chapter 9, Section 9.9

- ii. For a vehicle approaching from the south, the existing sightline is 75m which does not meet the standard.
- iii. For a vehicle approaching from the north, the existing sightline is 110m which exceeds this standard.
- b. Vehicle exiting the driveway turning right:
 - i. The design intersection sight distance for a vehicle turning right is 75m. This applies only to vehicles approaching from the north.
 - ii. For a vehicle approaching from the north, the existing sightline is 110m which exceeds this standard.

2. *Assessment:*

- a. Sightlines: The sightlines for this access meet the standards except for vehicles turning left. In the MoTI corridor review report, recommendations have been made to improve the transition from 80km/h through to 30km/h for vehicles approaching northbound. It is suggested that these improvements by MoTI would help mitigate the sightline for vehicles turning left and improve the future operation of this access. This report includes the following potential mitigation measures for northbound traffic close to the frontage of the site:
 - i. Replacing existing speed signage with larger signs.
 - ii. Increasing the length of the speed transition zones.
 - iii. Adding a new speed reader sign on Highway 99 just south of Industrial Way.
 - iv. Consideration of transverse pavement markings.
- b. The bus stop needs to be relocated to the north outside of the sightline triangle so that a stopped bus does not obstruct a motorist's sightlines. This will need to be discussed further with the Village of Pemberton and the Regional District.
- c. This access will have a stop control with a pedestrian crossing linking to the proposed new pathway on the site frontage.

Site Generated Traffic Demand:

Site traffic has been calculated by using the Institute of Transportation Engineers (ITE) trip generation rates⁴ as the main reference point. The ITE Trip Rates used are shown in **Table 1**.

Table 1: ITE Trip Generation Rates referenced

						AM TRIP RATES			PM TRIP RATES		
LAND USE DESCRIPTION	ITE DESCRIPTION	ITE REF	ITE Description		Measure	RATE IN	RATE OUT	TOTAL RATE	RATE IN	RATE OUT	TOTAL RATE
Apartments - 2 storey	Multifamily Housing (Low Rise)	10th 220	Gen Urban Suburban	1-2 levels	Units	0.11	0.35	0.46	0.35	0.21	0.56
						23%	77%		63%	37%	
Apartments - 3 storey	Multifamily Housing (Mid Rise) - 3-10 storeys	10th 221	Gen Urban Suburban	3-10 levels	Units	0.09	0.27	0.36	0.27	0.17	0.44
						26%	74%		61%	39%	
Commercial CRUs	Variety Store	10th 814	General Urban/Surburban		1,000 sqft	1.81	1.37	3.18	3.56	3.28	6.84
						57%	43%		52%	48%	
Artisan CRU	Office	10th 710	General Urban/Surburban		1,000 sqft	1.00	0.16	1.16	0.18	0.97	1.15
						86%	14%		16%	84%	

⁴ Institute of Transportation Engineers (ITE), 10th Edition

Table 2 below shows the calculation of the site traffic per land use as per ITE.

Table 2: Site Traffic as per ITE

			AM PEAK HOUR							PM PEAK HOUR						
DESCRIPTION	ITE REF		RATE IN	RATE OUT	TOTAL RATE	UNITS	TRIPS IN	TRIPS OUT	TRIPS	RATE IN	RATE OUT	TOTAL RATE	TRIPS IN	TRIPS OUT	TRIPS	
Apartments - 2 storey	10th 220	1-2 levels	0.11	0.35	0.46	17	2	6	8	0.35	0.21	0.56	6	4	10	
			23%	77%						63%	37%					
Apartments - 3 storey	10th 221	3-10 levels	0.09	0.27	0.36	36	3	10	13	0.27	0.17	0.44	10	6	16	
			26%	74%						61%	39%					
Commercial CRUs	10th 814	1000 Sqft	1.81	1.37	3.18	3.66	7	5	12	3.56	3.28	6.84	13	12	25	
			57%	43%						52%	48%					
Artisan CRU	10th 710	1000 Sqft	1.00	0.16	1.16	3.45	3	1	4	0.18	0.97	1.15	1	3	4	
			86%	14%						16%	84%					
							15	21	36				29	25	54	

In summary, the ITE generated site trips are estimated as total two-way AM peak hour of 36 trips, and total two-way PM peak hour of 54 trips.

These trips calculations are conservative and are based on North American suburban development. Trip reductions can be made related to low car ownership based on the subsidised housing component. In addition, the site is located within walking distance of places of employment and some amenities.

It is proposed that trip reductions in the order of 10-20% are appropriate in this case based on the specific details of the proposed development which are the location close to amenities/employment, low car ownership and subsidized housing type.

The actual trips will be closer to: AM two-way trips of 29-32 trips, and PM two-way trips of 43-49 trips. As noted previously, these trips have already been included in the future growth in this corridor in the previous Traffic Impact Study undertaken for this area.

The trip distribution is based on the assumed demand to and from Pemberton Village to the south (employment, schooling, amenities) and the Mount Currie to the north west (employment). It is assumed that there will be no left turns out from the southern access. The trips have been distributed as shown in **Table 3**.

Table 3: Trip distribution

External Connection	North Access				South Access			
	AM		PM		AM		PM	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Mount Currie to NW	30%	50%	30%	50%	0%	0%	0%	0%
Pemberton Village S	30%	0%	30%	0%	40%	50%	40%	50%

The resulting site trips are shown in **Figure 13**.

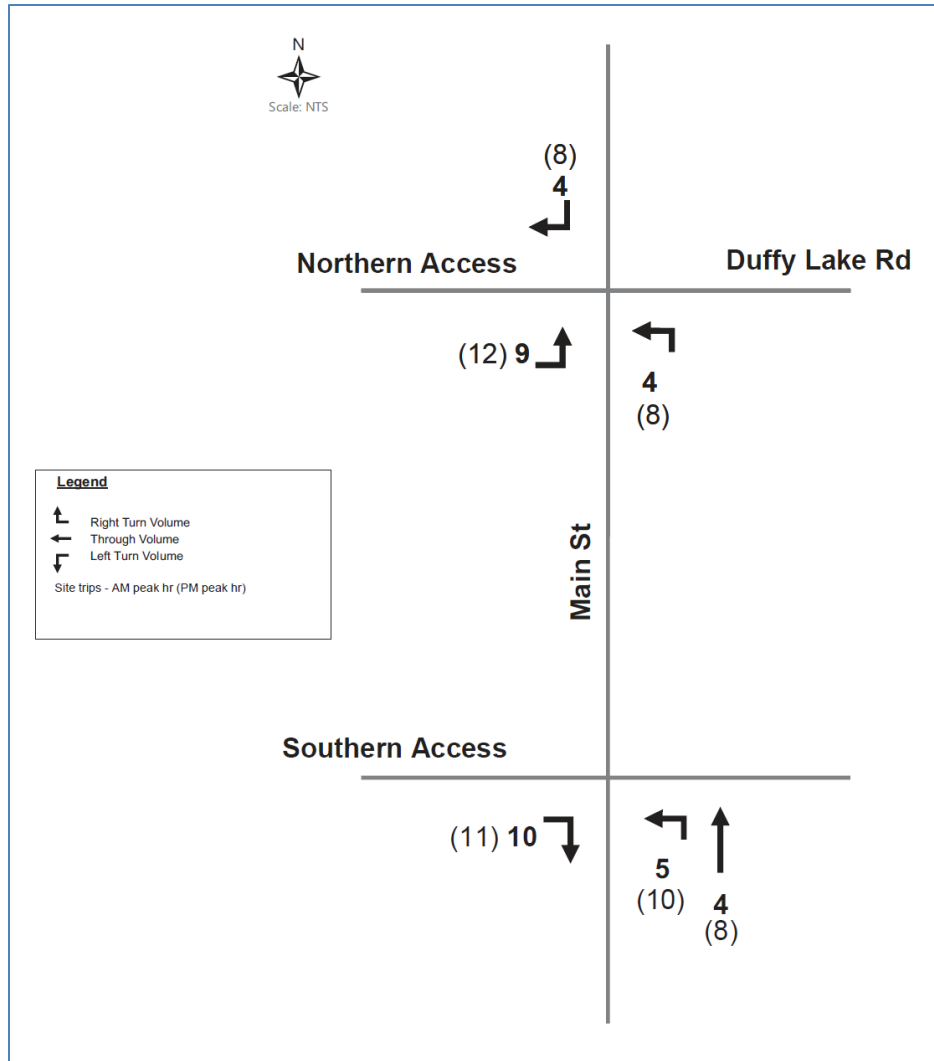


Figure 13: Site Traffic Volumes at the Accesses

Access Point Design:

The future access point designs need to refer to the BC Supplement to TAC Section 730. After further discussion with MoTI, the following items need to be considered:

1. Northern Access:
 - a. Align the access with the Duffy Lake Road approach on the east leg.
 - b. The width of the driveway is to be 9m.
 - c. The access type is likely to be a Type 1A or 1B.
 - d. The design will be further developed in the detailed design stage.
2. Southern Access:
 - a. The width of the driveway is to be 9m.
 - b. The access type is likely to be a Type 1A or 1B.
 - c. The design will be further developed in the detailed design stage.

Active Transportation Facilities:

The development includes improvements to pedestrian facilities along the frontage. As can be seen on the site plan and cross section (**Appendix A**), a new 1.8m sidewalk is proposed to run adjacent to the road with a swale separating the edge of pavement and the sidewalk. In addition, there will be pedestrian access to the buildings which will connect to both access points. This includes a crosswalk on the driveway access.

At the intersection of Highway 99/Main Street/Duffy Lake Road, further monitoring and review of the pedestrian crossing on the south leg is recommended. This is the most likely path that pedestrians will take to walk to and from the eastbound bus stop. Consideration should be given to providing a crosswalk on the south leg at a future stage.

It is assumed that cycling will continue to be accommodated on the highway shoulder which is designated as a bicycle facility and continues on Main Street north of Highway 99.

The southbound transit stop will be relocated to the north of the southern site access and this modification will comply with BC Transit design standards. Further discussion is required with the Village of Pemberton and the Regional District to confirm the location and design requirements.

It is understood that discussions are on-going between MoTI and Lílwat regarding improvements to Main Street north of Highway 99. These improvements may include traffic calming measures as well as pedestrian and cycling facilities. It is suggested that, for continuity, consideration should be given to extend some of the active mode improvements south across this property. There appears to be sufficient space within the road dedication for additional active transportation facilities, and this can be reviewed this at the detailed design stage.

Summary of Key Findings:

The key findings and conclusions of this report are as follows:

1. Intersection of Highway 99/Main Street/Duffy Lake Road:
 - a. The north access point will form the west leg of the intersection of Highway 99/Main Street/Duffy Lake Road. This access meets design standards for sightlines.
 - b. This access will be stop controlled with a pedestrian crossing linking to the proposed new sidewalk on the site frontage.
 - c. In order to improve visibility of vehicles, pedestrians and cyclists approaching from the north, some shrubbery on the west side of the north leg needs to be removed. In addition, the existing signage should be relocated outside of the sightline area.
 - d. Future monitoring by MoTI of the pedestrian movements from the new development to the bus stop on the east leg to review the demand on the south leg of Highway 99/Main Street/Duffy Lake Road intersection.
2. Southern Access point:
 - a. This access will be stop controlled with a pedestrian crossing linking to the proposed new pathway on the site frontage.
 - b. The access meets design standards for sightlines for right turning vehicles but is 10m short of the standard for left turning vehicles for an operating speed on 40km/h on Highway 99.
 - c. It is proposed that the speed mitigation measures identified in the recent MoTI Corridor Study be further reviewed with MoTI. Implementation of some of these items would in mitigate the sightline issue.

3. Site generated trips are estimated as: AM two-way trips of 29-32 trips, and PM two-way trips of 43-49 trips. These trips have already been included in the future growth in this corridor in the previous Traffic Impact Study undertaken for this area.
4. The development includes improvements to pedestrian facilities along the frontage which include a new sidewalk and swale adjacent to the roadway edge. Cyclists would continue to use the road shoulder.
5. A relocated bus stop will be provided on the development frontage to the north of the southern access. The bus stop will be designed to BC Transit standards and located outside of the sightline triangle so that a stopped bus does not obstruct motorist's sightlines. This will need to be discussed further with the Village of Pemberton and the Regional District.
6. Consideration should be given to continuity of design for active modes between this development frontage and the proposed improvements to Main Street north of Highway 99.

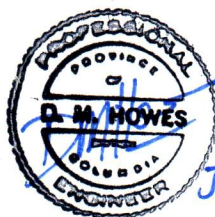
Recommendations:

The following improvements are recommended to be included in the design over and above the off-site improvements already included in the site plan:

1. Removal of some shrubbery and relocation of existing wayfinding signage on the west side of the north leg of the intersection of Highway 99/Main Street/Duffy Lake Road.
2. Future monitoring by MoTI of the pedestrian demand on the south leg of the intersection of Highway 99/Main Street/Duffy Lake Road.
3. Further discussion is required with MoTI for the detailed design of the access points with reference to BC Supplement to TAC Section 730.
4. Design the relocated southbound bus stop to BC Transit standards and locate the stop outside of the sightline triangle of the southern access. Further details to be discussed with the Village of Pemberton and the Regional District.
5. In order to mitigate the left turn sightlines at the southern access, it is recommended that the proposed speed mitigation measures from the MoTI Corridor study be discussed further with MoTI. It is assumed that these improvements will be implemented by MoTI in conjunction with Lilwat.

Please advise if you require any further information.

Respectfully submitted,



Donna Howes, P.Eng., PTOE, FEC

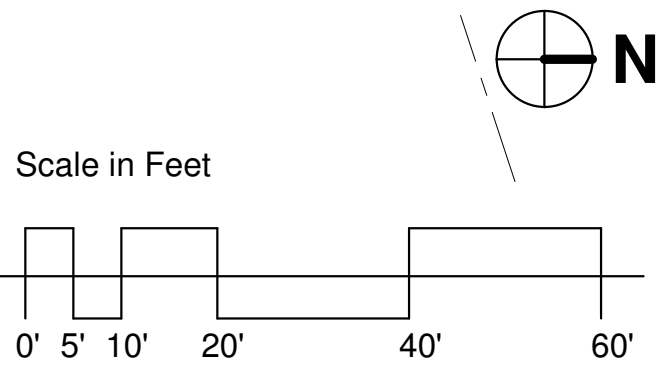
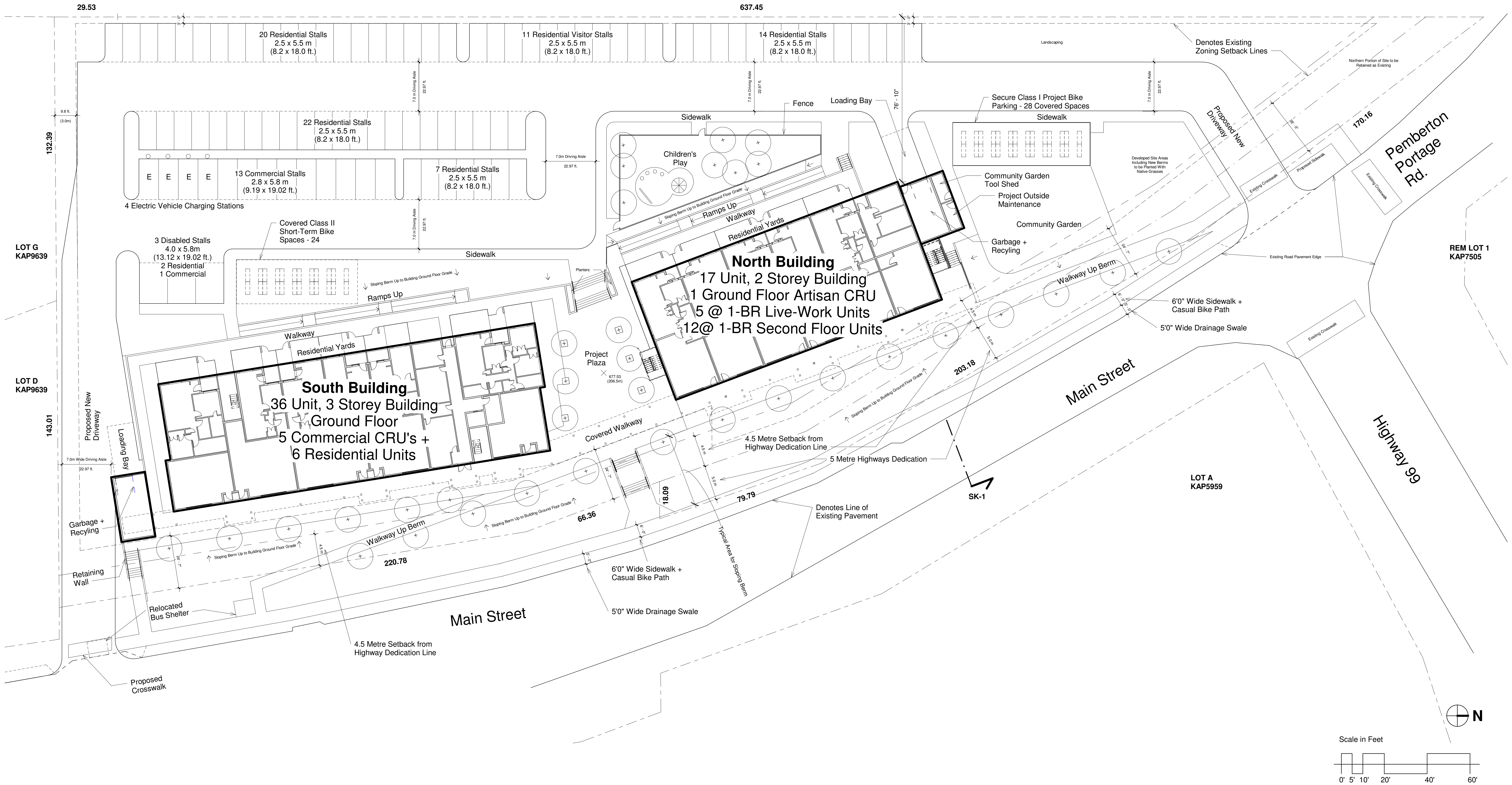
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APPENDIX A

Site Layout and Streetscape

S.R.McEwan Architect, 10 March 2021



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Lil'wat Main Street - South and North Buildings

Lot 1, Main Street, Mount Currie



Revisions

2

Issued for Review of
Highways Setback

09 April 2021

Drawing

Site Plan

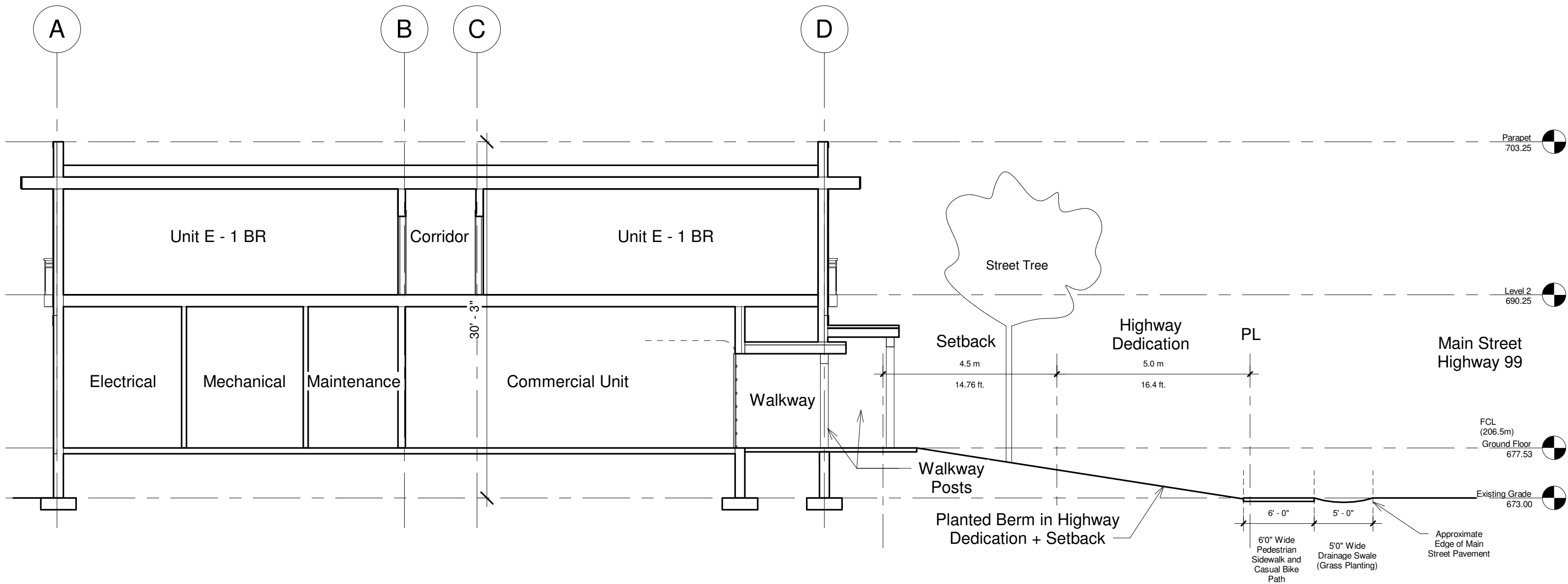
Scale

1" = 20'-0"

Sheet Number

Revision
2

A03



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Lil'wat Main Street - North Building

Lot 1, Main Street, Mount Currie



Scale Drawing

SK-1

1/8" = 1'-0"

Revision

Issued for Review of Highways Setback

09 April 2021

APPENDIX B

Sightline Assessment

Sight Line Measurements for Accesses to Lot 1, Main Street:

This assessment is high level for this stage of the design process. Measurements were taken on site together with photographs. These measurements are approximate and have not been surveyed. The SLRD Public map has been used as a base for reference.⁵

Northern Access:

- (A) – proposed access point
- (B) – sight distance point measured looking left
- (C) – sight distance point measured looking right



⁵ [SLRD Public Map \(arcgis.com\)](https://arcgis.com)

Southern Access:

- (A) – proposed access point
- (B) – sight distance point measured looking left
- (C) – sight distance point measured looking right

