Executive Summary

108 Street (Highway 40) was identified as a major arterial and truck route by the City's 2002 Transportation Master Plan. The plan recommended a number of road improvements that would be required from now to when Grande Prairie's population reaches the 75,000 level. 108 Street presently accommodates heavy traffic volumes in the built up area. It is currently 2 lanes wide from the South City Limits to 76 Avenue, from which point it is 4 lane undivided to south of 97 Avenue and subsequently 4 lanes divided north to 100 Avenue (Highway 43).

This functional planning study was directed by a Technical Review Committee composed of members from the City, including the Chairman of the Committee, and Alberta Transportation plus consultant team staff from ISL and Lovatt Planning.

Land use along 108 Street is currently commercial/industrial from 100 Avenue south to 84 Avenue. Canfor is the largest industrial company in this area. The Canfor Haul Road which approaches the mill from the south, parallels 108 Street on the east side and complicates major cross street intersections along 108 Street. South of 84 Avenue, the future land use is predominantly residential. These land use plans include Pinnacle Ridge, Mission Heights, development of the Southwest Area Structure Plan and the O'Brien Lake Outline Plan.

An extensive traffic counting program was undertaken to determine 2003 traffic counts on all major intersections. Traffic forecasts prepared for the Transportation Master Plan were utilized to estimate future traffic on 108 Street at the 46,000 and 59,000 population horizons. These forecasts were analyzed to determine future roadway upgrading required to ensure that future traffic can be accommodated at a reasonable level of congestion at each future population horizon. Exhibits 3.1 through 3.3 in the report show existing and forecast late afternoon peak hour volumes at major intersections on 108 Street.

Utilities along 108 Street were identified and located. A listing of known existing utilities, their ownership and location are provided in Table 4.1 and are shown on Exhibits 4.1 through 4.4 in the report. Drainage facilities required due to the additional road construction were determined. Location of these drainage facilities are also shown on Exhibits 4.1 through 4.4. and related property requirements on Exhibits 6.17 through 6.20.

Three different design speeds were utilized for this roadway. The section from the South City Limit to 60 Avenue utilized a 110 km/h design speed due to its largely rural setting anticipated for some time in the future when it will function as essentially a rural highway. The section from 60 Avenue to 84 Avenue will require an 80 km/h design speed as it will be a high standard urban arterial in this area. The section from 84 Avenue to 100 Avenue is unlikely to have a speed limit above 50 km/h due to the relatively closely spaced intersections and present traffic signals. As a result, a 60 km/h design speed is adequate for this portion. As loaded log haul trucks use 108 Street and turn into Canfor from 108 Street on to 76 Avenue, selected intersections require special designs to accommodate the turning by log trucks so that their loads do not swing into other lanes of traffic when the trucks turn left or right at 108 Street. Typical cross sections for 108 Street are shown on Exhibits 5.1 and 5.2 in the report.

The construction costs to upgrade 108 Street from the South City Limit to 100 Avenue (100 Avenue intersection costs would be Alberta Transportation's responsibility) are estimated at $16.6 million from now through to the ultimate stage.

The ultimate stage improvements for 108 Street, which will be adequate to a 75,000 population horizon are shown on Exhibits 6.1 through 6.4 in the report. There are no significant grades on 108 Street. At this stage, 108 Street will be 4 lanes divided from the South City Limit to 84 Avenue intersection where it will be widened to 6 lanes divided from 84 Avenue north to 100 Avenue. The median will be about 6 m wide to accommodate protected (separate) left turn lanes at intersections and to separate the northbound and southbound traffic. Two metre outside shoulders with ditch drainage will be provided from the South City Limit to 60 Avenue, at which point, curb and gutter will replace the shoulders but ditch drainage will be retained on the east side north to 76 Avenue. North of 76 Avenue, a full urban cross section will be provided with underground stormwater drainage.

At 50 and 60 Avenue intersections, a number of existing accesses are consolidated at these intersections by means of new service road connections. A short length of the existing private service road is retained on the east side of 108 Street north of a right in/right out located north of 84 Avenue. The existing west service road is retained between 89 Avenue and 92 Avenue but its access is restricted to 92 Avenue. The service road intersection with 92 Avenue is relocated slightly to the west to improve traffic operations. Similarly, the west

service road south of 97 Avenue is relocated slightly to the west at 97 Avenue. This service road north of 97 Avenue is closed at 97 Avenue and the service road connects to the north at the 100 Avenue/110 Street intersection.

Stage 1 plans, which are required by the 40,000 horizon, are shown on Exhibits 6.5 through 6.8.

At 50 Avenue, a flared intersection is provided in the initial stage to improve safety for traffic turning into and out of Sprucewood Subdivision. A new intersection is constructed at 60 Avenue, consolidating a number of existing accesses by means of service roads to the south from 60 Avenue.

South of 68 Avenue, 108 Street is widened to a 4 lane divided highway, continuing this cross section north to tie into the existing 4 lane divided roadway just south of 97 Avenue. All intersections will have left turn lanes for both northbound and southbound approaches on 108 Street. At 68 Avenue and 84 Avenue, all right turns will have separate right turn lanes and right turn islands. All collector intersections (76, 79, 89, 92, 97 Avenues) have right turn lanes on 108 Street where heavy right turns are anticipated. A northbound right in/right out is provided about 140 m north of 84 Avenue and a southbound right in/right out about 260 m south of 89 Avenue. The existing east service road from the northbound right in/right out will be retained north to 89 Avenue. The ultimate west service road treatments outlined above will be initiated from 89 Avenue to 97 Avenue. Construction costs for Stage 1 improvements are estimated at $10.7 m.

Stage 2 plans are illustrated on Exhibits 6.9 to 6.12 inclusive. The only improvement required at this stage is closure of another approach south of 60 Avenue resulting in need for extension of the service road in the southeast quadrant of this intersection, shown on Exhibit 6.10. Costs for this stage, expected to be required by the 46,000 horizon, are estimated at about $0.4 million.

Exhibits 6.13 through 6.16 show the Stage 3 road requirements by the 59,000 population horizon. At 50 Avenue intersection, 50 Avenue is extended east across the Canfor Haul Road and then north to replace an approach presently located about 200 m north of 50 Avenue which will be closed. Costs for this stage are also estimated at approximately $0.4

million.

Costs to upgrade from the 59,000 horizon requirements to the ultimate road layout are estimated at $5.1 million, resulting in the total multi-stage cost of $16.6 million.

Property requirements (shown on Exhibits 6.17 through 6.20) include a strip of land through City property east of the 50 Avenue intersection for the service road on the east side of 108 Street. A small parcel on the east side will be required to accommodate realignment of the Haul Road caused by construction of the tourist information pullout. Two parcels are required for drainage retention ponds in SE10-71-6-6 on either side of Flyingshot Creek.

At 60 Avenue intersection, there are right of way requirements for the service roads in both quadrants of the intersection south of 60 Avenue. At 64 Avenue and 68 Avenue, some minor property is required to divert the Haul Road to the east of these intersections. Property requirements are shown along 68 Avenue, although these are associated with the widening of 68 Avenue. They would however be required to provide for the upgrading of the 108 Street/68 Avenue intersection which will likely precede 4 laning of 68 Avenue.

There are narrow strips of land required in the northwest quadrant of the 76 Avenue and 79 Avenue intersections to accommodate southbound right turn lanes. Three corner parcels are required at the 84 Avenue intersection. A varying width on the east side is required for the 108 Street widening from 84 Avenue to RailNet. A parcel is required on the east side of 108 Street to accommodate the right in / right out about 140 m north of 84 Avenue. Additional land may be required for the service road right of way north from the right in / right out to 89 Avenue if it becomes a public service road. Small parcels are required in the southwest quadrants of the 92 Avenue and 97 Avenue intersections to provide for the relocation of service roads at these avenues.

An extensive public and stakeholder input program was undertaken for this project which included 2 open houses for the general public and 2 landowner/tenant meetings. A landowner meeting and open house were held September 16, 2003 and a further set on October 30, 2003 all located at the Muskoseepi Pavilion. The landowner meetings were held in the early afternoon, and the open houses in late afternoon, continuing through the early evening. The first set of sessions reviewed the preliminary ultimate plans for 108 Street while

the second sessions reviewed the staging plans and the finalized ultimate plans. The open houses were advertised in the media and letters were sent to all landowners along 108 Street prior to the stakeholder meetings.

Nineteen stakeholders attended the first landowner session. Concerns expressed were access and property requirements between 84 Avenue and 89 Avenue on the east side, traffic safety at the Sprucewood access (50 Avenue), concern about timing of improvements, safety and dust concerns along the Canfor Haul Road. The first open house was lightly attended with about 12 attendees having no significant concerns indicated on the returned comment sheets.

The second stakeholder meeting attracted 11 people. Similar concerns were expressed as at the initial meeting. The open house later in the day had 10 attendees. There was some concern about property impacts due to the westward relocation of the west service road to the south of 97 Avenue.

Table of Contents

1

Introduction

1.1 Background

108 Street is defined as a major arterial route in the 2002 City of Grande Prairie Transportation Master Plan (TMP). The TMP also designated 108 Street as a truck and dangerous goods route. The cross section was indicated as varying from a 4 lane urban arterial divided (4UAD) to a 6 lane urban arterial divided (6UAD) in the long term. This section of 108 Street is also the City portion of Highway 40, which terminates at 100 Avenue (Highway 43). The 108 Street / 100 Avenue intersection is presently one of the busiest intersections in the City, and is under Alberta Transportation's (TRANS) jurisdiction.

108 Street is currently 4 lanes divided from 100 Avenue south to 97 Avenue and 4 lanes undivided from south of 97 Avenue to 76 Avenue, with raised median through most important intersections. There are present traffic signals at 100 Avenue, 97 Avenue, 92 Avenue, 84 Avenue, 76 Avenue and 68 Avenue. South of 76 Avenue, the cross section is 2 lane undivided. There are no traffic signals south of 68 Avenue.

Highway 40 is a long distance link in TRANS's highway system. It extends south from Highway 43 (100 Avenue) in Grande Prairie to the City Limits, continuing south to Grande Cache and Hinton, with further extensions to the south. Highway 40 is the main access to the Ainsworth plant and functions as the north-south truck route serving truck traffic to Canfor and Weyerhaeuser.

A private road, known as the Canfor Haul Road, parallels 108 Street to the east. This road serves as a seasonal off-highway access for loaded log trucks from the south to Canfor. This road operates predominantly during the winter while the ground is frozen.

The trucks using this haul road can utilize log overhangs in excess of 9 m. Non-standard signals and signing are utilized at the haul road and 68 Avenue, 76 Avenue, and 84 Avenue crossings to warn vehicular traffic on these roads of approaching log trucks, which have the right-of-way.

Generally, 108 Street passes through industrial / commercial areas with the present exceptions of Mission Heights and Pinnacle Ridge which are residential developments south of 84 Avenue. Also development is proceeding in the O'Brien Lake area west of 108 Street and south of 68 Avenue.

108 Street (Highway 40) proceeds south of the South City Limit about 800 m to the intersection with Highway 668. Highway 668 provides an important connection east to the County industrial area, connects further east to Resources Road and hence provides access to Weyerhaeuser.

1.2 Study Management

The study was guided by a Technical Review Committee, chaired by the City and consisting of representatives of the City and Alberta Transportation. The Committee met 4 times during the Study.

2

Land Use

2.1 Existing Land Use

Present land uses along 108 Street include commercial / industrial uses from 100 Avenue south to 84 Avenue, the largest of which is Canfor on the east side of 108 Street. South of 84 Avenue, the Provincial Forestry yards are located in the southwest quadrant of the 108 Street / 84 Avenue intersection. Land use south of 84 Avenue is predominantly residential to 68 Avenue, with some development initiated in O'Brien Lake.

Land use south of 68 Avenue to the South City Limit is generally rural, agricultural with scattered country residential developments such as Sprucewood and a few commercial/industrial parcels.

2.2 Future Land Use

Between 100 Avenue and 84 Avenue proposed land uses include the ongoing development of the co-generation power plant (Canadian Gas and Electric) adjacent to Canfor and redevelopment of the old County lands by Peace Wapiti School Division and the Hazco (old Alberta Transportation yards) property east and west of 108 Street respectively. Completion of Pinnacle Ridge on the west side of 108 Street, build out of Mission Estates and the Community Knowledge Campus development to the east of 108 Street, are occurring south of 84 Avenue to 68 Avenue.

South of 68 Avenue, the O'Brien Lake outline plan provides for residential land use on the west side of 108 Street. There will also be residential uses on the east side of 108 Street to 1.6 km south of 68 Avenue, just north of 50 Avenue.

3

Traffic Forecasts/Analysis

3.1 Traffic Forecasts

3.1.1 Existing Traffic

Afternoon (2003) peak hour traffic volume counts are shown on Exhibit 3.1 at the end of this section. Note that high right turning volumes in the P.M. will in turn be heavy left turns in the A.M. peak hour and vice versa.

There are heavy turning volumes (over 200 vph) at the 100 Avenue intersection, namely:

- from north to west 290 vph
- from west to north 380 vph
- from south to east 370 vph

At 97 Avenue there is a left turn of 280 vph from west to north and a 220 vph right turn from west to south. Similarly, at 92 Avenue there are about 250 vph making a left turn from west to north.

At 84 Avenue, there is a heavy left turn from north to east of 550 vph, and 240 vph for the same movement at 68 Avenue.

Volumes south of 68 Avenue are about 300 vph southbound and 410 northbound.

3.1.2 46,000 Horizon (2010) Forecasts

Note that these forecasts are based on the land uses assumed and the traffic forecasts undertaken in 2000 for the 2002 Transportation Master Plan. Shown on Exhibit 3.2, the 46,000 population horizon forecasts for the 100 Avenue intersection have the following

heavy traffic movements:

- 370 vph from north to west, 290 vph from west to north
- 370 vph from west to south
- 380 vph from south to east
- 220 vph from east to north.

At 97 Avenue, there are 260 vph turning right from west to south, 250 vph turning left from west to north and 200 vph from south to west. At 92 Avenue there are 150 vph turning right from north to west and 220 vph from west to north. At 84 Avenue, there are 260 vph turning right from east to north, and 250 vph from north to east. 240 vph turn right from west to south.

At 76 Avenue, there are 200 vph turning right from north to west. At 68 Avenue, there are 520 vph turning left from north to east with 210 vph from east to north. There are minor volumes turning at both 60 and 50 Avenues.

South of 68 Avenue, there are about 440 vph southbound and 370 northbound.

3.1.3 59,000 Horizon (2020) Forecasts

These traffic volume forecasts are illustrated on Exhibit 3.3.

At 100 Avenue, there are heavy turning volumes as follows:

- 410 vph from north to west and 350 vph from west to north
- 460 vph from south to east and from east to south of 310 vph
- 400 vph from west to south
- 290 vph from east to north

At 97 Avenue, the from west to south right turn is 260 vph and the left turn from west to north is 270 vph. At 92 Avenue the left turn from west to north is 300 vph. At 84 Avenue, there are 250 vph turning from east to north and 260 vph from north to east. There are 280 vph turning right from west to south.

At 76 Avenue, there are 260 vph from north to west. At 68 Avenue, 570 vph turn left from north to east with right turns from east to north of 220 vph.

There are about 470 vph northbound and 620 vph southbound south of 68 Avenue.

3.2 Roadway Requirements

3.2.1 Present Requirements

At present population of about 40,000, a median should be constructed on 108 Street to produce a 4 lane divided cross section from 76 Avenue to 97 Avenue. The 2 lane section from 76 Avenue to 68 Avenue should be upgraded to 4 lanes divided. Applicable lengths of right and left turn lanes for at least a 20 year design life should be implemented at this time. Access control should be improved on the east side of 108 Street between 84 Avenue and 89 Avenue. Flared intersections should be implemented at 60 Avenue and 50 Avenue to provide bypass lanes for through traffic to avoid left turning traffic at these rural intersections.

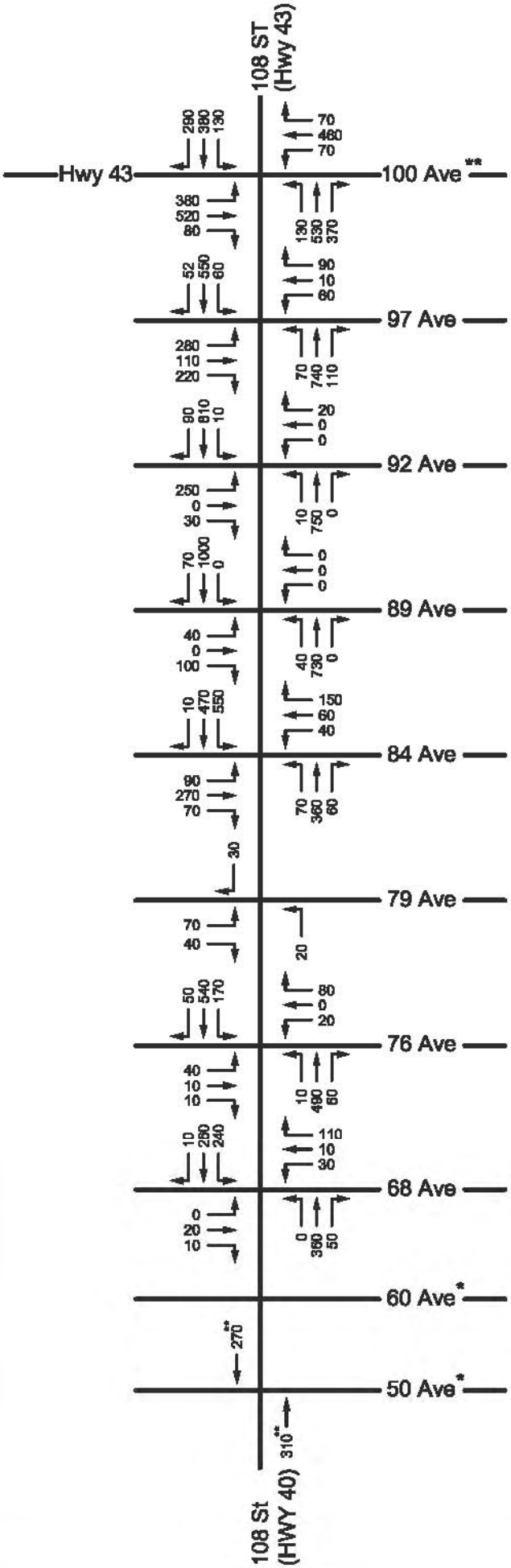
3.2.2 46,000 Horizon Requirements

No further capacity related improvements will be required by this horizon, however, access management measures to consolidate a number of existing approaches to 108 Street at the 60 Avenue intersection should be implemented.

3.2.3 59,000 Horizon Requirements

Similarly at the 59,000 horizon, the only improvements required would be additional access control measures to the north of 50 Avenue to consolidate present local accesses in the area at the 50 Avenue intersection.

Exhibit 3.1



P.M. Peak Hour Volumes
in vehicles per hour

* NOT PRESENTLY IN SERVICE

** TRANS COUNT IN 2002

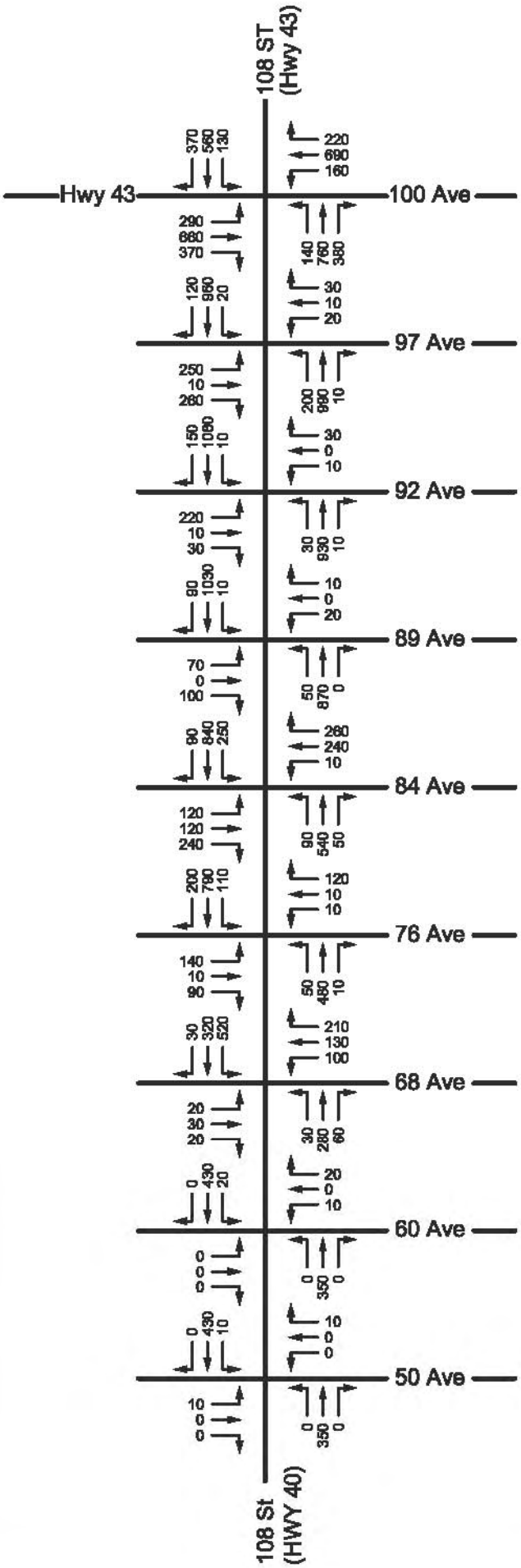
108 STREET FUNCTIONAL PLANNING STUDY

2003 TRAFFIC COUNTS

ISL Infrastructure Systems Ltd.

TC 04/MAR/26 K:\108900\108988-GP 108 ST FPS\EXHIBITS-03\TRAFFIC COUNT EXH.DWG

Exhibit 3.2



P.M. Peak Hour Volumes in vehicles per hour, 2002 Transportation Master Plan Forecasts

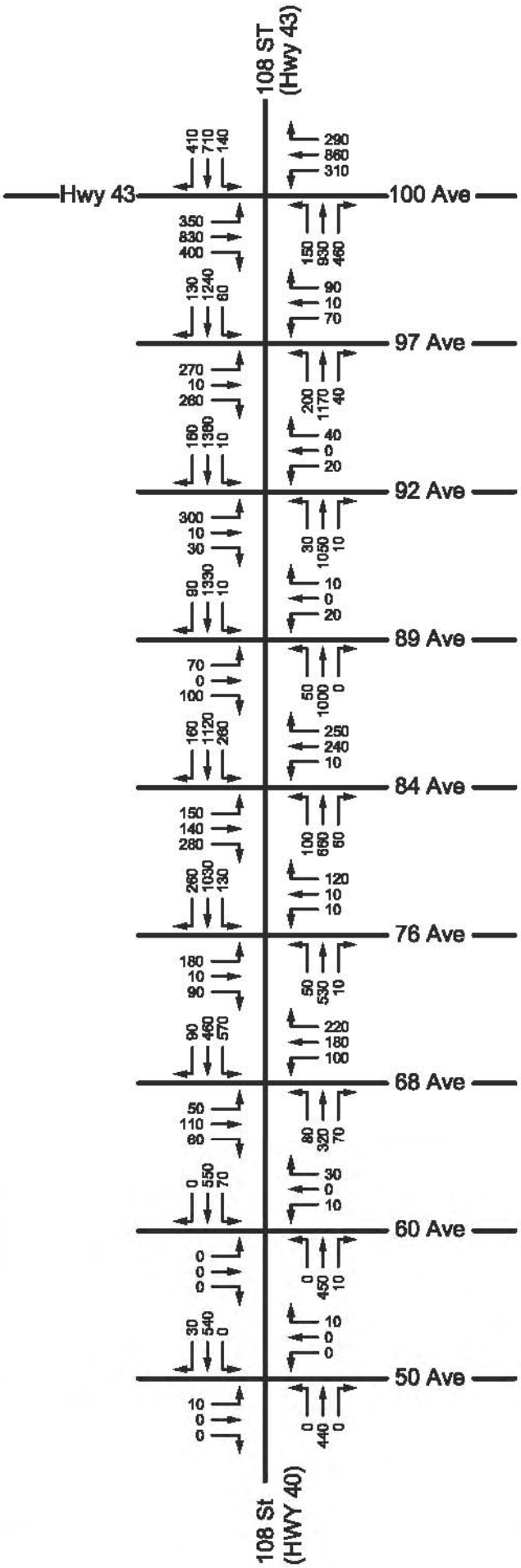
108 STREET FUNCTIONAL PLANNING STUDY

46,000 TRAFFIC FORECAST

ISL Infrastructure Systems Ltd.

TC 04/MAR/26 K:\108900\108988-GP 108 ST FPS\EXHIBITS-03\TRAFFIC COUNT EXH.DWG

Exhibit 3.3



P.M. Peak Hour Volumes in vehicles per hour, 2002 Transportation Master Plan Forecasts

108 STREET FUNCTIONAL PLANNING STUDY

59,000 TRAFFIC FORECAST

ISL Infrastructure Systems Ltd.

TC 04/MAR/26 K:\108900\108988-GP 108 ST FPS\EXHIBITS-GIS\TRAFFIC COUNT EXH.DWG

4

Background Information

4.1 Utilities

The following utilities were identified during the study. At the design stage, a thorough search of utilities in place at that time should be undertaken to ensure that all utilities have been identified and accurately located. Depth of cover should be determined at that time and any need for protection of underground utilities and pipelines or need to relocate buried shallow or above-ground utilities should be determined. A proposed sanitary trunk main may be located along 108 Street from 68 Avenue to 76 Avenue, with potential extension to 84 Avenue and south to about 50 Avenue. There is also a proposed watermain extension from 68 Avenue south to about 50 Avenue and a gas transmission line from 68 Avenue to the South City Limits. The utility locations are shown on Exhibits 4.1 through 4.4 at the end of this section and are outlined in the table below:

Table 4.1

Utilities Locations

Owner	Location Chainage (approx.)	Details
1. Atco Gas	0+820 to 3+220 (proposed)	Parallels road on west side
	1+830	Local service crossing
	2+080	Local service crossing
	2+390	Local service crossing
	2+440	Transmission line crossing
	4+030	Transmission line crossing
	4+870	Two Transmission line crossings
	4+870 to 5+380	Two lines parallel road on west side
	5+230	Local service crossing

Owner	Location Chainage (approx.)	Details
	5+380 to 6+400	Parallels on west side
	5+380 to 6+400	Parallels west side of service road
	5+430	Local service crossing
	5+800	Local service crossing
	5+950	Local service crossing
	6+060	Local service crossing
	6+130	Local service crossing
2. Atco Power (overhead lines)	0+820 to 6+220	Parallels road on east side
	1+410	Local service crossing
	2+400	Local service crossing
	3+220	Local service crossing
	4+020	Local service crossing
	4+870	Powerline crossing
	5+370	Local service crossing
	5+980	Powerline crossing
	5+980 to 6+230	Parallels road on east side
3. City of Grande Prairie/Aquatera		
3.1 Stormwater Lines	4+200 to 6+400	Parallels road on west side
	4+860	Stormwater crossing
	5+280	Catchbasin connection
	5+380	Catchbasin connection
	5+380	Stormwater connection
	5+950	Catchbasin connection
	6+040	Catchbasin connection
	6+120	Catchbasin connection
	6+230	Catchbasin connection
3.2 Sanitary Sewers	1+600 (proposed)	Trunk crossing
	1+600 to 3+220 (proposed)	Trunk parallels on west side
	2+820 (proposed)	Trunk crossing
	3+220 to 4+840 (proposed)	Trunk, parallels on west side
	3+250 to 3+620	200mm, parallels on east side
	4+860	375mm crossing
	5+400	250mm crossing
	5+400 to 5+600	200mm, parallels on west side
	4+860 to 5+670	675mm, parallels on east side
	5+670 to 6+030	600mm, parallels on east side

Owner	Location Chainage (approx.)	Details
	6+030	600mm crossing
	6+030	300mm crossing
	6+030 to 6+400	600mm, parallels on west side
	6+030 to 6+220	200mm, parallels on west side
3.3 Waterlines	1+610 to 3+250 (proposed)	Watermain, parallels on east side
	3+240 to 4+050	400mm, parallels on eastside
	4+050	400mm crossing
	4+050 to 6+440	350mm, parallels on east side
	4+330	300mm crossing
	4+870	200mm crossing
	4+870 to 5+120	200mm, parallels on east side
	5+120	150mm crossing
	5+120 to 6+400	150mm, parallels road on west side (at least section north of 97 Avenue abandoned)
	5+670	200mm crossing
	6+050	200mm crossing
4. Telus	0+820 to 5+990	Line parallels on west side
	3+280	Crossing
	5+990	Line crosses north of RailNet
	5+990 to 6+400	Line parallels on east side

4.2 Drainage

The full report on the drainage considerations is provided in Appendix A. This drainage component is based on the recommendations of the City's Master Drainage Plan (2001).

The design criteria utilized for major storms is a maximum release rate of 5 l/s/ha and a 1:100 year, 24 hour storm. There is no existing piped stormwater system south of 76 Avenue. Both 1 in 5 year (minor storm) and 1 in 100 year storms were modelled for the Master Drainage Plan.

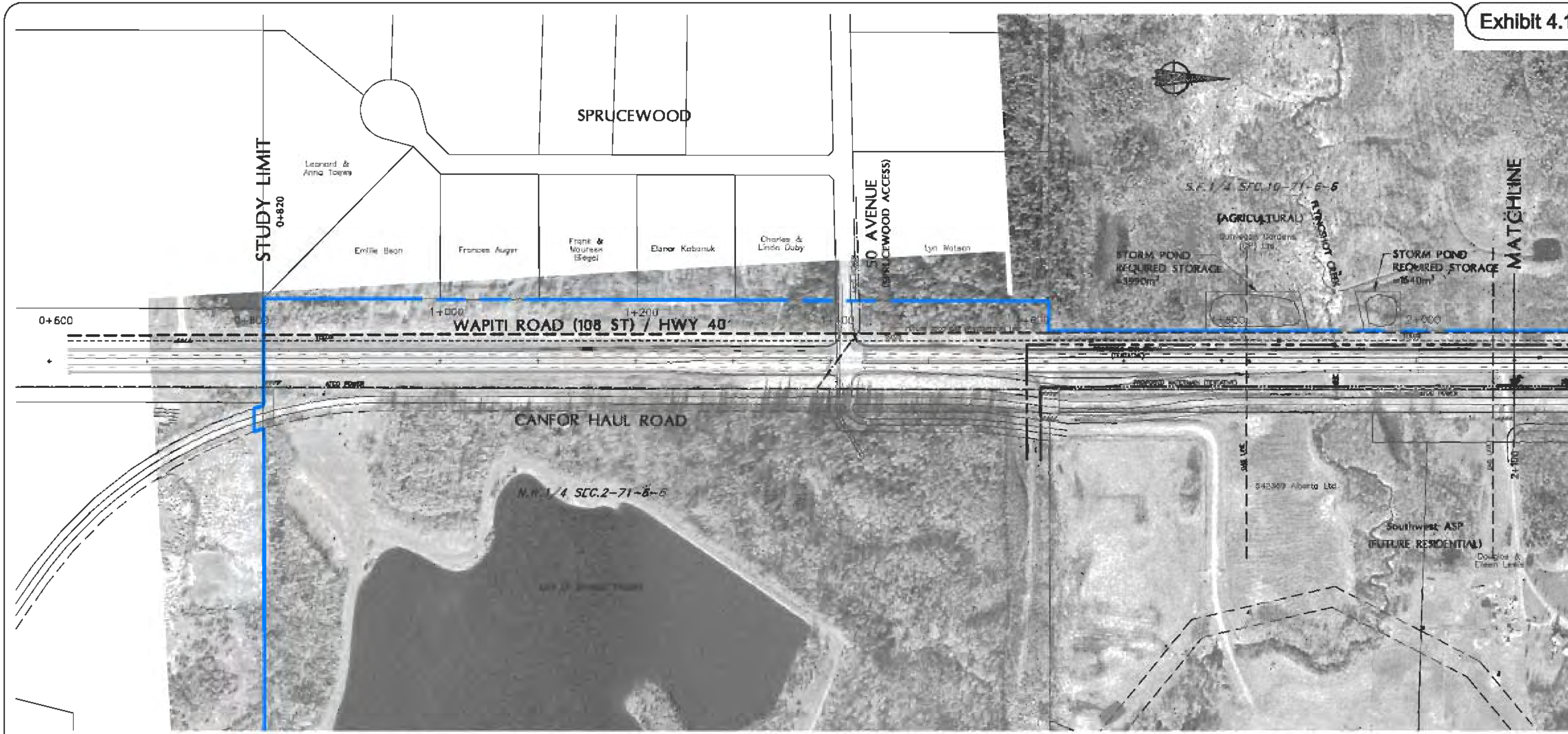
A temporary storage area of 3,990 m^3 would be required for 108 Street south of Flyingshot Creek. Two ditch storage areas on either side of 108 Street will be required to accommodate this storage. From south of 76 Avenue to about 60 Avenue, stormwater

should be intercepted and routed into O'Brien Lake. A sedimentation pond may be required prior to this stormwater being discharged into the lake. 3,560 m³ of storage in the area of the lake would be required or a 4 cm rise in lake elevation would have to be tolerated to handle these flows. South of 60 Avenue, 1,640 m³ of temporary storage capacity is required. Though it would be desirable to direct this flow to a regional storage facility, this storage could be accommodated by a temporary pond north of Flyingshot Creek.

North of 76 Avenue to the RailNet tracks, it is proposed to drain the road runoff into existing storm sewers and hence use the east-west drainage ditch through Canfor to Bear Creek. An additional 5,430 m³ pf storage would be required at the pond near Bear Creek to accommodate this stormwater. The drainage ditch may have to be upgraded to handle existing and future flows.

From RailNet to 100 Avenue, it is recommended that a stormwater pond be constructed in the road right-of-way on the east side of 108 Street between RailNet and 97 Avenue. Additional storage of about 1,400 m³ would be required.

Exhibit 4.1



108 STREET FUNCTIONAL PLANNING STUDY

UTILITY PLANS

South City Limit to North of 50 Avenue

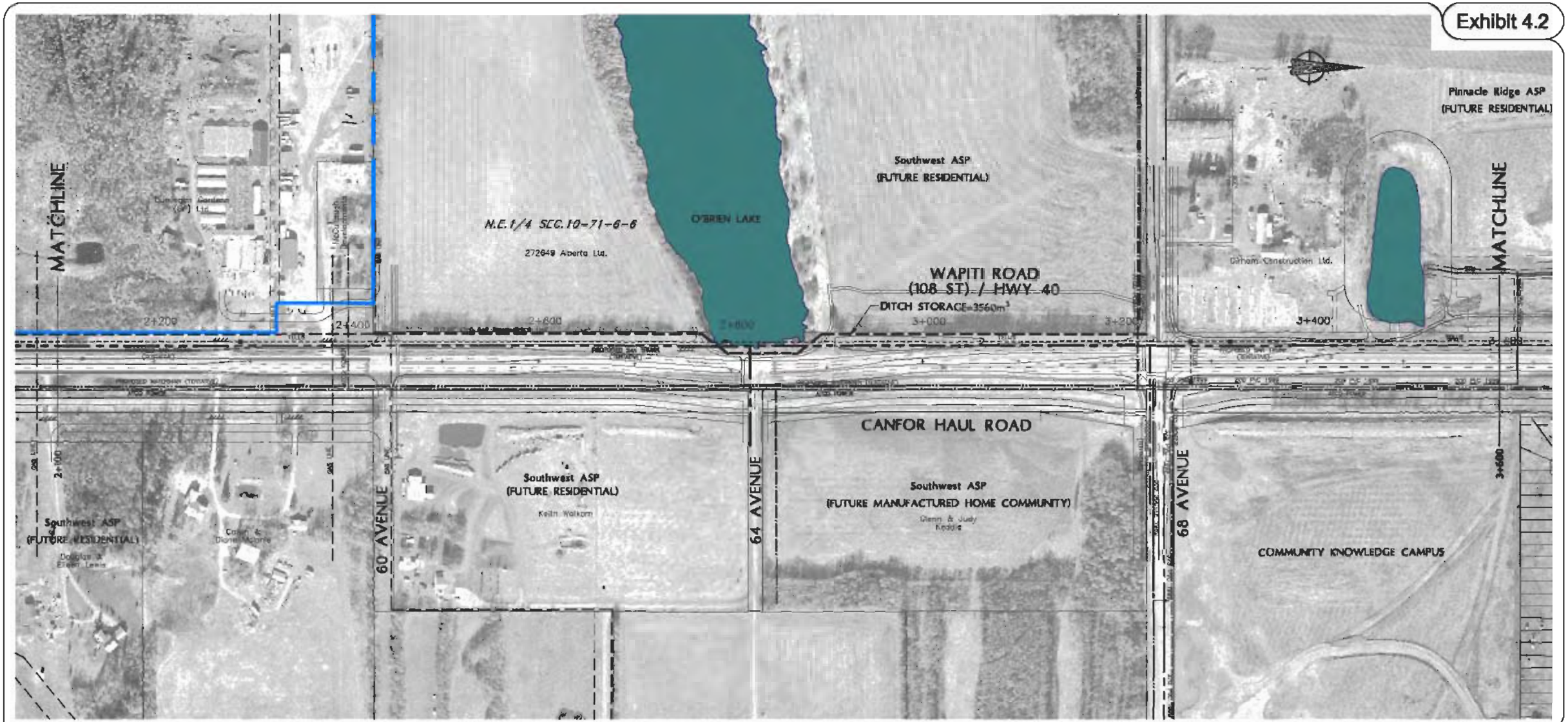
ISL Infrastructure Systems Ltd.

LEGEND

- GAS LINE
- STORM LINE
- SANITARY LINE
- WATER LINE
- POWER LINE
- TELUS LINE

NOTE:
THE LOCATION OF THE UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL ALSO VERIFY THE EXACT LOCATION AND INVERT ELEVATION BY HAND EXCAVATION BEFORE CONSTRUCTION OF THE UTILITY CROSSING AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE.

Exhibit 4.2



LEGEND

- GAS LINE
- STORM LINE
- SANITARY LINE
- WATER LINE
- POWER LINE
- TELUS LINE

NOTE:
THE LOCATION OF THE UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL ALSO VERIFY THE EXACT LOCATION AND INVERT ELEVATION BY HAND EXCAVATION BEFORE CONSTRUCTION OF THE UTILITY CROSSING AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE

108 STREET FUNCTIONAL PLANNING STUDY

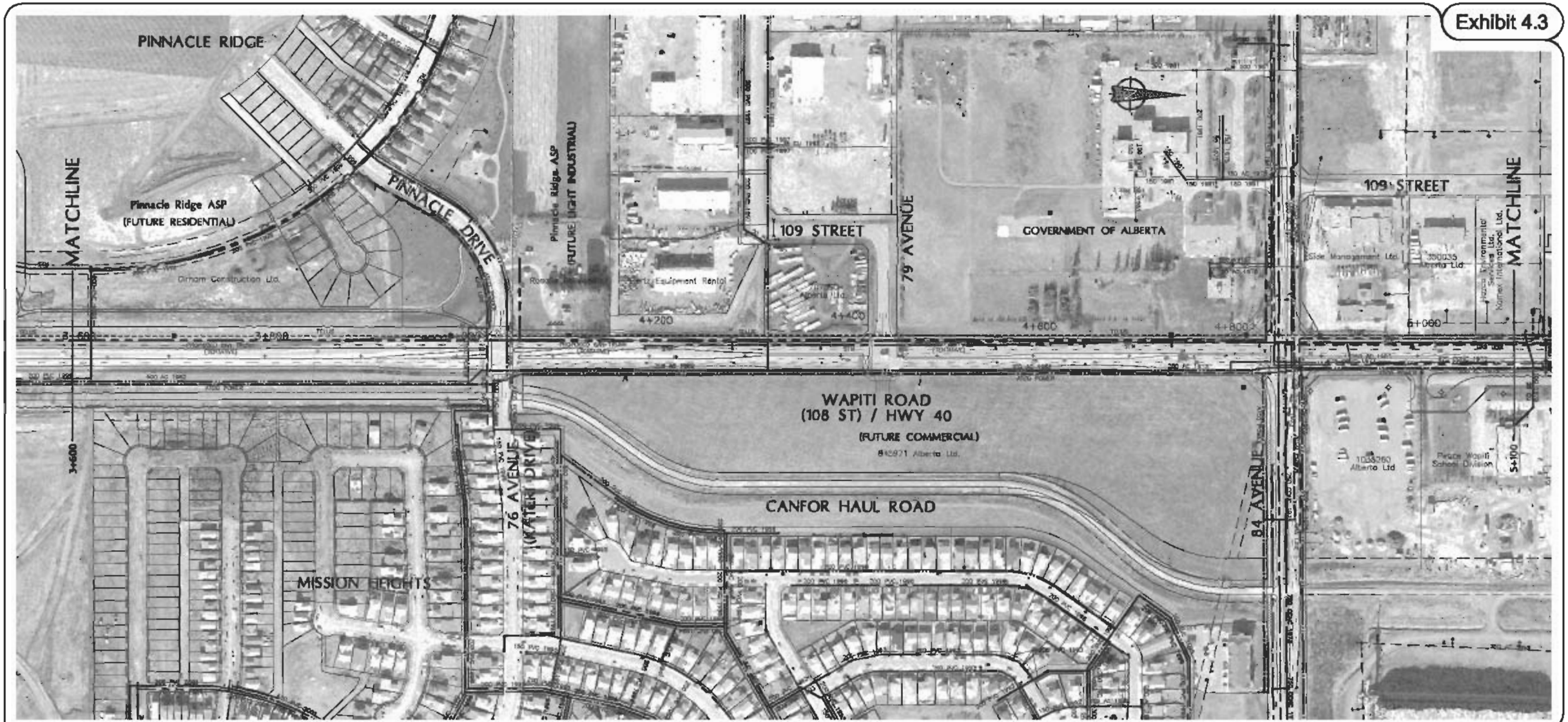
UTILITY PLANS

South of 60 Avenue to North of 68 Avenue

ISL Infrastructure Systems Ltd.

TC 04/MAR/23 K:\106000\106926-01P 108 ST FPS\EXH\B-TB-02\106926-UTILITY.DWG

Exhibit 4.3



LEGEND

- GAS LINE
- STORM LINE
- SANITARY LINE
- WATER LINE
- POWER LINE
- TELUS LINE

NOTE:
THE LOCATION OF THE UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL ALSO VERIFY THE EXACT LOCATION AND INVERT ELEVATION BY HAND EXCAVATION BEFORE CONSTRUCTION OF THE UTILITY CROSSING AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE.

108 STREET FUNCTIONAL PLANNING STUDY

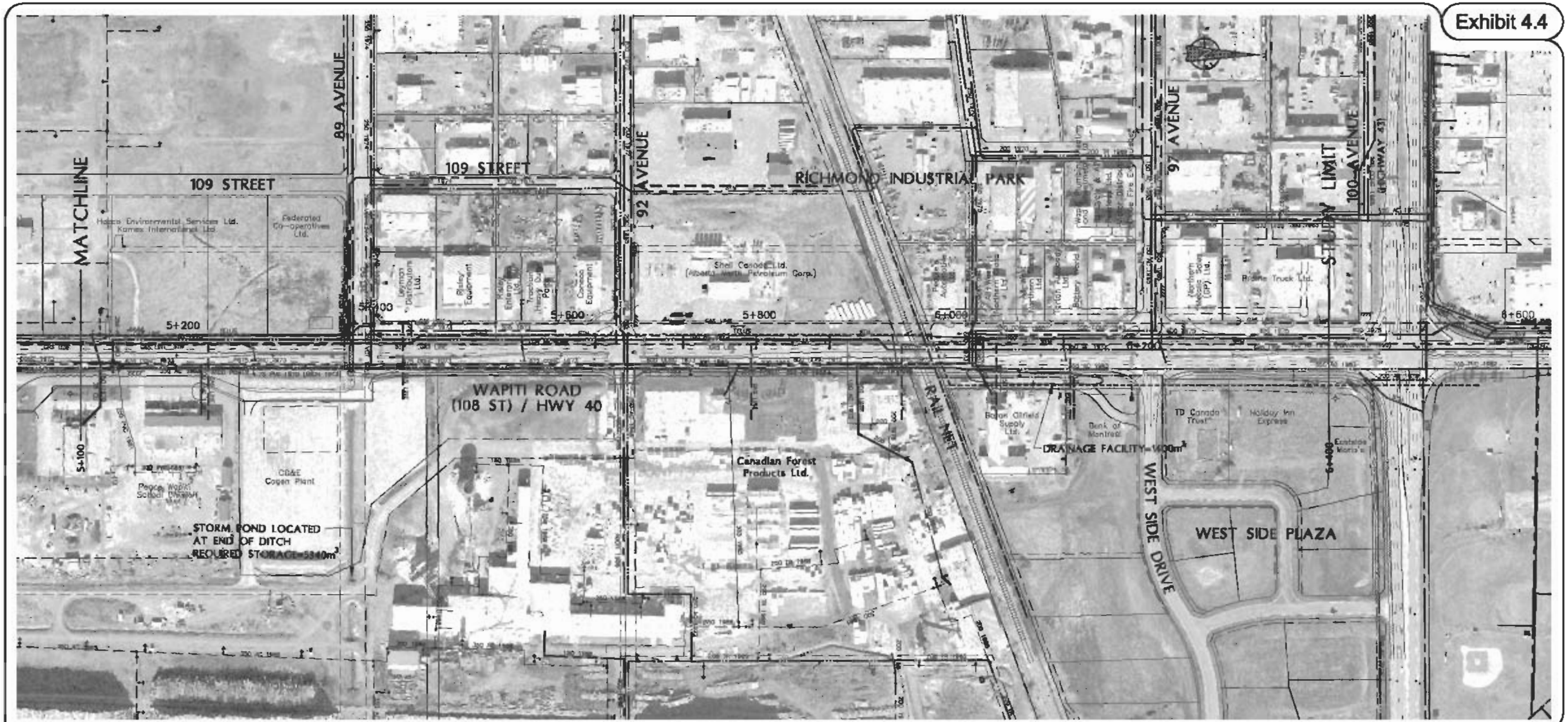
UTILITY PLANS

South of 76 Avenue to North of 84 Avenue

ISL Infrastructure Systems Ltd.

TC 000ECV11 K:\105000\105888-CP 108 ST PFS\EXHIBITS\105888 UTILITY.DWG

Exhibit 4.4



TC 000ECV11 K:\105000\105868-GP-108 ST FPS\EXHIBITS\105868-UTILITY.DWG

LEGEND

- GAS LINE
- STORM LINE
- SANITARY LINE
- WATER LINE
- POWER LINE
- TELUS LINE

NOTE:
THE LOCATION OF THE UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL ALSO VERIFY THE EXACT LOCATION AND INVERT ELEVATION BY HAND EXCAVATION BEFORE CONSTRUCTION OF THE UTILITY CROSSING AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE.

108 STREET FUNCTIONAL PLANNING STUDY

UTILITY PLANS

South of 89 Avenue to 100 Avenue

ISL Infrastructure Systems Ltd.

5

Design Standards

At the ultimate stage, a design speed of 80 km/h would be appropriate on 108 Street for a 4 or 6 lane, high capacity roadway with a number of at grade intersections. As 108 Street is a highway route, a reasonably high design speed and stringent access management should be employed. However, there are existing relatively closely spaced intersections in place, particularly from 84 Avenue to 100 Avenue which will necessitate a design speed of about 70km/h. The rural section south of 60 Avenue at the two lane stage is designed for a 110 km/h design speed as it will essentially continue to be a rural highway until urban development occurs in this area. The present speed limit reduces to 80 km/h south of 60 Avenue, and then to 60 km/h south of 68 Avenue.

Typical design parameters for the 80 and 110 km/h design speeds are as follows:

	80 km/h (TAC)	**110 km/h (TRANS)**
• Minimum horizontal curve radius	250 m	600 m
• Superelevation rate	0.06 m/m	0.06 m/m
• Minimum crest curve	K 24-36	K 100
• Minimum sag curve (lighted)	K 12-16	K 30
(unlighted)	K 25-32	K 60
• lane width	3.7 m	3.7 m
• design vehicle	WB 21	WB 21
• decelaration distance for intersections	130 - 170 m	190 m

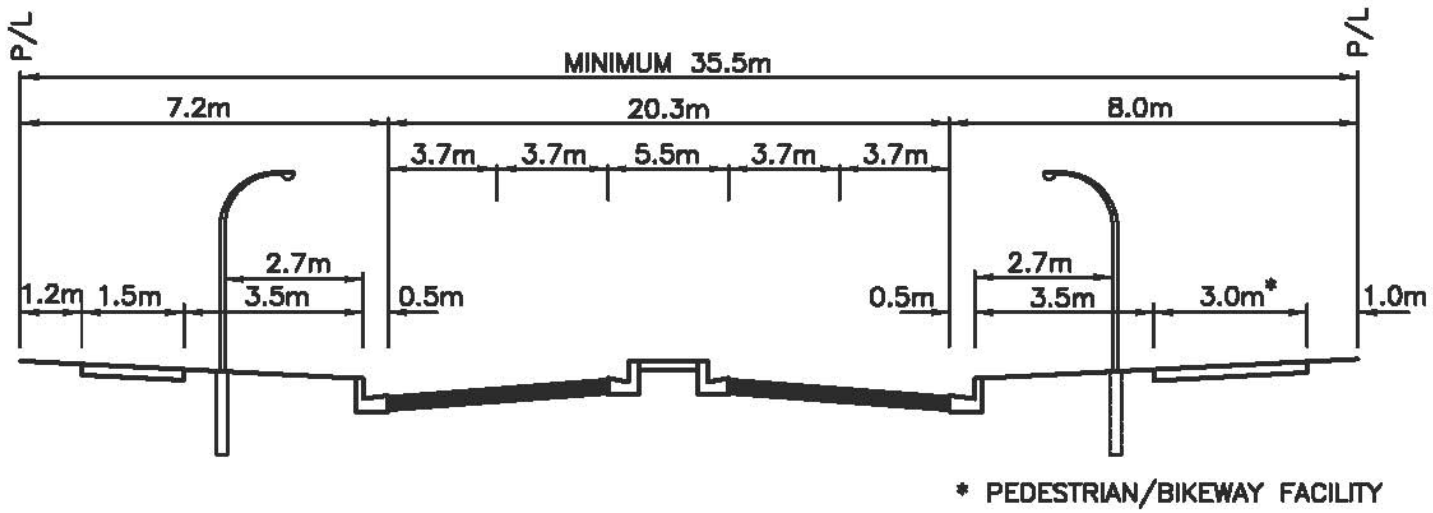
Loaded log trucks with 9 m log overhang presently turn off of 108 Street to Canfor at the

76 Avenue intersection. Turns from north to east must be designed to account for the outstwing of logs overhanging the rear axle. Also at 84 Avenue, the from west to south movement will require log truck design to handle trucks approaching from the west on 116 Street and 84 Avenue. As loaded log trucks presently use the 100 Avenue / 108 Street intersection, it is assumed that this intersection has been designed for these vehicles particularly for the movement from west to south. The above assumes that log trucks will continue to access the Canfor plant via 76 Avenue at the Canfor Haul Road. If this access location changes, the effected intersection will have to be designed to safely accommodate the log trucks turning at the intersection.

Typical cross sections for the 4 lane divided roadway through rural areas, commercial / industrial uses and through residential areas are shown on Exhibit 5.1and 5.2. Exhibit 5.2 also shows a 6 lane divided cross section required in the ultimate stage between 84 Avenue and 100 Avenue.

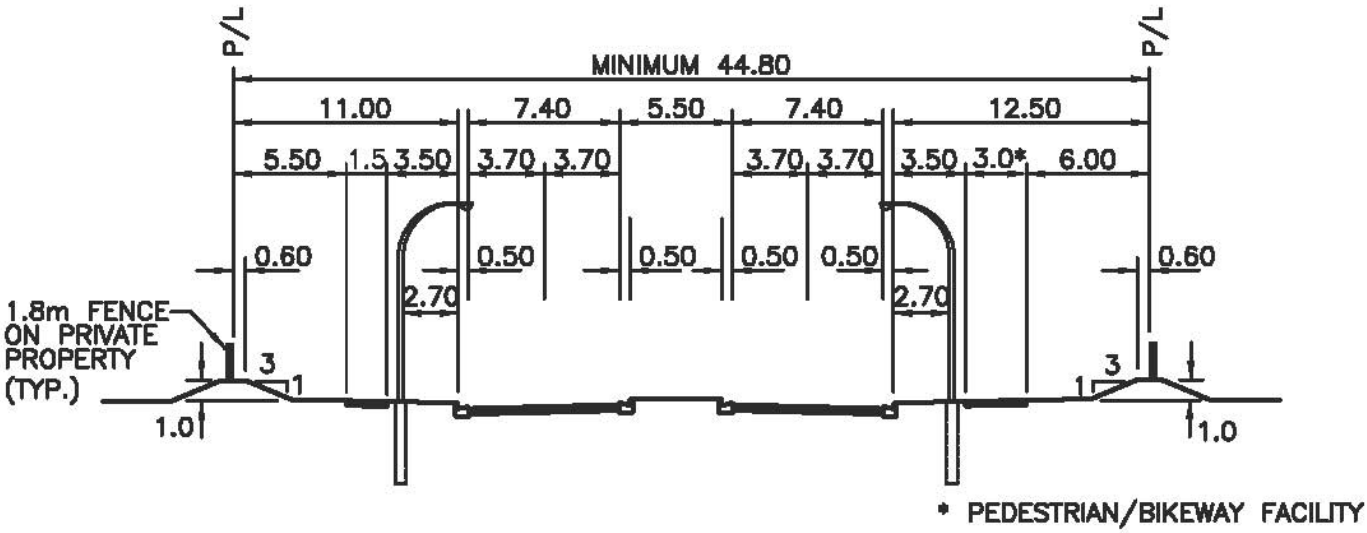
Turning bay lengths have been determined on the basis of requirements for storage of turning vehicles, ability to bypass mainline queues, and deceleration length required for the design speed. The latter usually dictates turning lane length. At the design stage, the current turning volume storage and through traffic queues should be checked to ensure that adequate turning lane lengths and tapers to handle the more current design year traffic (20 years post construction) are provided. The lengths provided in this report have been based on traffic forecasts developed for the 2002 Transportation Master Plan, as outlined in Section 3, which are the most current traffic forecasts available at this time.

Exhibit 5.1



* PEDESTRIAN/BIKEWAY FACILITY

4 LANE DIVIDED ARTERIAL



* PEDESTRIAN/BIKEWAY FACILITY

4 LANE DIVIDED ARTERIAL WITH NOISE BERMS

NOT TO SCALE

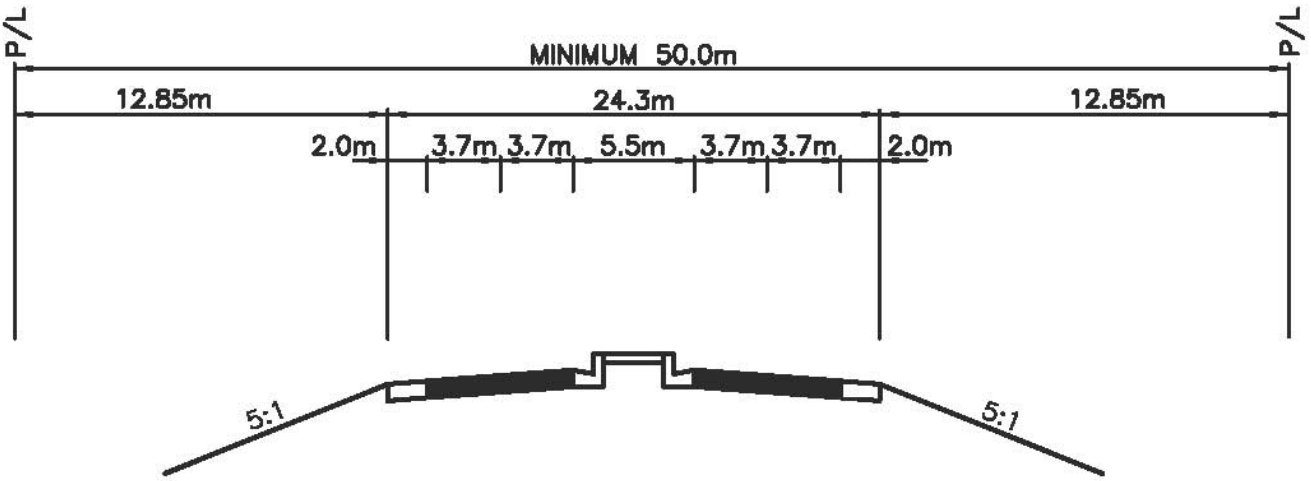
108 STREET FUNCTIONAL PLANNING STUDY

TYPICAL CROSS SECTIONS

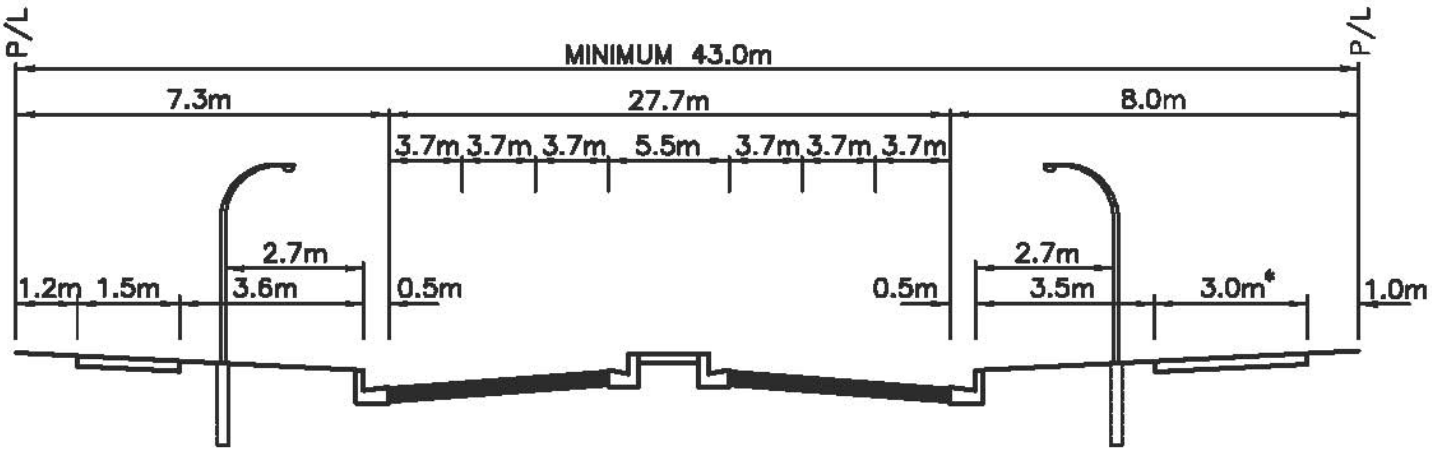
ISL Infrastructure Systems Ltd.

TC 04/MAR/16 K:\109000\109898-GP 108 St FPS\EXHIBITS-08\TYP-X-SECTION.DWG

Exhibit 5.2



4 LANE DIVIDED RURAL ARTERIAL



* PEDESTRIAN/BIKEWAY FACILITY

6 LANE DIVIDED ARTERIAL

TC 04/MAR/16 K:\109000\109898-GP 108 St FPS\EXHIBITS-08\TYP-X-SECTION.DWG

NOT TO SCALE

108 STREET FUNCTIONAL PLANNING STUDY

TYPICAL CROSS SECTIONS

ISL Infrastructure Systems Ltd.

6

Functional Plans/Profiles

All exhibits illustrating the plans, profiles and property requirements are provided at the end of this section.

Construction costs for this project from the South City Limit to just south of 100 Avenue are estimated as follows:

• Stage 1	$	10.7 m
• Stage 2	$	0.42 m
• Stage 3	$	0.40 m
• Ultimate Stage	$	5.1 m
• Total Costs	$	16.6 m

The unit costs utilized in preparing these estimates are as follows:

Item	**Unit Cost**
• Earthwork	$8.00 per m^3
• Pavement	$30.00 per m^2
• Curb and Gutter	$60.00 per m
• Sidewalk/Median/Islands	$60.00 per m^2
• Asphalt Bikeways	$20.00 per m^2
• Signing	4%
• Drainage	12%
• Landscaping	4%
• Traffic Signals	$250,000 per intersection
• Street Lights	$300,000 per km
• Rail Crossing	$300,000
• Pavement/Concrete/Removals	$5.00 per m^2
• Curb and Gutter Removals	$2.00 per m
• Retaining Wall	$500.00

- Contingencies 20%

These costs reflect costs to stage construction incrementally from now through the ultimate development as outlined in this section and do not include costs for major utilities or for right-of-way requirements.

The access locations shown in this report reflect the access management recommendations in TRANS' 2001 Highway 40:42 Access Management Study.

6.1 Ultimate Stage

The Ultimate Stage plans include acceleration lanes at a number of intersections. These were added at the direction of the city's Public Works Committee. Exhibits 6.1 through 6.4 were modified to reflect this new direction, however, time did not permit a number of consequential issues to be resolved. These issues are identified in Appendix C.

6.1.1 South City Limits to North of 50 Avenue

The alignment for future 108 Street follows the existing 108 Street in this section as shown on Exhibit 6.1 from 0+820 to 2+100. The roadway is essentially centred on the existing right-of-way for the roadway. 108 Street is paralleled to the east by the Canfor Haul Road. The offset for the haul road in this area is approximately 40 m from 108 Street, centerline to centerline.

The cross-section in this area is a 4 lane divided section with 4 lanes, a raised 6 m median, 2 m shoulders and ditch drainage. North of 50 Avenue, the speed limit presently reduces from 100 km/h to 80 km/h.

The profile for 108 Street is generally quite flat. All vertical curves are well above the minimums for a 110 km/h design speed.

On Exhibit 6.1, an intersection is provided for 50 Avenue at 1+420 to provide access to the Sprucewood subdivision. It also provides access to the east across the Canfor Haul Road to provide access to NW 2-71-6-6 and the south portion of SW 11-71-6-6. This

intersection has a 130 m right turn lane for movements from north to west and 150 m long left turn bays for movements from south to west and from north to east. The latter left turn is anticipated to be very light until urban development occurs in SW 11.

It should be noted that in this southwest section of the City, there have been no plans for east/west arterial roadways extending west of 116 Street. This is an important question which should be addressed by the next Transportation Master Plan revision, but the issue is raised that there will likely be a need for an east/west arterial just north of 50 Avenue which could be extended from 108 Street to west of Flyingshot Lake. It would be wise to protect for an east-west arterial road right-of-way north of Sprucewood Subdivision if developments are proposed in this area.

A 30 m right-of-way is required from the City land in NW 2-71-6-6 to accommodate the service road east of the highway (Exhibit 6.17). In SW 11-71-6-6, the service road extension would be a private roadway. A parcel is required east of the existing Haul Road to accommodate the diversion of the Haul Road around the proposed tourist information pullout and the temporary stormwater ponds in the area of Flyingshot Creek. In SE 10-71-6-6, two parcels are required to accommodate the two temporary ponds at Flyingshot Creek.

A tourist information turnout is provided between 50 Avenue and Flyingshot Creek at about 1+660. It will have room for two large parked trucks. A taper and declaration lane of about 160 m and an acceleration lane and taper of about 200 m are provided from the parking area. Construction costs for the related road improvements for the turnout are included in the cost estimates. Costs for the sign would be in the order of $25,000.

The Flyingshot Creek crossing (presently two 2.7 m pipes) would have to be extended at a cost of about $125,000 when this section is 4 laned.

Noise attenuation may be required in this area where residential land use is planned as 108 Street is a truck route. Adequate noise attenuation as approved by the City would be required.

6.1.2 South of 60 Avenue to North of 68 Avenue

Exhibit 6.2 shows the ultimate road improvements in this area from 2+100 to 3+600.

The road alignment follows the existing highway except for a slight diversion to the east to avoid negative impact on O'Brien Lake. Gentle reverse curves of R 1200/800/1200 provides this minor diversion.

There is a grade of 2.6% from about 2+100 to 2+380. Otherwise, all grades are quite flat. From 2+380 to 2+890, the present highway grade has been increased to 0.5% to provide adequate longitudinal drainage when the urban cross section with curb and gutter is provided north of 60 Avenue. An existing recently constructed grade of about 0.4% from 68 Avenue to about 3+700 has been retained. Additional catch basins will be required along 108 Street to provide adequate longitudinal drainage on this grade.

An intersection is provided at 60 Avenue which is planned as a collector roadway. Through the intersection area, 60 Avenue is 4 lanes undivided and would taper to a 2 lane collector cross-section in the adjacent subdivision on each side of 108 Street. This cross-section allows a lane for left turns from 60 Avenue on to 108 Street while allowing right turn and through movements around the left turning traffic. It also allows simultaneous left and right turns off of 108 Street on to 60 Avenue. This design is used at most collector intersections along 108 Street north to 100 Avenue. Left turn lanes of about 170 m including tapers and right turn lanes of about 150 m and 180 m including tapers are provided on the north and south approaches respectively. North of 60 Avenue, the design speed reduces to 80 km/h.

Service roads are provided from 60 Avenue to access present developments in the southwest quadrant of the intersection and in the southeast quadrant. These service roads should be eliminated when urban development occurs in this area and be replaced with an internal road system at that time.

Another collector intersection is provided at 64 Avenue. This is a T-intersection adjacent to O'Brien Lake. Two westbound lanes are provided at the intersection to allow separation of left and right turning traffic so that left turning traffic does not block the right

turns. The left turn from north to east is served by about a 150 m protected left turn lane.

At 68 Avenue, a major arterial intersection is provided. All right turns have about 160 m right turn lanes with right turn islands at the intersection. Left turn lanes of about 130 m to 160 m are provided on all approaches. The from north to east left turn has double left turn lanes with the from south to west movement accommodated by a slotted left turn.

In this area, the Canfor Haul Road parallels 108 Street at a spacing of about 40 m to 50 m centreline to centreline. Log haul movements will negatively impact traffic operations and safety due to the close location of the Haul Road intersection to the 68 Avenue/108 Street intersection.

Property requirements are shown for this section of roadway on Exhibit 6.18. Property will be required in both south quadrants of the 60 Avenue intersection to provide for the proposed service roads (30 m strip to the east and 15 m on west side). At 64 Avenue and 68 Avenue, small triangles of land are required to accommodate the diversion to the east of the Canfor Haul Road. At 64 Avenue, the diversion of 108 Street east of O'Brien Lake is also a contributing factor.

At 68 Avenue, widening of 13.4 m is required in the southeast quadrant, and 12.6 m in both west quadrants. Though this right of way is required mainly for 68 Avenue widening, it will likely be required first for upgrading of the 68 Avenue intersection at time of 4 laning 108 Street. If the road upgrading precedes development in the area, a stormwater pond (3560 m^3) may have to the constructed to accommodate additional runoff due to the road upgrading. This pond can be accommodated in the 108 Street right of way which would be available just north of O'Brien Lake, created by the relocation of 108 Street to the east in the area of 64 Avenue. If the developments in the area precede the road construction, ponds for these developments should include the requirements to handle the additional roadway runoff and negate the need for this pond.

As it is City policy to provide noise attenuation for new residential areas on truck routes, noise berms/fences should be provided on both sides of 108 Street in this area.

North of 60 Avenue, a sidewalk is provided on the east side of 108 Street, while a bikeway is provided on the west. Between O'Brien Lake and 68 Avenue, this bikeway connection is provided through the subdivision, not parallel to 108 Street.

6.1.3 South of 76 Avenue to North of 84 Avenue

The ultimate stage for this section of 108 Street from 3+600 to 5+100 is shown on Exhibit 6.3.

In this section, 108 Street is on a tangent alignment, centred on the existing right-of-way. There are no significant grades in this area with the maximum grade being a short section at 1.8%. The grades generally follow the existing profile. At the 84 Avenue intersection, 108 Street transitions to a 6 lane divided cross-section by providing a continuous northbound lane for the right turn from east to north and terminating the additional southbound lane at the right turn from north to west.

In the section from 68 Avenue to 76 Avenue, the median is 9.2 m wide to accommodate the double left turn lane at 68 Avenue and log haul left turns at the 76 Avenue intersection.

Intersections are provided in this area at 76 Avenue, 79 Avenue and 84 Avenue.

The intersection at 76 Avenue provides slotted left turn bays for the movements from south to west and from north to east. This intersection has to be carefully laid out at the design stage to safely handle log trucks with a 9 m overhang for the from north to east movement as this is the access to Canfor Haul Road which, in turn intersects 76 Avenue about 40 m east of the centreline of 108 Street. Right turn lanes are provided for turns from north to west and south to east. 76 Avenue is 4 lanes undivided at the intersection to efficiently handle the through and turning movements off of and on to 76 Avenue.

A local intersection is located at 79 Avenue to access the industrial uses west of 108 Street. Left turn lanes and right turn lanes are provided on the north and south approaches on 108 Street. In the area of the intersection, 4 lanes undivided are provided to accommodate through and turning traffic on 79 Avenue. 79 Avenue also provides

access to a proposed commercial development east of 108 Street. In the long term, signals may be required at this intersection, however, with traffic signals at both 76 and 84 Avenues, it is anticipated that adequate gaps for the 79 Avenue traffic may be available for some time into the future.

At 84 Avenue intersection, left and right turn lanes are provided on all 4 approaches. Islands are utilized to channelize all right turns. West of 108 Street on 84 Avenue (at 109 Street), right in/ right outs are provided in both directions of travel with no median break. All directional access will be available about 300 m west of 108 Street. On the east approach, a right in / right out will be provided about 60 m west of the Canfor Haul Road along with about a 100 m right turn lane. This right in / right out should be subject to a satisfactory traffic impact assessment at the time that development proceeds in the area. About 140 m north of 84 Avenue another right in / right out is provided on the east side of 108 Street to access the parcel directly north of 84 Avenue and to the Peace Wapiti School Division property. The existing east service road may be utilized to provide north-south access to the three properties in this area. The service road may eventually tie into the 89 Avenue intersection just north of the C.G. and E. co-generation plant. A portion of this existing private service road and the 89 Avenue intersection are shown on Exhibit 6.4.

As shown on Exhibit 6.19, a thin sliver of property is required on the northwest quadrants of the 76 and 79 Avenue intersections to accommodate the right turn lanes from north to west. On the east side of 108 Street, a small strip of land is required for the right turn lane in the southeast quadrant of the 84 Avenue intersection and narrow strip (6.3 m) along 108 Street north of 84 Avenue to accommodate the ultimate 108 Street roadway cross-section. In addition, between 84 Avenue and 89 Avenue, property may be required for the right in / right out and the service road north to 89 Avenue. This existing service road may become a public road to serve multiple landowners. Corner cuts are required in the southwest, southeast and northeast quadrants of the 84 Avenue intersection to provide for right turn movements.

Sidewalk is provided on the east side of 108 Street from south of 76 Avenue to 84 Avenue. A bikeway is provided on the west side of 108 Street through this section.

Considering the City's policy to have noise attenuation provided along truck routes in residential areas, noise attenuation should be provided on the west side adjacent to Pinnacle Ridge and on the east side from the south to 76 Avenue. It appears that providing the berm/fence combination may not be feasible due to lack of property on the east side unless the Haul Road is abandoned at some point in the future or a noise wall could be considered.

6.1.4 South of 89 Avenue to 100 Avenue

In this area, shown on Exhibit 6.4, 108 Street remains on a tangent alignment from 5+100 to 6+400 just south of the 100 Avenue intersection. The profile through this area is very flat, in fact 0.5% grades or better are introduced to provide adequate longitudinal grades for urban curb and gutter drainage. The 6 lane divided cross-section is provided from 84 Avenue to 100 Avenue, responding to heavy traffic volumes in this area at the long range ultimate stage.

An intersection is provided at 89 Avenue, which is an industrial collector in this area. 89 Avenue is extended east to provide access to the C.G.&E. co-generation plant. We understand that loaded truck access to their site will be provided via the 76 Avenue intersection and then north on the Canfor Haul Road. Right turn lanes are shown on the north approach to 89 Avenue and left turn lanes on both north and south approaches. 89 Avenue has 4 lanes undivided on the west approach to allow simultaneous left turns with through and right turns. Access to Leyman Distributors will be provided by a right-in just west of the intersection and a wider 2-way access further west on their property. 89 Avenue will transition to a 2 lane section to the west. It is expected that this intersection will require signals at some point in the future. Warrants should be checked regularly as traffic volumes increase on both 108 Street and on 89 Avenue.

The intersection at 92 Avenue provides access to the Canfor plant east of 108 Street and to the industrial area west of 108 Street. It provides left turn lanes on the north and south approaches to the intersection and a right turn lane on the north approach. Four lanes undivided are provided in the vicinity of the 108 Street intersection on 92 Avenue, tapering to 2 lanes west of the Shell cardlock. At Shell, a right-in is provided west of the

intersection with an all directional intersection about 100 m west of 108 Street. The existing service road is retained in the southwest quadrant, connecting south to terminate at Leyman Distributors (no service road connection to 89 Avenue). The service road intersection is relocated slightly to the west to improve traffic operations at the intersection. The 108 Street/92 Avenue intersection is presently signalized.

The RailNet crossing will have to be widened to accommodate the median and additional two lanes. Due to the infrequent rail traffic, gates are not anticipated to be warranted for some time.

At 97 Avenue, traffic signals are presently in place. This is a fairly major industrial/ commercial collector roadway. On 108 Street, there are left and right turn lanes on both the north and south approaches to the intersection. All right turns except the from west to south turn have channelizing islands. Four lanes undivided are provided on 97 Avenue in the vicinity of the intersection. The service road in the southwest quadrant of the intersection connects to 97 Avenue just west of the intersection. The service road intersection is offset slightly west from its present location. The present service road in the northwest quadrant is terminated at Northern Metallic Sales. This latter service road accesses 100 Avenue at 110 Street.

Upgrading of the 100 Avenue intersection is also shown on this exhibit. The intersection is upgraded to provide 6 through lanes on 108 Street through the intersection. Channelized right turns are provided in all four quadrants. Double left turn lanes are provided on the east and west approaches and single lane left turns on the north and south approaches as at present. This intersection is presently under Alberta Transportation's jurisdiction, so the final intersection configuration will be their responsibility. The intersection upgrading shown can be accommodated within the present right-of-way with an urban design.

On Exhibit 6.20, a 6.8 m strip of right-of-way is required from 89 Avenue to RailNet on the east side to accommodate the highway widening along with corner cuts at the 92 Avenue intersection just east of 108 Street. Small triangular parcels are required to offset the service roads in the southwest quadrants of the 92 and 97 Avenue intersections. Property requirements through Peace Wapiti and C.G. & E. were discussed in the

previous section. As there is a need to accommodate additional runoff from 108 Street of about 1400 m^3, this capacity may be accommodated in the present east service road right of way north of RailNet which is no longer required for a service road.

From south of 84 Avenue to 89 Avenue, a bikeway is provided on the west side of 108 Street. This bikeway then switches to the east side from 89 Avenue to 100 Avenue.

Costs for upgrading to this ultimate stage from the road improvements to be implemented by the 59,000 population horizon are estimated at $4.6 m.

6.2 Stage 1 (40,000) Stage Plans

The Stage 1 plans are shown on Exhibits 6.5 through 6.8.

At 50 Avenue, shown on Exhibit 6.5, a flared intersection is provided to allow right turns into Sprucewood subdivision to be completed on a parallel lane and taper. Similarly, provision for left turns is made by providing a bypass lane around traffic turning left into Sprucewood from the south and a short acceleration length for left turns from Sprucewood to the north. This is a rural highway intersection design to provide interim improvements for this intersection.

At 60 Avenue, on Exhibit 6.6, widening occurs at this intersection to provide for a painted median and left turn lanes for the from south to west and from north to east left turning traffic. In the southeast quadrant of the intersection, a service road east of the Canfor Haul Road provides access to the parcel immediately south of 60 Avenue and the 2 approaches presently servicing the residence on this property will be closed. Sight distances at these 2 approaches are presently restricted. Similarly, in the southwest quadrant, a service road replaces the existing approaches to the two businesses south of 60 Avenue.

South of 68 Avenue, 108 Street widens to provide a 4 lane divided cross-section. Left turn lanes are provided on both north and south approaches. These left turn lanes are about 160 m and 140 m in length respectively. A channelized right turn lane is provided from east to north. The median north of 68 Avenue would be about 9.2 m wide to

accommodate the future need for a double left turn lane from north to east at 68 Avenue and need for slotted left turns at 76 Avenue.

The 4 lane divided cross-section would be utilized from south of 68 Avenue north to the existing 4 lane divided section which begins south of 97 Avenue. 68 Avenue is widened through the intersection to provide right and left turns from 68 Avenue so the intersection would not likely need to be improved later when 68 Avenue is twinned.

At 76 Avenue, on Exhibit 6.7, the ultimate intersection layout would be implemented with slotted left turn lanes and parallel right turn lanes on 108 Street.

At 79 Avenue, the ultimate intersection layout would be implemented if the commercial development on the east side of 108 Street has been initiated. If not, only the left turn from south to west and right turn lane from north to west would be required. When the commercial development occurs east of 108 Street, the developer should contribute the cost of providing the right turn lane for from south to east and left turn lane for from north to east required to serve the property.

At 84 Avenue, the intersection layout would have channelized right turn lanes and left turn lanes on all approaches tying in to the existing 4 lane cross-section on 84 Avenue on the east leg. On the west leg, localized widening to 4 lanes would be implemented and carried west to west of 109 Street. If 4 laning of 84 Avenue to the west of 108 Street has not been constructed by this time, 84 Avenue should taper to a 2 lane roadway west of 109 Street. At 109 Street, a right-in/right-out is provided to service the Hazco development north of 84 Avenue and the Provincial offices opposite 109 Street. A northbound right-in/right-out is provided about 140 m north of 84 Avenue to access Peace Wapiti School Division and the property to the south. This right-in/right-out ties into the existing service road on the Peace Wapiti property to access their bus servicing and storage site to the north of the office building. A westbound right-in/right-out is provided on 84 Avenue about 60 m west of the Canfor Haul Road to access the property immediately north of 84 Avenue. This will be determined through a traffic impact assessment.

At 89 Avenue, shown on Exhibit 6.8, left turn lanes are provided on 108 Street on both north and south approaches along with right turn lanes. 89 Avenue will be extended east to access the C.G.&E. co-generation plant and west of 108 Street, the upgrading of the approaches to Leyman Distributors will be implemented. Four lanes undivided on the west approach will be extended west to 109 Street. Warrants for traffic signals should be regularly monitored at the 108 Street / 89 Avenue intersection. The existing service road in the southeast quadrant links from south of 89 Avenue to the right in / right out north of 84 Avenue.

A similar treatment is provided for the intersection at 92 Avenue. The service road in the southwest quadrant is relocated slightly to the west at this stage along with the improvements to 92 Avenue at the accesses to Coneco and to Shell west of 108 Street. This intersection is presently signalized.

The 4 lane divided cross-section is extended north to tie into the existing divided standard south of 97 Avenue. At 97 Avenue, a right turn lane is provided for the south to east and for the north to west movements. The service road in the southwest quadrant will be relocated slightly to the west and the service road in the northwest quadrant will be terminated north of 97 Avenue.

The properties required at this stage are as follows:

- at 60 Avenue, the property for the service road in the southwest quadrant and in the southeast quadrant, property for the service road in the first parcel south of 60 Avenue
- diversion for Canfor Haul Road north and south of 68 Avenue
- properties for right turn lanes from north to west at 76 Avenue (Pinnacle Drive) and at 79 Avenue
- a strip through the properties on east side for 108 Street widening from 84 Avenue to RailNet
- right of way for the right in / right out north of 84 Avenue on the east side of 108 Street and service road connecting north to 89 Avenue plus corner cuts for right turns in the southwest, southeast and northeast quadrants of the 84 Avenue intersection

- property for the service road diversions in the southwest quadrants of the intersections at 92 Avenue and at 97 Avenue

Costs for this Stage 1 construction are estimated at $10.7 million.

6.3 Stage 2 (46,000) Plan

At the 46,000 stage, minimal upgrading is required. Stage 2 plans are shown on Exhibits 6.9 through 6.12.

At the 60 Avenue intersection (Exhibit 6.10), the service road in the southeast quadrant is extended south to eliminate the present access located at about 2+100 which will be closed. No further property would be required as the service road would be a private road south of the property to the north.

The four laning of 84 Avenue west of 108 Street is expected to occur at about this horizon, hence 84 Avenue is shown as four lanes west of the intersection widening provided at the previous 40,000 horizon.

Costs for this stage are estimated at $0.4 million.

6.4 Stage 3 (59,000) Plans

Again, at the 59,000 horizon, very limited upgrading is required to handle the increased traffic forecast for that stage. Stage 3 plans are illustrated on Exhibits 6.13 through 6.16.

At 50 Avenue, on Exhibit 6.13, 50 Avenue is extended east across the Canfor Haul Road and extended north as a service road to provide access to the south parcel of SW 11-71-6-6. This service road replaces the present approach at about 1+630 which will be closed. The property for this service road will be required at this stage.

68 Avenue intersection will be upgraded to provide for 4 lanes on the east and west approaches as planned for in the ultimate stage.

Costs for this stage are estimated at $0.4 million.

6.5 Right-of-Way

Property required to implement the road improvements recommended in this report is outlined on Exhibit 6.17 through Exhibit 6.20.

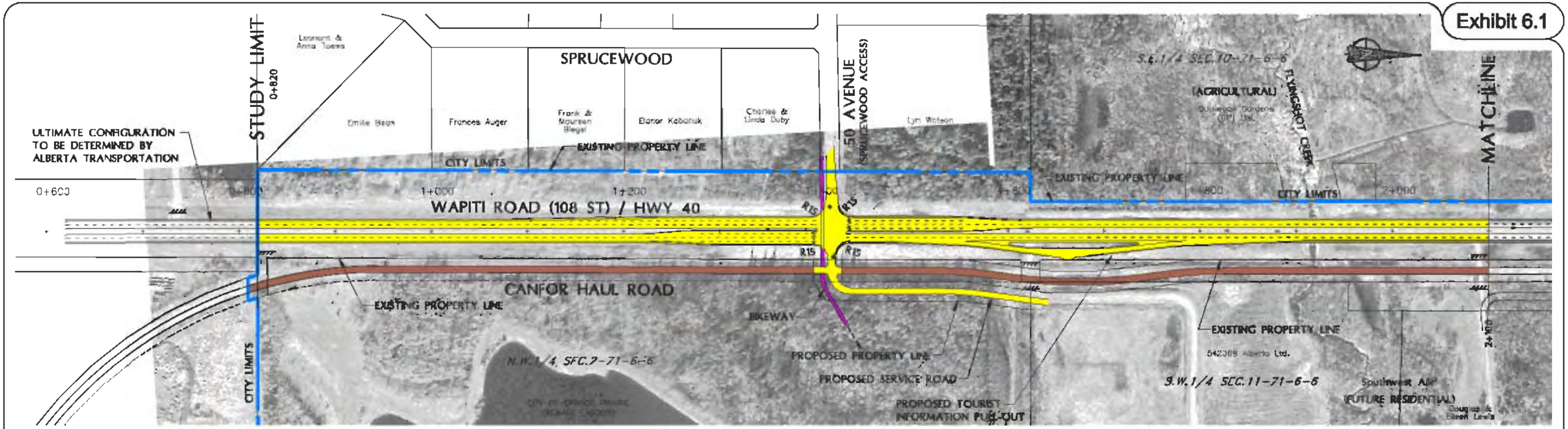
On Exhibit 6.17, a 30 m strip is required through City property for the service road east of 108 Street. A 0.16 ha (0.13 and 0.03 ha) parcel is required to divert the Haul Road east of 108 Street at the tourist information turnout. Two parcels of about 0.4 ha and 0.16 ha are required south and north of Flyingshot Creek to accommodate storm ponds.

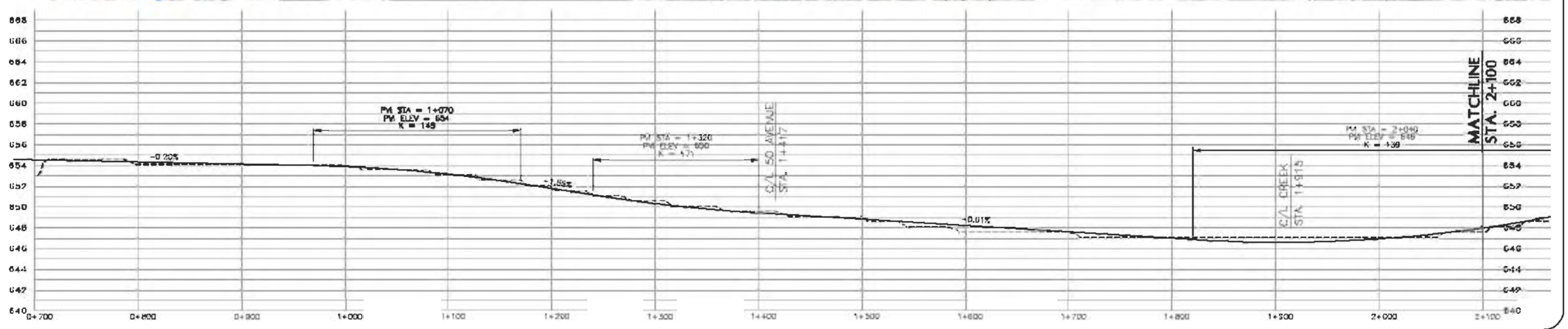
At 60 Avenue intersection on Exhibit 6.18, a 30 m service road right of way is required in the southeast quadrant through the first parcel south of 60 Avenue. Similarly in the southwest quadrant of the intersection a small parcel of 0.09 ha is required to establish the new service road to the south. Small parcels are required for the diversion of the Canfor Haul Road at 64 and 68 Avenue intersections. Widening (13.4 m) is required for 68 Avenue in the southeast quadrant of the 68 Avenue intersection and 12.6 m strips both north and south of 68 Avenue on the west side of the intersection. This widening is essentially required for widening of 68 Avenue, however this property would likely have to be obtained to accommodate upgrading of the 108 Street/68 Avenue intersection.

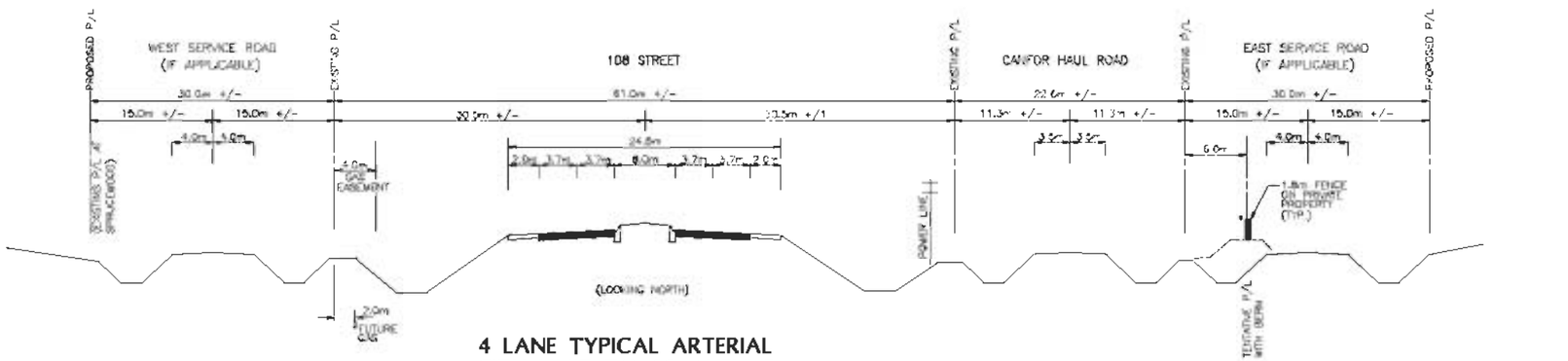
On Exhibit 6.19, a narrow strip of right of way is required to accommodate the right turn lane in the northwest quadrants of the 76 Avenue and 79 Avenue intersections. Corner cuts are required at the 84 Avenue intersection to accommodate right turning lanes in the southwest, southeast and northeast quadrants. A 6.3 to 6.8 m strip is required on the east side of 108 Street from 84 Avenue to RailNet to accommodate 108 Street widening (also shown on Exhibit 6.20). Right of way is required for the northbound right in / right out north of 84 Avenue and for the service road which may now be a public road as it serves more than one landowner (Exhibits 6.19 and 6.20).

Corner cuts are required on the east approach at the 92 Avenue intersection, shown on Exhibit 6.20. In the southwest quadrants of both the 92 and 97 Avenue intersections, small parcels are required to relocate the service roads to the west.

Exhibit 6.1







4 LANE TYPICAL ARTERIAL
CITY LIMIT TO 60 AVENUE

*TENTATIVE BERMING ADJACENT TO NON RESIDENTIAL AREAS (SUBJECT TO TERMS OF SUBDIVISION)

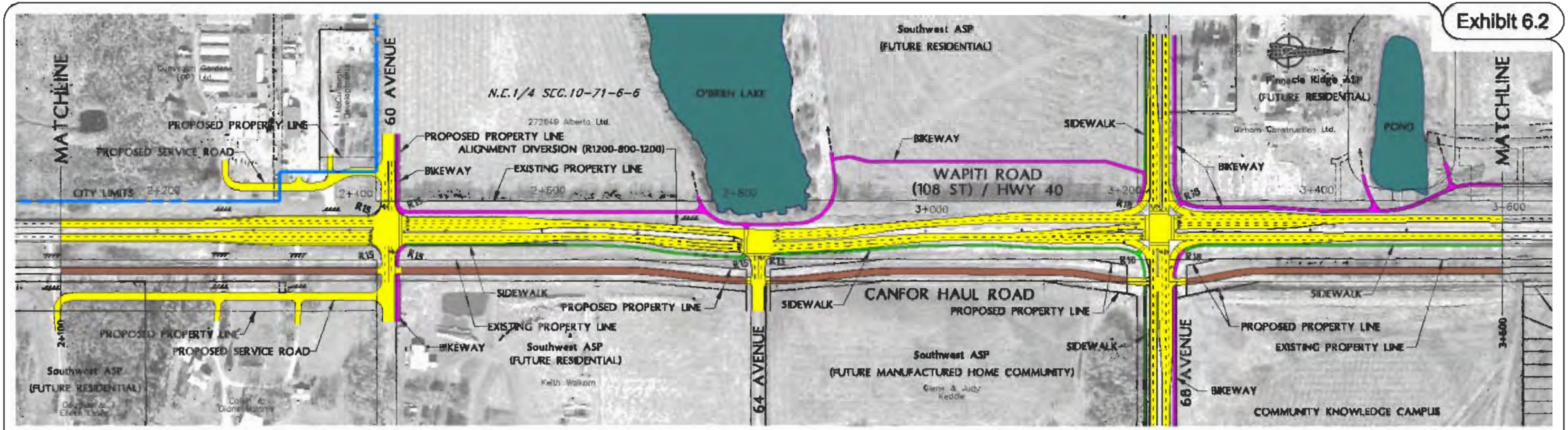
108 STREET FUNCTIONAL PLANNING STUDY

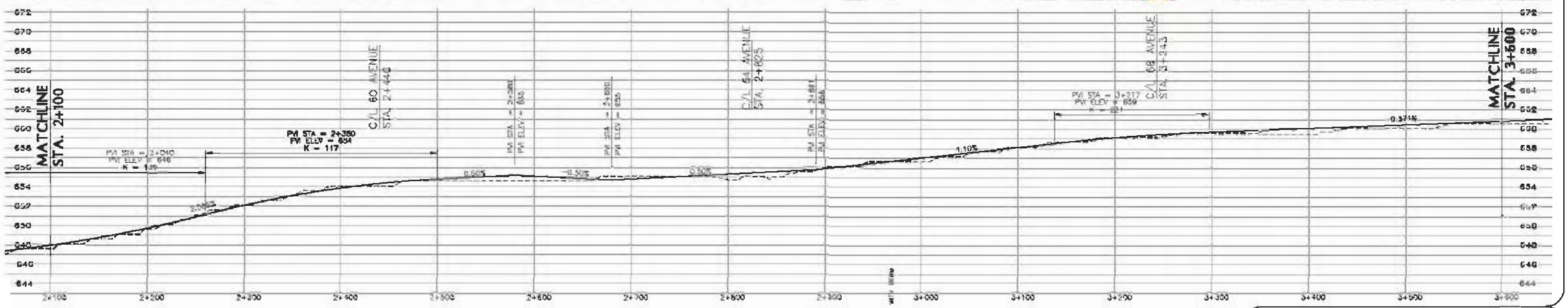
ULTIMATE STAGE
PLAN / PROFILE
South City Limit to
North of 50 Avenue

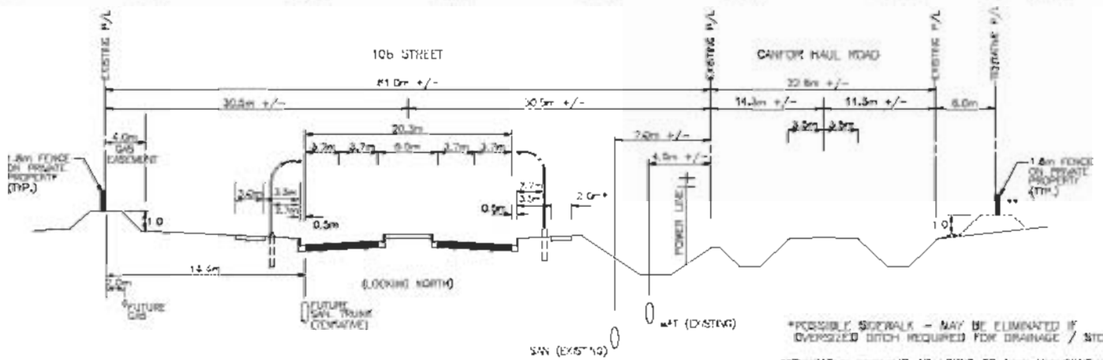
ISL Infrastructure Systems Ltd.

TC04/JULY/23 K:\10900\10966-DP 108 ST FPS\ESH\BTB-JUNE03\10966-FP.DWG

Exhibit 6.2







4 LANE TYPICAL ARTERIAL
60 AVE to 76 AVE

*POSSIBLE SIDEWALK - MAY BE ELIMINATED IF OVERSIZED DITCH REQUIRED FOR DRAINAGE / STORAGE

**TENTATIVE BERMING ADJACENT TO NEW RESIDENTIAL AREAS (SUBJECT TO TERMS OF SUBDIVISION)

108 STREET FUNCTIONAL PLANNING STUDY

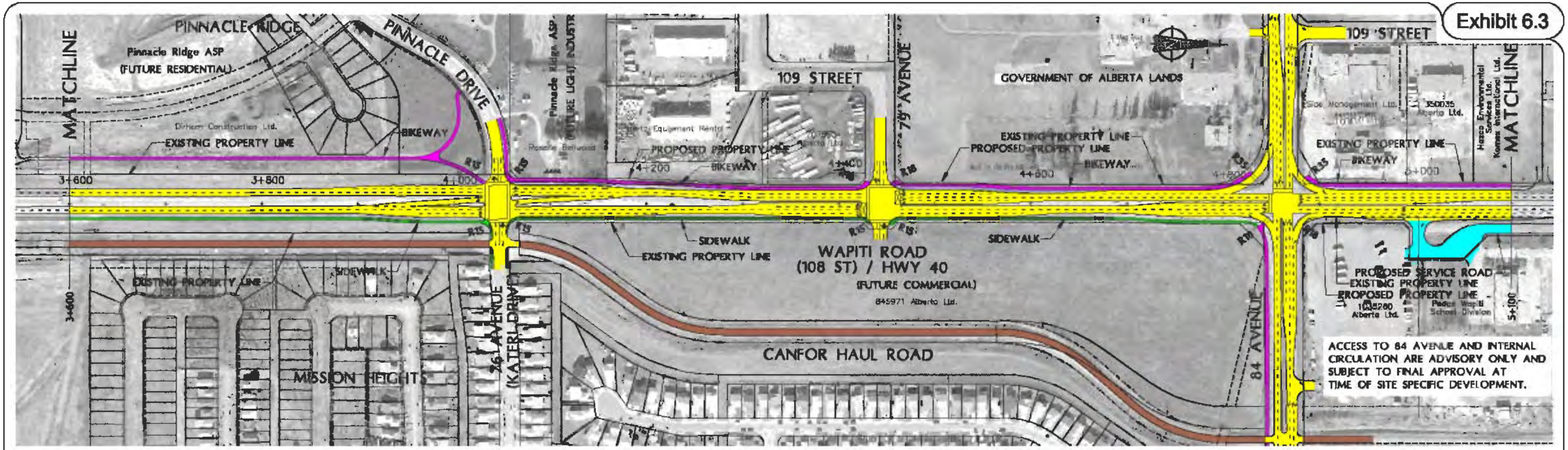
ULTIMATE STAGE
PLAN / PROFILE

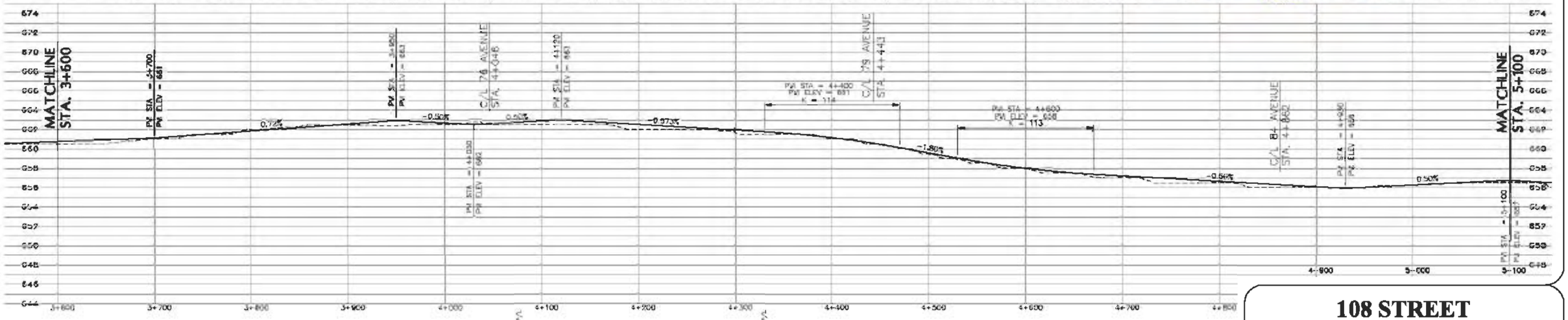
South of 60 Avenue to
North of 68 Avenue

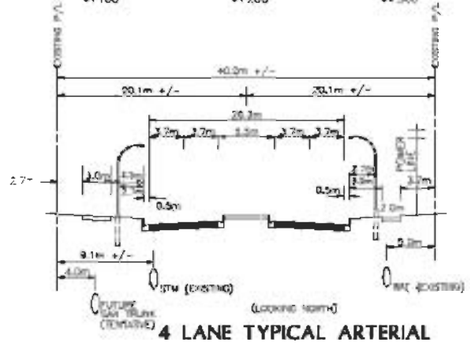
ISL Infrastructure Systems Ltd.

TC 04/JULY/23 K:\10900\10968-00\108 ST FPS\EXHIBITS-JUNE\03\10968-FP.DWG

Exhibit 6.3







4 LANE TYPICAL ARTERIAL
76 AVE to 84 AVE

108 STREET FUNCTIONAL PLANNING STUDY

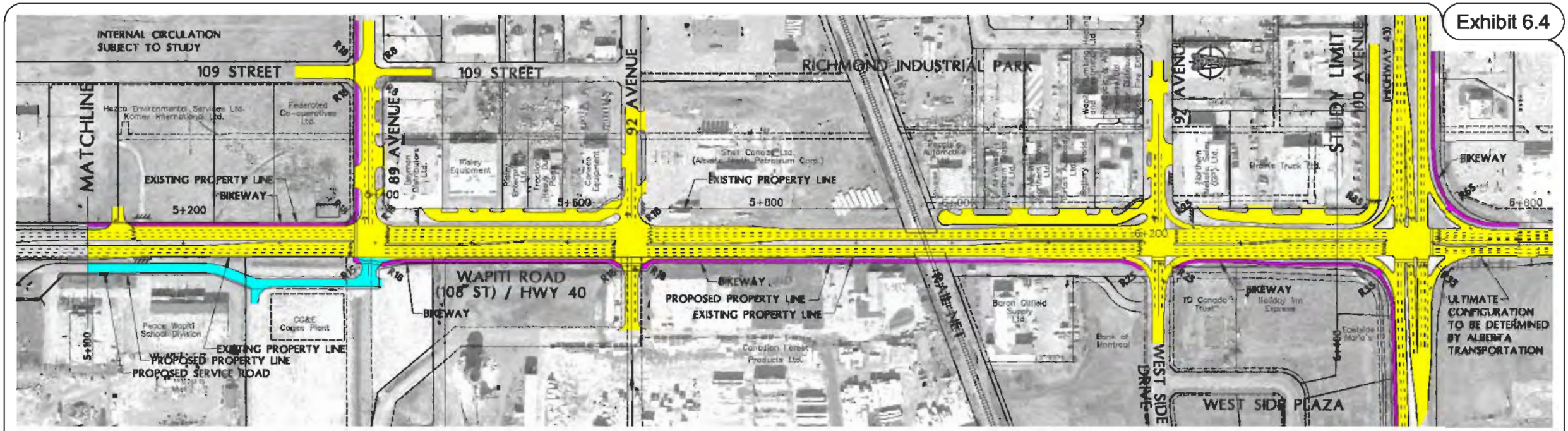
ULTIMATE STAGE
PLAN / PROFILE

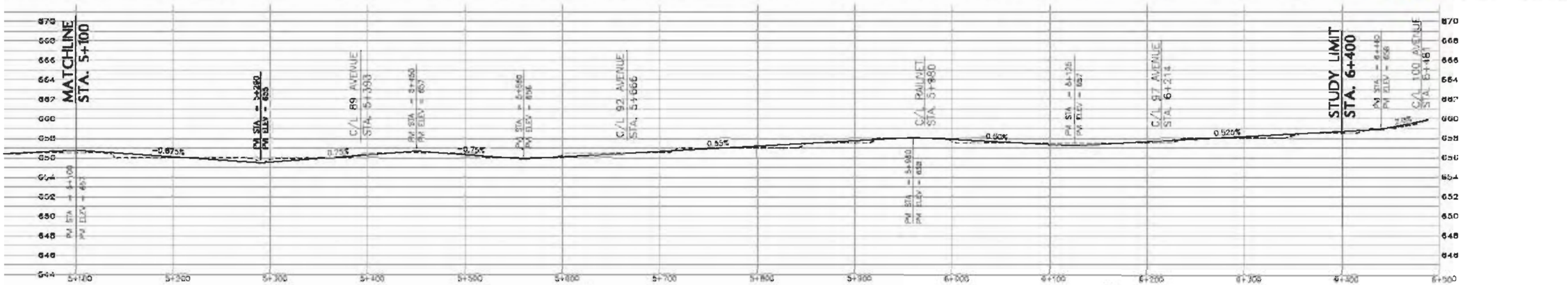
South of 76 Avenue to
North of 84 Avenue

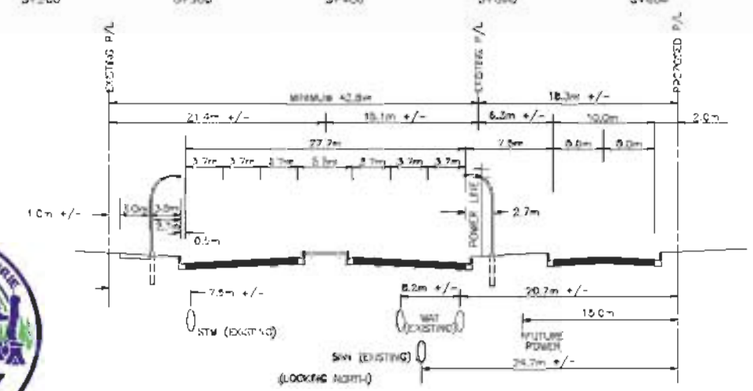
ISL Infrastructure Systems Ltd.

TC04JULY23 K:\10900\10968-00-108 ST FP\EXHIBITS-JUNE23\10968-FP.DWG

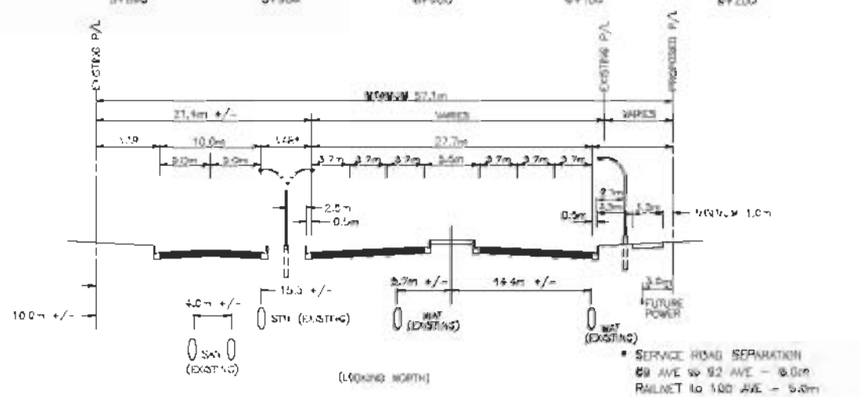
Exhibit 6.4







6 LANE TYPICAL ARTERIAL
84 AVE to 89 AVE



6 LANE TYPICAL ARTERIAL
89 AVE to 100 AVE

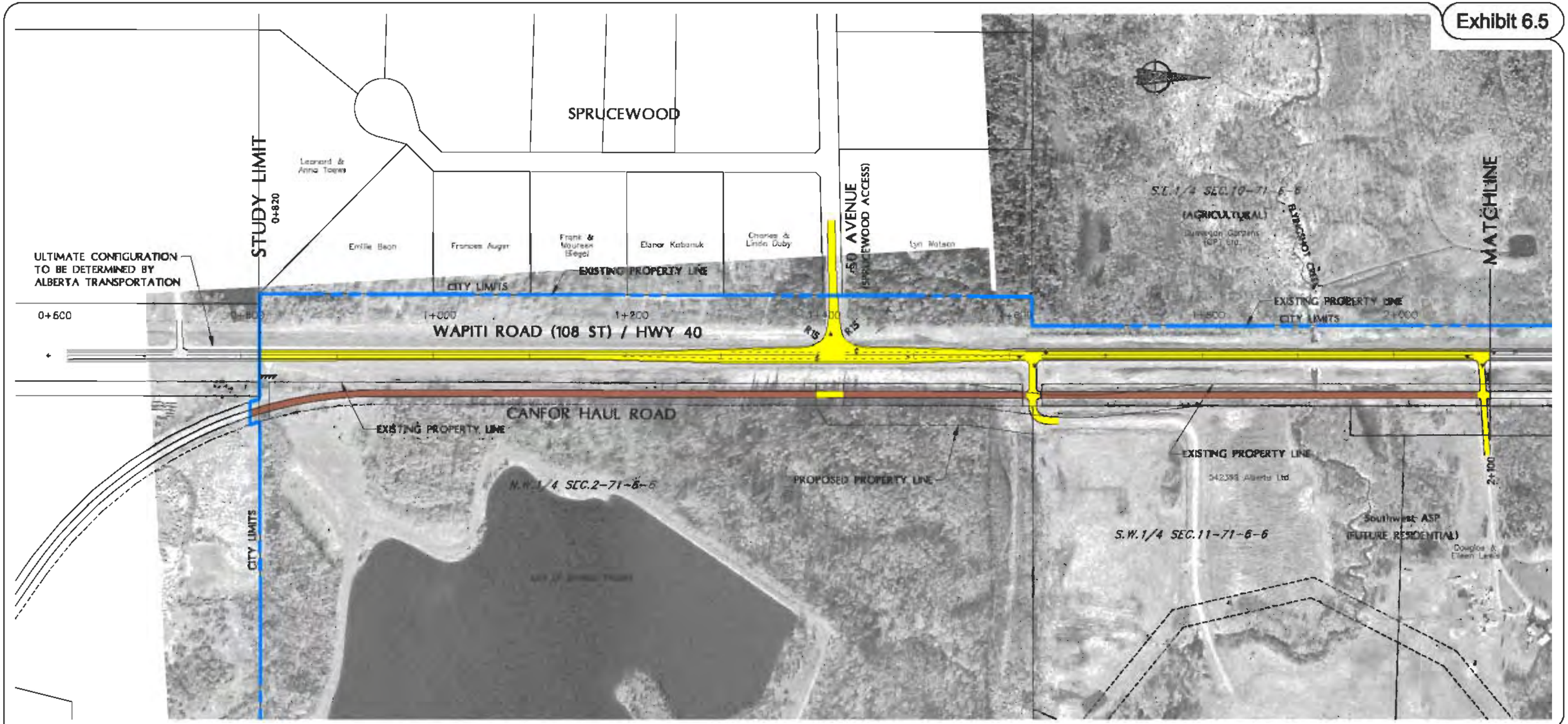
108 STREET FUNCTIONAL PLANNING STUDY

ULTIMATE STAGE
PLAN / PROFILE

South of 89 Avenue to
100 Avenue

ISL Infrastructure Systems Ltd.

Exhibit 6.5



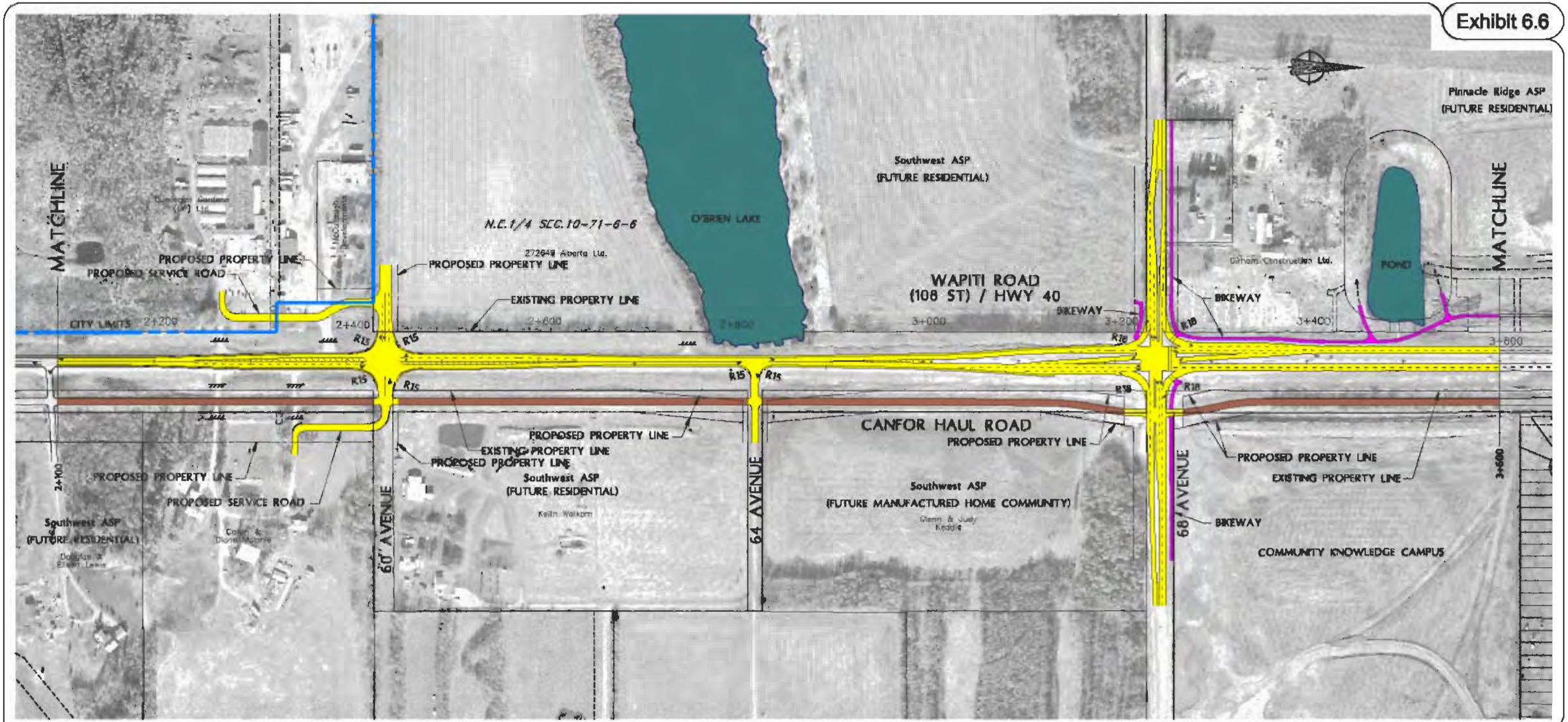
108 STREET FUNCTIONAL PLANNING STUDY

40,000 POPULATION
ROADWAY PLAN
South City Limit to
North of 50 Avenue

ISL Infrastructure Systems Ltd.

TC 04-FEB-08 K:\10800\10886-01P-108 ST FPS\EXHIB\TB-03\10886-EXH-40000.DWG

Exhibit 6.6



108 STREET FUNCTIONAL PLANNING STUDY

40,000 POPULATION
ROADWAY PLAN

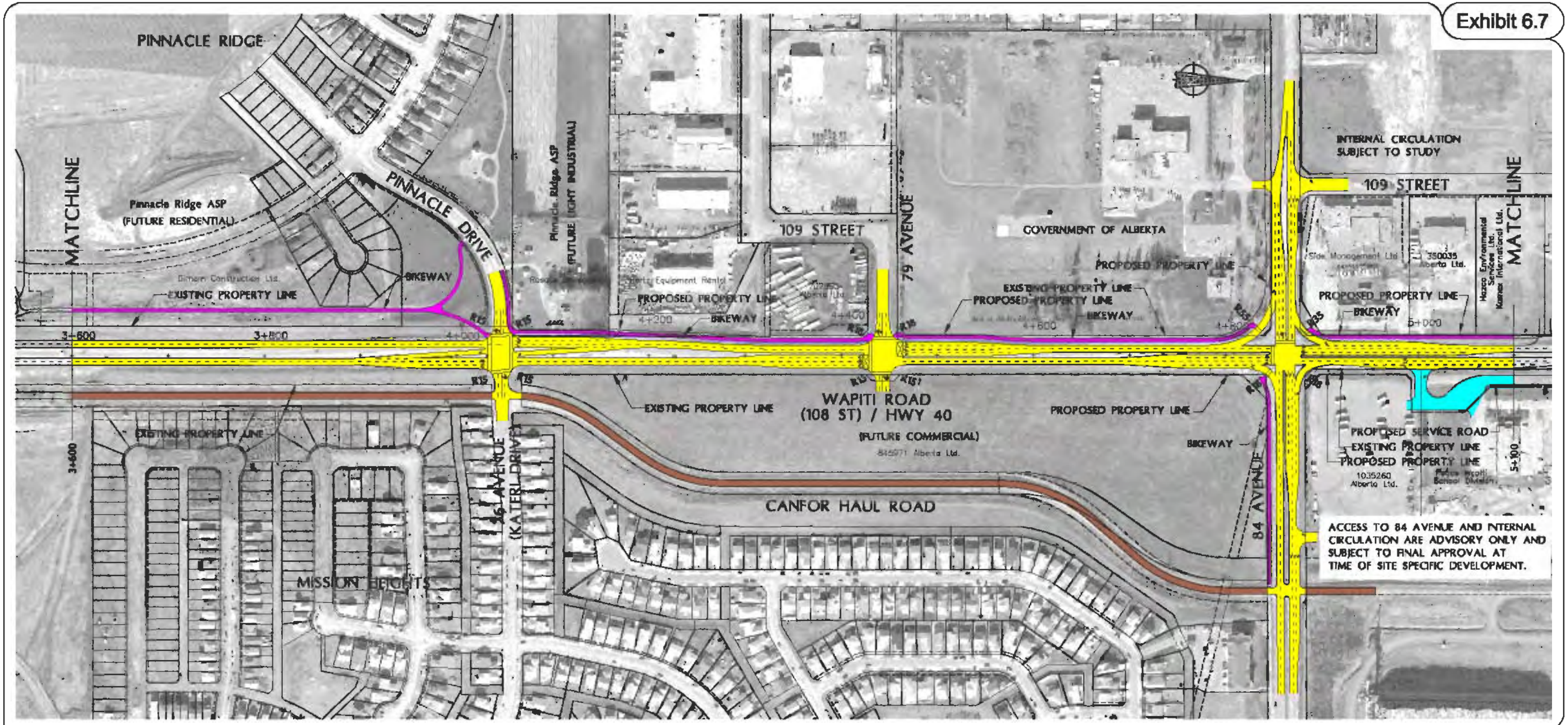
South of 60 Avenue to
North of 68 Avenue

CITY OF GRANDE PRAIRIE ALBERTA

ISL Infrastructure Systems Ltd.

TC 04-FEB/06 K:\10000\10086-GP 108 ST FP\EXCH\B TB-03\10086-EXH-40000.DWG

Exhibit 6.7



108 STREET FUNCTIONAL PLANNING STUDY

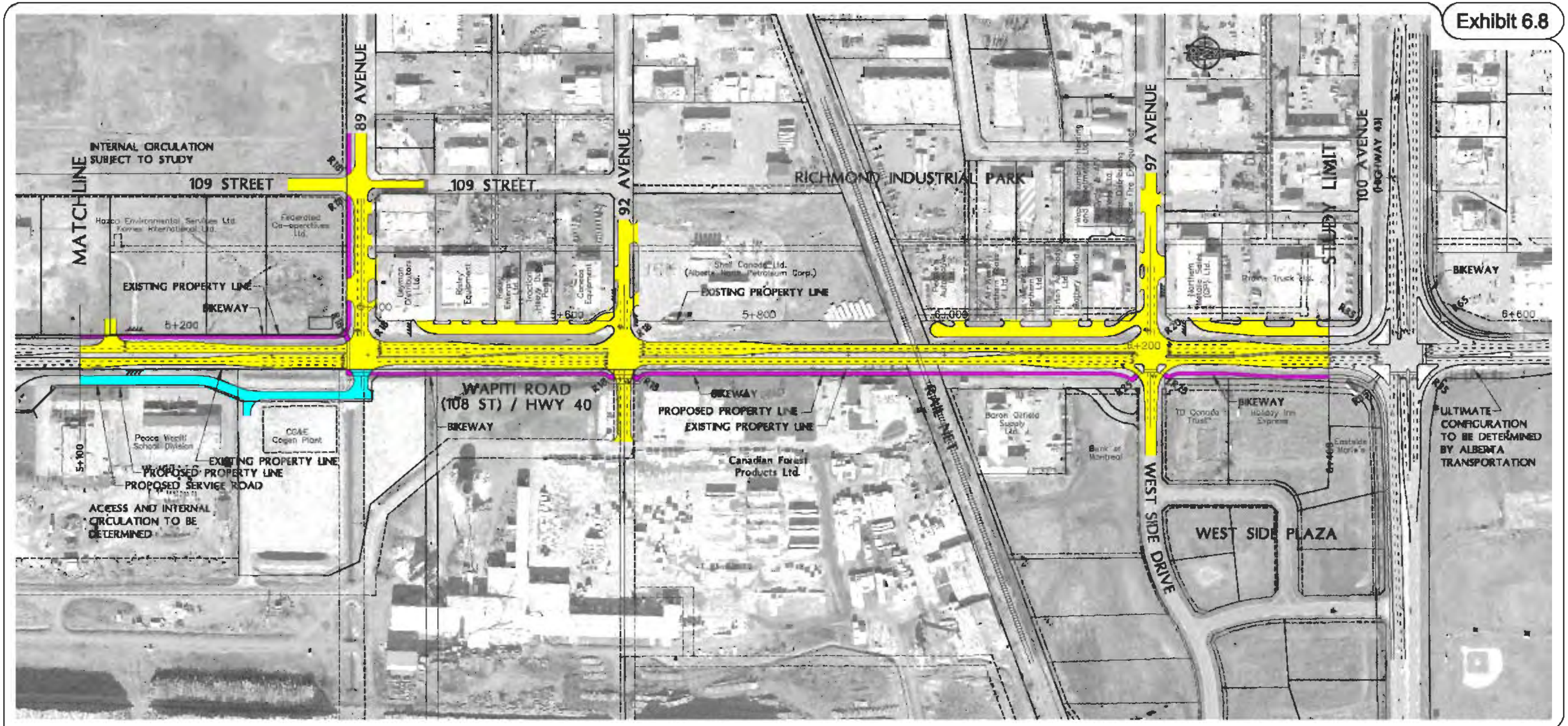
40,000 POPULATION
ROADWAY PLAN

South of 76 Avenue to
North of 84 Avenue

ISL Infrastructure Systems Ltd.

TC 04JULY16 K:\10900\10668-QP 108 ST FPS\EXHIBITS-08\10668-EX1-40000.DWG

Exhibit 6.8



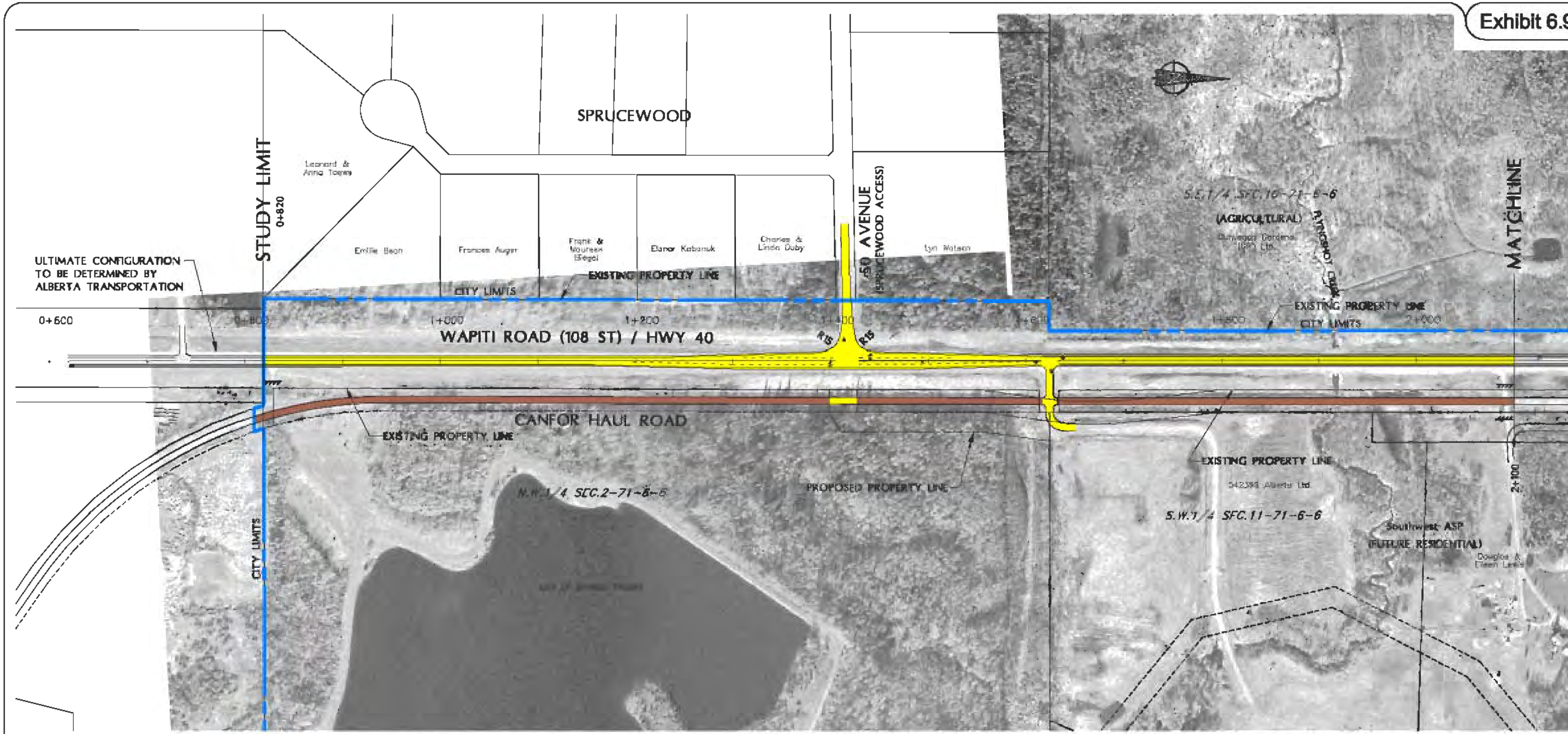
108 STREET FUNCTIONAL PLANNING STUDY

40,000 POPULATION
ROADWAY PLAN
South of 89 Avenue to 100 Avenue

ISL Infrastructure Systems Ltd.

TC-04JULY16 K:\109001\10968-QP 108 ST FP\EXHIBITS-03\110968-EXH-400000.DWG

Exhibit 6.9

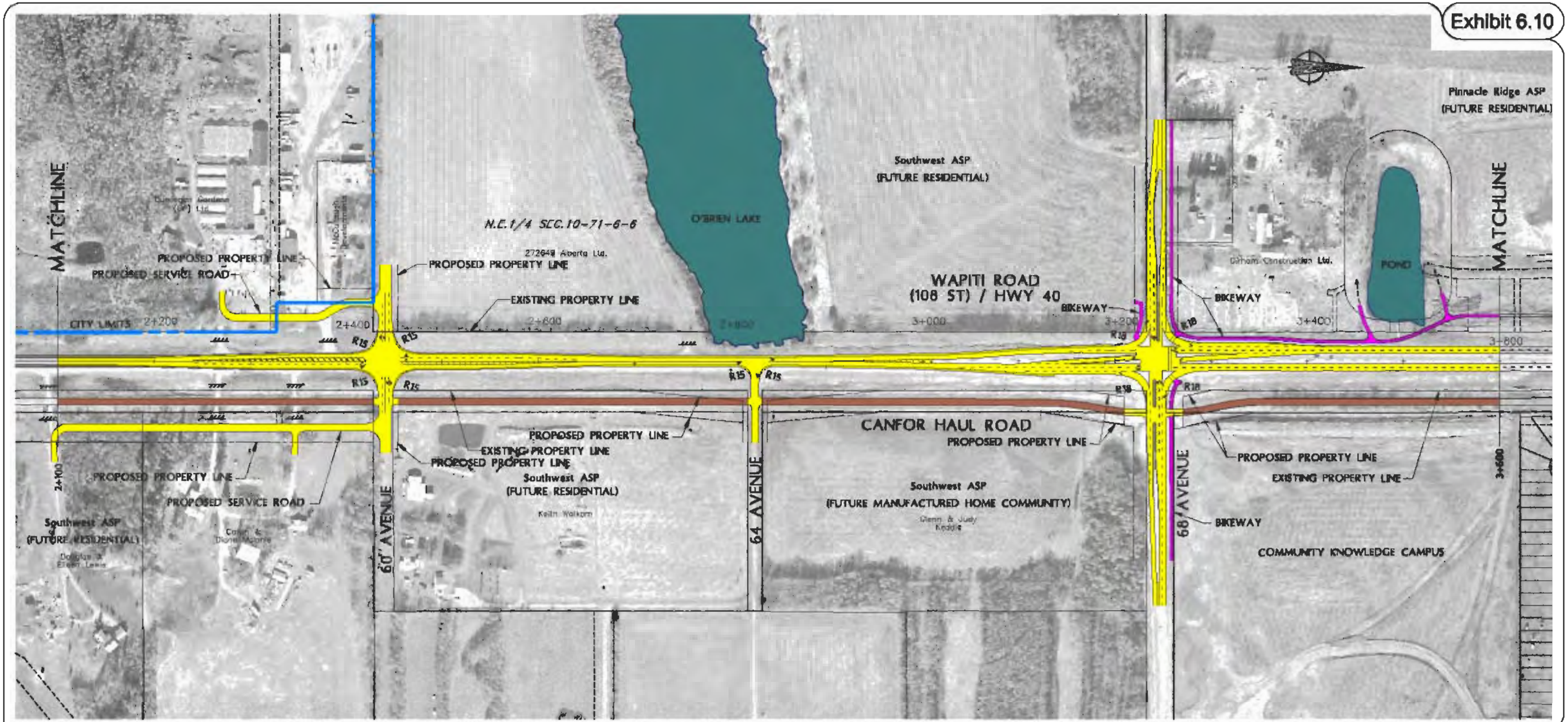


108 STREET FUNCTIONAL PLANNING STUDY

46,000 POPULATION
ROADWAY PLAN
South City Limit to
North of 50 Avenue

ISL
Infrastructure Systems Ltd.

Exhibit 6.10



108 STREET FUNCTIONAL PLANNING STUDY

46,000 POPULATION
ROADWAY PLAN

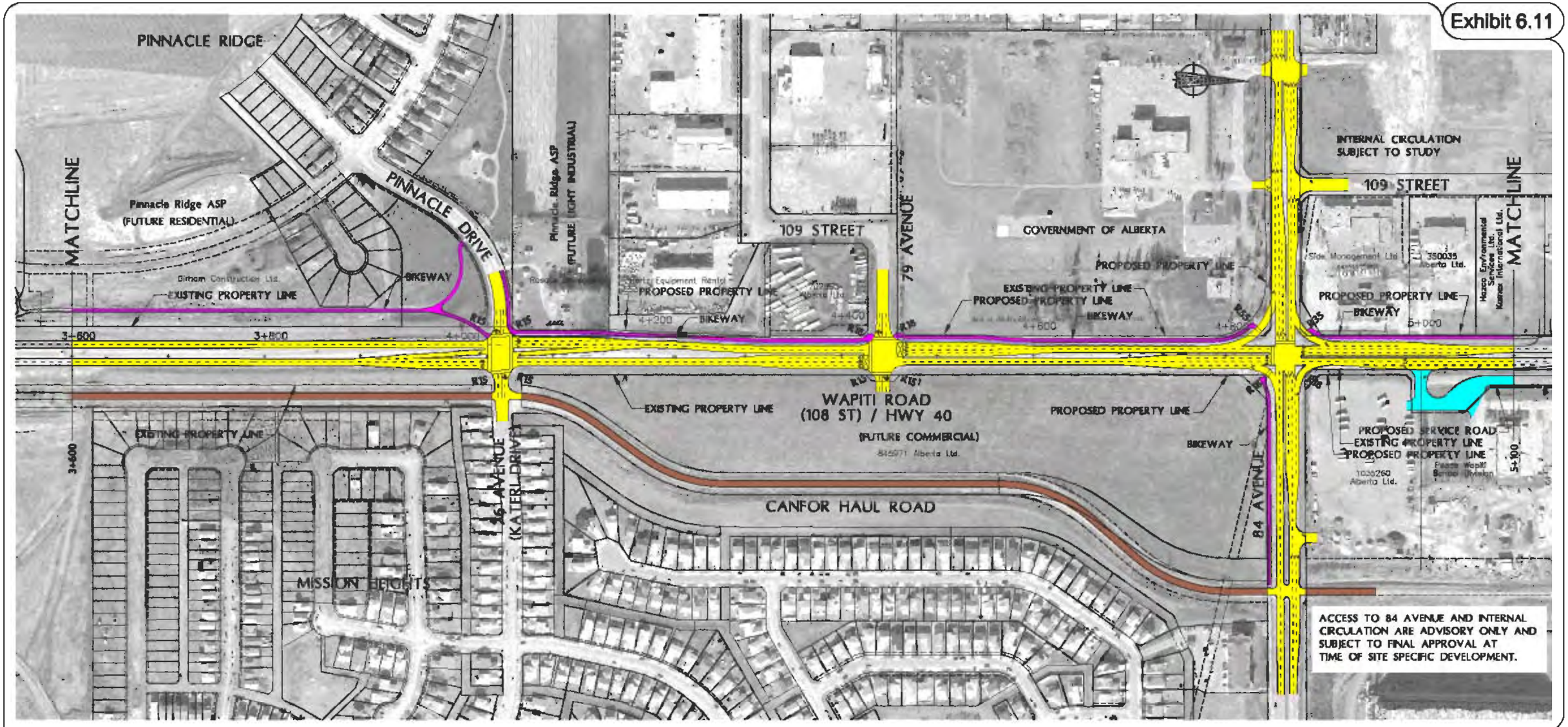
South of 60 Avenue to
North of 68 Avenue

ISL Infrastructure Systems Ltd.

CITY OF GRANDE PRAIRIE ALBERTA

TC 04-FEB/06 K:\10000\10086-GP 108 ST FP\EXCH\B TB-03\10086-EXH-46000.DWG

Exhibit 6.11



TC-04JULY16 K:\105001\05698-02\P-108 ST FP\EXHIBITS\105698-EXH-46000.DWG

CITY OF GRANDE PRAIRIE ALBERTA

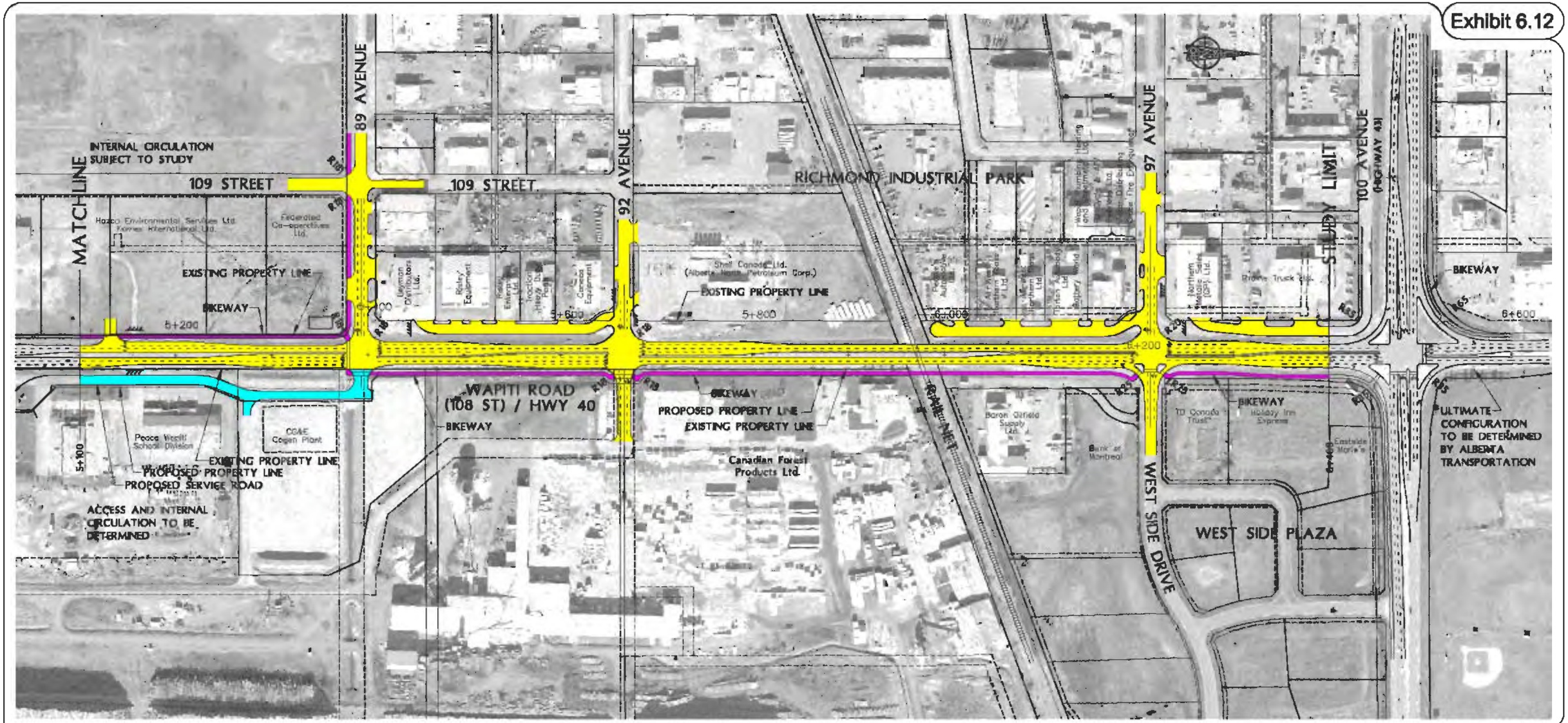
108 STREET FUNCTIONAL PLANNING STUDY

46,000 POPULATION
ROADWAY PLAN

South of 76 Avenue to
North of 84 Avenue

ISL Infrastructure Systems Ltd.

Exhibit 6.12



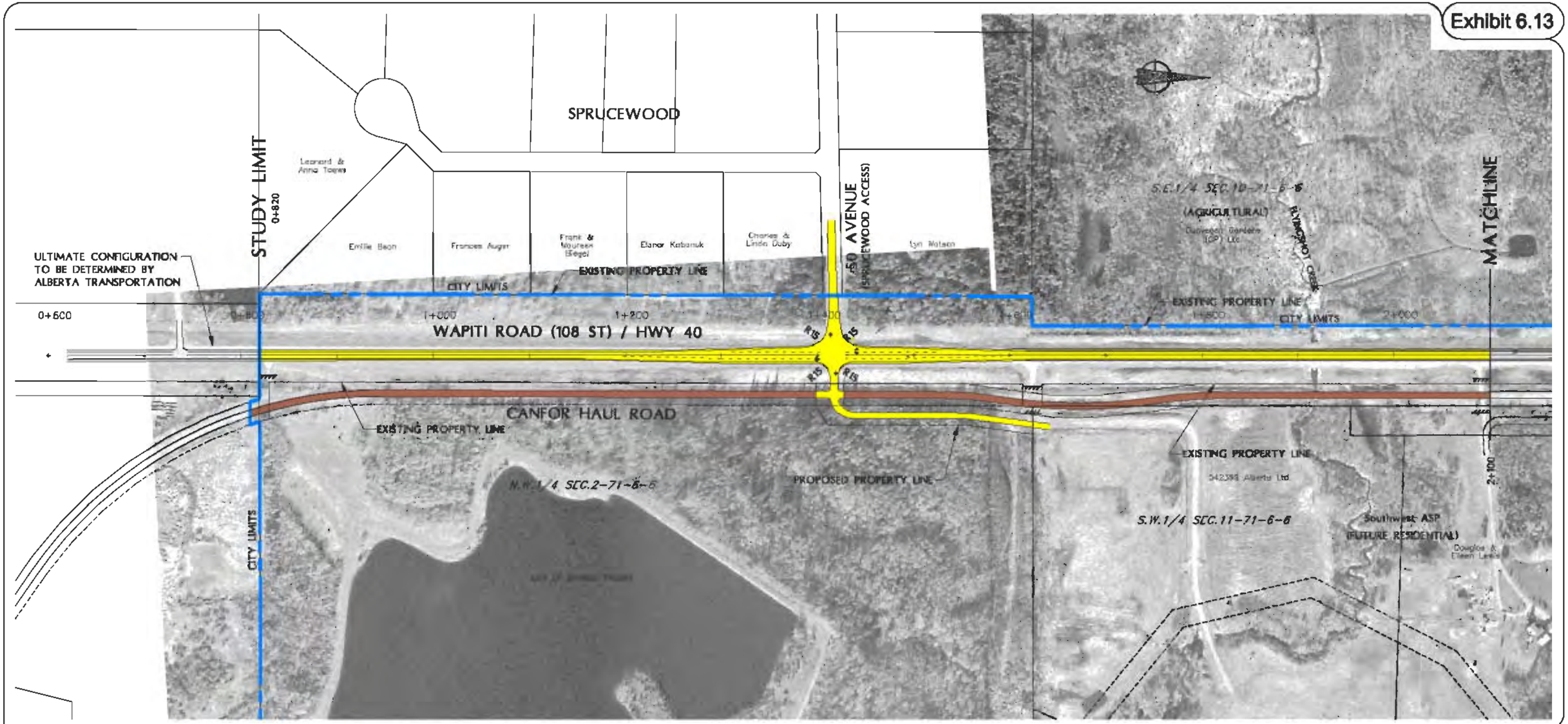
108 STREET FUNCTIONAL PLANNING STUDY

46,000 POPULATION
ROADWAY PLAN
South of 89 Avenue to
100 Avenue

ISL Infrastructure Systems Ltd.

TC 04/JULY/16 K:\105001\10998-DP 108 ST FPS\EXHIBITS\103110998-EXH-46000.DWG

Exhibit 6.13



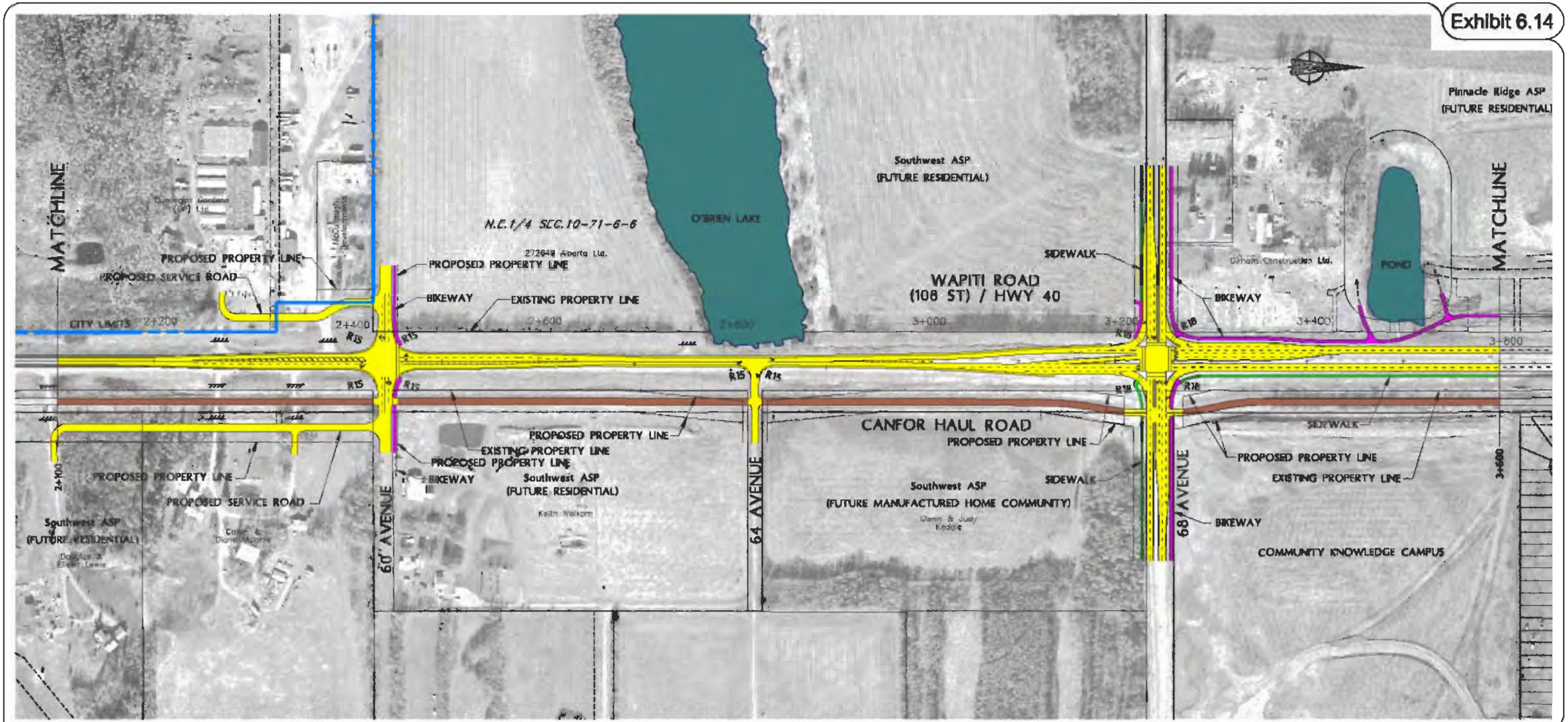
108 STREET FUNCTIONAL PLANNING STUDY

59,000 POPULATION
ROADWAY PLAN
South City Limit to
North of 50 Avenue

ISL Infrastructure Systems Ltd.

TC 04-FEB/06 K:\10600\10686-01P-108 ST FP\EXHIB\TB-031010686-EXH-65000.DWG

Exhibit 6.14



108 STREET FUNCTIONAL PLANNING STUDY

59,000 POPULATION
ROADWAY PLAN

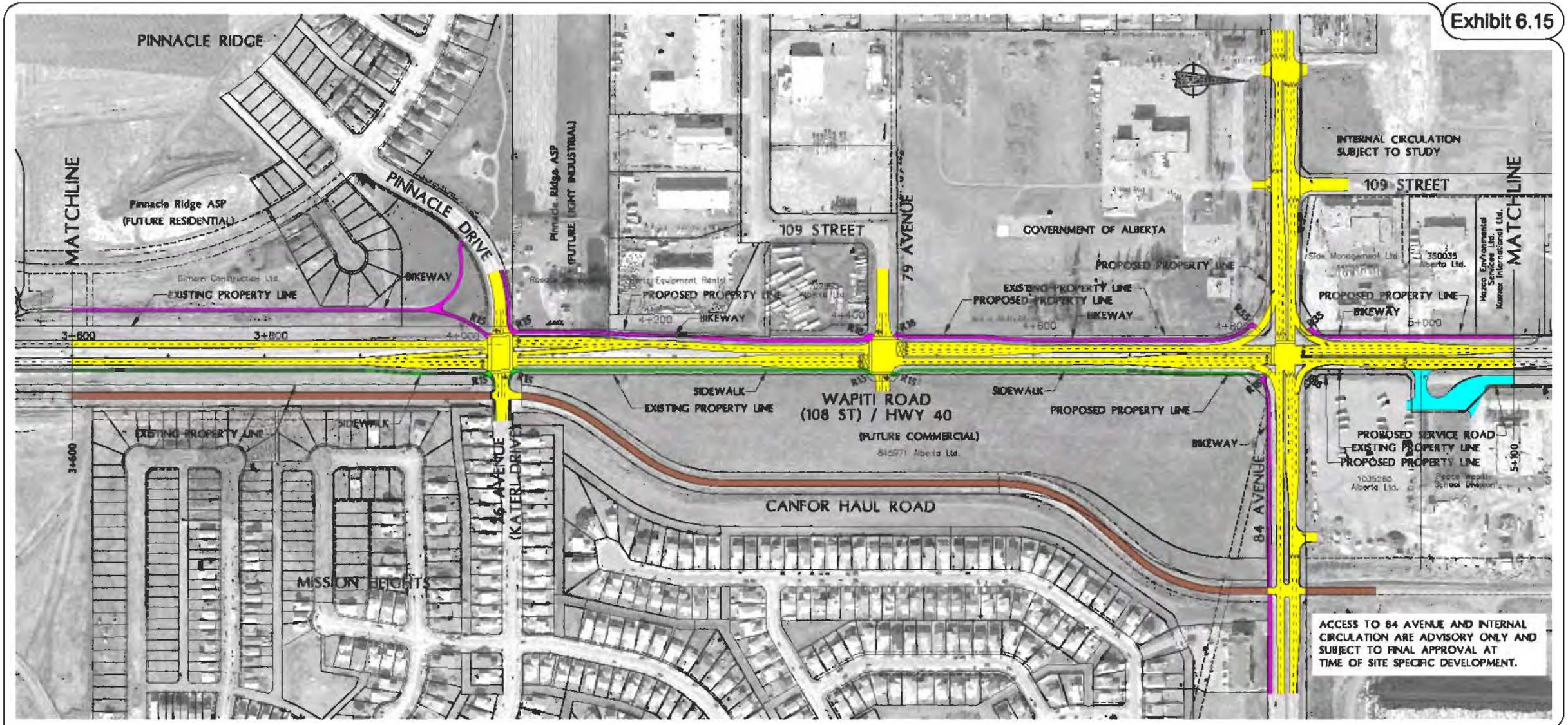
South of 60 Avenue to
North of 68 Avenue

ISL Infrastructure Systems Ltd.

CITY OF GRANDE PRAIRIE ALBERTA

TC 04-FEB/06 K:\10000\10086-GP 108 ST FP\EXHIB T9-03\10086-EXH-03000.DWG

Exhibit 6.15



108 STREET FUNCTIONAL PLANNING STUDY

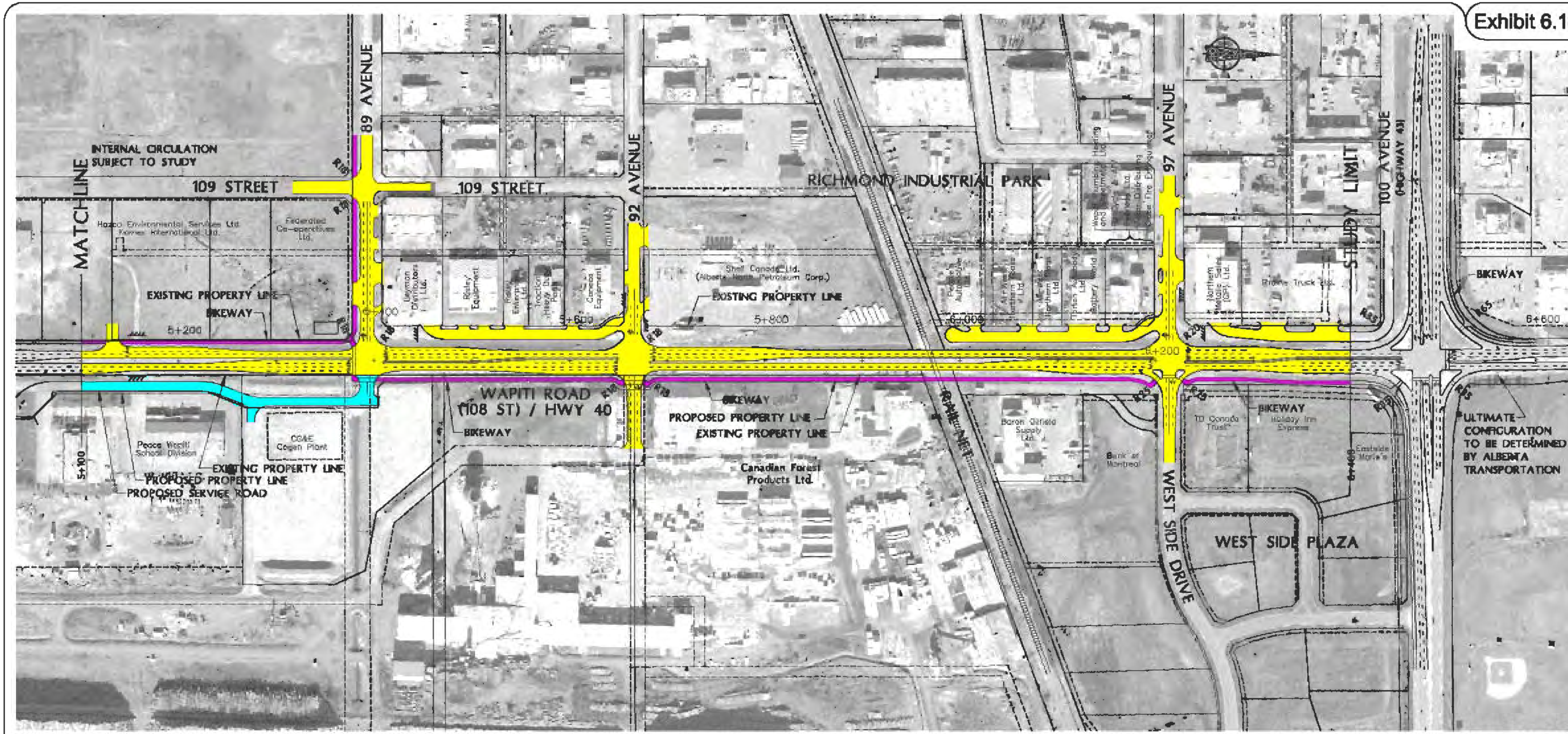
59,000 POPULATION
ROADWAY PLAN

South of 76 Avenue to
North of 84 Avenue

ISL Infrastructure Systems Ltd.

TC04JULY16 K:\10900\10668-GP-108 ST FPS\EXHIBITS\10668-EXH-59000.DWG

Exhibit 6.16



108 STREET FUNCTIONAL PLANNING STUDY

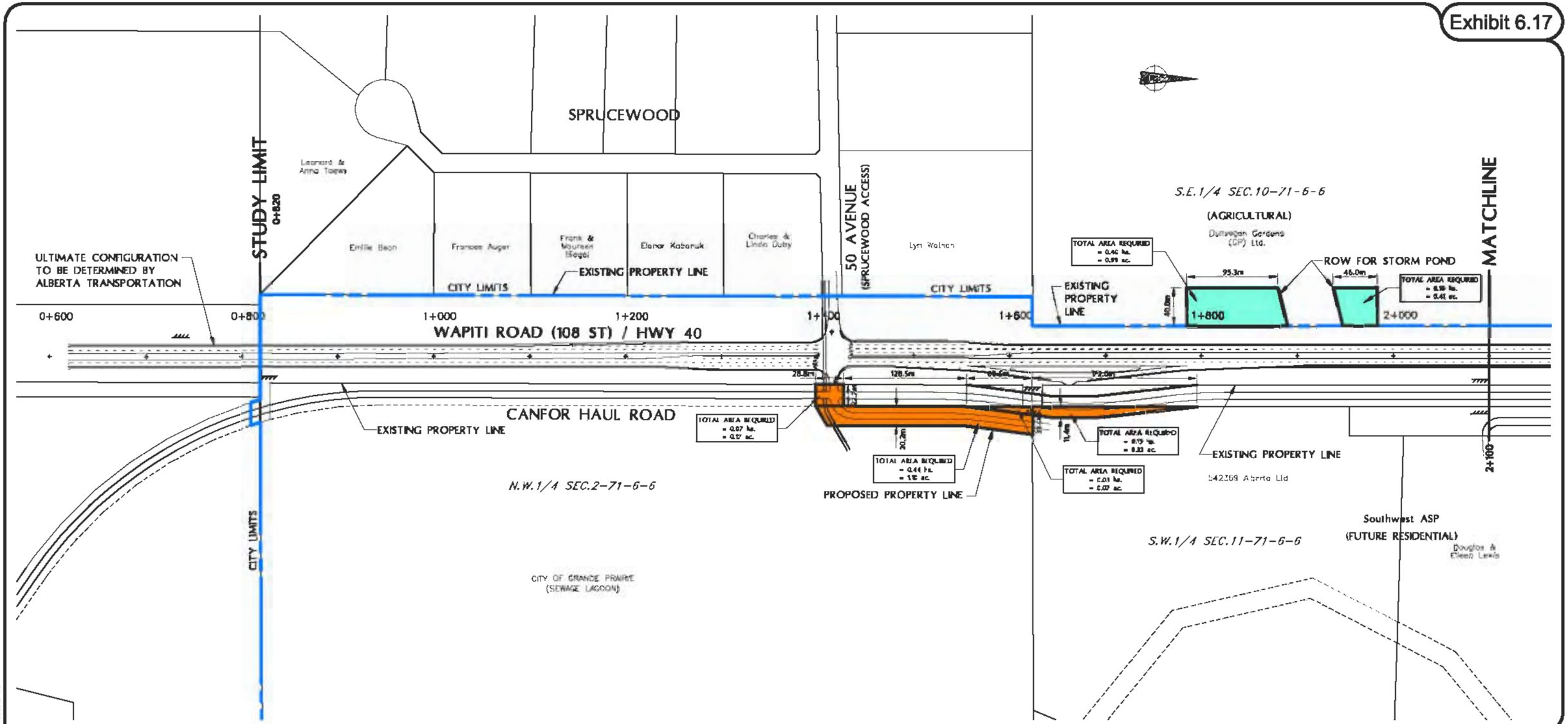
59,000 POPULATION ROADWAY PLAN

South of 89 Avenue to 100 Avenue

ISL Infrastructure Systems Ltd.

TC 04/JULY/15 K:\1090001\0998-OP 108 ST FPS\EXHIBITS\0311\0998-EXH-6\3000.DWG

Exhibit 6.17



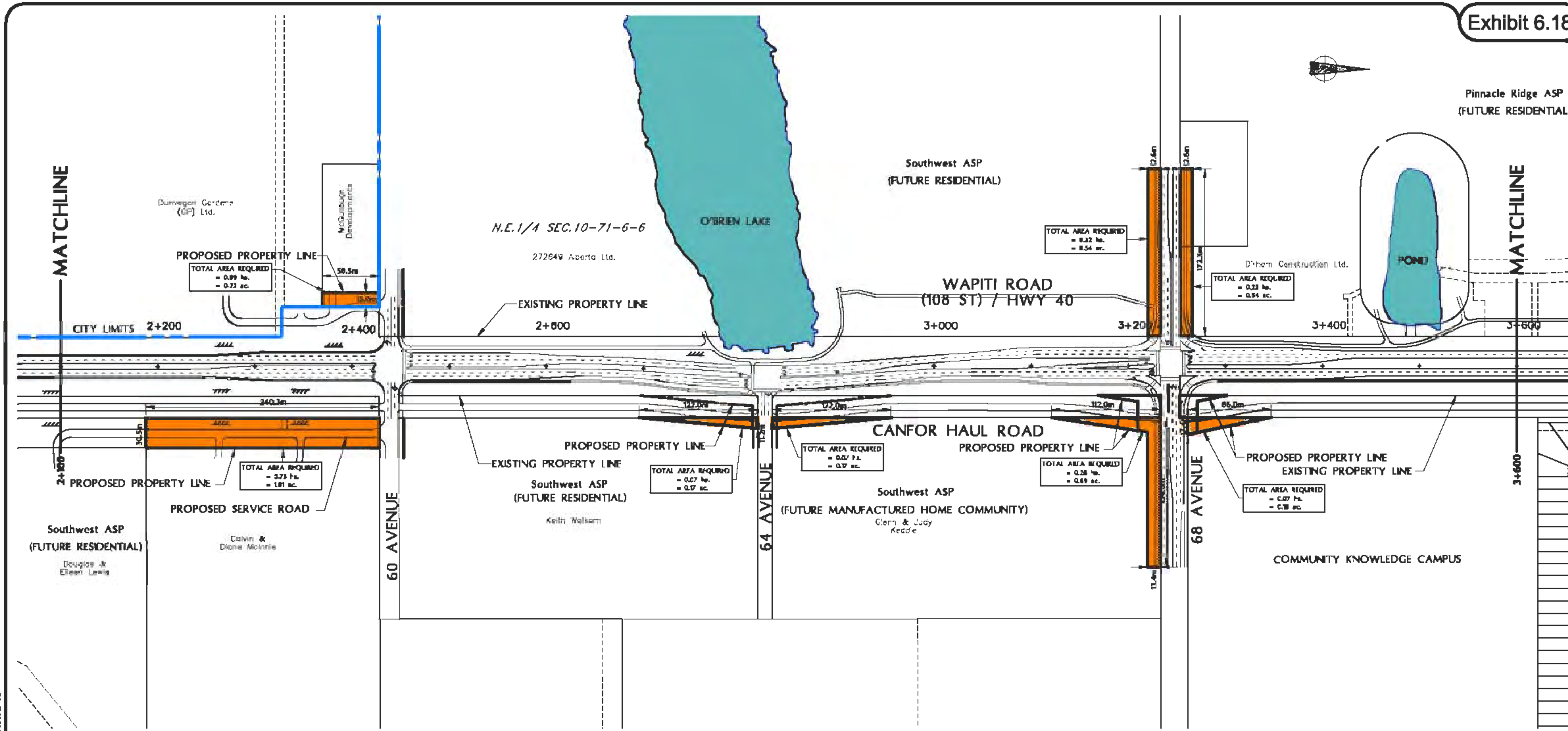
108 STREET FUNCTIONAL PLANNING STUDY

RIGHT OF WAY
PLAN
South City Limit to
North of 50 Avenue

ISL Infrastructure Systems Ltd.

TC 04/AUG/03 K:\10900\10598-CP 108 ST FP\EXH B\TB-031006B-ROW.DWG

Exhibit 6.18



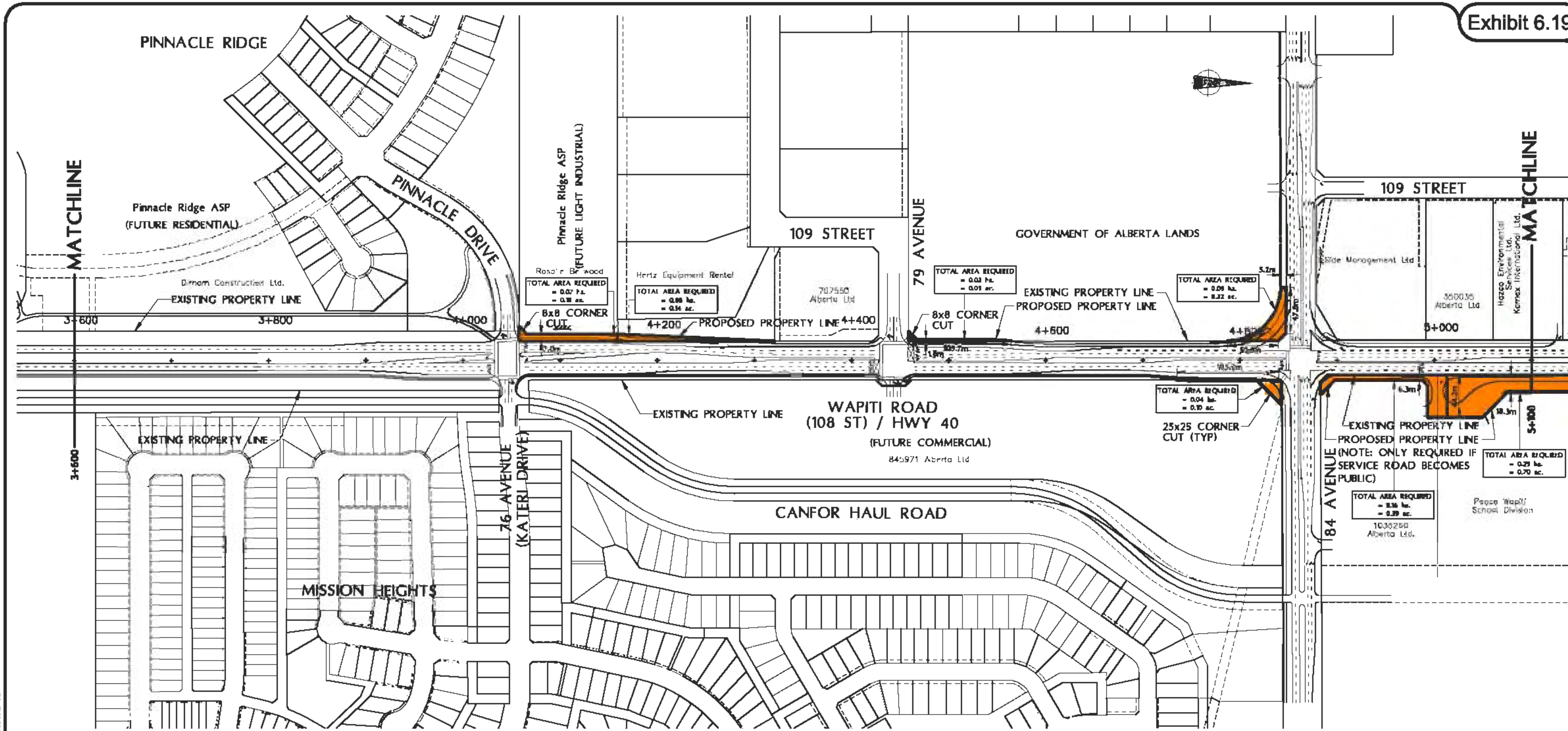
108 STREET FUNCTIONAL PLANNING STUDY

RIGHT OF WAY PLAN

South of 60 Avenue to North of 68 Avenue

ISL Infrastructure Systems Ltd.

Exhibit 6.19

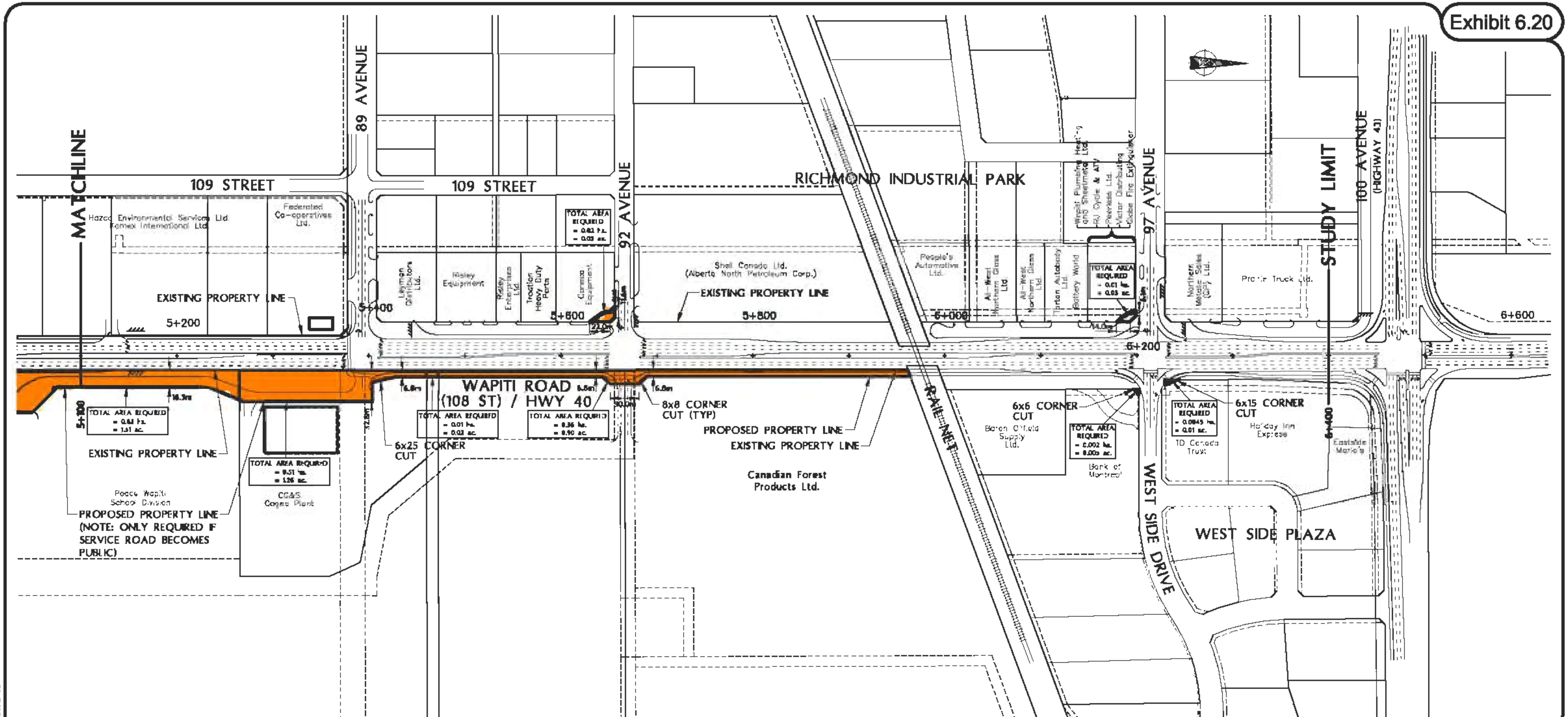


108 STREET FUNCTIONAL PLANNING STUDY

RIGHT OF WAY PLAN

South of 76 Avenue to North of 84 Avenue

ISL
Infrastructure Systems Ltd.



108 STREET FUNCTIONAL PLANNING STUDY

RIGHT OF WAY PLAN

South of 89 Avenue to 100 Avenue

ISL Infrastructure Systems Ltd.

7

Public Input

The full reports on the public input process are provided in Appendix B.

7.1 Input to Preliminary Plans (Ultimate)

7.1.1 Stakeholder Input

A meeting with adjacent landowners and businesses along 108 Street was held on September 16, 2003 at 1:30 p.m. in the Muskoseppi Pavilion. Nineteen stakeholders signed the guest register and 8 comment sheets were returned.

For background, ISL outlined the need for improvement to 108 Street, the objectives of the study and the present functions of 108 Street. The preliminary plans for the ultimate stage of development were presented from the South City Limit to the 100 Avenue intersection.

Major concerns raised were:

- access to and property requirements along the east side of 108 Street from 84 Avenue to 89 Avenue (C.G.&E., Peace Wapiti School Division)
- residents from Sprucewood were concerned about traffic operations and safety at their access to 108 Street
- concerns respecting safety and dust due to the Canfor Haul Road
- timing of improvements and noise were other concerns.

7.1.2 Open House

The public open house was held subsequent to the above meeting at the same venue from 4:00 p.m. to 8:00 p.m. on September 16, 2003.

Twelve persons signed the register and only 2 comment sheets were returned. Most of the attendees were from Alberta Transportation, City and County staff.

The only comment returned indicated that the plans provided for better traffic movement and safety.

7.2 Input to Final Plans

7.2.1 Stakeholder Input

The second meeting with the stakeholders was held on October 30, 2003 at 1:30 p.m. at the Muskoseppi Pavilion. The purpose of the meeting was to present the finalized plans for ultimate development and staging plans for 108 Street and to attain stakeholder feedback on the plans. 11 people attended, while 2 staff from the City and 4 consultant team staff were present.

Concerns/issues expressed by the attendees as indicated on their comment sheets were:

- Concern for safety at Sprucewood access. The project team indicated that the intersection design would be modified to allow some provision of acceleration distance for left turn out of Sprucewood to the north.
- There were access and property concerns by Peace Wapiti School Division and C.G.&E. These concerns were resolved at a later meeting with the project team.
- Continued concerns about impacts of the Canfor Haul Road and the plant on urban development.
- With flared intersections at initial stages, there will only be short lengths of 2 lane highway.
- Should be higher priority for Sprucewood intersection improvements. Should 4 lane south to correction line road (Highway 668) soon.

7.2.2 Open House

The Open House was held later in the day on October 30, 2003 from 4 p.m. to 8 p.m., also at the Muskoseppi Pavilion. The Open House was staffed by City and consultant team staff. About 10 persons signed the register though attendance was slightly higher.

The following concerns were raised in the returned comment sheets:

- Property take required for diversion of service road to the west at 97 Avenue. This diversion will reduce parking lot area.
- 108 Street is very busy and requires improvement. Service road (at 97 Avenue?) should be extended across railway or have a back way out.

NOTICE TO USER'S OF THIS DOCUMENT

Infrastructure Systems Ltd. (ISL) has prepared this document entitled "108 Street Functional Planning Study" for the City of Grande Prairie. The material contained herein reflects ISL's best judgement in light of information available at the time and the level of detail normally expected at the functional planning stage. Any use which a third party makes of this report, reliance on, or decisions made based on it are the responsibility of such third parties. ISL accepts no responsibilities for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Appendix A

Drainage Report

108 Street Stormwater Management Plan

The ultimate roadway configuration for 108 Street will vary from a 4 lane rural section in the south to a 6 lane urban section in the north. The existing 108 Street cross section is rural from the South City Limits to 76 Avenue and urban from this point north. The conversion from the existing rural section to urban can create difficulties for major overland flow paths as the existing ditches are removed and replaced with landscaped boulevards.

The limits of the 108 Street Functional Planning Study are from South City Limits to South of 100 Avenue.

Design Criteria

Minor Storms

The design criteria set out in the 2001 Master Drainage Plan, which is presently in draft form, recommend that the minor system be designed by rational method using a 5 year return period storm with a starting inlet time of 10 minutes. The rational method C values are to be 0.9 for impervious areas and 0.1 for pervious areas for the minor storm.

Major Storms

The Master Drainage Plan recommends the major storm be controlled (using stormwater management facilities) to a maximum release rate of 5 l/s/ha. The 1:100 year 24 hour storm is the design major storm.

The Master Drainage Plan contains a lengthy discussion on the proliferation of stormwater ponds in Grande Prairie. The document recommends the City pursue opportunities to reduce the number of stormwater ponds by constructing larger regional facilities where possible. It is also recommended to minimize small dry ponds that have limited use and provide minimal water quality benefits. In spite of this recommendation our report suggests implementing temporary small dry ponds for a number of the storage facilities. This is due to the fact the roadway is only a small percentage of the future regional catchment areas, making the construction of the large regional ponds excessive and costly for this little development. Once development occurs and the regional facilities are constructed, they need to be sized to accommodate the road stormwater and the temporary dry ponds can then be removed.

Existing System

No stormwater piping system currently exists south of 76 Avenue. Ditches carry stormwater south from 76 Avenue to Flyingshot Creek (sta. 1+900). The north section between 100 Avenue and 76 Avenue has an existing stormwater piping system which discharges to the Canfor Ditch at 89 Avenue. From the information available it appears that the catchment area for the storm sewer system along 108 Street includes only the road right of way. Developments adjacent to the road handle their own stormwater management.

Major overland flow pathways are currently not well defined. Between 76 Avenue and 92 Avenue overland drainage will travel towards the Canfor Ditch which discharges to Bear

Creek. The Master Drainage Plan identifies the Canfor Ditch as flat and poorly graded with several culverts that restrict its capacity. The Master Drainage Plan recommends upgrading the ditch system.

North of 92 Avenue overland flows contribute to the RailNet ditches which carry flows to Bear Creek. The west side of 108 Street just north of the RailNet tracks has been identified in the Master Plan as a location susceptible to flooding due to overland flows from the west industrial areas.

As part of the Master Drainage Plan, the existing stormwater system was modelled using XP-SWMM software. Both the 1:5 and 1:100 year rainfall events were modelled. The model identified that during the 5 year storm much of the existing piping system would be surcharged, but only one location would be surcharged to grade. We have assumed the imperviousness of the road and right of way was for the model. At the time of this writing we have not received an answer, but it is anticipated that the assumed imperviousness was equivalent to the ultimate construction of the roadway. With this in mind, it is not anticipated that the existing storm sewer system would need to be upgraded for future staging of the roadway. At detailed design stage, storm sewer system capacities will need to be confirmed.

Future Drainage System

Basin 1 - South of Flyingshot Creek (Exhibit 6.17)

The section south of Flyingshot Creek is in the newly annexed area, and it appears no discussion of this area was included in the Storm Drainage Master Plan. It is expected that as development occurs a stormwater pond would be constructed in the area to the east of 108 Street to which this area will ultimately contribute stormwater. Until this stormwater pond is constructed, temporary dry ponds may be the best option for stormwater management. As this area will remain a rural section, these temporary storm ponds can be incorporated into the proposed ditches. To minimize outfalls to the Creek the two ditch storage sections should be connected with only one outfall to the Creek. Using the 1:100 year 24 hour design storm and a release rate of 5 l/s/ha, the estimated storage required for this area would be 3990 m^3.

Basin 2 - Flyingshot Creek to 76 Avenue (Exhibits 6.18, 6.19)

The Master Drainage Plan recommended that the existing stormwater management pond in Pinnacle Ridge just north of 68 Avenue drain into the downstream wetland known as O'Brien Lake to sustain water levels and water quality of the wetland. O'Brien Lake discharges south to Flyingshot Creek. This discharge pipe should ultimately be shared as part of the 108 Street minor storm drainage system.

Where grades permit (approx. 60 Avenue), stormwater runoff from the area north of Flyingshot Creek should be intercepted and routed into O'Brien Lake instead of discharging directly into Flyingshot Creek. To improve the water quality of the stormwater discharged into O'Brien Lake, grassed swale conveyance should be maintained until development requires an urban section for the roadway. Grassed swales increase water quality and decrease quantity through filtration, infiltration and storage of the stormwater.

When the road section between 76 and 60 Avenues become an urban cross section, a sedimentation pond may be necessary prior to entering the Lake. Using the 1:100 year 24 hour design storm and a release rate of 5 l/s/ha, the estimated storage required for this area would be 3560 m³. This would be equivalent to a 4 cm rise in the lake water elevation.

For the section between Flyingshot Creek and 60 Avenue, it may not be feasible to drain overland flows to a regional storm pond due to the topography. Using the 1:100 year 24 hour design storm and a release rate of 5 l/s/ha, the estimated storage required for this area would be 1640 m³. This storage could be accomplished through some widened ditch sections and controlled outlet prior to Flyingshot Creek.

Basin 3 -76 Avenue to RailNet Tracks (Exhibits 6.19, 6.20)
As mentioned in the *Existing System* section, it is anticipated that although surcharged, the existing stormwater system in this area will function adequately for the proposed future roadway. Capacities will need to be confirmed during the detailed design stage. The storm system currently discharges to the Canfor Ditch.

This section has very little slope throughout with the low point located near the Canfor Ditch (89 Avenue). Currently the major overland flows travel via ditch to the Canfor Ditch and east to Bear Creek. It is important that when this area becomes an urban road section that the overland drainage is maintained and ponding depths are limited to 300mm.

The Master Drainage Plan recommends constructing a stormwater management facility at the end of the Canfor Ditch prior to it entering the outfall pipe to Bear Creek. Basin 3 will be part of the catchment area for this pond. Much of the area that currently contributes to the Canfor Ditch is currently developed. In this case the City may want to investigate constructing the regional pond during the first stages of construction.

If the timing of construction of the regional pond is not compatible with the first stages of upgrading, temporary storage facilities will be required. The limited area left for development along the roadway and the urban cross section creates difficulties in finding locations to create this storage. Some options for temporary storage until the regional stormwater facility is constructed include:

- Upgrading of the Canfor Ditch to provide some storage. As this is a shared outfall the storage would be shared among the entire catchment area
- Purchase land adjacent to the roadway near Canfor Ditch to construct a temporary storage facility.

Using the 1:100 year 24 hour design storm and a release rate of 5 l/s/ha, the estimated storage required for this area would be 5340 m³.

Basin 4 - RailNet Tracks to 100 Avenue (Exhibit 6.20)
This area has an existing storm sewer system which is discussed in the *Existing System* section. It is anticipated that the existing stormwater system in this area will function adequately for the proposed future roadway. Capacities will need to be confirmed during the detailed design stage. The piped storm sewer system currently discharges to the Canfor Ditch, and the major overland flows contribute to the RailNet Ditch.

The Master Drainage Plan has identified potential for surface ponding on the west side of 108 Street in this area. As with Basin 3 there is limited land available for stormwater storage. It is recommended that the grading of the right of way be such that the overland flows will spill from the low point at 6+150 to a swale on the east side of the road and flow south towards the tracks. On the east side of the road between West Side Drive and the RailNet tracks there is some surplus land in which a small storage swale could be constructed. This storage swale would only store major overland flows and would have a controlled outlet to the RailNet Ditch. A detailed analysis of the proposed catchbasins and their estimated capture rates would need to be undertaken to estimate the major overland flow expected and the storage required. It could be estimated at approximately half of the 2830 m^3 of storage required for this catchment area. The other +1400 m^3 of the stormwater storage required from this area would be added to the Basin 3 storage requirements.

Appendix B

Public Input Reports

108th Street Functional Planning Study

Public Consultation Process

prepared by

LOVATT PLANNING CONSULTANTS

in association with

INFRASTRUCTURE SYSTEMS LTD.

November 2003

EXECUTIVE SUMMARY

The City of Grande Prairie has finalized the functional plan for 108th Street (Highway 40) from 100th Avenue to the south City boundary. Improvements to the roadway are in keeping with the Transportation Master Plan and are being undertaken to increase the safety and capacity of this important section of roadway.

In order to inform the public of the scope, timing and details of the functional planning study, the consulting team held two open houses at strategic points during the project. Each open house was paired with a landowner meeting. The initial open house, held September 16th at the Muskosipee Pavilion provided opportunities to gather input on a draft functional plan, with the second and final open house used to gather comments on the consulting team's recommended plan. Direct mail was used to invite adjacent landowners and other interested participants and key stakeholders to the events. Two successive ads on the Friday page of the Herald-Tribune were used to inform the general public regarding the time and location of each open house.

The stakeholder meeting discussions and suggestions received on comment sheets have been documented with a list of registered attendees and project team members to provide the following meeting records:

- September 16th Stakeholder Meeting
- September 16th Open House
- October 30th Stakeholder Meeting
- October 30th Open house

108th Street Functional Planning Study
Stakeholder Meeting
Muskoseepi Pavilion
September 16th 2003, 1:30 – 2:30 p.m.

PARTICIPANTS

Bruce McCullough	Pat McCullough	Wade Bloomer
Chad Friesen	Cibylla Rakestraw	Poland LaCroix
Doug Hazelton	Calvin McInnis	Darwin Eckstrom
Leslie Head	Lynne Hook	Randy Melnyk
Maureen Biegel	Frances Auger	Chris Kriebum Quinn
Dennis Thompson	Len Salacki	Andy Gregory
	Geoff Rogers	

PROJECT TEAM MEMBERS

Norm Kyle
City of Grande Prairie

Jeff Johnston
City of Grande Prairie

Christine Donnelly
City of Grande Prairie

Steve Quiring
Infrastructure Systems Ltd.

Chris Delanoy
Infrastructure Systems Ltd.

Dave McRae
Infrastructure Systems Ltd.

Jim Lovatt
Lovatt Planning Consultants Inc.

MEETING REVIEW AND COMMENTS

The meeting, held on September 16th at the Muskoseepi Pavilion in Grande Prairie, ran from 1:30 p.m. to 2:30 p.m. Representatives from the City's Development and Transportation Departments, Infrastructure Systems Ltd. and Lovatt Planning Consultants attended the meeting.

Steve Quiring, Project Manager for the functional planning study, introduced the project to participants, linking the roadway needs contemplated in the City's 2000 Transportation Master Plan with the functional planning study. The presentation focussed on the ultimate (future City population of 75,000) configuration of the facility. The TMP identified 108th Street as a major arterial truck route and dangerous goods route. Steve also indicated that the final long-term plan and short-term staging concepts will be presented to the public later this fall.

Steve described the roadway as being located on the existing alignment with a good profile and, with the exception of a slight diversion around O'Brien Lake, the alignment is straight.

Intersections are located at (from the south) 68, 76, 79, 84, 89, 92, and 97 Avenues. The roadway will be comprised of two lanes in each direction from the City boundary to 84 Avenue. The section of 108th Street from 84 to 100 Avenue will ultimately have three core lanes in each direction. All intersections will have left turn bays with major intersections having right turn bays as well.

- The property requirements and need for the right-in/right-out for the service road east of 108th Street between 84th and 89th Avenues was questioned. Those most affected by the right-in/right-out access suggested that the approach was not necessary and alternate access was desirable. This group met with Jeff Johnston and Steve Quiring after the meeting to discuss an appropriate resolution to the access issue. The group agreed that the right-in/right-out was not necessary and the property requirements without the access were clarified. (Property requirements will be checked in the field by CW and E.)

- Residents from the Sprucewood subdivision raised concerns regarding current traffic volumes on 108th Street and their ability to enter and exit the subdivision in safety. Reduced posted speeds have not helped relieve the safety concern.

  Chris Delanoy suggested that provision for intersection improvements (flaring for acceleration and deceleration lanes) at problem intersections could be included in Stage 1 of the implementation of the project. Some intersection improvements could be made before the roadway is completed to a four-lane facility.

  Steve added that the rural intersections with 108th Street are not illuminated and that lighting may also be included as part of the improvement to the intersections.

- The dusty condition; location; and need for; the Canfor haul road were all discussed. Chris Delanoy reminded participants that the haul road is a private road located on property owned by Canfor. The study assumed the location of road and mill as givens, therefore, discussions of eliminating the haul road are not within the scope of the functional planning study.

  Jeff Johnston added that the City and Canfor recognize the road presents problems. They are continually working together to resolve day-to-day issues as well as the larger planning and development issues. As an example, the proposed changes to traffic signalization for some intersections crossed by the haul road will make concrete improvements to roadway safety and operations.

Steve reminded participants that the plans for presentation at the next meeting would detail the final functional plan for 108th Street complete with staging concepts.

Consulting team members were very pleased with the level of interest and general support for the improvements.

COMMENT SHEET RESPONSES

Although actual attendance was slightly higher, registered attendees numbered 19. Each participant was asked to fill out a comment sheet prior to leaving the venue. The brief questionnaire asked respondents how the proposed improvement of 108th Street would affect their business, residence or land and also allowed responses of support or non-support of the proposed improvement. Eight (8) of the comment sheets were returned with a mixed response from participants. Although many see the benefits from the proposed improvements to 108th Street, some are concerned that the change to the existing pattern of access will harm their business or create unnecessary hardship. The issue of the right-in/right-out access was cause for some participants to not support the project. Other participants expressed concerns regarding the lengthy time frame for implementation of the improvements.

Following are the unabridged responses from open house participants.

1. I have the following comments regarding the impact of the proposed improvements on my business, residence and/or land.

- There will be a significant increase in safety due to the improvements.

- I have a concern regarding the proposed service road entrance at the Peace Wapiti School Division Building. The proposed design: 1) negatively impacts the proposed signage for the Business Career College, which I represent. 2) Our preference is to have the service road accessed through the 89th Avenue intersection only. 3) We have serious safety concerns with the designed service road access. We have moved into our new location on August 21, 2003 and anticipate approximately 200 fulltime students attending our facility in the next 12 months.

- It is a major negative impact to our business site.

- This proposal does not adequately address the very dangerous industrial traffic problems that occur at every intersection. The dust control will still be inadequate and very dangerous for all traffic. To continue with this design until you have properly addressed this problem is futile. To build it this way would be negligent!

- It isn't happening soon enough! Someone will get killed trying to access Sprucewood Subdivision. We need the flaring done as soon as possible.

- The proposed improvements will have a negative impact on our business. The proposed changes will disrupt our customer flow into our business. As it stands now we have access to our business from 89 & 92 Avenues. To block off the entrances now existing on our property would cause a bottle neck for our customers.

- More access and egress is needed between 84 Avenue and 76 Avenue on the east side of Highway 40 to accommodate any development.

2. I am in favour/not in favour of the proposed improvements because...

- In favour. The time line to make improvements to enter and exit Sprucewood is not acceptable. Some changes need to be made now! *A representative from the County of Grande Prairie should have been present at this meeting to address concerns in their area.

- In favour. 1) Provide adequate sound control (barrier.) 2) Providing that the (dirt) gravel road is limited to winter traffic only complete with dust control and proper "over passes" at major intersections. The design at present is "very dangerous" due to the close proximity to the intersections of the main roadways. 3) Provide road blocks on Canfor Road when not in use.

- In favour. Ultimately it will be safer. Please give us a wider road at Sprucewood. Also, I am very concerned that at night it is so very dark trying to turn into the subdivision. Please give us a light or two!

- Not in favour. As the improvements stand at the present time I am not in favour of the plan. With some discussion the plan could be approved.

- Not in favour of the lack of access and egress on that property.

- Not in favour. O'Brien Lake – do not put curve in the highway. Get on the Environmental Department now so that the highway goes straight.

- Not in favour. Major impact to site design would impact services coming to the property plus our fuel storage building would need to be moved. The net result being a need to feed fuel with a large loader operating adjacent to a major thoroughfare. This would be a huge safety issue for our operation plus the traffic going by.

Faxed Comment

Received September 25, 2003 (the fax is in response to a revised design circulated to the school board September 24, 2003)

The Peace Wapiti School Board finds both 108th Street proposals from September 16th and September 24th unacceptable.

Increased traffic on the proposed service road would cause safety concerns. Access to the land south of Peace Wapiti School Board should be attained from 84th Avenue and east of the property. Large truck traffic should go north and south on 116th Street.

108th Street Functional Planning Study

Open House

Muskoseepi Pavilion

September 16th 2003 – 4:00 – 8:00 p.m.

PARTICIPANTS

Don Bradley	Geoff Rogers	Harvey Stewart
Randy Glenn	Ed Piebiak	John Simpson
Brian Morrison	Ken Misik	Geoff Dunn
C & G Whipple	Coral Watson	Colin Luscombe

PROJECT TEAM MEMBERS

Jeff Johnston
City of Grande Prairie

Steve Quiring
Infrastructure Systems Ltd.

Dave McRae
Infrastructure Systems Ltd.

Chris Delanoy
Infrastructure Systems Ltd.

Jim Lovatt
Lovatt Planning Consultants Inc.

MEETING REVIEW AND COMMENTS

The meeting, held on September 16th at the Muskoseepi Pavilion in Grande Prairie, ran from 4:00 p.m. to 8:00 p.m. Representatives from the City's Transportation Department, Infrastructure Systems Ltd. and Lovatt Planning Consultants attended the meeting.

COMMENT SHEET RESPONSES

Although actual attendance was slightly higher, registered attendees numbered 12. Each participant was asked to fill out a comment sheet prior to leaving the venue. The brief questionnaire asked respondents how the proposed improvement of 108th Street would affect their business, residence or land and also allowed responses of support or non-support of the proposed improvement. One (1) of the comment sheets was returned.

Following are the unabridged responses from open house participants.

1. I have the following comments regarding the impact of the proposed improvements on my business, residence and/or land.

- No responses.

2. I am in favour/not in favour of the proposed improvements because...

- In favour. Better traffic movement and safety.

108th Street Functional Planning Study
Stakeholder Meeting
Muskoseepi Pavilion
October 30th 2003, 1:30 – 2:20 p.m.

PARTICIPANTS

Gerald O'Connell	Greg Haglund	Agnes Klassen
Irwin Klassen	Syd Hollanda	Doug Hazelton
Roland LaCroix	Howard Antoniuk	Leonard Teows
	J. A. Hollands	Rhonda Side

PROJECT TEAM MEMBERS

Darwin Juell
City of Grande Prairie

Jeff Johnston
City of Grande Prairie

Chris Delanoy
Infrastructure Systems Ltd.

Steve Quiring
Infrastructure Systems Ltd.

Dave McRae
Infrastructure Systems Ltd.

Jim Lovatt
Lovatt Planning Consultants Inc.

MEETING REVIEW AND COMMENTS

The meeting, held on October 30th at the Muskoseepi Pavilion in Grande Prairie, ran from 1:30 p.m. to 2:30 p.m. Representatives from the City's Transportation Department, Infrastructure Systems Ltd. and Lovatt Planning Consultants attended the meeting. The meeting was the second in a series of meetings and open houses held regarding the 108th Street project.

Steve Quiring, Project Manager for the functional planning study, introduced the project to participants, linking the roadway needs contemplated in the City's 2000 Transportation Master Plan with the functional planning study. The presentation focussed on the revisions to the ultimate (future City population of 75,000) configuration of the facility and proposed construction staging to achieve the ultimate configuration. Revisions to the ultimate configuration incorporated the comments and suggestions received from the previous stakeholder meeting.

The four stages relate to the population horizons established as part of the Transportation Master Planning process.

The four stages are:

Stage	Population
1	40,000
2	46,000
3	59,000
4	75,000 to 80,000

Steve described the roadway improvements by section, by stage, beginning with the section from the south City Limits to 60th Avenue:

- Sage 1 will include intersection flaring and improved lighting at the Sprucewood access (50th Avenue).
- The ultimate stage includes a tourism turnout on the east side of 108th Street.
- Some relatively small portions of land are required to extend the east service road to 50th Avenue in the ultimate stage.

Residents from the Sprucewood subdivision raised concerns regarding current traffic volumes on 108th Street and their ability to turn left to exit the subdivision in safety.

- Steve suggested that the flaring of the intersection will provide a lane for left-turning northbound traffic.

In response to a query regarding construction timing Steve indicated that the timing of the improvement would be based on the onset of development in the area.

- Darwin Juell added that the detailed design for the portion of 108th Street south of 60th Avenue will address appropriate staging beyond the 40,000 population threshold to the 46,000 threshold.

60th to 84th Avenues

- Stage 1 – install service roads to consolidate several approaches at 60th Avenue, upgrade intersection at 68th Avenue to include channelized left and right turns.
- Alberta Transportation has approved funding to construct a four lane divided roadway from 68th Avenue to 84th Avenue for the coming construction season. The project will be tender early in 2004.

Will the improvement of 108th Street relieve the congestion on 116th Street?

- Yes, but likely only as far south as 84th Avenue.

- from south of 76th Avenue to north of 84 Avenue – Stage 1 construction will include a full four lane urban cross section with major intersections at 76th and 84th Avenues. 79th Avenue will be a minor intersection.
- The ultimate stage includes a six lane roadway north of 84th Avenue.
- Property requirements are limited to small areas at 84th Avenue for service roads and corner cuts.

Why not build 108th Street to accommodate the haul road trucks and get rid of the haul road?

- Canfor is committed to using the road for the next ten years at least. The study's approach was to assume the haul road as a given and accommodate traffic safely.

84th to 100th Avenues

- Major intersections at 89th, 92nd and 97th Avenues
  - Changes in access for the service road between 89th and 92nd Avenues and for the service road between 79 Avenue to Railnet
- Property required adjacent the east side of 108th Street from 84th Avenue to Railnet with some small portion adjacent the west side of the 92nd Street intersection.

Meeting adjourned at 2:25 p.m.

A brief meeting between project team members and landowners adjacent the east side of 108th Street from 89th Avenue to 84th Avenue to resolve access to east side properties was convened after the stakeholder meeting. The access issue was successfully resolved with the result to be included in the final plan.

COMMENT SHEET RESPONSES

Although actual attendance was slightly higher, registered attendees numbered 11. Each participant was asked to fill out a comment sheet prior to leaving the venue. The brief questionnaire asked respondents how the proposed improvement of 108th Street would affect their business, residence or land and also allowed responses of support or non-support of the proposed improvement. Three (3) of the comment sheets were returned with a mixed response from participants. .

Following are the unabridged responses from open house participants.

1. I have the following comments regarding the impact of the proposed improvements on my business, residence and/or land.

- I would like to see a better method of accommodating traffic coming out of Sprucewood park and turning north. The volume of traffic using Highway 40 makes this very hazardous at times – particularly when foggy. This is the reason Wapiti School bus had to reverse it's schedule so it did not have to face this problem.
- 1). My major concern for access to Sprucewood is that the intersection be flared enough so that left turning traffic will be able to cross to the centre safely, then proceed as traffic allows.

  2). In general flaring to four lanes at intersections and then cutting back to two lanes seems unreasonable as there are such short distances that are two lane.

- I'm sure some pressure could be put on Canfor to move their mill:
  - a fire (which is quite probable), could cause very much property damage and loss of life.
  - their logging trucks are very fast, which could also cause accidents and possible death.

2. I am in favour/not in favour of the proposed improvements because...

- In favour. A turning lane coming out of Sprucewood going north should be given much greater priority. Hwy 40 should be twinned very soon up to the correction line.

108th Street Functional Planning Study

Open House

Muskoseepi Pavilion

October 30, 2003 – 4:00 – 8:00 p.m.

PARTICIPANTS

Don Bradley	Geoff Dunn	Harvey Stewart
Randy Glenn	Sean Germain	Dan McInnis
Brian Morrison	Ken Misik	Dale VanVolkingburgh

PROJECT TEAM MEMBERS

Jeff Johnston
City of Grande Prairie

Steve Quiring
Infrastructure Systems Ltd.

Dave McRae
Infrastructure Systems Ltd.

Chris Delanoy
Infrastructure Systems Ltd.

Jim Lovatt
Lovatt Planning Consultants Inc.

MEETING REVIEW AND COMMENTS

The open house, held on October 30th at the Muskoseepi Pavilion in Grande Prairie, ran from 4:00 p.m. to 8:00 p.m. Representatives from the City's Transportation Department, Infrastructure Systems Ltd. and Lovatt Planning Consultants attended the session.

COMMENT SHEET RESPONSES

Although actual attendance was higher, registered attendees numbered 9. Each participant was asked to fill out a comment sheet prior to leaving the venue. The brief questionnaire asked respondents how the proposed improvement of 108th Street would affect their business, residence or land and also allowed responses of support or non-support of the proposed improvement. Two (2) comment sheets were returned.

Following are the response from open house participants.

1. I have the following comments regarding the impact of the proposed improvements on my business, residence and/or land.

- This will not change the existing problem with the service road where it enters 97 Ave. Most of the traffic drive through our property to get to 97 Ave. causing our tenants problems and wrecking the parking lot.

2. I am in favour/not in favour of the proposed improvements because...

- In favour - 108th Street/Highway 40 has become extremely busy and requires improvement, particularly at intersections to accommodate turning movements. Future plans are pretty much as expected and do not raise any alarms.
- Not in favour – This service road should have another exit, either across the R.R. tracks or a back way out. This would alleviate the problem.

Appendix C

Acceleration Lane Issues

At the direction of Public Works Committee, acceleration lanes were added to the Ultimate Plans. This was done very late in the Study. A number of issues were identified with the revised plans but there was not sufficient time to address these issues. The issues are listed below.

1. 50 Avenue -A NB accel lane interferes with the tourist information pull-out. If the tourist information pull-out is gone in the long term, then this is not an issue.
2. 64 Ave - NB accel lane added but it is awkward because of the curvature of the road. As well, the pedestrian crossing is longer.
3. 68 Ave - SB accel lane now infringes on corner of adjacent lots, which have already been subdivided and a noise berm and fence has been constructed. This is a significant issue and will require addressing in the design stage. There are options to mitigate these impacts, such as reducing the radius of the right turning roadway/island.
4. 79 Ave - for SB, the roadway shifts west to taper the lane out. It looks unappealing and may need realigning during detailed design.
5. 84 Ave - The SB acceleration lane ends approximately 60 m from the start of the deceleration lane for 79 Avenue. This looks unappealing and may cause some operational difficulties.
6. South of 89 Avenue SB accel lane terminates at access, consider pulling accel lane through access.
7. 89 Ave - SB accel is continuous to SB decel at 84 Avenue and infringes on existing trail. NB accel is continuous to NB decel at 92 Avenue. Pedestrian accommodation is going to require better corner cut on east side.
8. 92 Ave - SB accel fits, but MAY require retaining wall along service road. It is continuous with SB decel @ 89. Trucks from the service road will need to swing wide in order make a hairpin turn (that is, they will not be able to use the acceleration lane). This is not judged as a significant issue as trucks had to swing wide even without acceleration lanes.
9. 97 Ave - SB accel fits, but WILL require retaining wall along service road. The alignment is very tight here. The utility plans must be checked for pipes. Trucks from the service road will need to swing wide in order make a hairpin turn (that is, they will not be able to use the acceleration lane). This is not judged as a significant issue as trucks had to swing wide even without acceleration lanes. NB accel and is continuous w/ NB decel at 100 Ave, and will require a portion of the new bank's parking lot. The proposed property line is modified on Exhibit 6.4 but is NOT reflected on the property plan exhibits.
10. The acceleration lanes were added in a way to minimize reconstruction of the existing road. However, many of the accel lanes are now directly aligned with decel lanes prior to the intersection and therefore appear to be a through lane. Normally islands are introduced to force turns and allow acceleration drivers a more free-flow movement. Islands were not added in many cases as they would significantly increase property acquisition and possibly require complete re-alignment of the through lanes.

Due to the above issues, it is recommended that the need for acceleration lanes at all intersections be further reviewed at the detailed design stage prior to construction of the ultimate plans.