

## HIGHWAY 2 / 338 AVENUE INTERCHANGE FUNCTIONAL PLANNING STUDY

ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS TOWN OF OKOTOKS – FOOTHILLS COUNTY

R-1268 – FINAL REPORT – EXECUTIVE SUMMARY

JUNE 2023



ISL Engineering and Land Services Ltd. Is an award-winning full-service consulting firm dedicated to working with all levels of government and the private sector to deliver planning and design solutions for transportation, water, and land projects.

Proudly certified as a leader in quality management under Engineers and Geoscientists BC's OQM Program from 2014 to 2021.





## **Executive Summary**

Highway 2 is the busiest highway in the province and, as part of the CANAMEX North South Trade Corridor linking Alaska and Mexico, it plays a key role in facilitating the movement of people, goods, and services, regionally, inter-provincially and internationally. Approximately 27,000 vehicles per day travel on Highway 2 near 338 Avenue. Traffic on this segment of Highway 2 has steadily increased over the past 20 years and this trend is expected to continue.

As Okotoks and the surrounding area continues to grow, there is increasing demand for access to and across Highway 2, and mounting safety issues for drivers navigating the at-grade intersection at 338 Avenue. In 2020, the Calgary Metropolitan Region Board completed the South and East Calgary Regional Transportation Study and a future interchange at Highway 2 and 338 Avenue was ranked in the top 20 most-beneficial regional projects within a 10-year window. In response to prior studies, and growing safety concerns in the area, Alberta Transportation and Economic Corridors (ATEC), in a three-way partnership with the Town of Okotoks (the Town) and Foothills County (the County), engaged ISL Engineering and Land Services Ltd. (ISL) to undertake a Functional Planning Study for an interchange to replace the at-grade intersection at Highway 2 and 338 Avenue, east of Okotoks.

Through the development of options and selection of a preferred interchange location and configuration, this study has considered:

- Operational factors (e.g. capacity, access, interchange configurations and right-of-way (ROW) requirements) to develop functional plans for the interchange.
- 338 Avenue's alignment and how it connects to the future proposed interchange.
- Input from Albertans including multiple stakeholders and adjacent property owners.

Funding, design and construction timelines have not yet been established for this project. Recommendations from this study will be considered moving forward based on provincial priorities and funding plans. The recommendations provide ATEC, the Town and the County with a definitive yet flexible blueprint to support continued development and growing traffic volumes in the region. The recommended functional plan offers a robust solution with a staged approach that enables investment in the roadway network to be scaled to meet demand as the region continues to grow. It provides a basis for all parties to ensure ROW protection, development access and capital programming are aligned with the ultimate vision for Highway 2 and demand along 338 Avenue as development progresses.

### ES.1 Planning Process

Initiated in September of 2021, this study followed the three-phase process outlined below in **Figure 1.1.** A Technical Review Committee (TRC), comprised of representatives from ATEC, the Town, the County, and ISL, provided input and direction throughout the process. The first phase of the study included a comprehensive review of existing conditions including an environmental evaluation, a geotechnical assessment, and a utility review. Through three multiple account evaluation workshops, the TRC reached a consensus on the final recommended interchange plan. The study included two rounds of engagement at key project decision points to gather feedback from landowners, stakeholders and the public on the recommendations and collect suggestions for refinements to the plan.

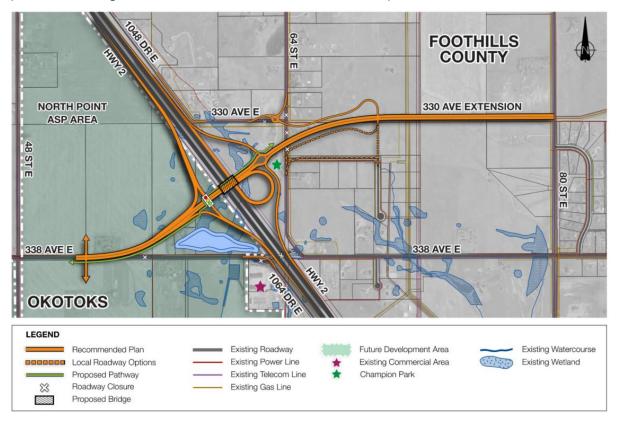






### ES.2 Recommended Functional Plan

The study recommends a Parclo A interchange, with a loop ramp in the southeast quadrant, approximately 500m north of the existing at-grade intersection. The interchange connects to existing 338 Avenue west of Highway 2 and provides a new connection to 80 Street to the east. This location and configuration offers a balanced solution that improves access and connectivity between Highway 2 and the adjacent roadway network. The recommended plan is shown in **Figure 2.1** with additional technical details included on plans **ES-01** to **ES-05**.





### ES.2.1 The recommended configuration serves growing demand and supports future development.

Growth within Okotoks and the broader Calgary Metropolitan Region was a key driver for this study. 338 Avenue is expected to be a major arterial connection into Okotoks, and the land west of Highway 2 along 338 Avenue is identified as a future employment area in the Town's Municipal Development Plan. Both anticipated regional transportation network improvements and area structure plans in progress within Okotoks informed the traffic forecasting for the future interchange and helped guide the development of interchange options. Specific land use changes and the Town's future vision for 338 Avenue also helped inform access needs, design vehicles and cross section parameters for the interchange.





Specific features of the recommended plan that address anticipated growth and land use changes in the area include:

- Interchange location: The alignment for 338 Avenue and overall location of the interchange was selected to minimize the number of direct impacts to existing private properties and prevent land fragmentation in ways that would make parcels more challenging to service or develop.
- **Capacity**: A total of six lanes along 338 Avenue west of Highway 2, a dual eastbound to northbound loop ramp and a dual southbound to westbound exit ramp accommodate the projected commuter traffic at the 40-year design horizon.
- Design Vehicles: Based on existing agricultural land use in the area and anticipated commercial/industrial development anticipated west of the interchange, the interchange ramp terminals are designed to accommodate large commercial vehicles and agricultural equipment. Once the interchange is built 338 Avenue may also need to accommodate oversize and overweight loads west of the interchange. Intersection details, signage and lighting can all be designed to accommodate these larger vehicles if needed.
- Local Access: West of the interchange, the first access point on 338 Avenue is set based on space needed to accommodate traffic movements between the interchange ramps and the future intersection. East of the interchange, the study has suggested a first intersection location on 338 Avenue based on the existing local roadway network. Should land development in the area proceed ahead of the interchange, these ultimate access points can guide the development of local roadway networks in the interim to encourage compatibility with long-term plans and facilitate tie-ins when the interchange is built.

## ES.2.2 The proposed interchange provides safer, all-turns access between the local roadway network and Highway 2 for all road users.

Grade separating access at 338 Avenue is the key safety improvement offered by the recommended plan. Removing conflicts between the high-speed highway lanes and turning movements on 338 Avenue provides significant benefits both for vehicles travelling inter-regionally along Highway 2 and local drivers accessing destinations and services on both side of the highway. Grade separation is also part of a larger effort to create free-flowing conditions along Highway 2 and the CANMEX Corridor. An independent road safety audit was conducted on the recommended plan to review the safety performance of the interchange and identify areas for further refinement at the detailed design stage.

The proposed roundabout at the east junction combines a teardrop roundabout configuration (common at interchange ramp junctions) with a spiral transition to help direct traffic to the correct lane and minimize collisions. The roundabout is also able to accommodate a wide range of design vehicles including oversize loads and agricultural equipment.

A traffic signal is proposed at the west junction as it provides more capacity to handle the AM peak period commuter traffic accessing northbound Highway 2 at the 40-year design horizon. The intersection is designed with free-flowing right-turn movements removing the PM peak period commuter traffic from the signal operations further optimizing operations and traffic flow along 338 Avenue.

The recommended plan also includes space for a pathway on the south side of 338 Avenue approaching the interchange from the west. The pathway then crosses Highway 2 using the north side of the interchange bridge. Pathway connections were planned to minimize conflicts with high-volume, high-speed vehicular movements. As Foothills County does not have plans to provide a separate pathway facility, the pathway is expected to transition to the local road network east of the interchange.



### ES.3 Project Implementation

Review of project implementation included recommendations for construction staging, development of projected capital construction costs, and definition of property requirements.

#### ES.3.1 The plan is flexible and can be implemented in stages.

The overall staging strategy developed as part of the study provides guidance on how the interchange construction could advance prior to highway widening or upgrades to 338 Avenue. The recommended Stage 1 plan is designed to accommodate projected traffic volumes at the 20-year horizon, but the plan is flexible and could easily be adapted, within the defined ROW, to align with development patterns, respond to travel demand and optimize cost at the time of construction. The recommended Stage 1 plan is shown in **Figure 3.1** with additional technical details included on **Plans ES-06** and **ES-07**.



Figure 3.1: Recommended Stage 1 Interchange Plan

Key elements of the Stage 1 plan that are designed for maximum flexibility and can be adapted if needed at the time of construction are noted below.

- The interchange could support fewer lanes on 338 Avenue and single lane ramps at its initial stage of construction.
- Embankments for 338 Avenue and the interchange ramps could be pre-graded to their ultimate widths to allow for widening with minimal disruption when capacity is needed in the future.
- The bridge could be built from the centre outwards with the full north half of the bridge constructed at the initial stage. The bridge can then be widened on the south when additional eastbound capacity is needed.
- West of the interchange, access to 338 Avenue from adjacent land and 1064 Drive is dependant on future municipal development plans. Interim roadway connections will need to align with the recommended ultimate access and will be confirmed by the Town.
- 338 Avenue could connect directly to a new local roundabout east of the interchange at 64 Street and 330 Avenue at the interim stage, as shown on **Figure 3.1.** This allows a more direct connection to the local roadway network, results in fewer property impacts at the initial stage, and defers a portion of the capital investment to the ultimate interchange.





## ES.3.2 The recommendations from this study set the overall footprint needed for the interchange providing clarity for stakeholders looking to advance adjacent developments.

A total of **123 acres (50 ha)** of land west of 64 Street will need to be acquired for construction of the Stage 1 interchange. An additional **64 acres (26 ha)** east of 64 Street will need to be acquired to complete the ultimate plan. In total, the ultimate interchange plan will impact **15 individual parcels** including 12 that are held by private landowners. These totals include **51 acres (21 ha)** identified as optional and meant to accommodate a range of local roadway connections under consideration east of the interchange. ROW requirements are shown on **Plan ES-08**.

On the east side of Highway 2, land required for the interchange impacts the Champion Park parcel. This land is jointly owned by the Town and the County, and an agreement is in place between the municipalities and former owners that affects the ongoing operation and maintenance of the property. Discussion will be needed to resolve outstanding obligations under this agreement prior to re-designation of this property for highway ROW purposes.

## ES.3.3 The capital cost estimates prepared for this study allow this project to be considered for future funding opportunities.

Cumulatively, across both initial and ultimate planning horizons, the recommended interchange plan is expected to cost approximately **\$120 million**. Should the Stage 1 interchange proceed, the initial capital investment is expected to be **\$86.8 million**. This total includes pre-grading much of the ultimate interchange footprint so additional capacity can be added in the future with minimal disruption. The remaining **\$32.8 million** estimated for completion of the ultimate functional plan is primarily reserved for widening the bridge structure, expanding pavement areas on 338 Avenue, and completing the extension of 330 Avenue to 80 Street.

While funding, design and construction timelines have not yet been established for this project, completion of the functional plan is necessary for the project to advance onto future capital plans. Recommendations from this study will be considered moving forward based on provincial priorities and funding plans.

### ES.4 Options and Evaluation

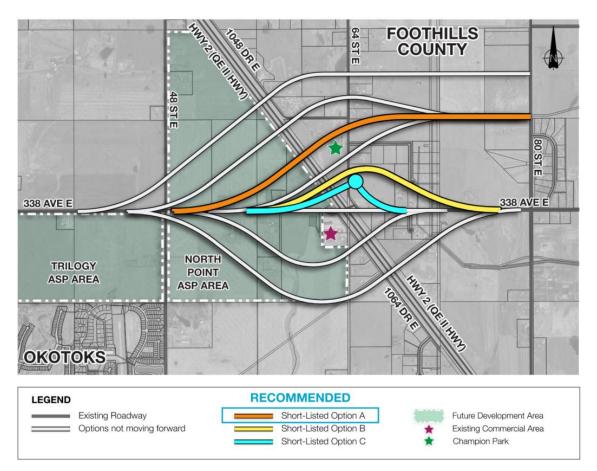
### ES.4.1 The study considered a wide range of alignments and interchange configurations.

Option development first focused on 338 Avenue and the full range of locations where the alignment could cross Highway 2 and tie back to the existing roadway network. In total, nine alignment options were developed in the vicinity of the existing 338 Avenue intersection. These are shown on **Figure 4.1**.

Key factors guiding the development of options included: property impacts, cost, integration with the existing and future local and regional transportation network, and typical minimum design parameters defined by ATEC and the Transportation Association of Canada.

Through the evaluation process, three options (shown in orange, yellow and blue on **Figure 4.1**) were short-listed for further development and shared with the public in round 1 of engagement held March 2022. The orange alignment was ultimately selected as the recommended option.





#### Figure 4.1: 338 Avenue Alignment Options

Following the shortlisting of three alignment options, option development shifted to focus on identifying a preferred interchange configuration for each alignment. Several interchange types that specifically address the high commuter volumes and movements were explored including two parclo-type interchanges and three crossover-type interchanges. ATEC's preference was to proceed with parclo-type interchanges that are familiar to drivers, consistent with other interchanges in this area and provide more flexibility for construction staging. Parclo A (with a single loop ramp in the southeast quadrant) and Parclo A4 (with loop ramps in the southeast and northwest quadrants) configurations were developed along each of the short-listed alignment options.

## ES.4.2 The recommendations were established though a robust evaluation process to build consensus on the recommended concept.

This study used a multiple account evaluation process which considered a range of technical criteria in four major categories: community sustainability, environment, finance, and user benefits. Using this process, ATEC, the Town, and the County, with support from the consultant team, first collectively developed the evaluation framework and then used this framework to evaluate options and build consensus on the preferred location and configuration for the future interchange.

Throughout option development, the consultant team provided a wide range of functional planning options that met technical design criteria while considering project specific constraints and future development priorities. The evaluation of these options took place through a consensus-building process at evaluation workshops, where representatives from ATEC, the Town, and County confirmed the performance of each option for each criterion in the multiple account evaluation framework to establish a recommendation.





# ES.4.3 The project included two rounds of engagement with virtual and in-person opportunities for landowners and the public.

Engagement for the study was organized into two rounds following the multiple account evaluation workshops. Input from the public helped inform the option evaluation and guide final refinements to the recommended plan.

#### Round 1 Engagement - February / March 2022



#### Round 2 Engagement - October / November 2022

Presented draft recommended plan and gathered feedback on potential opportunities for refinements



In-person Open House • 110 Attendees In-Person Landowner Meeting • 17 Attendees Online Survey • 419 Responses

In total, over 1100 contacts were made with landowners, project stakeholders and interested members of the public over the course of the project. Engagement events during both rounds of engagement were well attended and the online survey elicited high response rates. The majority of respondents expressed support for the new interchange. Overall, there was a lot of interest from the public in seeing the interchange move forward to improve access and safety at the existing intersection. General uncertainty of when the project would begin remains a major concern for residents, specifically regarding property impacts, land acquisition timelines and mobility constraints in relation to the median removals project.

A significant amount of public feedback received was related to the proposed median removals near the study area that are anticipated in Summer 2023. While decisions related to median removals are outside of the scope of this study, the strong public response speaks to the public interest in seeing opportunities for improved access to and across Highway 2 advanced in the near future.

A few survey respondents indicated a preference for an alternative option. Many of these respondents preferred options with less impact to Champion Park or options that were farther from their individual property to lessen indirect impacts such as increased traffic, headlight glare, noise, visual aesthetics, and property value. While the recommended plan does result in both direct and indirect impacts for some property owners, the location of the interchange was selected as part of a robust evaluation process with input from ATEC, the Town and the County. The recommendation represents a balanced solution that comes with benefits and drawbacks for those who live in the area. Impacts were considered in the context of all properties and users of the roadway network within the study area, as well as the development plans and priorities of the adjacent municipalities and the Province. On balance, the recommended plan offers improved access and connectivity between Highway 2 and the adjacent roadway network and provides flexibility to adapt the plan, within the defined ROW, as necessary to respond to development patterns and travel demands over time. As such, further exploration of alternative alignments or interchange locations was not considered in response to these comments.

### ES.5 Summary and Future Considerations

The recommendations provide ATEC, the Town and the County with a definitive yet flexible blueprint to support continued development and growing traffic volumes in the region. The recommended functional plan offers a robust solution with a staged approach that enables investment in the roadway network to be scaled to meet demand as the region continues to grow. It provides a basis for all parties to ensure ROW protection, development access and capital programming are aligned with the ultimate vision for Highway 2 and demand along 338 Avenue as development progresses.





#### ES.5.1 Following completion of the planning study, additional work is needed to move this project forward.

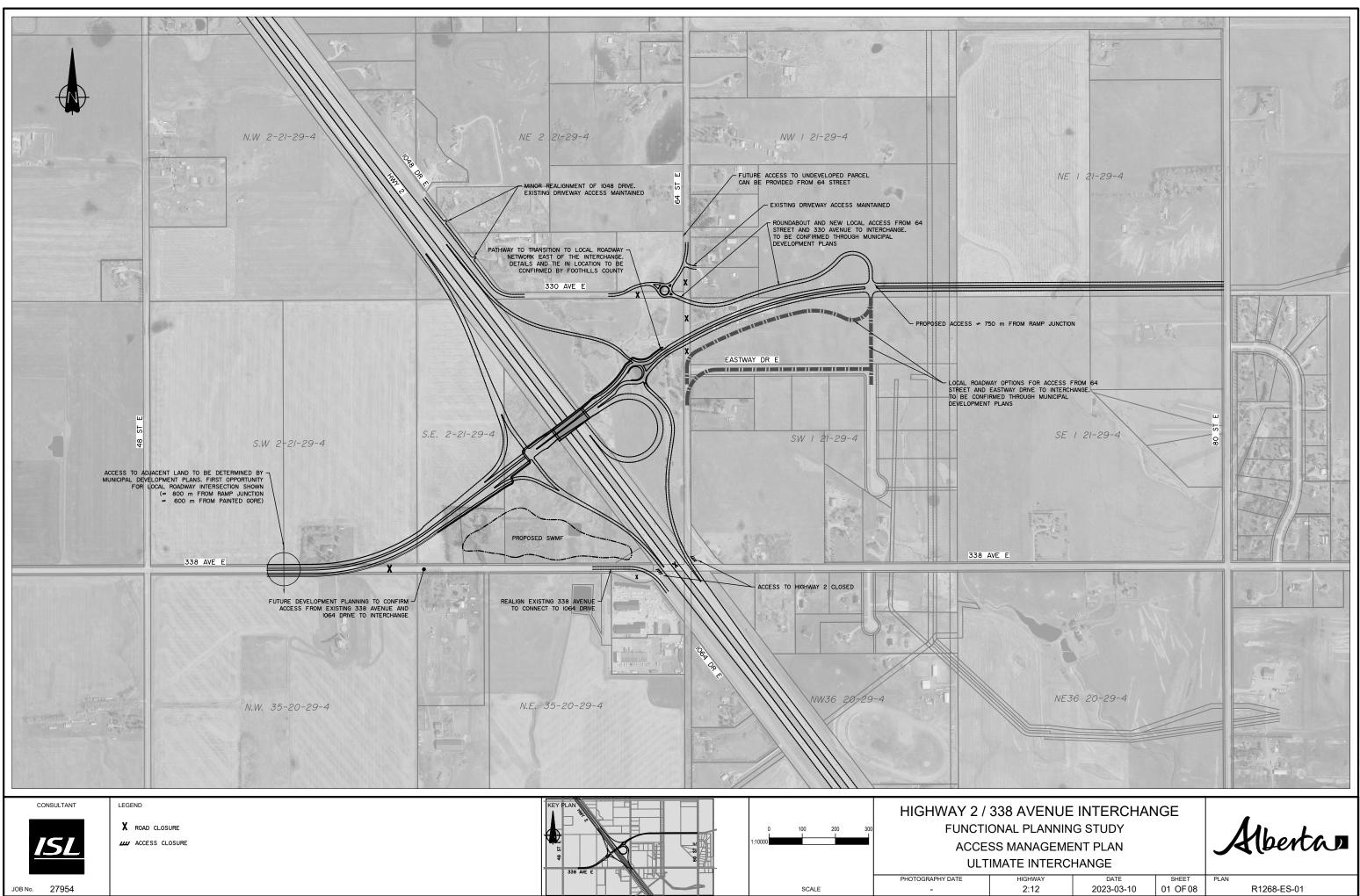
While many elements of the design will be revisited and refined as the project progresses through detailed design and construction, the following specific actions and considerations are highlighted for future designers.

- Monitor the progression of development in the region and review capacity needs identified by this study at the initial and ultimate stages. The ROW protected for the recommended Parclo A interchange is sufficient to accommodate other cross-over type interchanges if future demand is significantly different than traffic projections available at the time of this study.
- Complete an independent Road Safety Audit at the detailed design stage to ensure all outstanding issues and suggested mitigations with the planning level RSA are incorporated into the final design.
- Complete a subsurface geotechnical exploration program in proximity to the bridge abutments and embankment extents and consider general criteria and risks identified in the geotechnical assessment completed at the functional planning stage.
- Complete a hydrovac program to locate all utilities within the proposed ROW and confirm relocation and/or other mitigation measures with utility owners.
- Confirm mitigation measures with the Orphan Well Association for construction of the 330 Avenue extension over abandoned gas transmission pipelines.
- Complete the following additional environmental field investigations to support permit applications required by provincial and federal regulators.
  - A vegetation inventory and rare plant field study prior to construction and within the growing season.
  - Wildlife surveys for sharp-tailed grouse, breeding birds, and prairie raptors prior to the start of construction.
  - A wetlands assessment prior to construction and within the growing season to delineate and classify wetlands within the project area, determine if Water Act approval or Code of Practice notification is required and establish wetland mitigation and/or compensation requirements.
  - A field-verified water well survey to determine the use and depth of any nearby domestic use water wells.
  - Further investigations as warranted prior to construction of roadways requiring excavations near the oil and gas pipelines.
  - Confirm Historical Resources Act requirements are satisfied, and no additional historical resource investigations are needed.
- Continue to inform impacted landowners and other stakeholders of project updates and milestones as the project progresses and land acquisition commences.

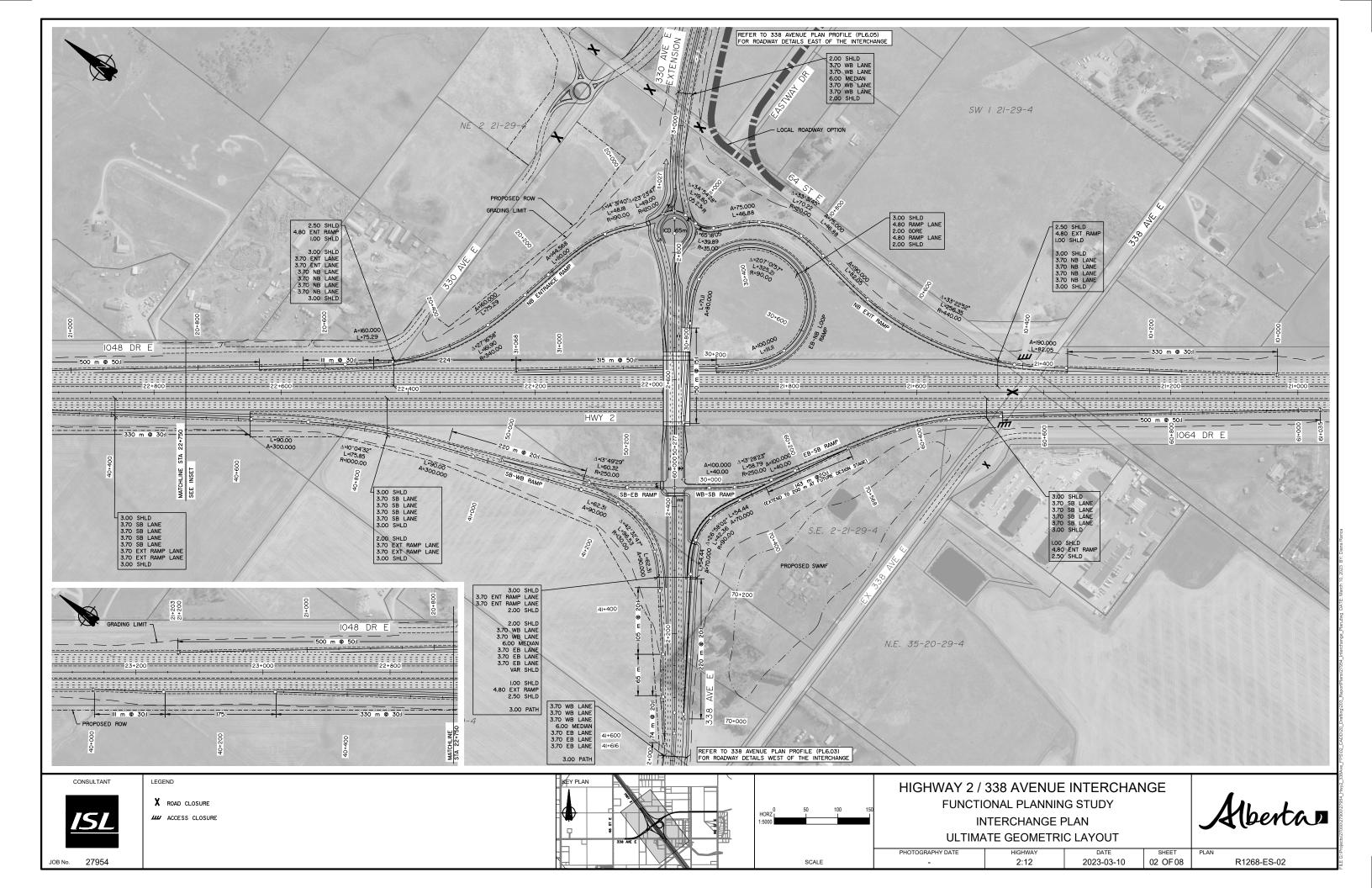
## ES.5.2 Further municipal planning efforts are needed to determine how adjacent development will interface will the interchange.

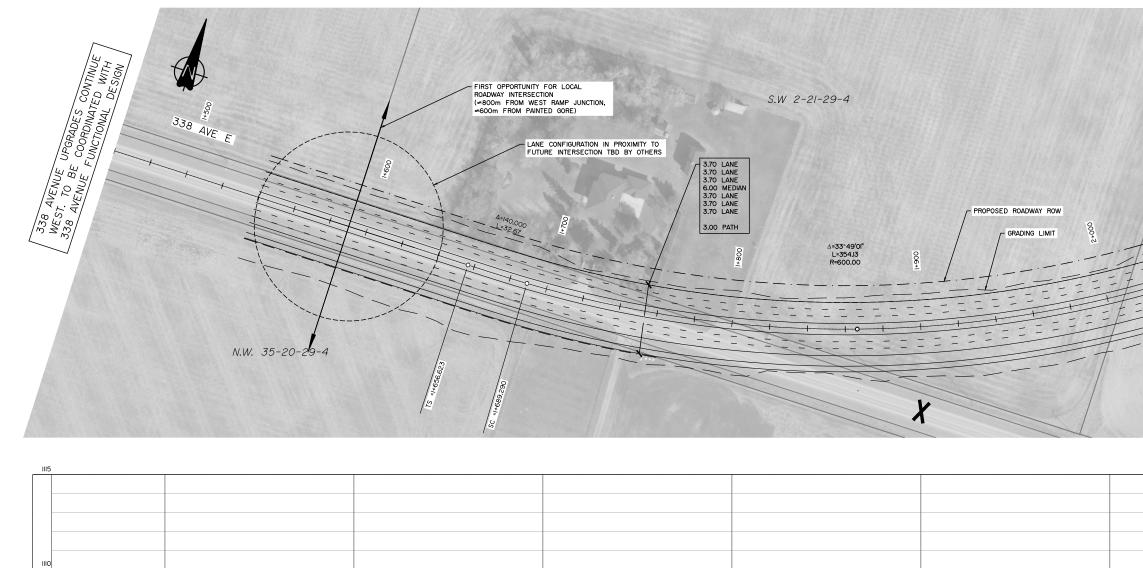
As development plans were underway but not yet complete at the time of this study, a number of outstanding decisions will need to be addressed by the Town and the County as development plans are finalized in the region:

- Resolution of outstanding obligations and costs related to the Champion Park parcel prior to re-designation of this property for highway ROW purposes.
- Confirmation of the future roadway network within the North Point ASP development area and the access needs (intersection configurations and locations) west of the interchange.
- Provision of temporary access to existing properties along 338 Avenue (west of the interchange) and 1064 Drive should construction of the interchange proceed ahead of property acquisition and redevelopment within the North Point ASP boundary. This includes identification of any additional property requirements for temporary connections to the ultimate intersection west of the interchange.
- Completion of the interface of the Town's functional design of 338 Avenue with the alignment, profile and cross section of 338 Avenue recommended by this study. This includes confirmation of the transition from 6-lanes to 4-lanes at or beyond the first intersection west of the interchange, consolidation of the multi-use pathway network to the south side of 338 Avenue west of the interchange and confirmation of property requirements.
- Confirmation of the preferred alignment and property requirements to connect 64 Street and East way Drive to the ultimate 330 Avenue extension east of the interchange.



E G:/Projects/27000/279504 Hwy2 338Ave\_FPS/02\_CADD/20\_Drafting/203\_ReportPlans/27954\_AccessManagementPlan.dwg DATE: March 10, 2023 BY: Diant





	105							
ľ				-0.60%		×\		
						PROPOSED GRADE 338 AVE CL		
	100							GROUND 33
	1+440	+5	00  +6	00 1+7	200	00 1+9	00 2	+000

CONSULTANT	LEGEND	KEY F	PLAN	1111 2				00 10 00	HIGHWAY 2 /	338 AVE
	X ROAD CLOSURE		E				HORZ 1:2000	20 40 60		ONAL PLA
ISL	ACCESS CLOSURE		48 ST -		X		0 VERT I	2 4 6	PLAN PROF	ILE - 338 A
				338 AVE E			1:200			TA 1+440
									PHOTOGRAPHY DATE	HIGHWAY
JOB No. 27954					F			SCALE	-	2:12

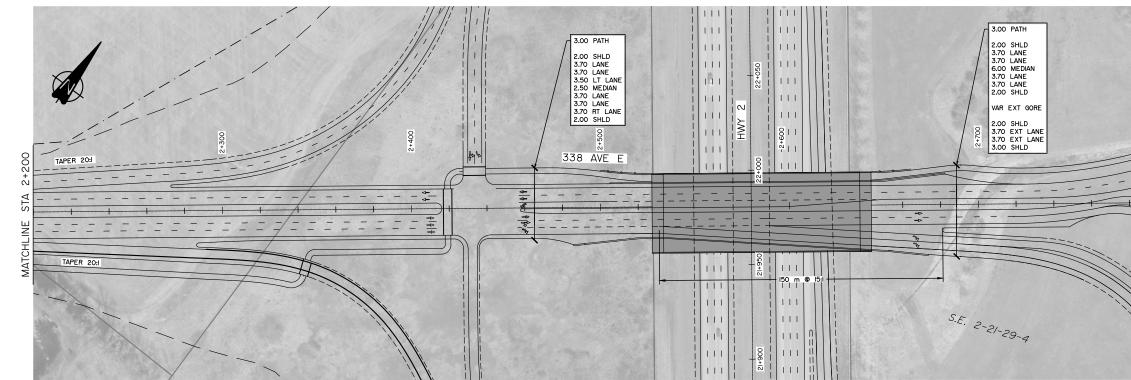
1-322.67 A:40.000 TAPER 201 TAPER 201 TA	RATCH INTO	
75 00 901 901 902 4 38 AVE CL 38 AVE CL	K=60.00 L=156.00 LP STA=2+1/2.11 LP ELEV=1102.28	II5 II0 II0 II05
AVENUE INTERCHAI AL PLANNING STUDY - 338 AVENUE - ULTIMATE 1+440 TO 2+200	Mark	

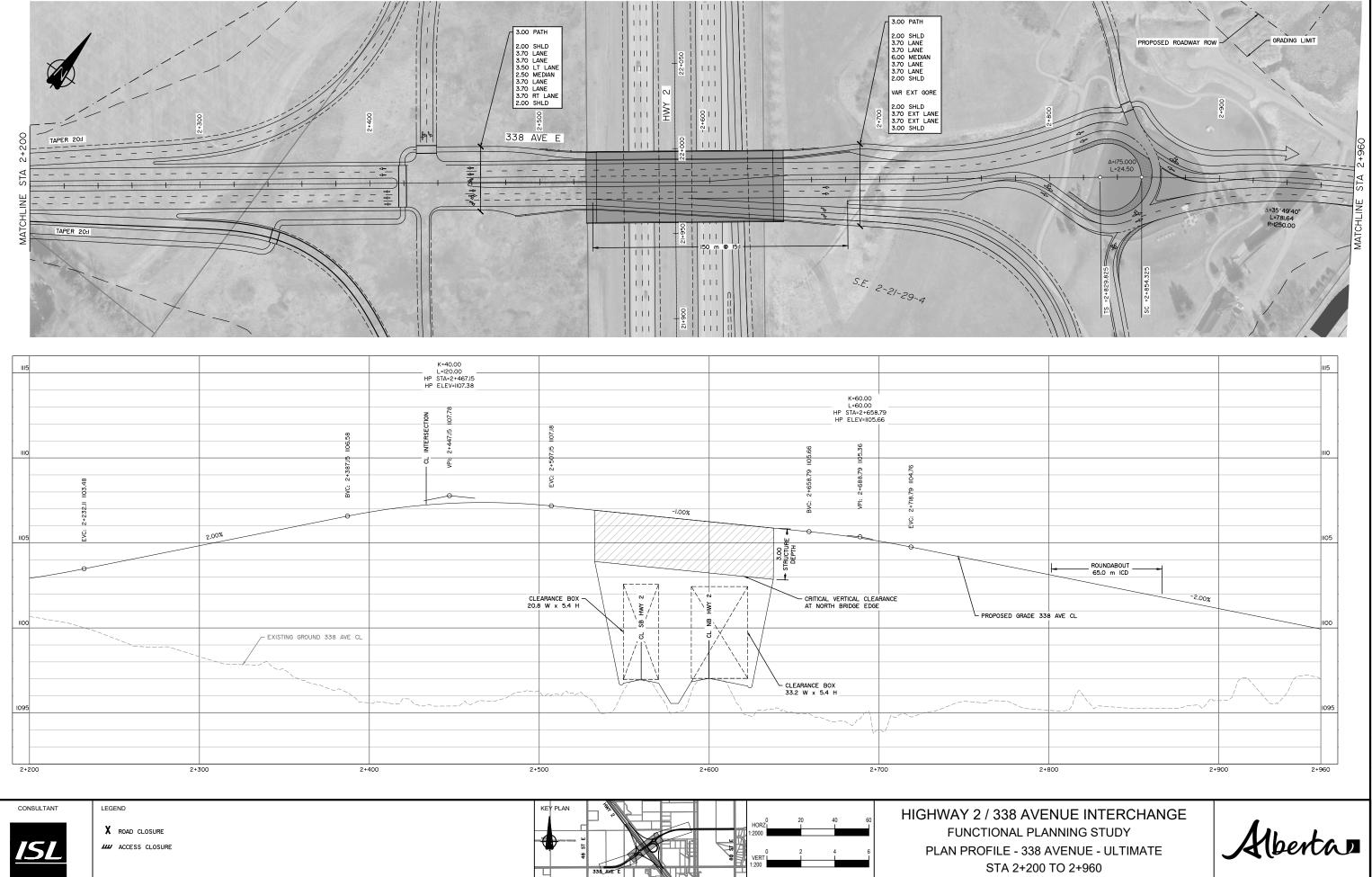
ELE G:Projects/27000/27900/27904\_Hwy2\_338Ave\_FPS/02\_CADD/20\_Drafting/203\_ReportPlans/27954\_PlanProfiles\_338Ave.dwg DATE: March 10, 2023 BY: D

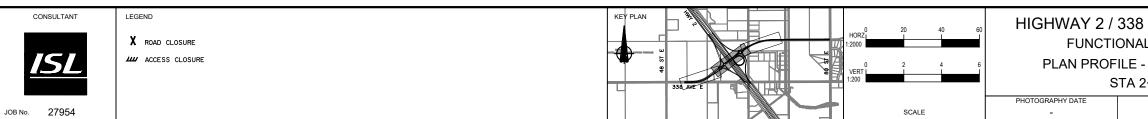
DATE SHEET 2023-03-10 03 OF 08

R12

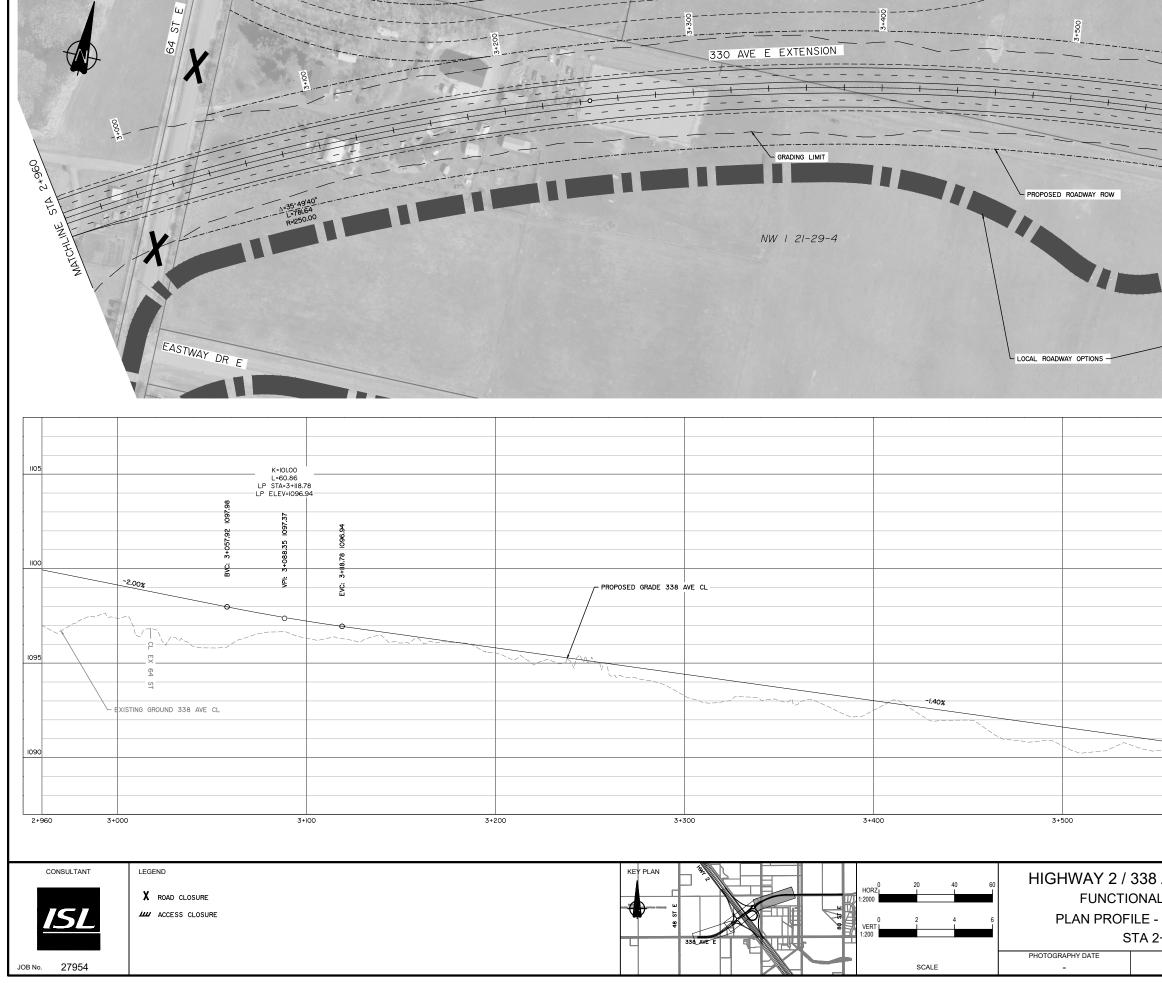
R1268-ES-03





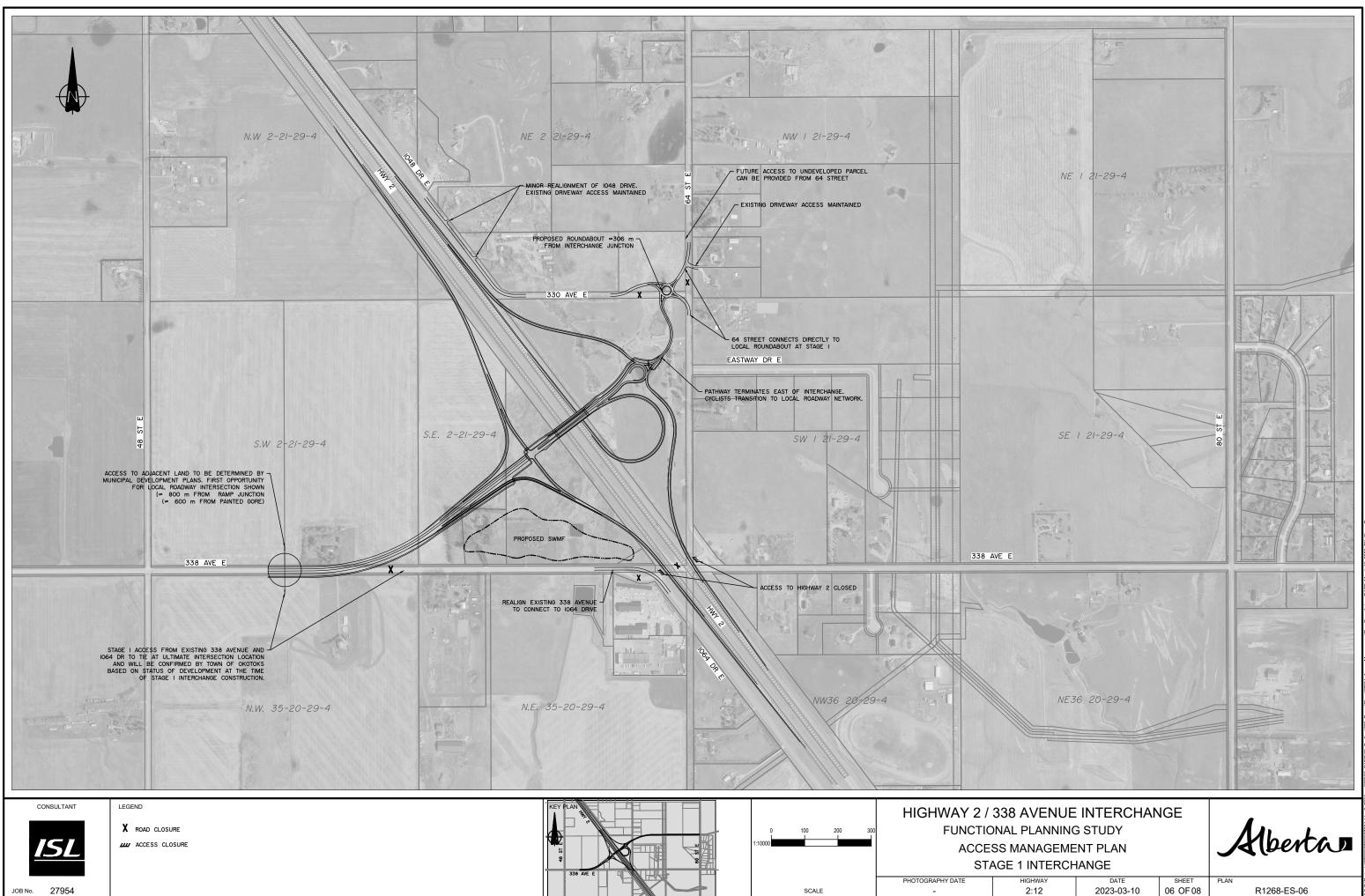


2+200 TO 2-	+960			
HIGHWAY	DATE	SHEET	PLAN	
2:12	2023-03-10	04 OF 08		R1268-ES-04

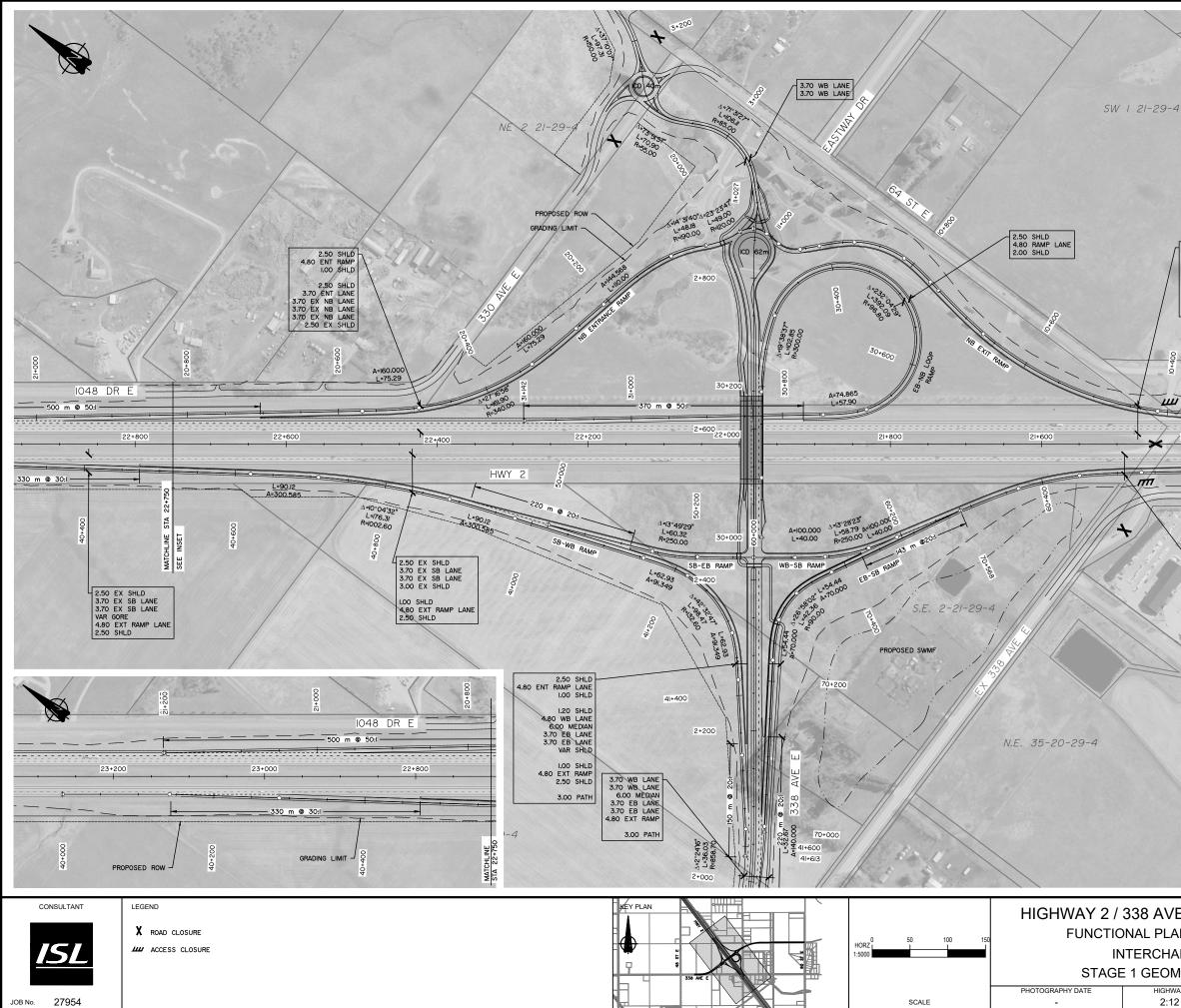


		L=24.50 A=175.000 S96 S96 L5		FROPOSED ROADWAY CONTINUES
	EASTWAY DR		13	PROPOSE EAST TO 102
				CO
				1095
				1090
	3+600		3+700	) 3+740
L PLANNIN	UE - ULTIMA		Au	perta
HIGHWAY 2:12	DATE 2023-03-10	SHEET 05 OF 08	PLAN R120	68-ES-05

-ILE O

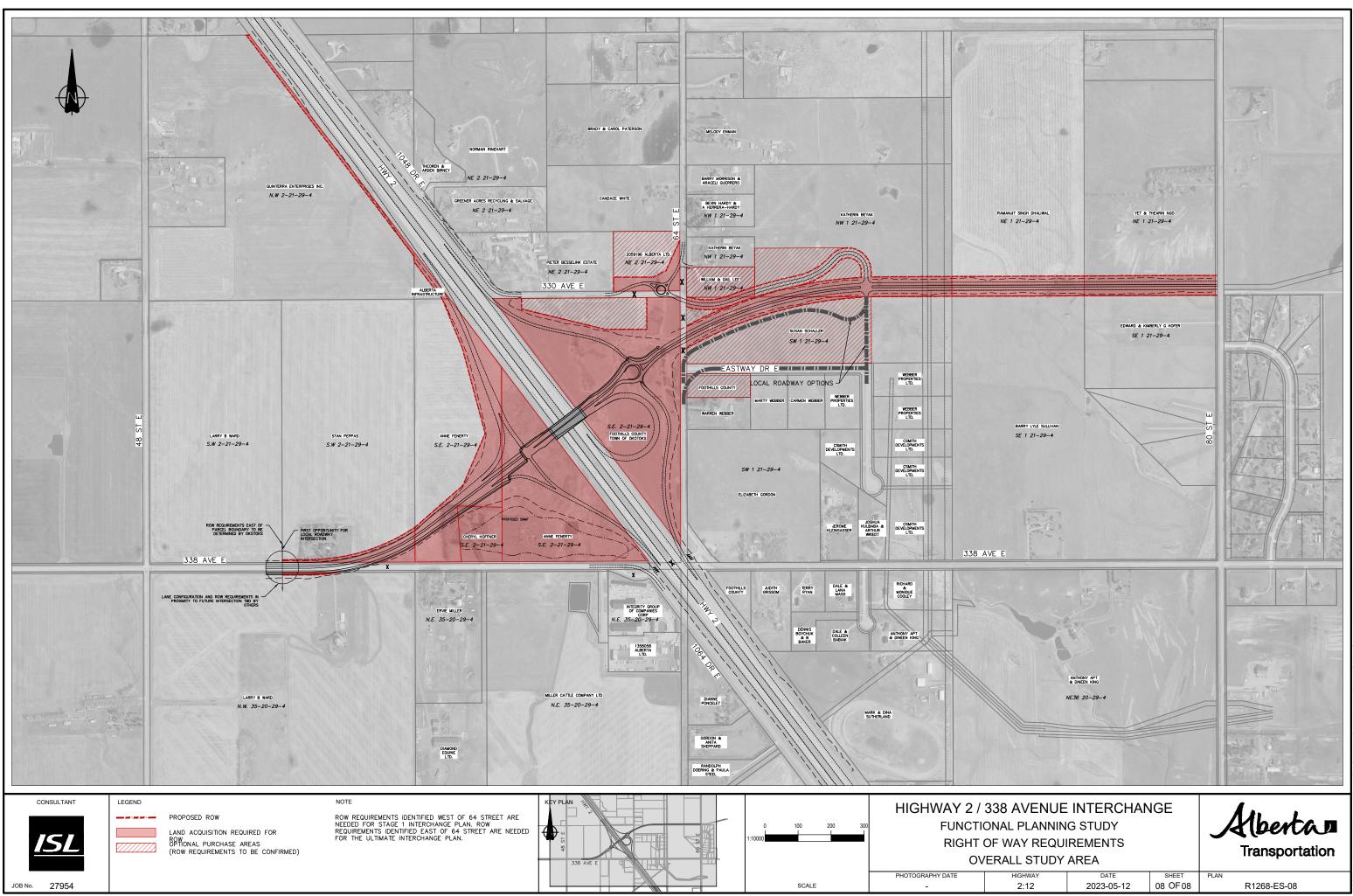


silProjects/27000/27900/27954\_Hwy2\_338Ave\_FPS/02\_CADD/20\_Drafting/203\_ReportPlans/27954\_AccessMa



2.50 SHLD 4.80 EXT RAMP I.00 SHLD 3.00 EX SHLD 3.70 EX NB LANE 3.70 EX NB LANE 3.70 EX NB LANE 2.50 EX SHLD ð — 330 m @ 30 Ш 21+200 21+000 21+400 500 m @ 50·l 0+19 81064 DR E 2.50 EX SHLD 3.70 EX SB LANE 3.70 EX SB LANE 3.00 EX SHLD 1.00 SHLD 4.80 ENT RAMP 2.50 SHLD HIGHWAY 2 / 338 AVENUE INTERCHANGE Albertan FUNCTIONAL PLANNING STUDY INTERCHANGE PLAN STAGE 1 GEOMETRIC LAYOUT SHEET 07 OF 08 HIGHWAY DATE PLAN 2:12 2023-03-10 R1268-ES-07

FILE G:hrojects/27000/27900/27954\_Hwy2\_338Ave\_FPS/02\_CADD/20\_Drafting/203\_ReportPlans/27954\_Interchange\_Plan-Stage1.dwg\_DATE: March 10, 2023\_BY: Dit



E G:/Projects/27000/27900/27954\_Hwy2\_338Ave\_FPS/02\_CADD/20\_Draffing/203\_ReportPlans/27954\_ROW\_Req\_Overall.dwg DATE: May 30, 2023 BY: J/