

LLOYDMINSTER

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WIGFIELD AREA STRUCTURE PLAN

Bylaw XX-2023
April 2023

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EXECUTIVE SUMMARY

The **Wigfield Industrial Area Structure Plan** ("Wigfield ASP" or "the ASP") plan area is located at the southeast corner of the City of Lloydminster, in Saskatchewan, adjacent to the Rural Municipality of Wilton No. 472. The ASP area consists of approximately 101.6 hectares.

The original Wigfield Industrial Area Structure Plan (ASP), prepared in 2014, provided new business and employment opportunities in the City of Lloydminster. The identification of this area for industrial land use was intended to ensure a supply of serviced and accessible industrial lots in the future.

After the approval of the original ASP, decisions were made that required a revised policy direction for the Wigfield area, including:

- The annexation of 23.5 quarter sections from the County of Vermilion River in early 2022 created opportunities to locate industrial land elsewhere in the city.
- Revisions to the Northeast Area Structure Plan were made to accommodate additional industrial lands north of Highway 16 in Saskatchewan.
- This revised Wigfield ASP provides a comprehensive framework to reflect the change in approach for this area and provides direction for future, more detailed planning work to support subdivision and development via Neighbourhood Structure Plans (NSP).

This revised Wigfield ASP is consistent with existing plans, policies and regulations.

The ASP lands are not overly constrained for development, with consideration required for setbacks to the CP Rail line and the existing intensive agricultural operation south of the southern ASP boundary.

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The ASP includes policies that respond to the natural environment and the recommendations of the Environmental Impact Assessment, as well as policies that respond to existing built structures, and existing infrastructure capacities.

High-level engineering analyses was undertaken by the City to assess water, wastewater and stormwater management servicing requirements for development, with direction to undertake detailed capacity and network requirement analyses at the Neighbourhood Structure Plan stage to support development. However, there are known limitations to existing capacity in the wastewater collection system, in particular the East Trunk, that require careful monitoring as development progresses.

The Future Land Use Concept accommodates the future recreation and event facility site with additional complementary commercial uses along the 40 Avenue corridor on the north side of 36 Street, and a neighbourhood village-style residential community south of 36 Street in the Wigfield ASP. A mix of uses are proposed in addition to the recreation and event facility site, including single detached houses, mixed use buildings, townhouses and medium density housing, along with neighbourhood commercial pockets and a commercial corridor along 40 Avenue.

The CP railway will be buffered with a landscaped buffer and trail system that connects the two stormwater management facilities located in the northeast and southeast corners of the ASP. There is also a buffer proposed along the southern boundary with landscaping and trail.

It is expected that the north area of the ASP, those lands north of 36 Street, will develop first and require land use redistricting to support development. A Neighbourhood Structure Plan will be required to support further development.

A number transportation network improvements are required by 'opening day' of the recreation and event facility development, including:

- 41 Street, 36 Street and 31 Street classified as collector roadways inside the Plan Area
- Upgrade 41 Street to a paved Urban Residential Collector Roadway standard
- 40 Avenue and 41 Street
  - Southbound approach: upgrade from a shared right-through-left land to a shared through/right land with a left turn bay with 70m of storage.
  - Add traffic signals.
- 40 Avenue and 36 Street
  - Add traffic signals.

A number of other transportation network improvements are recommended to improve overall flow, including:

- 37 Avenue and 44 Street Traffic Signals
  - Northbound and southbound left turn movements are expected to operate a level of service E during the PM peak. City should consider signalization if left turning volumes increase or other concerns arise.
- 40 Avenue and 36 Street
  - Convert the southbound leg to a shared through/right lane and left turn bay. This would reduce PM peak hour queue from approximately 100m to 75m.The City should consider adding a left turn bay if delays and queuing become a concern in the future.

The Wigfield ASP is a long-term policy document that promotes a vision for development within the plan area and provides guiding principles and policies that work towards achieving that vision over-time. The plan may be amended in response to changes in the overall policy direction within the City. Such amendment processes will be supported by public engagement activities.

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01 INTRODUCTION & PURPOSE

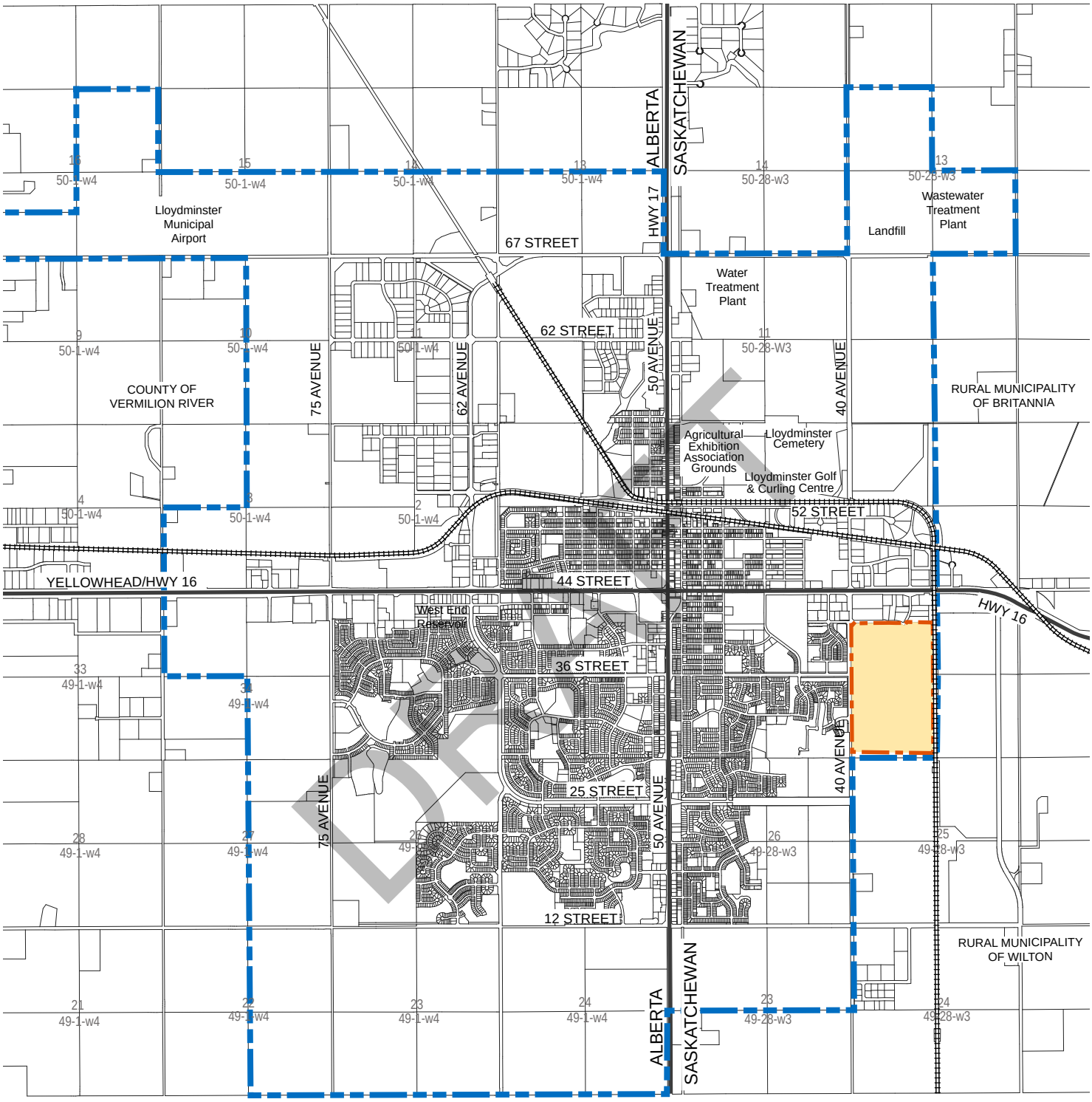
As shown in **FIGURE 1 — Plan Location**, the plan area is located at the southeast corner of the City of Lloydminster, in Saskatchewan, adjacent to the Rural Municipality of Wilton No. 472. The ASP area consists of approximately 101.6 hectares and is bounded by:

- 40 Avenue and the Larson Grove and Aurora neighbourhoods to the west
- the Canadian Pacific Railway ROW and industrial development to the east
- 41 Street and existing commercial and industrial development to the north
- the City boundary and agricultural development to the south

The portions of the original Wigfield ASP located north of 41 Street are fully developed and were therefore removed from the ASP boundary in this revised version.

The original Wigfield Industrial Area Structure Plan (ASP), prepared in 2014, provided new business and employment opportunities in the City of Lloydminster. The identification of this area for industrial land use was intended to ensure a supply of serviced and accessible industrial lots in the future.

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Legend

City Boundary

ASP Boundary

FIGURE 1

Plan Location

After the approval of the original ASP, decisions were made that required a revised policy direction for the Wigfield area, including:

- The annexation of 23.5 quarter sections from the County of Vermilion River in early 2022 created opportunities to locate industrial land elsewhere in the city.

- Revisions to the Northeast Area Structure Plan were made to accommodate additional industrial lands north of Highway 16 in Saskatchewan.

On January 6, 2022, the City identified the northern portion of the Wigfield plan area Lot: NW (PT OF) Block: Section 36, Plan: T49-R28-W3, Lloydminster, Saskatchewan as its preferred site for a future multi-use recreation area with event facility development.

Given these significant decisions, the City deemed it appropriate to reconsider the future land uses for the Wigfield plan area. This revised Wigfield ASP provides a comprehensive framework to reflect the change in approach for this area and provides direction for future, more detailed planning work to support subdivision and development via Neighbourhood Structure Plans (NSP).

This amended ASP provides a statutory planning framework to guide the review of and decisions for development applications within the Wigfield ASP boundary. It conceptually identifies land uses, the location of transportation routes, alignments for public utilities and servicing and the anticipated sequence of development. The ASP is consistent with current and relevant City policy direction and provides the basis for the submission of more detailed Neighbourhood Structure Plans (NSPs).



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02 POLICY FRAMEWORK CONTEXT

This section briefly summarizes the key influencing statutory, regulatory and policy documents on the ASP's policy framework.

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PART 2.1
STATUTORY DOCUMENTS

MUNICIPAL GOVERNMENT ACT (MGA)

Per the Lloydminster Charter, ASPs are governed under the Alberta Municipal Government Act (MGA) which provides direction for the contents of an ASP, ensuring they describe:

- The sequence of development proposed for the area,
- The land uses proposed for the area, either generally or with respect to specific parts of the area,
- The density of population proposed for the area either generally or with respect to specific parts of the area, and
- The general location of major transportation routes and public utilities.

The Wigfield ASP complies with the requirements of the MGA.

PART 2.2

REGULATORY DOCUMENTS

LLOYDMINSTER PLANNING DISTRICT OFFICIAL COMMUNITY PLAN (OCP)

The Wigfield ASP falls within the ½ mile Referral Area of the RM of Wilton and is adjacent to a Rural Commercial Policy Area in the RM of Wilton as identified in the Official Community Plan (OCP).

The purpose of the OCP is to identify and protect future growth areas in the City of Lloydminster and the Rural Municipalities of Wilton and Britannia; to provide land use policy which allows for flexibility of choice in land use planning options; and to develop a cooperative administrative structure.

This ASP is consistent with Map 1 Future Land Use Concept of the OCP and identifies a multi-use trail and buffer along the west side of the railway. The ASP is also within the ½ mile referral area identified in Map 2 Referral Areas and as such was referred to the RMs of Wilton and Britannia for review and comment. It was also discussed at the Lloydminster Planning District Commission meeting.

LLOYDMINSTER MUNICIPAL DEVELOPMENT PLAN (MDP) 2023

Map 5 Future Land Use Concept of the proposed 2023 Municipal Development Plan identifies the ASP lands for future residential and commercial lands, which is consistent with the intent of the ASP. Specific land use districts will be applied at the time of redistricting by the proponent, as supported by a Neighbourhood Structure Plan.

LAND USE BYLAW

The Wigfield ASP lands are currently districted Urban Transition (UT) District in the LUB and therefore an amendment to the LUB will be required prior to development.

To achieve the specific vision of the proposed future recreational and event facility development in the north area of the ASP, the UP Urban Park District is proposed, with amendments. The purpose of the UP District is to provide lands for active and passive recreational uses. The land uses will be confirmed by through the development of Neighbourhood Structure Plans, and subject to redistricting approval by Council.

The lands south of 36 Street, the south area, will also require redistricting once development plans are confirmed and supported by a separate, approved Neighbourhood Structure Plan.

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PART 2.3

PLANS & POLICY DOCUMENTS

The Wigfield ASP aligns with the following plans and policy documents:

COMMUNITY FACILITIES MASTER PLAN 2017

The Community Facilities Master Plan highlights the increasing demand on existing facilities and the need for additional services. This includes:

- more connectivity between the trail systems
- expansion of recreation and cultural programming
- greater seating capacity
- new fields (synthetic turf)
- additional amenities for existing fields

The proposed recreational and event facility site provides a suitable location to develop a replacement facility for the Centennial Civic Arena and, being an undeveloped site, provides opportunities to further develop appropriate supporting uses and ensure the amenities are well connected and accessible.

LLOYDMINSTER RECREATION FACILITIES FEASIBILITY STUDY 2020

The Feasibility Study highlights an immediate need for the replacement of existing facilities. The study identifies the Wigfield site as able to provide strong mobility connections to residential areas and accommodate supporting uses and functional elements in a comprehensive manner.

City of Lloydminster Strategic Plan 2022

The Strategic Plan supports the replacement of existing facilities and includes the following goals:

- updating statutory documents as required to keep them current,
- preparing infrastructure for a growing city, and
- providing a parks, trails, and wayfinding system that meets resident and visitor needs.

CITY OF LLOYDMINSTER AREA STRUCTURE PLAN POLICY 610-03

Policy 610-03 provides a framework and clarity to produce long-range plans for undeveloped land greater than a quarter section, or about 65 ha, in area. It outlines a process for the preparation and submission of ASPs and provides a Terms of Reference and sample table of contents to assist applicants. This ASP is consistent with the Terms of Reference and sample table of contents of Policy 610-03.

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03 ANALYSIS OF EXISTING CONDITIONS

This section details the existing conditions within and adjacent to the Wigfield ASP boundaries. See **FIGURE 2 — Plan Area Context** for reference.

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PART 3.1
NATURAL FEATURES

Most of the plan area is cleared with some dispersed tree stands and low-lying areas. In the northern portion, a stormwater drainage channel parallels the west and north boundary of the plan area (beginning at 36 Street). This channel drains to an existing stormwater management facility located at the northeast corner of the area. The lands within the northern portion of plan area slope gradually to the northeast.

In the southern portion of the plan area, an east–west trending ridge with a maximum elevation of approximately 645 m exists that slopes gradually to the southeast. The plan area is relatively flat, and the elevation varies by about seven meters across the site.

The plan area is generally clear of natural and ecological areas of interest due to generations of agricultural use. Some low areas exist, but these are not proposed for preservation in their natural state and will instead be incorporated into the on-site stormwater management system.

An Environmental Impact Assessment (EIA) was provided as part of the ASP process, the finding and recommendations are summarized below (found in **Appendix A**).

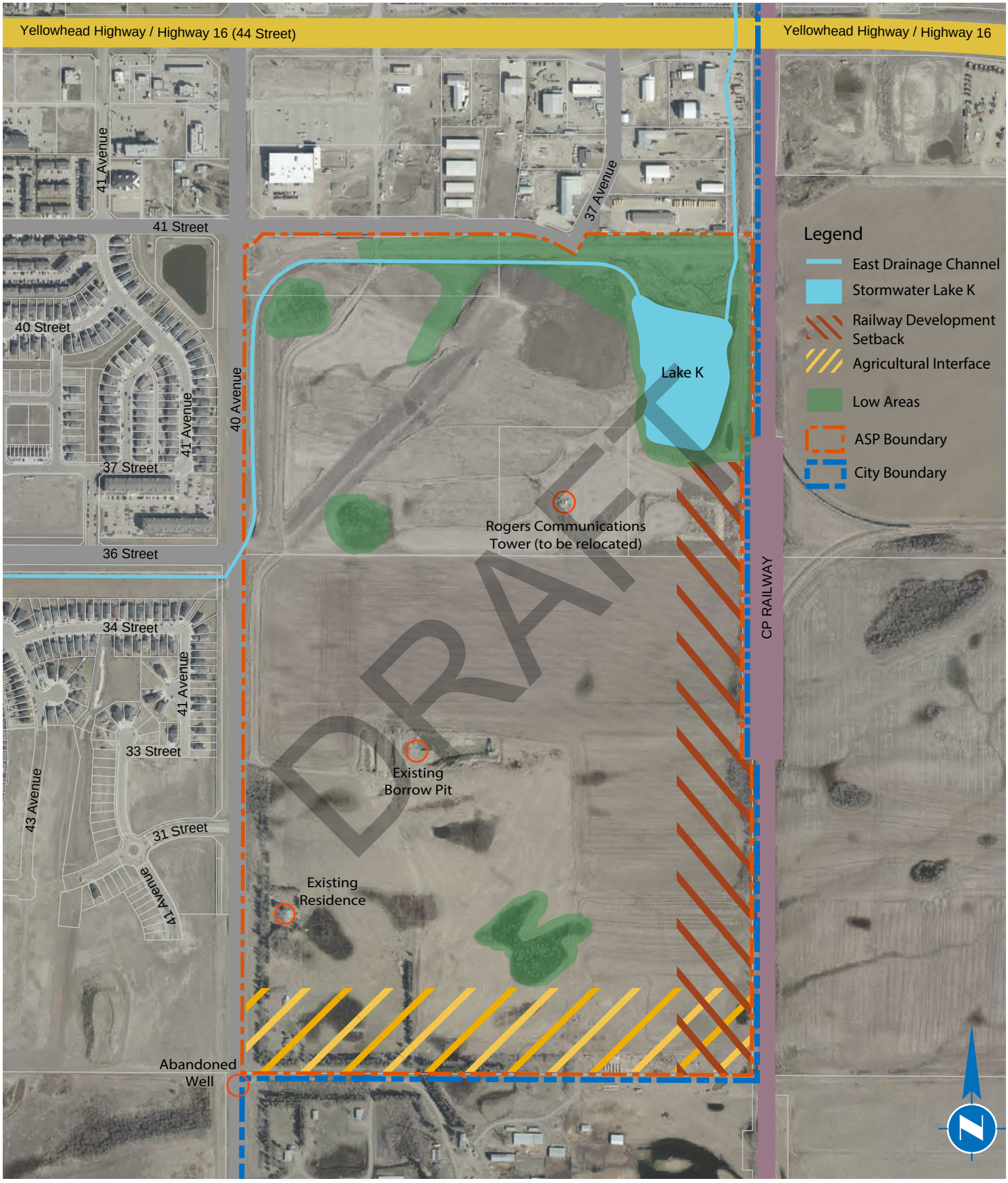


FIGURE 2

Plan Area Context

LOCAL & IMPORTANT WILDLIFE HABITATS

The ASP is not located within or adjacent to identified preservation areas and is not located within or adjacent to any provincially identified parks or ecological reserves.

Vegetation within the ASP area is mainly cultivated. Interspersed are numerous wetlands and treed areas including treed wetlands which are photo interpreted to be dominated by Aspen. The lands south of 31 Street are dominated by various species of planted coniferous trees.

It is recommended in the EIA that noise abatement equipment be used to limit the transmission of noise beyond the site. If active nests, dens, burrows, etc., are found, consultation with the appropriate regulator is required. Active nests may be subject to appropriate buffers until the next is no longer active or a permit may be required for the nest removal.

VEGETATION

No rare vascular or non-vascular species occurrences are present in the ASP area. The nearest historical occurrence (with the 2 km study area) is located within city limits of Lloydminster in a developed area and is unlikely to be currently present given apparent development.

It is recommended in the EIA that weed species be controlled prior to commencement of construction and that equipment and vehicles not be parked/stored on weed infested grounds unless weeds are first controlled.

RARE WILDLIFE SPECIES

A search of the Saskatchewan database determined that one occurrence of a rare vertebrate animal, and one occurrence of an invertebrate and no occurrences of animal assemblages are located within the ASP area. The identified species are not listed in the Saskatchewan Wildlife Species at Risk Regulations.

It is recommended in the EIA that a wildlife field study be undertaken to determine the need for screening, and that pre-disturbance wildlife surveys during the migratory bird nesting window or at sensitive periods for bats be undertaken.

FISH AND FISH HABITAT

The ASP area is located in the Southern Fishing Zone and potential fish habitat in the ASP area is limited to waterbodies which contain water on a year-round basis and do not freeze to the bed. Although the SWMF is unlikely the contain fish, there is still potential for fish to occur given the presumed depth and size of the waterbody. Fieldwork to determine the presence of fish in the SWFM is recommended.

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TOPOGRAPHY & SOIL

Topography is generally flat with depressional wetland areas, which is likely to change with development. Careful stormwater management will be necessary if wetland areas or infilled.

Soils in the ASP area are dominantly Black Loam with Dark Gray and Gray Luvisolic soils. Soils in this class have moderate limitations that reduce the choice of crops or require moderate conservation practices.

It is recommended in the EIA that an erosion and sediment control plan be implemented. Further, the Phase 1 ESA undertaken in support of the original Wigfield ASP, prepared in 2012, identified the need for a Phase 2 ESA, so it is recommended that Phase 2 ESA be undertaken prior to development.

WETLANDS

The desktop analysis identified 28 wetland features within the ASP. Further classification of the wetlands north of 31 Street was provided for two wetland areas, the dugout in the northeast corner and the swamp in the southwest corner of the north parcel. Classification of wetlands south of 31 Street will be required prior to development in that area of the ASP.

The wetland classification identified the two wetlands as follows:

- **Dugout** – anthropogenic and not a natural wetland that has surface water year-round.
- **Swamp** – a Class III seasonal wetland that is usually dry by the end of August.

It is recommended in the EIA that waterbodies that should not be disturbed during the construction process be flagged or fenced off with a buffer to protect against sedimentation.

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PART 3.2

BUILT ENVIRONMENT

In the northeast portion of Wigfield approximately 4.0 ha (10.0 ac) of land is leased for a radio tower installation. The site will be available for development upon expiry of the lease. This lease area is accessed by a gravel road from 40 Avenue which aligns generally with 36 Street to the west of the ASP area.

An abandoned gas well is located within the 40 Avenue right-of-way at the southwest corner of the ASP. This is a former sweet gas well which has been reclaimed and no setbacks are required for development within the area.

Three residences are located in the southwest portion of the plan area, south of the proposed recreation and event facility development.

The area immediately north of the ASP was included in the original Wigfield Industrial ASP. The lands are currently developed as commercial and industrial uses, including the Gold Horse Casino.

ADJACENT DEVELOPMENT

Larsen Grove

The Larsen Grove neighbourhood is located west of 40 Avenue and north of 36 Street, to the west of the plan area. Larsen Grove includes low and medium density residential and commercial land uses.

Aurora

The Aurora neighbourhood is located west of 40 Avenue and south of 36 Street, to the west of the plan area. Aurora is a low density residential community, which also includes institutional uses and extensive pedestrian linkages which extend north into Larsen Grove.

Rural Municipality of Wilton No. 472

The Rural Municipality of Wilton No. 472 lies east and south of Wigfield and the municipal boundary. Agricultural land uses occupy the lands east of the ASP (east of the CP Rail right-of-way which forms the eastern boundary of the ASP), which are owned by Cenovus and a Cenovus oil upgrader site is located further to the east.

Lands south of Wigfield are occupied by intensive agriculture operations, including a feedlot, grain handling and residences. Proposed development within the Wigfield ASP is outside the prescribed setbacks from those uses.

ACCESS, ROADS & RAIL

Primary access to the ASP area is via 36 Street and 31 Street. A single access to the proposed recreation and event facility is located at the north end of the site from 41 Street.

There is a CP Rail line that runs along the entire eastern boundary of the ASP. There is no access or crossings available to or from the ASP lands.

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PART 3.3

EXISTING INFRASTRUCTURE & CAPACITY

The following discussion is derived from the Wigfield ASP Servicing Study, prepared by the City of Lloydminster Engineering Services department, April 2023. Some of the text has been transcribed exactly as it appears in the servicing study and some has been paraphrased. For infrastructure locational context, please see Figures 7-9 herein, which depict local existing infrastructure as well as future proposed infrastructure.

WATER

There is minimal water distribution infrastructure within the ASP boundary. However, there is existing infrastructure located long 40 Avenue on the west side of the ASP. An existing 300 mm diameter potable water main bisects the northern portion of the ASP lands which connects infrastructure from 36 Street to 41 Street. An existing 350 mm diameter raw water watermain runs along 40 Avenue and through the ASP boundary within the future 36 Street right-of-way.

The existing WTP is located northwest of the ASP and has an average flow of 11,000 m3/day with a net production capacity of 21,125m3/day. The 2016 Water Master Plan identified that a major upgrade to the existing WTP would be required by 2026. As not all the ASP lands were included in the 2016 Water Master Plan, it is expected that an upgrade to the WTP would be required to support their development. It is recommended that a Water Master Plan update include all the lands within the ASP, and that capacity implications of development on the existing WTP be determined at the Neighbourhood Structure Plan stage.

The City stores potable water at the West End Reservoir, located along 43 Street west of 62 Avenue, with a capacity of 24,746m3. Based on treated water storage volumed required in 2019, the existing reservoir is already over-utilized. Therefore, it is recommended that as part of the future update to the Water Master Plan that the Wigfield ASP lands be included in the capacity analysis of the West End Reservoir, and that the capacity implications of development of the Wigfield ASP lands be determined that Neighbourhood Structure Plan stage.

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WASTEWATER

The existing wastewater system conveys flows to the Wastewater Treatment Plant (WWTP) located north of 67 Street and approximately 800 m east of 40 Avenue. The East Trunk is one of the two primary wastewater trunks in the city, which runs along the east boundary of the city, and is connected to the ASP lands via a 900 mm diameter wastewater main within the 37 Avenue road right-of-way. Inside the ASP boundary the East Trunk reduces to a 750 mm diameter wastewater main, which bisects the northern portion of the study area and connects 36 Street to 41 Street.

According to the 2016 Sanitary Sewer Master Plan (AECOM, 2016), there is minimal existing capacity within the East Trunk. The Master Plan recommended the East Trunk be twinned to service future development, including that of the Wigfield ASP lands. Capacity implications to the East Trunk must be confirmed through the preparation of the Neighbourhood Structure Plan and future detailed designs.

STORMWATER

Under existing conditions, stormwater generally drains across the ASP toward the northeast where it is intercepted by an existing stormwater management facility known as Lake K.

Downstream of Lake K, north of Highway 16, is Lake N, which is also a stormwater management facility. Lake K and Lake N are connected via an outlet control structure and a series of culverts and overland drainage channel sections. Lake N discharges into the East Drainage Channel, which crosses 67 Street near the City's Wastewater Treatment Plant, and which ultimately flows into the Neale Edmunds Wetland Complex.

The East Drainage Channel parallels both 41 Street and 40 Avenue within the north half of the Wigfield ASP. This section of the East Drainage Channel is scheduled for rehabilitation in 2023 to ensure a 1:100-year storm event can be efficiently accommodated within the channel.

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PART 3.4

HISTORICAL RESOURCES

The lands within the plan area have previously been disturbed through extensive farming. A previous review utilising the Government of Saskatchewan's Land Sensitivity Screening Tool did not identify any of the subject lands as historically significant.

04 GENERALIZED FUTURE LAND USE CONCEPT

This section discussed the proposed development concepts within the ASP boundary and lays the foundation for the development of policies that will guide future subdivision and development decision that will ultimately implement these concepts.

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PART 4.1
OVERVIEW

The Future Land Use Concept (FLUC) shown in **FIGURE 3 — Future Land Use Concept**, accommodates the future recreation and event facility site with additional complementary commercial uses along the 40 Avenue corridor on the north side of 36 Street, and a neighbourhood village-style residential community south of 36 Street in the Wigfield ASP. The policy areas below are described in the order in which they appear on the legend of Figure 3.



FIGURE 3

Future Land Use Concept



PART 4.2

RECREATION

A recreation hub is envisioned for this area comprising a grouping of sports fields and future campground and/or stadium. The sports fields will respond to the near-term need for more softball fields while the campground and/or stadium development will be further refined in response to market need and supported by future planning articulated in subsequent Neighbourhood Structure Plans.

Details of the recreation hub will be provided established at the Neighbourhood Structure Plan stage.

PART 4.3

OPEN SPACE

Linear open space corridors and pocket parks are provided within the Wigfield ASP, identified on Figure 3 as dark green. The exact sizes and locations of these open spaces will be confirmed in Neighbourhood Structure Plans but shall generally comply with Figure 3.

The trails provide connections between the existing stormwater management facility in the northern portion of the plan area and the proposed stormwater management facility to be located in the southeast corner of the plan area. The linear parks offer casual recreation opportunities for area residents and important linkages to the adjacent commercial uses and the recreation and event facility.

Neighbourhood parks are scattered throughout the neighbourhood village in the south area with trails connecting to parks, to sidewalks, and to other trails. Placement of parks is considerate of public safety and equitable access, with every park having direct public roadway, good sightlines, human-scale lighting, and multiple trail access points.

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BUFFERS FROM EXISTING USES

Proximity guidelines prepared by CN Rail advise that a 30m setback from main rail lines is required for residential development, and these guidelines are being applied to the existing CP Rail line running along the east boundary of the ASP. **FIGURE 4 — Berm Trail Illustration** conceptually depicts the proposed 30m wide buffer strip between the CP railway and adjacent medium and low density residential, which contains fencing, landscaping and a 3m wide multi-use asphalt trail.

The southern boundary of the ASP area is also buffered with a 30m berm and trail corridor from adjacent existing intensive agricultural operation, which will be similar to that shown in Figure 4 except without the galvanized chain link fence on the outer perimeter.

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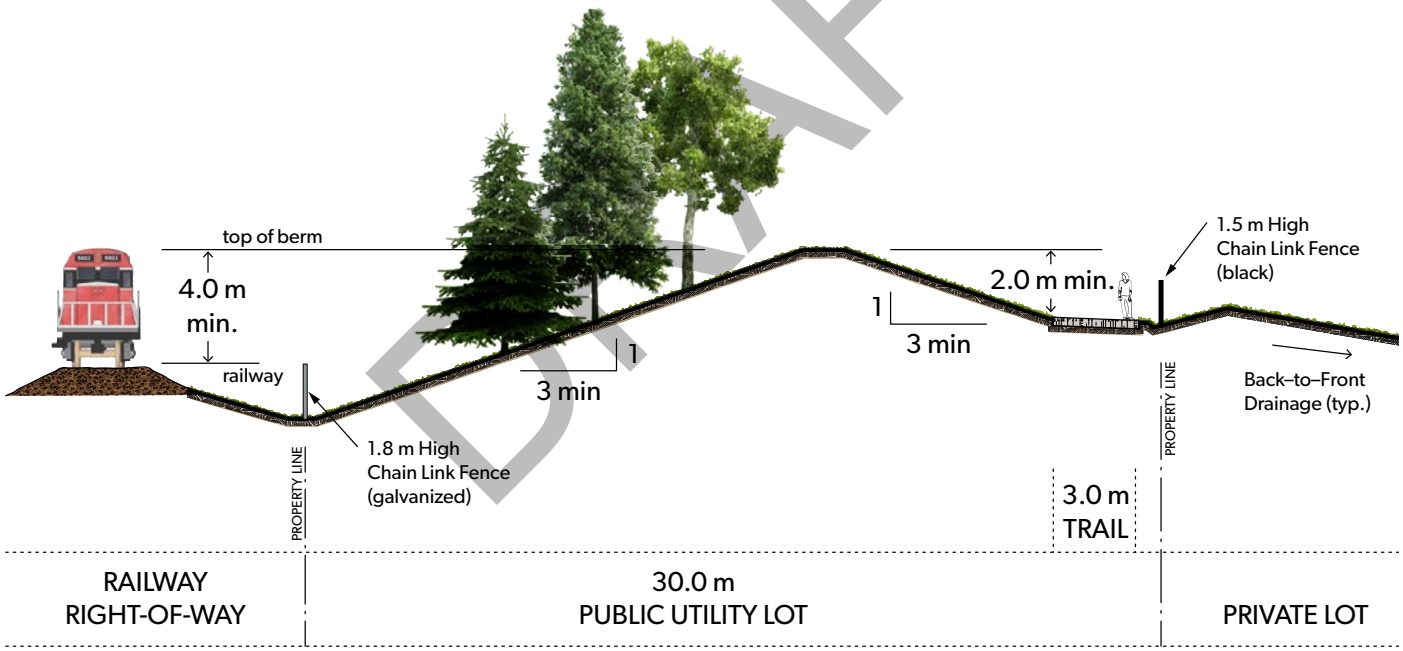


FIGURE 4

Berm Trail Illustration



PART 4.4

EVENT FACILITY

A destination event facility is envisioned to meet today's need for more indoor ice surfaces in the City of Lloydminster, as well as to elevate Lloydminster's reputation as a convention and entertainment event destination.

The development aims host organized sports teams and tournaments, provide for other indoor recreation pursuits, offer leased spaces for food and beverage service providers, and attract cultural and musical events that enhance Lloydminster's quality of life.

The exact design, size and use of the event facility will be refined in a subsequent Neighbourhood Structure Plan(s).

PART 4.5

NEIGHBOURHOOD COMMERCIAL

There are two neighbourhood scale commercial sites interior of the residential community to provide convenience access to goods and services and provide opportunities for social gathering. It is expected that these sites would be developed as convenience stores and may include a coffee shop, bakery, hair salon or similar types of uses complementary to the surrounding residential nature of the block. Gas bars and other vehicle-oriented uses are not supported.

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PART 4.6

COMMERCIAL

Commercial uses ancillary to the recreation and event facility development will be compatible and supportive, and meet the local needs of the residential neighbourhood. It is expected that visitor patronage of adjacent commercial uses will contribute to the local economy.

Vehicle-oriented uses such as automobile repairs and service, gas bars and car washes, and vehicle sales will not be supported north of 36 Street. Rather, hotels, sit-down restaurants and pubs, personal service shops, and retail stores are envisioned as complementary uses. Drive-through food and beverage establishments may be compatible but shall not be the dominant form of food and beverage establishments north of 36 Street.

South of 36 Street, daily amenities can be accessed at the neighbourhood village commercial hub, located at the intersection of 31 Street and 40 Avenue. Along the 40 Avenue corridor south of 36 Street the FLUC proposes a flexible mix of commercial/office/residential uses at the intersection of 31 Street and 40 Avenue to meet the daily need of area residents. It is anticipated the neighbourhood village commercial hub could include grocery retail, gas bar, coffee shops, personal service shops, medical offices, medium density residential and other related uses.

PART 4.7

MEDIUM & LOW DENSITY RESIDENTIAL

Figure 3 provides for neighbourhood village-style residential community south of 36 Street with a mix of housing forms and access to daily amenities, with a focus on pedestrian friendly streets that promote connectivity and encourage active transportation like walking and cycling.

Low density housing forms will include single detached houses, with or without secondary suites, with front attached garages as well as narrower detached houses on lanes with access to rear detached garages, which could contain garage suites. Lane product is identified where single detached houses are backing onto townhouses which front collector roads, where single detached houses are backing on to the berm along the east and south boundaries, and/or where single detached houses are fronting collector roads.

Medium density housing as semi-detached units and townhouses are offered. These can be developed with rear lane access along the collector roadways and backing onto the railway to improve the streetscape, increase on-street parking, and improve separation distance from the railway.

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PART 4.8

MIXED USE

Along the 36 Street corridor mixed use is contemplated with low intensity commercial on the main floor and residential units on the second (and third) floors. This mixed use is intended to respect the recreation and event facility development to the north, offering complementary commercial and residential uses with attractive frontages. Dwelling units above the commercial main floors may be ideally located to attract short term accommodation investors.

The mixed use land use designation allocated along 40 Avenue south of 36 Street may flex into more commercial oriented development should the residential component not be required by the market. Changing the land use designation from mixed use to commercial along 40 Avenue in a Neighbourhood Structure Plan would not necessitate an amendment to this ASP.

PART 4.9

HOUSING DENSITY & POPULATION

The population of the ASP will reside in the southern area, that is, the area south of 36 Street. As detailed in **TABLE 1 — Land Use Statistics**, the south area of the ASP is anticipated to accommodate a population of approximately 1,838 people, including 130 school-aged students.

The population will reside in 766 dwelling units of varying types, including single detached houses, semi-detached homes, and mixed use properties and townhouses, with and without rear lane access. Low density housing accounts for almost 47% of the southern developable lands (almost 29% when combined with the north area). Medium density represents another 12.36% and mixed-use residential, 9.67% (7.65% and 5.99% of the combined areas, respectively).

The land use statistics presented here are based on the following assumptions:

- A minimum density target of 17 - 20 dwelling units per net residential hectare (du/nrh).
- A blended population generation factor of 2.4 persons per dwelling unit (PPU) based on a range between 1.6 to 3.0 PPU depending on housing type.
- The student population was based on generation factor of 0.07 calculated from Canada Census data for Lloydminster.

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TABLE 1

Land Use Statistics

Land Use Type	Area (ha)	Area (ac)	% of GDA	Density	Units	Pop.	Student Pop.
NORTH AREA	hectares	acres	% of GDA	Density	Units	Pop.	Student Pop.
Gross Developable Area	**38.8**	**95.9**	**100.0%**				
Berm	1.4	3.5	3.61%				
PUL/Storm Pond	8.9	22.0	22.94%				
Recreation	11.6	28.7	29.90%				
Event Facility	8.0	19.8	20.62%				
Commercial	5.7	14.1	14.69%				
Road	3.2	7.9	8.25%				
SOUTH AREA	hectares	acres	% of GDA	Density	Units	Pop.	Student Pop.
Gross Developable Area	**63.1**	**155.9**	**100.0%**	upha		2.4/unit	0.07/pop
Berm	4.1	10.1	6.50%				
PUL/Storm Pond	2.9	7.2	4.60%				
Open Space (MR)	1.5	3.7	2.38%				
Trails (MR)	0.8	2.0	1.27%				
Low Density Residential	29.5	72.9	46.75%	15	443	1,063	75
Medium Density Residential	7.8	19.3	12.36%	30	234	562	40
Mixed Use	6.1	15.1	9.67%	15	92	221	16
Commercial 1	3.0	7.4	4.75%				
Commercial 2 - Nbhd	1.0	2.5	1.58%				
Roads	6.4	15.8	10.14%				
TOTAL	hectares	acres	% of GDA	Density	Units	Pop.	Student Pop.
Gross Developable Area	**101.9**	**251.8**	**100.0%**	upha		2.4/unit	0.07/pop
Berm	5.5	13.6	5.40%				
PUL/Storm Pond	11.8	29.2	11.58%				
Open Space (MR)	1.5	3.7	1.47%				
Trails (MR)	0.8	2.0	0.79%				
Recreation	11.6	28.7	11.38%				
Event Facility	8.0	19.8	7.85%				
Low Density Residential	29.5	72.9	28.95%	15	443	1,063	75
Medium Density Residential	7.8	19.3	7.65%	30	234	562	40
Mixed Use	6.1	15.1	5.99%	15	92	221	16
Commercial 1	8.7	21.5	8.54%				
Commercial 2 - Nbhd	1.0	2.5	0.98%				
Roads	9.6	23.7	9.42%				

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PART 4.10

INTERNAL CIRCULATION

Future development will be serviced by a loop collector which aligns with the existing residential intersections along 40 Avenue. Local roadways are not shown within the proposed residential development on the ASP concept and will be provided at the NSP stage, but the residential areas have been designed to accommodate a block-based development pattern.

The ASP promotes multi-modal transportation opportunities through the provision of linear open space corridors. Trails not only offer casual recreational opportunities, but they can also be used in conjunction with the sidewalk system to navigate to daily amenities with improved safety.

Similar to the local road network, the exact size and location of the trail network south of 36 Street will be established at the NSP stage.

PART 4.11

RESERVE LAND

Reserve land dedication will be allocated as appropriate to the full extent enabled by the MGA. Land above the high-water mark of stormwater management facilities may be credited as Municipal Reserve (MR). The size and location of parks, open spaces and trails, including MR dedication, will be confirmed at the NSP stage.

PART 4.12

FUTURE PLANNING

Prior to approval of land use amendments or subdivision and development applications for the lands within the ASP boundary, more comprehensively detailed Neighbourhood Structure Plans will be required to provide sufficient engineering analysis with respect to utility infrastructure and transportation needs.

An NSP will provide details regarding subdivision design, specific land use districting, standard of urban, architectural and landscaping design, residential and employment densities, services and amenities, and, parks and open space for the specified development area.

PART 4.13

SEQUENCE OF DEVELOPMENT

FIGURE 5 — Sequence of Development illustrates the expected sequence of development within the ASP area broken out into the north area and the south area. It is conceptual only and actual sequencing of development will depend on project funding, market forces and other influences. It is expected that the north and south areas may be broken into subsequent development phases, supported by Neighbourhood Structure Plans.

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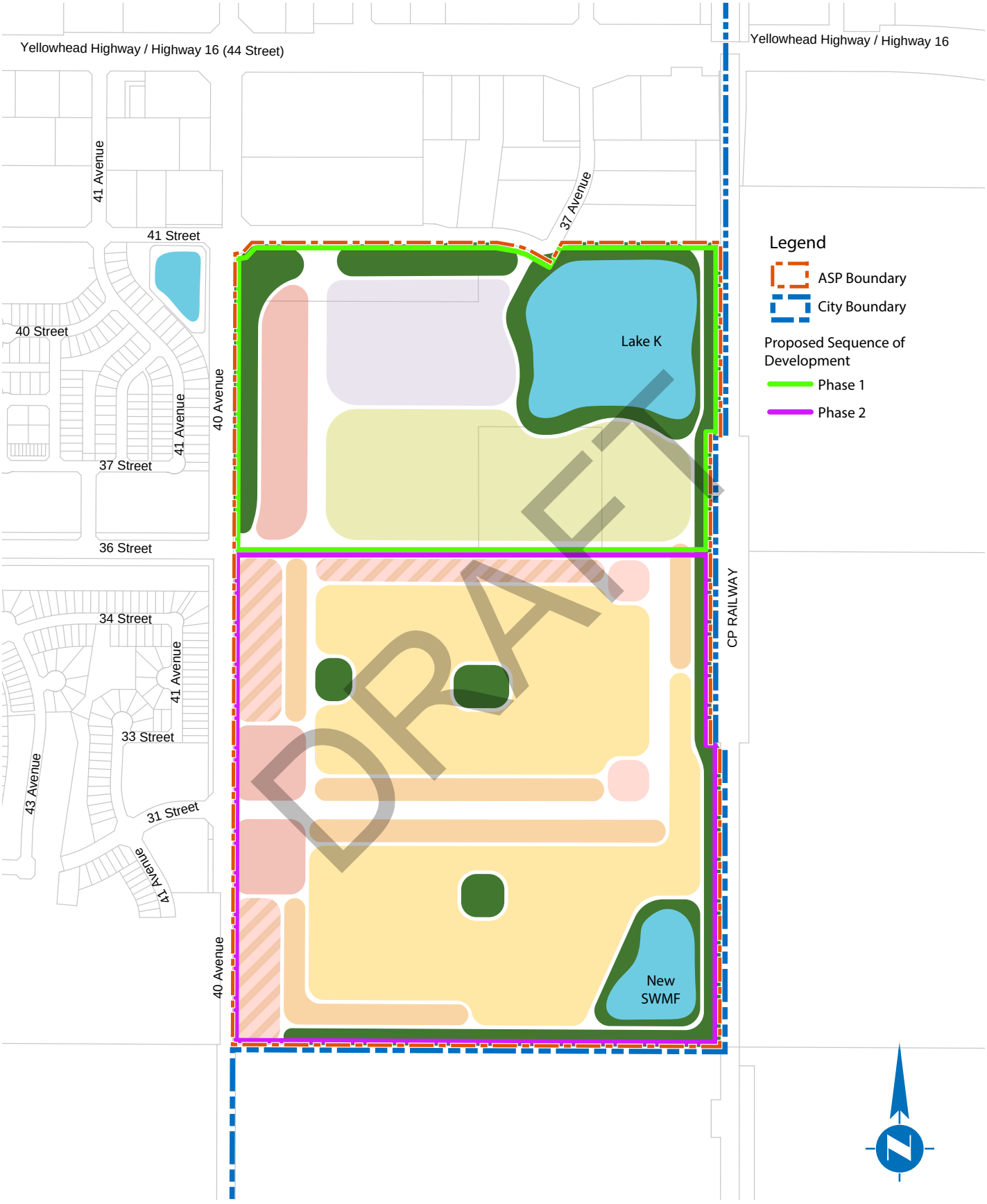


FIGURE 5

Sequence of Development

05 TRANSPORTATION NETWORK

As shown in **FIGURE 6 — Transportation Network**, the collector roadway network has been developed to accommodate anticipated traffic volumes in an efficient, safe, and effective manner. Alignment of the local road network within the proposed residential neighbourhood will be required at the NSP stage and will not trigger an amendment to this ASP.

The collector road network has been designed to accommodate future transit routes such that service can be provided within a 400-metre walking distance of most homes.

If future development proposals anticipate densities which exceed those proposed in this ASP, further TIAs may be required.

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PART 5.1
CONNECTIVITY

Connectivity for pedestrians and cyclists is an important component to future development in the Wigfield ASP. Pedestrian and cycling routes are proposed throughout the residential neighbourhood and are intended to provide an integrated network linking the residential areas with the recreation and event facility and the rest of the city.

Efficient and attractive routes within the neighbourhoods encourage increased walking and cycling.



FIGURE 6

Transportation Network

PART 5.2

TRAFFIC IMPACT ASSESSMENT

A Transportation Impact Assessment (TIA) was prepared concurrent with the ASP to provide an overview of the transportation implications anticipated from the proposed ASP land use categories and recommendations for the internal and surrounding transportation network to support development (**Appendix B**).

A summary of the findings and recommendations are found below:

OPENING DAY OPERATIONS

The current transportation network is anticipated to be able to accommodate the expected traffic generated by the recreation and event facility development site (not including any additional development on the south parcel), with some improvements.

The expected level of service of existing intersections is a Level C. For context, a level of service "D" reflects 'normal' peak hour congestion, and typically anything level of service D or better is considered acceptable.

The following intersection improvements are required to support Opening Day levels of service:

- 41 Street, 36 Street and 31 Street classified as collector roadways inside the Plan Area
- Upgrade 41 Street to a paved Urban Residential Collector Roadway standard
- 40 Avenue and 41 Street
  - Southbound approach: upgrade from a shared right-through-left land to a shared through/right land with a left turn bay with 70m of storage.
  - Add traffic signals.
- 40 Avenue and 36 Street
  - Add traffic signals.

The following intersection improvements are not triggered by the recreation and event facility development for Opening Day but would improve the overall flow of the transportation network:

- 37 Avenue and 44 Street Traffic Signals
  - Northbound and southbound left turn movements are expected to operate a level of service E during the PM peak. City should consider signalization if left turning volumes increase or other concerns arise.
- 40 Avenue and 36 Street
  - Convert the southbound leg to a shared through/right lane and left turn bay. This would reduce PM peak hour queue from approximately 100m to 75m.The City should consider adding a left turn bay if delays and queuing become a concern in the future.

ULTIMATE HORIZON TRAFFIC OPERATIONS

The Ultimate Horizon includes the development of the south parcel and is expected 55 years into the future. At this stage, the analysis shows that the intersection of 40 Avenue and 44 Street may not be able to accommodate the increased demand, with a level of service F during the PM peak, and long delays and queuing are anticipated. All the other intersections are expected to operate within performance thresholds during the AM and PM peaks. The north site access at 41 Street is recommended to be signalized at the Ultimate Horizon.

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The Functional Study prepared for 40 Avenue assumed a population horizon of 100,000. This study identified a number of improvements to area roadways that the Wigfield TIA analysis found to be unnecessary.

The following intersection improvements are required to support Ultimate Horizon:

- It is recommended the City revisit the 40 Avenue Functional Study 100,000 population concept plan.
- The intersection of 40 Avenue and 44 Street is expected to operate at a level of service F during the Ultimate Horizon PM peak, and it is recommended this intersection be signalized.
- Turn bay storage lengths at 44 Street and 40 Avenue and at 41 Street and 40 Avenue are not provided in the Functional Study. These movements require very long storage bays based on the analysis (200m+). It is recommended the City revisit the Functional Study and use the result to inform the storage bay lengths at these locations.

Access Management

The recommended access spacing for the recreation and event facility development is summarized below:

- 41 Street
  - Minimum 100m from 40 Avenue. This provides space for the 90m right turn storage anticipated at the Ultimate Horizon.
- 36 Street
  - Minimum 60 m from 40 Avenue. The turn bay storage anticipated for the Ultimate Horizon is less than 60m.

FUTURE MOBILITY

The TIA makes a number of recommendations regarding future mobility options, summarized below:

- The existing Sidewalk and Trails Master Plan does not contemplate the Wigfield area for non-industrial development and therefore does not identify the need for additional sidewalk or trail infrastructure. The Master Plan may need updating to reflect the needs of a complete neighbourhood, including timely walking/cycling connections between the recreation and event facility development and adjacent existing/future residential areas.
- In the future when the south plan area develops for residential uses, children living there will likely need to cross 40 Avenue multiple times per day to get to and from school. Crossing locations should be well lit to ensure pedestrians remain visible during the winter when the sun rises late and set early.
- Future local transit services could help reduce demand on local roadways, and transit stops in this area should be considered as part of an overall exploration of providing transit services.

40 AVENUE: DANGEROUS GOODS & TRUCK ROUTE

The primary access road to the ASP lands is 40 Avenue, which is currently one of the City's key Dangerous Goods and Truck Routes. With a proposed change in land use from industrial to residential and mixed uses, using 40 Avenue as a Dangerous Goods & Truck Route is not appropriate, and continued use will cause conflicting user priorities.

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06 PROPOSED UTILITY SERVICES

The City undertook preliminary engineering analysis for proposed utility services within the Wigfield ASP boundary, see Wigfield ASP Servicing Study in Appendix C. The discussion below is excerpted and paraphrased from the Wigfield ASP Servicing Study. It should be noted that the recommendations of the Wigfield ASP Servicing Study are for reference purposes only and should not be relied upon without prior written consent from the City of Lloydminster's Engineering Services department.

Detailed analysis associated with pipe capacity, pipe sizing, serviceability parameters for water distribution, wastewater collection, and piped stormwater collection infrastructure is required at the Neighbourhood Structure Plan and detailed design stages.

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PART 6.1

WATER

The proposed water distributions systems for the ASP are separated into two: one in the north area between 36 Street and 41 Street, and one in the south area, south of 36 Street to the southern ASP boundary (see **FIGURE 7 — Water Distribution System**).

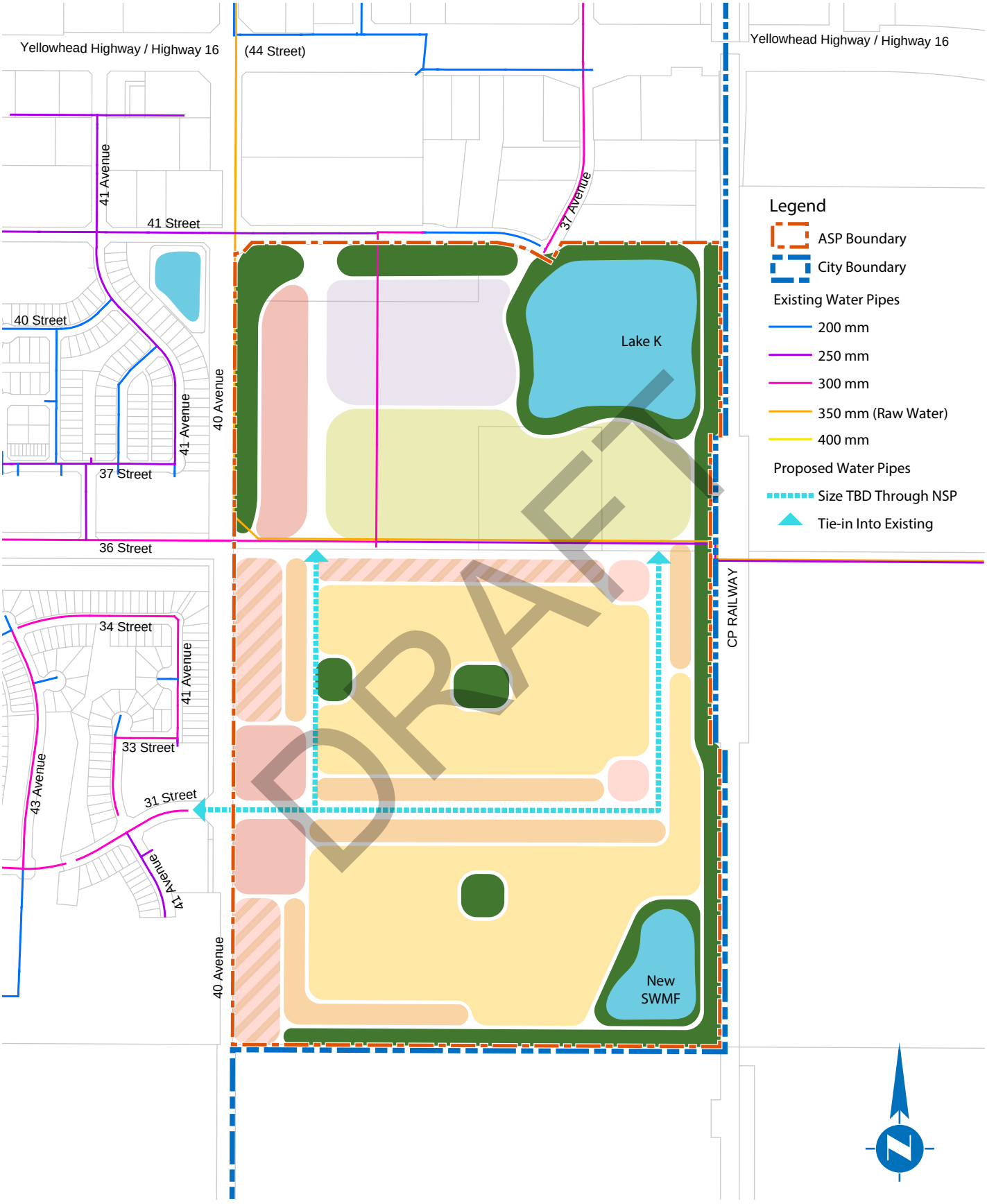


FIGURE 7

Water Distribution System

NORTH AREA

It is recommended that the north area use the existing 300 mm diameter watermain as the 'backbone' to which all other water servicing is connected. The alignments of the water distribution system within the north area shall adhere to future Neighbourhood Structure Plan(s) as well as site development detailed designs.

Water servicing in the north area could be accommodated through either individual connection to the 300 mm diameter water main or through a single connection with a branched-type network. If a branch system if used, it is recommended it be looped in order to ensure fire flows, capacity, and to protect against service interruptions in the event of a watermain failure.

SOUTH AREA

Due to the presence of the 300 mm diameter and the 250 mm diameter watermain within the future 36 Street extension road right-of-way, the south area shall use this watermain is the 'backbone' to which all other water services are connected. It is recommended that the 250 mm diameter watermain (which currently services the Cenovus Energy Upgrader) be reviewed and upsized as needed between the connection the existing 300 mm diameter watermain and the eastern ASP boundary.

To ensure fire flows, capacity and to protect against service interruptions in the even of a watermain failure, it is recommended the proposed watermain be connected to the existing watermain within the 31 Street road right-of-way west of 40 Avenue within the Aurora residential neighbourhood, as well as at two points along the existing 300 mm/250 mm diameter watermain along the 36 Street extension road right-of-way, as shown on Figure 7.

Sizing of the watermains within the ASP boundary shall be confirmed through Neighbourhood Structure Plans and future detailed design stages. Regardless, all pipe sizes shall adhere to the latest version of the City of Lloydminster's Municipal Development Standards.

Future Neighbourhood Structure Plan(s) and detailed design will need to determine the available capacity of the WTP and the reservoir storage and identify what upgrades may be required to support development within the Wigfield ASP.

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PART 6.2

WASTEWATER

The proposes wastewater collection system is to be connected to the City's existing wastewater system within the future 36 Street extension road right-of-way, as well as to the north-south line that connects 36 Street to 41 Street.

Similar to the proposed water servicing discussion, the proposed wastewater collection system is broken into the north area and the south area (see **FIGURE 8 — Wastewater Collection System**).

NORTH AREA

It is recommended that proposed development within the north area connect to the existing 750 mm diameter wastewater main that runs north-south through the area. The existing wastewater main would be the 'backbone' to which all other wastewater collection servicing is connected. Future servicing could be accommodated via individual connections to the 750 mm diameter wastewater main or via a single connection with a branch-type network. The details of the proposed system will be determined at the Neighbourhood Structure Plan and detailed design stages.

SOUTH AREA

In the south area, the existing 750 mm and 250 mm diameter wastewater mains within the future extension of 36 Street right-of-way can serve as a 'backbone' to which all other servicing can connect. Wastewater servicing serving the south area shall follow any proposed collector roads identified.

The 250 mm diameter wastewater main should be reviewed for capacity and upsized as necessary between the connection to the existing 750 mm diameter wastewater main and the eastern boundary of the ASP.

Sizing of the wastewater collection system within the Wigfield Asp shall be confirmed through a Neighbourhood Structure Plan and through detailed designs stages. Pipe sizing shall adhere to the latest version of the City of Lloydminster's Municipal Development Standards.

The entire ASP must be serviced by the existing East Trunk. With the existing capacity concerns identified by the 2016 Sanitary Sewer Master Plan, in depth analysis of the East Trunk and the timing triggers for the East Trunk Twin shall be monitored by the City to determine when the East Trunk Twin project will be triggered.

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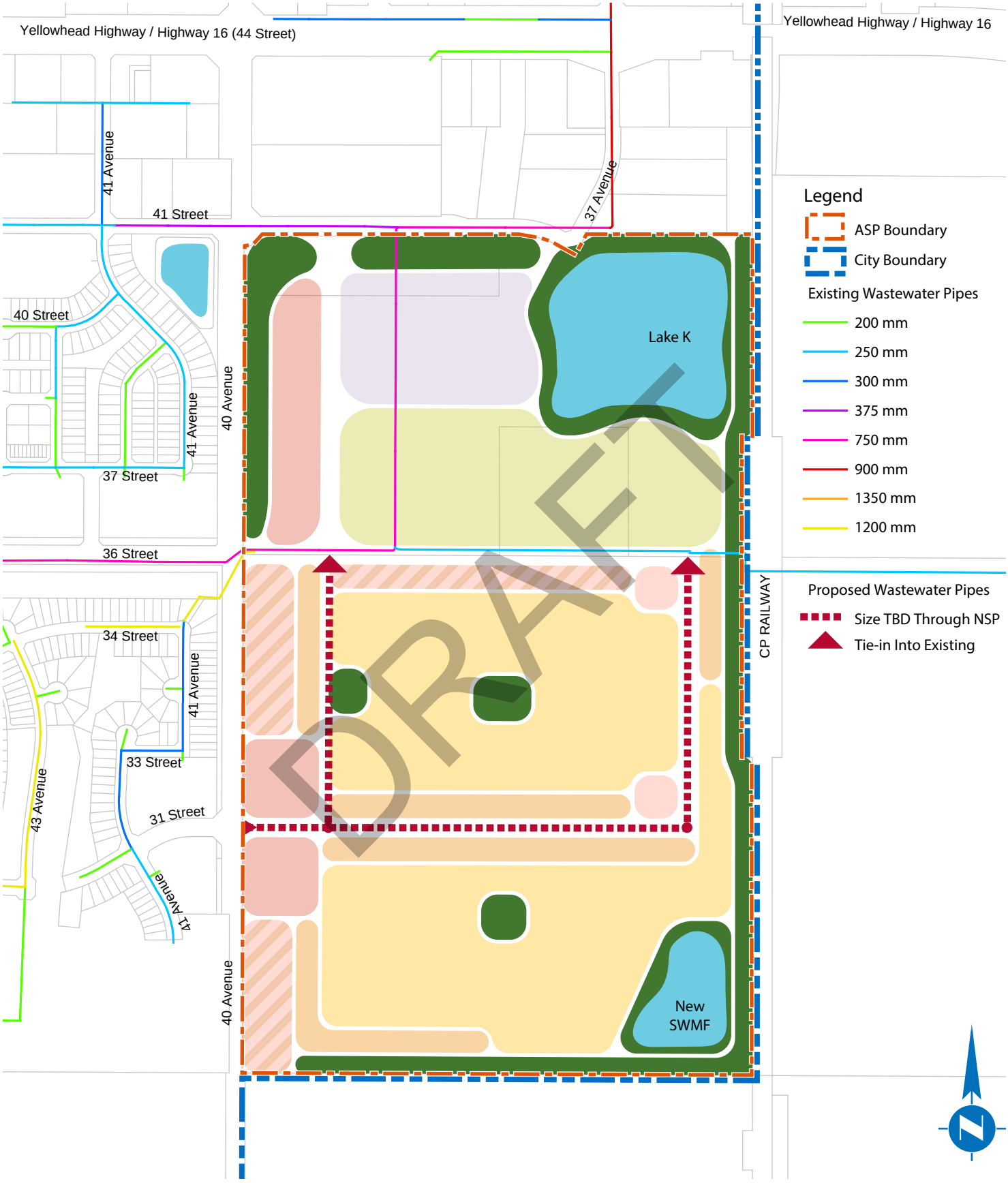


FIGURE 8

Wastewater Collection System

PART 6.3

STORMWATER

Due to the topography and drainage within the ASP boundary, the proposed stormwater systems and site drainage basins have been split into the north area and south area. However, the south area has been further split into South 1 and South 2 (see **FIGURE 9 — Stormwater Management and Drainage Collection**).

NORTH AREA

The entire north area will drain to either the East Drainage Channel or directly into Lake K through a mixture of both overland drainage and piped connections. Catchment areas will need to be determined through the preparation of a Neighbourhood Structure Plan and future detailed designs.

SOUTH AREA

South 1

The South 1 catchment area will drain predominately towards the north. It is recommended this catchment area be drained internally through a piped network and discharged into the East Drainage Channel near the intersection of 36 Street and 40 Avenue.

The design parameters for Lake K have been adjusted to account for South 1 catchment, and therefore flow restrictions or other control devices are not necessary, rather the area is to be allowed to free drain to the East Drainage Channel at which point the release rate will be addressed through the release of Lake K.

The stormwater main for South 1 is to be installed along the future extension of 36 Street right-of-way and act as a 'backbone' to which the servicing from South 1 connects. From here, South 1 stormwater can be directed either west to the East Drainage Channel or east and north to Lake K.

South 2

South 2 catchment area will drain predominately towards the south. It is recommended that the South 2 be drained internally through a piped network and discharged into the proposed stormwater management facility located in the southeast corner of the ASP. The proposed stormwater management facility would be connected to Lake K through a piped connection along the eastern boundary.

Stormwater mains shall follow the proposed collector roads as identified on the Future Land Use Concept. Drainage of open spaces and developed lots shall be determined through the Neighbourhood Structure Plan and future detailed design stages.

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PART 6.4

SHALLOW UTILITIES

Shallow Utilities include telephone, natural gas, electrical, internet, fibre optic and cable services. The developer shall be responsible for the provision of these services and extension from adjacent developed/developing areas.

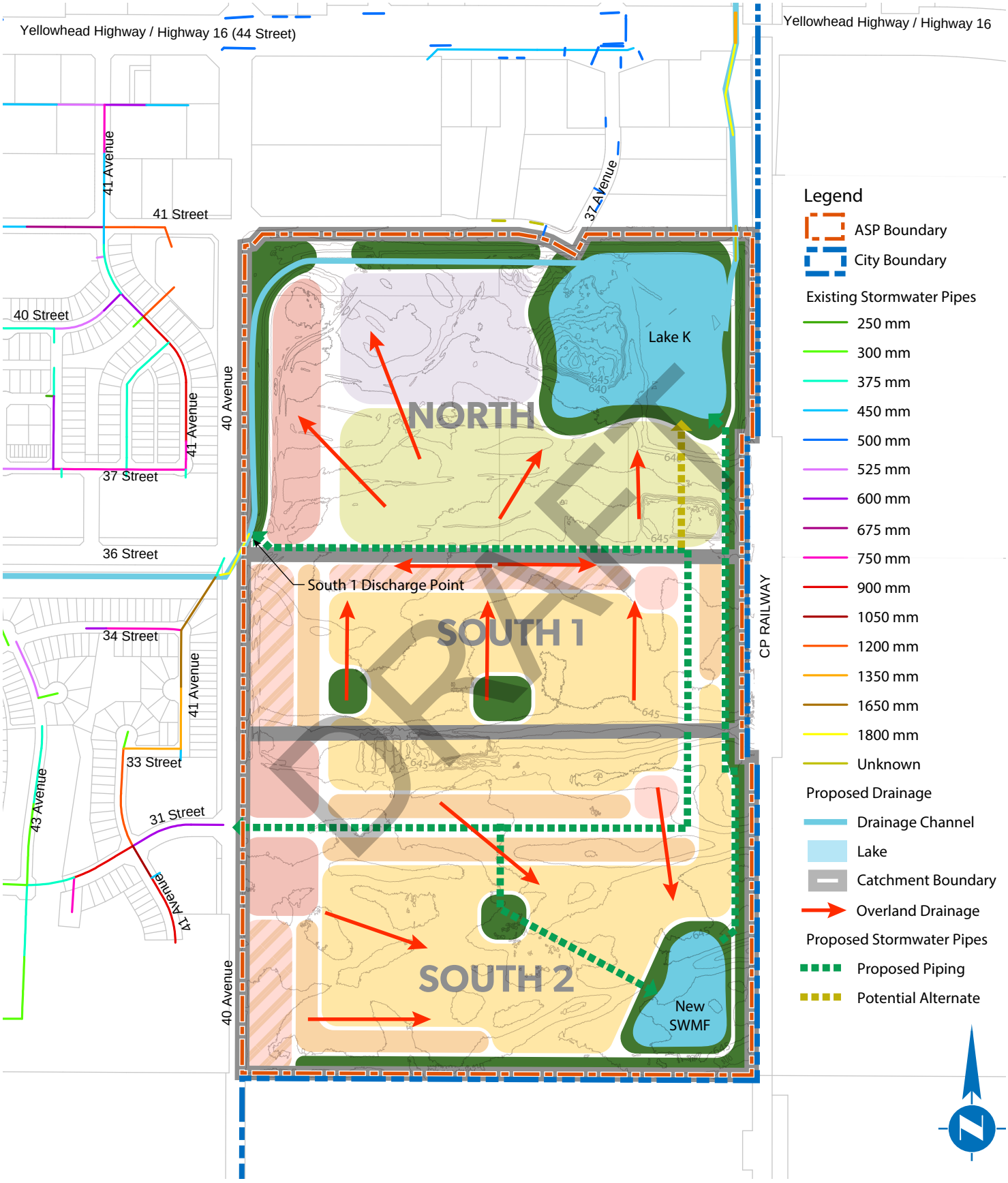


FIGURE 9

Stormwater Management and Drainage Collection

07 POLICIES

The following section provides policies the City will use to implement this ASP, guide developers, review and assess future Neighbourhood Structure Plans, and render decisions on redistricting, subdivision and development applications.

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PART 7.1
URBAN DESIGN

Policy 7.1.1	The City should require development proposals to incorporate Crime Prevention Through Environmental Design (CPTED) principles to improve public safety.
Policy 7.1.2	The City shall require that all mechanical equipment associated with development on the exterior of a structure be concealed by screening.
Policy 7.1.3	The City should require complementary exterior façade design in terms of colours, materials and details throughout the ASP to promote cohesion and sense of identify within the development.

PART 7.2

CN RAIL PROXIMITY

Policy 7.2.1	The City shall require development in proximity to railway lines to reflect the latest version of the CN Proximity Guidelines.
Policy 7.2.2	The City shall ensure that residential development backing onto the CP Rail right-of-way is separated by a landscaped buffer as depicted in Figure 4.

PART 7.3

LAND USE POLICIES

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OPEN SPACE

Policy 7.3.1	The City shall require a variety of open spaces, including enhanced natural areas and linear open spaces to be distributed throughout the plan area to ensure convenience and accessibility.
Policy 7.3.2	The exact sizes and locations of these open spaces shall be confirmed in Neighbourhood Structure Plans and shall generally comply with Figure 3.
Policy 7.3.3	The City should ensure that placement of parks in Neighbourhood Structure Plans is considerate of public safety and equitable access, with every park having direct public roadway, good sightlines, human-scale lighting, and multiple trail access points.

RECREATION

Policy 7.3.4	The Developer shall ensure that trails within the Recreation land use designation are connected to the wider community trails network.
Policy 7.3.5	The City should encourage the development of a recreation 'destination' that encourages positive and supportive social interactions.
Policy 7.3.6	The Developer shall install a playground within the Recreation designation.

EVENT FACILITY

Policy 7.3.7	The exact design, size and use of the event facility shall be refined and detailed in a Neighbourhood Structure Plan subject to the City's approval.

COMMERCIAL

Policy 7.3.8	The City shall not require an amendment to this ASP to support changes in land use designation as depicted in Figure 3 from mixed use to commercial along 40 Avenue.
Policy 7.3.9	The City shall ensure that commercial uses adjacent to the recreation and event facility development is compatible with and complementary to the long-term vision of the development.
Policy 7.3.10	The City shall not support automobile-oriented commercial uses adjacent to the recreation and event facility development, such as automobile service and repair, gas bars and car washes, and automobile sales.
Policy 7.3.11	Notwithstanding the above, the City support a limited number of drive-through food and beverage establishments adjacent to the recreation and event facility developments, but these shall not be the dominant form of food and beverage establishments north of 36 Street.

NEIGHBOURHOOD COMMERCIAL

Policy 7.3.12	The City should consider convenience stores, coffee shops, bakeries, personal service shops, or similar types of uses that are complementary to the surrounding residential nature of the block as suitable uses for neighbourhood commercial.
Policy 7.3.13	The City shall not support gas bars and other vehicle-oriented uses for neighbourhood commercial.

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MIXED USE

Policy 7.3.14	The City should consider mix use to include buildings that contain low intensity commercial uses on the main floor and residential units on the second (and third) floors.
Policy 7.3.15	The City shall require that mixed use building offer complementary commercial and residential uses with attractive frontages.
Policy 7.3.16	The City shall allow for the lands identified as mixed use along 40 Avenue south of 36 Street to be identified as commercial in a subsequent Neighbourhood Structure Plan without requiring an amendment to this ASP should there be demonstrable evidence of a lack of market demand for mixed use product.

LOW & MEDIUM DENSITY RESIDENTIAL

Policy 7.3.17	The City shall require a range of housing forms and densities be accommodated in the plan area.
Policy 7.3.18	The City should require that medium density residential areas include predominately semi-detached and townhouses.
Policy 7.3.19	The City shall require access via rear lanes where single detached houses are backing onto townhouses which front collector roads, where single detached houses are backing on to the berm along the east and south boundaries, and where single detached houses are fronting collector roads.
Policy 7.3.20	The City should not allow front attached garage access from main collector roadways.

RESERVE LANDS

Policy 7.3.21	The City shall require full dedication of municipal reserve (MR) pursuant to the Municipal Government Act in the form of land.
Policy 7.3.22	The City may credit as municipal reserve (MR) land above the high-water mark of stormwater management facilities.

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PART 7.4

FUTURE PLANNING

Policy 7.4.1	The City shall require more comprehensively detailed Neighbourhood Structure Plans to be prepared that provide sufficient engineering analysis with respect to utility infrastructure and transportation needs.
Policy 7.4.2	The City shall require a satisfactory Neighbourhood Structure Plan prior to considering approval of land use amendments, subdivision or development applications for the lands within the ASP boundary.

PART 7.5

SEQUENCE OF DEVELOPMENT

Policy 7.5.1	The City may allow for variances to the proposed sequence of development so long as an acceptable strategy to provide the required infrastructure has been provided and the variance is justified to the satisfaction of the Development Authority.

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PART 7.6

TRANSPORTATION & MOBILITY

GENERAL

Policy 7.6.1	The City shall require that collector roadways are generally located as shown on Figure 6.
Policy 7.6.2	The City shall allow for the design and alignment of local roadways within the residential neighbourhoods to be determined through the Neighbourhood Structure Plan process without requiring an amendment to the ASP.
Policy 7.6.3	The City shall require that all roadways be constructed to the latest version of the City of Lloydminster's Municipal Development Standards.

ACCESS & PARKING

Policy 7.6.4	The City shall not permit direct access from 40 Avenue into the ASP boundary except at existing intersections.
Policy 7.6.5	The City shall require that parking and loading areas be clearly delineated from driveway access and pedestrian areas through landscaping as determined in a Neighbourhood Structure Plan.
Policy 7.6.6	The Developer shall provide sidewalks and pedestrian accesses to the satisfaction of the Development Authority.

TRAILS

Policy 7.6.7	The Developer shall adhere to the trail standards and associated signage requirements of the City of Lloydminster's Municipal Development Standards.
Policy 7.6.8	The location of the trail network south of 36 Street shall be established at the Neighbourhood Structure Plan stage.

TIA RECOMMENDED IMPROVEMENTS

Policy 7.6.9	The City should require that the intersection of 37 Avenue and 44 Street be signalized if left turning volumes increase beyond level of service E during the PM peak, or if other concerns arise.
Policy 7.6.10	The City should consider converting the southbound leg of the 40 Avenue-36 Street intersection to a shared through/right turn and left turn bay to reduce PM Peak hour queuing; and should consider adding a left turn bay if delays and queuing become a concern in the future.
Policy 7.6.11	The City should require that the north site access at 41 Street be signalized at the Ultimate Horizon.
Policy 7.6.12	The City should revisit the 40 Avenue Functional Study's 100,000 person population concept plan.
Policy 7.6.13	The City should require the intersection of 40 Avenue and 44 Street be signalized at the Ultimate Horizon to address expected PM peak level of service F.

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PART 7.7

SERVICING

GENERAL

Policy 7.7.1	The Developer shall be required to provide, or enter into an agreement to provide when required, the utility rights-of-way or easements necessary to accommodate the extension of infrastructure through or adjacent to a site to allow for servicing.
Policy 7.7.2	The City shall require that servicing be aligned to avoid environmentally sensitive areas.
Policy 7.7.3	The City shall require that temporary disturbances of environmentally sensitive area be reclaimed to the satisfaction of the Development Authority.
Policy 7.7.4	The Developer shall ensure that servicing pipe sizes adhere to the latest version of the City of Lloydminster's Municipal Development Standards.

WATER SERVICING

Policy 7.7.5	The City shall require the water distribution system to be provided generally as shown on Figure 7.
Policy 7.7.6	The City shall require that the water distribution system be designed to facilitate development to the satisfaction of the Development Authority.
Policy 7.7.7	The City shall require that the design of the water distribution system ensures that as development progresses, sufficient looping and connections are provided for adequate domestic and fire flows.
Policy 7.7.8	The Developer shall determine the capacity implications of development on the existing Water Treatment Plant at the Neighbourhood Structure Plan stage.
Policy 7.7.9	The Developer shall determine the capacity implications of development on the East Trunk at the Neighbourhood Structure Plan stage and detailed design.
Policy 7.7.10	The Developer shall provide detailed analysis associated with pipe capacity, pipe sizing, serviceability parameters for water distribution, wastewater collection, and piped stormwater collection infrastructure at the Neighbourhood Structure Plan and detailed design.

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Policy 7.7.11	The Developer shall ensure that alignments of the water distribution system within the ASP area north of 36 Street shall adhere to future Neighbourhood Structure Plan(s) as well as site development detailed design.
Policy 7.7.12	The City shall allow water servicing north of 36 Street to be accommodated through either individual connections to the 300 mm diameter water main or through a single connection with a branch type network. If a branch system if used, it shall be looped to ensure fire flows, capacity, and to protect against service interruptions in the event of a watermain failure.
Policy 7.7.13	The Developer shall confirm sizing of the watermains within the ASP boundary through Neighbourhood Structure Plans and future detailed design stages.

WASTEWATER SERVICING

Policy 7.7.14	The City shall require that sanitary servicing be provided generally as shown on Figure 8.
Policy 7.7.15	The City shall require the sanitary system be designed to facilitate development to the satisfaction of the Development Authority.
Policy 7.7.16	The Developer shall determine the available capacity of the Water Treatment Plant and the reservoir storage and identify what upgrades may be required to support development within the Wigfield ASP, through a Neighbourhood Structure Plan and detailed design.
Policy 7.7.17	The City shall require that the 250 mm diameter wastewater main be reviewed for capacity and upsized as necessary between the connection to the existing 750 mm diameter wastewater main and the eastern boundary of the ASP.
Policy 7.7.18	The Developer shall confirm the sizing of the wastewater collection system through a Neighbourhood Structure Plan and through detailed design.
Policy 7.7.19	The City shall require an in-depth analysis of the East Trunk and monitor the timing triggers for the East Trunk twinning.

STORMWATER MANAGEMENT

Policy 7.7.20	The City shall require that stormwater management be generally consistent with the catchment areas and ponds as shown on Figure 9.
Policy 7.7.21	The City shall require a Stormwater Management Plan be prepared to support a Neighbourhood Structure Plan.
Policy 7.7.22	The City shall require that grading be maintained to continue to provide effective site drainage.

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Policy 7.7.23	The City shall require that where storm management facilities are not designed to restrict outflow as a result of being directly connected to wetlands, surrounding development be designed to manage stormwater runoff on-site.
Policy 7.7.24	The City should support the use of natural and/or reconstructed wetlands and other natural drainage systems for stormwater management where feasible and approved by the applicable Provincial authority as may be necessary.
Policy 7.7.25	The Developer shall confirm the catchment areas through the preparation of a Neighbourhood Structure Plan and detailed design.
Policy 7.7.26	The City shall require that stormwater mains follow the proposed collector roads as identified on the Future Land Use Concept.
Policy 7.7.27	The Developer shall determine drainage of open spaces and developed lots through the Neighbourhood Structure Plan and detailed design.

SHALLOW UTILITIES

Policy 7.7.28	The Developer shall determine utility alignments and detailed design of shallow utilities at the Subdivision stage.

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PART 7.8

ENVIRONMENTAL

EROSION & SEDIMENTATION

Policy 7.8.1	The Developer shall prepare and implement an erosion and sediment control plan, in accordance with the City of Lloydminster's Municipal Development Standards, as applicable.

PHASE 2 ESA

Policy 7.8.2	The Developer shall undertake a Phase 2 Environmental Site Assessment prior to development and in support of a Neighbourhood Structure Plan.

WILDLIFE & VEGETATION

Policy 7.8.3	The Developer should endeavor to enhance biodiversity by preserving and planting plant species natural to the region.
Policy 7.8.4	The Developer shall consult with the appropriate regulator if during the pre-construction survey active nests, dens, burrows, and the like, are found.
Policy 7.8.5	The Developer may require a permit to remove a nest and should provide appropriate buffers around active nests until the nest is no longer active.
Policy 7.8.6	The Developer shall control weed species prior to commencement of construction and should not park vehicles or equipment on weed infested grounds unless the weeds are first controlled.
Policy 7.8.7	The Developer should, prior to commencement of construction, retain an environmental professional to conduct a wildlife field study to determine the need for screening, and to conduct a pre-disturbance survey during the migratory bird nesting window or during sensitive times for bats.

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NOISE ABATEMENT

Policy 7.8.8	The Developer should use noise abatement equipment during construction to limit the transmission of noise beyond the site.

WATERBODIES

Policy 7.8.9	The Developer should flag or fence off water bodies that will not be disturbed during the construction process and protect retained waterbodies against sedimentation.

PART 7.9

OIL & GAS

Policy 7.9.1	The City shall require that development complies with all Saskatchewan Ministry of Energy and Resources requirements for urban development setbacks from gas wells and pipelines.

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08 IMPLEMENTATION

The ASP will be implemented through the subdivision, redistricting and development processes, supported by the production of Neighbourhood Structure Plans that provide detailed analysis consistent with this ASP.

It is anticipated that at least two future Neighbourhood Structure Plans will be required in the future, one for the 'north area' and one for the 'south area'.

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09 MONITORING & AMENDMENT

The Wigfield ASP is a long-term policy document that promotes a vision for development within the plan area and provides guiding principles and policies that work towards achieving that vision over-time. The plan may be amended in response to changes in the overall policy direction within the City. Such amendment processes will be supported by public engagement activities.

Since this ASP does not show the local roadways, and trails are depicted conceptually only, it is anticipated that subsequent planning efforts through the production of Neighbourhood Structure Plans shall define these sorts of details. However, the collector roadways shown in this ASP shall not be changed without an amendment to the ASP bylaw.

With the exception of changes to the flexible sites identified in this ASP, significant changes (greater than 10%) to the allocation of the various land uses shall require an amendment to the ASP bylaw.

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APPENDIX

A

ENVIRON–MENTAL SITE ASSESSMENT

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The following report is provided for reference purposes and does not form part of this bylaw.



DRAFT

Desktop Environmental Impact Assessment for the Wigfield ASP Amendment

City of Lloydminster

FINAL REPORT

April 2022

DRAFT

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.

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Appendix E HABISask Important Habitat Public Output

Appendix F HABISask Fisheries Output

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1.0
Introduction

1.1 Environmental Impact Assessment Contents

As described in the Municipal Development Plan (MDP) 2013-2032 (Parioplan 2013), an Environmental Impact Assessment (EIA) is required for any proposed development that may have an environmental effect. As this Area Structure Plan (ASP) includes turning primarily agricultural lands into a developed area containing recreational, residential, commercial and industrial infrastructure, an EIA is required.

EIA's may include, but not be limited to:

- A project description including its purpose, alternatives and staging requirements.
- A description of the biophysical development affected e.g., site conditions and topography including natural and man-made constraints to development).
- A prediction of effects that the project may have on the biophysical environment
- Limitations of the study, criteria used in any predictions, and interests consulted
- Recommendations and mitigation measures
- A framework for decision makers to determine the final course of action.

Lloydminster is uniquely positioned as a cross border city, however the Wigfield ASP is located on the Saskatchewan side of the border and relevant Saskatchewan information and legislation is discussed in this report. Notably, the Saskatchewan Water Shed Authority Act (2005) is in force within the jurisdictional boundaries of the City of Lloydminster.

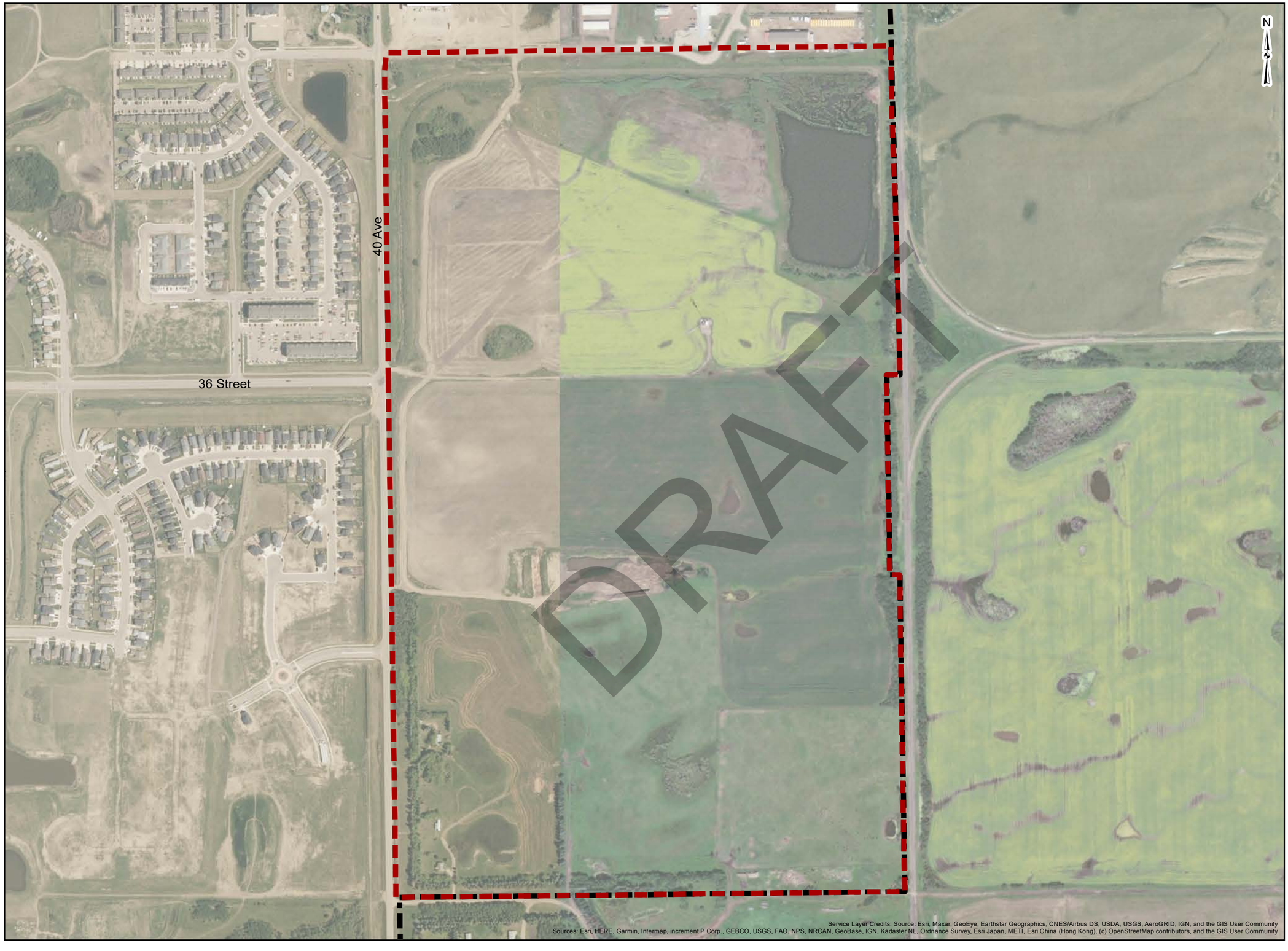
The EIA of the Project (Figure 1.1) uses desktop level analysis to identify potentially sensitive biological and physical features on or adjacent to the Study Area that have potential to be impacted by the Project; the study area is defined as within 2.0 km of the Project footprint (Figure 1.2). Included in this report is baseline environmental conditions pertaining to current land use, existing site conditions, potential vegetation communities, potential wildlife habitat, as well as species and areas of management concern. A field visit was not conducted and as such, historical photography and google streetview taken in summer conditions are used where available.

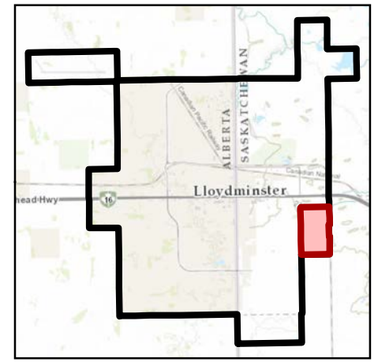
1.2 Project Description

ISL Engineering and Land Services Ltd. (ISL) has been retained by The City of Lloydminster (The City) to conduct a desktop EIA (Parioplan 2013), as part of the Wigfield ASP amendment (the Project), depicted on Figure 1.1. The amendment is to include accommodations for an Event Arena and consider appropriate adjacent land uses given this. The original Wigfield ASP was conducted by Select Engineering (2014).

The Project is located at NW and SW 36-49-28 W3M. The ASP area is bounded by 40 Avenue on the west, 41 Street on the north and Lloydminster city limits on the south and east. The Wigfield ASP lands are currently agricultural. Within the agricultural area there is a storm water management facility, dugouts and 3 residences. There is an area of disturbance and access road located within the agricultural lands at approximately 36 Street which is described in the Wigfield ASP as a radio tower site (Select 2014). There is an abandoned former sweet gas well described as located within the 40 Avenue right-of-way, and which has been reclaimed (Select 2014). Construction will begin with the event centre, located north of 36 Street.

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Legend

- City Boundary
- ASP Boundary

0 70 140 280 Meters

1:5,700 NAD 1983 UTM Zone 12N

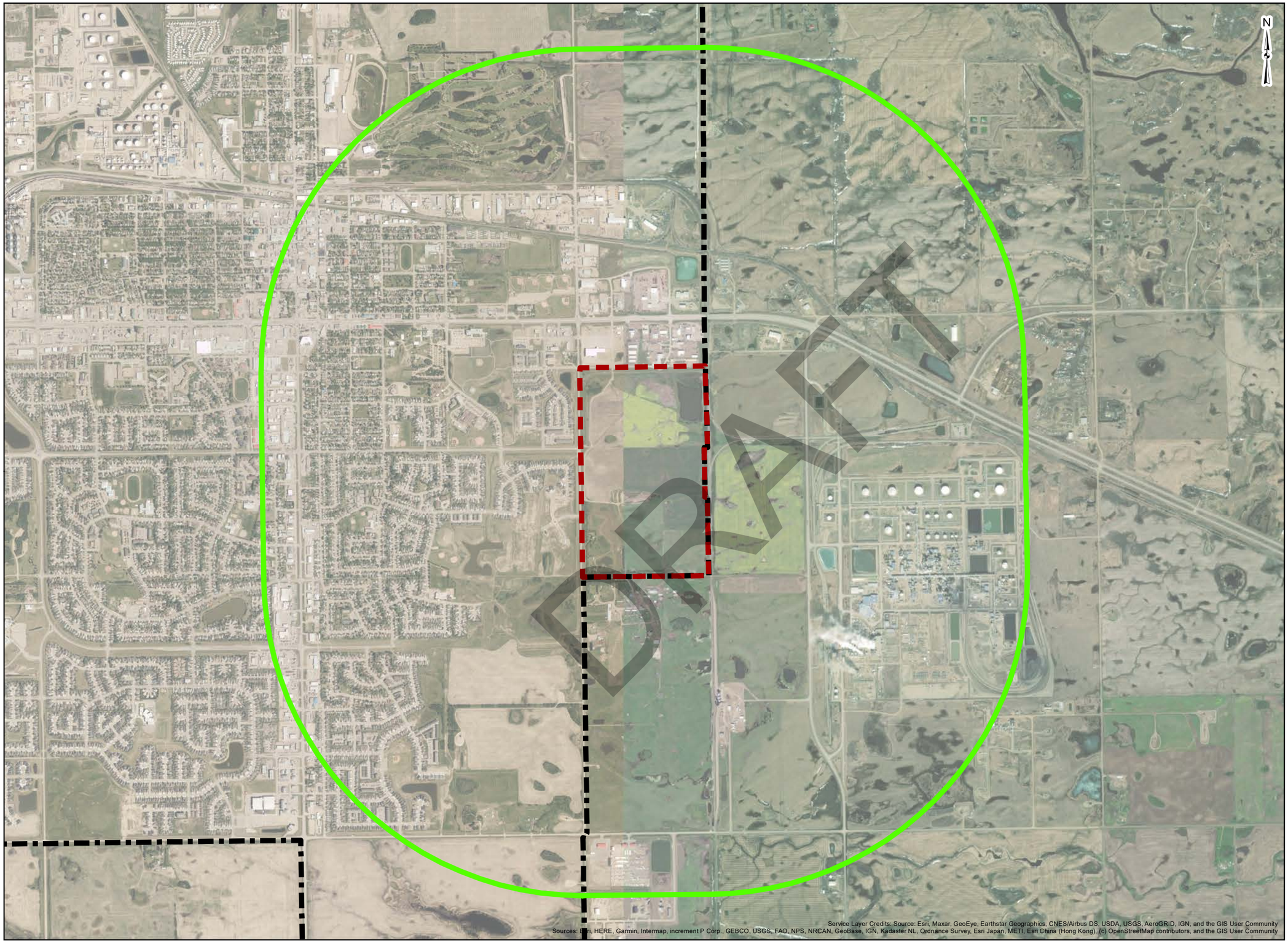
FIGURE 1.1
PROJECT AREA
WIGFIELD ASP

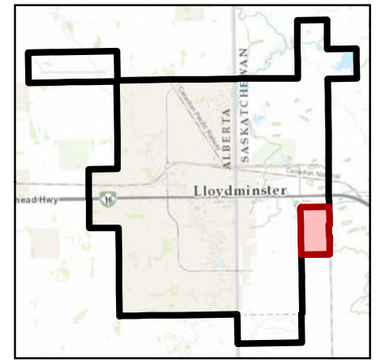
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Date: 2022-05-05 Document: V:\Projects\28059_WigfieldASP\03_EnvReportFigures\Fig1.1_Projectoverview\28059_Figure_1.1_Proj_Area_v2.mxd





Legend

- ASP Boundary
- City Boundary
- Study Area (2km Buffer)

0 295 590 1,180 Meters

1:23,000 NAD 1983 UTM Zone 12N

FIGURE 1.2
PROJECT STUDY AREA
WIGFIELD ASP

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2.0
Biophysical Elements

2.1 Desktop Methodology

Wildlife species and vegetation elements of management concern are any that meet the following criteria:

- Species for which provincial and/or federal restricted activity periods or setback distances exist (Environment and Climate Change Canada 2018);
- Species listed to be of Special Concern, Threatened or Endangered under the *Species at Risk Act* (*SARA*) *(*Government of Canada, 2002) or in the *Wildlife Act* (Government of Saskatchewan 1998)
- Previously identified fish and wildlife species provided by HABISask and listed in the *Wildlife Act* (SK CDC 2022a, Government of Saskatchewan 1983); and
- Rare vegetation species listed on HABISask (SK CDC 2022a).

Additional biophysical elements have been included if thought to be of potential concern given the biophysical elements present or potentially present in the ASP area.

2.1.1 Vegetation

HABISask (Hunting Angling and Biodiversity Information) element occurrence data was reviewed to identify known rare plant and rare ecological community occurrences in the 2km study area of the ASP. For invasive species, iMapInvasives was used to identify any potential concerns with invasive species in the ASP.

2.1.2 Wildlife

ISL conducted a review of the HABISask database for Saskatchewan to determine known species and wildlife protection area occurrences within a 2 km radius in the 2km Study Area.

2.1.3 Fish

To determine the presence of fish, and potential for fish habitat in the ASP area, a review of the HABISask database for Saskatchewan was conducted.

2.1.4 Soil

Saskatchewan Soil Capability classification is interpretive, often based on existing information and not field studies. The Soil Index describes the limitations of soils affecting agricultural use. Classes 1-3 are considered suitable for crops, 4 are considered marginal and 5-7 are suitable as pasture (Shields et al. 1968). The HABISask Database was queried to determine the Soil Index value (Appendix A).

2.1.5 Wetlands

The HABISask database was assessed for potential water features by examining contour lines to gain an understanding of the number, size, and location of potential wetlands. To further identify wetlands, an assessment of historical photographs and satellite imagery was completed.

Wetland Classification

Wetlands are areas where the soil is inundated with water at an ephemeral to permanent time scale, such that the soils become reduced (i.e., hydric) and hydrophytic vegetation is dominant. Based on hydrologic, ecological, and soil (e.g., biogeochemical) properties, wetlands can be further grouped and classified. The methodology used to classify wetlands for the Project was based on the Stewart and Kantrud (1971) Wetland Classification System Please refer to Table 2.1.

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Table 2.1: Wetland Classification

System	Class	Type		
		Salinity	Water Permanence[1]	Plant Community Zone
S&K	Class I - Ephemeral ponds	-	Surface water present after snowmelt in most years for only a brief period of time	Low Prairie Zone
S&K	Class II - Temporary ponds	-	Surface water present after snowmelt or heavy rainfall	Wet Meadow
S&K	Class III - Seasonal Ponds	-	Surface water present in growing season, gone by end of the summer	Shallow Wetland
S&K	Class IV - Semi-permanent ponds	-	Surface water present year round in the majority of years unless in drought conditions	Deep Wetland
S&K	Class V - Permanent Ponds	-	Surface water present in all years including drought conditions	Open water
S&K	Class VI - Alkali ponds	High concentration of salts and dominated by salt tolerant plants	Intermittent	Alkaline

1. See Classes discussion by Stewart and Kantrud (1971).

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2.2 Results of the Desktop Review

2.2.1 Land Use and Habitat

Ecoregion and Landscape Area

The Aspen Parkland Ecoregion is a mosaic of aspen stands and fescue prairies. Aspen concentration becomes more pronounced as one moves northward in the ecoregion. Typically, the aspen stands will occur in moister areas such as valley bottoms and north facing slopes and hillsides. Fescue dominated grasslands will occur in drier and southward facing slopes (SK CDC 2020). The Project occurs in the Lloydminster Plain Landscape Area (H1). The plain is nearly level, although morainal uplands such as Eagle Hills and valleys such as the Big Gully Coulee occur within the Landscape Area. Most of the Lloydminster Plain is cropland for cereals (Padbury et al. 1998).

Local Habitat

Vegetation within the ASP area is mainly cultivated. Interspersed within is numerous wetlands, and treed areas including treed wetlands. The treed areas are photo interpreted to be dominated by Aspen. The windrow on the Little Pine (south portion) of the ASP is dominated by various species of planted coniferous trees. Photo plates of habitats taken by Google Streetview in September 2018 are provided in Appendix B.

2.2.2 Vegetation

Rare Species

No rare vascular or non-vascular species (i.e., bryophytes or lichens) occurrences are present in the ASP area (SK CDC 2022b). The output from the publicly available database is provided in Appendix C. The nearest historical occurrence (with the 2km Study area) is located within city limits of Lloydminster in a developed area and is unlikely to be currently present given apparent development.

None of the plant species known to occur within the 2km Study Area are listed in the *SARA* public registry, or the *Wildlife Act* and regulations (Government of Canada 2022, Government of Saskatchewan 1998). A listing of rare vascular vegetation species known to occur in the H1-Lloyminster plain is provided in Table 2.2 below.

Table 2.2: Rare Vascular Vegetation Species in the H1- Lloydminster Plain Landscape Area

Common Name	Scientific Name	Provincial Rank[1]	Global Rank[2]
Vascular Plants			
Achnatherum nelsonii ssp. dorei	Columbia Needlegrass	S3	G5T5?
Antennaria dimorpha	Low Pussytoes	S3	G5
Botrychium pallidum	Pale Moonwort	S1	G3
Carex eburnea	Bristle-leaved Sedge	S3	G5
Cirsium drummondii	Short-stemmed Thistle	S3	G5
Corallorhiza striata var. striata	Striped Coral-root	S3	G5T5
Corispermum villosum	Hairy Bugseed	S2	G4?
Cypripedium parviflorum var. makasin	Small Yellow Lady's Slipper	S3	G5T4T5
Danthonia californica	California Oat Grass	S3	G5
Eleocharis elliptica	Slender Spike-rush	S3	G5
Festuca hallii	Plains Rough Fescue	S3	G5

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Common Name	Scientific Name	Provincial Rank[1]	Global Rank[2]
Gentiana fremontii	Moss Gentian	S3	G3G4
Geranium carolinianum	Carolina Wild Geranium	S3	G5
Geranium viscosissimum	Sticky Purple Geranium	S2	G5
Lactuca biennis	Tall Blue Lettuce	S3	G5
Lilium philadelphicum var. andinum f immaculata	Immaculate Lily	S1	G5TUQ
Lomatogonium rotatum var. fontanum	Marsh Felwort	S3	G5TNR
Monarda fistulosa var. mollis	Soft Wild Bergamot	S3	G5T5?
Nothocalais cuspidata	Prairie False-dandelion	S3	G5
Piptatherum canadense	Canada Mountain-ricegrass	S3	G4G5
Poa fendleriana ssp. fendleriana	Mutton Grass	S3	G5T5
Potentilla concinna var. concinna	Early Cinquefoil	S2	G5T4G5
Potentilla lasiodonta	Sandhills Cinquefoil	S2	G3
Ranunculus pedatifidus var. affinis	Northern Buttercup	S3	G5T5
Schedonnardus paniculatus	Tumble Grass	S3	G5
Silene menziesii	Menzies' Catchfly	S3	G5
Sisyrinchium septentrionale	Northern Blue-eyed-grass	S3	G4
Viola pedatifida	Crowfoot Violet	S3	G5

Source: Saskatchewan Conservation Data Centre (2022)

1. S1 (Critically Imperiled): Five or fewer occurrences, or especially vulnerable to extirpation due to other factor(s).
   S2 (Imperiled): Twenty or fewer occurrences, or vulnerable to extirpation due to other factor(s).
   S3 (Vulnerable): One hundred or fewer occurrences, or somewhat vulnerable due to other factors, such as restricted range, relatively small population sizes, or other factor(s).
   S4 (Apparently Secure): Uncommon but not rare; potentially some cause for long term concern due to declines or other factors.
   S5 (Secure): Common, widespread, abundant.
   B: Breeding.
   S_S_: Denotes the range of uncertainty about the status rank of the element.
   SNA: Not Applicable because the species or ecosystems is not a suitable target for conservation activities (e.g., introduced species).
   T (Tracked): Current information suggest species is rare or of conservation concern.
   ? (Inexact numeric rank): Denotes inexact numeric rank; this should not be used with any of the Variant Global Conservation Status Ranks or GX or GH.
2. Global (G) ranks are based on species status world-wide and follow a system parallel to Provincial Ranks (Note 1).

Weeds

Plants designated as Prohibited, Noxious or Nuisance in Saskatchewan are listed in Schedule I, II and III of the Ministerial Order for designation of Prohibited, Noxious and Nuisance weed in Accordance with the *Weed Control Act* (Government of Saskatchewan 2010a,b). A search of the iMAPInvasives Database produced no results for within the ASP (Appendix D). Species known to be present are provided listed by the Saskatchewan Conservation Data Centre (2014) and are provided in the table below.

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Table 2.3: Weeds in Saskatchewan

Common Name	Scientific Name
Common burdock	*Arctium minus*
Absinthe	*Artemisia absinthium*
Japanese Brome	*Bromus japonicus*
Downy Brome	*Bromus tectorum*
Flowering Rush	*Butomus umbellatus*
Heart-pod Hoarycress	*Cardaria draba*
Nodding Thistle	*Carduus nutans*
Spotted knapweed	*Centaurea stoebe ssp. micranthos*
Canada Thistle	*Cirsium arvense*
Field Bindweed	*Convolvulus arvensis*
Common Hound's-tongue	*Cynoglossum officinale*
Leafy Spurge	*Euphorbia esula*
Baby's-breath	*Gypsophila paniculata*
Dame's Rocket	*Hesperis matronalis*
Common Frogbit	*Hydrocharis morsus-ranae*
Himalayan Balsam	*Impatiens glandulifera*
Field Scabious	*Knautia arvensis*
Kochia	*Kochia scoparia*
Long-stalk Hoarycress	*Lepidium appelianum*
Oxeye Daisy	*Leucanthemum vulgare*
Yellow Toadflax	*Linaria vulgaris*
Purple Loosestrife	*Lythrum salicaria*
Scentless Chamomile	*Matricaria perforata*
Wild Parsnip	*Pastinaca sativa*
European Buckthorn	*Rhamnus cathartica*
Russian Thistle	*Salsola kali*
White Cockle	*Silene latifolia*
Bladder Campion	*Silene vulgaris*
Perrenial Sowthistle	*Sonchus arvensis*
Salt Cedar, Tamarisk	*Tamarix spp.*
Common Tansy	*Tanacetum vulgare*
Common Dandelion	*Taraxacum officinale*

Source: Saskatchewan Conservation Data Centre (2014)

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2.2.3 Wildlife

2.2.4 Important Wildlife Habitats

The ASP is not located within or adjacent to any Ramsar wetlands (Bureau of the Convention on Wetlands 2014), World Biosphere Reserves (UNESCO 2015), Western Hemisphere Shorebird Reserves (WHSRN 2019), Important Bird Areas (IBAs) (Bird Studies Canada and Nature Canada 2015), Ducks Unlimited Canada Projects (DUC 2022), Migratory Bird Sanctuaries or National Wildlife Areas (Environment and Climate Change Canada 2021).

The ASP is not located within or adjacent to any provincially-identified parks, ecological reserves, Saskatchewan *Wildlife Habitat Protection Act* (WHPA) lands, Fish and Wildlife Development Fund lands or Agriculture and Agri-Food Canada (AAFC) Community Pasture Program (CPP) lands (AAFC-CPP lands) (SK CDC 2022; Appendix E).

The ASP is within a North American Waterfowl Management Plan (NAWMP) Target Landscape (Government of Saskatchewan 2015). The Saskatchewan Water Security Agency encourages land owners to participate in a voluntary stewardship agreement where conservation is recognized through a certificate of appreciation.

2.2.5 Rare Wildlife Species

A search of the HABISask database determined that one occurrence of a rare vertebrate animal, and one occurrence of an invertebrate and no occurrences of animal assemblages are located within the ASP area. Five additional vertebrate animal occurrences are within the 2km Study Area, approximately 2 km from the ASP (SK CDC 2022) (Appendix C).

The one vertebrate species with a record overlapping ASP is listed on Schedule 1 of the *Species at Risk Act* as Endangered. This species is not listed in the Saskatchewan Wildlife Species at Risk Regulations (Government of Saskatchewan 1983).

2.2.6 Invasive Wildlife Species

Invasive wildlife species as listed by the Saskatchewan CDC are provided in Table 2.4 below.

Table 2.4: Invasive Wildlife Species in Saskatchewan

Common Name	Scientific Name
Rock Pigeon	*Columba livia*
Common Carp	*Cyprinus carpio*
House Sparrow	*Passer domesticus*
Gray Partridge	*Perdix perdix*
Ring-necked Pheasant	*Phasianus colchicus*
Wild Boar	*Sus scrofa*

Source: Saskatchewan Conservation Data Centre (2014)

2.2.7 Fish and Fish Habitat

The ASP area is located in the Southern Fishing Zone (SK CDC 2022) (Appendix F). Potential fish habitat in the ASP area is limited to waterbodies which contain water on a year-round basis and do not freeze to the bed, of which the ASP area contains potential in the Storm Water Management Facility (SWMF) in the north east portion

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of the ASP. The HABISask Database for Saskatchewan does not contain fisheries data in the ASP, however the absence of data does not equate to an absence of fish (SKCDC 2022).

Although the SWMF is unlikely the contain fish, there is still potential for fish to occur given the presumed depth and size of the waterbody.

2.2.8 Soil

Soils in the H1 Landscape Area are dominantly Black Loam with Dark Gray and Gray Luvisolic soils in heavily treed north facing slopes (Padbury et al. 1998). The soil is classified Index 2 in the Saskatchewan Soil Capability Index (SK CDC 2018). Soils in this class have moderate limitations that reduce the choice of crops or require moderate conservation practices (Shields et al. 1968).

2.2.9 Wetlands

In the ASP, 28 wetland features were desktop identified, delineated, and Classed using current and historical aerial photography and imagery (Appendix G). Wetlands include Marshes and Swamps. Three Artificial features were also identified in the ASP area; dugouts and a SWMF complex (Figure 2.1). Table 2.5 summarizes the results of the desktop historical photograph interpretation within the Area.

Figure 2.1 below illustrates the probable extents and locations of wetlands existing in the ASP currently, based on the combination of current ESRI Imagery and historical photography. Note that one infilled wetland feature is included as it was only recently filled and work appears to be ongoing.

Table 2.5: Desktop Wetland Assessment Results[1]

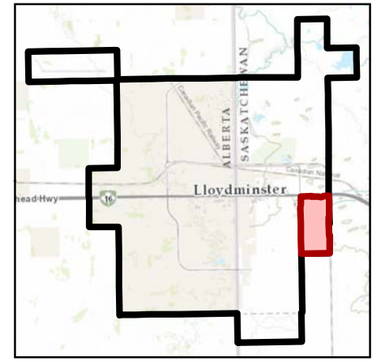
Wetland Description[1]	S&K Class	Number of Features	Area (ha)
Artificial	-	2	0.5
Disturbed	-	1	0.3
Wetland -SWMF Complex	-	1	6.9
Prairie Pothole Region Wetlands	I	5	0.2
	II	10	2.9
	III	6	3.4
	IV	0	-
	V	0	-
	VI (Alkaline)	0	-
Swamp	-	6	1.7
Total:		**31**	**15.9**

Notes:

1. This table is an estimate of wetland numbers and types based on the most current imagery available and visible presence of potential wetlands in historical photography (Figure 2.1). Fieldwork during the growing season is recommend for confirmation.
2. Wetlands that contain more than one Class are considered complexes. In this case the SWMF is complexed with a mineral wetland (Class III)

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Legend

ASP Boundary

Potential Wetlands (Desktop)

- Dugout
- Class I
- Class II
- Class III
- SWMF complex
- now infilled
- swamp

0 70 140 280 Meters

1:5,700 NAD 1983 UTM Zone 12N

FIGURE 2.1
WETLANDS
WIGFIELD ASP

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Date: 2022-05-05 Document: V:\Projects\28059_WigfieldASP\03_EnvReportFigures\Fig2.1_wetlands\28059_Figure_2.1_wetlands.mxd



3.0 Effects on Biophysical Elements

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3.1 Study Limitations

Aerial imagery interpretation is an effective way to identify biophysical features such as wetlands during project planning stages. However, some biophysical features may not be evident on imagery and to be appropriately assessed, fieldwork should be conducted during an appropriate time of the year. Examples include wildlife such as birds, mammals, reptiles, and rare plants.

Pertaining to wetlands, the inconspicuous physical characteristics of some wetlands may have potentially hindered their identification during interpretation due to their small size or often temporary and seasonal occurrence especially on agricultural land. Additionally, Swamp wetlands are particularly difficult to differentiate from wet forest during imagery interpretation. Due to the limitations of imagery interpretation, the wetland location, size, and Class provided in Section 2 above should be used as a guideline for planning purposes only.

The absence of data available in provincial databases does not equate to the absence of species in an assessment area. Databases can only confirm presence of a species at a particular moment at the time of collection.

3.2 Prediction of Effects on Biophysical Elements

Table 3.1 describes potential impacts that may occur as a result of infrastructure (residential, commercial, industrial and institutional) development within the ASP area.

Table 3.1: Potential Biophysical Effects

Potential Biophysical Impacts of Development in the ASP Area				
Environmental Elements	**Description of Interaction (How, When, Where, Positive, Negative)**	**Type of Potential Impact**	**Mitigation Recommendations**	**Potential Residual Adverse Impact**
Topography	Topography along the ASP Area is generally flat with depressional wetland areas. Topography is likely to change with development.	There is a risk for erosion and sedimentation across the ASP area where vegetation will be stripped. Water management will be critical if wetlands are infilled.	Implement an erosion and sediment control plan and a water management plan.	Loss of natural landscape contours, alteration of surface drainage patterns.
Hydrogeology/ Groundwater	Construction of infrastructure in the ASP area has the potential to interact with groundwater. Groundwater is expected to be a muted representation of surface water and surface water is present in multiple locations in the ASP.	If permanent earthworks occur, this may cause a change in groundwater quality and/or quantity during construction and flow, post construction.	Implement a groundwater monitoring plan, implement erosion and sediment control as well as a spill response plan.	Alteration of groundwater flows, potential for contamination.
Aquatic Resources	Wetlands, a SWMF and dugouts occur within the ASP. Construction has potential to interact with these aquatic resources.	Earthworks may cause a temporary change in surface water quality during construction. Loss of aquatic habitat area may occur.	Flag or fence off waterbodies that are not to be disturbed, include a buffer for protection from sedimentation (e.g., silt fence).	If wetland or waterbodies are infilled, loss of aquatic and shoreline habitat will occur.

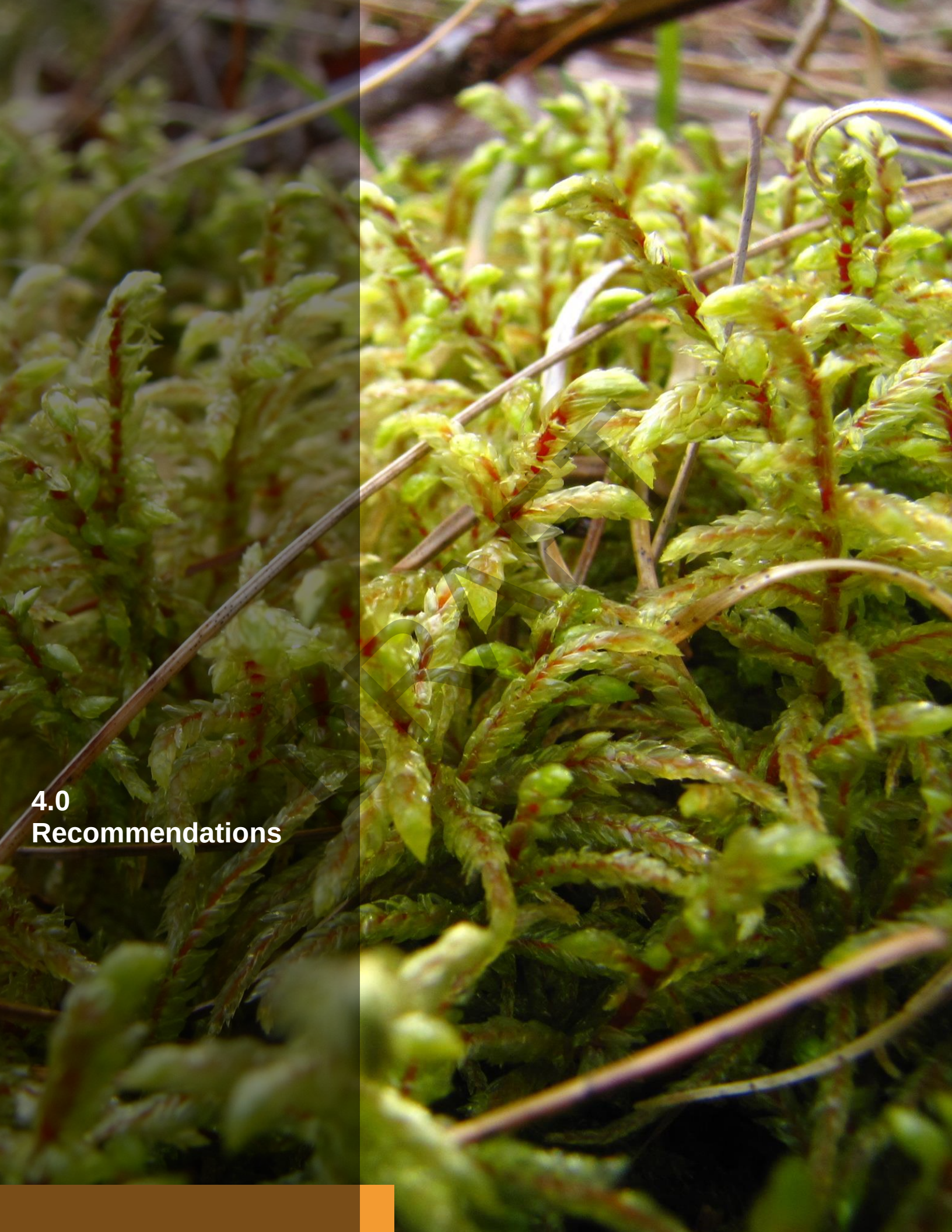
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Soils	Earthworks will occur during the construction of the Project. Admixing of soils has potential to occur as does erosion and sedimentation. Soils from outside the project may be brought in.	Loss of topsoil, erosion and sedimentation. Potential admixing. It is unknown if soils have contamination issues.	-Implement an erosion and sediment control plan. - Machibroda (2012) recommended a Phase II ESA be conducted. Conduct an Environmental Site Assessment (Phase II) to determine potential contamination issues.	Loss of capability for cultivation, admixing of topsoil with subsoils.
Vegetation	No historical rare plant occurrences overlap the ASP, however some native areas exist and there is low to moderate potential for rare plants. Introduction of soils and dirty construction equipment may result in the introduction or spread of weeds.	Transportation and introduction of weeds. Loss of rare plants or native plants. Loss of native plants and potential habitat for them.	-Prior to construction, manage weeds. Do not park or store vehicles/equipment on infestations and if needed, control weeds prior to use. -Ensure vehicles and soils brought on site are clean and free of weed seeds. -Flag or fence off areas of native vegetation to be retained.	Loss of rare plants, stands of native vegetation, introduction of weeds.
Wildlife and Wildlife habitat	Historical records of vertebrate wildlife and invertebrates are in the area. Potential bird habitat (tree stands and wetlands) exist in the ASP, therefore migratory birds, bats and other wildlife may occur within the ASP and 2 km Study Area.	Construction activities may cause sensory disturbance to wildlife species, causing avoidance. Some wetland and tree/shrub/herbaceous habitat is likely to be removed.	-Follow the recommended timing and setbacks for Species at Risk (if they occur). - There is a record of a Schedule 1 Endangered Species on the *Species At Risk Act* that overlaps the Wigfield ASP. Complete a wildlife field study to determine need for Screening (see 4.1.2). -Complete pre-disturbance wildlife surveys during the migratory bird nesting window or at sensitive periods for bats. Implement all recommendations the wildlife biologist recommends. -Ensure that noise abatement equipment (e.g., mufflers) on machinery is in good working order. Turn off equipment when not in use. Enclose noisy equipment, as needed, to limit the transmission of noise beyond the construction site. -In the event that active nests, dens, burrows, etc. are found during clearing and construction activities, consultation with the appropriate regulator is required. Active nests may be subject to an appropriate buffer until the nest is no longer active or a permit may be granted for removal. -Do not harass or feed wildlife. -Avoid removal of nests and/or nest buffer, wildlife trees, important habitat features such as ungulate browse, or other	Loss of nesting habitat, migratory refuges and foraging habitat.

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			habitat features, where practical.	
Fish and Fish Habitat	The ASP occurs in an area with a SWMF that may be altered in the future. If fish are present in the SWMF or in wetlands, loss of aquatic habitat may impact them and their populations.	Construction activities have potential to cause sedimentation. Loss of aquatic habitat area is anticipated with if the SWMF or wetlands occur.	-Conduct fieldwork to determine if fish are present within the SWMF. -Obtain regulatory approvals as per the *Fisheries Act*, if fish are present. -If applicable, follow guidance on screen design found in DFO's Freshwater Intake End-of- Pipe Fish Screen Guideline (DFO 1995). -Monitor to assess sediment release (i.e., turbidity and Total Suspended Solids [TSS]) if required by the applicable regulatory approvals. -If present, fish must be salvaged from within isolated work site and returned to a suitable location -Do not wash equipment or machinery near any waterbody. Control wastewater from construction activities to avoid discharge directly into water -Prohibit fuel storage, refuelling, or servicing of equipment within 100 m of any waterbody, except where secondary containment and/or tertiary containment is provided.	Loss of aquatic habitat, fish mortality.
Species at Risk (COSEWIC, SARA)	One federally listed species (Schedule 1, Endangered) has been previously identified within the 2km Study Area. The ASP does appear to have preferred habitat, however field studies will confirm. Construction activities may cause sensory disturbance to wildlife species, causing avoidance.	Preconstruction surveys will provide appropriate mitigation measures specific for species found.	See wildlife, vegetation and fish and fish habitat, above.	Loss of potential habitat.
Land and Resource Use	The current agricultural cultivation will no longer occur with infrastructure development.	Change in land use and users.	Public consultation will aid in mitigation for concerns over land use changes.	Loss of crop area.

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4.0 Recommendations

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4.1 Regulatory Framework

All federal, provincial regulations and municipal policies must be adhered to. Provincial regulations that have potential to be applicable in the ASP are described below.. Regulations often change over time, new ones introduced or repealed and requirements may change over time. Fieldwork timed to occur in the growing season prior to ground disturbance will ensure the results are not considered expired by the time of construction.

4.1.1 Federal

Fisheries Act

The provisions of the *Fisheries Act* came into force in August 2019. While guidance documents are still being developed, important changes include the new prohibitions:

- 34.4 (1) No person shall carry on any work, undertaking or activity, other than fishing, that results in the death of fish
- 35 (1) No person shall carry on any work, undertaking or activity that results in the harmful alteration, disruption or destruction of fish habitat
- Harmful Alteration: any change to fish habitat that reduces its long-term capacity to support one or more life processes of fish but does not permanently eliminate the habitat
- Disruption: any change to fish habitat occurring for a limited period of time that reduces its capacity to support one or more life processes of fish
- Destruction: any permanent change of fish habitat, which completely eliminates its capacity to support one or more life processes of fish

Prior to impacts or alteration of the SWMF of connecting waterbodies, conduct a minnow trapping study at approximately to determine if fish are present and if *Fisheries Act* will apply.

Migratory Birds Convention Act

The *Migratory Birds Convention Act (MBCA)* is administered by Environment and Climate Change Canada (ECCC) to ensure protection of migratory birds, their nests, and their eggs. Birds protected by the *MBCA* include waterfowl (such as ducks, geese, and swans), insectivorous birds (such as wrens, robins, shrikes, and woodpeckers), and some nongame birds (such as herons and gulls) (ECCC 2017).

To protect migratory birds, ECCC provides general nesting periods based on geographic location (ECCC 2018). The general nesting period covers the majority of species covered under the *MBCA*; however, it may not be accurate for species that can breed at any time during optimal conditions (*e.g.* crossbill species), or species that may nest earlier or later (ECCC 2018).

The general migratory bird-nesting period for the Project (located within zone B5) is mid-April to late August (ECCC 2018). During this period, construction activities require a pre-construction sweep to avoid disturbance and nest sweeps every 3-7 days where habitat occurs. In the event that nesting migratory birds are identified during the nest sweep, a setback may be identified through consultation with ECCC where feasible, or a permit would be required to remove the nest.

If construction is to occur during the nesting period, mid-April to late August, pre-disturbance mitigation such as nest sweeps will be required to ensure compliance with the *MBCA*. The field wildlife biologist may determine that an extension to this period is warranted based on the species observed during field studies (e.g., owls).

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Species at Risk Act

The *Species at Risk Act (SARA)* includes several prohibitions to protect species listed on Schedule 1 of *SARA*. Under Sections 32 and 33 of *SARA*, it is an offence to:

- Kill, harm, harass, capture, or take an individual of a species listed under *SARA* as extirpated, endangered, or threatened
- Possess, collect, buy, sell, or trade an individual of a species listed under *SARA* as extirpated, endangered, or threatened, or any part or derivative of such an individual
- Damage or destroy the residence of one or more individuals of a listed endangered or threatened species or of a listed extirpated species if a recovery strategy has recommended its reintroduction into the wild in Canada

No SARA permit is expected or required for the Project, as no SARA listed species of aquatic habitats are expected to be impacted. The ASP is not located within Federal Lands (e.g., a National Park), and not located within land that is subject to an Emergency Order under *SARA*.

Canada Navigable Waters Act

The *Canada Navigable Waters Act*, administered by Transport Canada, provides protection of navigation on all public navigable waterways in Canada through the Navigation Protection Program (Transport Canada 2021). Regulatory approval is required in scheduled navigable waters, as well as waters that are considered Navigated, where the works risk a substantial interference with navigable.

The SWMF is not considered navigable waters and the *Canada Navigable Waters Act* is not expected to apply to this ASP.

4.1.2 Provincial

Saskatchewan Environmental Assessment Act

The Saskatchewan *Environmental Assessment Act* (EAA) pertains to impacts on the environment from new developments. Development means any project, operation or activity or any alteration or expansion of any project, operation of activity likely to have an effect on rare and unique or endangered features, substantially use a provincial resources, emit pollutants in a manner that is not regulated by another *Act* or regulation, cause widespread public concern or others as listed in Part 1(2(d)) of Chapter E-10.1 of the *Environmental Assessment Act* (Government of Saskatchewan 1980). Due to the recorded occurrence of a *SARA* listed Schedule 1 Endangered wildlife species in the HABISask database and potential presence of habitat (i.e., trees, wetlands) in the ASP area, ISL recommends a wildlife biologist to be hired to conduct field studies in the appropriate season prior to construction, and based on these studies, determine the need to submit a screening to the ministry.

The Saskatchewan Environmental Management and Protection Act and Regulations

To conduct work in or near water, or to discharge with an adverse effect on water, an individual or corporation must obtain an Aquatic Habitat Protection Permit. Work requiring a permit includes: road developments such as culvert or bridge installations; shoreline stabilization; recreational development such as docks, beaches and boat launches; riparian and aquatic vegetation removal; channelization; ditch maintenance; and water use infrastructure such as pumphouses (Saskatchewan Water Security Agency [WSA] 2017). Allow at minimum 12 weeks for Aquatic Habitat Protection Permit processing.

Drainage projects and wetland infilling require a drainage approval. Requirements include: When draining, the proponent must have permission to move water onto, or across, any other person's land to the point of adequate outlet; approval holders will be required to use best practices in design and construction of works to reduce impacts of drainage; approval holders may be required to retain some surface water or storage space for water.

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Note that there will not be grandfathering of projects that occurred in the past and all will require an approval in time (WSA 2022).

Saskatchewan Wildlife Habitat Protection Act (WHPA)

The *Wildlife Habitat Protection Act* pertains to crown lands designated as wildlife habitat and ecological lands. The *Act* prohibits lands alteration of designated lands (Government of Saskatchewan 1983). No WHPA lands are in or nearby the ASP.

The Wildlife Act and Wild Species at Risk Regulations

The Saskatchewan *Wildlife Act* determines the protection of wild species considered "designated". The minister can prepare and implement recovery plans for designated species (Government of Saskatchewan 1998). The *Wildlife Act* may be applicable if designated species are discovered prior to construction. The *Wild Species at Risk Regulations* list the species which are designated as extirpated, endangered and threatened (Government of Saskatchewan 1999). A field study should be conducted by a wildlife biologist during the appropriate season prior to construction, to determine if there are designated species using the ASP area.

The Fisheries (Saskatchewan) Act

A new *Fisheries Act* came into force in 2020. A fisheries license is required to obtain or possess fish by any method for scientific purposes (Section 18(1b)). Part 6 of the *Act* designates the Protection of Aquatic Species at Risk, recovery plans, and prohibited activities. Several aquatic species are considered invasive in Saskatchewan and if designated so by a Minister, prohibitions such as importation, buying, selling, transporting, introduction and deposition is prohibited.

A fisheries license will be required to conduct fish studies.

The Weed Control Act

The *Weed Control Act* designates weeds as Prohibited, Noxious or Nuisance. A prohibited weed shall be eradicated while a noxious weed is prohibited from movement by any material, machine, or domestic animal. A ministerial order designates the weed species included (Government of Saskatchewan 2010). A weed survey in the growing season may be beneficial one to two years prior to planned construction. Weed control prior to area development, if needed, is recommended.

4.1.3 Municipal

Lloydminster Municipal Development Plan

Objective 7.1 in the Municipal Development Plan (Parioplan 2013) states an objective "*To identify, conserve and integrate environmentally significant and natural areas into the design of neighbourhoods and other forms of development*".

As per Policy 7.1.1, a biophysical or geotechnical assessment is required prior to subdivision or development. This is to include natural areas and hazard lands and be completed by a qualified consultant. Policy 7.1.3 describes the Protection of Natural Areas through Environmental Reserve dedication, Municipal Reserve dedication, easements, donations and bequests, and acquisition through purchase or land trades. Objective 7.2 further details Environmental Reserve Dedication and Easement.

Policy 7.3.3 describes an Environmental Impact Assessment (EIA), which is required for any proposed development that may have a detrimental environmental effect. The required contents of an EIA are described in Section 1.1.

This report will be included with the ASP amendment and reviewed and approved by the City of Lloydminster.

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4.2 Wetland Conservation and Protection

Generally, ISL recommends retention of wetlands that appear more permanent, are large in area, and/or complex wetlands due to the potential landscape hydrologic impact. Typically, the longer water is present, the more likely limited anthropogenic disturbance has occurred. They often contain native plant communities, have high potential for rare species, and are stable wildlife habitat for waterfowl, shorebirds, amphibians, and invertebrate species. Additionally, these basins typically hold more water than other wetlands and may be significant to catchment hydrology. To infill them during development would not only displace this water, but also likely impact the overland flow dynamics, which could lead to flooding and/or spring melt and stormwater management issues.

It should also be noted that less permanent wetlands also provide important wetland functions such as stormwater retention, sediment and nutrient retention, as well as wildlife habitat, however, they occur as smaller features on the landscape within the ASP and the impact of their disturbance is anticipated to be less since the majority of them have been historically disturbed by cultivation. ISL recommends that during design, conservation of these wetlands be considered.

4.2.1 Setbacks and Environmental Reserve

Neither the Government of Saskatchewan nor the City of Lloydminster have mandated setbacks for wetlands. In addition, there is no Policy or Regulation which speaks to setbacks for wetlands in Saskatchewan. However, wetland setbacks are important to consider for development planning. Setbacks provide a buffer of vegetation and help to filter water and other inputs, provide habitat for wildlife, and help protect the wetland from disturbance.

The Saskatchewan Wetland Conservation Corporation makes recommendations for land management around wetlands in a document called *Managing Saskatchewan Wetlands – A Landowner's Guide* (2000). The *Guide* recommends a 10m minimum buffer strip around wetlands be maintained when in cropland. Wider buffers may be recommended if the soil is prone to erosion, salinity is likely or other factors.

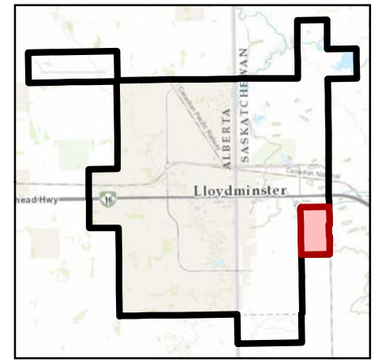
ISL recommends that intact wetlands, such as those that are treed or not disturbed by agriculture, be retained as Environmental Reserve and have a 10 m setback buffer applied. This is in accordance with the recommended (not required) best practices described in the *Guide*. Based on recent imagery, the SWMF is the only feature to regularly contain open water and appears as part of a wetland complex and ditch/drainage system. Given the size of this feature and its large water storage capacity, retention is recommended primarily for storm water management purposes. Impacts to other portions of the complex and ditch associated with the SWMF is not recommend until a storm water management plan is completed.

4.3 Recommended Pre-Construction Studies

ISL recommends planning field studies in the appropriate season, prior to the time of ground disturbance. Field information and data collected during fieldwork is generally considered expired 3-5 years from collection. ISL recommends wildlife studies, specifically migratory bird assessments and bat assessments during the appropriate season to assess for protected species and to ensure compliance with federal and provincial legislation. ISL also recommends wetland field studies prior to ground disturbance to provide accuracy in the drainage application and to provide baseline information for water management planning. Additionally, if the SWMF or connected waterbodies are to be disturbed, an assessment for fish presence in the SWMF is recommended to determine if the federal *Fisheries Act* applies. Additional recommendations and options for mitigation at the time of construction are provided in Table 3.1, above. A memorandum or short report detailing the results of these field studies should be produced for the City of Lloydminster.

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Legend

- ASP Boundary
- Wetlands and SWMF
- 10m Buffer
- drainge

0 70 140 280 Meters

1:5,700 NAD 1983 UTM Zone 12N

FIGURE 4.1
WETLANDS AND SWMF RECOMMENDED FOR RETENTION

WIGFIELD ASP

ISL

LLOYDMINSTER

Integrated Expertise. Locally Delivered.

Date: 2022-05-05 Document: V:\Projects\28059_WigfieldASP\03_EnvReportFigures\Fig4.1_RetentionWetlands\28059_Figure_4.1_Retwetlands_v2.mxd



5.0
Decision Making Framework

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At the desktop stage, there do not appear to be encumbrances to development that cannot be mitigated for. Fieldwork prior to ground disturbance will provide site and species-specific mitigation and is recommended.

Table 5.1: Decision and Timing Framework

Task	Main Recommendations	Timeframe
Further Biological Assessments?	Recommended, See Section 4.2 and Table 3.1	In the appropriate season, prior to construction
Regulatory Approvals Required?	Yes likely. This is dependent on results of fieldwork at appropriate time of year.	Regulatory planning to follow from the biological field assessment results. Applications for any regulatory approvals should be submitted well prior to construction as application queue times may be many months.
Environmental Reserve and setbacks?	ISL recommends retention of wetlands where possible. Preferably those wetlands that appear most intact and natural. Conduct wetland field assessment to support regulatory applications and stormwater planning. Fieldwork may help refine which wetlands to retain. If wildlife studies determine the presence of rare or at risk species, retention of their habitat may be recommended by the field biologist. ISL recommends retention of the existing SWMF and incorporation into the stormwater planning.	Biophysical fieldwork should occur at the biologically appropriate season prior to construction.

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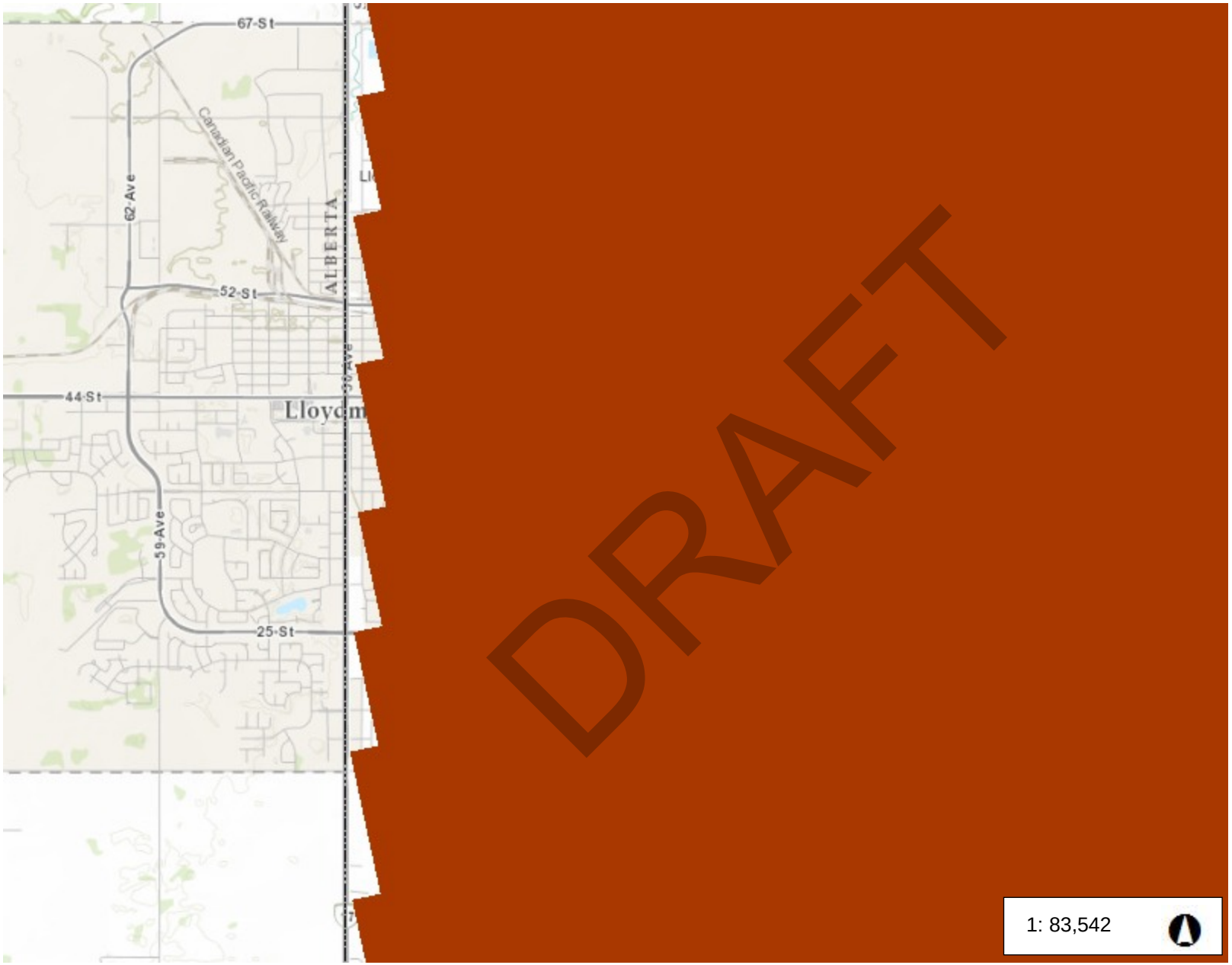
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APPENDIX A
HABISask Soil Output

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HABISask- Soils





Legend

- Provincial Boundary
- Saskatchewan Soil Capability
  - Class 1
  - Class 2
  - Class 3
  - Class 4
  - Class 5
  - Class 6
  - Class 7
  - Organic

Notes

4.2 0 2.12 4.2 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

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APPENDIX B
Photo Plates

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Plate 1 View east on 40th Avenue north of 36th Street of the Wigfield ASP (Google Streetview, September 2018)



Plate 2 View east on 40th Avenue at 36th Street of the Wigfield ASP (Google Streetview, September 2018)

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Plate 3 View east on 40th Avenue south of 36th Street of the Wigfield ASP (Google Streetview, September 2018)



Plate 4 View south from the Yellowhead Hwy into the already developed portion of the Wigfield ASP (Google Streetview, September 2018)

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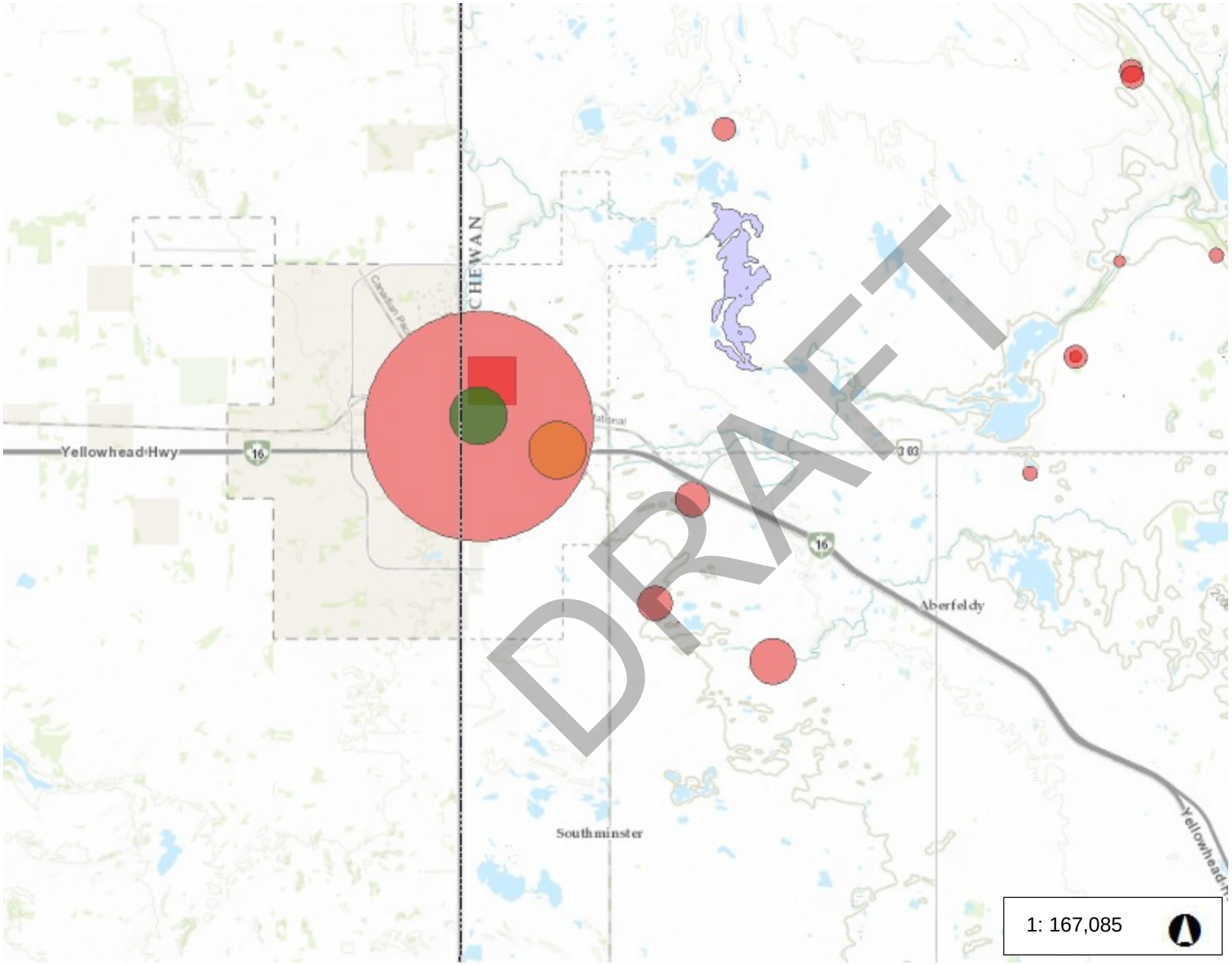
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APPENDIX C
HABISask Rare Species (Public) Output

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HABISask- Rare and Endangered Species





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Legend

- Provincial Boundary
- Rare and Endangered Species
  - Vertebrate Animal
  - Invertebrate Animal
  - Animal Assemblage
  - Vascular Plant
  - Nonvascular Plant
  - Other (Botanical)
  - Fungus
- National Park
- Provincial Park

1: 167,085

Notes

8.5 0 4.24 8.5 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

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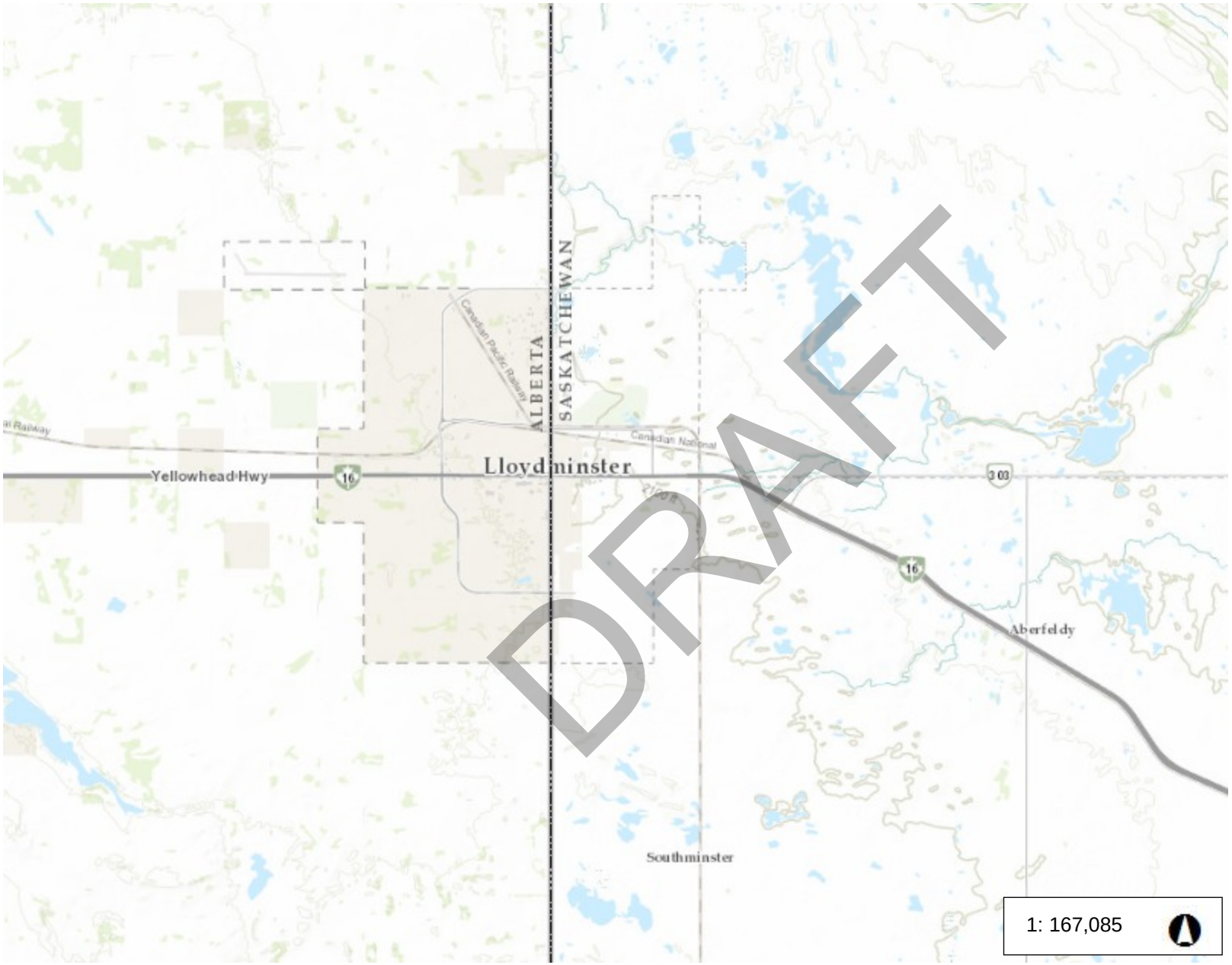
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APPENDIX D
iMapInvasives Output

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HABISask- Invasives





Legend

- Confirmed Present Species Pc
- Confirmed Present Species Lir
- Confirmed Present Species
- Confirmed Present Species Ce
- Provincial Boundary
- National Park
- Provincial Park

1: 167,085

Notes

8.5 0 4.24 8.5 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

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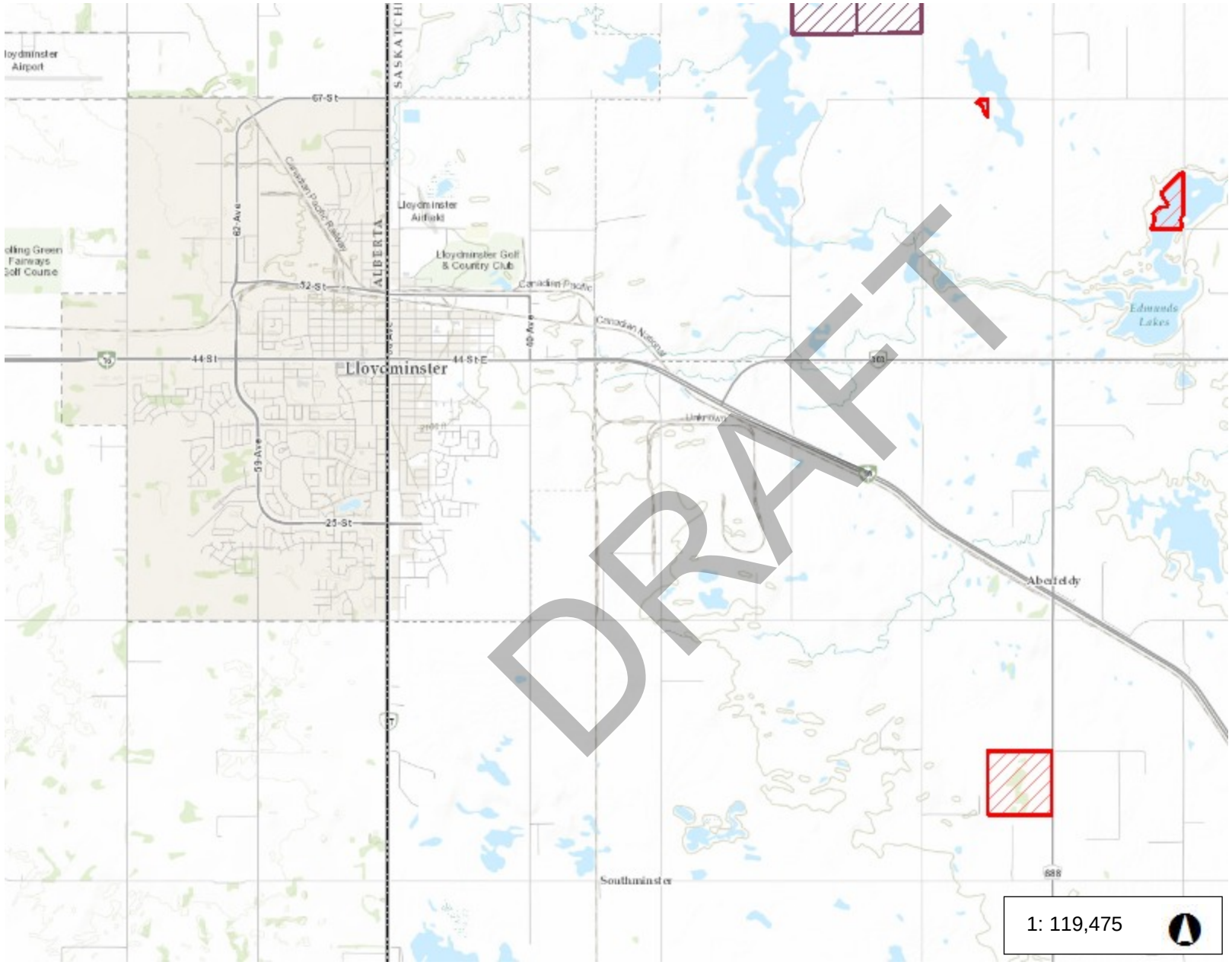
APPENDIX E

HABISask Important Habitat (Public) Output

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HABISask- Important Habitat





Legend

- Provincial Boundary
- Water Security Agency
- Game Preserve
- National Wildlife Area
- Migratory Bird Sanctuary
- Conservation Easements
- Crown Land Subdivisions
- Ecological Reserves
- Fish and Wildlife Development
  - Managing Jurisdiction
  - Ducks Unlimited Canada
  - Ducks Unlimited Canada; Nature C
  - Government of Saskatchewan, Min
  - Nature Conservancy of Canada
  - Nature Conservancy of Canada; Sa Federation
  - Regina Fish & Game League
  - Saskatchewan Pheasants Forever
  - Saskatchewan Wildlife Federation
- Former Federal Pastures
- Ramsar Wetland
- Reservior Development Areas
- Crown Conservation Easemen
- Protected and Conserved Area
- National Park
- Provincial Park

1: 119,475

Notes

6.1 0 3.03 6.1 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

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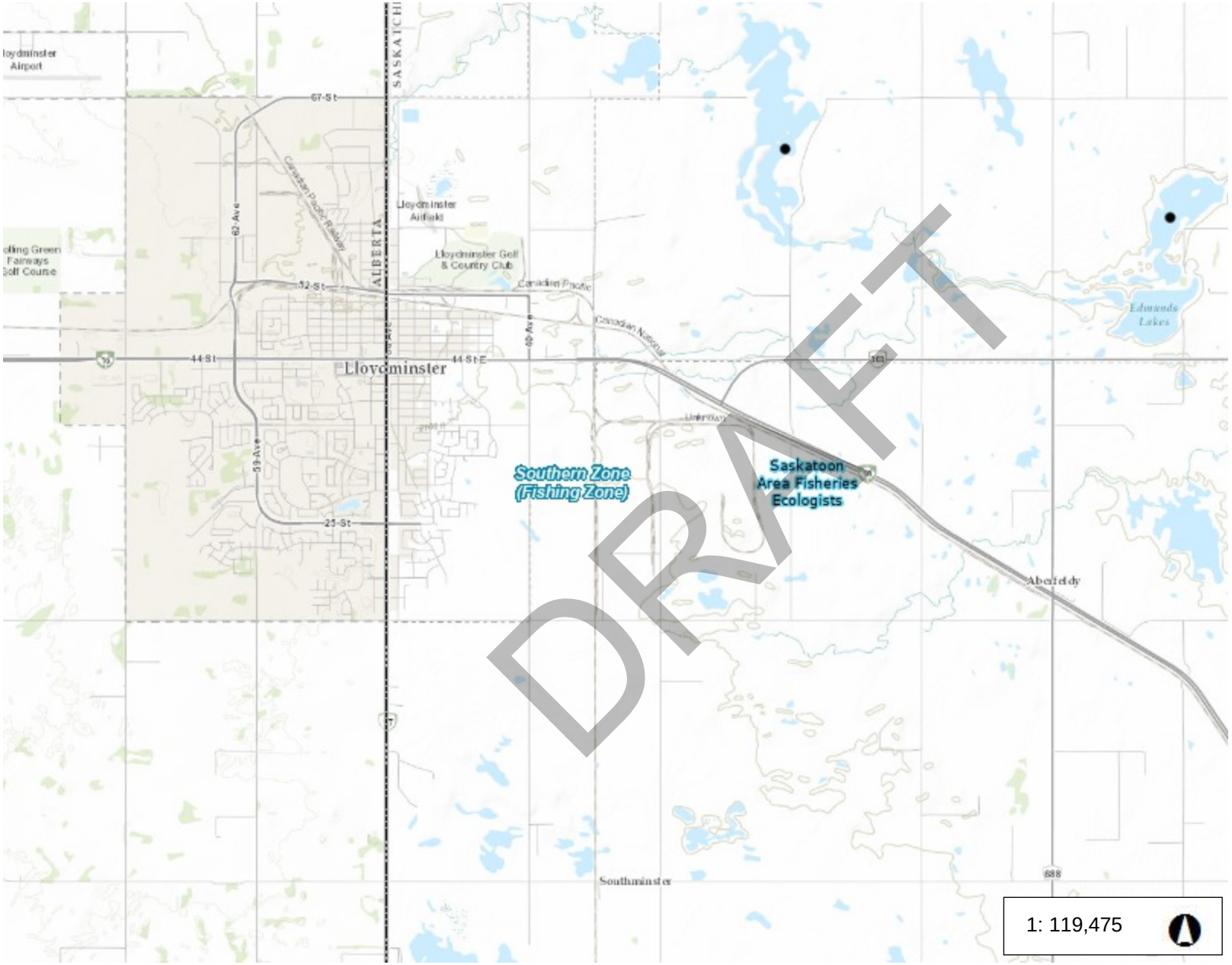
DRAFT

APPENDIX F
HABISask Fisheries Output

DRAFT

HABISask- Fisheries





Legend

- Provincial Boundary
- Sport Fish Management Zones
- Area Fisheries Ecologists
- Commercial Closures Line
- Commercial Closures
- Angling Closures Line
- Angling Closures
- Fisheries - Special Regulations
- Fisheries - Species Info
- Fisheries - No Lake Info

1: 119,475

Notes

6.1 0 3.03 6.1 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

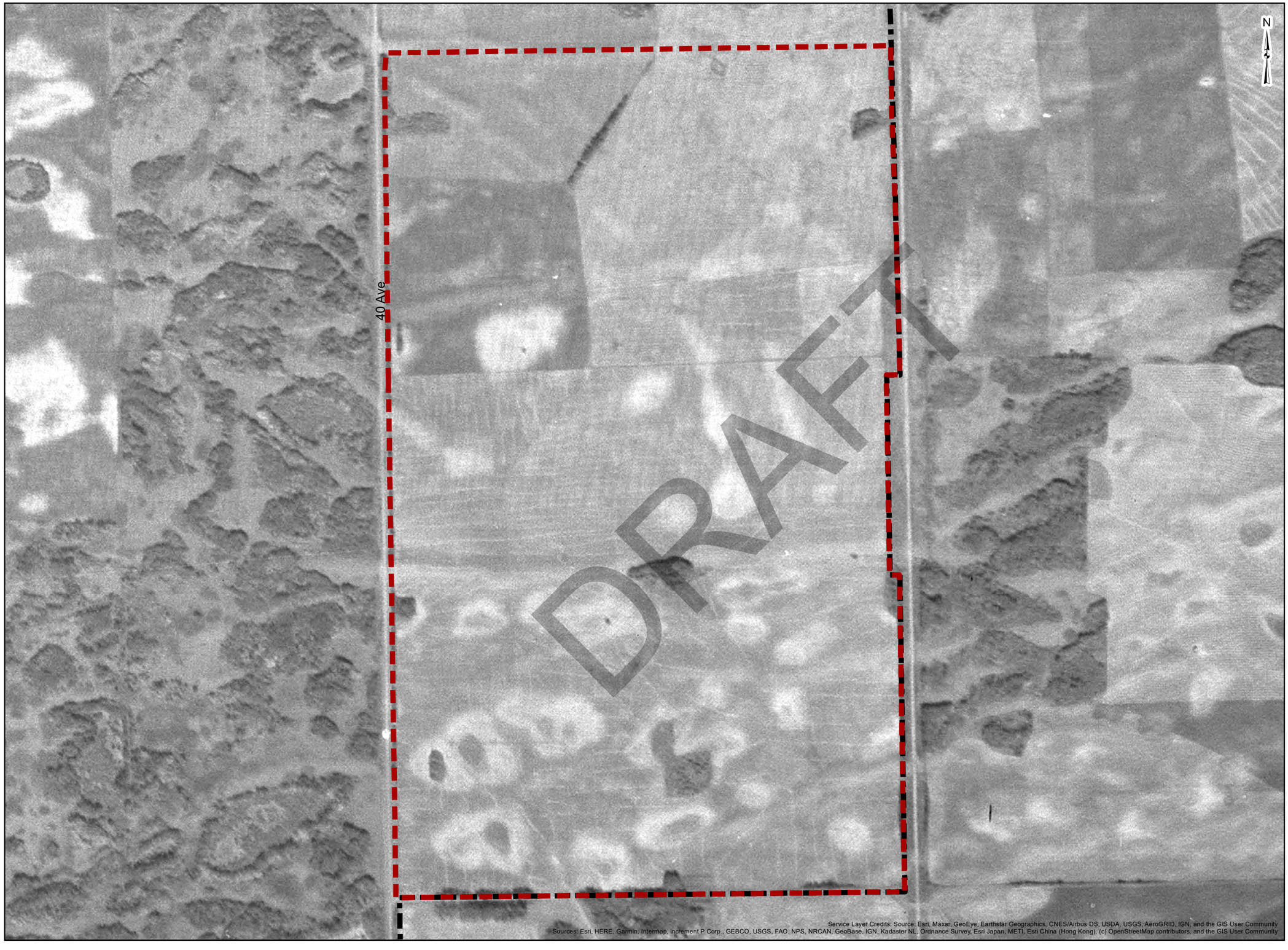
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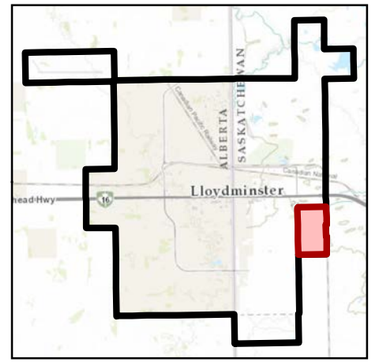
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APPENDIX G
Historical Photography

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Legend

ASP Boundary

City Boundary

0 70 140 280 Meters

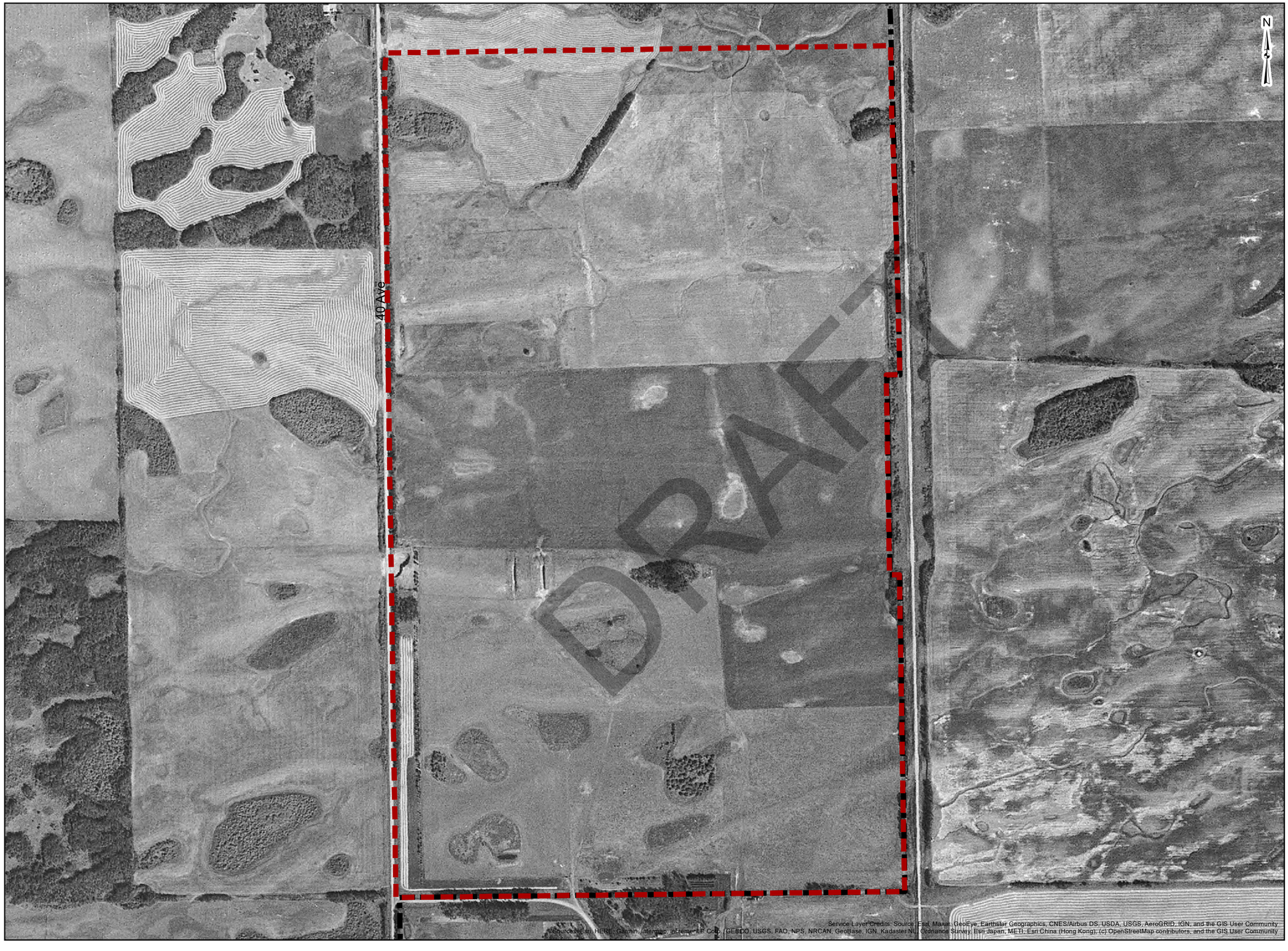
1:5,700 NAD 1983 UTM Zone 12N

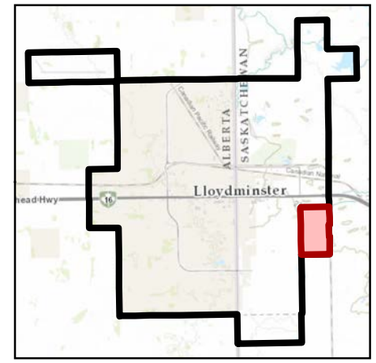
HISTORICAL PHOTOGRAPHY
1949

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Legend

- ASP Boundary
- City Boundary

0 70 140 280 Meters

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HISTORICAL PHOTOGRAPHY
1965

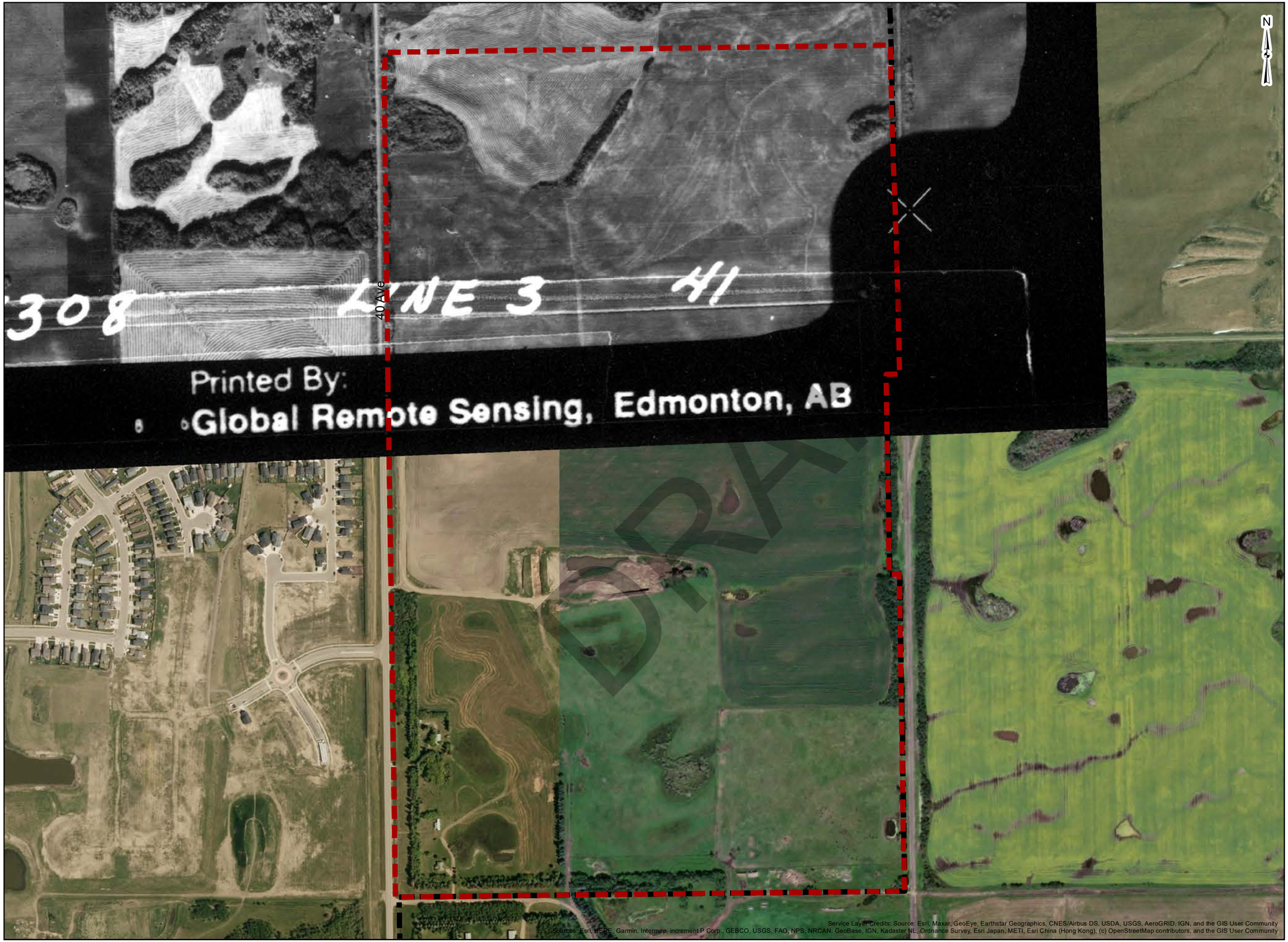
WIGFIELD ASP

ISL

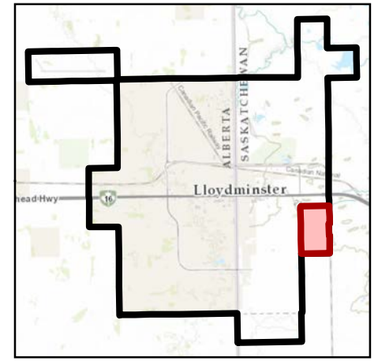
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Legend

- ASP Boundary
- City Boundary

0 70 140 280 Meters

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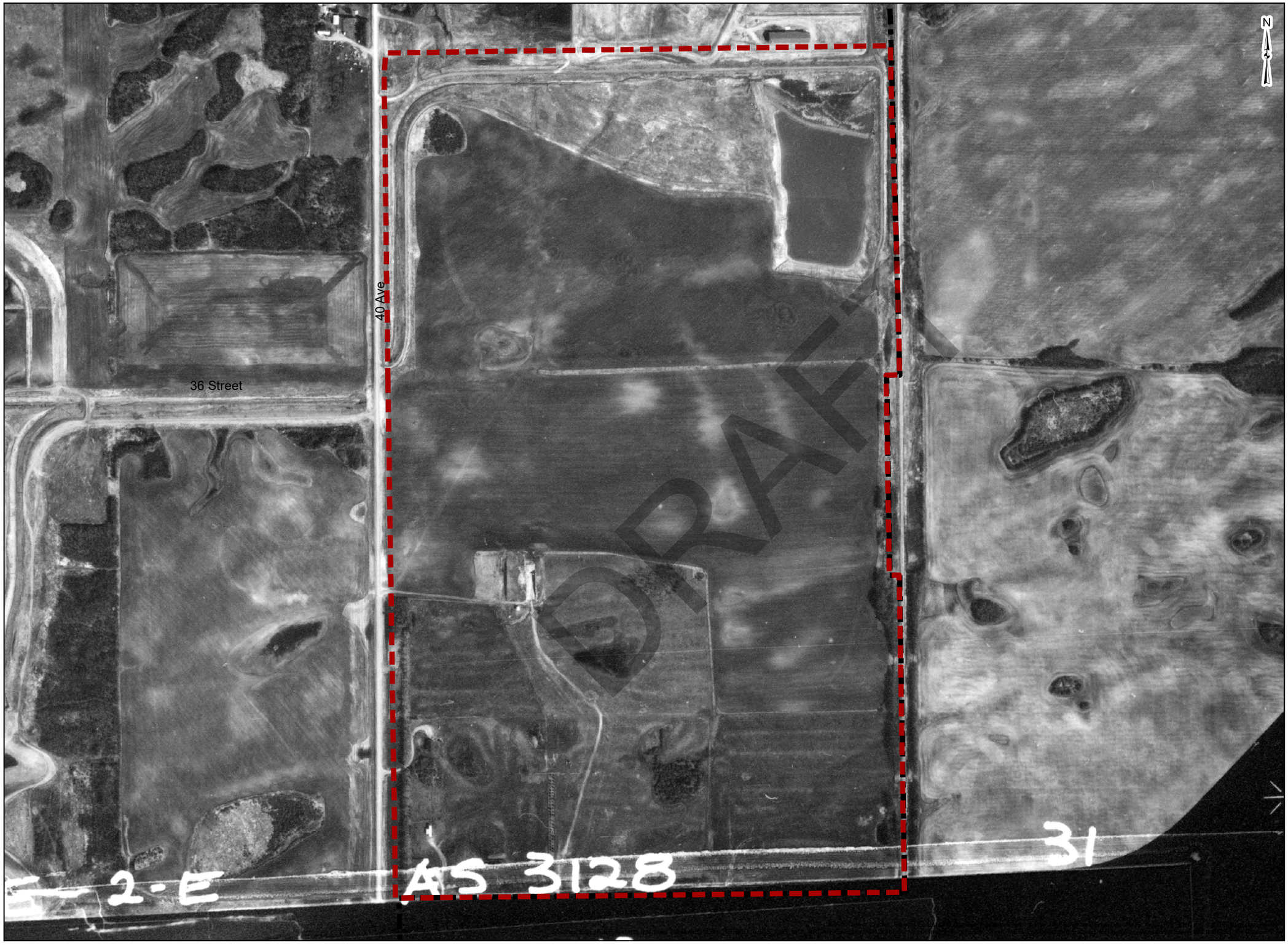
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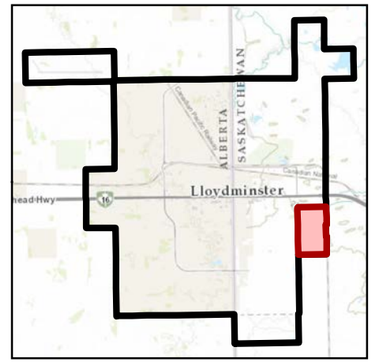
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ASP Boundary

City Boundary

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HISTORICAL PHOTOGRAPHY
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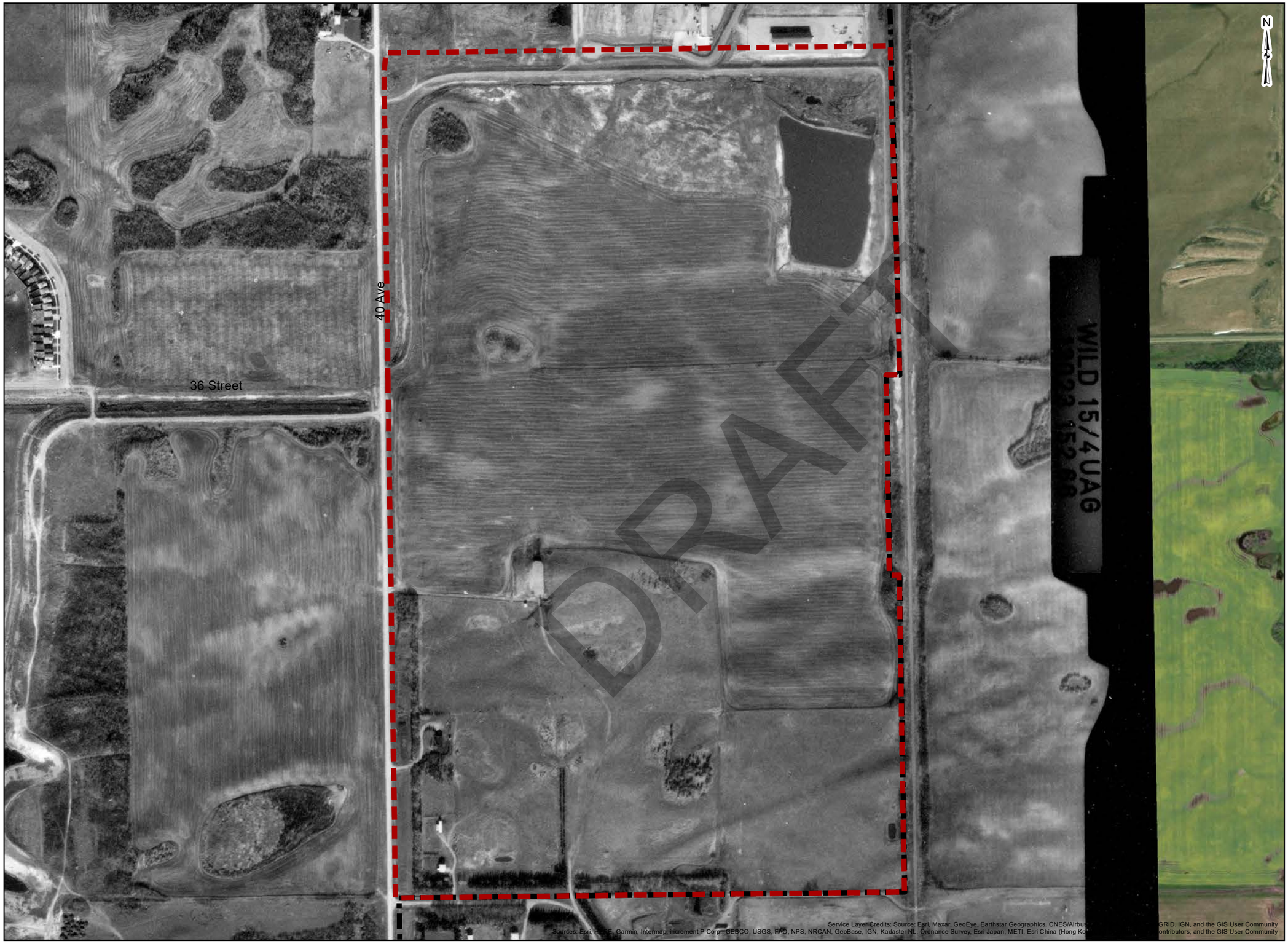
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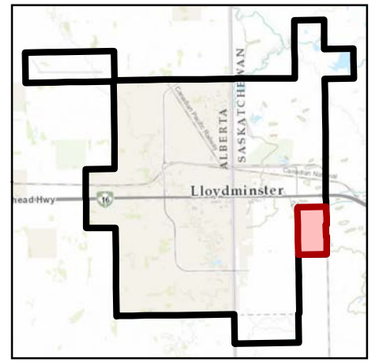
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- ASP Boundary
- City Boundary

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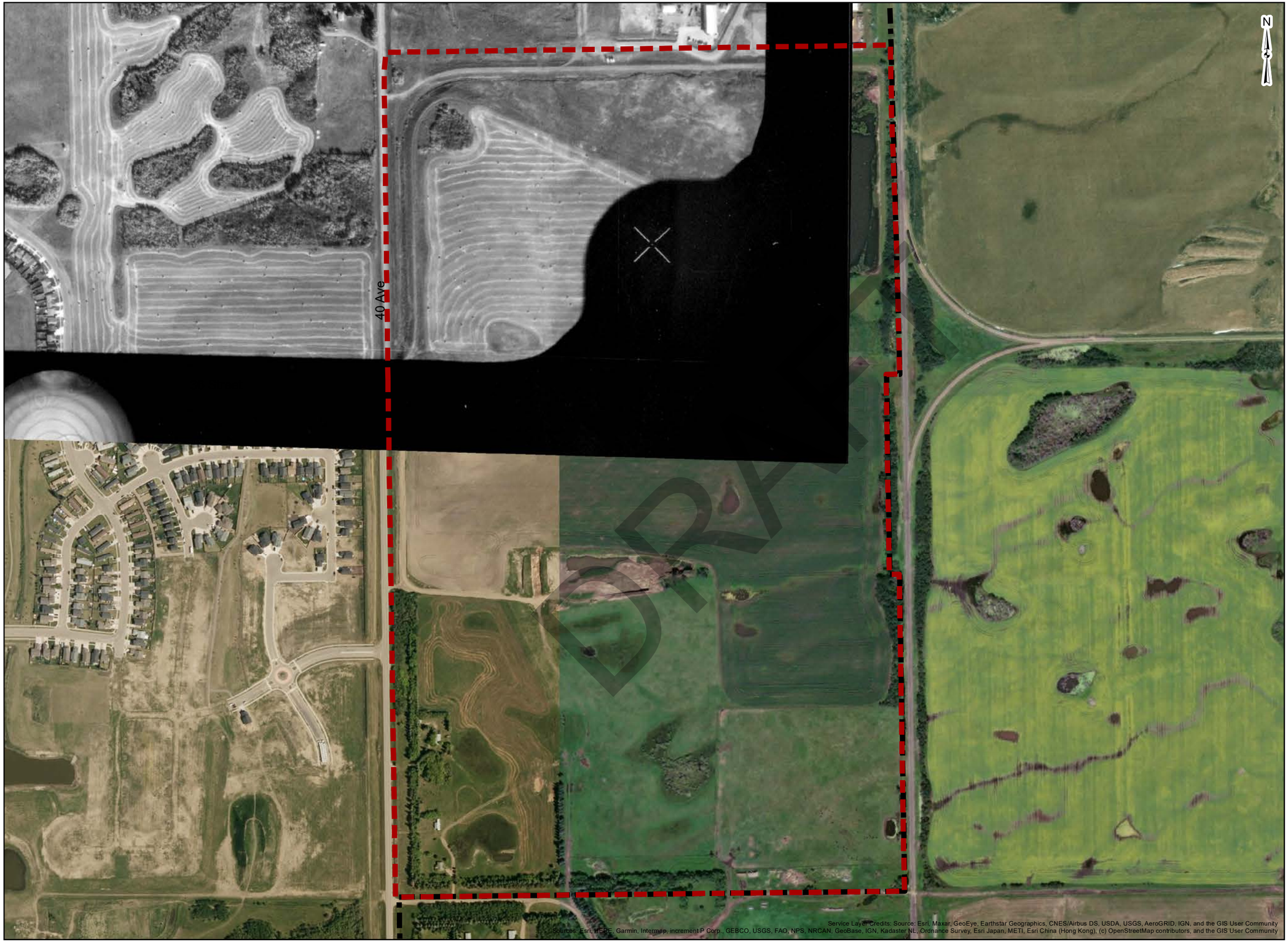
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HISTORICAL PHOTOGRAPHY
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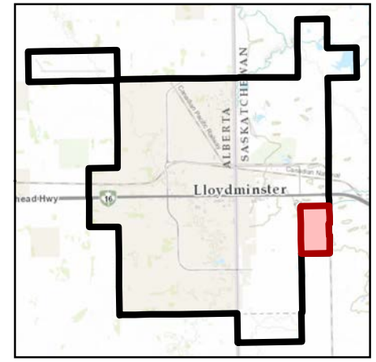
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- ASP Boundary
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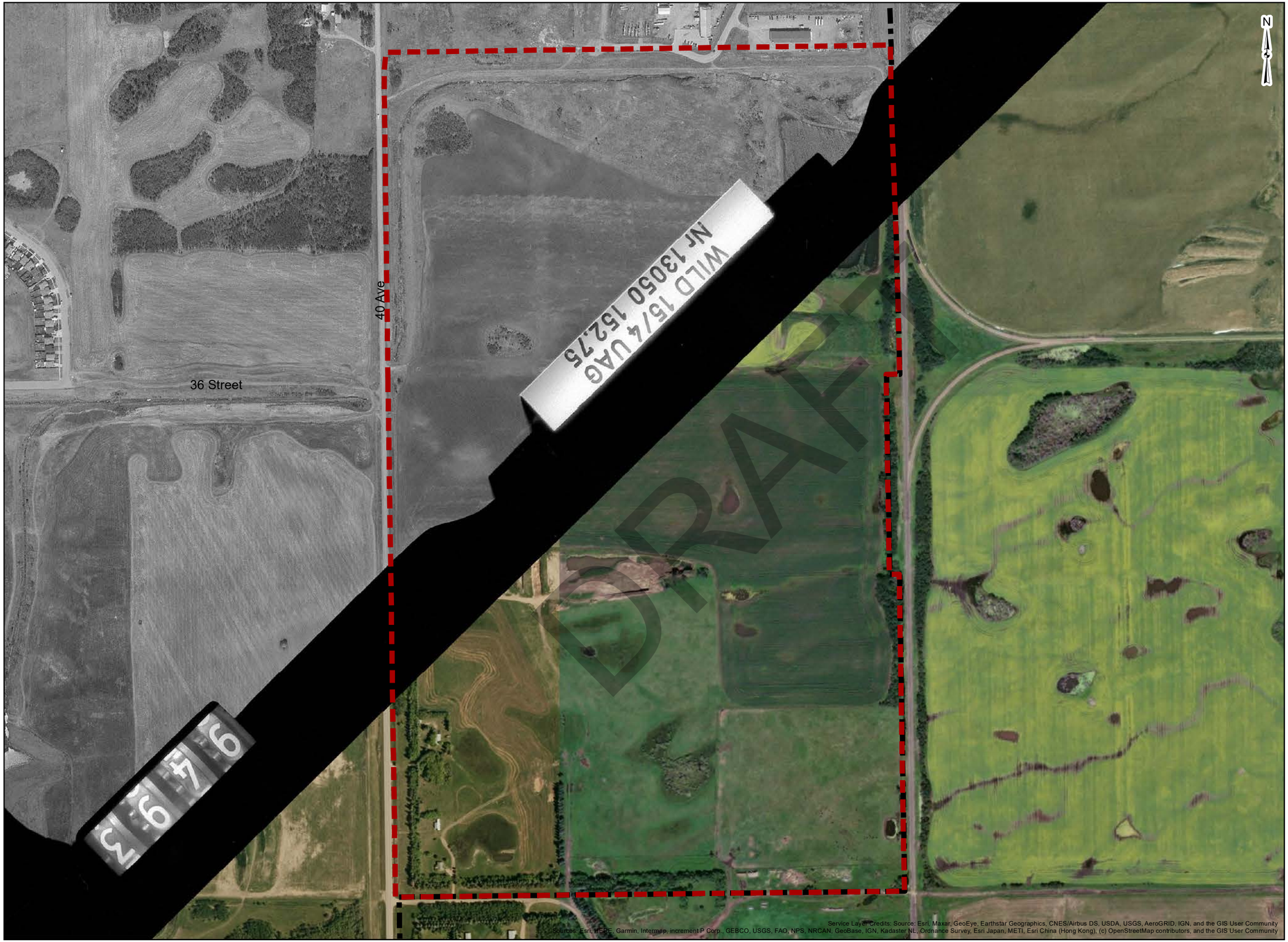
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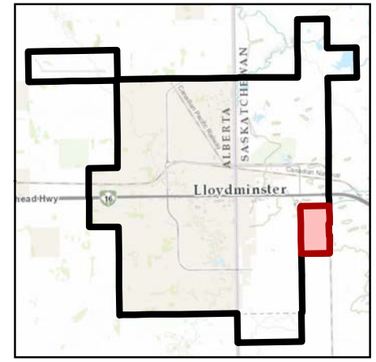
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ASP Boundary

City Boundary

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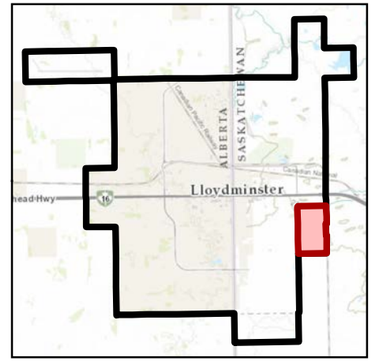
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ASP Boundary

City Boundary

0 70 140 280 Meters

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HISTORICAL PHOTOGRAPHY
2009

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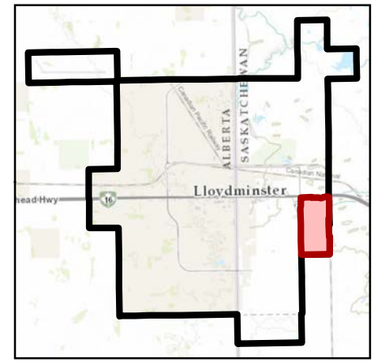
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Legend

- ASP Boundary
- City Boundary

0 70 140 280 Meters

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HISTORICAL PHOTOGRAPHY
2016

WIGFIELD ASP

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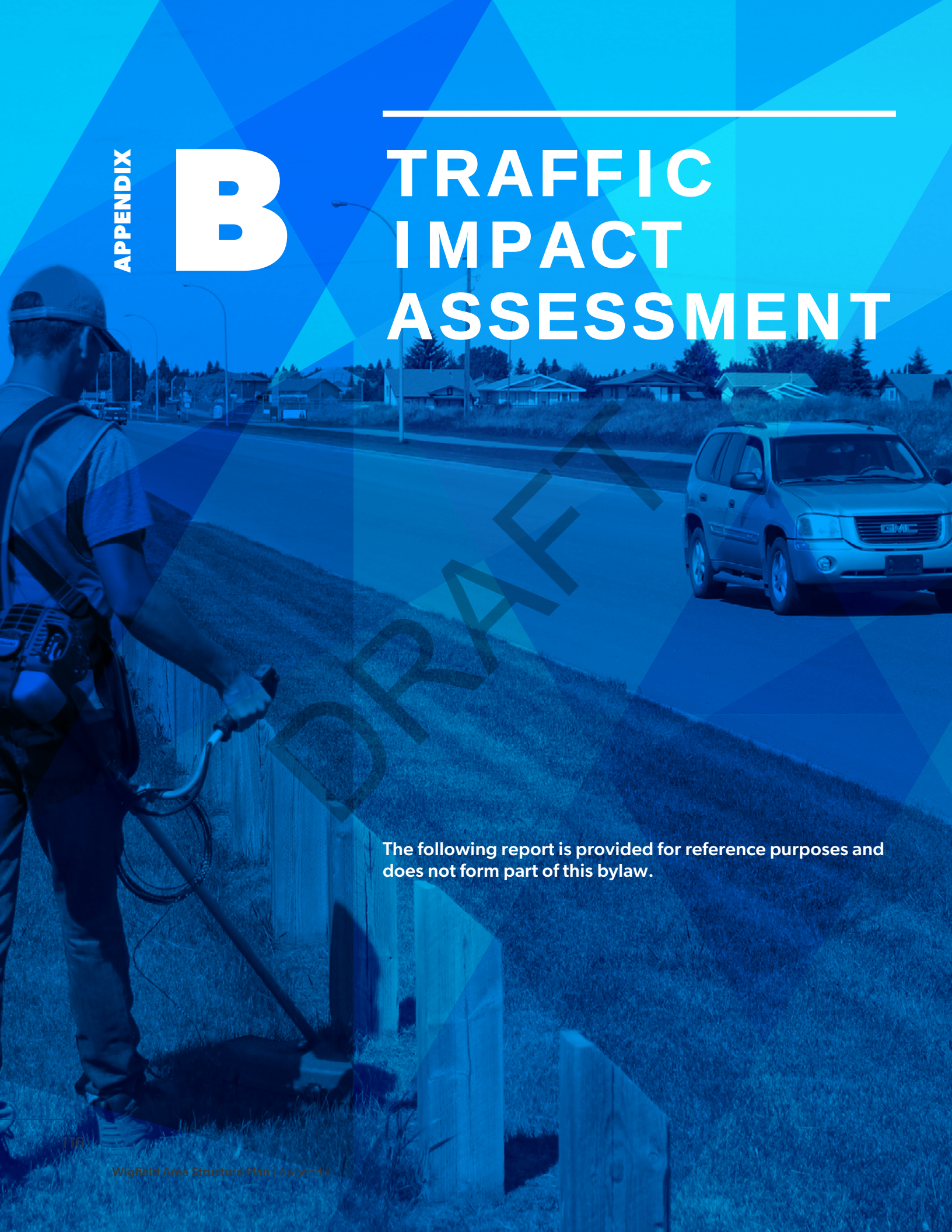
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APPENDIX

B

TRAFFIC IMPACT ASSESSMENT



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The following report is provided for reference purposes and does not form part of this bylaw.



DRAFT

City of Lloydminster

Draft/Final Report

Wigfield ASP TIA

SEPTEMBER 2022

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- 1.2 Scope 1

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1.0 Introduction

The original Wigfield Industrial Area Structure Plan (ASP), prepared in 2014, provided new business and employment opportunities in the City of Lloydminster. The identification of this area for industrial land use was intended to ensure a supply of serviced and accessible industrial lots in the future.

After the approval of the original Wigfield ASP, a number of changes have occurred that require a revised policy direction for the Wigfield area. This report provides an overview of the transportation implications anticipated from the proposed ASP land uses and provides recommendations for the transportation network to support development.

1.1 Site Location

As shown in Exhibit 1 – Study Area, the plan area is located at the southeast corner of the City of Lloydminster, in Saskatchewan, adjacent to the Rural Municipality of Wilton No. 472. The Wigfield ASP area is bounded by:

- 40 Avenue and the Larson Grove and Aurora neighbourhoods to the west,
- the Canadian Pacific Railway ROW and industrial development to the east,
- 41 Street and existing commercial and industrial development to the north, and
- The City boundary and agricultural development to the south.

1.2 Scope

The following study provides an overview of the transportation implications anticipated from the proposed Wigfield ASP land uses and provides recommendations for the internal and surrounding transportation network to support development. This TIA includes two study horizons:

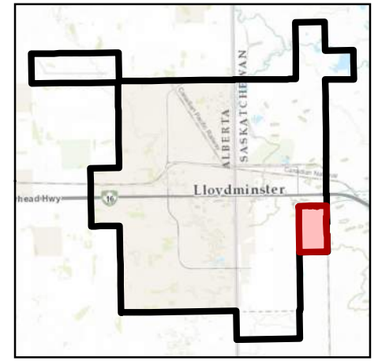
- Short Term (Opening Day): 5-year horizon with a City of Lloydminster (the City) population of approximately 35,000.
- Long Term (Ultimate): 55-year horizon with a City population of approximately 100,000.

The study scope includes:

- **Existing Conditions –** Background and existing conditions which may impact the creation of the Wigfield ASP.
  - Existing Roadway Network: internal and external roadway conditions and intersections.
  - Existing Mobility Review: trails and sidewalks, transit, and rail adjacent to and within the subject area.
  - Current and adjacent land uses.
- **Proposed Development –** An overview of future conditions.
  - Future Adjacent Land Uses.
  - Proposed Land Uses.
  - Proposed Roadway Network.
  - Study Intersections.
- **Traffic Volumes –** Anticipated traffic volumes for the short- and long-term horizon.
  - Existing Traffic: current traffic volumes based on traffic counts provided by the City.

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Legend

- ASP Boundary
- City Boundary

0 75 150 300 Meters

1:6,000 NAD 1983 UTM Zone 12N

EXHIBIT 1.1
STUDY AREA
WIGFIELD ASP AMMENDMENT
SERVICING STUDY

ISL

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- Background Traffic: projected traffic volumes for the short- and long-term scenarios without the proposed Wigfield ASP land uses.
- Site Generated Traffic: anticipated traffic volumes generated by the proposed land uses.
- Total Traffic: total traffic volumes anticipated for the short- and long-term scenarios.

- **Traffic Analysis** – Assessment of traffic operations to understand the implications of the ASP on the roadway network in the short- and long-term horizons. The traffic analysis results will inform proposed network improvements and the Wigfield ASP roadway classifications.
- **Event Sensitivity Analysis –** A high-level assessment of traffic operations when an event is hosted at the Multiuse Recreational and Event Facility. The analysis results will provide insight into potential traffic management needs for events.
- **Future Mobility** – A review of non-vehicles transportation within and adjacent to the Wigfield ASP, including trails and sidewalks, rail, and transit.
- **Conclusions and Recommendations**

Study Horizon Determination

The study horizons align with the population horizons as identified within the 40 Avenue Functional Study. The 40 Avenue Functional Study provides four geometric configurations for 40 Avenue based on the population: 35,000; 50,000; 75,000; and 100,000. A linear growth rate of 2.2 percent is applied to the City's Federal 2021 Census population to determine the approximate years corresponding to the 40 Avenue Functional Study population horizons. The 2.2 percent growth rate is from the City of Lloydminster and County of Vermillion River Regional Growth Study completed in 2019. The estimated future population is provided in the table below.

Table 1.1: Estimated City Population by Year

Year	Horizon	Population
2021	-	31,582
2022	0	32,277
2027	**5**	**35,827**
2032	10	39,768
2037	15	44,143
2042	**20**	**48,998**
2047	25	54,388
2052	30	60,371
2057	35	67,012
2062	**40**	**74,383**
2067	45	82,565
2072	50	91,647
2077	**55**	**101,729**

*From Federal 2021 Census

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The short-term five-year horizon represents the “opening day” scenario for the Multiuse Recreational and Event Facility, while the long-term 55-year will be used to confirm the ultimate 40 Avenue configuration from the Functional Study.

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2.0 Existing Conditions

2.1 Existing Land Use

The plan area is currently zoned as Urban Transition (UT). Based on the current City's Land Use Bylaws, this district allows for limited agricultural and rural land use activities as the lands await urban development and utility servicing. The lands are currently used for agriculture. The existing land use is shown in Exhibit 2.1.

2.2 Existing Transportation Network

The existing transportation network adjacent to the plan area is shown in Exhibit 2.2 and discussed in the following sections.

2.2.1 Existing Roadway Network

The existing roadway network in the southeast corner of the City is described below:

- **44 Street** is a four-lane divided highway, going east and west from 40 Avenue to the Canadian Pacific Railway ROW and industrial development to the east.
- **40 Avenue** is a two-lane Arterial road, going north and south from 44 Street to the City boundary and agricultural development to the south.
- **41 Street** is a rural/undeveloped two-lane local road going east and west from 40 Avenue to the Canadian Pacific Railway ROW and industrial development to the east.
- **37 Avenue** is a two-lane local road going north and south from 44 Street to 41 Street.
- **36 Street** is a two-lane collector road, going east and west from 40 Avenue to the Canadian Pacific Railway ROW and industrial development to the east.
- **31 Street** is a two-lane local road going east and west, west of the plan area.

2.2.2 Current Mobility

Sidewalks and Trails

There are currently no sidewalks or trails within or adjacent to the plan area. Nearby facilities include a multi-use path on the north side of 36 Street terminating at 40 Avenue, and sidewalks within the residential neighbourhoods to the west.

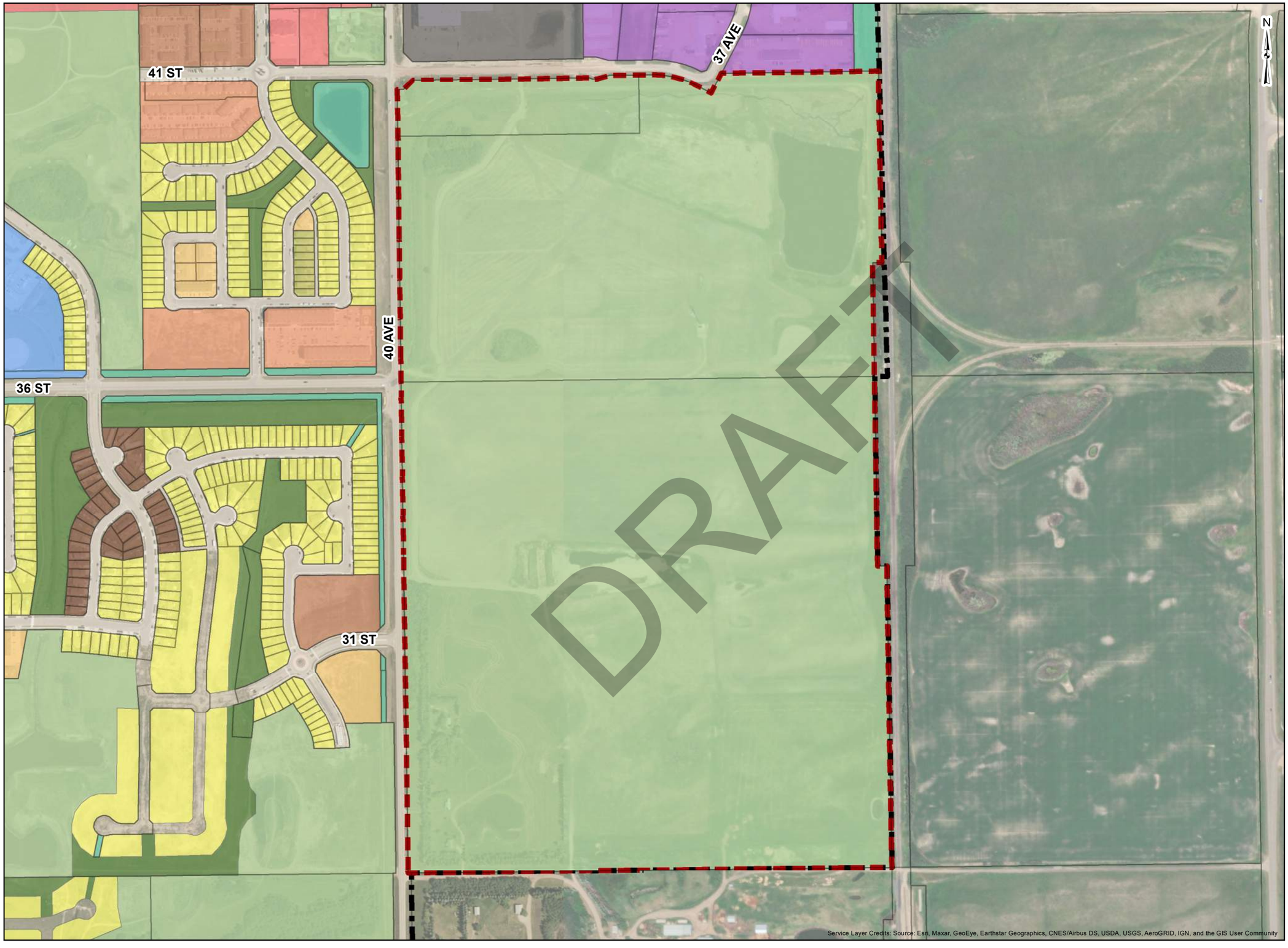
Transit

The City does not currently provide public transit.

Rail

Canadian Pacific's single track freight rail line and ROW forms the eastern boundary of the plan area. The track is part of the Lloydminster subdivision with an average of two trains daily based on the most current data from the publicly available Grade Crossing Inventory. Spurs off the main track service industrial businesses to the east. There is currently a grade-separated crossing at 44 Street and an at-grade crossing with passive protection at the southeastern boundary of the plan area.

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Legend

Land Use District

- Single-Detached Residential
- Semi-Detached Residential
- Row House Residential
- Medium Density Residential
- High Density Residential
- Residential Manufactured Home
- Central Commercial
- Highway Corridor Commercial
- Neighbourhood Commercial
- Service Commercial
- Light Industrial
- Medium Industrial
- Public Services
- Public Utility
- Urban Park
- Urban Transition
- Direct Control
- ASP Boundary
- City Boundary

0 75 150 300 Meters

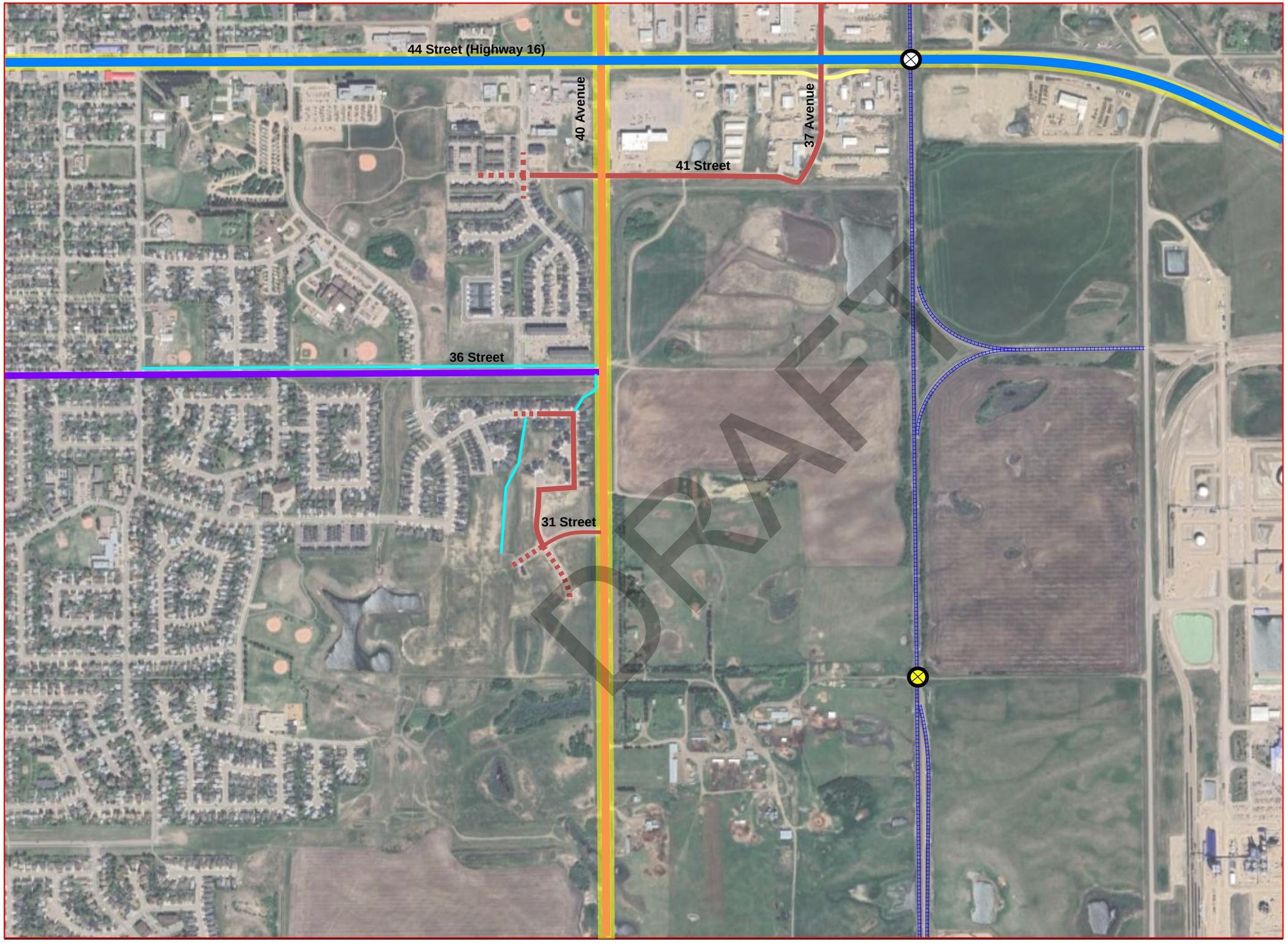
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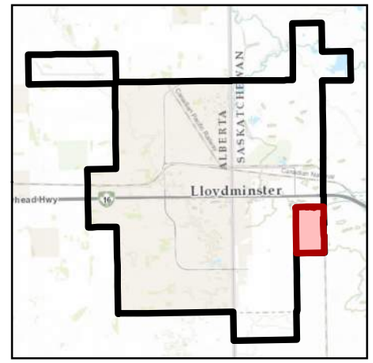
EXHIBIT 2.1
EXISTING LAND USE
WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

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Legend

- Primary Highway Connector
- Arterial Road
- Collector Road
- Local Road
- Continuation of Road
- Multi-use Path
- Dangerous Goods and Truck Route
- Rail (CP)
- Rail Crossing (at grade)
- Rail Crossing (Grade Separated)

EXHIBIT 2.2
EXISTING TRANSPORTATION NETWORK
WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

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2.2.3 Dangerous Goods and Truck Routes

44 Street and 40 Avenue are designated Dangerous Goods and Truck Routes. The plan area is currently designated a Truck Route Area, which means that all roads within the area are designated truck routes.

2.3 Adjacent Land Uses

Land uses adjacent to the plan area are as follows:

- North: Gold Horse Casino is located directly north of the plan area. The remaining lands to the north are classified as medium industrial (I1) and light industrial (I2) based on the City's current Land Use map.
- East: Most of the lands are being used by Husky Energy Upgrader for industrial operations. These lands are outside of the City's current boundary.
- South: These lands are outside of the City's current boundary and currently being used for agriculture.
- West: These lands are part of the Larson Grove, Aurora, Wallicefield, and The Willows ASPs. Larson Grove is mostly developed. Aurora appears to be approximately 75% developed while Wallicefield is approximately 50% developed. The Willows remains undeveloped. The undeveloped areas are all adjacent to 40 Avenue. The current land use designations for the western lands include:
  - Residential (R1, R2, R3, R4, R5),
  - Commercial (C2, C3, C5),
  - Public Service (P3), and
  - Urban Transition (UT).

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3.0 Proposed Development

3.1 Future Adjacent Land Uses

Future development is mostly planned east of the plan area in the Larson Grove, Aurora, Wallicefield, and The Willows neighbourhoods. The current ASPs indicate these lands are intended for residential neighbourhoods with some commercial and institutional areas.

3.2 Proposed Land Uses

The proposed land uses in the Wigfield ASP update is provided in Exhibit 3.1. The ASP includes two distinct areas:

- The Multiuse Recreational and Event Facility site forms the northern portion of the plan area bounded by 36 Street. Proposed land uses include:
  - Commercial along 40 Avenue,
  - Event Centre,
  - Camping,
  - Sports Fields, and
  - Stormwater Management.
- The Residential Neighbourhood is considered the lands south of 36 Street for the purpose of this TIA. Proposed land uses include:
  - Commercial along 36 Street,
  - Low-density residential,
  - Multi-Family residential, and
  - Stormwater Management.

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3.3 Proposed Roadway Network

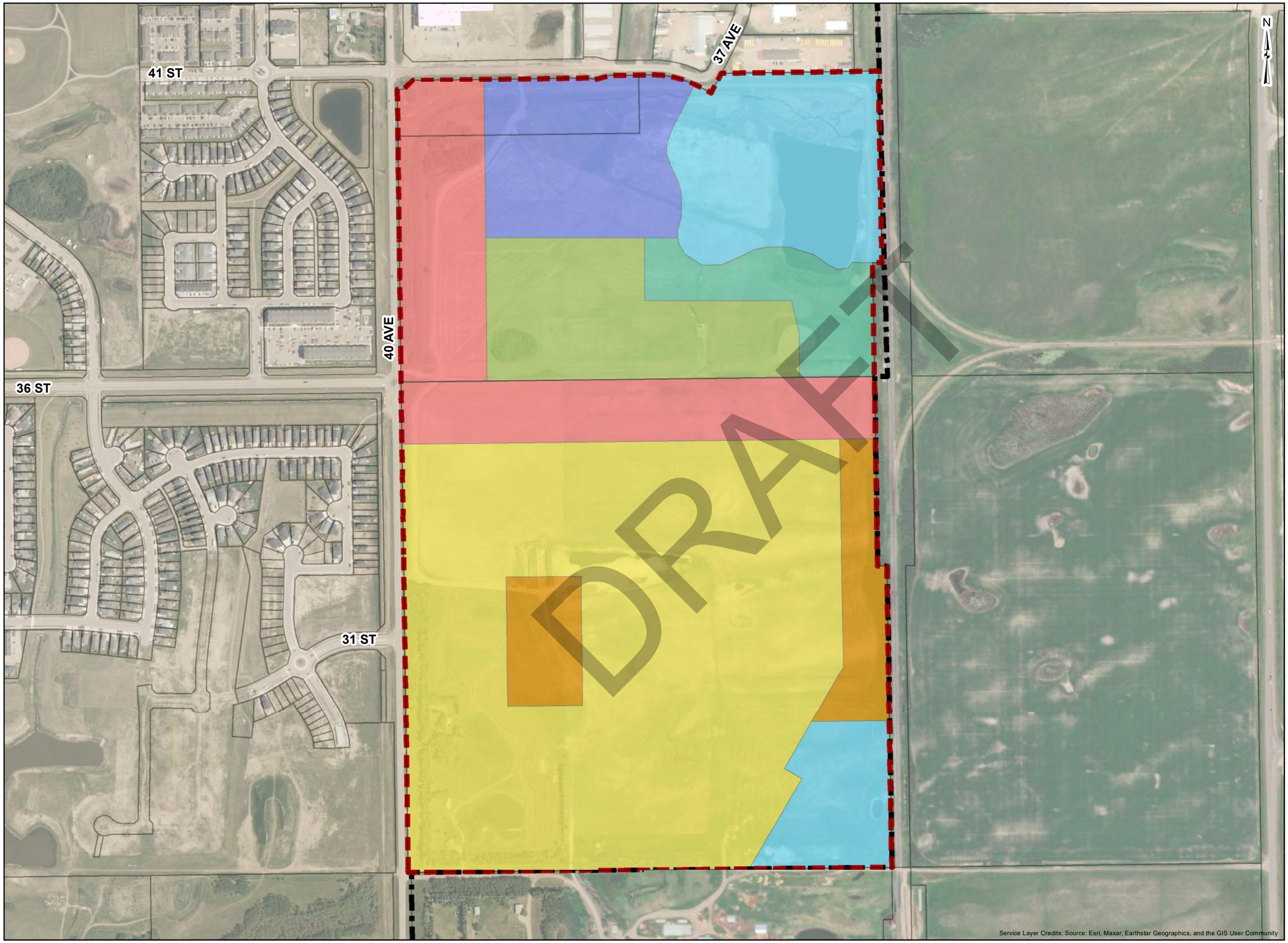
The proposed roadway network is similar to the previous Wigfield ASP completed in 2014 with accesses at the same locations: 36 Street and 31 Street. Unlike the previous ASP, the two roads extend east into the plan area and join making a loop. The Multiuse Recreational and Event Facility area is accessed off 41 Street and 36 Street. No new access on 40 Avenue is proposed.

The proposed roadway network is provided in Exhibit 3.2.

3.4 Proposed Active Modes Network

A highly connected active network is proposed for the plan area. This reflects the change in land use from industrial to residential. Key features include:

- Trails or green space around the entire plan area,
- Trails or green space crossing the plan area east-west and north-south,
- High quality, high visibility crosswalks on 40 Avenue connecting planned trails to the rest of the City's active mode network.
- Several active mode connections to the Multiuse Recreational and Event Facility.



Legend

Proposed Land Use

- Low-Density Residential
- Multi-Family Residential
- Commercial
- Event Centre
- Stormwater Management
- Camping
- Sports Fields
- ASP Boundary
- City Boundary

0 75 150 300 Meters

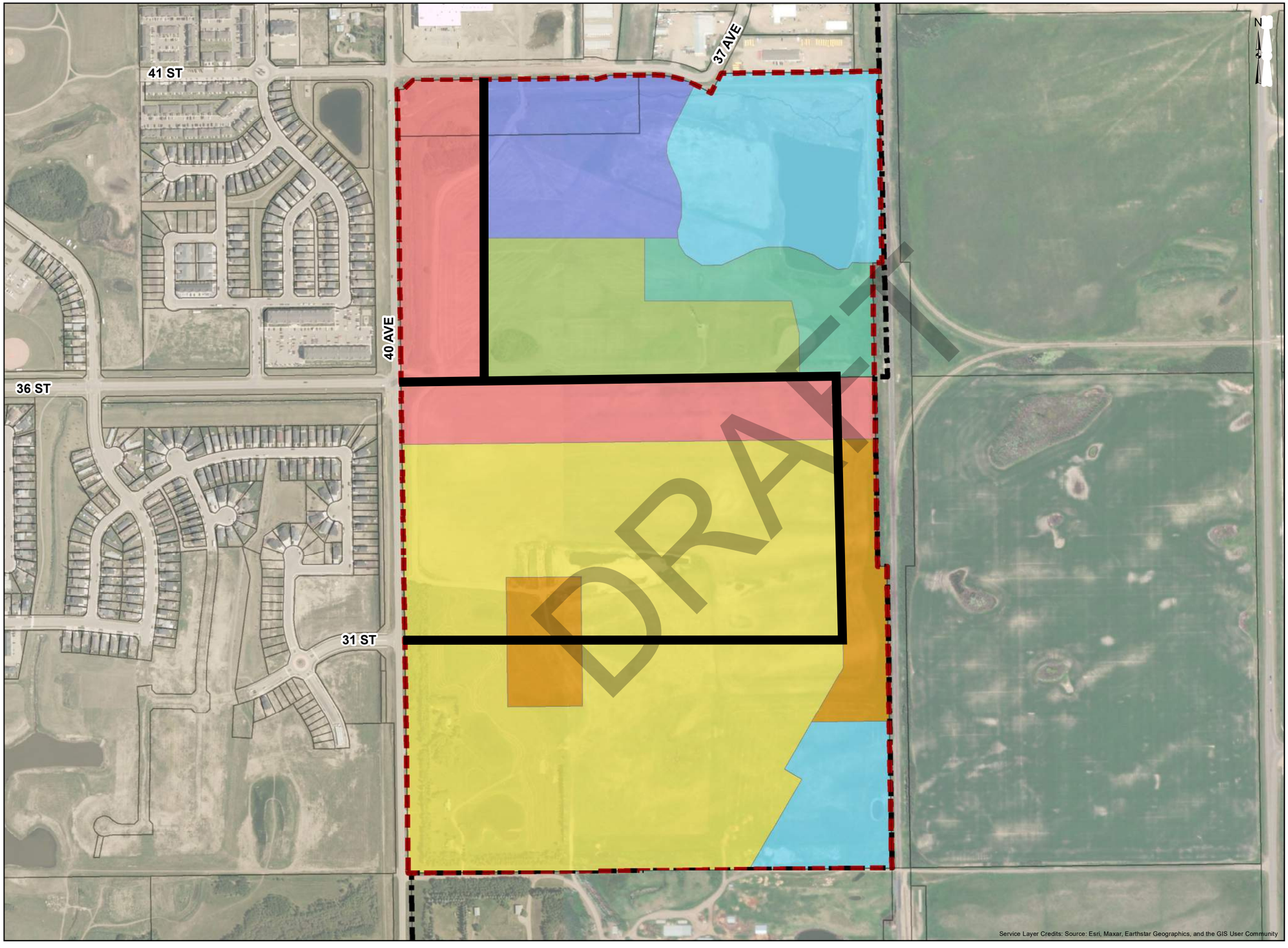
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EXHIBIT 3.1
PROPOSED LAND USE
WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

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Legend

Proposed Land Use

- Low-Density Residential
- Multi-Family Residential
- Commercial
- Event Centre
- Stormwater Management
- Camping
- Sports Fields
- ASP Boundary
- City Boundary
- Proposed Roadway Network

0 75 150 300 Meters

1:6,000 NAD 1983 UTM Zone 12N

EXHIBIT 3.2
PROPOSED ROADWAY NETWORK
WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

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Date: 2022-07-21 Document: Q:\Projects\28059_WigfieldASP\25_GIS\251_Figures\1_Servicing\28059_Figure_2.6_Pr_Land_Use.mxd

3.5 Study Intersections and Zones

The following intersections were identified as key to the Wigfield ASP's transportation network and will be included in the traffic analysis:

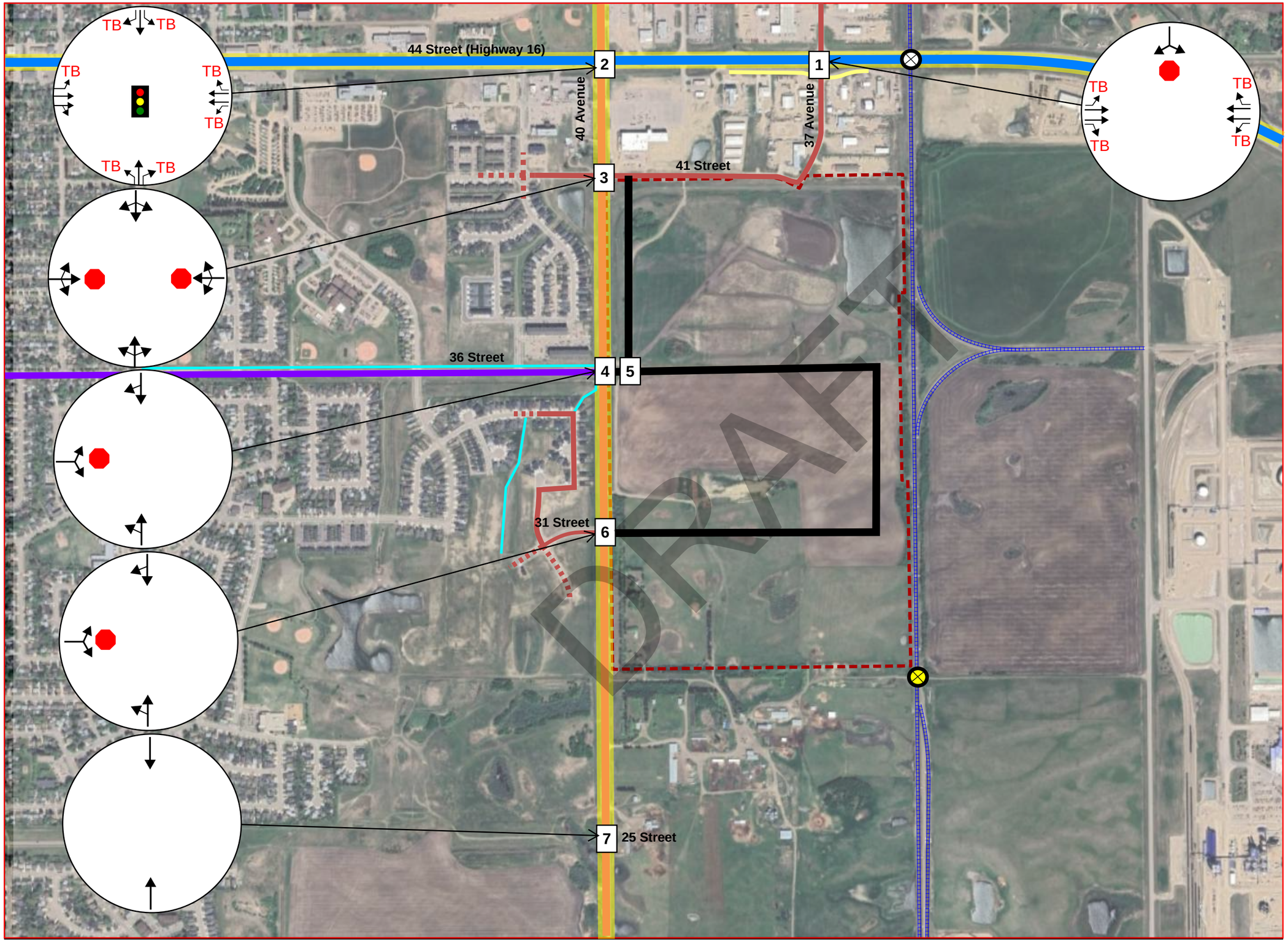
- **Intersection #1:** 44 Street (Highway 16) and 37 Avenue
- **Intersection #2:** 44 Street (Highway 16) and 40 Avenue
- **Intersection #3:** 40 Avenue and 41 Street
- **Intersection #4:** 40 Avenue and 36 Street
- **Intersection #5:** 36 Street and Multiuse Recreational and Event Facility site access (future)
- **Intersection #6:** 40 Avenue and 31 Street
- **Intersection #7:** 40 Avenue and 25 Street (future)

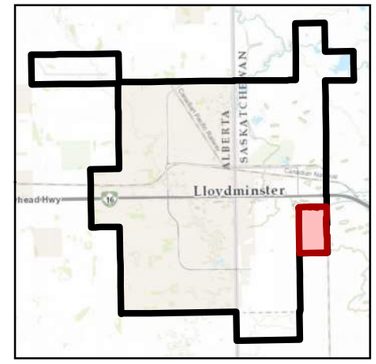
The study intersections and current geometric configuration are shown in Exhibit 3.4.

The Wigfield ASP area was divided into three zones to simplify calculations and site generated traffic discussions. The zones are shown in Exhibit 3.5 and summarized as:

- Arena: The Multiuse Recreational and Event Facility site lands.
- Zone 1: The northern residential neighbourhood area. Trips to and from this zone are assumed to primarily use 36 Street. This includes the commercial area, northern multi-family site, and a small portion of single-family homes.
- Zone 2: The southern residential neighbourhood area. Trips to and from this zone are assumed to primarily use 31 Street. This includes most of the single family and multi-family areas.

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Legend

- Primary Highway Connector
- Arterial Road
- Collector Road
- Local Road
- Continuation of Road
- Multi-use Path
- Dangerous Goods and Truck Route
- Rail (CP)
- Rail Crossing (at grade)
- Rail Crossing (Grade Separated)

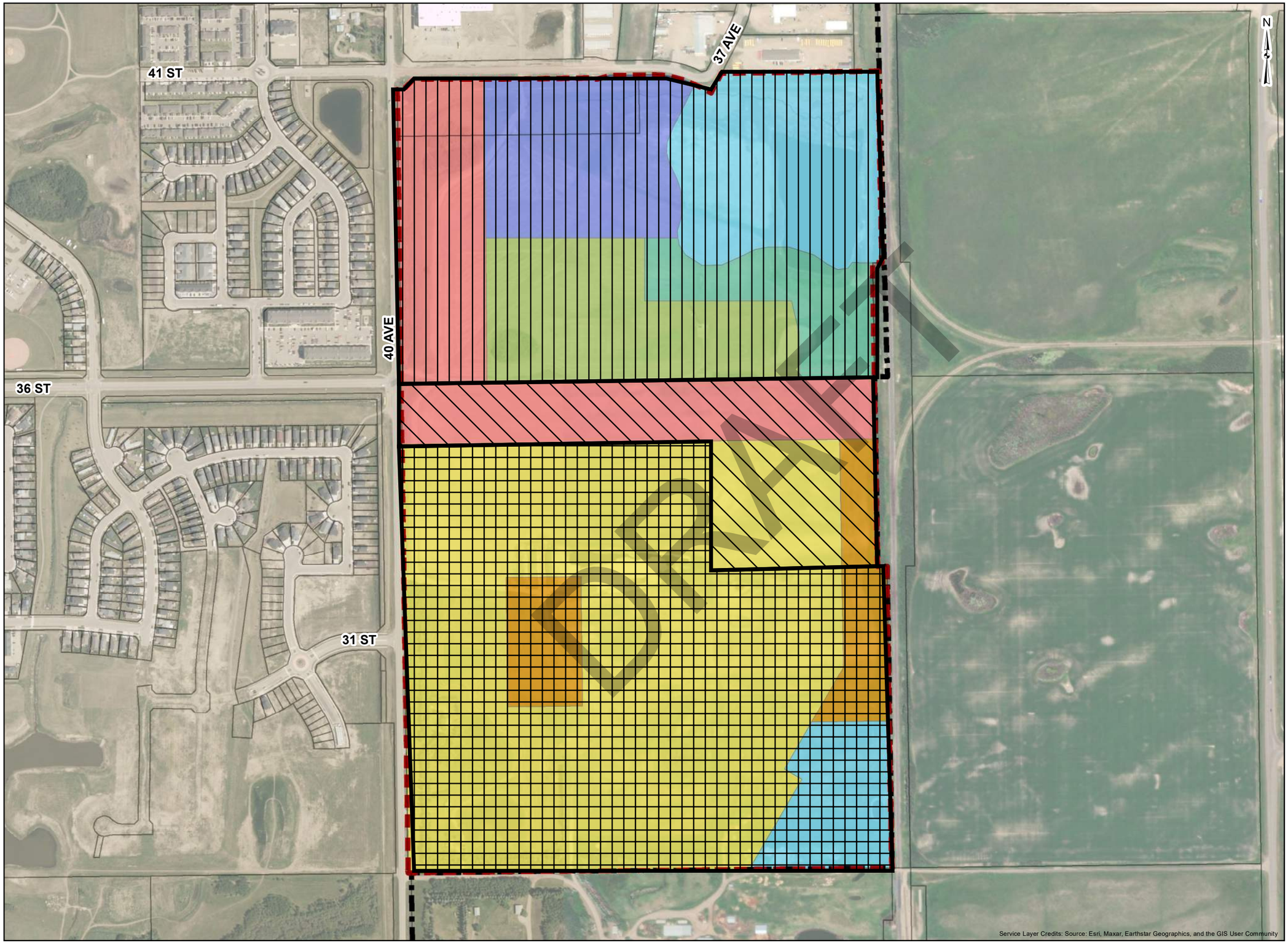
EXHIBIT 3.3
STUDY INTERSECTIOND, EXISTING GEOMETRIC & TRAFFIC CONTROL
WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

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Legend

Proposed Land Use

- Low-Density Residential
- Multi-Family Residential
- Commercial
- Event Centre
- Stormwater Management
- Camping
- Sports Fields
- ASP Boundary
- City Boundary
- Arena Zone
- Neighbourhood Zone 1
- Neighbourhood Zone 2

0 75 150 300 Meters

1:6,000 NAD 1983 UTM Zone 12N

EXHIBIT 3.4
TRAFFIC ANALYSIS ZONES
WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

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4.0 Traffic Volumes

4.1 Existing Traffic Volumes

The existing traffic volumes are based on traffic counts provided by the City. The existing traffic is shown in Exhibit 4.1 and the traffic counts are provided in Appendix A.

4.2 Background Traffic Volumes

The background traffic volumes are based on different sources for the two Scenarios:

- **Opening Day (35,000 population):** a 2.2 percent linear yearly growth rate was applied to through movements on 40 Avenue and 44 Street. This represents expected increases in traffic from the City's and County's growth over five years. Turning movements were not increased. It is assumed that increases in turning movement volume from development will be minimal for the opening day scenario.
- **Ultimate (100,000 population):** 2070 total traffic volumes from the 40 Avenue Functional Study were used as the basis for the background traffic volumes. The Functional Study volumes include traffic from adjacent development as well as the casino area. At the time, the Wigfield ASP lands were designated for industrial uses. The ultimate background traffic volumes were calculated by subtracting the traffic entering the Wigfield ASP area from the Functional Study 2070 total traffic volumes.
  - Some adjacent land uses may have been modified since the Functional Study in 2015; however, more recent traffic projections were not available at the time of this TIA.

The background traffic volumes for the Opening Day and Ultimate scenarios are provided in Exhibits 4.2 and 4.3.

4.3 Site Generated Traffic Volumes

The site generated traffic is calculated using the proposed land use for the Wigfield ASP. Each land use has an anticipated trip generation rate that is used to create an estimate of the site generated traffic. The Institute of Transportation (ITE) Engineers Trip Generation Manual (11th Edition) is the main source for this study's trip generation rates. Engineering judgement supplements the ITE manual where needed.

The components of the site generated traffic for the two scenarios are as follows:

- **Opening Day:** This scenario only includes traffic generated by the Multiuse Recreational and Event Facility site. No development is assumed for the residential neighbourhood.
- **Ultimate:** This scenario includes site generated traffic from the Multiuse Recreational and Event Facility site and the residential neighbourhood.

The site generated traffic for the Opening Day and Ultimate scenarios are shown in Exhibit 4.4 and 4.5.

The Multiuse Recreational and Event Facility site land use is based on the most recent concept plan available at the time of this study. This includes:

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- Multiuse Recreational and Event Facility – two indoor skating rinks with potential to convert the rinks into event areas. The current plan includes 2440 seats on the event side, 3500 seats on the event side with floor seating, and 500 seats on the community side.
- Six Slo-Pitch diamonds.
- Six commercial (CRU) parcels – Specific businesses have not been confirmed at the time of this TIA. Likely businesses include drive thru, bank, retail, convenience, and restaurant. Expression of interest has been received for a sports equipment store, physiotherapy, and liquor store.
- Recreational Vehicle Park – 40 powered stalls, 16 unpowered.
- One hotel with approximately 100 rooms.

4.3.1 Trip Generation Rates

Trip generation rates are used to estimate the number of trips a lane use will produce. Most of the trip rates used for this TIA are from the 11th Edition Trip Generation Manual produced by ITE, an international association of transportation professionals. The following trip generation rates and assumptions were used for this TIA:

- **Multiuse Recreational and Event Facility site:**
  - **Commercial:** The ITE 820 Shopping Centre trip rate is often used when retail types are not defined, however the potential businesses listed are anticipated to generate traffic at much higher rates than ITE's 820 Shopping Centre. The following retail types are assumed:
    - **Sporting Goods Superstore**: ITE trip rate 861.
    - **High-Turnover (Sit-Down) Restaurant**: ITE trip rate 932. The ITE Trip Generation Manual defines this type of restaurant is usually moderately priced and often belongs to a restaurant chain.
    - **Fast-Food Restaurant with Drive-Through Window**: ITE trip rate 934.
    - **Strip Retail Plaza**: ITE trip rate 822. This land use is like the ITE 820 shopping centre but for retail area with less than 40,000 ft^2 of gross floor area.
  - **Multiuse Recreational and Event Facility:**
    - **Typical use:** The ITE 465 Ice Skating Rink. This represents the typical use of the arena for iced skating rinks. The trip rate is reduced to fifteen percent (15%) to represent the anticipated usage outside of the hockey season. This reduction is based on data from the City's other facilities. The ITE Trip Generation Manual does not include trip rates for the AM peak hour. It is assumed that the AM peak hour usage will be like the slo-pitch rate, approximately one eighth of the PM peak hour rate.
    - **Event Scenario**: Trips are correlated with the seating capacity.
  - **Slo-Pitch**: the ITE Trip Generation Manual a trip rate for an outdoor soccer complex (488). For this report, baseball diamonds are assumed to generate the same trips as a soccer field.
  - **Recreational Vehicle Park:** ITE trip rate 416.
  - **Hotel**: ITE trip rate 310.
- **Residential Neighbourhood**:
  - **Residential:** ITE trip rate 210 Single Family Detached.
  - **Multi-Family:** ITE trip rate 215 Single Family Attached. This trip generation rate is used for any single-family housing that shares a wall with an adjoining unit. This can include duplexes and townhouses/rowhouses.

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- **Commercial:**
  - **Shopping Centre:** ITE trip rate 820. The ITE Trip Generation Manual defines a shopping centre as having more than 150,000 ft^2 gross floor area. The three largest commercial areas are close to or greater than this threshold.
  - **Shopping Plaza:** ITE trip rate 821. The ITE Trip Generation Manual defines a shopping centre as having between 40,000 and 150,000 ft^2 gross floor area. This land use typically includes a supermarket but could alternatively include home improvement, discount, or other stores.

The trip generation rates are summarized in the table below.

Table 4.1: IASP Trip Generation Rates and Sources

Land Use	Unit	AM			PM			Source
		Rate	In	Out	Rate	In	Out	
Liquor Store	1000 ft^2 GFA	2.08	51%	49%	17	50%	50%	ITE 899
Sporting Goods Superstore	1000 ft^2 GFA	2.05	52%	48%	2.58	46%	54%	ITE 861
High-Turnover (Sit-Down) Restaurant	1000 ft^2 GFA	13.7	57%	43%	16.35	51%	49%	ITE 932
Fast-Food Restaurant with Drive-Through Window	1000 ft^2 GFA	50.57	52%	48%	50.94	51%	49%	ITE 934
Strip Retail Plaza	1000 ft^2 GFA	7.6	50%	50%	13.24	54%	46%	ITE 822
Ice Skating Rink	Rinks	1.04	50%	50%	8.30	62%	38%	ITE 465
Slo Pitch Diamond	Diamonds	1.77	53%	47%	16.9	47%	53%	ITE 488
Campground/Recreational Vehicle Park	Occupied Campsites	0.25	36%	64%	0.41	62%	38%	ITE 416
Hotel	Rooms	0.53	53%	47%	0.6	58%	42%	ITE 310
Single Family Detached Housing	Dwelling Units	0.75	26%	74%	0.99	64%	36%	ITE 210
Single-Family Attached Housing	Dwelling Units	0.55	25%	75%	0.61	62%	38%	ITE 215
Shopping Centre	1000 ft^2 GFA	0.94	62%	38%	3.81	48%	52%	ITE 820
Shopping Plaza	1000 ft^2 GFA	7.06	52%	48%	9.72	49%	51%	ITE 821

GFA = Gross Floor Area

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4.3.2 Gross Site Generated Traffic Volume Estimate

A total of 1,067 trips per AM peak hour (in and out) are estimated, with 475 trips inbound and 592 trips outbound. A total of 1,814 trips per PM peak hour (in and out) are estimated, with 977 trips inbound and 837 trips outbound.

The estimated gross site generate traffic by zone is summarized in the table below.

Table 4.2: Gross Trips Generated

Zone	Land Use	AM			PM		
		In	Out	Total	In	Out	Total
Arena	Liquor Store	7	7	14	60	60	120
	Sporting Goods Superstore	7	7	14	8	10	18

Zone	Land Use	AM			PM		
		In	Out	Total	In	Out	Total
	High-Turnover (Sit-Down) Restaurant	55	41	96	58	56	114
	Fast-Food Restaurant with Drive-Through Window	131	121	252	130	125	255
	Strip Retail Plaza	53	53	106	100	85	185
	Ice Skating Rink	1	1	2	10	6	16
	Slo Pitch Diamond	6	5	11	48	54	102
	Campground/Recreational Vehicle Park	5	9	14	14	9	23
	Hotel	28	25	53	35	25	60
1	Single Family Detached Housing	10	27	37	31	17	48
	Single-Family Attached Housing	2	7	9	7	4	11
	Shopping Centre	59	36	95	185	200	385
	Shopping Plaza	33	30	63	43	45	88
2	Single Family Detached Housing	67	190	257	217	122	339
	Single-Family Attached Housing	11	33	44	31	19	50
Total		**475**	**592**	**1067**	**977**	**837**	**1814**

4.3.3 Pass-by

A proportion of the commercial trips generated are assumed to be “pass-by” trips. This is when a vehicle traveling along a roadway makes a stop at an adjacent commercial area on their way to their ultimate destination.

The amount of pass-by trips are removed from the Opening Day and Ultimate background through traffic on 44 Street and 40 Avenue. These pass by trips are then manually assigned onto the transportation network to account for vehicles turning into and out of a commercial area during the peak hour. This reduction only applies to commercial land uses.

Pass-by rates from the ITE 11th Edition Trip Generation Manual Pass-By Tables were used. The Pass-by trip adjustment and rates are summarized in the table below.

Table 4.3: Pass-by Trip Adjustment

Zone	Land Use	Pass-by Rate (%)	AM		PM	
			In	Out	In	Out
Arena	Liquor Store	50	4	4	30	30
	Sporting Goods Superstore	40	3	3	3	4
	High-Turnover (Sit-Down) Restaurant	43	24	18	25	24
	Fast-Food Restaurant with Drive-Through Window	55	72	67	72	69

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Zone	Land Use	Pass-by Rate (%)	AM		PM	
			In	Out	In	Out
	Strip Retail Plaza	29	15	15	29	25
1	Shopping Centre	29	17	10	54	58
	Shopping Plaza	40	13	12	17	18

4.3.4 Internal

Internal intersection operations were not assessed for the Wigfield ASP except the Multiuse Recreational and Event Facility access on 36 Street. A ten percent (10%) trip reduction was applied to represent internal trips made by Wigfield ASP residents between Zones 1 and 2. The internal trip reduction is provided in the table below.

Table 4.4: Internal Trip Reduction

Zone	Land Use	AM			PM		
		In	Out	Total	In	Out	Total
1	Single Family Detached Housing	1	3	4	3	2	5
	Single-Family Attached Housing	0	1	1	1	0	1
2	Single Family Detached Housing	7	19	26	22	12	34
	Single-Family Attached Housing	1	3	4	3	2	5

4.3.5 Mode Split

Five percent (5%) of the of vehicle trips were removed to represent the number of trips completed by other modes such as cycling or walking. While most trips are assumed to be by vehicles, it is assumed that a small proportion of residents will walk to work or make purchases in one of the commercial areas. The reduction in vehicle trips to account for the assumed mode split is provided in the table below.

Table 4.5: Mode Split Reduction

Zone	Land Use	AM			PM		
		In	Out	Total	In	Out	Total
Arena	Liquor Store	0	0	0	2	2	3
	Sporting Goods Superstore	0	0	0	0	0	1
	High-Turnover (Sit-Down) Restaurant	2	1	3	2	2	3
	Fast-Food Restaurant with Drive-Through Window	3	3	6	3	3	6
	Strip Retail Plaza	2	2	4	4	3	7
	Ice Skating Rink	0	0	0	1	0	1
	Slo Pitch Diamond	0	0	1	2	3	5
	Campground/Recreational Vehicle Park	0	0	1	1	0	1
	Hotel	1	1	3	2	1	3
1	Single Family Detached Housing	0	1	2	1	1	2

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Zone	Land Use	AM			PM		
		In	Out	Total	In	Out	Total
	Single-Family Attached Housing	0	0	0	0	0	0
	Shopping Centre	2	1	3	7	7	14
	Shopping Plaza	1	1	2	1	1	3
2	Single Family Detached Housing	3	9	12	10	5	15
	Single-Family Attached Housing	0	1	2	1	1	2

A five percent (5%) mode split is a conservative estimate. A higher proportion of active mode trips may occur considering the Multiuse Recreational and Event Facility site and plans for high-quality active mode connections to the area. This may result in lower traffic volumes than what is estimated for the Ultimate scenario.

4.3.6 Net Traffic Volumes

The net site generated traffic volumes were calculated by removing the pass-by, internal, and mode split volumes. The proposed land uses are anticipated to generate 717 trips during the AM peak hour (304 in, 418 out) and 1246 trips during the PM peak hour (682 in, 564 out). The net site generated traffic volumes are provided in the tables below.

Table 4.6: Estimated Net Site Generated Traffic Volumes by Zone

Zone	Land Use	AM Trips			PM Trips		
		In	Out	Total	In	Out	Total
Arena	Liquor Store	4	4	7	28	28	57
	Sporting Goods Superstore	4	4	8	5	6	10
	High-Turnover (Sit-Down) Restaurant	29	22	52	31	30	62
	Fast-Food Restaurant with Drive-Through Window	56	51	107	56	53	109
	Strip Retail Plaza	36	36	71	67	57	124
	Ice Skating Rink	1	1	2	9	6	15
	Slo Pitch Diamond	6	5	10	46	51	97
	Campground/Recreational Vehicle Park	5	9	13	13	9	22
	Hotel	27	24	50	33	24	57
1	Single Family Detached Housing	9	23	31	27	14	41
	Single-Family Attached Housing	2	6	8	6	4	10
	Shopping Centre	40	25	64	124	135	259
	Shopping Plaza	19	17	36	25	26	50
2	Single Family Detached Housing	57	162	219	185	105	290
	Single-Family Attached Housing	10	29	38	27	16	43
Total		**304**	**418**	**717**	**682**	**564**	**1246**

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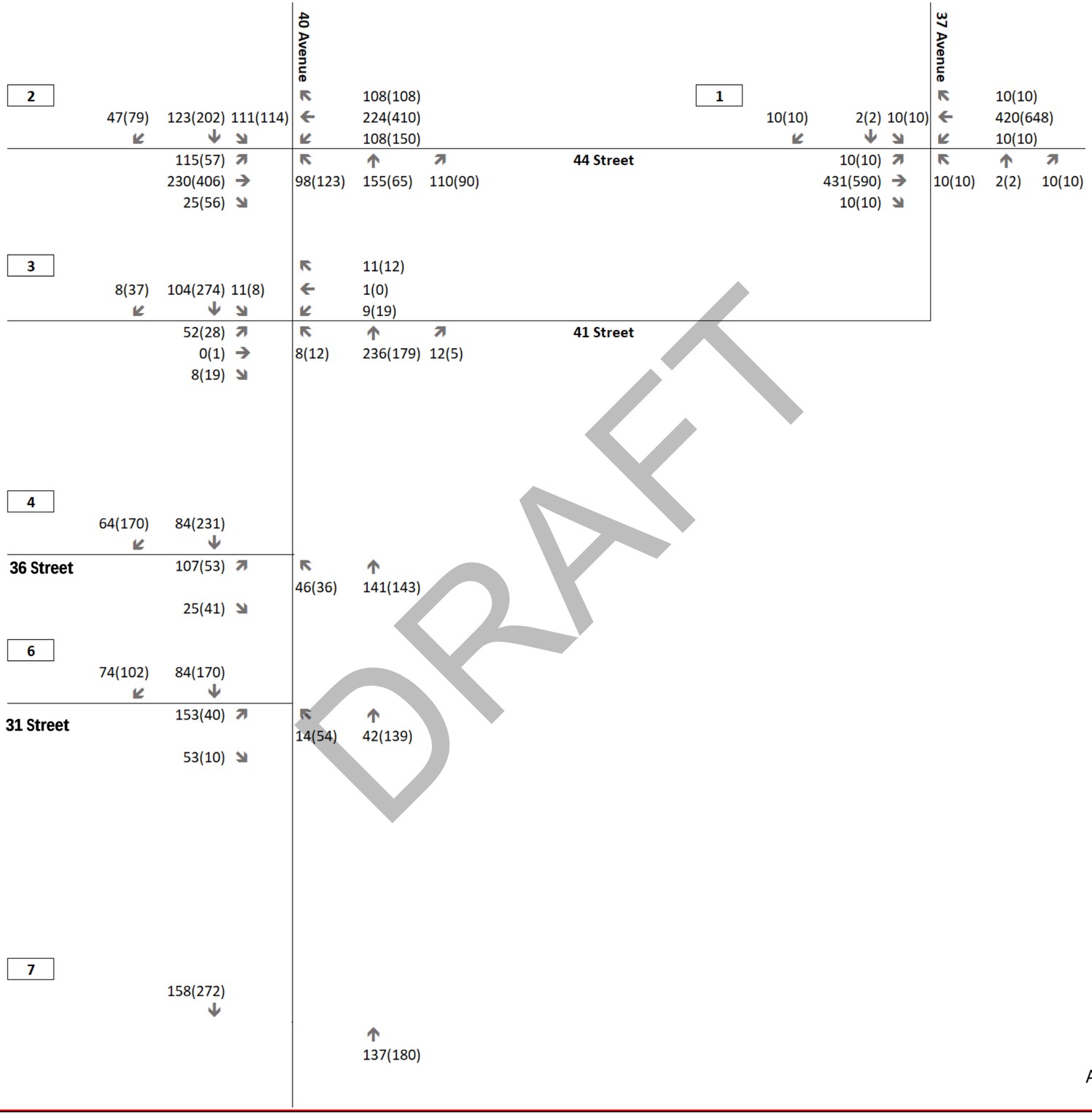
Table 4.7: Estimated Net Site Generated Traffic by Area

Area	AM Trips			PM Trips		
	In	Out	Total	In	Out	Total
Multiuse Recreational and Event Facility	168	156	321	287	265	553
Residential Neighbourhood	137	262	397	395	300	693
Total	**304**	**418**	**717**	**682**	**564**	**1246**

4.4 Opening Day and Ultimate Traffic Volumes

The Opening Day and Ultimate traffic volumes were calculated by adding the respective background and site generated volumes and are provided in Exhibits 4.6 and 4.7.

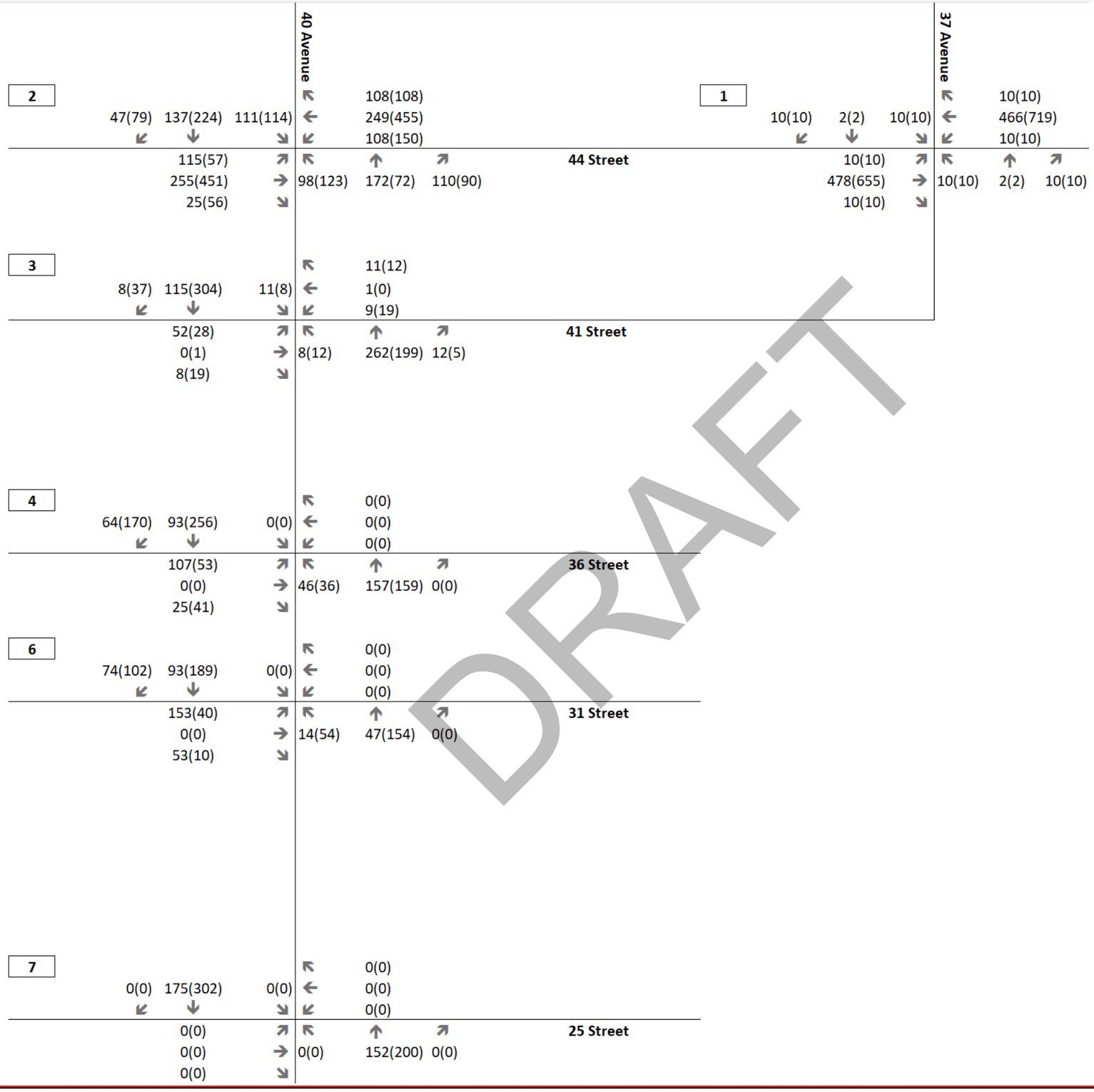
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EXHIBIT 4.1
2022 - BACKGROUND TRAFFIC AM (PM) VOLUMES
WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

Integrated Expertise. Locally Delivered.



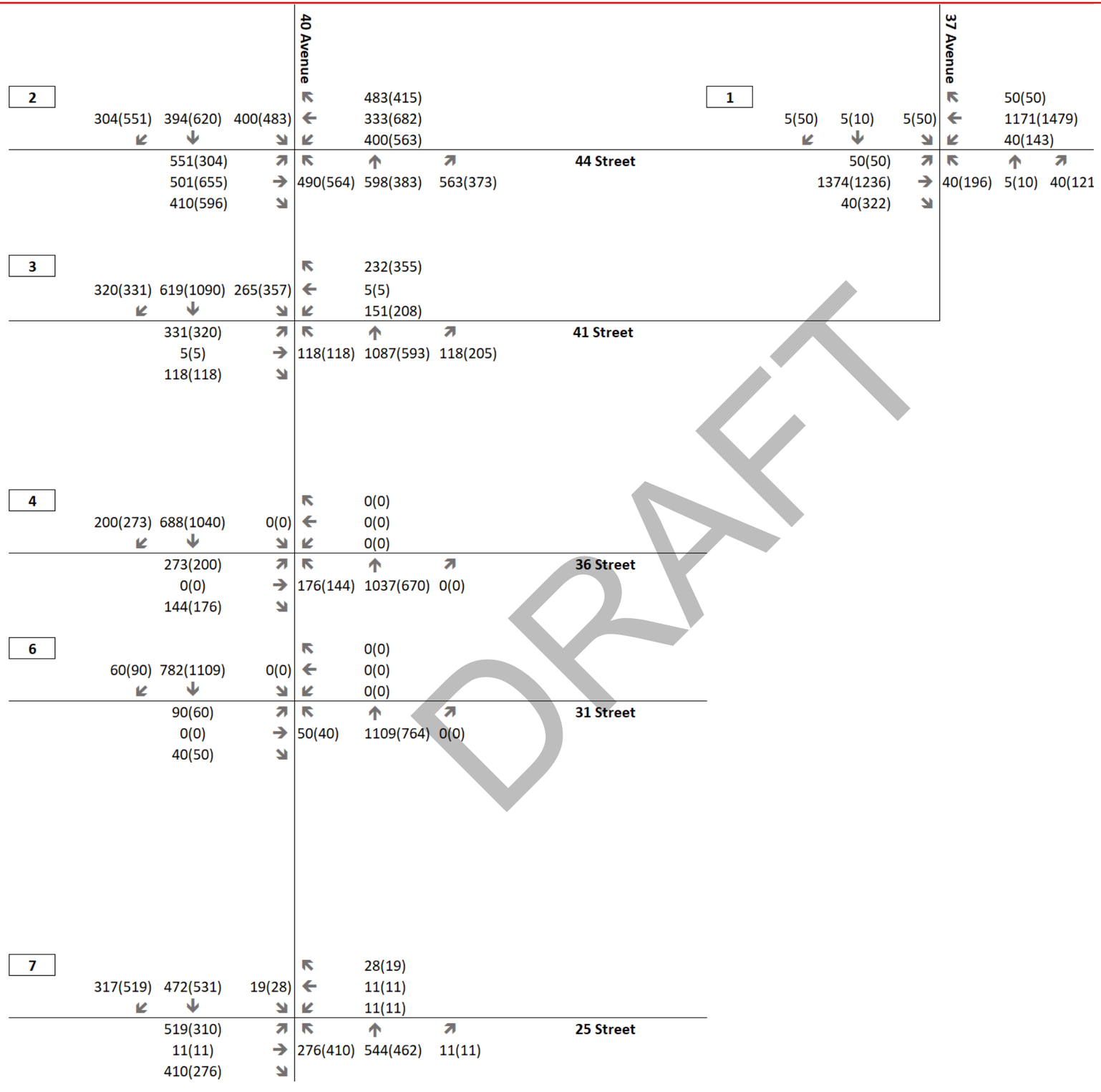
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EXHIBIT 4.2
5 YEAR - OPENING DAY BACKGROUND TRAFFIC VOLUMES

WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

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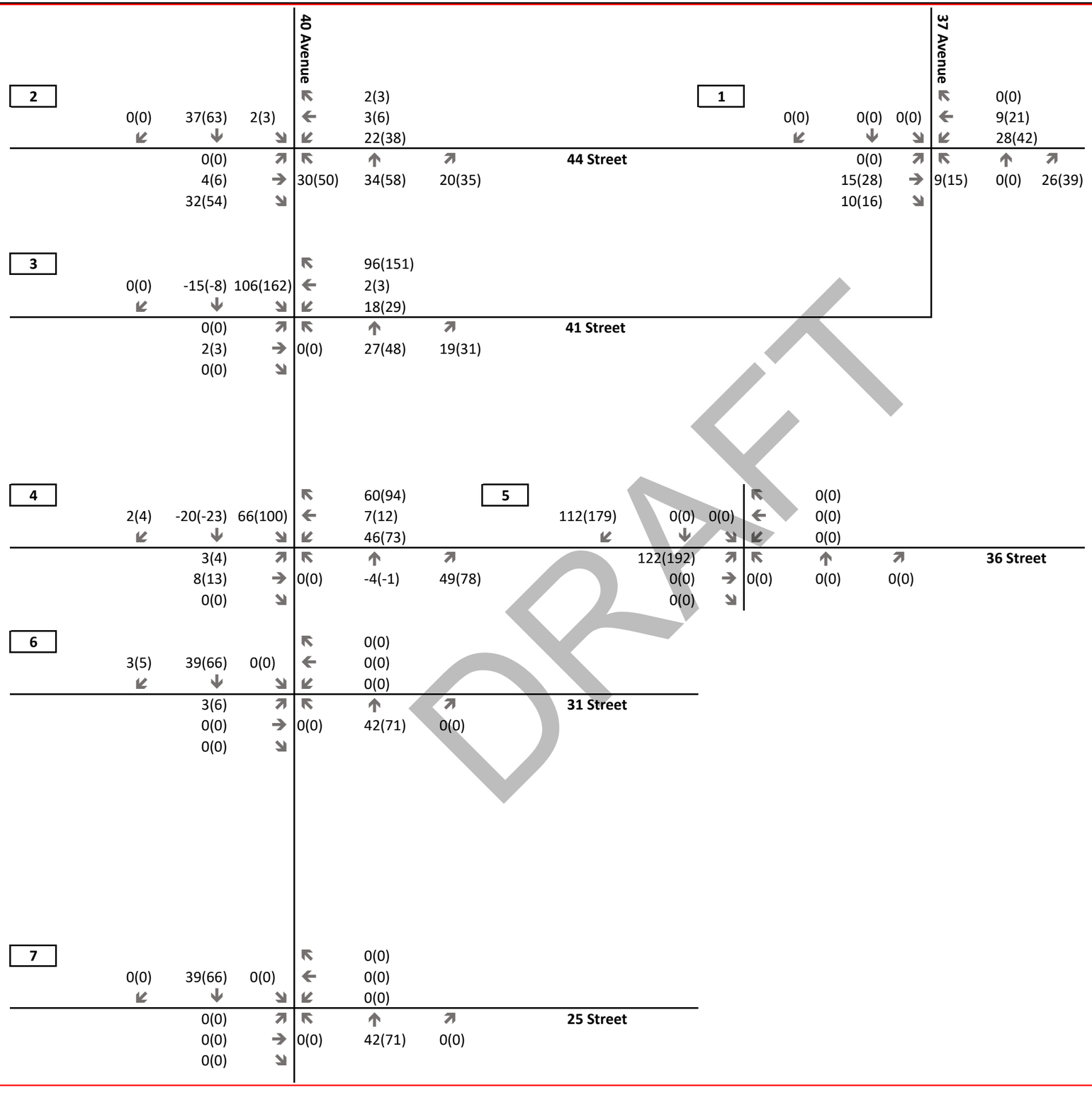
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EXHIBIT 4.3
55 YEAR - ULTIMATE BACKGROUND TRAFFIC VOLUMES

WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

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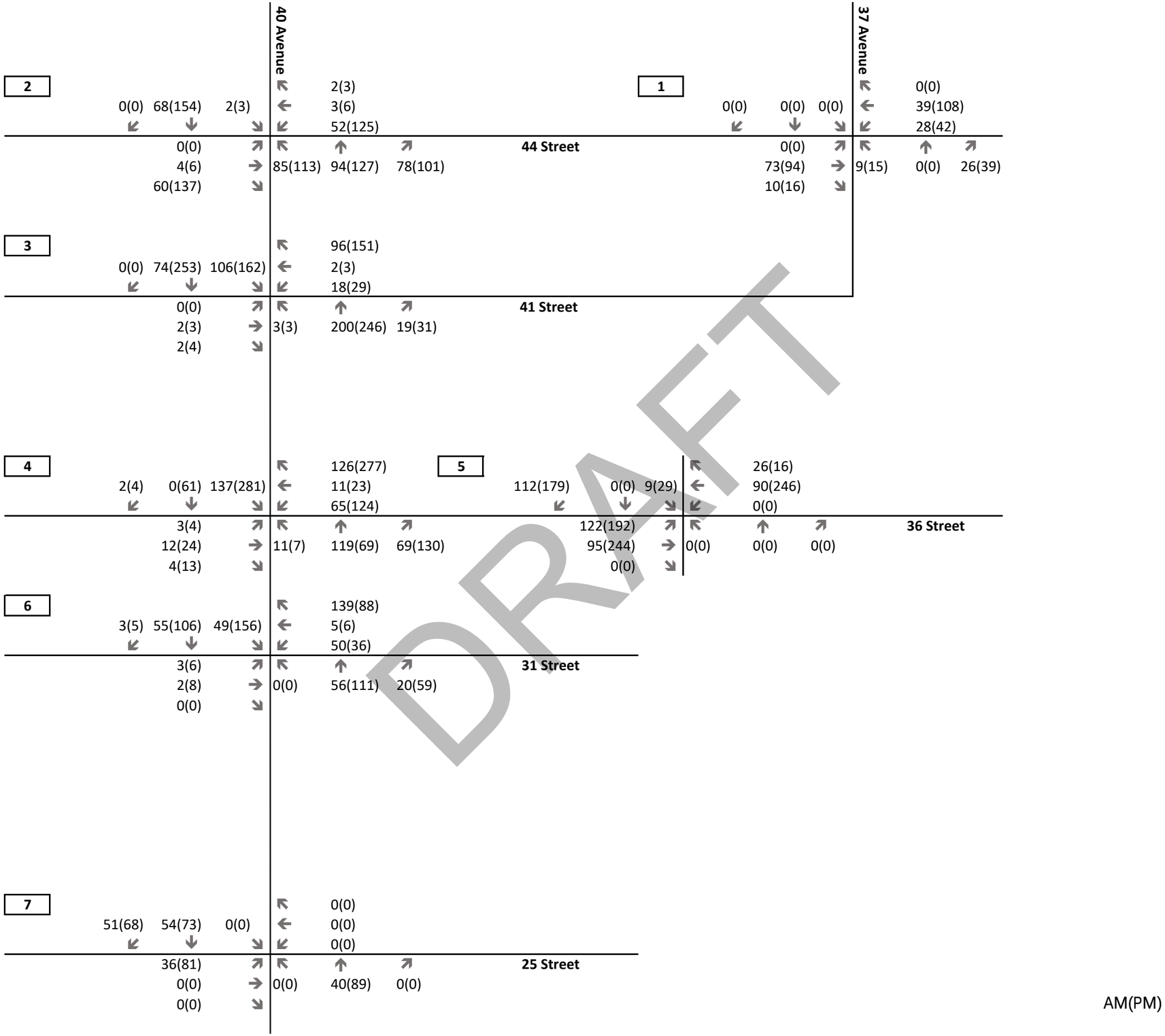
EXHIBIT 4.4
OPENING DAY SITE GENERATED TRAFFIC VOLUMES

WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

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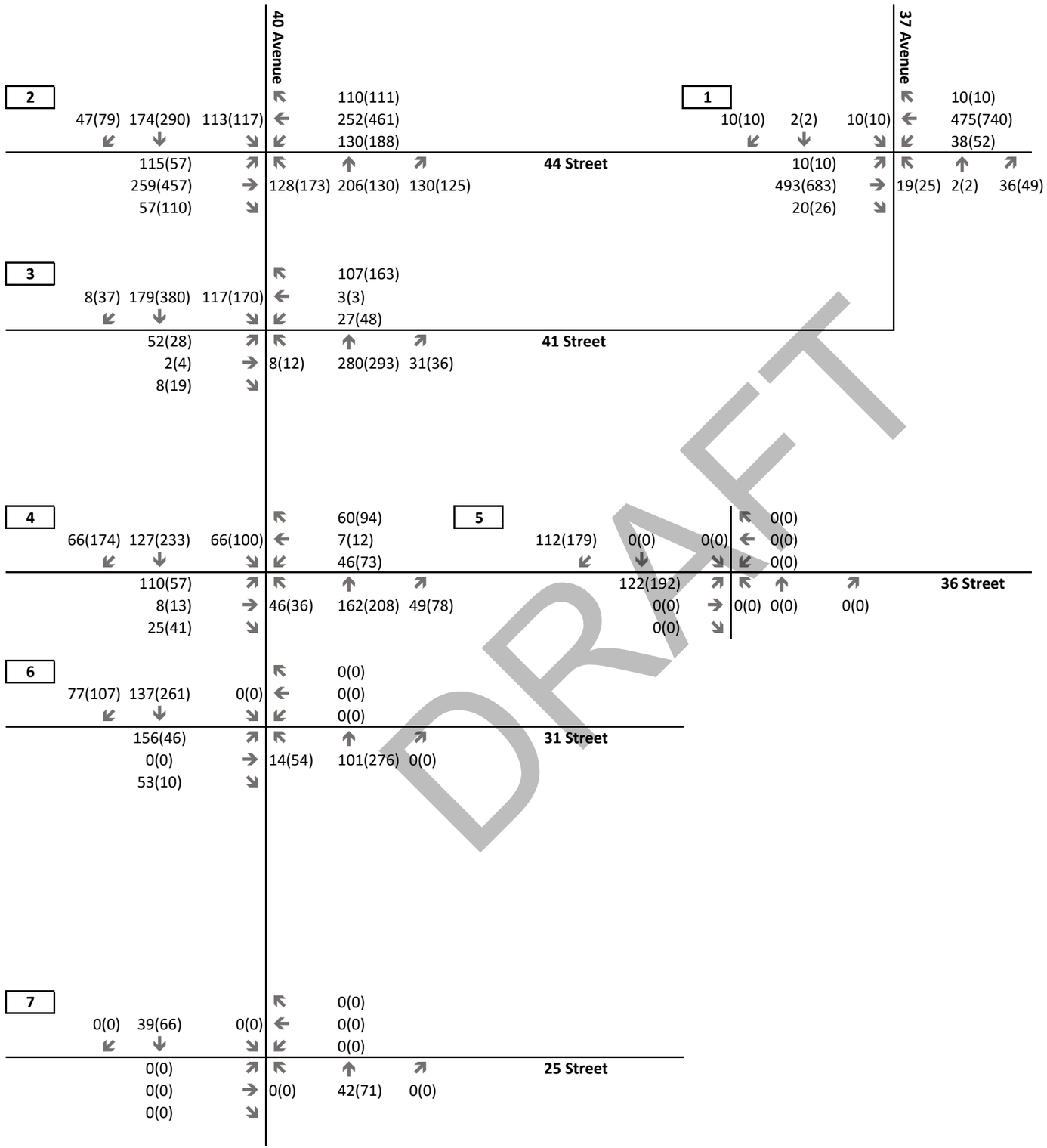
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AM(PM)

EXHIBIT 4.5
ULTIMATE SITE GENERATED VOLUMES

WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

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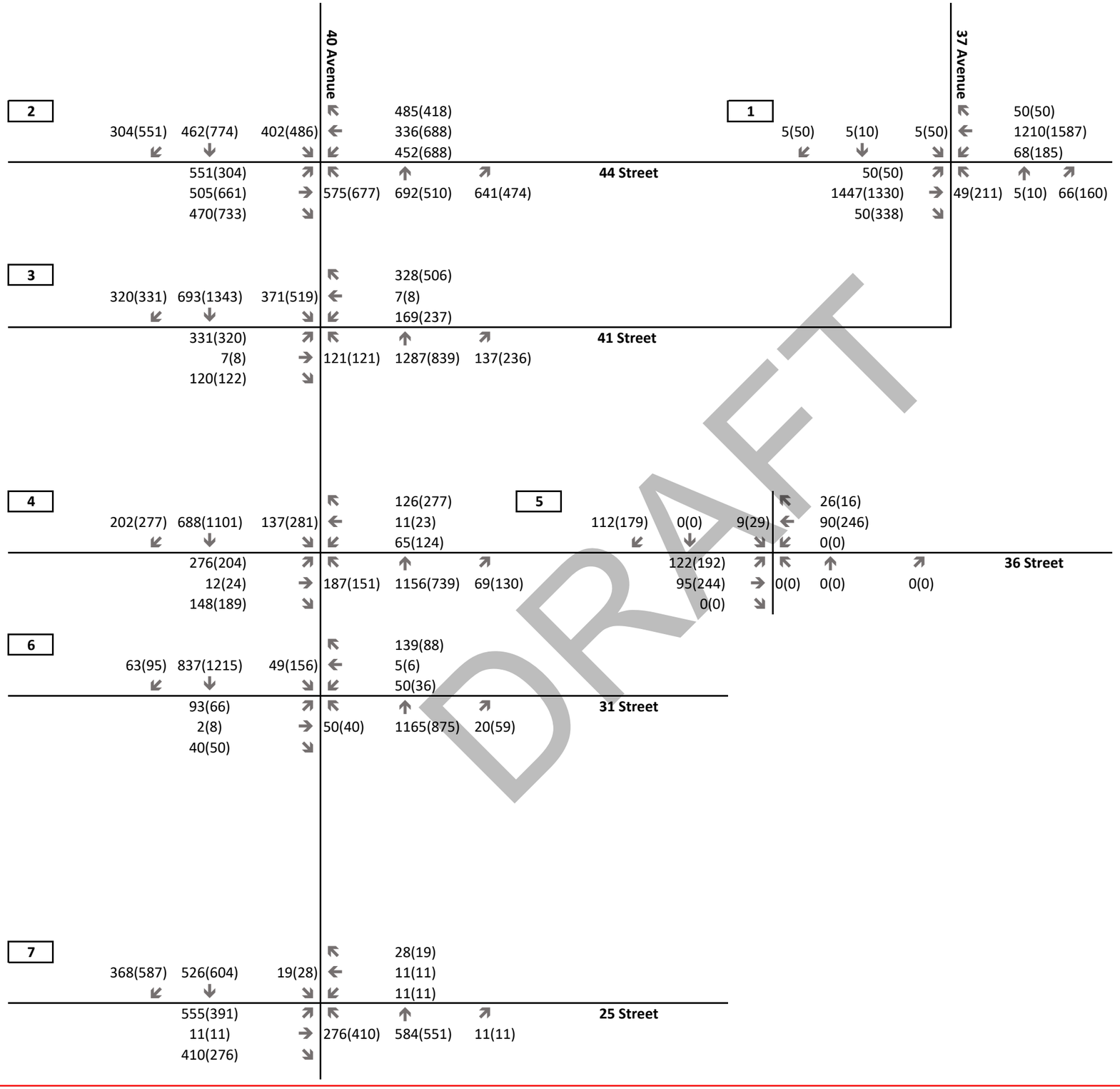
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EXHIBIT 4.6
5 YEAR - OPENING DAY TOTAL TRAFFIC VOLUMES

WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

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EXHIBIT 4.7
55 YEAR - ULTIMATE TOTAL TRAFFIC VOLUMES

WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

ISL

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5.0 Traffic Analysis

5.1 Traffic Analysis Methodology

Operational analyses for signalized and unsignalized intersections were performed using Synchro 9. This software is used to evaluate the performance of intersections on the roadway network using the Highway Capacity Manual (HCM) techniques. Using the HCM methodology, intersection performance is categorized by its "Level of Service", or LOS. There are six levels of service as follows:

- LOS A represents the highest level of service, or generally "free flowing conditions"
- LOS F generally represents a "breakdown" or "gridlock" condition in vehicular flow. At signalized intersections drivers will experience waits of two or more cycles.
- Levels of service B, C, D and E are intermediate levels of performance between each extreme
- LOS D reflects "normal" peak hour congestion, generally accepted criterion for design analysis.
- LOS E reflects an intersection or movement experiencing congestion and high delays. It may be accepted for certain movements only (such as low volume or low v/c ratio movements).

Typically, LOS D or better is the accepted standard for peak hour operations of all movements at an intersection. Table 3 shows average delay per vehicle values that correspond with the six service levels.

Table 5.1: LOS Criteria for Signalized and Unsignalized intersections

	Average Delay Per Vehicle (s)	
LOS	Signalized	Unsignalized
A	< 10	< 10
B	10 – 20	10 – 15
C	20 – 35	15 – 25
D	35 – 55	25 – 35
E	55 – 80	35 – 50
F	> 80	> 50

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In this study LOS is reported for each intersection movement. This allows for an accurate assessment of each movement's delay, as opposed to averaging delays for approaches or the entire intersection, which can mask specific problem movements.

Synchro also calculates each movement's volume to capacity ratio (v/c). A v/c ratio of 1.0 represents an intersection or movement at full capacity with no ability to accommodate additional traffic. Typically, a v/c ratio of 0.9 or lower for all intersection movements is the accepted standard for peak hour operations. Finally, Synchro also calculates the 95th percentile vehicle queue length for each intersection movement. This allows the determination of left and right turn storage requirements. Use of the 95th percentile vehicle queue length criterion is accepted practice for normal peak hour operation; it means that the queue length is exceeded five percent (5%) of the time.

5.2 Assumed Intersection Geometry

The traffic analysis was completed using the intersection geometry and lane numbers from the following sources:

- **Opening Day:** The existing roadway network conditions. The Opening Day analysis assumes that only the Multiuse Recreational and Event Facility has been developed. No development is assumed for the neighbourhood area. As such, 31 Street is assumed to remain a three-legged stop-controlled intersection with no access into the study area.
- **Ultimate:** the recommended 100,000 population horizon concept plan from the 40 Avenue Functional Study. Recommended deviations from the Functional Study geometry based on the traffic analysis, if any, are discussed in Section 5.3. The intersection of 37 Avenue and 44 Street is not included in the 40 Avenue Functional Study. As such, the intersection is modelled based on its current conditions:
  - Eastbound and Westbound: Two through lanes, one left turn bay, one right turn bay.
  - Northbound and Southbound: A shared left/through/right lane.

The Multiuse Recreational and Event Facility access intersections are assumed to be stop control on the northbound and southbound legs a single shared lane for all movements. The recommended roadway network from the 40 Avenue Functional Study for the 35,000 and 100,000 population horizons are provided in Appendix B.

5.3 Traffic Analysis Results

The traffic analysis results are summarized and discussed in the sections below. Detailed Synchro reports of the Opening Dan and Ultimate traffic analysis are provided in the Appendix C.

5.3.1 Opening Day

The Opening Day traffic analysis results indicate that the Multiuse Recreational and Event Facility site is not anticipated to have a significant impact on the adjacent transportation network. All study intersections are expected to operate at an overall intersection LOS of C or better on Opening Day with the following recommended intersection improvements:

- **40 Avenue and 41 Street (3):**
  - Southbound approach: shared through/right lane with a left turn bay with 70 m of storage.
    - Currently a shared right/through/left. While the southbound approach is expected to operate at LOS B, the 95th percentile queue length indicates that PM peak hour southbound queues may spill back into the casino and commercial access to the north. The recommended left turn bay reduces expected queues from approximately 145 m to 70 m.
  - Traffic signals.
    - Multiple eastbound and westbound movements are expected to operate at LOS E or F during the PM peak hour with the current two-way stop control.
- **40 Avenue and 36 Street (4):**
  - Traffic signals.
    - The eastbound and westbound left turns are expected to operate at LOS E during the PM peak hour with the current two-way stop control.

The Multiuse Recreational and Event Facility accesses are expected to operate well with stop control on the northbound and southbound legs. Queues are not expected to exceed 20 m during either peak hour.

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The Background and Total Opening Day traffic analysis results are summarized in the table below.

Table 5.2: Background and Total Opening Day Traffic Analysis Summary

ID	Intersection	Background		Total	
		Intersection LOS AM(PM)	Traffic Control	Intersection LOS AM(PM)	Traffic Control
1	37 Avenue and 44 Street	A(A)	Two-way stop	A(A)	Two-way stop
2	40 Avenue and 44 Street	B(C)	Signalized	C(C)	Signalized
3	40 Avenue and 41 Street	A(A)	Two-way stop	B(B)	Signalized
4	40 Avenue and 36 Street	B(A)	Two-way stop	B(B)	Signalized
5	36 Street Multiuse Recreational and Event Facility Access	-	-	A(A)	One-way stop
6	40 Avenue and 31 Street	A(A)	One-way stop	A(A)	One-way stop
8	41 Street Multiuse Recreational and Event Facility Access	-	-	A(A)	Two-way stop

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Analysis Results Discussion

Some upgrades are not triggered by the proposed development on Opening Day but improve the overall flow of the transportation network. These improvements are provided for the City's consideration:

- 37 Avenue and 44 Street traffic signals:
  - The northbound and southbound left turn movements are expected to operate at LOS E during the PM peak. This would generally trigger consideration for signalization; however, this would likely increase delays for other movements while only benefiting 35 vehicles. It is recommended the City maintain the two-way stop control at 37 Avenue and consider the merits of traffic signals should left turning volumes increase or other concerns arise.
- 40 Avenue and 36 Street:
  - Convert the southbound leg to a shared through/right lane and left turn bay. Like 41 Avenue, this would reduce the expected PM peak hour queue from approximately 100m to 75 m. Queuing between 36 Street and 41 Street is less of a concern because there is a greater distance between the two streets. The City may consider adding a left turn bay if delays and queuing become a concern in the future.

5.3.2 Ultimate Horizon

The Ultimate Horizon analysis results indicate that the intersection of 40 Avenue and 44 Street may not be able to accommodate the increased traffic demand from the proposed Wigfield ASP land uses. The intersection has an overall LOS F during the PM peak hour. Long delays and queues are anticipated.

All other intersections are anticipated to operate within the performance thresholds during the AM and PM peak hour with only minor changes to the overall LOS. The Multiuse Recreational and Event Facility access intersection on 36 Street is expected to operate well with a stop sign on the access. The 41 Street access to the Multiuse Recreational and Event Facility is recommended to be signalized as several movements are anticipated be operate at LOS F with a two-way stop.

The analysis results indicate that the intersection of 25 Street and 40 Avenue does not need as many lanes as the 40 Avenue Functional Study 100,000 population horizon concept plan. The following lane reductions are recommended:

- Eastbound: One through lane and one shared through/right turn.
  - Concept Plan: one through lane and one right turn bay.
- Westbound: Shared right/through/left turn lane
  - Concept Plan: one left turn bay and a shared through/right lane.
- Northbound: One through lane and one shared through/right turn.
  - Concept Plan: two through lanes and one right turn bay.
- Southbound: One through lane and one shared through/left turn lane.
  - Concept Plan: Two through lanes and one left turn bay.

The Background and Total Ultimate horizon traffic analysis results are summarized in the table below.

Table 5.3: Background (2077) and Total (2077) Traffic Analysis Summary

ID	Intersection	Background (2077)		Total (2077)	
		Intersection LOS AM(PM)	Traffic Control	Intersection LOS AM(PM)	Traffic Control
1	37 Avenue and 44 Street	A(C)	Signalized	A(D)	Signalized
2	40 Avenue and 44 Street	D(D)	Signalized	D(F)	Signalized
3	40 Avenue and 41 Street	C(C)	Signalized	D(D)	Signalized
4	40 Avenue and 36 Street	B(A)	Signalized	B(B)	Signalized
5	36 Street and Multiuse Recreational and Event Facility Access	-	-	A(A)	Two-way stop
6	40 Avenue and 31 Street	A(A)	Signalized	B(A)	Signalized
7	40 Avenue and 25 Street	C(C)	Signalized	D(D)	Signalized
8	41 Street and Multiuse Recreational and Event Facility Access	-	-	B(B)	Signalized

*AM(PM)

Analysis Results Discussion

The recommended roadway network for the 100,000 population horizon in the 40 Avenue Functional Study is generally anticipated to be able to accommodate the expected traffic generated by the proposed Wigfield ASP land uses. The intersection of 40 Avenue and 44 Street is the exception, as it is expected to operate at LOS F during the Ultimate PM peak hour. Several factors contribute to the anticipated operational challenges at 40 Avenue and 44 Street:

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- **High left turning volumes:** every approach is anticipated to have between 304 and 688 attempting to turn left during the PM peak hour. The dual left turn bays included in the Functional Study geometry helps to increase the left turning capacity but also increases the time needed for each cycle of the traffic signal. This is because best practice recommends protected only phases for dual left turn lanes as a safety precaution. The addition of protected left turn phases means now a single traffic signal cycle length is shared between eight movements rather than four, leaving less time for through movements.
- **High right turning volumes:** over 700 eastbound vehicles are anticipated to attempt to turn right at 40 Avenue and 44 Street during the PM peak hour. The turn bay is almost at full capacity and cannot accommodate the high volume.
  - Delays can be significantly reduced by providing a right turn overlap signal. This is a signal that indicates that drivers can complete right turns without coming to a complete stop during a specific left turn phase. This was implemented in the traffic analysis but the eastbound left turn movements remains LOS F.
  - The City could consider changing the eastbound right turn to free flow rather than the yield control included in the Functional Study. This would be achieved by adding an auxiliary lane to 40 Avenue south. High-level analysis indicates that the overall intersection LOS would become E with this modification. Obtaining right-of-way for an auxiliary lane may be difficult because the area is already developed.
- **Pedestrian clearance times:** each through movement needs to have enough time with a green light (green time) for pedestrians to fully cross the street. This is called the pedestrian clearance time. Wider streets mean more pedestrian clearance time is needed. This can result in some movements having longer green times than is strictly necessary for the vehicles.
  - The Wigfield ASP lands were assumed to be industrial in the 40 Avenue Functional Study and pedestrian timings were not emphasised. More pedestrians are expected to want to cross 40 Avenue now that residential land uses are planned on both sides of the street. Because of this, a higher emphasis on pedestrian safety and comfort was applied to this analysis. Each leg has an assumed five pedestrians crossing during the AM and PM peak hour. This may be conservative and may be revisited when more insights into expected pedestrian behavior is available for the area.

The Ultimate horizon is estimated to be 55 years into the future. It is difficult to capture a truly accurate prediction of transportation behaviors this far into the future. Changes to the way people mode such as introducing local transit routes, a shift to more active modes, or an increase in trip sharing could have significant implications on this study's findings. The traffic volume estimates could be revisited closer to a certain stage of development to confirm the recommendations from this study are still representative of the future transportation behaviors.

5.4 Event Sensitivity Analysis

The Multiuse Recreational and Event Facility is expected to host events intermittently throughout the year. An event sensitivity analysis was completed to understand the impacts of the increased event traffic on the transportation network.

For this study, events are assumed to occur in the evening past the PM peak hour. Event start and end traffic volumes were estimated to understand the potential impact an event may have on the

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recommended Opening Day roadway network. The following assumptions were used to develop the event scenario traffic analysis volumes:

- Traffic generated by the Event is assumed based on the number of seats and number of parking stalls. High-level analysis was completed for events with 2440, 3500, and 4000 guests. For each scenario, 10% of event trips are assumed to be drop offs, with vehicles entering then exiting the Multiuse Recreational and Event Facility within the analysis hour.
- The trips generated by the remaining land uses in the Multiuse Recreational and Event Facility area were reduced to represent the later start and end times for the event, assuming the land uses attracted 75% of the PM peak hour trips during the start of the event and 25% at the end of the event.

The sensitivity analysis results indicate that the City may want to consider some form of traffic management for events over 2440 expected attendees. This is due to traffic movements expected to operate at LOS F with the increased volumes as well as queue lengths over 100 m which may impact adjacent intersection operations.
The following could be considered to improve traffic flow during an event:

- 37 Avenue and 44 Street:
  - As in the Opening Day analysis, site generated traffic at this intersection is relatively low. One option is to temporarily prohibit left turning traffic at the intersection to improve traffic flow. Traffic would be diverted to 40 Avenue which would impact the other study intersections but would also centralize event related traffic to one corridor.
- 40 Avenue and 44 Street:
  - Event specific timing plans could be employed to address operational issues at the intersection providing it is possible with the City's traffic signal hardware.
- 41 Street Multiuse Recreational and Event Facility Access:
  - Temporarily convert the intersection to a four-way stop. This provides equal opportunity for traffic movements and results in LOS D or better for all approaches for events with 2440 attendees.
  - Some movements are expected to be LOS F with 3500 or 4000 attendees even as a four-way stop. At this point, a four-way stop with a flag person to direct traffic flow as needed could be considered.

Generally, traffic flow would be improved with dedicated turn bays for turning onto or off 41 Street or 36 Street from 40 Avenue. This is not triggered by the typical Opening Day scenario but could be implemented by the City in the future.

The sensitivity analysis results are summarized by LOS F and queues over 100 m in the tables below.

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Table 5.4: Event Sensitivity Analysis – Movements with LOS F

Intersection	2440		3500		4000	
	Start	End	Start	End	Start	End
37 Avenue and 44 Street	-	NB	-	NB, SB	-	NB, SB
40 Avenue and 44 Street	-	-	WBL[1]	SBL[1]	WBL[1]	SBL[1]
40 Avenue and 41 Street	-	-	-	-	-	WB[1]
41 Street Multiuse Recreational and Event Facility Access	NB[2]		NB	NB	NB	NB
40 Avenue and 36 Street	-	-	-	-	SB	-
36 Street Multiuse Recreational and Event Facility Access	-	-	-	-	-	-
40 Avenue and 31 Street	-	-	-	-	-	-

1: LOS F addressed with changes to the signal timing plan
2: LOS F addressed with four-way stop

Table 5.5: Event Sensitivity Analysis – Movements with Queues over 100 m

Intersection	2440		3500		4000	
	Start	End	Start	End	Start	End
37 Avenue and 44 Street	-	-	-	-	-	-
40 Avenue and 44 Street	-	-	SBT: 136 m WBT: 120 m	-	SBT: 189 m WBT - 117 m	-
40 Avenue and 41 Street	-	-	NB: 146 m SBL: 100 m	WB: 169 m NB: 127 m	NB: 159 m SBT: 161 m	WB: 213 m NB: 201 m
41 Street Multiuse Recreational and Event Facility Access	-	NB: 103 m	NB: 139 m	NB: 231 m	NB: 203 m	NB: 352 m
40 Avenue and 36 Street	SB: 153 m	WB: 125 m SB: 131 m	NB: 120 m SB: 246 m	WB: 200 m SB: 164 m	EB: 107 m NB: 140 m SB: 154 m	WB: 241 m SB: 201 m
36 Street Multiuse Recreational and Event Facility Access	-	-	-	-	-	-
40 Avenue and 31 Street	-	-	-	-	-	-

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5.5 Recommended Roadway Network

The recommended roadway network for the Opening Day and Ultimate horizons are provided in Exhibit 5.1 and 5.2. The recommended roadway network improvements are summarized below:

Roadway Classifications and improvements:

- 41 Street, 36 Street, and 31 Street classified as a collector roadway within the plan area.
- Upgrade 41 Street to a paved Urban Residential Collector Roadway standard (drawing 1-101 from the City of Lloydminster Standard Drawings).
  - Traffic on 41 Street for Opening Day is expected to exceed 1000 vehicles per day with the addition of the site generated traffic. This is within the 1000 – 5000 daily volume range for an urban collector road based on Table 3.1 from the City's Municipal Development Standards.

Opening Day Intersection Improvements:

- 40 Avenue and 41 Street (3):
  - Southbound approach: upgrade from a shared right-through-left lane to a shared through/right lane with a left turn bay with 70 m of storage.
  - Traffic signals.
- 40 Avenue and 36 Street (4):
  - Traffic signals.

Ultimate Horizon Intersection Improvements:

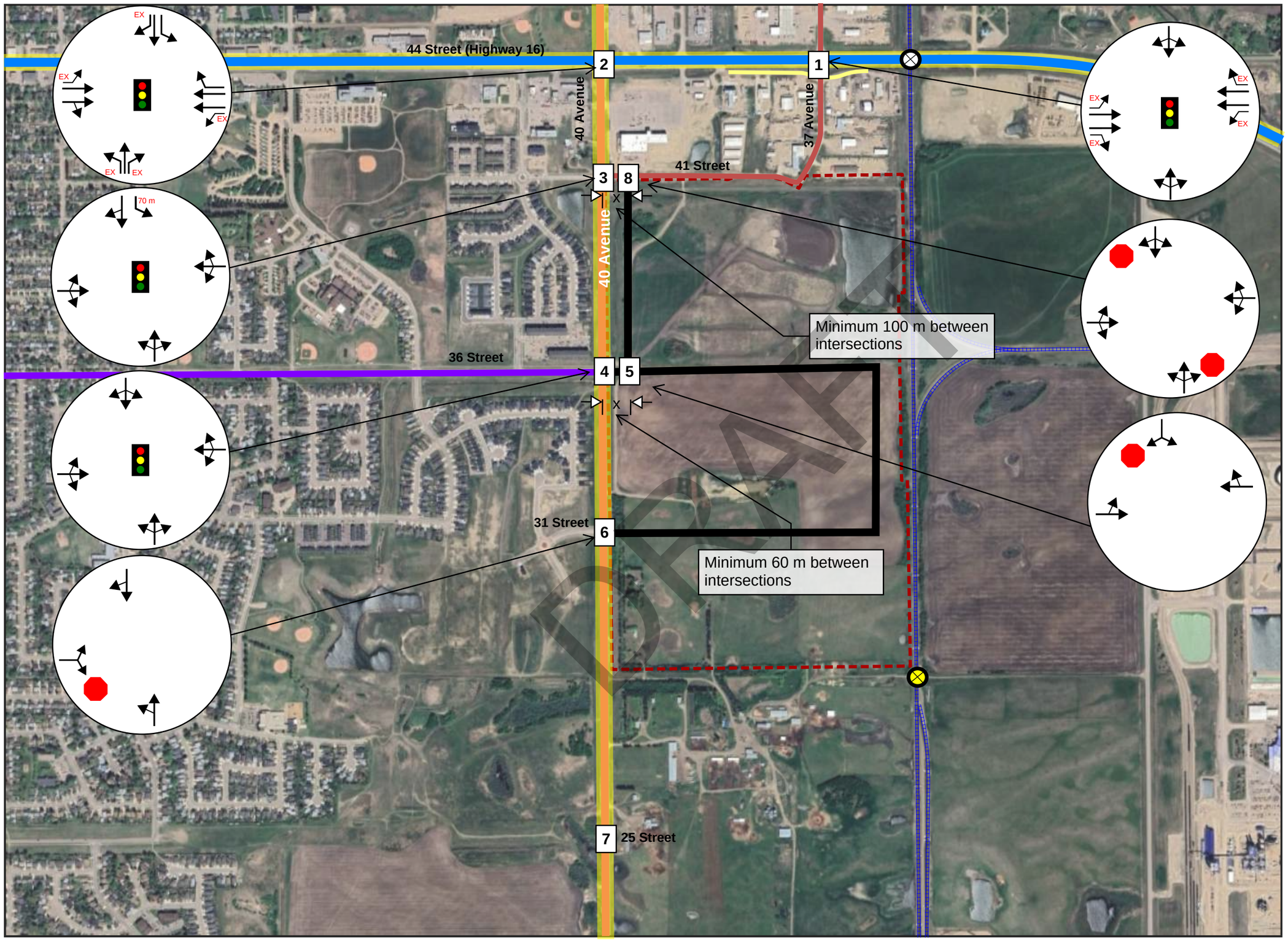
- No modifications to the 40 Avenue Functional Study 100,000 population concept plan are recommended, although the City could consider adding an auxiliary lane for the eastbound right turn in the Ultimate horizon.
- Consider revisiting the 40 Avenue Functional Study 100,000 population concept plan.
- Some turn bay storage lengths at 44 Street and 40 Avenue and 41 Street and 40 Avenue are not provided. These movements require very long storage bays based on the analysis (+200 m). It is recommended the City revisit the 40 Avenue Functional Study and use the results to inform the storage bay lengths at these locations.

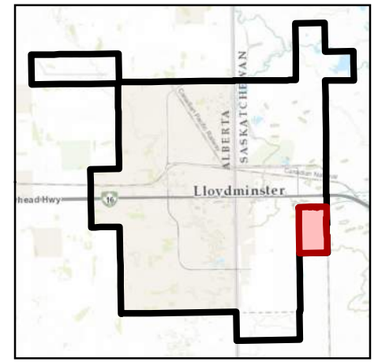
Access Management

Access management requirements need to be considered for the Multiuse Recreational and Event Facility. The City's Municipal Development Standards require designs to be in accordance with Transportation Association of Canada's (TAC) Geometric Design Guide. TAC recommends a minimum intersection spacing of 60 m on collector roadways. The access must also provide sufficient space for the westbound right and left turn bay storage at the 40 Avenue and 41 Street/36 Street intersections. Based on these two criteria, the recommended access spacing for the Multiuse Recreational and Event Facility is summarized below.

- 41 Street: Minimum 100 m from 40 Avenue. This provides sufficient space for the 90m right turn storage anticipated in the Ultimate Horizon.
- 36 Street: Minimum 60 m from 40 Avenue. The turb bay storage anticipated for the Ultimate Horizon is less that 60 m so the minimum TAC spacing is recommended.

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Legend

- ASP Boundary
- Primary Highway Connector
- Arterial Road
- Collector Road
- Local Road
- Dangerous Goods and Truck Route
- Rail (CP)
- Rail Crossing (at grade)
- Rail Crossing (Grade Separated)
- Proposed Roadway Network
- # m — Turn Bay Storage (EX = no change to existing)
- Traffic Signal
- Stop Control
- # — Study Intersection

EXHIBIT 5.1

RECOMMENDED OPENING DAY ROADWAY NETWORK

WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

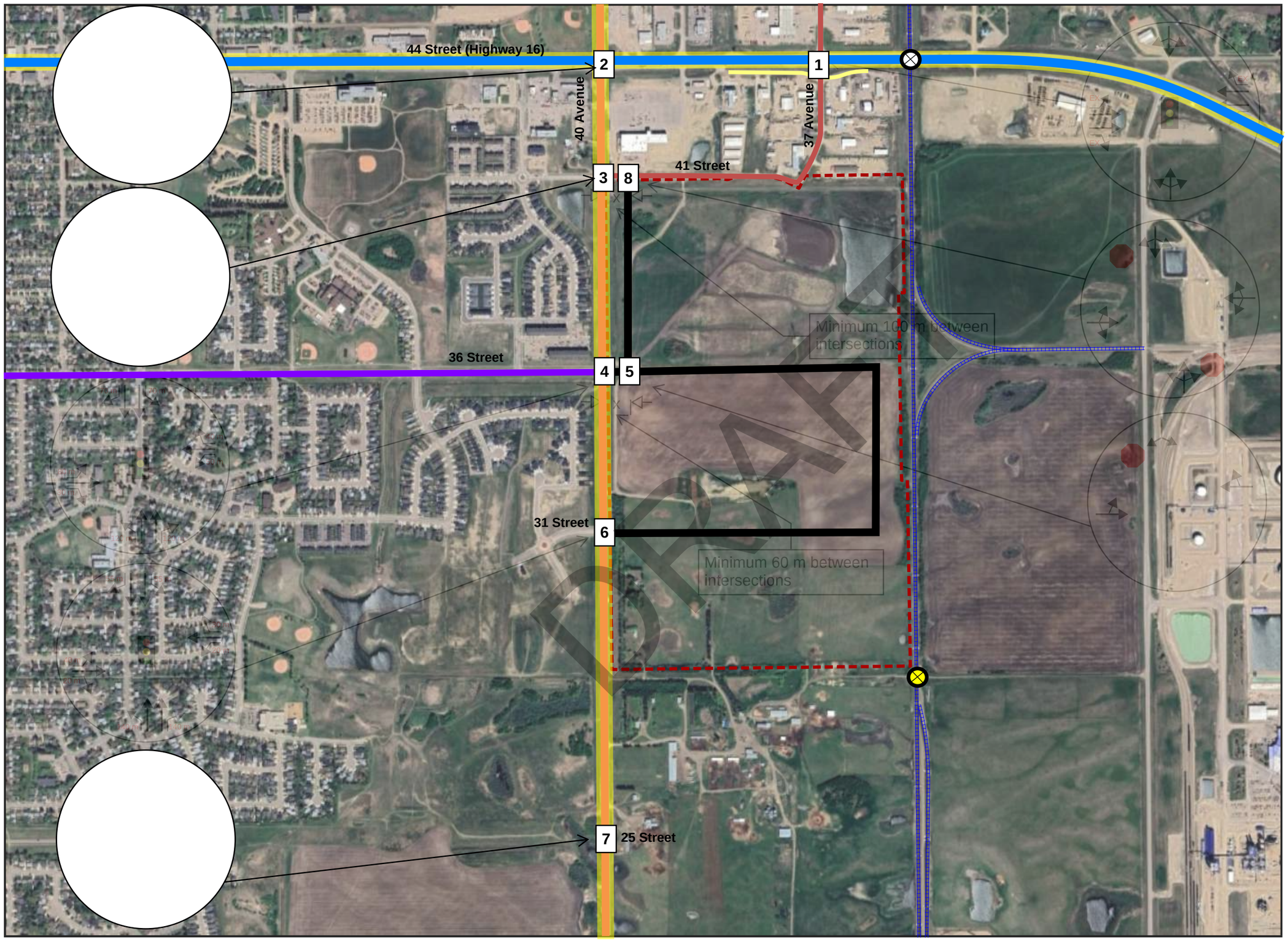
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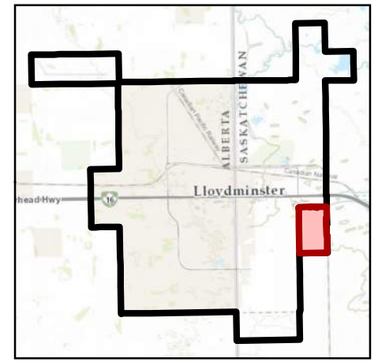
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Legend

- ASP Boundary
- Primary Highway Connector
- Arterial Road
- Collector Road
- Local Road
- Dangerous Goods and Truck Route
- Rail (CP)
- Rail Crossing (at grade)
- Rail Crossing (Grade Separated)
- Proposed Roadway Network
- # m — Turn Bay Storage (EX = no change to existing, * = additional study recommended)
- Traffic Signal
- Stop Control
- # — Study Intersection

EXHIBIT 5.1

RECOMMENDED OPENING DAY ROADWAY NETWORK

WIGFIELD AREA STRUCTURE PLAN
TRAFFIC IMPACT ASSESSMENT

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6.0 Future Mobility

6.1 Sidewalks and Trails

The Sidewalk and Trails Master Plan recommends a trail along the west side of 40 Avenue up to 31 Street in the medium term and up to 25 Street in the long term. It does not include a recommendation for additional infrastructure on 44 Street east of 40 Avenue nor within the plan area. This is reasonable as the Master Plan was completed prior to the Wigfield ASP update so the area was assumed to be industrial.

It is recommended the City consider revisiting the recommended infrastructure and timelines in Wigfield and the surrounding areas due to the proposed residential land use. Connections to the Recreational and Event Facility site may be made a higher priority to make walking or cycling to the Facility a more attractive option.

The plan area doesn't currently include institutional lands. Children will likely attend one of the current or planned schools west of 40 Avenue which means some may need to cross 40 Avenue several times a day. Crossing locations should be well lit to ensure pedestrians remain visible during the winter when the sun rises late and sets early.

6.2 Transit

Future local transit services could help reduce the demand on the roadway network. While none are in place currently, the City is considering the merits of providing transit services and may do so in the future.

6.3 Rail

No documented future rail plans were available at the time of this study.

6.4 Dangerous Goods and Truck Routes

40 Avenue is one of the City's key Dangerous Goods and Truck Routes. This aligned well with the plan area's previous industrial designation. The change to residential neighbourhoods will present some challenges on 40 Avenue as there are now conflicting user priorities. It is important the City maintain the corridor for goods movement, but this must be balanced with ensuring Wigfield remains well connected with the rest of the City.

The City should remove the plan area's designation as a Truck Route Area prior to development as this no longer aligns with the future land use.

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7.0 Conclusion and Recommendations

7.1 Conclusion

The following conclusions have been made based on this study:

- **Opening Day Traffic Operations:** the current transportation network is anticipated to be able to accommodate the expected traffic generated by the Multiuse Recreational and Event Facility site with some improvements.
- **Ultimate Traffic Operations:** Most intersections are expected to meet performance thresholds. Significant delays and queuing are expected at 40 Avenue and 44 Street during the PM peak hour. This is primarily due to high right and left turning volumes. The delays at 40 Avenue and 44 Street also impact 41 Street and 40 Avenue, resulting in long queues. It is noted that the Ultimate horizon is likely 55 years into the future and several changes in people's transportation habits may occur between the completion of this study and then.
- **Future Mobility:** previous active mode studies were completed assuming industrial uses for the plan area. These should be revisited to consider the proposed residential land uses to ensure future residents are provided high-quality active mode connections.
- **Dangerous Goods and Truck Routes:** There could be conflicting user priorities on 40 Avenue. Careful consideration should be taken to ensure 40 Avenue is able to balance the needs for goods movement with the adjacent residential neighbourhoods. The Truck Route Area designation does not align with the future land use.

7.2 Recommendations

The following is recommended for the Wigfield ASP transportation network:

Roadway Classifications and improvements:

- 41 Street, 36 Street, and 31 Street classified as a collector roadway within the plan area.
- Upgrade 41 Street to a paved Urban Residential Collector Roadway standard (drawing 1-101 from the City of Lloydminster Standard Drawings).
  - Traffic on 41 Street for Opening Day is expected to exceed 1000 vehicles per day with the addition of the site generated traffic. This is within the 1000 – 5000 daily volume range for an urban collector road based on Table 3.1 from the City's Municipal Development Standards.

Multiuse Recreational and Event Facility Access Locations:

- 41 Street: Minimum 100 m from 40 Avenue.
- 36 Street: Minimum 60 m from 40 Avenue.

Opening Day Intersection Improvements:

- 40 Avenue and 41 Street (3):
  - Southbound approach: upgrade from a shared right-through-left lane to a shared through/right lane with a left turn bay with 70 m of storage.
  - Traffic signals.
- 40 Avenue and 36 Street (4):
  - Traffic signals.

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Ultimate Horizon Intersection Improvements:

- 41 Street Multiuse Recreational and Event Facility access intersection:
  - Traffic signals.
- Reduced number of lanes at 25 Street and 40 Avenue, as shown in Exhibit 5.2.
- Revisit the 40 Avenue Functional Study Ultimate Horizon recommendations. Review the assumptions and inputs for recommended improvements to ensure they are still relevant before moving forward with the improvements.
  - Consider an eastbound right turn auxiliary lane at 40 Avenue and 44 Street to accommodate high estimated turning volumes. The City may consider reviewing right-of-way requirements plan to either acquire or reserve the additional lands required.

Mobility:

- Ensure high quality active mode connections between the plan area and adjacent neighbourhoods as well as between the neighbourhood zones and the Multiuse Recreational and Event Facility site.
- Ensure high-visibility pedestrian crossings are provided on 40 Avenue based on the Transportation of Canada's Pedestrian Crossing Control Guide.
- Consider local transit services to reduce roadway demand.
- The City should remove the plan area's designation as a Truck Route Area prior to development as this no longer aligns with the future land use.

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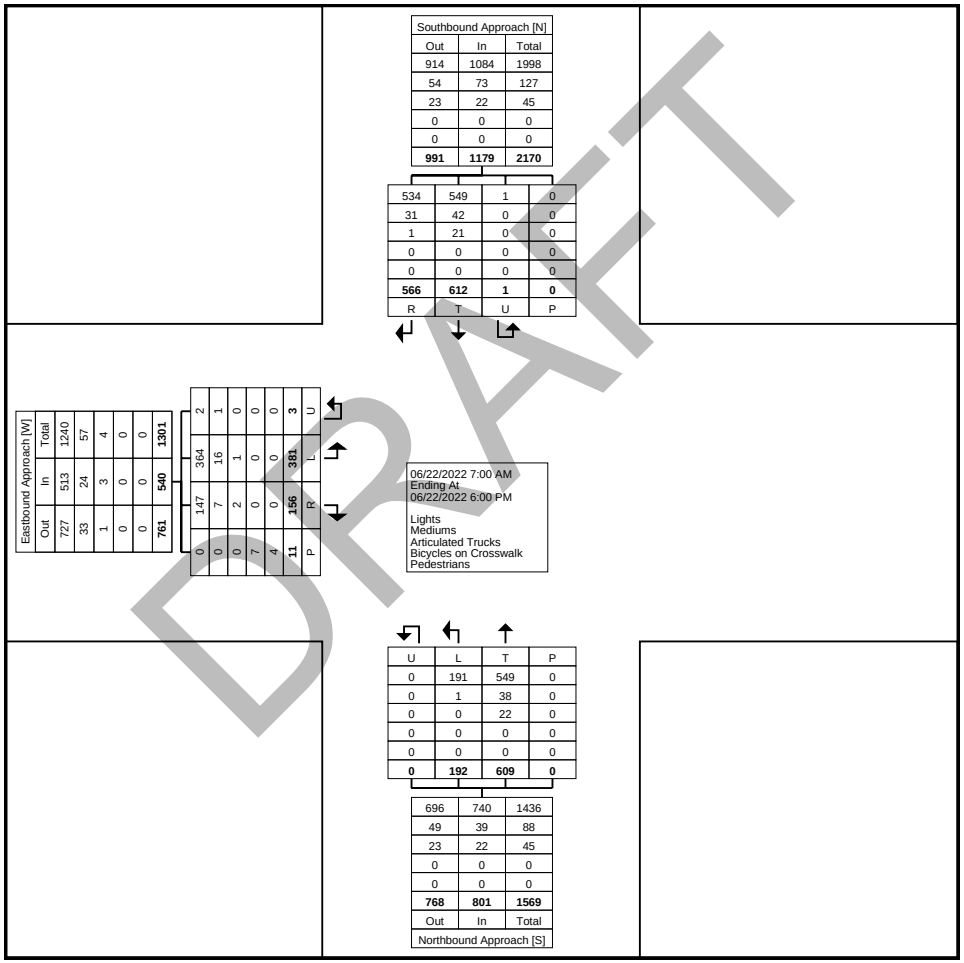
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APPENDIX A
Traffic Count Data

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 waguinaldo@lloydminster.ca

Count Name: 36 Street and 40 Avenue
Site Code: 3640
Start Date: 06/22/2022



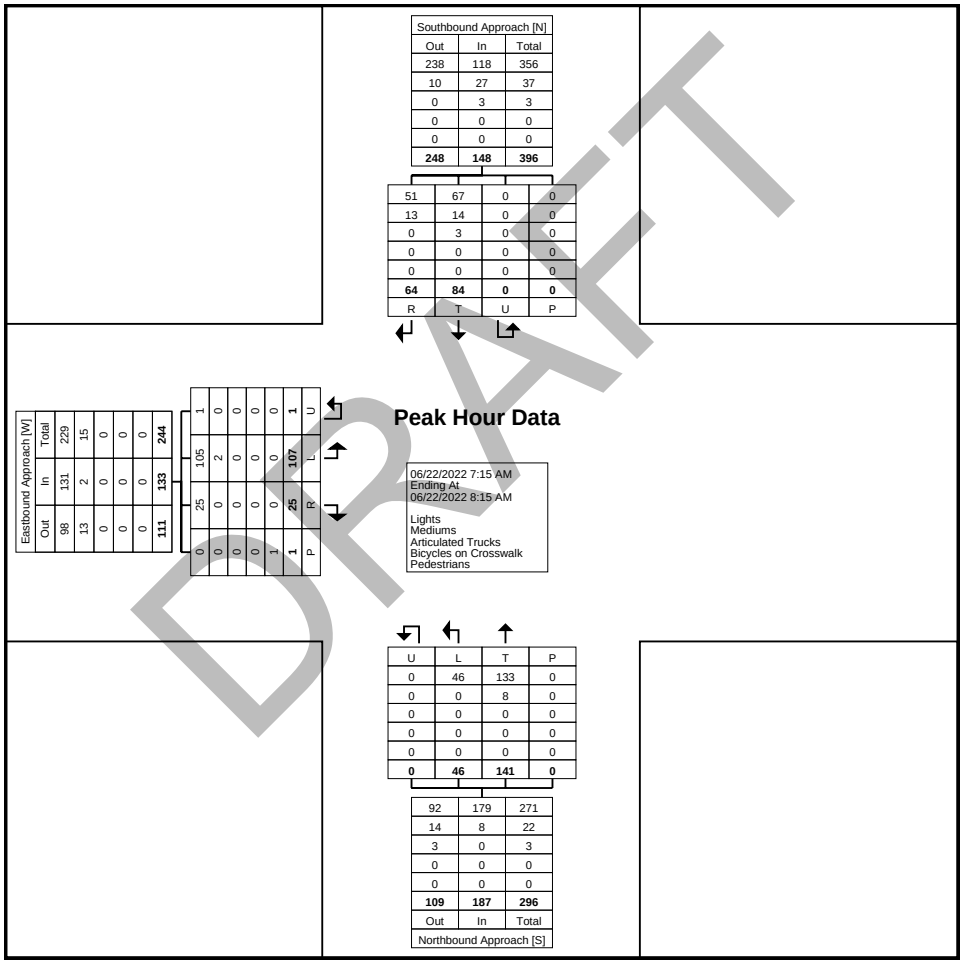
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Turning Movement Data Plot

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 waguinaldo@lloydminster.ca

Count Name: 36 Street and 40 Avenue
Site Code: 3640
Start Date: 06/22/2022



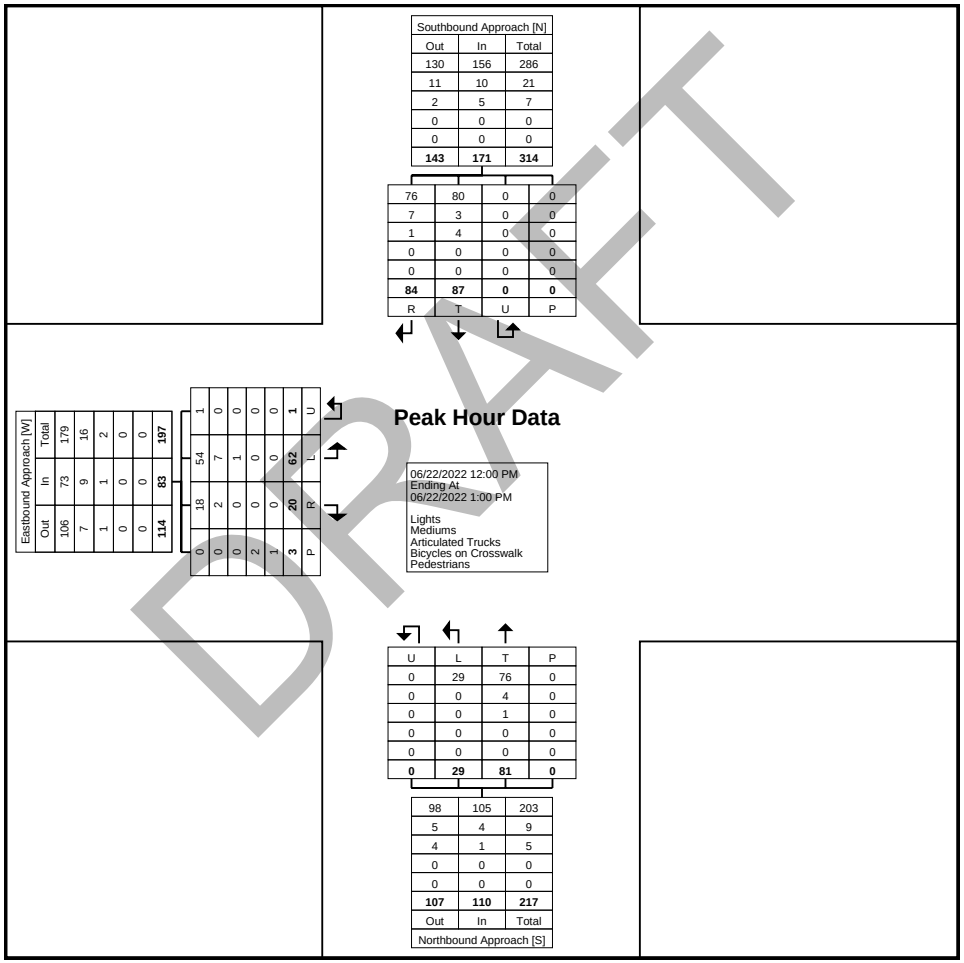
Turning Movement Peak Hour Data Plot (7:15 AM)

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City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 waguinaldo@lloydminster.ca

Count Name: 36 Street and 40 Avenue
Site Code: 3640
Start Date: 06/22/2022



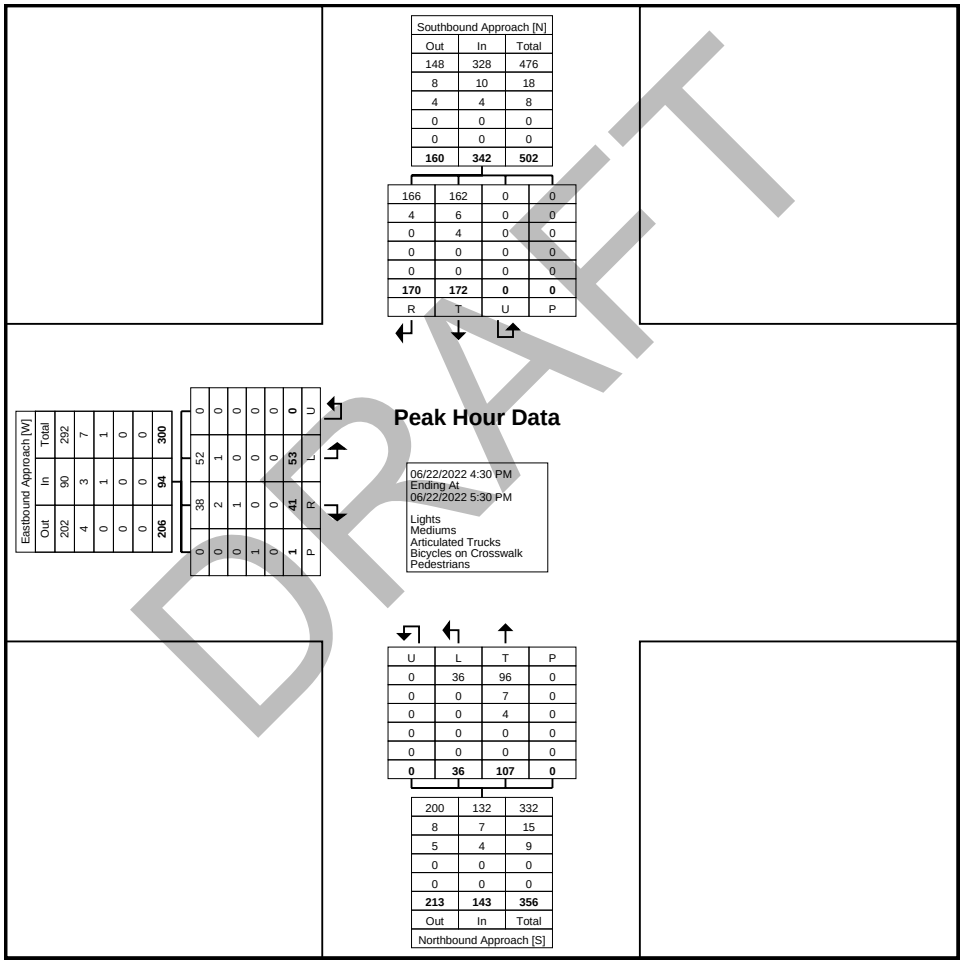
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Turning Movement Peak Hour Data Plot (12:00 PM)

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 waguinaldo@lloydminster.ca

Count Name: 36 Street and 40 Avenue
Site Code: 3640
Start Date: 06/22/2022



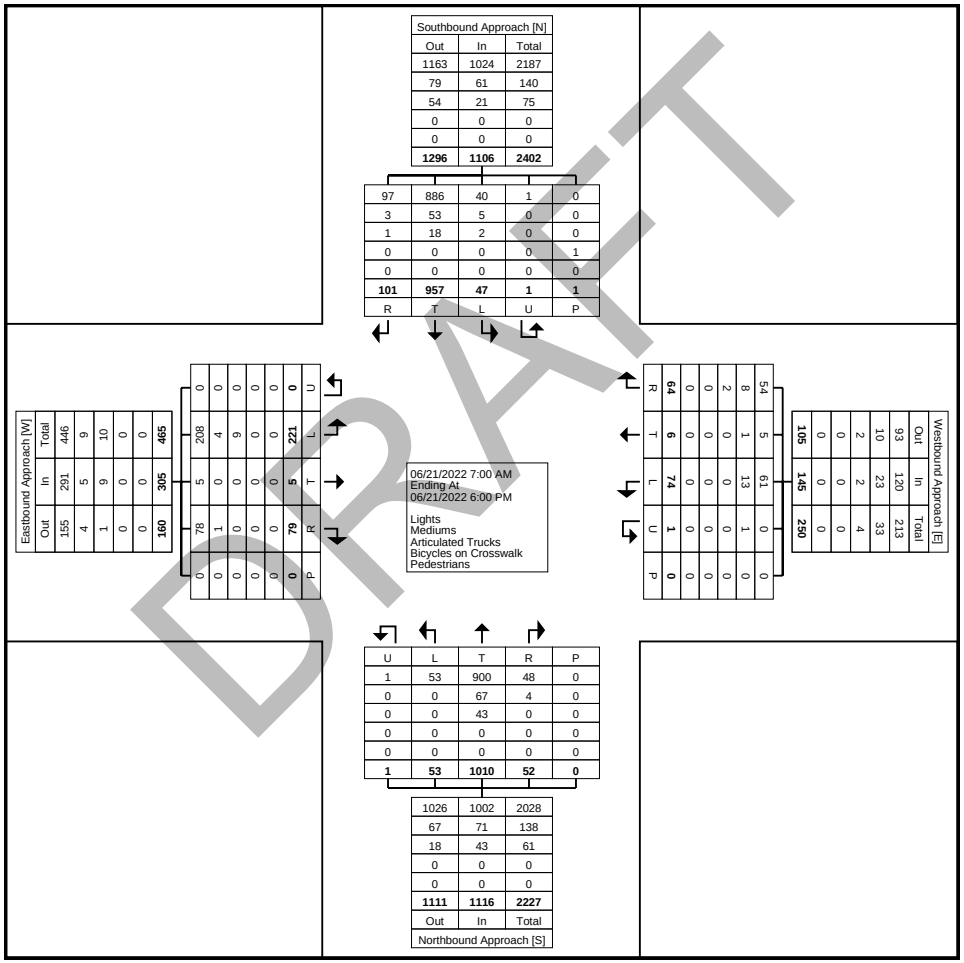
DRAFT

Turning Movement Peak Hour Data Plot (4:30 PM)

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 waguinaldo@lloydminster.ca

Count Name: 41 Street and 40 Avenue
Site Code: 4140
Start Date: 06/21/2022



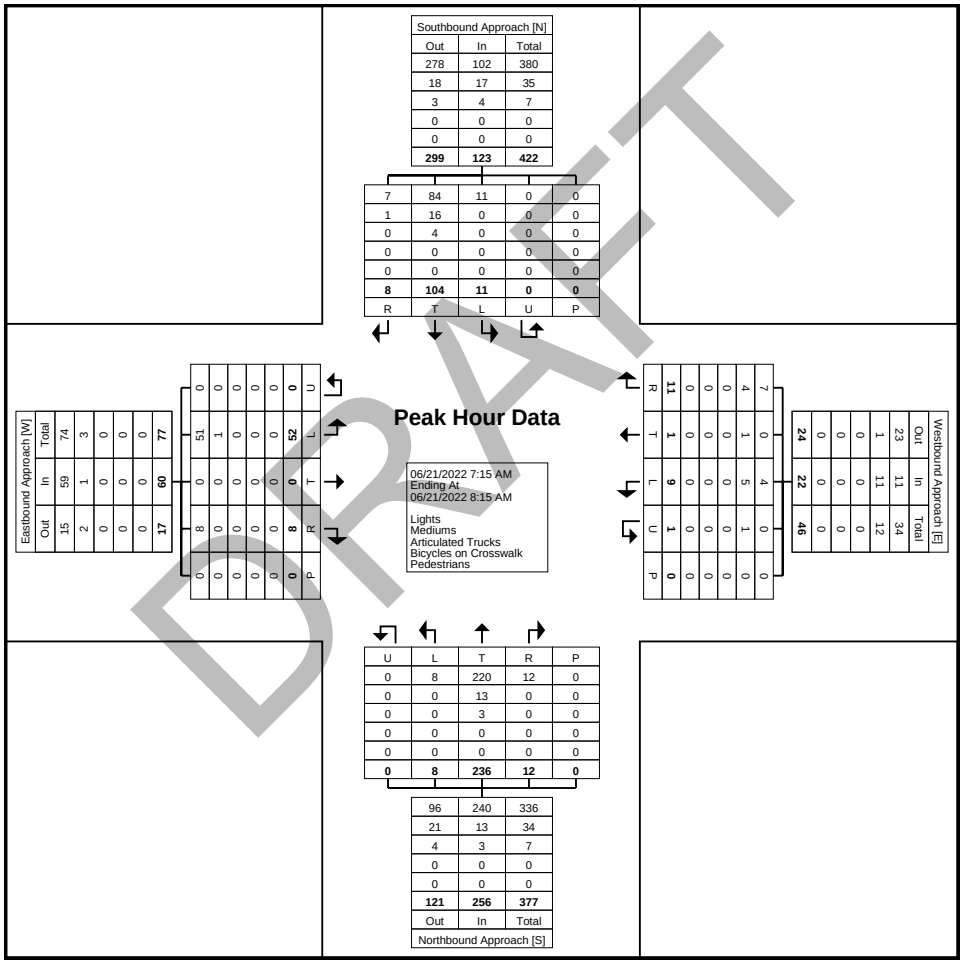
Turning Movement Data Plot

DRAFT

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 waguinaldo@lloydminster.ca

Count Name: 41 Street and 40 Avenue
Site Code: 4140
Start Date: 06/21/2022



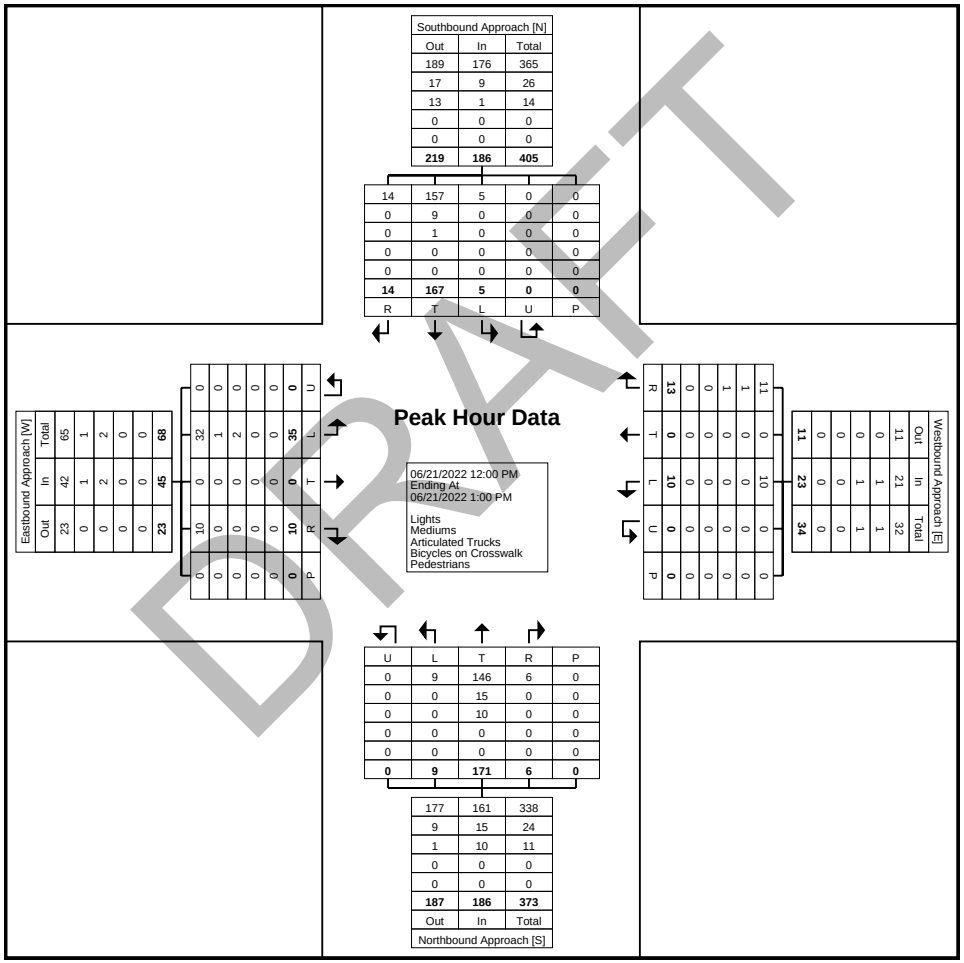
Turning Movement Peak Hour Data Plot (7:15 AM)

DRAFT

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 waguinaldo@lloydminster.ca

Count Name: 41 Street and 40 Avenue
Site Code: 4140
Start Date: 06/21/2022



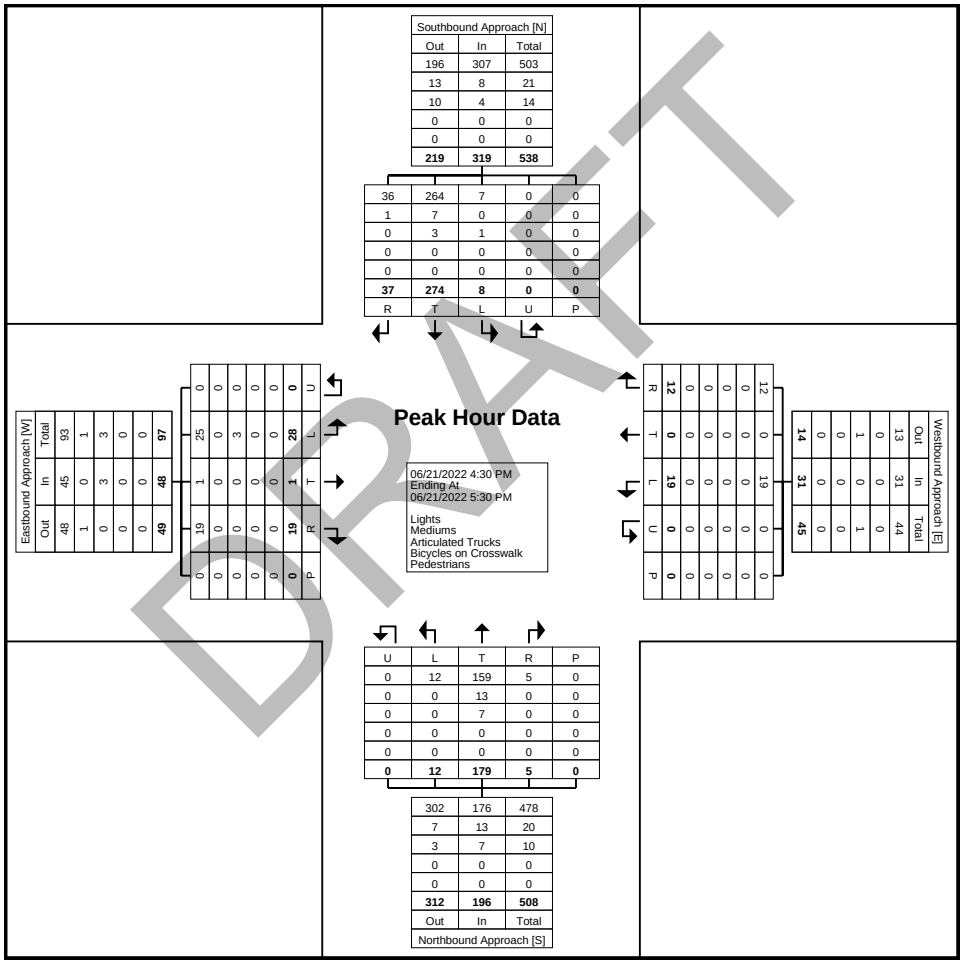
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Turning Movement Peak Hour Data Plot (12:00 PM)

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 waguinaldo@lloydminster.ca

Count Name: 41 Street and 40 Avenue
Site Code: 4140
Start Date: 06/21/2022



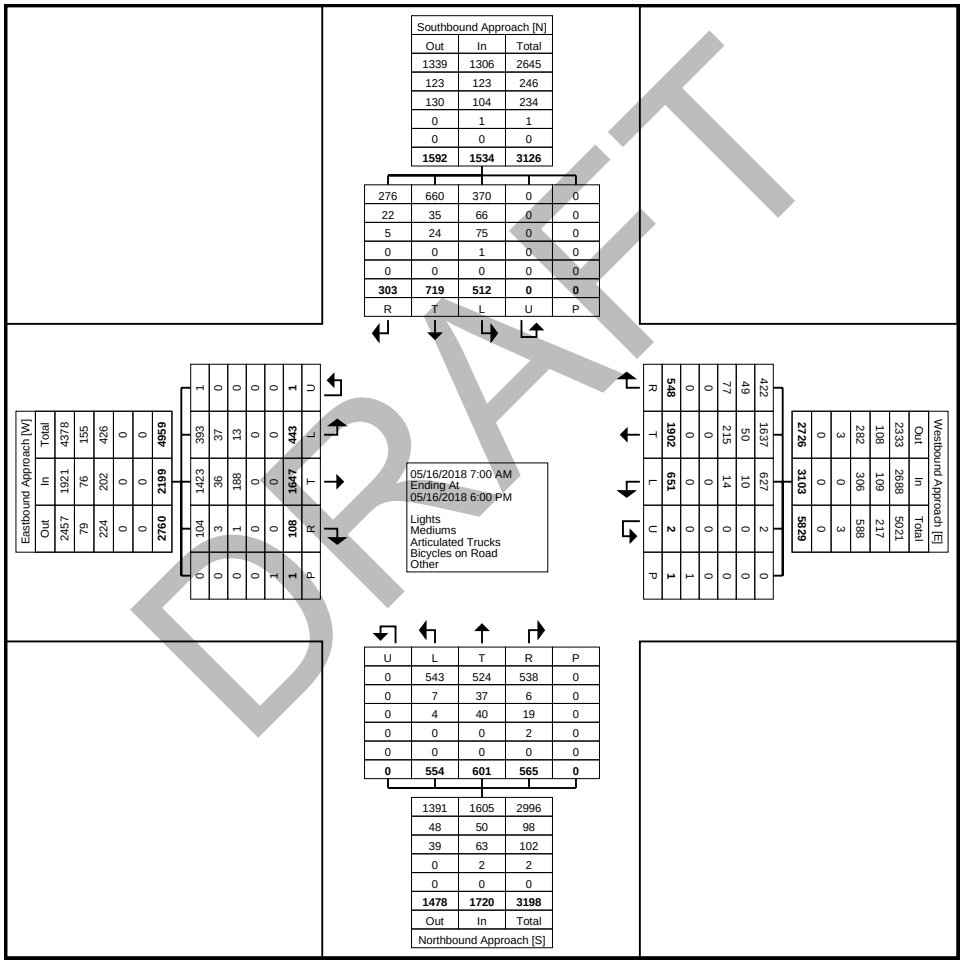
DRAFT

Turning Movement Peak Hour Data Plot (4:30 PM)

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 waguinaldo@lloydminster.ca

Count Name: 44 Street and 40 Avenue
Site Code: 4440
Start Date: 05/16/2018



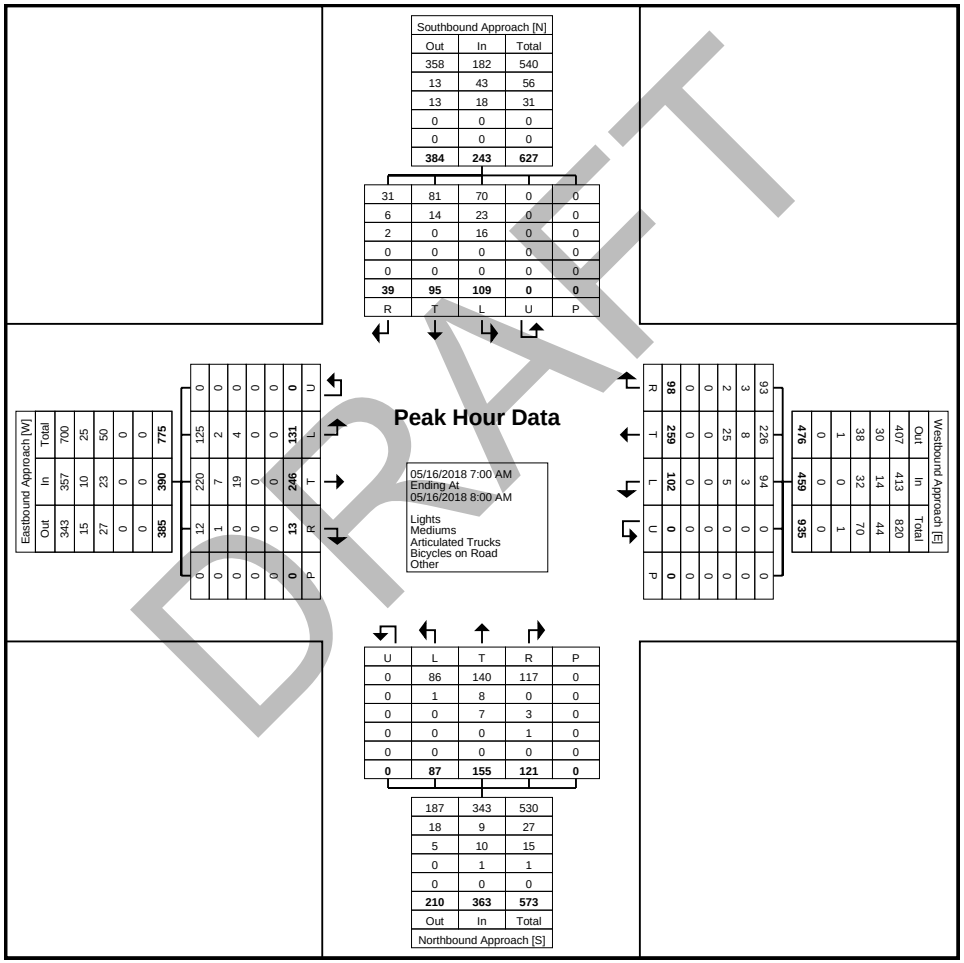
Turning Movement Data Plot

DRAFT

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 waguinaldo@lloydminster.ca

Count Name: 44 Street and 40 Avenue
Site Code: 4440
Start Date: 05/16/2018



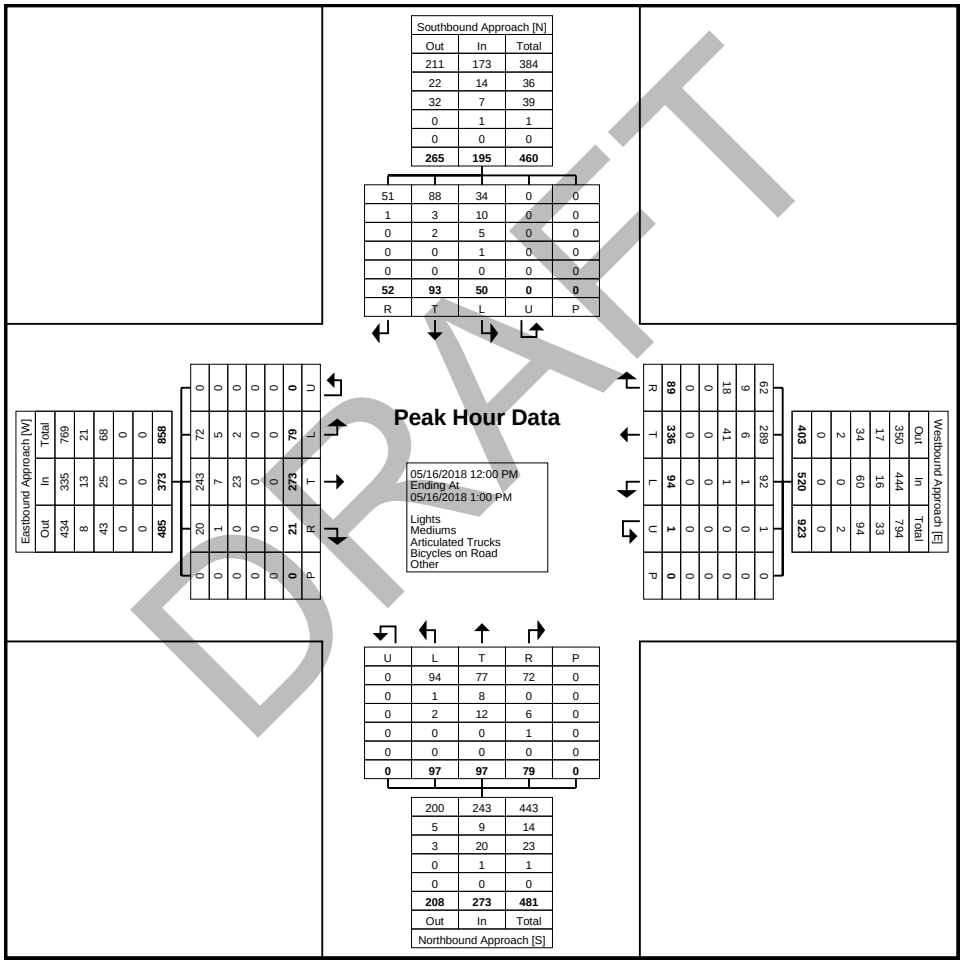
Turning Movement Peak Hour Data Plot (7:00 AM)

DRAFT

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 waguinaldo@lloydminster.ca

Count Name: 44 Street and 40 Avenue
Site Code: 4440
Start Date: 05/16/2018



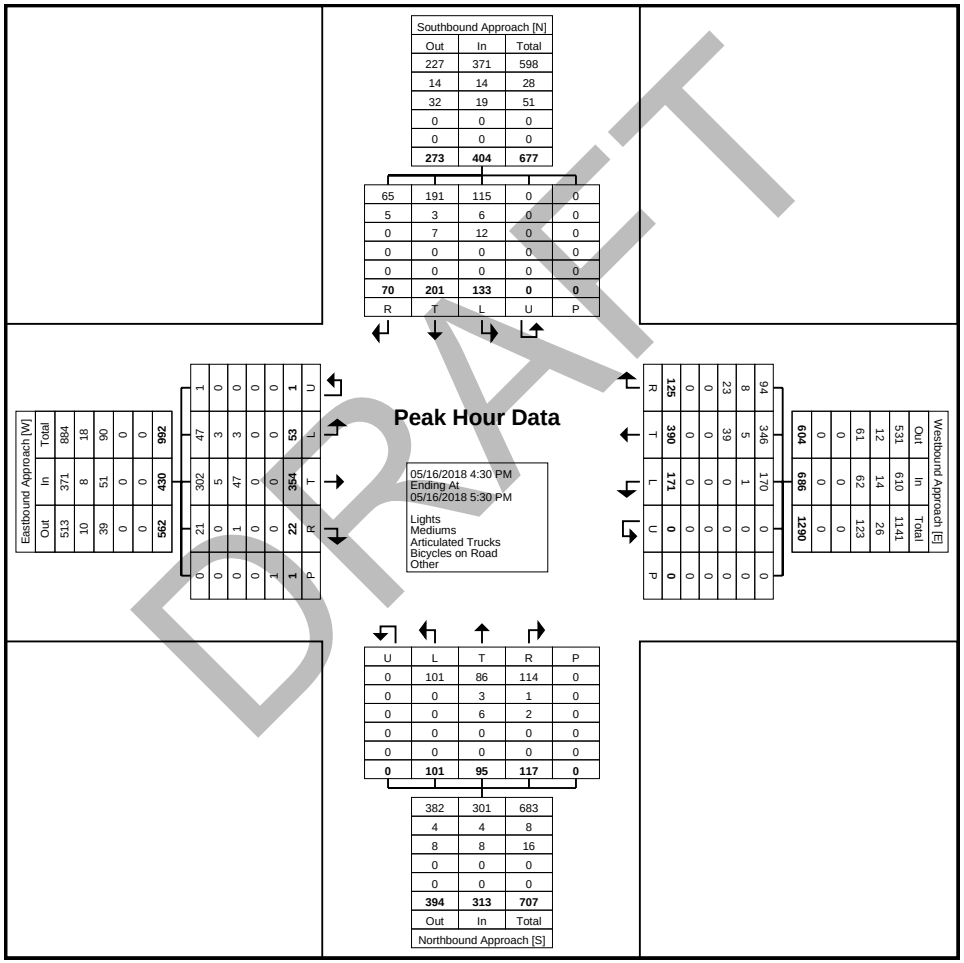
Turning Movement Peak Hour Data Plot (12:00 PM)

DRAFT

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 waguinaldo@lloydminster.ca

Count Name: 44 Street and 40 Avenue
Site Code: 4440
Start Date: 05/16/2018



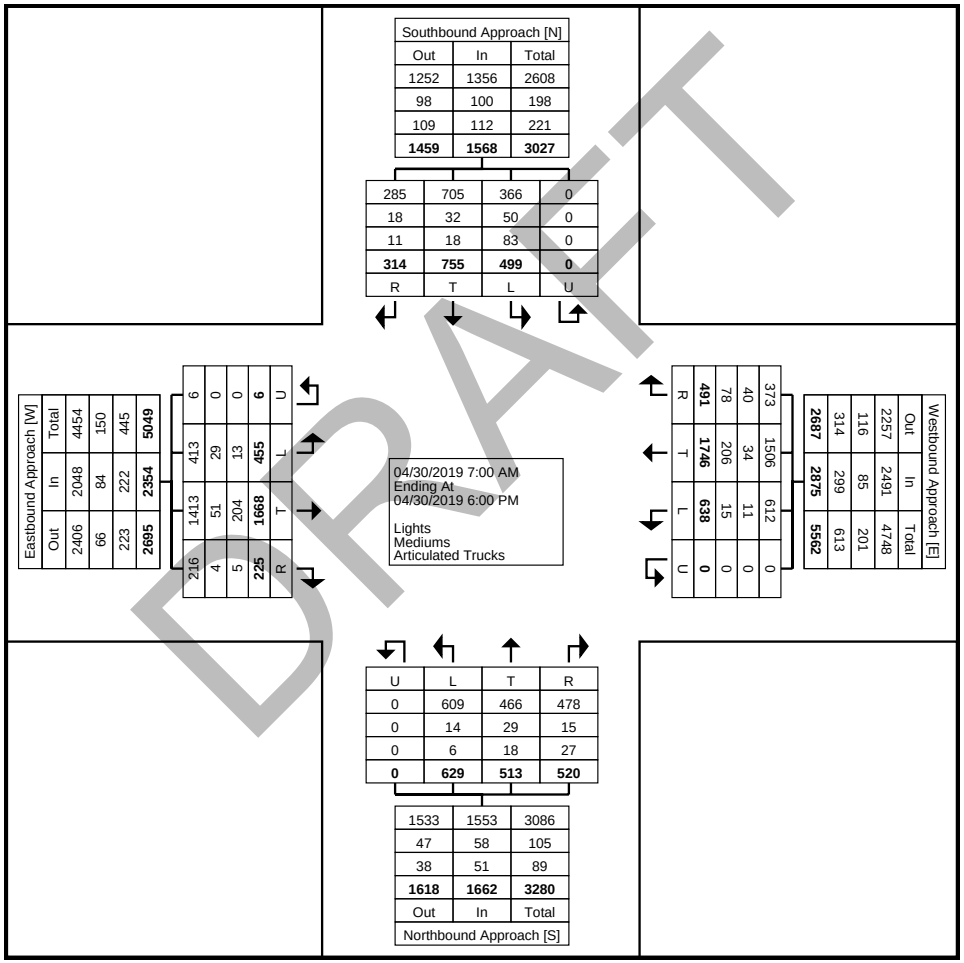
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Turning Movement Peak Hour Data Plot (4:30 PM)

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 bcarriere@lloydminster.ca

Count Name: 44 Street and 40 Avenue
Site Code: 4440
Start Date: 04/30/2019
Page No: 3



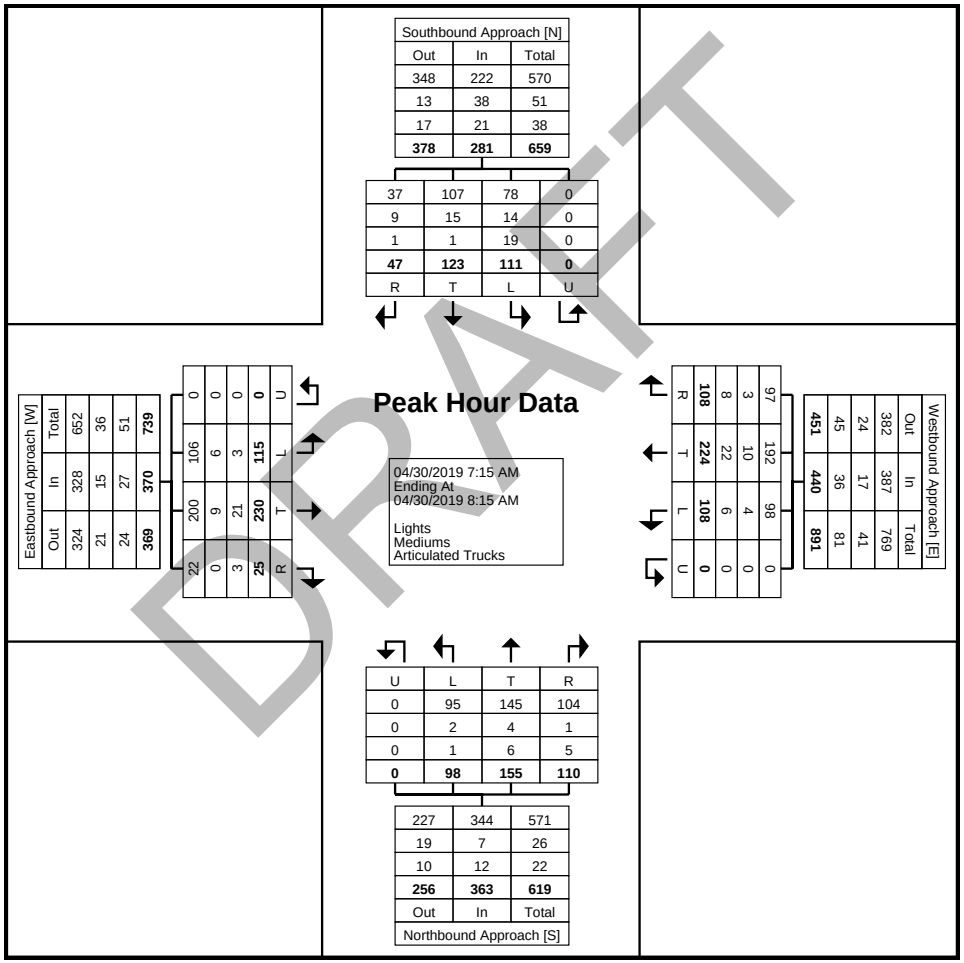
Turning Movement Data Plot

DRAFT

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 bcarriere@lloydminster.ca

Count Name: 44 Street and 40 Avenue
Site Code: 4440
Start Date: 04/30/2019



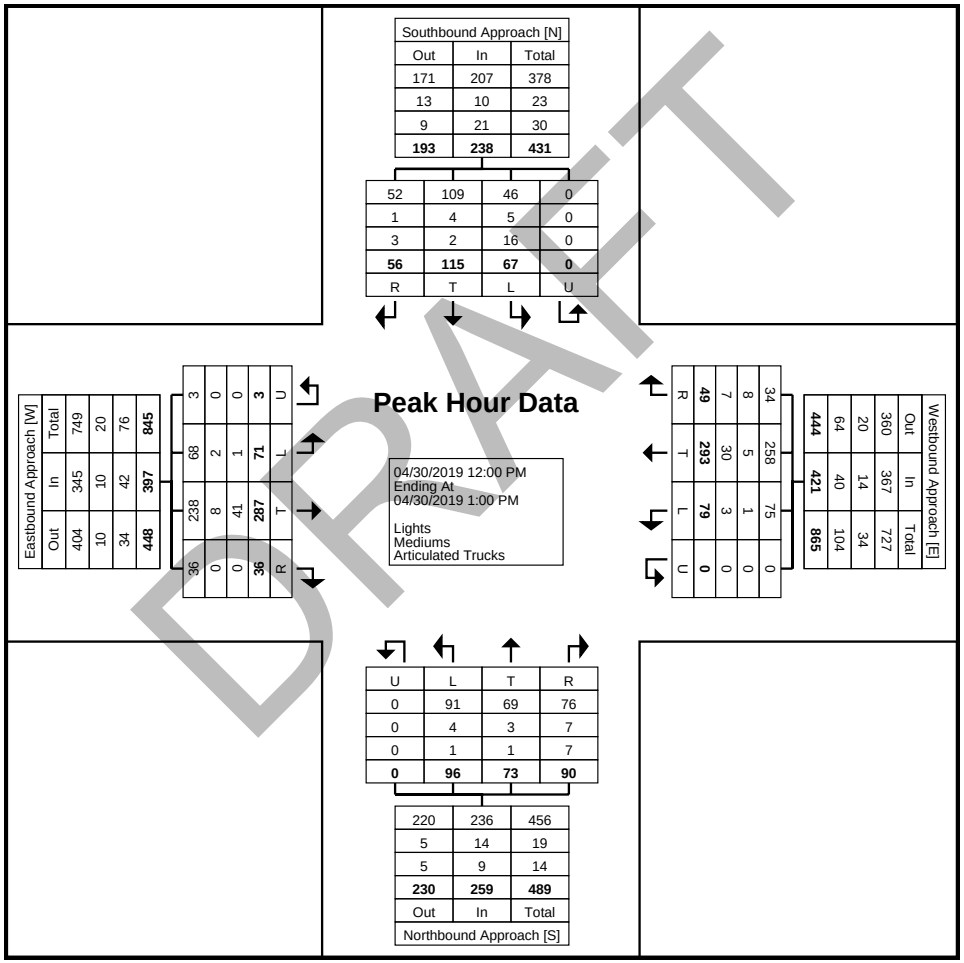
DRAFT

Turning Movement Peak Hour Data Plot (7:15 AM)

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 bcarriere@lloydminster.ca

Count Name: 44 Street and 40 Avenue
Site Code: 4440
Start Date: 04/30/2019



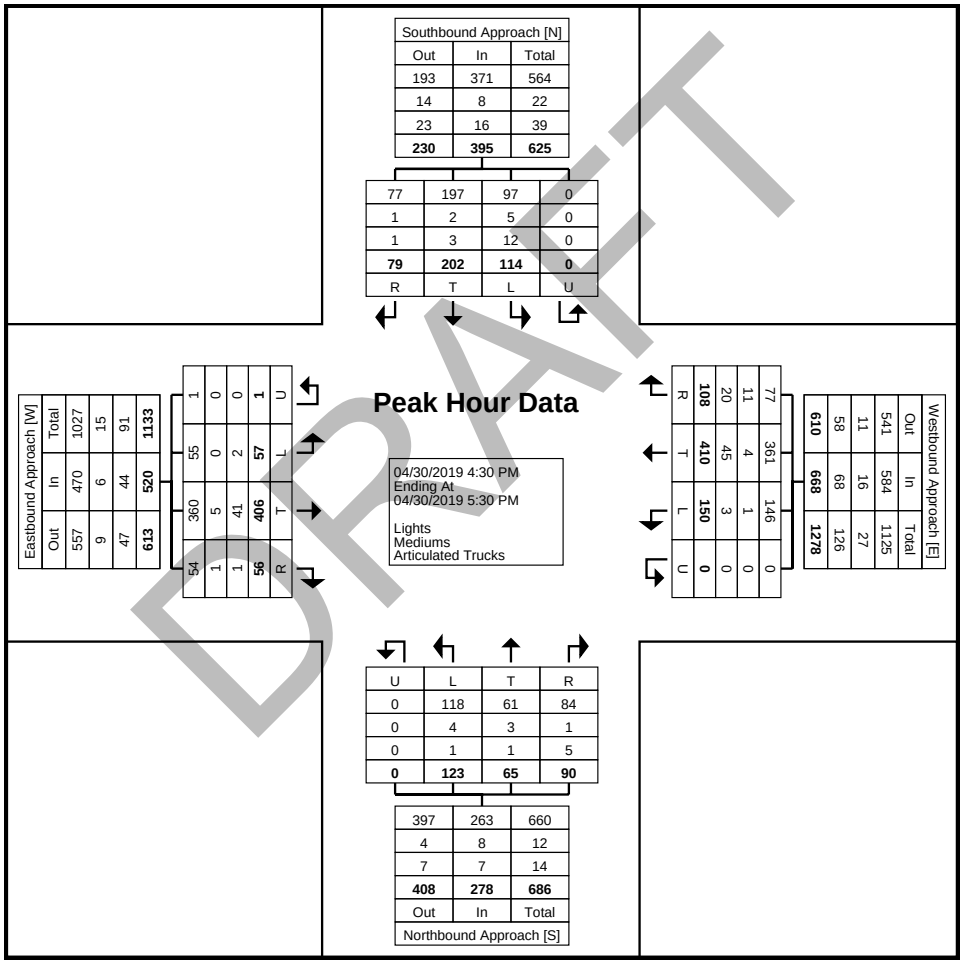
DRAFT

Turning Movement Peak Hour Data Plot (12:00 PM)

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 bcarriere@lloydminster.ca

Count Name: 44 Street and 40 Avenue
Site Code: 4440
Start Date: 04/30/2019



DRAFT

Turning Movement Peak Hour Data Plot (4:30 PM)

City of Lloydminster
4420-50 Avenue

Lloydminster, Alberta, Canada T9V 0W2
(780) 875-6184 bcarriere@lloydminster.ca

DRAFT

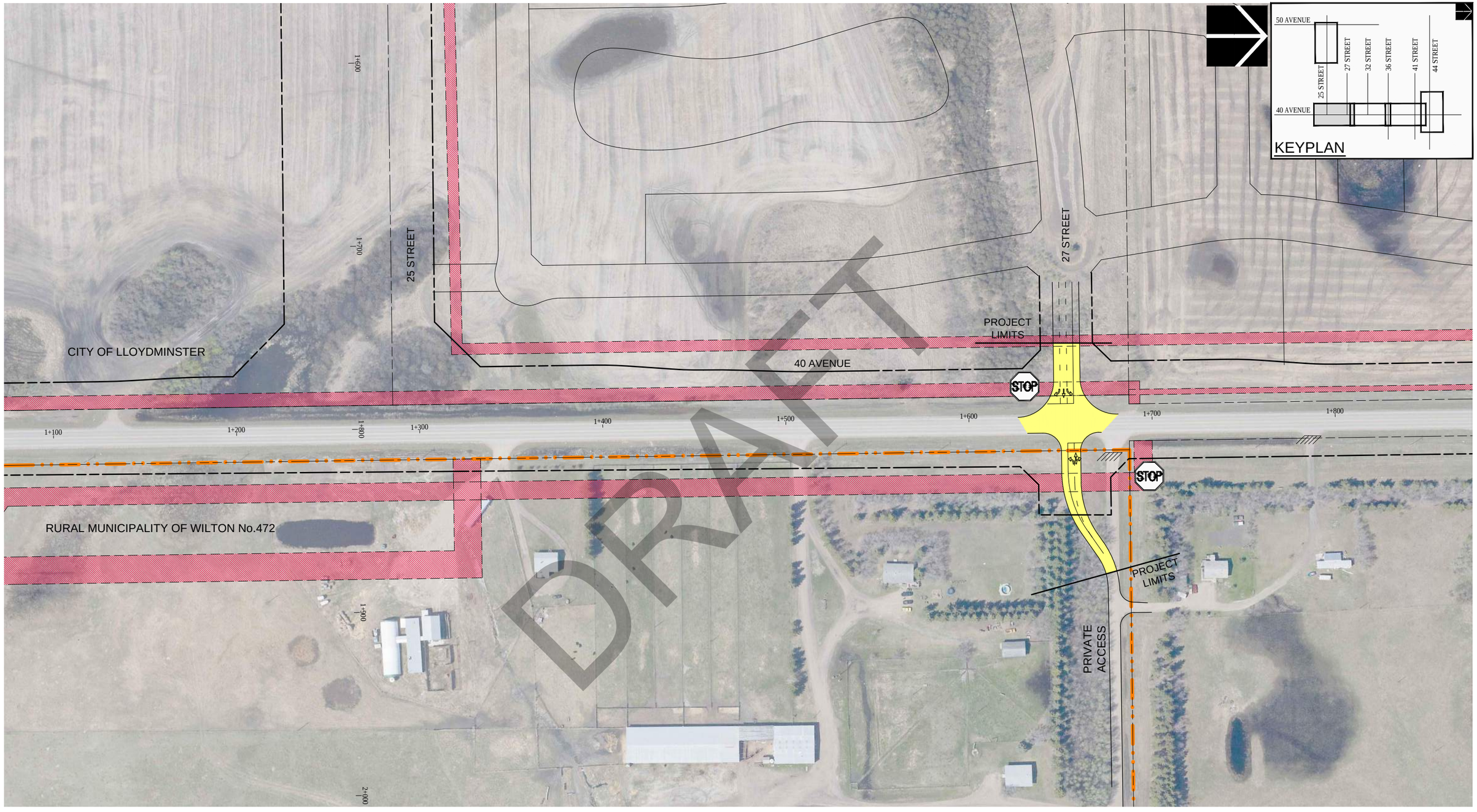
APPENDIX B
40 Avenue Functional Study Excerpts

DRAFT

35,000 Population Horizon Plans

DRAFT

DRAFT



HORZ 0 20 40 60 80m
1:2000

ISL Engineering and Land Services

LLOYDMINSTER Canada's Border City

Legend

- SIDEWALKS
- ROADWAY
- BERMS
- DRAINAGE CHANNEL
- EASEMENT
- POND
- HIGHWAY COMMERICAL
- WIGFIELD INDUSTRIAL PARK
- FUTURE LIGHT INDUSTRIAL
- ROAD CLOSURE
- CURRENT CITY BOUNDARY
- PROPOSED RIGHT-of-WAY
- TRAFFIC CONTROL
- PEDESTRIAN CONTROL

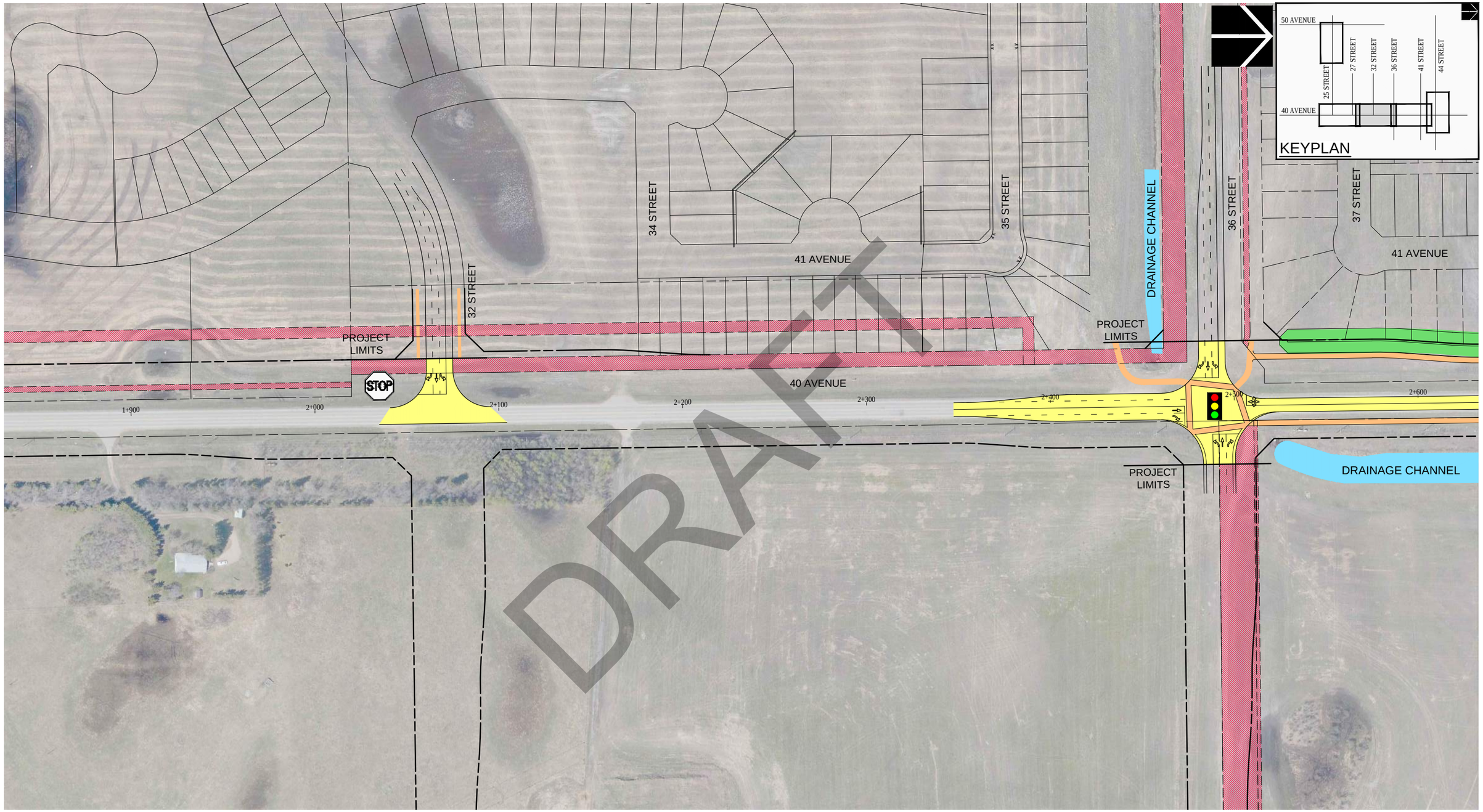
Project 40 AVENUE CONCEPT PLAN

Title 35,000 POPULATION HORIZON

Exhibit No. A2

Date August 30, 2013

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ISL Engineering and Land Services

LLOYDMINSTER Canada's Border City

Legend

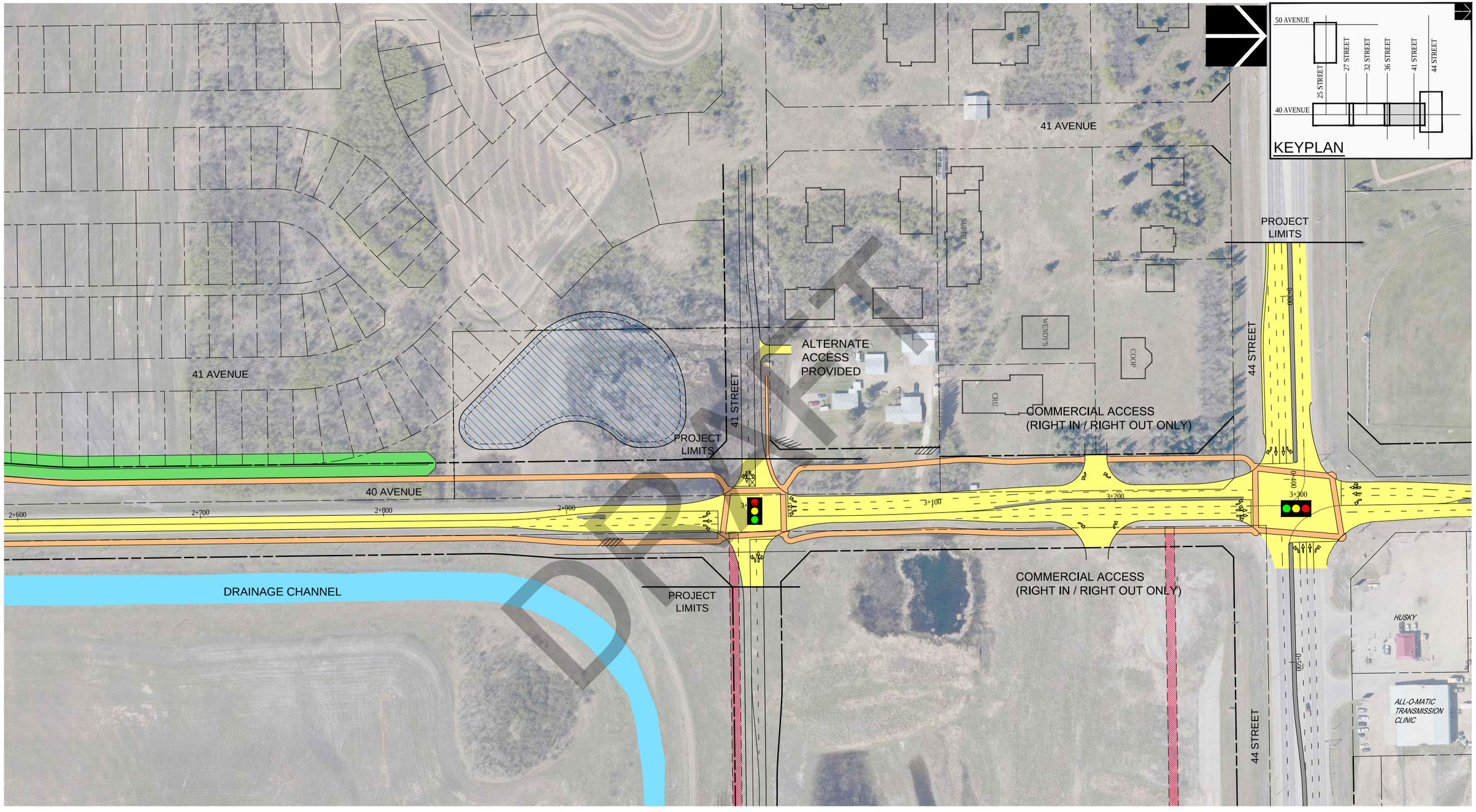
- SIDEWALKS
- ROADWAY
- BERMS
- DRAINAGE CHANNEL
- EASEMENT
- POND
- HIGHWAY COMMERICAL
- WIGFIELD INDUSTRIAL PARK
- FUTURE LIGHT INDUSTRIAL
- ROAD CLOSURE
- CURRENT CITY BOUNDARY
- PROPOSED RIGHT-of-WAY
- TRAFFIC CONTROL
- PEDESTRIAN CONTROL

Project 40 AVENUE CONCEPT PLAN

Title 35,000 POPULATION HORIZON

Exhibit No. A3 Date August 30, 2013

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ISL Engineering and Land Services

LLOYDMINSTER Canada's Border City

Legend

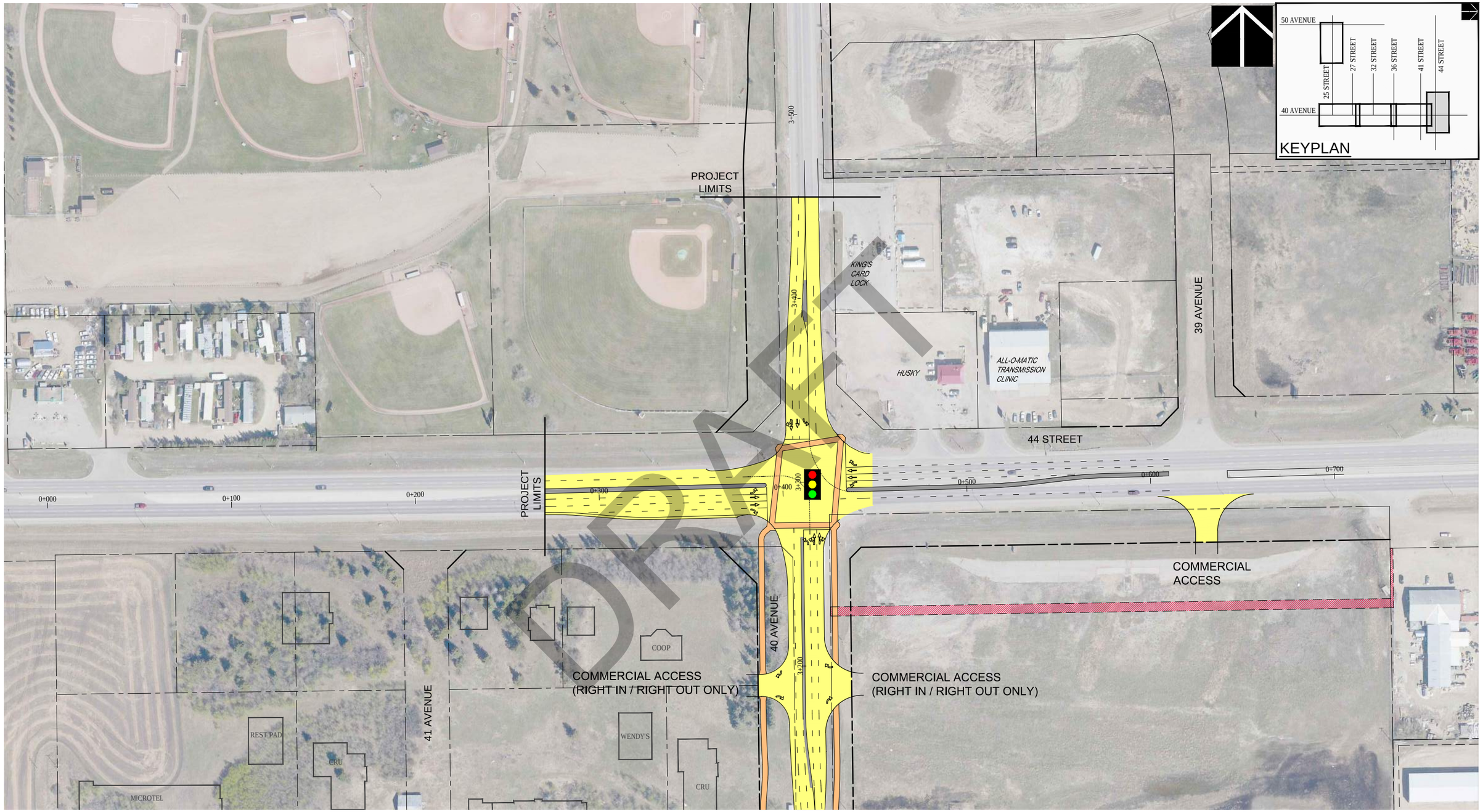
- SIDEWALKS
- ROADWAY
- BERMS
- DRAINAGE CHANNEL
- EASEMENT
- POND
- HIGHWAY COMMERICAL
- WIGFIELD INDUSTRIAL PARK
- FUTURE LIGHT INDUSTRIAL
- ROAD CLOSURE
- CURRENT CITY BOUNDARY
- PROPOSED RIGHT-of-WAY
- TRAFFIC CONTROL
- PEDESTRIAN CONTROL

Project 40 AVENUE CONCEPT PLAN

Title 35,000 POPULATION HORIZON

Exhibit No. A4 Date August 30, 2013

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DRAFT

HORZ 0 20 40 60 80m
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ISL Engineering and Land Services

LLOYDMINSTER Canada's Border City

Legend

- SIDEWALKS
- ROADWAY
- BERMS
- DRAINAGE CHANNEL
- EASEMENT
- POND
- HIGHWAY COMMERICAL
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- FUTURE LIGHT INDUSTRIAL
- ROAD CLOSURE
- CURRENT CITY BOUNDARY
- PROPOSED RIGHT-of-WAY
- TRAFFIC CONTROL
- PEDESTRIAN CONTROL

Project 40 AVENUE CONCEPT PLAN

Title 35,000 POPULATION HORIZON

Exhibit No. A5 Date August 30, 2013

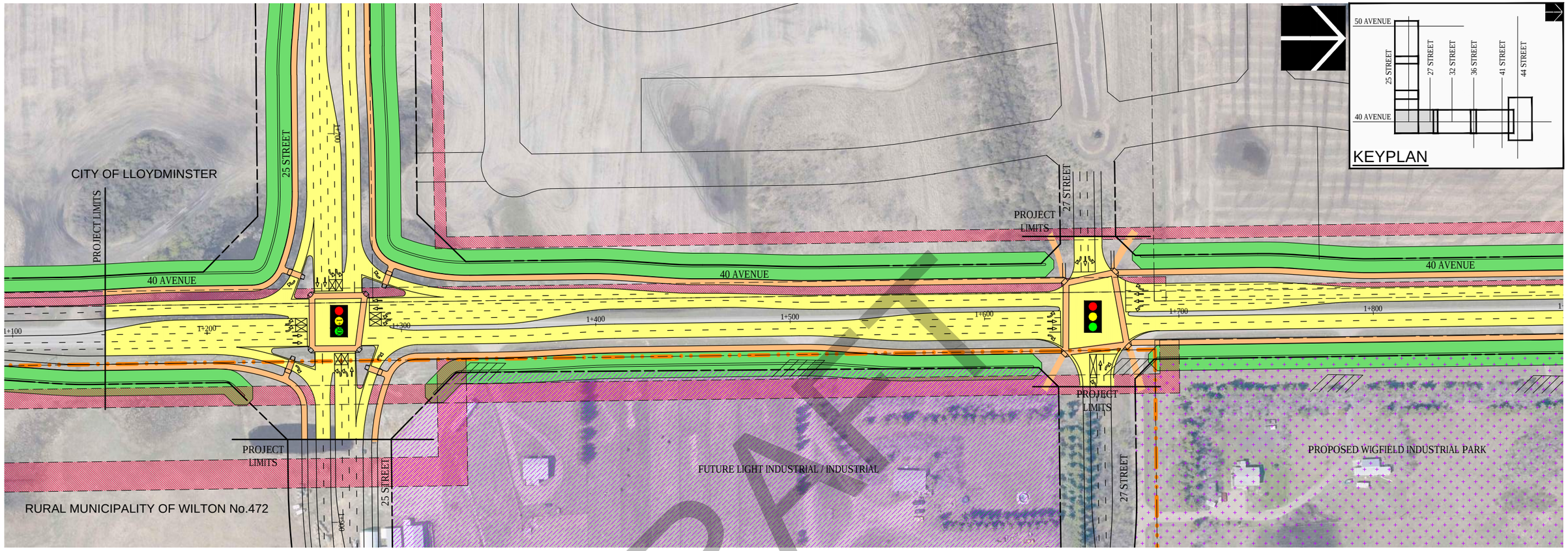
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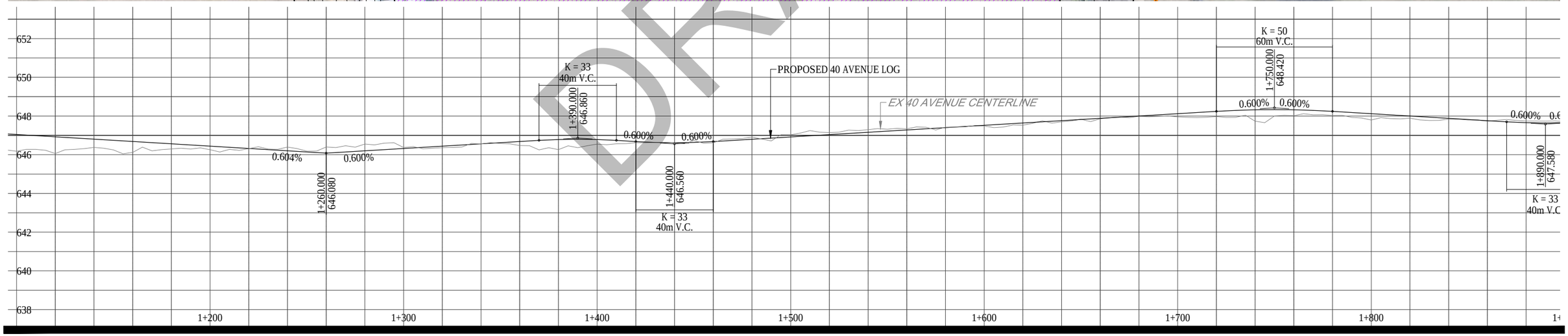
DRAFT

100,000 Population Horizon Plans and Profiles

DRAFT

DRAFT





DRAFT

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ISL Engineering and Land Services

LLOYDMINSTER Canada's Border City

Legend

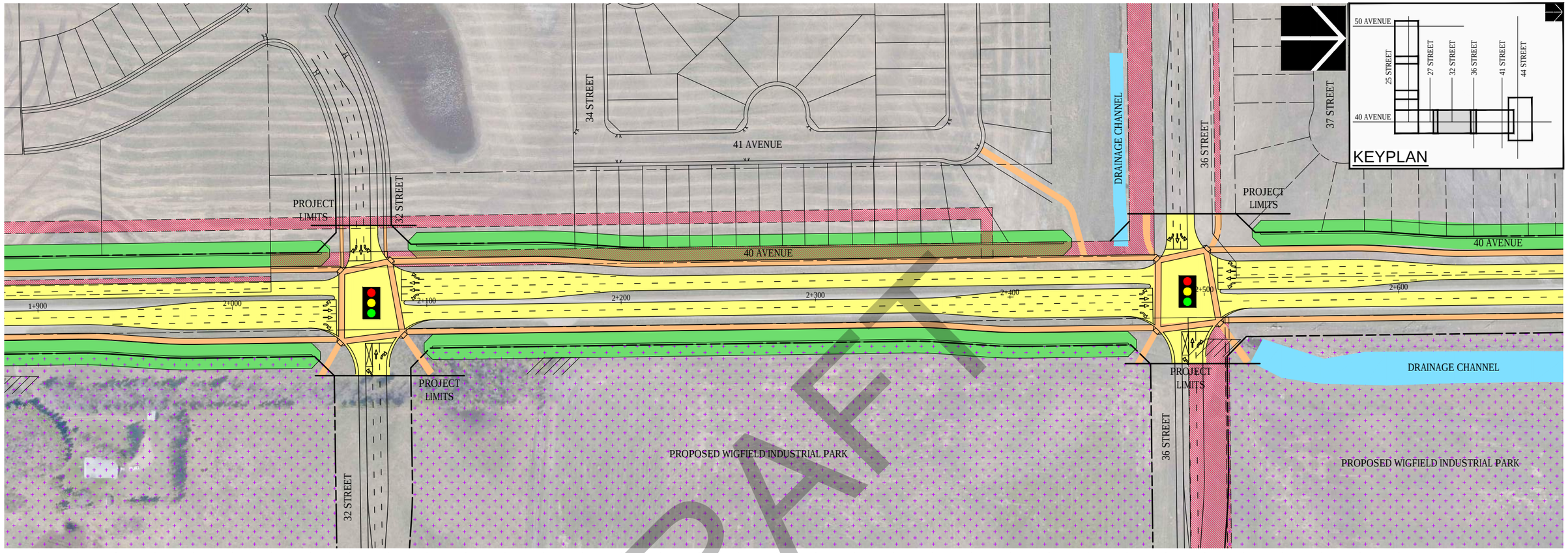
- SIDEWALKS
- ROADWAY
- BERMS
- DRAINAGE CHANNEL
- EASEMENT
- POND
- HIGHWAY COMMERICAL
- WIGFIELD INDUSTRIAL PARK
- FUTURE LIGHT INDUSTRIAL
- ROAD CLOSURE
- CURRENT CITY BOUNDARY
- PROPOSED RIGHT-of-WAY
- TRAFFIC CONTROL
- PEDESTRIAN CONTROL

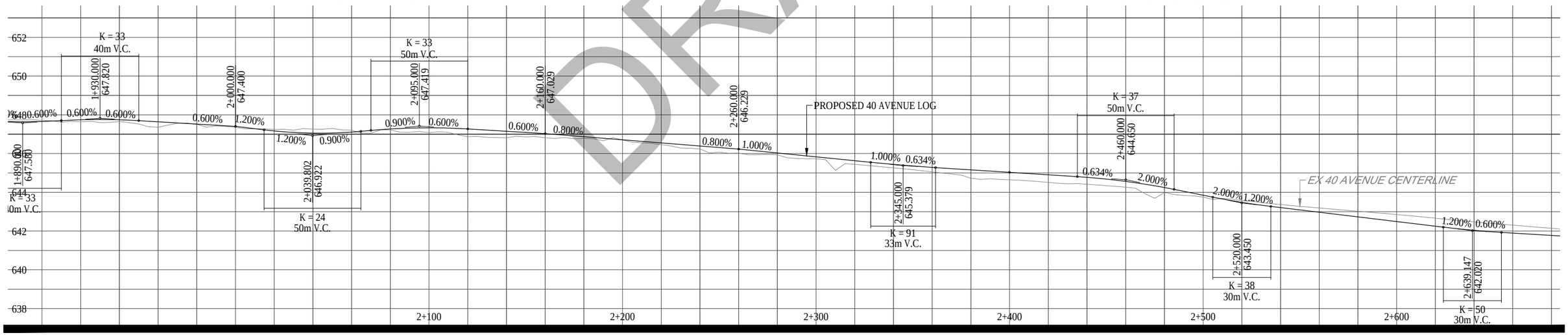
Project 40 AVENUE CONCEPT PLAN

Title ULTIMATE STAGE (100,000 POPULATION HORIZON)

Exhibit No. C4 Date August 30, 2013

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DRAFT

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VERT 0 2 4 6 8m
1:200

ISL Engineering and Land Services

LLOYDMINSTER
Canada's Border City

Legend

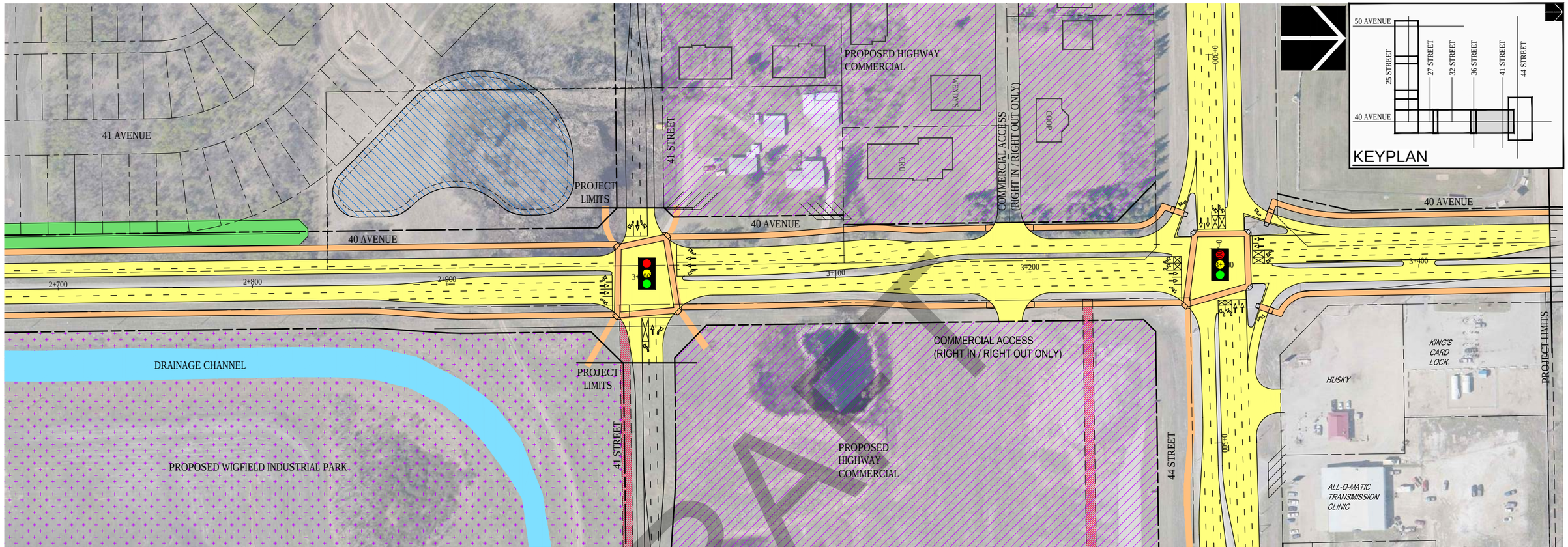
- SIDEWALKS
- ROADWAY
- BERMS
- DRAINAGE CHANNEL
- EASEMENT
- POND
- HIGHWAY COMMERICAL
- WIGFIELD INDUSTRIAL PARK
- FUTURE LIGHT INDUSTRIAL
- ROAD CLOSURE
- CURRENT CITY BOUNDARY
- PROPOSED RIGHT-of-WAY
- TRAFFIC CONTROL
- PEDESTRIAN CONTROL

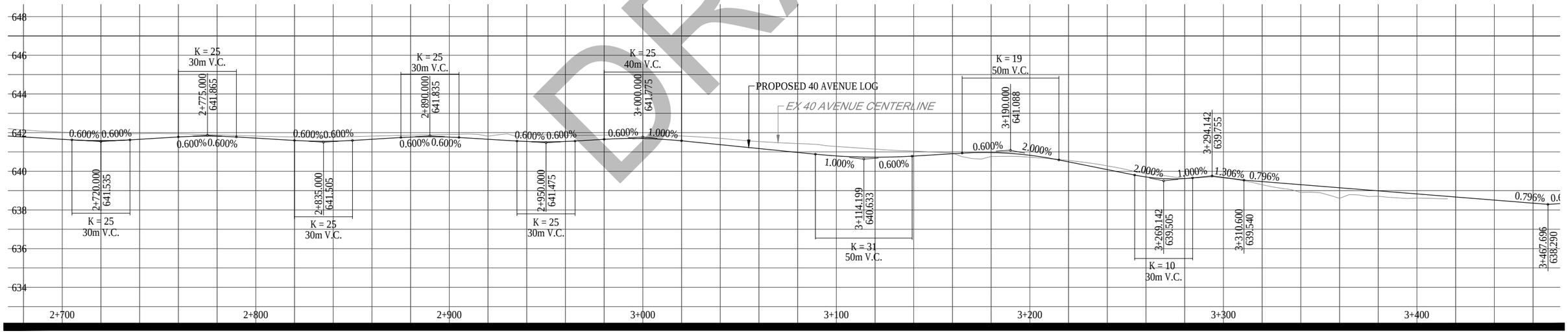
Project 40 AVENUE CONCEPT PLAN

Title ULTIMATE STAGE
(100,000 POPULATION HORIZON)

Exhibit No. C5 Date August 30, 2013

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DRAFT

HORZ 1:2000 0 20 40 60 80m
VERT 1:200 0 2 4 6 8m

ISL Engineering and Land Services

LLOYDMINSTER Canada's Border City

Legend

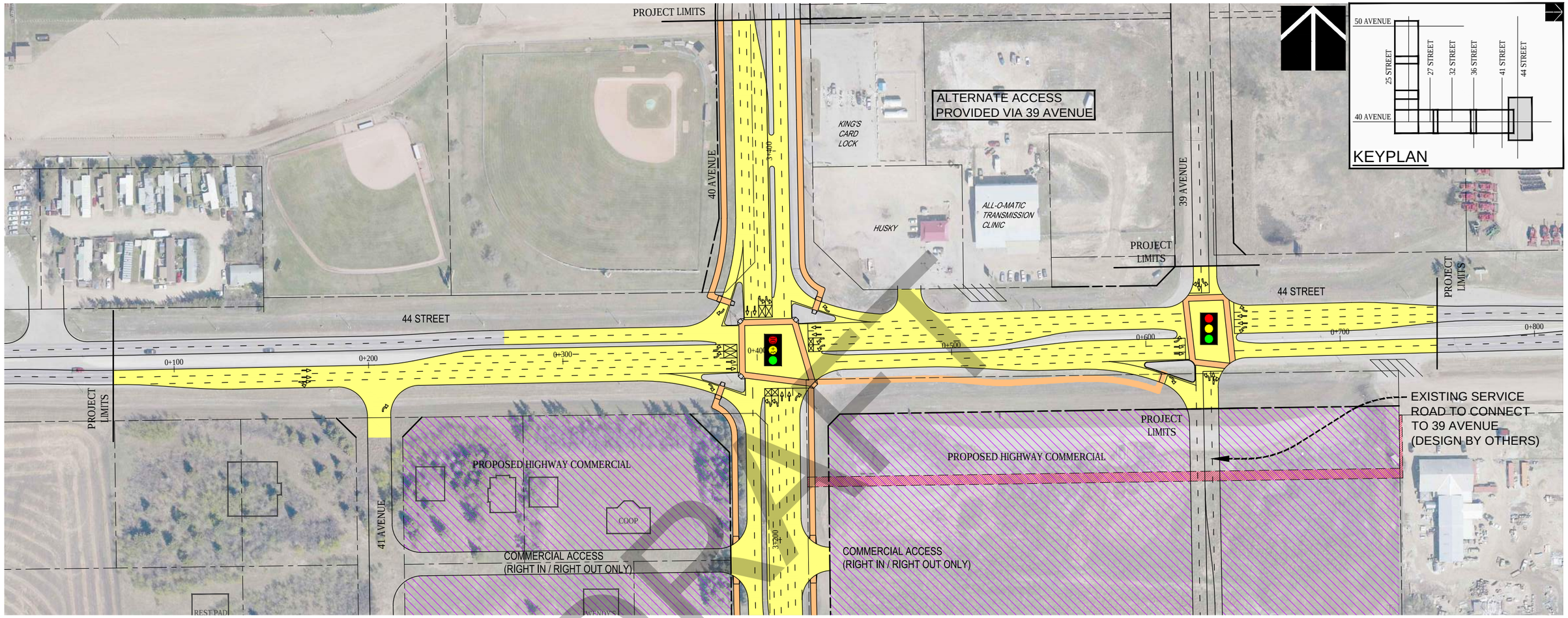
- SIDEWALKS
- ROADWAY
- BERMS
- DRAINAGE CHANNEL
- EASEMENT
- POND
- HIGHWAY COMMERICAL
- WIGFIELD INDUSTRIAL PARK
- FUTURE LIGHT INDUSTRIAL
- ROAD CLOSURE
- CURRENT CITY BOUNDARY
- PROPOSED RIGHT-of-WAY
- TRAFFIC CONTROL
- PEDESTRIAN CONTROL

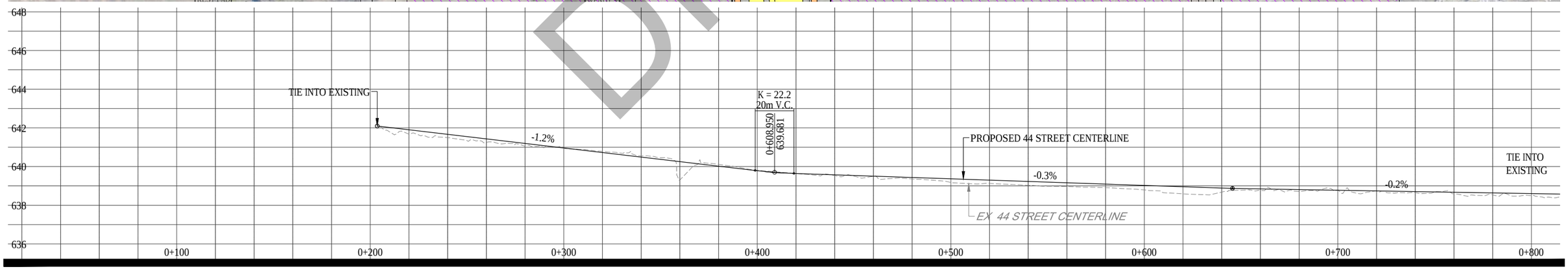
Project 40 AVENUE CONCEPT PLAN

Title ULTIMATE STAGE (100,000 POPULATION HORIZON)

Exhibit No. C6 Date August 30, 2013

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DRAFT

HORZ 1:2000 0 20 40 60 80m
VERT 1:200 0 2 4 6 8m

ISL Engineering and Land Services

LLOYDMINSTER Canada's Border City

Legend

- SIDEWALKS
- ROADWAY
- BERMS
- DRAINAGE CHANNEL
- EASEMENT
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- TRAFFIC CONTROL
- PEDESTRIAN CONTROL

Project 40 AVENUE CONCEPT PLAN

Title ULTIMATE STAGE (100,000 POPULATION HORIZON)

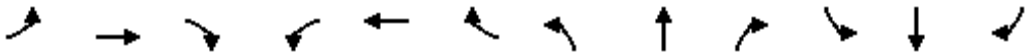
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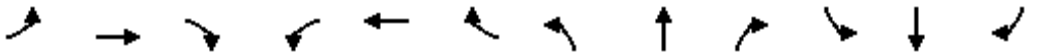
APPENDIX C
Synchro Report



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	478	10	10	466	10	10	2	10	10	2	10
Future Volume (vph)	10	478	10	10	466	10	10	2	10	10	2	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	180.0		60.0	60.0		130.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850		0.938			0.938	
Flt Protected	0.950			0.950				0.978			0.978	
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	0	1728	0	0	1728	0
Flt Permitted	0.950			0.950				0.978			0.978	
Satd. Flow (perm)	1789	3579	1601	1789	3579	1601	0	1728	0	0	1728	0
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		567.2			295.2			164.6			169.3	
Travel Time (s)		34.0			17.7			9.9			10.2	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	520	11	11	507	11	11	2	11	11	2	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	520	11	11	507	11	0	24	0	0	24	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

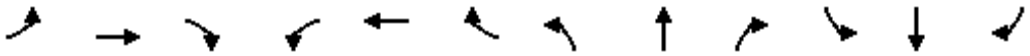
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.8%		ICU Level of Service A	
Analysis Period (min) 15			

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	255	25	108	249	108	98	172	110	111	137	47
Future Volume (vph)	115	255	25	108	249	108	98	172	110	111	137	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		60.0	120.0		300.0	100.0		100.0	100.0		100.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.585			0.581			0.650			0.608		
Satd. Flow (perm)	1097	3579	1572	1091	3579	1575	1220	1883	1575	1142	1883	1575
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			117			120			182
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		786.6			567.2			287.0			105.8	
Travel Time (s)		47.2			34.0			17.2			6.3	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	277	27	117	271	117	107	187	120	121	149	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	277	27	117	271	117	107	187	120	121	149	51
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.0			6.0			6.0			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm

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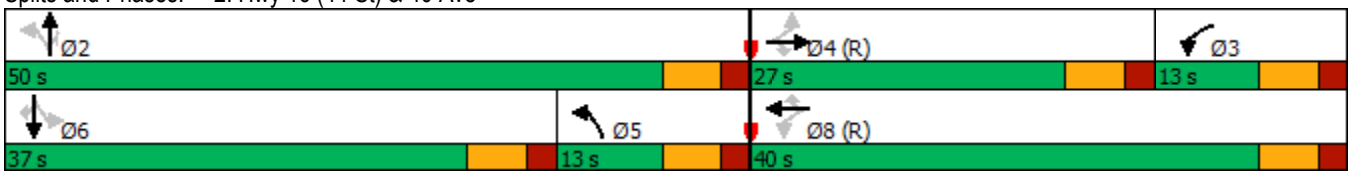
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	3	8	8	5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	10.0	7.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	24.0	24.0	24.0	13.0	24.0	24.0	13.0	40.0	40.0	37.0	37.0	37.0
Total Split (s)	27.0	27.0	27.0	13.0	40.0	40.0	13.0	50.0	50.0	37.0	37.0	37.0
Total Split (%)	30.0%	30.0%	30.0%	14.4%	44.4%	44.4%	14.4%	55.6%	55.6%	41.1%	41.1%	41.1%
Maximum Green (s)	21.0	21.0	21.0	7.0	34.0	34.0	7.0	44.0	44.0	31.0	31.0	31.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag			Lag			Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)								7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)								27.0	27.0	24.0	24.0	24.0
Pedestrian Calls (#/hr)								5	5	5	5	5
Act Effct Green (s)	38.6	38.6	38.6	49.0	49.0	49.0	30.4	29.0	29.0	18.6	18.6	18.6
Actuated g/C Ratio	0.43	0.43	0.43	0.54	0.54	0.54	0.34	0.32	0.32	0.21	0.21	0.21
v/c Ratio	0.27	0.18	0.03	0.18	0.14	0.13	0.23	0.31	0.20	0.51	0.38	0.11
Control Delay	24.0	20.1	0.1	14.7	12.5	3.7	20.8	22.3	3.9	38.2	32.3	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	20.1	0.1	14.7	12.5	3.7	20.8	22.3	3.9	38.2	32.3	0.5
LOS	C	C	A	B	B	A	C	C	A	D	C	A
Approach Delay		20.0			10.9			16.6			29.5	
Approach LOS		B			B			B			C	
Queue Length 50th (m)	14.7	16.5	0.0	9.5	11.6	0.0	14.2	25.8	0.0	20.8	24.8	0.0
Queue Length 95th (m)	37.9	33.6	0.0	26.0	26.2	10.6	19.3	31.2	8.6	30.7	33.7	0.0
Internal Link Dist (m)		762.6			543.2			263.0			81.8	
Turn Bay Length (m)	120.0		60.0	120.0		300.0	100.0		100.0	100.0		100.0
Base Capacity (vph)	469	1533	777	647	1947	910	456	920	831	393	648	661
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.18	0.03	0.18	0.14	0.13	0.23	0.20	0.14	0.31	0.23	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 18.2		Intersection LOS: B	
Intersection Capacity Utilization 64.1%		ICU Level of Service C	

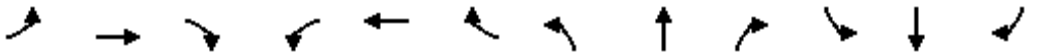
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Analysis Period (min) 15

Splits and Phases: 2: Hwy 16 (44 St) & 40 Ave

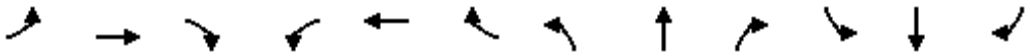


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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	0	8	9	1	11	8	253	12	11	194	8
Future Volume (vph)	52	0	8	9	1	11	8	253	12	11	194	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	90.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.97		0.99	0.97		0.99	1.00		0.99		0.97
Frt		0.850			0.862			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1555	0	1789	1580	0	1789	1868	0	1789	1883	1601
Flt Permitted	0.749			0.407			0.626			0.583		
Satd. Flow (perm)	1398	1555	0	761	1580	0	1171	1868	0	1092	1883	1555
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		569			12			4				153
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		224.2			166.6			519.4			287.0	
Travel Time (s)		13.5			10.0			31.2			17.2	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	0	9	10	1	12	9	275	13	12	211	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	9	0	10	13	0	9	288	0	12	211	9
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	24.0	24.0		10.0	24.0		24.0	24.0		24.0	24.0	24.0
Total Split (s)	24.0	24.0		12.0	32.0		28.0	28.0		28.0	28.0	28.0
Total Split (%)	37.5%	37.5%		18.8%	50.0%		43.8%	43.8%		43.8%	43.8%	43.8%
Maximum Green (s)	18.0	18.0		6.0	26.0		22.0	22.0		22.0	22.0	22.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	5	5			5		5	5		5	5	5
Act Effct Green (s)	9.5	9.5		11.7	11.7		47.3	47.3		47.3	47.3	47.3
Actuated g/C Ratio	0.15	0.15		0.18	0.18		0.74	0.74		0.74	0.74	0.74
v/c Ratio	0.28	0.01		0.04	0.04		0.01	0.21		0.01	0.15	0.01
Control Delay	25.5	0.0		16.1	8.3		10.6	8.6		9.5	7.6	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	25.5	0.0		16.1	8.3		10.6	8.6		9.5	7.6	0.0
LOS	C	A		B	A		B	A		A	A	A
Approach Delay		22.1			11.7			8.7			7.4	
Approach LOS		C			B			A			A	
Queue Length 50th (m)	6.6	0.0		1.1	0.1		0.4	14.7		0.4	7.4	0.0
Queue Length 95th (m)	13.3	0.0		2.8	2.5		m3.2	39.7		4.2	34.5	0.0
Internal Link Dist (m)		200.2			142.6			495.4			263.0	
Turn Bay Length (m)	60.0			60.0			60.0			90.0		
Base Capacity (vph)	393	846		237	747		866	1382		807	1393	1190
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.15	0.01		0.04	0.02		0.01	0.21		0.01	0.15	0.01

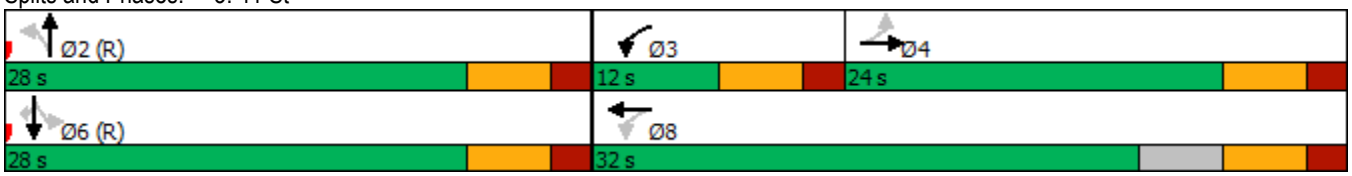
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Intersection Summary			
Area Type:	Other		
Cycle Length: 64			
Actuated Cycle Length: 64			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.28			
Intersection Signal Delay: 9.7		Intersection LOS: A	
Intersection Capacity Utilization 38.5%		ICU Level of Service A	

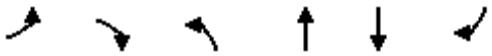
Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: 41 St

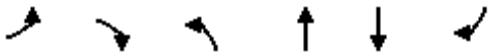


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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	107	25	46	166	147	64
Future Volume (vph)	107	25	46	166	147	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0	60.0	60.0			60.0
Storage Lanes	1	0	0			0
Taper Length (m)	25.0		25.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.97		1.00	0.99	
Frt		0.850			0.959	
Flt Protected	0.950			0.989		
Satd. Flow (prot)	1789	1601	0	1863	1790	0
Flt Permitted	0.950			0.903		
Satd. Flow (perm)	1773	1555	0	1698	1790	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		27			52	
Link Speed (k/h)	60			60	60	
Link Distance (m)	241.7			126.6	519.4	
Travel Time (s)	14.5			7.6	31.2	
Confl. Peds. (#/hr)	5	5	5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	116	27	50	180	160	70
Shared Lane Traffic (%)						
Lane Group Flow (vph)	116	27	0	230	230	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	pm+pt	Perm	Perm	NA	NA	

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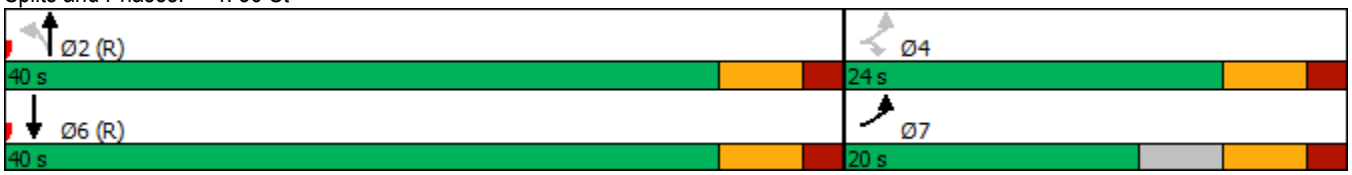
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	7			2	6	
Permitted Phases	4	4	2			
Detector Phase	7	4	2	2	6	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	10.0	24.0	24.0	24.0	24.0	
Total Split (s)	20.0	24.0	40.0	40.0	40.0	
Total Split (%)	31.3%	37.5%	62.5%	62.5%	62.5%	
Maximum Green (s)	14.0	18.0	34.0	34.0	34.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)		7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		5	5	5	5	
Act Effct Green (s)	10.5	10.4		45.1	45.1	
Actuated g/C Ratio	0.16	0.16		0.70	0.70	
v/c Ratio	0.40	0.10		0.19	0.18	
Control Delay	26.5	9.0		5.9	8.6	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	26.5	9.0		5.9	8.6	
LOS	C	A		A	A	
Approach Delay	23.2			5.9	8.6	
Approach LOS	C			A	A	
Queue Length 50th (m)	13.4	0.0		9.2	5.5	
Queue Length 95th (m)	22.8	5.1		25.7	36.5	
Internal Link Dist (m)	217.7			102.6	495.4	
Turn Bay Length (m)	60.0	60.0				
Base Capacity (vph)	503	456		1197	1277	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.23	0.06		0.19	0.18	

Intersection Summary	
Area Type:	Other
Cycle Length: 64	
Actuated Cycle Length: 64	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.40	
Intersection Signal Delay: 11.0	Intersection LOS: B
Intersection Capacity Utilization 47.2%	ICU Level of Service A

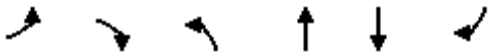
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Analysis Period (min) 15

Splits and Phases: 4: 36 St



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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	153	53	14	59	98	74
Future Volume (vph)	153	53	14	59	98	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0	60.0	60.0			60.0
Storage Lanes	1	0	0			0
Taper Length (m)	25.0		25.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.942	
Flt Protected	0.950			0.991		
Satd. Flow (prot)	1789	1601	0	1866	1774	0
Flt Permitted	0.950			0.991		
Satd. Flow (perm)	1789	1601	0	1866	1774	0
Link Speed (k/h)	60			60	60	
Link Distance (m)	252.3			793.2	292.1	
Travel Time (s)	15.1			47.6	17.5	
Confl. Peds. (#/hr)	5	5	5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	166	58	15	64	107	80
Shared Lane Traffic (%)						
Lane Group Flow (vph)	166	58	0	79	187	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

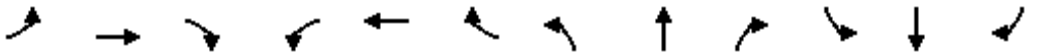
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.1%		ICU Level of Service A	
Analysis Period (min) 15			

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	655	10	10	719	10	10	2	10	10	2	10
Future Volume (vph)	10	655	10	10	719	10	10	2	10	10	2	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	180.0		60.0	60.0		130.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850		0.938			0.938	
Flt Protected	0.950			0.950				0.978			0.978	
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	0	1728	0	0	1728	0
Flt Permitted	0.950			0.950				0.978			0.978	
Satd. Flow (perm)	1789	3579	1601	1789	3579	1601	0	1728	0	0	1728	0
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		567.2			295.2			164.6			169.3	
Travel Time (s)		34.0			17.7			9.9			10.2	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	712	11	11	782	11	11	2	11	11	2	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	712	11	11	782	11	0	24	0	0	24	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

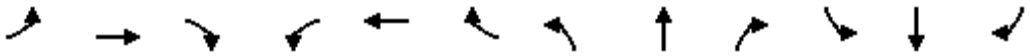
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.4%		ICU Level of Service A	
Analysis Period (min) 15			

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	451	56	150	455	108	123	72	90	114	227	79
Future Volume (vph)	57	451	56	150	455	108	123	72	90	114	227	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		60.0	120.0		300.0	100.0		100.0	100.0		100.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.453			0.439			0.432			0.706		
Satd. Flow (perm)	852	3579	1575	825	3579	1575	811	1883	1576	1324	1883	1574
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			149			117			98			149
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		786.6			567.2			287.0			105.8	
Travel Time (s)		47.2			34.0			17.2			6.3	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	490	61	163	495	117	134	78	98	124	247	86
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	490	61	163	495	117	134	78	98	124	247	86
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.0			6.0			6.0			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm

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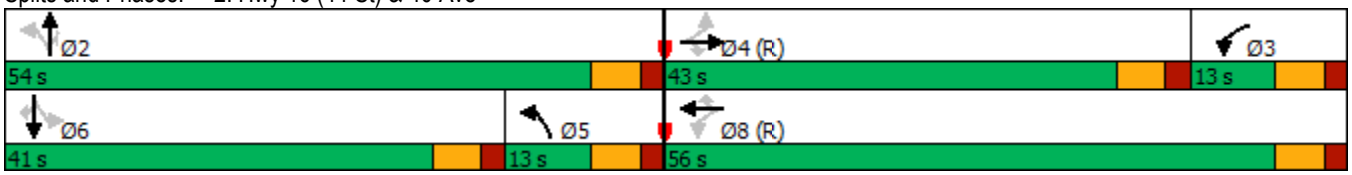
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	3	8	8	5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	10.0	7.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	43.0	43.0	43.0	13.0	47.0	47.0	13.0	40.0	40.0	41.0	41.0	41.0
Total Split (s)	43.0	43.0	43.0	13.0	56.0	56.0	13.0	54.0	54.0	41.0	41.0	41.0
Total Split (%)	39.1%	39.1%	39.1%	11.8%	50.9%	50.9%	11.8%	49.1%	49.1%	37.3%	37.3%	37.3%
Maximum Green (s)	37.0	37.0	37.0	7.0	50.0	50.0	7.0	48.0	48.0	35.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag			Lag			Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0		7.0	7.0				7.0	7.0	7.0
Flash Dont Walk (s)	30.0	30.0	30.0		34.0	34.0				28.0	28.0	28.0
Pedestrian Calls (#/hr)	5	5	5		5	5				5	5	5
Act Effct Green (s)	50.0	50.0	50.0	63.0	63.0	63.0	35.0	35.0	35.0	21.9	21.9	21.9
Actuated g/C Ratio	0.45	0.45	0.45	0.57	0.57	0.57	0.32	0.32	0.32	0.20	0.20	0.20
v/c Ratio	0.16	0.30	0.08	0.31	0.24	0.12	0.42	0.13	0.17	0.47	0.66	0.20
Control Delay	22.2	21.0	0.2	16.8	13.2	3.2	33.5	25.0	5.0	43.2	48.3	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	21.0	0.2	16.8	13.2	3.2	33.5	25.0	5.0	43.2	48.3	1.3
LOS	C	C	A	B	B	A	C	C	A	D	D	A
Approach Delay		19.0			12.4			22.3			38.1	
Approach LOS		B			B			C			D	
Queue Length 50th (m)	7.7	34.4	0.0	15.5	26.1	0.0	22.9	12.9	0.0	25.6	53.2	0.0
Queue Length 95th (m)	21.2	59.6	0.0	35.7	48.6	10.1	31.1	19.6	9.7	37.4	67.3	1.1
Internal Link Dist (m)		762.6			543.2			263.0			81.8	
Turn Bay Length (m)	120.0		60.0	120.0		300.0	100.0		100.0	100.0		100.0
Base Capacity (vph)	387	1628	797	534	2051	952	320	821	742	421	599	602
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.30	0.08	0.31	0.24	0.12	0.42	0.10	0.13	0.29	0.41	0.14

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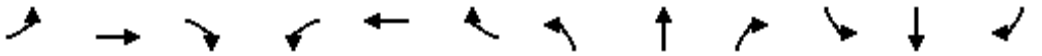
Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 21.2		Intersection LOS: C	
Intersection Capacity Utilization 87.5%		ICU Level of Service E	

Analysis Period (min) 15

Splits and Phases: 2: Hwy 16 (44 St) & 40 Ave

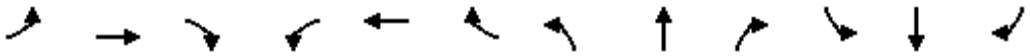


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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	1	19	19	0	12	12	245	5	8	388	37
Future Volume (vph)	28	1	19	19	0	12	12	245	5	8	388	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	90.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.97		0.99	0.97		1.00	1.00		0.99		0.97
Frt		0.857			0.850			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1570	0	1789	1555	0	1789	1877	0	1789	1883	1601
Flt Permitted	0.749			0.415			0.483			0.593		
Satd. Flow (perm)	1399	1570	0	776	1555	0	906	1877	0	1110	1883	1555
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			353			2				156
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		224.2			166.6			519.4			287.0	
Travel Time (s)		13.5			10.0			31.2			17.2	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	1	21	21	0	13	13	266	5	9	422	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	22	0	21	13	0	13	271	0	9	422	40
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		15.0	15.0		15.0	15.0	15.0
Minimum Split (s)	24.0	24.0		13.0	24.0		24.0	24.0		24.0	24.0	24.0
Total Split (s)	24.0	24.0		13.0	34.0		26.0	26.0		26.0	26.0	26.0
Total Split (%)	38.1%	38.1%		20.6%	54.0%		41.3%	41.3%		41.3%	41.3%	41.3%
Maximum Green (s)	18.0	18.0		7.0	28.0		20.0	20.0		20.0	20.0	20.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	5	5			5		5	5		5	5	5
Act Effct Green (s)	11.6	11.6		13.0	14.2		45.6	45.6		45.6	45.6	45.6
Actuated g/C Ratio	0.18	0.18		0.21	0.23		0.72	0.72		0.72	0.72	0.72
v/c Ratio	0.12	0.07		0.08	0.02		0.02	0.20		0.01	0.31	0.03
Control Delay	21.0	9.8		16.1	0.1		10.3	8.4		10.2	9.6	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	21.0	9.8		16.1	0.1		10.3	8.4		10.2	9.6	0.1
LOS	C	A		B	A		B	A		B	A	A
Approach Delay		16.3			9.9			8.5			8.8	
Approach LOS		B			A			A			A	
Queue Length 50th (m)	3.2	0.1		2.2	0.0		0.5	11.2		0.3	19.4	0.0
Queue Length 95th (m)	8.2	4.6		4.2	0.0		4.5	45.3		3.5	#76.2	0.0
Internal Link Dist (m)		200.2			142.6			495.4			263.0	
Turn Bay Length (m)	60.0			60.0			60.0			90.0		
Base Capacity (vph)	399	463		272	944		655	1359		803	1363	1168
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.08	0.05		0.08	0.01		0.02	0.20		0.01	0.31	0.03

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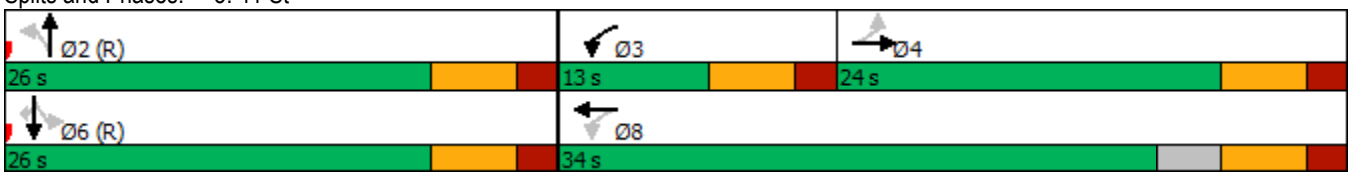
Intersection Summary			
Area Type:	Other		
Cycle Length: 63			
Actuated Cycle Length: 63			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.31			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 51.9%		ICU Level of Service A	

Analysis Period (min) 15

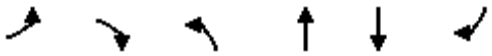
\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: 41 St

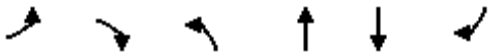


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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	53	41	36	209	256	170
Future Volume (vph)	53	41	36	209	256	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0	60.0	60.0			60.0
Storage Lanes	1	0	0			0
Taper Length (m)	25.0		25.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.97		1.00	0.99	
Frt		0.850			0.946	
Flt Protected	0.950			0.993		
Satd. Flow (prot)	1789	1601	0	1870	1763	0
Flt Permitted	0.950			0.904		
Satd. Flow (perm)	1777	1558	0	1702	1763	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		45			80	
Link Speed (k/h)	60			60	60	
Link Distance (m)	241.7			126.6	519.4	
Travel Time (s)	14.5			7.6	31.2	
Confl. Peds. (#/hr)	5	5	5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	58	45	39	227	278	185
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	45	0	266	463	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	pm+pt	Perm	Perm	NA	NA	

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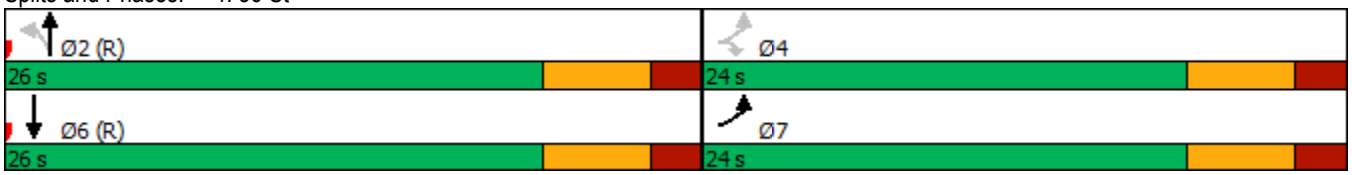
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	7			2	6	
Permitted Phases	4	4	2			
Detector Phase	7	4	2	2	6	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	10.0	24.0	24.0	24.0	24.0	
Total Split (s)	24.0	24.0	26.0	26.0	26.0	
Total Split (%)	48.0%	48.0%	52.0%	52.0%	52.0%	
Maximum Green (s)	18.0	18.0	20.0	20.0	20.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)		7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		5	5	5	5	
Act Effct Green (s)	8.9	8.8		36.2	36.2	
Actuated g/C Ratio	0.18	0.18		0.72	0.72	
v/c Ratio	0.18	0.15		0.22	0.36	
Control Delay	16.7	6.2		6.5	6.4	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	16.7	6.2		6.5	6.4	
LOS	B	A		A	A	
Approach Delay	12.1			6.5	6.4	
Approach LOS	B			A	A	
Queue Length 50th (m)	4.9	0.0		9.1	14.2	
Queue Length 95th (m)	9.3	4.9		32.2	51.4	
Internal Link Dist (m)	217.7			102.6	495.4	
Turn Bay Length (m)	60.0	60.0				
Base Capacity (vph)	644	589		1233	1300	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.09	0.08		0.22	0.36	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 50			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.36			
Intersection Signal Delay: 7.2		Intersection LOS: A	
Intersection Capacity Utilization 54.9%		ICU Level of Service A	

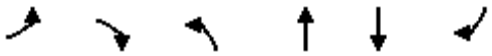
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Analysis Period (min) 15

Splits and Phases: 4: 36 St



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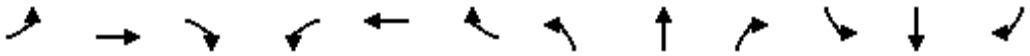
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	40	10	54	205	195	102
Future Volume (vph)	40	10	54	205	195	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0	60.0	60.0			60.0
Storage Lanes	1	0	0			0
Taper Length (m)	25.0		25.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.954	
Flt Protected	0.950			0.990		
Satd. Flow (prot)	1789	1601	0	1865	1797	0
Flt Permitted	0.950			0.990		
Satd. Flow (perm)	1789	1601	0	1865	1797	0
Link Speed (k/h)	60			60	60	
Link Distance (m)	252.3			793.2	292.1	
Travel Time (s)	15.1			47.6	17.5	
Confl. Peds. (#/hr)	5	5	5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	11	59	223	212	111
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	11	0	282	323	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	1374	40	40	1171	50	40	5	40	5	5	5
Future Volume (vph)	50	1374	40	40	1171	50	40	5	40	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		0.0	0.0		60.0
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.866				0.850
Flt Protected	0.950			0.950			0.950				0.976	
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	1789	1631	0	0	1838	1601
Flt Permitted	0.200			0.153			0.751				0.877	
Satd. Flow (perm)	377	3579	1601	288	3579	1601	1414	1631	0	0	1652	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			36			54		43				22
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		312.2			262.4			149.4			186.9	
Travel Time (s)		18.7			15.7			9.0			11.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	1493	43	43	1273	54	43	5	43	5	5	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	1493	43	43	1273	54	43	48	0	0	10	5
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		4

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2	2	6	6	6	8	8		4	4	4
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	40.0	40.0		40.0	40.0	40.0
Total Split (s)	110.0	110.0	110.0	110.0	110.0	110.0	40.0	40.0		40.0	40.0	40.0
Total Split (%)	73.3%	73.3%	73.3%	73.3%	73.3%	73.3%	26.7%	26.7%		26.7%	26.7%	26.7%
Maximum Green (s)	104.0	104.0	104.0	104.0	104.0	104.0	34.0	34.0		34.0	34.0	34.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	Min	Min		Min	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0	18.0	27.0	27.0		27.0	27.0	27.0
Pedestrian Calls (#/hr)	5	5	5	5	5	5	5	5		5	5	5
Act Effct Green (s)	122.9	122.9	122.9	122.9	122.9	122.9	15.1	15.1			15.1	15.1
Actuated g/C Ratio	0.82	0.82	0.82	0.82	0.82	0.82	0.10	0.10			0.10	0.10
v/c Ratio	0.18	0.51	0.03	0.18	0.43	0.04	0.30	0.24			0.06	0.03
Control Delay	2.6	2.2	0.1	1.2	0.4	0.0	64.7	19.8			56.0	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	2.6	2.3	0.1	1.2	0.4	0.0	64.7	19.8			56.0	0.2
LOS	A	A	A	A	A	A	E	B			E	A
Approach Delay		2.2			0.4			41.0			37.4	
Approach LOS		A			A			D			D	
Queue Length 50th (m)	1.2	17.7	0.0	0.0	0.3	0.0	13.2	1.5			3.0	0.0
Queue Length 95th (m)	m2.4	m28.9	m0.0	m0.1	1.0	m0.0	22.4	12.9			8.0	0.0
Internal Link Dist (m)		288.2			238.4			125.4			162.9	
Turn Bay Length (m)	60.0		60.0	60.0		60.0	60.0					60.0
Base Capacity (vph)	308	2931	1317	235	2931	1321	320	402			374	379
Starvation Cap Reductn	0	130	0	0	152	0	0	0			0	0
Spillback Cap Reductn	0	1	0	0	0	0	0	0			0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0			0	0
Reduced v/c Ratio	0.18	0.53	0.03	0.18	0.46	0.04	0.13	0.12			0.03	0.01

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Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 92 (61%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 2.7	Intersection LOS: A
Intersection Capacity Utilization 64.0%	ICU Level of Service C
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

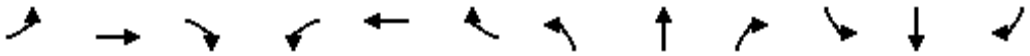
Splits and Phases: 1: 39 Ave



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	551	501	410	400	333	483	490	598	563	400	394	304
Future Volume (vph)	551	501	410	400	333	483	490	598	563	400	394	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		120.0	120.0		120.0	100.0		100.0	100.0		100.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3471	3579	1601	3471	3579	1601	3471	3579	1601	3471	3579	1601
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3471	3579	1601	3471	3579	1601	3471	3579	1601	3471	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65			330			347			109
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		786.6			312.2			156.5			465.2	
Travel Time (s)		47.2			18.7			9.4			27.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	599	545	446	435	362	525	533	650	612	435	428	330
Shared Lane Traffic (%)												
Lane Group Flow (vph)	599	545	446	435	362	525	533	650	612	435	428	330
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		9.0			9.0			9.0			9.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6		3	8		7	4	5
Permitted Phases			2			6			8			4

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	3	1	6	6	3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	15.0	7.0	7.0	15.0	15.0	7.0	10.0	10.0	7.0	10.0	7.0
Minimum Split (s)	13.0	43.0	13.0	13.0	35.0	35.0	13.0	34.0	34.0	13.0	40.0	13.0
Total Split (s)	35.0	50.0	31.0	29.0	44.0	44.0	31.0	42.0	42.0	29.0	40.0	35.0
Total Split (%)	23.3%	33.3%	20.7%	19.3%	29.3%	29.3%	20.7%	28.0%	28.0%	19.3%	26.7%	23.3%
Maximum Green (s)	29.0	44.0	25.0	23.0	38.0	38.0	25.0	36.0	36.0	23.0	34.0	29.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	None	C-Max	C-Max	None	Min	Min	None	Min	None
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		30.0			22.0	22.0		21.0	21.0		27.0	
Pedestrian Calls (#/hr)		5			5	5		5	5		5	
Act Effct Green (s)	28.3	47.6	85.4	22.3	41.6	41.6	31.8	34.1	34.1	21.9	24.3	58.6
Actuated g/C Ratio	0.19	0.32	0.57	0.15	0.28	0.28	0.21	0.23	0.23	0.15	0.16	0.39
v/c Ratio	0.92	0.48	0.47	0.84	0.36	0.77	0.73	0.80	0.97	0.86	0.74	0.48
Control Delay	79.1	44.0	19.1	57.6	23.4	16.0	61.2	62.7	53.2	79.2	67.4	23.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.1	44.0	19.1	57.6	23.4	16.0	61.2	62.7	53.2	79.2	67.4	23.7
LOS	E	D	B	E	C	B	E	E	D	E	E	C
Approach Delay		50.2			31.7			59.0			59.6	
Approach LOS		D			C			E			E	
Queue Length 50th (m)	95.4	75.2	67.1	73.5	24.7	49.1	78.0	100.3	95.5	68.9	68.7	51.3
Queue Length 95th (m)	#127.3	94.6	113.3	#94.2	41.2	66.5	#119.6	123.9	#176.4	#92.6	81.1	70.6
Internal Link Dist (m)		762.6			288.2			132.5			441.2	
Turn Bay Length (m)	120.0		120.0	120.0		120.0	100.0		100.0	100.0		100.0
Base Capacity (vph)	671	1136	940	532	993	682	735	858	647	532	811	686
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.48	0.47	0.82	0.36	0.77	0.73	0.76	0.95	0.82	0.53	0.48

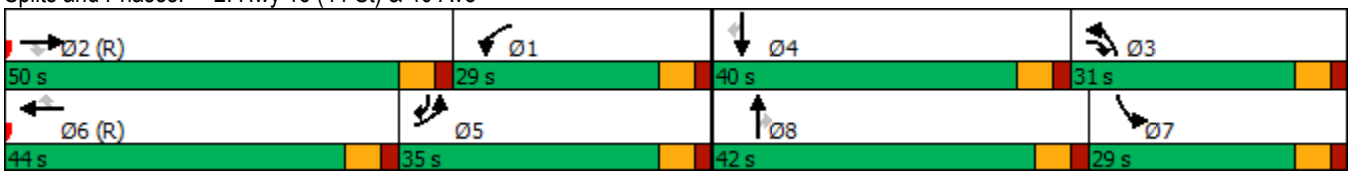
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Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection			
Natural Cycle: 130			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 50.6		Intersection LOS: D	
Intersection Capacity Utilization 77.2%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

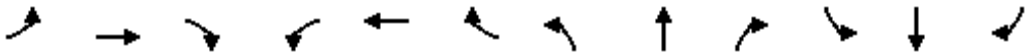
Splits and Phases: 2: Hwy 16 (44 St) & 40 Ave



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	331	5	118	151	5	232	118	1087	118	265	619	320
Future Volume (vph)	331	5	118	151	5	232	118	1087	118	265	619	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	90.0		60.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950	0.954		0.950			0.950			0.950		
Satd. Flow (prot)	1700	1707	1601	1789	1883	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.754	0.729		0.380			0.396			0.095		
Satd. Flow (perm)	1349	1304	1601	716	1883	1601	746	3579	1601	179	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			176			252			126			348
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		224.2			386.6			519.4			130.5	
Travel Time (s)		13.5			23.2			31.2			7.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	360	5	128	164	5	252	128	1182	128	288	673	348
Shared Lane Traffic (%)	49%											
Lane Group Flow (vph)	184	181	128	164	5	252	128	1182	128	288	673	348
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			6.0			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	10.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	45.0	45.0	45.0	13.0	44.0	44.0	13.0	35.0	35.0	13.0	40.0	40.0
Total Split (s)	45.0	45.0	45.0	13.0	58.0	58.0	15.0	50.0	50.0	22.0	57.0	57.0
Total Split (%)	34.6%	34.6%	34.6%	10.0%	44.6%	44.6%	11.5%	38.5%	38.5%	16.9%	43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0	7.0	52.0	52.0	9.0	44.0	44.0	16.0	51.0	51.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead			Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	32.0	32.0	32.0		31.0	31.0		22.0	22.0		27.0	27.0
Pedestrian Calls (#/hr)	5	5	5		5	5		5	5		5	5
Act Effct Green (s)	24.8	24.8	24.8	37.8	37.8	37.8	51.2	51.2	51.2	65.2	65.2	65.2
Actuated g/C Ratio	0.19	0.19	0.19	0.29	0.29	0.29	0.39	0.39	0.39	0.50	0.50	0.50
v/c Ratio	0.72	0.73	0.29	0.62	0.01	0.39	0.35	0.84	0.18	0.77	0.37	0.36
Control Delay	63.5	65.0	3.0	45.6	27.4	5.1	31.1	36.1	9.3	46.5	22.1	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.5	65.0	3.0	45.6	27.4	5.1	31.1	36.1	9.3	46.5	22.1	3.5
LOS	E	E	A	D	C	A	C	D	A	D	C	A
Approach Delay		48.3			21.1			33.3			22.5	
Approach LOS		D			C			C			C	
Queue Length 50th (m)	50.1	49.3	0.0	35.1	1.0	0.0	17.4	118.5	4.1	55.8	55.7	0.0
Queue Length 95th (m)	67.4	66.8	5.2	46.1	3.6	16.7	46.9	#220.6	23.3	#131.6	89.1	19.2
Internal Link Dist (m)		200.2			362.6			495.4			106.5	
Turn Bay Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	90.0		60.0
Base Capacity (vph)	404	391	603	265	753	791	366	1409	706	374	1795	976
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.46	0.21	0.62	0.01	0.32	0.35	0.84	0.18	0.77	0.37	0.36

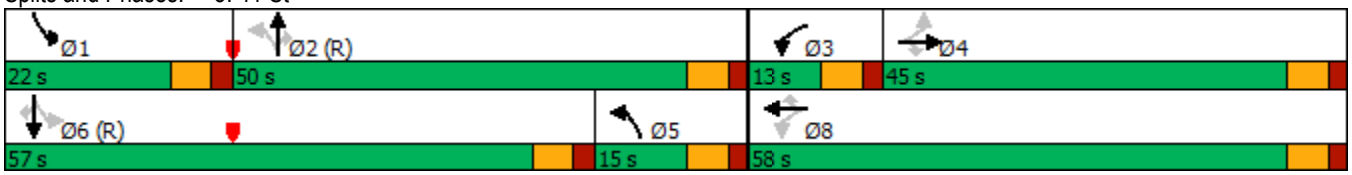
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Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 125			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 30.1		Intersection LOS: C	
Intersection Capacity Utilization 75.7%		ICU Level of Service D	
Analysis Period (min) 15			

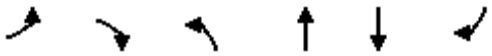
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: 41 St

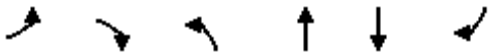


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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	273	144	176	1037	688	200
Future Volume (vph)	273	144	176	1037	688	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0	60.0	60.0			60.0
Storage Lanes	1	0	1			1
Taper Length (m)	25.0		25.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1601	1789	3579	3579	1601
Flt Permitted	0.950		0.347			
Satd. Flow (perm)	1789	1601	654	3579	3579	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		157				217
Link Speed (k/h)	60			60	60	
Link Distance (m)	241.7			421.0	519.4	
Travel Time (s)	14.5			25.3	31.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	297	157	191	1127	748	217
Shared Lane Traffic (%)						
Lane Group Flow (vph)	297	157	191	1127	748	217
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			6.0	6.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	15.0	15.0	15.0	15.0
Minimum Split (s)	43.0	43.0	40.0	40.0	35.0	35.0
Total Split (s)	47.0	47.0	83.0	83.0	83.0	83.0
Total Split (%)	36.2%	36.2%	63.8%	63.8%	63.8%	63.8%
Maximum Green (s)	41.0	41.0	77.0	77.0	77.0	77.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	30.0	30.0	27.0	27.0	22.0	22.0
Pedestrian Calls (#/hr)	5	5	5	5	5	5
Act Effct Green (s)	27.4	27.4	90.6	90.6	90.6	90.6
Actuated g/C Ratio	0.21	0.21	0.70	0.70	0.70	0.70
v/c Ratio	0.79	0.34	0.42	0.45	0.30	0.18
Control Delay	63.1	7.6	5.6	3.7	6.7	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.1	7.6	5.6	3.7	6.7	0.8
LOS	E	A	A	A	A	A
Approach Delay	43.9			4.0	5.4	
Approach LOS	D			A	A	
Queue Length 50th (m)	76.7	0.0	6.7	20.8	20.8	0.0
Queue Length 95th (m)	100.0	16.7	9.7	23.2	29.1	0.0
Internal Link Dist (m)	217.7			397.0	495.4	
Turn Bay Length (m)	60.0	60.0	60.0			60.0
Base Capacity (vph)	564	612	455	2494	2494	1181
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.26	0.42	0.45	0.30	0.18

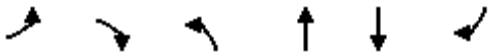
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Intersection Summary	
Area Type:	Other
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 6 (5%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 11.1	Intersection LOS: B
Intersection Capacity Utilization 61.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4:

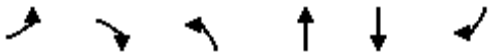


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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	90	40	50	1109	782	60
Future Volume (vph)	90	40	50	1109	782	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0	60.0	60.0			60.0
Storage Lanes	1	0	1			1
Taper Length (m)	25.0		25.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1601	1789	3579	3579	1601
Flt Permitted	0.950		0.321			
Satd. Flow (perm)	1789	1601	605	3579	3579	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		43				65
Link Speed (k/h)	60			60	60	
Link Distance (m)	252.3			561.3	421.0	
Travel Time (s)	15.1			33.7	25.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	43	54	1205	850	65
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	43	54	1205	850	65
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			6.0	6.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	15.0	15.0	15.0	15.0
Minimum Split (s)	43.0	43.0	40.0	40.0	33.0	33.0
Total Split (s)	47.0	47.0	83.0	83.0	83.0	83.0
Total Split (%)	36.2%	36.2%	63.8%	63.8%	63.8%	63.8%
Maximum Green (s)	41.0	41.0	77.0	77.0	77.0	77.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	30.0	30.0	27.0	27.0	20.0	20.0
Pedestrian Calls (#/hr)	5	5	5	5	5	5
Act Effct Green (s)	16.9	16.9	101.1	101.1	101.1	101.1
Actuated g/C Ratio	0.13	0.13	0.78	0.78	0.78	0.78
v/c Ratio	0.42	0.18	0.11	0.43	0.31	0.05
Control Delay	55.0	12.8	5.4	6.0	2.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.0	12.8	5.4	6.0	2.5	0.2
LOS	E	B	A	A	A	A
Approach Delay	42.2			6.0	2.3	
Approach LOS	D			A	A	
Queue Length 50th (m)	25.7	0.0	4.1	55.7	10.3	0.0
Queue Length 95th (m)	35.4	9.4	12.0	89.0	24.7	0.3
Internal Link Dist (m)	228.3			537.3	397.0	
Turn Bay Length (m)	60.0	60.0	60.0			60.0
Base Capacity (vph)	564	534	470	2783	2783	1259
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.08	0.11	0.43	0.31	0.05

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Intersection Summary	
Area Type:	Other
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 1 (1%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 6.7	Intersection LOS: A
Intersection Capacity Utilization 57.4%	ICU Level of Service B
Analysis Period (min) 15	

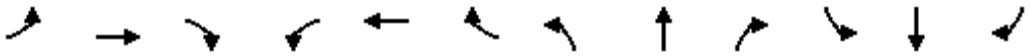
Splits and Phases: 6: 31 St



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	519	11	410	11	11	28	276	544	11	19	472	317
Future Volume (vph)	519	11	410	11	11	28	276	544	11	19	472	317
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.893				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3471	1883	1601	1789	1682	0	3471	3579	1601	1789	3579	1601
Flt Permitted	0.950			0.750			0.950			0.429		
Satd. Flow (perm)	3471	1883	1601	1413	1682	0	3471	3579	1601	808	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			430		30				76			345
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		293.2			157.4			231.2			229.6	
Travel Time (s)		17.6			9.4			13.9			13.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	564	12	446	12	12	30	300	591	12	21	513	345
Shared Lane Traffic (%)												
Lane Group Flow (vph)	564	12	446	12	42	0	300	591	12	21	513	345
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			8.0			8.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases			4	8					2	6		6

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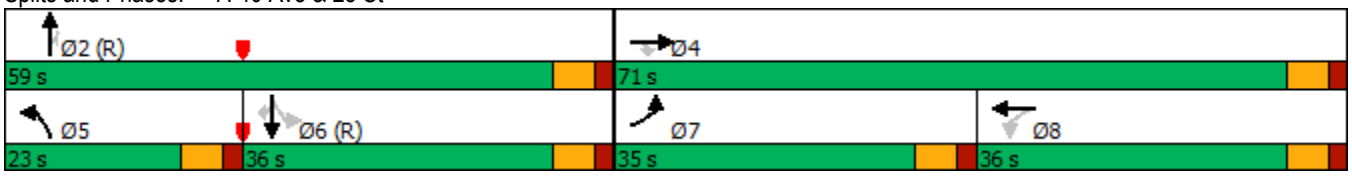


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	10.0	10.0		7.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	36.0	36.0	36.0	36.0		13.0	33.0	33.0	35.0	35.0	35.0
Total Split (s)	35.0	71.0	71.0	36.0	36.0		23.0	59.0	59.0	36.0	36.0	36.0
Total Split (%)	26.9%	54.6%	54.6%	27.7%	27.7%		17.7%	45.4%	45.4%	27.7%	27.7%	27.7%
Maximum Green (s)	29.0	65.0	65.0	30.0	30.0		17.0	53.0	53.0	30.0	30.0	30.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		7.0	7.0	7.0	7.0			7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		23.0	23.0	23.0	23.0			20.0	20.0	22.0	22.0	22.0
Pedestrian Calls (#/hr)		5	5	5	5			5	5	5	5	5
Act Effct Green (s)	25.6	42.4	42.4	14.0	14.0		15.7	75.6	75.6	53.9	53.9	53.9
Actuated g/C Ratio	0.20	0.33	0.33	0.11	0.11		0.12	0.58	0.58	0.41	0.41	0.41
v/c Ratio	0.83	0.02	0.55	0.08	0.20		0.72	0.28	0.01	0.06	0.35	0.40
Control Delay	60.9	23.0	5.2	48.9	23.8		65.0	16.6	0.0	16.9	16.2	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.9	23.0	5.2	48.9	23.8		65.0	16.6	0.0	16.9	16.2	2.8
LOS	E	C	A	D	C		E	B	A	B	B	A
Approach Delay		36.1			29.4			32.4			10.9	
Approach LOS		D			C			C			B	
Queue Length 50th (m)	75.4	2.2	3.0	3.1	3.1		40.4	39.9	0.0	1.8	25.2	0.0
Queue Length 95th (m)	94.1	5.1	19.5	8.2	12.6		56.1	75.0	0.0	6.4	62.2	0.0
Internal Link Dist (m)		269.2			133.4			207.2			205.6	
Turn Bay Length (m)	60.0		60.0	60.0			60.0		60.0	60.0		60.0
Base Capacity (vph)	774	941	1015	326	411		459	2081	963	335	1484	865
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.01	0.44	0.04	0.10		0.65	0.28	0.01	0.06	0.35	0.40

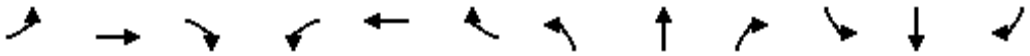
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Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 78 (60%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 27.1		Intersection LOS: C	
Intersection Capacity Utilization 64.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 7: 40 Ave & 25 St



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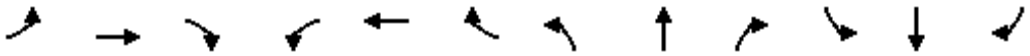
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	20	0	0	20	0	1630	20	0	1184	20
Future Volume (vph)	0	0	20	0	0	20	0	1630	20	0	1184	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.865			0.865		0.998			0.997	
Flt Protected												
Satd. Flow (prot)	0	0	1629	0	0	1629	0	3571	0	0	3568	0
Flt Permitted												
Satd. Flow (perm)	0	0	1629	0	0	1629	0	3571	0	0	3568	0
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		107.7			109.5			130.5			156.5	
Travel Time (s)		6.5			6.6			7.8			9.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	22	0	0	22	0	1772	22	0	1287	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	22	0	0	22	0	1794	0	0	1309	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			8.0			8.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	5	40	17	5	26	50	1033	12	35	739	60
Future Volume (vph)	90	5	40	17	5	26	50	1033	12	35	739	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.754			0.754			0.340			0.232		
Satd. Flow (perm)	1420	1883	1601	1420	1883	1601	640	3579	1601	437	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			43			28			17			65
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		299.6			269.2			229.6			561.3	
Travel Time (s)		18.0			16.2			13.8			33.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	5	43	18	5	28	54	1123	13	38	803	65
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	5	43	18	5	28	54	1123	13	38	803	65
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			6.0			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	42.0	42.0	42.0	42.0	42.0	42.0
Total Split (%)	35.4%	35.4%	35.4%	35.4%	35.4%	35.4%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%
Maximum Green (s)	19.0	19.0	19.0	19.0	19.0	19.0	38.0	38.0	38.0	38.0	38.0	38.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	9.8	9.8	9.8	9.8	9.8	9.8	49.9	49.9	49.9	49.9	49.9	49.9
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.77	0.77	0.77	0.77	0.77	0.77
v/c Ratio	0.46	0.02	0.16	0.08	0.02	0.11	0.11	0.41	0.01	0.11	0.29	0.05
Control Delay	31.2	21.4	9.2	22.6	21.4	10.1	1.8	2.4	0.2	2.5	2.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	21.4	9.2	22.6	21.4	10.1	1.8	2.4	0.2	2.5	2.3	0.2
LOS	C	C	A	C	C	B	A	A	A	A	A	A
Approach Delay		24.4			15.6			2.3			2.2	
Approach LOS		C			B			A			A	
Queue Length 50th (m)	11.5	0.6	0.0	2.0	0.6	0.0	1.0	44.1	0.1	0.8	8.9	0.0
Queue Length 95th (m)	22.9	3.0	7.1	6.6	3.0	5.8	m1.8	14.8	m0.0	1.8	11.4	0.3
Internal Link Dist (m)		275.6			245.2			205.6			537.3	
Turn Bay Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	415	550	498	415	550	487	491	2749	1234	335	2749	1245
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.01	0.09	0.04	0.01	0.06	0.11	0.41	0.01	0.11	0.29	0.05

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Intersection Summary	
Area Type:	Other
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 63 (97%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 4.0	Intersection LOS: A
Intersection Capacity Utilization 53.5%	ICU Level of Service A
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: 27 St



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1399	10	10	1241	10	10	5	10	10	5	10
Future Volume (vph)	10	1399	10	10	1241	10	10	5	10	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	180.0		60.0	60.0		180.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.945			0.945	
Flt Protected	0.950			0.950				0.980			0.980	
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	0	1744	0	0	1744	0
Flt Permitted	0.075			0.056				0.928			0.928	
Satd. Flow (perm)	141	3579	1601	105	3579	1601	0	1652	0	0	1652	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			22			22		11			11	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		262.4			316.2			143.4			113.3	
Travel Time (s)		15.7			19.0			8.6			6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1521	11	11	1349	11	11	5	11	11	5	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1521	11	11	1349	11	0	27	0	0	27	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	100		100	100		100	100		100	100		100
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		

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1. 100 k BG AM
16: 37 Ave

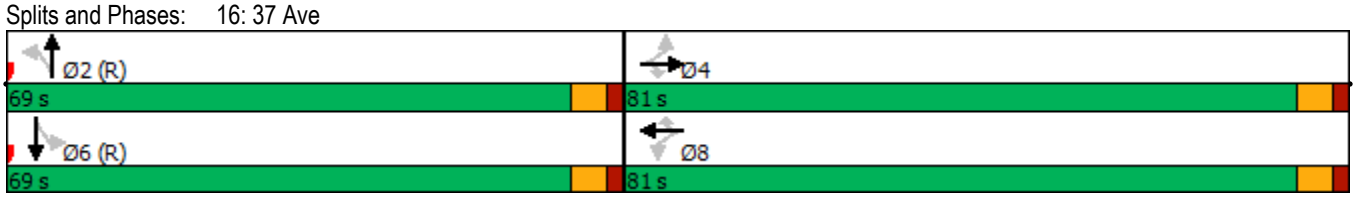
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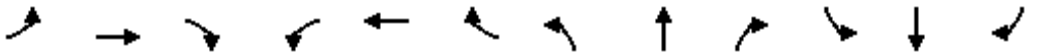
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	31.0	31.0		31.0	31.0	
Total Split (s)	81.0	81.0	81.0	81.0	81.0	81.0	69.0	69.0		69.0	69.0	
Total Split (%)	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	46.0%	46.0%		46.0%	46.0%	
Maximum Green (s)	75.0	75.0	75.0	75.0	75.0	75.0	63.0	63.0		63.0	63.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	71.5	71.5	71.5	71.5	71.5	71.5		66.5			66.5	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48		0.44			0.44	
v/c Ratio	0.16	0.89	0.01	0.22	0.79	0.01		0.04			0.04	
Control Delay	29.2	39.7	5.7	34.7	36.7	2.9		17.6			17.6	
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	29.2	39.7	5.7	34.7	36.7	2.9		17.6			17.6	
LOS	C	D	A	C	D	A		B			B	
Approach Delay		39.4			36.5			17.6			17.6	
Approach LOS		D			D			B			B	
Queue Length 50th (m)	1.6	173.3	0.2	1.9	179.6	0.0		2.8			2.8	
Queue Length 95th (m)	m2.6	189.7	m0.9	7.7	203.9	1.9		9.5			9.5	
Internal Link Dist (m)		238.4			292.2			119.4			89.3	
Turn Bay Length (m)	180.0		60.0	60.0		180.0						
Base Capacity (vph)	70	1789	811	52	1789	811		738			738	
Starvation Cap Reductn	0	8	0	0	0	0		0			0	
Spillback Cap Reductn	0	0	0	0	0	0		0			0	
Storage Cap Reductn	0	0	0	0	0	0		0			0	
Reduced v/c Ratio	0.16	0.85	0.01	0.21	0.75	0.01		0.04			0.04	

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Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 35 (23%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 37.6		Intersection LOS: D	
Intersection Capacity Utilization 57.0%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

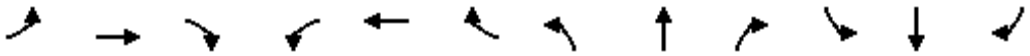
Splits and Phases: 16: 37 Ave





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	1139	322	143	1414	50	196	10	121	50	10	50
Future Volume (vph)	50	1139	322	143	1414	50	196	10	121	50	10	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		0.0	0.0		60.0
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.862				0.850
Flt Protected	0.950			0.950			0.950				0.960	
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	1789	1624	0	0	1808	1601
Flt Permitted	0.119			0.185			0.524				0.667	
Satd. Flow (perm)	224	3579	1601	348	3579	1601	987	1624	0	0	1256	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			265			65		65				65
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		312.2			262.4			149.4			186.9	
Travel Time (s)		18.7			15.7			9.0			11.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	1238	350	155	1537	54	213	11	132	54	11	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	1238	350	155	1537	54	213	143	0	0	65	54
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6		6	8			4		4

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2	2	6	6	6	3	8		4	4	4
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0	7.0	10.0		10.0	10.0	10.0
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	13.0	40.0		40.0	40.0	40.0
Total Split (s)	94.0	94.0	94.0	94.0	94.0	94.0	16.0	56.0		40.0	40.0	40.0
Total Split (%)	62.7%	62.7%	62.7%	62.7%	62.7%	62.7%	10.7%	37.3%		26.7%	26.7%	26.7%
Maximum Green (s)	88.0	88.0	88.0	88.0	88.0	88.0	10.0	50.0		34.0	34.0	34.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	Min		Min	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0		7.0	7.0	7.0
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0	18.0		27.0		27.0	27.0	27.0
Pedestrian Calls (#/hr)	5	5	5	5	5	5		5		5	5	5
Act Effct Green (s)	105.5	105.5	105.5	105.5	105.5	105.5	32.5	32.5			16.5	16.5
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70	0.70	0.22	0.22			0.11	0.11
v/c Ratio	0.34	0.49	0.29	0.64	0.61	0.05	0.80	0.35			0.47	0.23
Control Delay	28.4	22.7	9.0	32.5	19.9	5.7	73.8	27.3			71.1	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0			0.0	0.0
Total Delay	28.4	22.7	9.0	32.5	20.2	5.7	73.8	27.3			71.1	10.0
LOS	C	C	A	C	C	A	E	C			E	B
Approach Delay		20.0			20.8			55.1			43.4	
Approach LOS		C			C			E			D	
Queue Length 50th (m)	9.2	187.4	24.9	28.1	143.3	0.5	61.9	21.0			20.0	0.0
Queue Length 95th (m)	m23.3	210.2	m89.3	m#79.4	182.6	m5.2	74.7	35.1			31.6	9.3
Internal Link Dist (m)		288.2			238.4			125.4			162.9	
Turn Bay Length (m)	60.0		60.0	60.0		60.0	60.0					60.0
Base Capacity (vph)	157	2516	1204	244	2516	1144	267	584			284	413
Starvation Cap Reductn	0	0	0	0	372	0	0	0			0	0
Spillback Cap Reductn	0	69	0	0	0	0	0	1			0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0			0	0
Reduced v/c Ratio	0.34	0.51	0.29	0.64	0.72	0.05	0.80	0.25			0.23	0.13

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Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 135	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 24.3	Intersection LOS: C
Intersection Capacity Utilization 90.8%	ICU Level of Service E
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

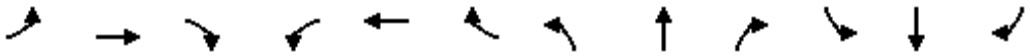
Splits and Phases: 1: 39 Ave



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	304	655	596	563	682	415	564	383	373	483	620	551
Future Volume (vph)	304	655	596	563	682	415	564	383	373	483	620	551
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		120.0	120.0		120.0	100.0		100.0	100.0		100.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3471	3579	1601	3471	3579	1601	3471	3579	1601	3471	3579	1601
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3471	3579	1601	3471	3579	1601	3471	3579	1601	3471	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65			398			364			109
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		786.6			312.2			156.5			465.2	
Travel Time (s)		47.2			18.7			9.4			27.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	330	712	648	612	741	451	613	416	405	525	674	599
Shared Lane Traffic (%)												
Lane Group Flow (vph)	330	712	648	612	741	451	613	416	405	525	674	599
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		9.0			9.0			9.0			9.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6		3	8		7	4	5
Permitted Phases			2			6			8			4

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	3	1	6	6	3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	15.0	7.0	7.0	15.0	15.0	7.0	10.0	10.0	7.0	10.0	7.0
Minimum Split (s)	13.0	43.0	13.0	13.0	35.0	35.0	13.0	34.0	34.0	13.0	40.0	13.0
Total Split (s)	35.0	43.0	34.0	33.0	41.0	41.0	34.0	42.0	42.0	32.0	40.0	35.0
Total Split (%)	23.3%	28.7%	22.7%	22.0%	27.3%	27.3%	22.7%	28.0%	28.0%	21.3%	26.7%	23.3%
Maximum Green (s)	29.0	37.0	28.0	27.0	35.0	35.0	28.0	36.0	36.0	26.0	34.0	29.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	None	C-Max	C-Max	None	Min	Min	None	Min	None
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)					22.0	22.0		21.0	21.0		27.0	
Pedestrian Calls (#/hr)					5	5		5	5		5	
Act Effct Green (s)	25.8	37.2	73.2	27.0	38.4	38.4	30.0	23.6	23.6	38.2	31.8	57.6
Actuated g/C Ratio	0.17	0.25	0.49	0.18	0.26	0.26	0.20	0.16	0.16	0.25	0.21	0.38
v/c Ratio	0.55	0.80	0.80	0.98	0.81	0.64	0.88	0.74	0.73	0.59	0.89	0.88
Control Delay	60.1	61.1	38.0	78.8	49.7	17.6	73.6	68.2	16.3	53.1	71.8	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.1	61.1	38.0	78.8	49.7	17.6	73.6	68.2	16.3	53.1	71.8	32.6
LOS	E	E	D	E	D	B	E	E	B	D	E	C
Approach Delay		52.0			51.6			55.8			53.3	
Approach LOS		D			D			E			D	
Queue Length 50th (m)	48.9	111.2	156.2	94.8	100.0	28.5	98.4	66.3	11.3	74.8	107.4	72.5
Queue Length 95th (m)	64.3	136.1	217.5	#137.8	#150.0	69.6	#136.5	81.7	47.3	100.2	131.5	97.5
Internal Link Dist (m)		762.6			288.2			132.5			441.2	
Turn Bay Length (m)	120.0		120.0	120.0		120.0	100.0		100.0	100.0		100.0
Base Capacity (vph)	671	886	814	624	915	705	694	858	660	884	811	713
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.80	0.80	0.98	0.81	0.64	0.88	0.48	0.61	0.59	0.83	0.84

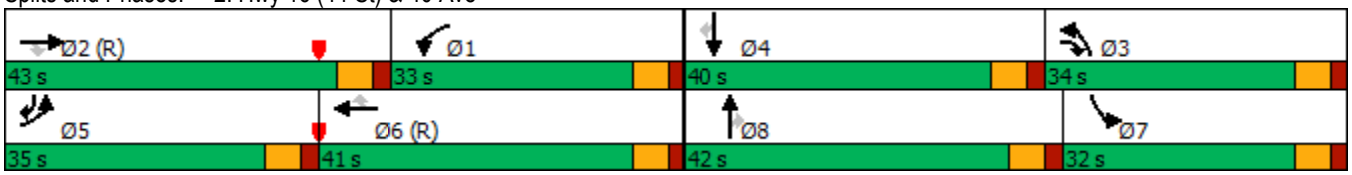
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Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 53.1		Intersection LOS: D	
Intersection Capacity Utilization 87.4%		ICU Level of Service E	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

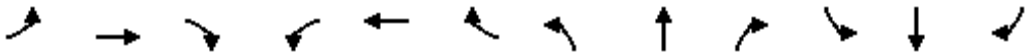
Splits and Phases: 2: Hwy 16 (44 St) & 40 Ave



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	320	5	118	208	5	355	118	593	205	357	1090	331
Future Volume (vph)	320	5	118	208	5	355	118	593	205	357	1090	331
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	90.0		60.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950	0.954		0.950			0.950			0.950		
Satd. Flow (prot)	1700	1707	1601	1789	1883	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.754	0.729		0.530			0.163			0.265		
Satd. Flow (perm)	1349	1304	1601	998	1883	1601	307	3579	1601	499	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191			386			223			215
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		224.2			386.6			519.4			130.5	
Travel Time (s)		13.5			23.2			31.2			7.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	5	128	226	5	386	128	645	223	388	1185	360
Shared Lane Traffic (%)	49%											
Lane Group Flow (vph)	177	176	128	226	5	386	128	645	223	388	1185	360
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			6.0			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	4.0	10.0	10.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	45.0	45.0	45.0	10.0	44.0	44.0	21.0	35.0	35.0	13.0	40.0	40.0
Total Split (s)	45.0	45.0	45.0	10.0	55.0	55.0	21.0	37.0	37.0	28.0	44.0	44.0
Total Split (%)	37.5%	37.5%	37.5%	8.3%	45.8%	45.8%	17.5%	30.8%	30.8%	23.3%	36.7%	36.7%
Maximum Green (s)	39.0	39.0	39.0	4.0	49.0	49.0	15.0	31.0	31.0	22.0	38.0	38.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	32.0	32.0	32.0		31.0	31.0		22.0	22.0		27.0	27.0
Pedestrian Calls (#/hr)	5	5	5		5	5		5	5		5	5
Act Effct Green (s)	23.4	23.4	23.4	34.6	34.6	34.6	54.2	44.3	44.3	73.4	57.5	57.5
Actuated g/C Ratio	0.20	0.20	0.20	0.29	0.29	0.29	0.45	0.37	0.37	0.61	0.48	0.48
v/c Ratio	0.67	0.69	0.28	0.70	0.01	0.52	0.49	0.49	0.31	0.70	0.69	0.41
Control Delay	55.9	57.7	2.2	50.2	25.0	5.2	20.1	27.9	7.0	21.5	29.2	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.9	57.7	2.2	50.2	25.0	5.2	20.1	27.9	7.0	21.5	29.2	11.2
LOS	E	E	A	D	C	A	C	C	A	C	C	B
Approach Delay		42.3			21.9			22.2			24.3	
Approach LOS		D			C			C			C	
Queue Length 50th (m)	44.0	44.0	0.0	46.4	0.9	0.0	9.7	56.7	1.0	43.3	112.0	19.2
Queue Length 95th (m)	58.4	58.6	2.7	57.4	3.4	18.9	29.1	107.5	32.6	#97.5	#210.7	59.1
Internal Link Dist (m)		200.2			362.6			495.4			106.5	
Turn Bay Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	90.0		60.0
Base Capacity (vph)	438	423	649	322	768	882	336	1320	731	563	1715	879
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.42	0.20	0.70	0.01	0.44	0.38	0.49	0.31	0.69	0.69	0.41

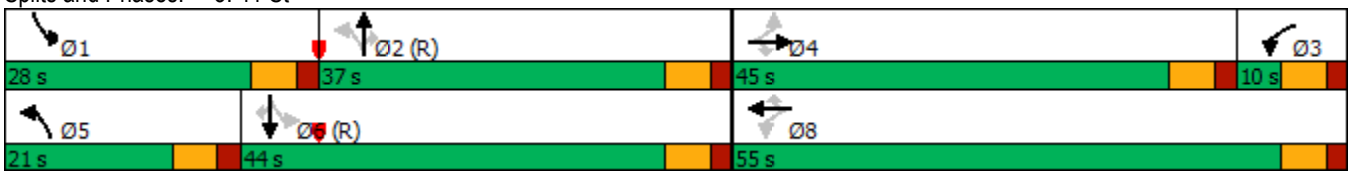
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Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 118 (98%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 25.6		Intersection LOS: C	
Intersection Capacity Utilization 69.9%		ICU Level of Service C	
Analysis Period (min) 15			

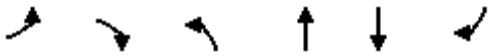
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: 41 St

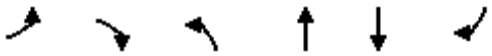


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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	200	176	144	670	1040	273
Future Volume (vph)	200	176	144	670	1040	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0	60.0	60.0			60.0
Storage Lanes	1	0	1			1
Taper Length (m)	25.0		25.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1601	1789	3579	3579	1601
Flt Permitted	0.950		0.220			
Satd. Flow (perm)	1789	1601	414	3579	3579	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		86				297
Link Speed (k/h)	60			60	60	
Link Distance (m)	241.7			421.0	519.4	
Travel Time (s)	14.5			25.3	31.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	217	191	157	728	1130	297
Shared Lane Traffic (%)						
Lane Group Flow (vph)	217	191	157	728	1130	297
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			6.0	6.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	15.0	15.0	15.0	15.0
Minimum Split (s)	43.0	43.0	40.0	40.0	35.0	35.0
Total Split (s)	43.0	43.0	77.0	77.0	77.0	77.0
Total Split (%)	35.8%	35.8%	64.2%	64.2%	64.2%	64.2%
Maximum Green (s)	37.0	37.0	71.0	71.0	71.0	71.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	30.0	30.0	27.0	27.0	22.0	22.0
Pedestrian Calls (#/hr)	5	5	5	5	5	5
Act Effct Green (s)	22.0	22.0	86.0	86.0	86.0	86.0
Actuated g/C Ratio	0.18	0.18	0.72	0.72	0.72	0.72
v/c Ratio	0.66	0.53	0.53	0.28	0.44	0.24
Control Delay	54.2	27.4	21.6	4.0	3.1	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.2	27.4	21.6	4.0	3.1	0.4
LOS	D	C	C	A	A	A
Approach Delay	41.7			7.2	2.5	
Approach LOS	D			A	A	
Queue Length 50th (m)	51.6	23.6	8.1	6.2	15.6	0.0
Queue Length 95th (m)	65.4	39.8	40.2	24.7	24.0	0.0
Internal Link Dist (m)	217.7			397.0	495.4	
Turn Bay Length (m)	60.0	60.0	60.0			60.0
Base Capacity (vph)	551	553	296	2565	2565	1231
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.35	0.53	0.28	0.44	0.24

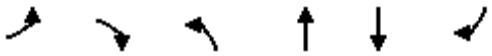
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Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 8 (7%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 9.9		Intersection LOS: A	
Intersection Capacity Utilization 67.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 4:

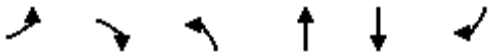


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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	60	50	40	764	1109	90
Future Volume (vph)	60	50	40	764	1109	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0	60.0	60.0			60.0
Storage Lanes	1	0	1			1
Taper Length (m)	25.0		25.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1601	1789	3579	3579	1601
Flt Permitted	0.950		0.214			
Satd. Flow (perm)	1789	1601	403	3579	3579	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		54				93
Link Speed (k/h)	60			60	60	
Link Distance (m)	252.3			561.3	421.0	
Travel Time (s)	15.1			33.7	25.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	54	43	830	1205	98
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	54	43	830	1205	98
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			6.0	6.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	15.0	15.0	15.0	15.0
Minimum Split (s)	43.0	43.0	40.0	40.0	33.0	33.0
Total Split (s)	45.0	45.0	75.0	75.0	75.0	75.0
Total Split (%)	37.5%	37.5%	62.5%	62.5%	62.5%	62.5%
Maximum Green (s)	39.0	39.0	69.0	69.0	69.0	69.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	30.0	30.0	27.0	27.0	20.0	20.0
Pedestrian Calls (#/hr)	5	5	5	5	5	5
Act Effct Green (s)	15.7	15.7	96.7	96.7	96.7	96.7
Actuated g/C Ratio	0.13	0.13	0.81	0.81	0.81	0.81
v/c Ratio	0.28	0.21	0.13	0.29	0.42	0.07
Control Delay	46.9	11.5	9.0	6.4	2.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.9	11.5	9.0	6.4	2.5	0.2
LOS	D	B	A	A	A	A
Approach Delay	30.8			6.5	2.3	
Approach LOS	C			A	A	
Queue Length 50th (m)	15.6	0.0	2.0	22.0	13.4	0.0
Queue Length 95th (m)	22.8	9.6	11.3	63.0	31.8	0.7
Internal Link Dist (m)	228.3			537.3	397.0	
Turn Bay Length (m)	60.0	60.0	60.0			60.0
Base Capacity (vph)	581	556	325	2885	2885	1308
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.10	0.13	0.29	0.42	0.07

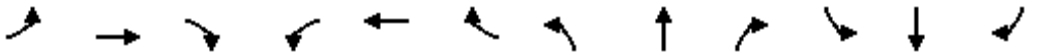
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Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 20 (17%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.42	
Intersection Signal Delay: 5.4	Intersection LOS: A
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: 31 St

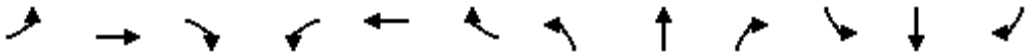


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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	310	11	276	11	11	19	410	462	11	28	531	519
Future Volume (vph)	310	11	276	11	11	19	410	462	11	28	531	519
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850		0.905				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3471	1883	1601	1789	1705	0	3471	3579	1601	1789	3579	1601
Flt Permitted	0.950			0.750			0.950			0.468		
Satd. Flow (perm)	3471	1883	1601	1413	1705	0	3471	3579	1601	881	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			300		21				82			564
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		293.2			157.4			231.2			229.6	
Travel Time (s)		17.6			9.4			13.9			13.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	337	12	300	12	12	21	446	502	12	30	577	564
Shared Lane Traffic (%)												
Lane Group Flow (vph)	337	12	300	12	33	0	446	502	12	30	577	564
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			8.0			8.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases			4	8					2	6		6

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8		5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	10.0	10.0		7.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	36.0	36.0	36.0	36.0		13.0	33.0	33.0	35.0	35.0	35.0
Total Split (s)	21.0	57.0	57.0	36.0	36.0		25.0	63.0	63.0	38.0	38.0	38.0
Total Split (%)	17.5%	47.5%	47.5%	30.0%	30.0%		20.8%	52.5%	52.5%	31.7%	31.7%	31.7%
Maximum Green (s)	15.0	51.0	51.0	30.0	30.0		19.0	57.0	57.0	32.0	32.0	32.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		7.0	7.0	7.0	7.0			7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		23.0	23.0	23.0	23.0			20.0	20.0	22.0	22.0	22.0
Pedestrian Calls (#/hr)		5	5	5	5			5	5	5	5	5
Act Effct Green (s)	14.6	28.2	28.2	14.0	14.0		19.5	79.8	79.8	54.4	54.4	54.4
Actuated g/C Ratio	0.12	0.24	0.24	0.12	0.12		0.16	0.66	0.66	0.45	0.45	0.45
v/c Ratio	0.80	0.03	0.50	0.07	0.15		0.79	0.21	0.01	0.08	0.36	0.55
Control Delay	66.3	27.2	5.8	43.7	24.2		59.4	10.4	0.0	21.0	18.5	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	66.3	27.2	5.8	43.7	24.2		59.4	10.4	0.0	21.0	18.5	6.7
LOS	E	C	A	D	C		E	B	A	C	B	A
Approach Delay		37.6			29.4			33.0			12.8	
Approach LOS		D			C			C			B	
Queue Length 50th (m)	42.3	2.2	0.0	2.8	2.8		54.6	25.2	0.0	2.7	28.2	4.6
Queue Length 95th (m)	#62.5	5.6	16.5	7.5	10.8		#79.0	51.3	0.0	12.2	76.0	53.1
Internal Link Dist (m)		269.2			133.4			207.2			205.6	
Turn Bay Length (m)	60.0		60.0	60.0			60.0		60.0	60.0		60.0
Base Capacity (vph)	433	800	852	353	442		581	2381	1092	399	1622	1033
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	59
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.01	0.35	0.03	0.07		0.77	0.21	0.01	0.08	0.36	0.58

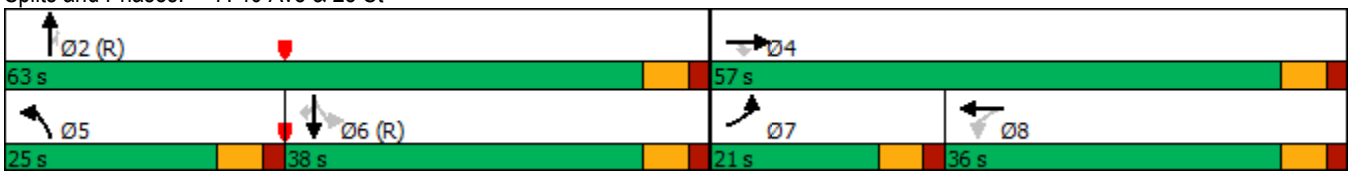
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Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 77 (64%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 25.7		Intersection LOS: C	
Intersection Capacity Utilization 67.2%		ICU Level of Service C	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: 40 Ave & 25 St



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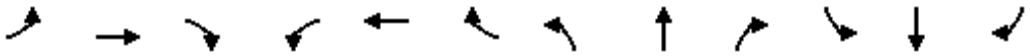
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	100	0	0	106	0	1214	54	0	1679	100
Future Volume (vph)	0	0	100	0	0	106	0	1214	54	0	1679	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.865			0.865		0.994			0.992	
Flt Protected												
Satd. Flow (prot)	0	0	1629	0	0	1629	0	3557	0	0	3550	0
Flt Permitted												
Satd. Flow (perm)	0	0	1629	0	0	1629	0	3557	0	0	3550	0
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		107.7			109.5			130.5			156.5	
Travel Time (s)		6.5			6.6			7.8			9.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	109	0	0	115	0	1320	59	0	1825	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	109	0	0	115	0	1379	0	0	1934	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			8.0			8.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	62.5%	ICU Level of Service B	
Analysis Period (min)	15		

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	5	50	12	5	35	40	722	17	26	1032	90
Future Volume (vph)	60	5	50	12	5	35	40	722	17	26	1032	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.754			0.754			0.235			0.351		
Satd. Flow (perm)	1420	1883	1601	1420	1883	1601	443	3579	1601	661	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			54			38			18			98
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		299.6			269.2			229.6			561.3	
Travel Time (s)		18.0			16.2			13.8			33.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	5	54	13	5	38	43	785	18	28	1122	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	5	54	13	5	38	43	785	18	28	1122	98
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			6.0			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	21.0	21.0	21.0	21.0	21.0	21.0	39.0	39.0	39.0	39.0	39.0	39.0
Total Split (%)	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
Maximum Green (s)	17.0	17.0	17.0	17.0	17.0	17.0	35.0	35.0	35.0	35.0	35.0	35.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	8.2	8.2	8.2	8.2	8.2	8.2	46.5	46.5	46.5	46.5	46.5	46.5
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.14	0.78	0.78	0.78	0.78	0.78	0.78
v/c Ratio	0.34	0.02	0.20	0.07	0.02	0.15	0.13	0.28	0.01	0.05	0.40	0.08
Control Delay	27.3	20.8	9.2	21.8	20.8	9.7	2.1	1.7	0.4	3.0	3.5	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.3	20.8	9.2	21.8	20.8	9.7	2.1	1.7	0.4	3.0	3.5	1.4
LOS	C	C	A	C	C	A	A	A	A	A	A	A
Approach Delay		19.2			13.5			1.7			3.3	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	7.0	0.5	0.0	1.4	0.5	0.0	0.6	6.4	0.0	0.5	14.3	0.0
Queue Length 95th (m)	16.0	2.9	7.9	5.2	2.9	6.6	m1.6	10.2	m0.2	m5.3	77.4	9.2
Internal Link Dist (m)		275.6			245.2			205.6			537.3	
Turn Bay Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	402	533	492	402	533	480	343	2772	1244	512	2772	1262
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.01	0.11	0.03	0.01	0.08	0.13	0.28	0.01	0.05	0.40	0.08

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Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.40	
Intersection Signal Delay: 3.8	Intersection LOS: A
Intersection Capacity Utilization 49.9%	ICU Level of Service A
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: 27 St



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	1260	25	25	1557	25	25	5	25	25	5	25
Future Volume (vph)	25	1260	25	25	1557	25	25	5	25	25	5	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	180.0		60.0	60.0		180.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.938			0.938	
Flt Protected	0.950			0.950				0.978			0.978	
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	0	1728	0	0	1728	0
Flt Permitted	0.079			0.142				0.867			0.867	
Satd. Flow (perm)	149	3579	1601	267	3579	1601	0	1532	0	0	1532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			24			27		26			26	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		262.4			316.2			143.4			113.3	
Travel Time (s)		15.7			19.0			8.6			6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	1370	27	27	1692	27	27	5	27	27	5	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	1370	27	27	1692	27	0	59	0	0	59	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		

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2. 100 k BG PM
16: 37 Ave

10-25-2022

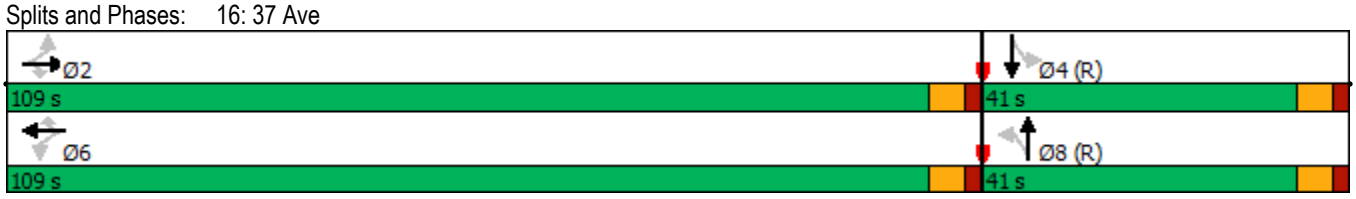
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	30.0	30.0		40.0	40.0	
Total Split (s)	109.0	109.0	109.0	109.0	109.0	109.0	41.0	41.0		41.0	41.0	
Total Split (%)	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%	27.3%	27.3%		27.3%	27.3%	
Maximum Green (s)	103.0	103.0	103.0	103.0	103.0	103.0	35.0	35.0		35.0	35.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	99.0	99.0	99.0	99.0	99.0	99.0		39.0			39.0	
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.66	0.66		0.26			0.26	
v/c Ratio	0.28	0.58	0.03	0.15	0.72	0.03		0.14			0.14	
Control Delay	30.1	34.9	8.4	10.7	18.3	2.5		28.7			28.7	
Queue Delay	0.0	0.8	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	30.1	35.7	8.4	10.7	18.3	2.5		28.7			28.7	
LOS	C	D	A	B	B	A		C			C	
Approach Delay		35.1			17.9			28.7			28.7	
Approach LOS		D			B			C			C	
Queue Length 50th (m)	0.0	208.8	4.1	2.8	153.8	0.0		8.2			8.2	
Queue Length 95th (m)	m15.6	227.5	m4.5	7.4	177.9	3.3		21.3			21.3	
Internal Link Dist (m)		238.4			292.2			119.4			89.3	
Turn Bay Length (m)	180.0		60.0	60.0		180.0						
Base Capacity (vph)	102	2457	1106	183	2457	1107		417			417	
Starvation Cap Reductn	0	709	0	0	0	0		0			0	
Spillback Cap Reductn	0	0	0	0	0	0		0			0	
Storage Cap Reductn	0	0	0	0	0	0		0			0	
Reduced v/c Ratio	0.26	0.78	0.02	0.15	0.69	0.02		0.14			0.14	

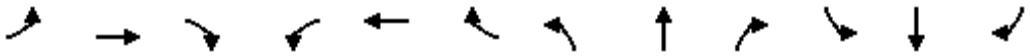
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Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 25.7 Intersection LOS: C
Intersection Capacity Utilization 61.4% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: 37 Ave

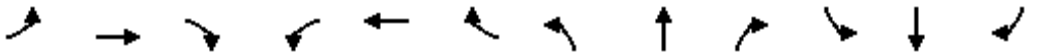




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	493	20	38	475	10	19	2	36	10	2	10
Future Volume (vph)	10	493	20	38	475	10	19	2	36	10	2	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		150.0	150.0		80.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.915			0.938	
Flt Protected	0.950			0.950				0.983			0.978	
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	0	1694	0	0	1728	0
Flt Permitted	0.950			0.950				0.983			0.978	
Satd. Flow (perm)	1789	3579	1601	1789	3579	1601	0	1694	0	0	1728	0
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		581.1			222.2			238.6			271.6	
Travel Time (s)		34.9			13.3			14.3			16.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	536	22	41	516	11	21	2	39	11	2	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	536	22	41	516	11	0	62	0	0	24	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

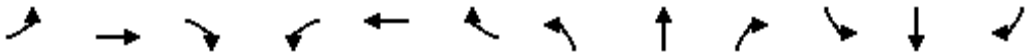
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	30.9%	ICU Level of Service	A
Analysis Period (min)	15		

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	259	57	130	252	110	128	206	130	113	174	47
Future Volume (vph)	115	259	57	130	252	110	128	206	130	113	174	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		120.0	120.0		0.0	100.0		20.0	0.0		100.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3482	0	1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.583			0.540			0.578			0.544		
Satd. Flow (perm)	1098	3482	0	1017	3579	1601	1089	1883	1601	1025	1883	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				120			141			182
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		786.6			581.1			287.0			335.3	
Travel Time (s)		47.2			34.9			17.2			20.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	282	62	141	274	120	139	224	141	123	189	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	344	0	141	274	120	139	224	141	123	189	51
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			6.0			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4			8		8	2		2	6		6

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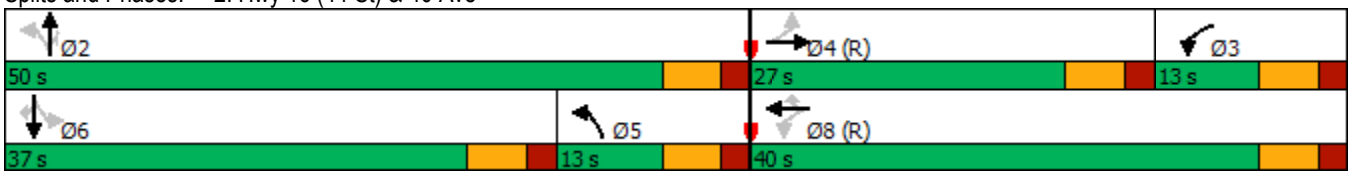


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		3	8	8	5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0	10.0	7.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	24.0	24.0		13.0	24.0	24.0	13.0	40.0	40.0	37.0	37.0	37.0
Total Split (s)	27.0	27.0		13.0	40.0	40.0	13.0	50.0	50.0	37.0	37.0	37.0
Total Split (%)	30.0%	30.0%		14.4%	44.4%	44.4%	14.4%	55.6%	55.6%	41.1%	41.1%	41.1%
Maximum Green (s)	21.0	21.0		7.0	34.0	34.0	7.0	44.0	44.0	31.0	31.0	31.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead		Lag			Lag			Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)								7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)								27.0	27.0	24.0	24.0	24.0
Pedestrian Calls (#/hr)								5	5	5	5	5
Act Effct Green (s)	33.2	33.2		46.2	46.2	46.2	31.8	31.8	31.8	18.8	18.8	18.8
Actuated g/C Ratio	0.37	0.37		0.51	0.51	0.51	0.35	0.35	0.35	0.21	0.21	0.21
v/c Ratio	0.31	0.26		0.24	0.15	0.14	0.32	0.34	0.21	0.57	0.48	0.11
Control Delay	25.4	20.3		15.9	13.1	3.7	22.5	21.9	3.6	41.7	34.4	0.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.4	20.3		15.9	13.1	3.7	22.5	21.9	3.6	41.7	34.4	0.4
LOS	C	C		B	B	A	C	C	A	D	C	A
Approach Delay		21.7			11.7			16.9			32.1	
Approach LOS		C			B			B			C	
Queue Length 50th (m)	14.7	19.2		11.6	11.8	0.0	18.8	31.6	0.0	21.4	32.2	0.0
Queue Length 95th (m)	37.8	38.7		30.7	26.4	10.7	24.2	37.2	9.3	31.9	41.9	0.0
Internal Link Dist (m)		762.6			557.1			263.0			311.3	
Turn Bay Length (m)	120.0			120.0			100.0		20.0			100.0
Base Capacity (vph)	405	1301		582	1837	880	439	920	854	353	648	670
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.26		0.24	0.15	0.14	0.32	0.24	0.17	0.35	0.29	0.08

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Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.57			
Intersection Signal Delay: 19.6		Intersection LOS: B	
Intersection Capacity Utilization 61.7%		ICU Level of Service B	
Analysis Period (min) 15			

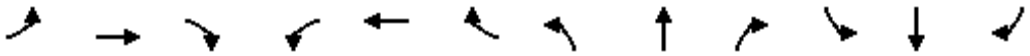
Splits and Phases: 2: Hwy 16 (44 St) & 40 Ave



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	2	8	27	3	107	8	280	31	117	179	8
Future Volume (vph)	52	2	8	27	3	107	8	280	31	117	179	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	90.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.894			0.987			0.993	
Flt Protected		0.960			0.990			0.999		0.950		
Satd. Flow (prot)	0	1776	0	0	1667	0	0	1857	0	1789	1870	0
Flt Permitted		0.650			0.924			0.993		0.576		
Satd. Flow (perm)	0	1202	0	0	1556	0	0	1846	0	1085	1870	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			116			9			4	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		224.2			222.7			519.4			287.0	
Travel Time (s)		13.5			13.4			31.2			17.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	2	9	29	3	116	9	304	34	127	195	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	68	0	0	148	0	0	347	0	127	204	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

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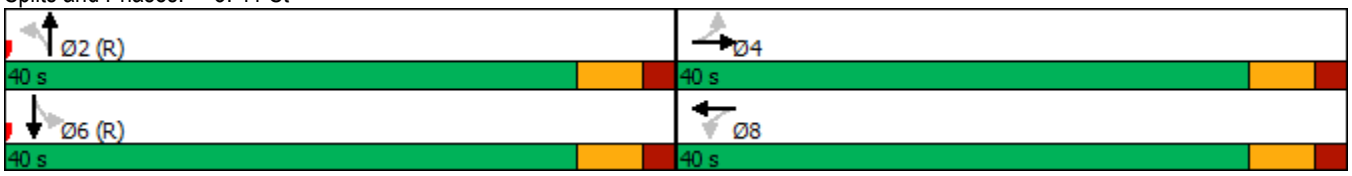


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	40.0	40.0		40.0	40.0		33.0	33.0		36.0	36.0	
Total Split (s)	40.0	40.0		40.0	40.0		40.0	40.0		40.0	40.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	34.0	34.0		34.0	34.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0			6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	27.0	27.0		27.0	27.0		20.0	20.0		23.0	23.0	
Pedestrian Calls (#/hr)	5	5		5	5		5	5		5	5	
Act Effct Green (s)		14.9			14.9			53.1		53.1	53.1	
Actuated g/C Ratio		0.19			0.19			0.66		0.66	0.66	
v/c Ratio		0.29			0.39			0.28		0.18	0.16	
Control Delay		25.4			10.2			8.4		8.7	7.6	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		25.4			10.2			8.4		8.7	7.6	
LOS		C			B			A		A	A	
Approach Delay		25.4			10.2			8.4			8.0	
Approach LOS		C			B			A			A	
Queue Length 50th (m)		8.8			4.6			14.8		5.1	8.0	
Queue Length 95th (m)		13.4			13.5			59.4		25.4	34.6	
Internal Link Dist (m)		200.2			198.7			495.4			263.0	
Turn Bay Length (m)										90.0		
Base Capacity (vph)		516			728			1227		719	1241	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.13			0.20			0.28		0.18	0.16	

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Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.39			
Intersection Signal Delay: 9.8		Intersection LOS: A	
Intersection Capacity Utilization 54.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: 41 St



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	8	25	46	7	60	46	162	49	66	127	66
Future Volume (vph)	110	8	25	46	7	60	46	162	49	66	127	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	0.0		0.0	60.0		60.0	60.0		60.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977			0.929			0.974			0.949	
Flt Protected		0.963			0.980			0.991		0.950		
Satd. Flow (prot)	0	1772	0	0	1715	0	0	1818	0	1789	1787	0
Flt Permitted		0.706			0.832			0.918		0.615		
Satd. Flow (perm)	0	1299	0	0	1456	0	0	1684	0	1158	1787	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			64			16			36	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		241.7			55.6			126.6			519.4	
Travel Time (s)		14.5			3.3			7.6			31.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	9	27	50	8	65	50	176	53	72	138	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	156	0	0	123	0	0	279	0	72	210	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		

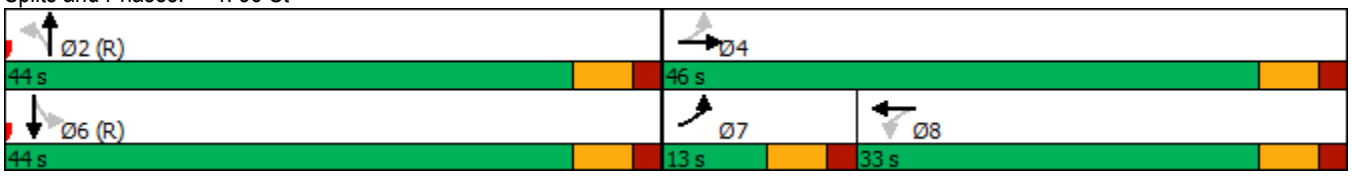
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	13.0	27.0		27.0	27.0		27.0	27.0		27.0	27.0	
Total Split (s)	13.0	46.0		33.0	33.0		44.0	44.0		44.0	44.0	
Total Split (%)	14.4%	51.1%		36.7%	36.7%		48.9%	48.9%		48.9%	48.9%	
Maximum Green (s)	7.0	40.0		27.0	27.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0			6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)		7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)		16.2			16.2			61.8		61.8	61.8	
Actuated g/C Ratio		0.18			0.18			0.69		0.69	0.69	
v/c Ratio		0.63			0.39			0.24		0.09	0.17	
Control Delay		41.5			19.2			6.4		6.3	5.3	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		41.5			19.2			6.4		6.3	5.3	
LOS		D			B			A		A	A	
Approach Delay		41.5			19.2			6.4			5.6	
Approach LOS		D			B			A			A	
Queue Length 50th (m)		24.1			9.3			15.1		3.7	9.3	
Queue Length 95th (m)		40.3			22.6			33.8		10.8	22.7	
Internal Link Dist (m)		217.7			31.6			102.6			495.4	
Turn Bay Length (m)										60.0		
Base Capacity (vph)		585			481			1161		794	1237	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.27			0.26			0.24		0.09	0.17	

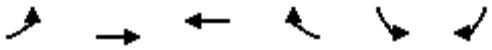
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Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 14.5		Intersection LOS: B	
Intersection Capacity Utilization 55.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 4: 36 St



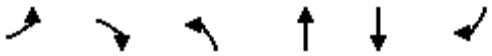
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	122	0	0	0	0	112
Future Volume (vph)	122	0	0	0	0	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.950				
Satd. Flow (prot)	0	1789	1883	0	1629	0
Flt Permitted		0.950				
Satd. Flow (perm)	0	1789	1883	0	1629	0
Link Speed (k/h)		60	60		60	
Link Distance (m)		55.6	585.2		162.5	
Travel Time (s)		3.3	35.1		9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	133	0	0	0	0	122
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	133	0	0	122	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.4%		ICU Level of Service A	
Analysis Period (min) 15			

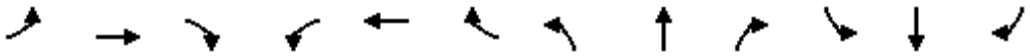
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	156	53	14	101	137	77
Future Volume (vph)	156	53	14	101	137	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0	60.0	60.0			60.0
Storage Lanes	1	0	0			0
Taper Length (m)	25.0		25.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.951	
Flt Protected	0.950			0.994		
Satd. Flow (prot)	1789	1601	0	1872	1791	0
Flt Permitted	0.950			0.994		
Satd. Flow (perm)	1789	1601	0	1872	1791	0
Link Speed (k/h)	60			60	60	
Link Distance (m)	252.3			794.4	290.7	
Travel Time (s)	15.1			47.7	17.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	170	58	15	110	149	84
Shared Lane Traffic (%)						
Lane Group Flow (vph)	170	58	0	125	233	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		

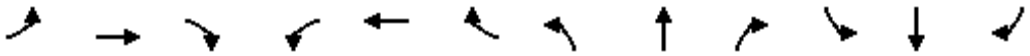
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	2	149	33	2	2	128	2	62	2	2	21
Future Volume (vph)	13	2	149	33	2	2	128	2	62	2	2	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.877			0.993			0.957			0.885	
Flt Protected		0.996			0.957			0.968			0.996	
Satd. Flow (prot)	0	1645	0	0	1790	0	0	1745	0	0	1660	0
Flt Permitted		0.996			0.957			0.968			0.996	
Satd. Flow (perm)	0	1645	0	0	1790	0	0	1745	0	0	1660	0
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		222.7			370.2			67.4			63.9	
Travel Time (s)		13.4			22.2			4.0			3.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	2	162	36	2	2	139	2	67	2	2	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	178	0	0	40	0	0	208	0	0	27	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	100		100	100		100	100		100	100		100
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.1%		ICU Level of Service A	
Analysis Period (min) 15			

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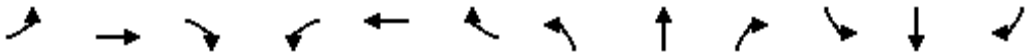
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	683	26	52	740	10	25	2	49	10	2	10
Future Volume (vph)	10	683	26	52	740	10	25	2	49	10	2	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		150.0	150.0		80.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.913			0.938	
Flt Protected	0.950			0.950				0.984			0.978	
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	0	1692	0	0	1728	0
Flt Permitted	0.950			0.950				0.984			0.978	
Satd. Flow (perm)	1789	3579	1601	1789	3579	1601	0	1692	0	0	1728	0
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		581.1			222.2			238.6			271.6	
Travel Time (s)		34.9			13.3			14.3			16.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	742	28	57	804	11	27	2	53	11	2	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	742	28	57	804	11	0	82	0	0	24	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.0%		ICU Level of Service A	
Analysis Period (min) 15			

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	457	110	188	461	111	173	130	125	117	290	79
Future Volume (vph)	57	457	110	188	461	111	173	130	125	117	290	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		120.0	120.0		0.0	100.0		20.0	0.0		100.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.971				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3475	0	1789	3579	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.436			0.334			0.393			0.667		
Satd. Flow (perm)	821	3475	0	629	3579	1601	740	1883	1601	1256	1883	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31				121			136			182
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		786.6			581.1			287.0			335.3	
Travel Time (s)		47.2			34.9			17.2			20.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	497	120	204	501	121	188	141	136	127	315	86
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	617	0	204	501	121	188	141	136	127	315	86
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			6.0			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4			8		8	2		2	6		6

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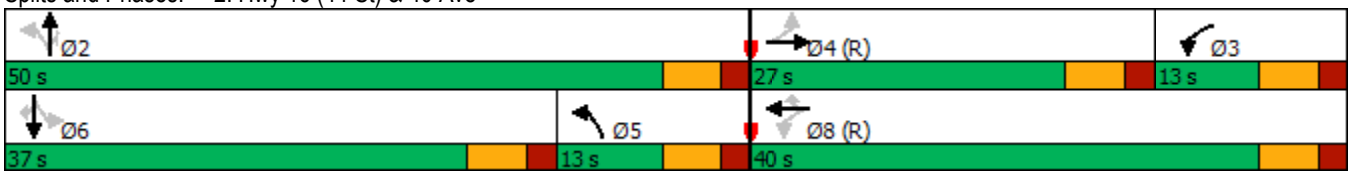


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		3	8	8	5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0	10.0	7.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	24.0	24.0		13.0	24.0	24.0	13.0	40.0	40.0	37.0	37.0	37.0
Total Split (s)	27.0	27.0		13.0	40.0	40.0	13.0	50.0	50.0	37.0	37.0	37.0
Total Split (%)	30.0%	30.0%		14.4%	44.4%	44.4%	14.4%	55.6%	55.6%	41.1%	41.1%	41.1%
Maximum Green (s)	21.0	21.0		7.0	34.0	34.0	7.0	44.0	44.0	31.0	31.0	31.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead		Lag			Lag			Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)								7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)								27.0	27.0	24.0	24.0	24.0
Pedestrian Calls (#/hr)								5	5	5	5	5
Act Effct Green (s)	29.9	29.9		42.9	42.9	42.9	35.1	35.1	35.1	21.5	21.5	21.5
Actuated g/C Ratio	0.33	0.33		0.48	0.48	0.48	0.39	0.39	0.39	0.24	0.24	0.24
v/c Ratio	0.23	0.52		0.52	0.29	0.15	0.50	0.19	0.19	0.42	0.70	0.17
Control Delay	27.9	26.4		27.1	16.1	4.0	26.5	17.4	3.2	32.0	39.3	0.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.9	26.4		27.1	16.1	4.0	26.5	17.4	3.2	32.0	39.3	0.7
LOS	C	C		C	B	A	C	B	A	C	D	A
Approach Delay		26.5			17.1			16.9			31.3	
Approach LOS		C			B			B			C	
Queue Length 50th (m)	7.9	43.6		20.3	27.0	0.0	23.5	17.0	0.0	19.9	53.4	0.0
Queue Length 95th (m)	21.6	71.9		43.0	47.4	10.7	31.8	24.3	9.0	31.4	69.7	0.0
Internal Link Dist (m)		762.6			557.1			263.0			311.3	
Turn Bay Length (m)	120.0			120.0			100.0		20.0			100.0
Base Capacity (vph)	273	1176		390	1707	827	376	920	852	432	648	670
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.52		0.52	0.29	0.15	0.50	0.15	0.16	0.29	0.49	0.13

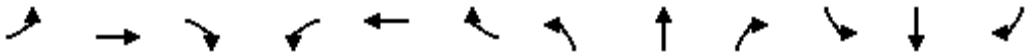
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Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 22.6		Intersection LOS: C	
Intersection Capacity Utilization 71.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Hwy 16 (44 St) & 40 Ave

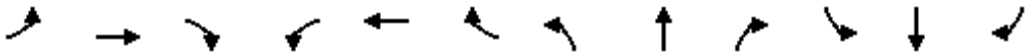


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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	4	19	48	3	163	12	293	36	170	380	37
Future Volume (vph)	28	4	19	48	3	163	12	293	36	170	380	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	90.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.948			0.897			0.986			0.987	
Flt Protected		0.973			0.989			0.998		0.950		
Satd. Flow (prot)	0	1737	0	0	1671	0	0	1853	0	1789	1859	0
Flt Permitted		0.757			0.907			0.982		0.571		
Satd. Flow (perm)	0	1352	0	0	1532	0	0	1824	0	1075	1859	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			177			12			10	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		224.2			222.7			519.4			287.0	
Travel Time (s)		13.5			13.4			31.2			17.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	4	21	52	3	177	13	318	39	185	413	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	55	0	0	232	0	0	370	0	185	453	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

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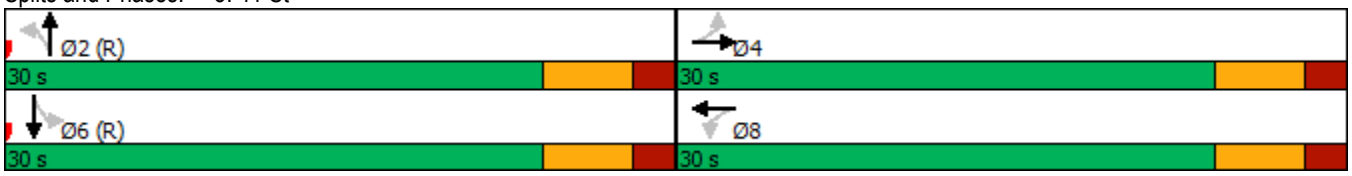


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	27.0	27.0		30.0	30.0		27.0	27.0		27.0	27.0	
Total Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0			6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	14.0	14.0		17.0	17.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	5	5		5	5		5	5		5	5	
Act Effct Green (s)		12.9			12.9			35.1		35.1	35.1	
Actuated g/C Ratio		0.22			0.22			0.58		0.58	0.58	
v/c Ratio		0.18			0.50			0.34		0.29	0.41	
Control Delay		13.1			9.3			9.9		9.7	9.6	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		13.1			9.3			9.9		9.7	9.6	
LOS		B			A			A		A	A	
Approach Delay		13.1			9.3			9.9			9.7	
Approach LOS		B			A			A			A	
Queue Length 50th (m)		3.4			5.6			14.4		8.0	20.7	
Queue Length 95th (m)		8.2			15.9			57.6		30.7	65.8	
Internal Link Dist (m)		200.2			198.7			495.4			263.0	
Turn Bay Length (m)										90.0		
Base Capacity (vph)		553			719			1073		629	1093	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.10			0.32			0.34		0.29	0.41	

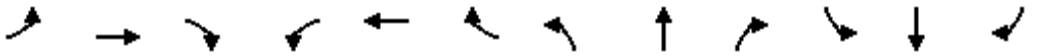
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Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 9.8		Intersection LOS: A	
Intersection Capacity Utilization 68.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: 41 St

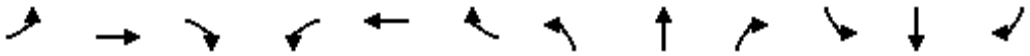


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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	13	41	73	12	94	36	208	78	100	233	174
Future Volume (vph)	57	13	41	73	12	94	36	208	78	100	233	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	0.0		0.0	60.0		60.0	60.0		60.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	25.0			25.0			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.950			0.929			0.967			0.936	
Flt Protected		0.975			0.980			0.994		0.950		
Satd. Flow (prot)	0	1745	0	0	1715	0	0	1810	0	1789	1763	0
Flt Permitted		0.759			0.838			0.925		0.586		
Satd. Flow (perm)	0	1358	0	0	1466	0	0	1685	0	1104	1763	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		45			102			35			81	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		241.7			55.6			126.6			519.4	
Travel Time (s)		14.5			3.3			7.6			31.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	14	45	79	13	102	39	226	85	109	253	189
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	121	0	0	194	0	0	350	0	109	442	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

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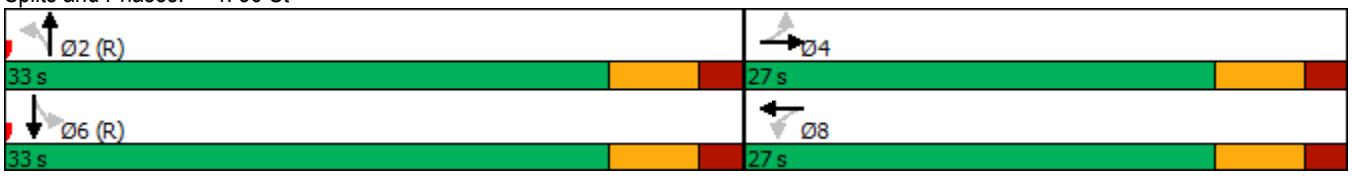


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		27.0	27.0		27.0	27.0	
Total Split (s)	27.0	27.0		27.0	27.0		33.0	33.0		33.0	33.0	
Total Split (%)	45.0%	45.0%		45.0%	45.0%		55.0%	55.0%		55.0%	55.0%	
Maximum Green (s)	21.0	21.0		21.0	21.0		27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0			6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	5	5		5	5		5	5		5	5	
Act Effct Green (s)		12.6			12.6			35.4		35.4	35.4	
Actuated g/C Ratio		0.21			0.21			0.59		0.59	0.59	
v/c Ratio		0.38			0.50			0.35		0.17	0.41	
Control Delay		16.0			14.4			7.9		11.1	10.4	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		16.0			14.4			7.9		11.1	10.4	
LOS		B			B			A		B	B	
Approach Delay		16.0			14.4			7.9			10.5	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		7.9			9.6			13.8		4.2	15.1	
Queue Length 95th (m)		16.2			20.3			42.6		25.9	74.2	
Internal Link Dist (m)		217.7			31.6			102.6			495.4	
Turn Bay Length (m)										60.0		
Base Capacity (vph)		504			579			1009		651	1074	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.24			0.34			0.35		0.17	0.41	

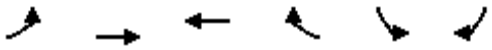
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Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 10.9		Intersection LOS: B	
Intersection Capacity Utilization 67.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 4: 36 St



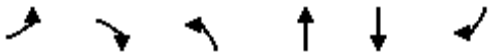
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	192	0	0	0	0	179
Future Volume (vph)	192	0	0	0	0	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.950				
Satd. Flow (prot)	0	1789	1883	0	1629	0
Flt Permitted		0.950				
Satd. Flow (perm)	0	1789	1883	0	1629	0
Link Speed (k/h)		60	60		60	
Link Distance (m)		55.6	585.2		162.5	
Travel Time (s)		3.3	35.1		9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	209	0	0	0	0	195
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	209	0	0	195	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.4%		ICU Level of Service A	
Analysis Period (min) 15			

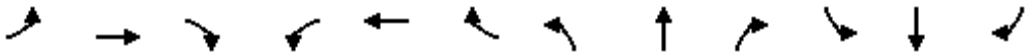
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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	46	10	54	276	261	107
Future Volume (vph)	46	10	54	276	261	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0	60.0	60.0			60.0
Storage Lanes	1	0	0			0
Taper Length (m)	25.0		25.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.961	
Flt Protected	0.950			0.992		
Satd. Flow (prot)	1789	1601	0	1868	1810	0
Flt Permitted	0.950			0.992		
Satd. Flow (perm)	1789	1601	0	1868	1810	0
Link Speed (k/h)	60			60	60	
Link Distance (m)	252.3			794.4	290.7	
Travel Time (s)	15.1			47.7	17.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	11	59	300	284	116
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	11	0	359	400	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

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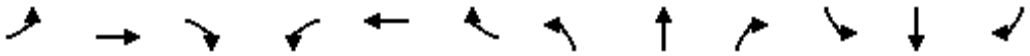
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2	196	58	2	2	183	2	54	2	2	31
Future Volume (vph)	14	2	196	58	2	2	183	2	54	2	2	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.875			0.996			0.969			0.879	
Flt Protected		0.997			0.955			0.963			0.997	
Satd. Flow (prot)	0	1643	0	0	1791	0	0	1758	0	0	1651	0
Flt Permitted		0.997			0.955			0.963			0.997	
Satd. Flow (perm)	0	1643	0	0	1791	0	0	1758	0	0	1651	0
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		222.7			370.2			67.4			63.9	
Travel Time (s)		13.4			22.2			4.0			3.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	2	213	63	2	2	199	2	59	2	2	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	230	0	0	67	0	0	260	0	0	38	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	1388	63	55	1462	50	68	5	79	10	5	10
Future Volume (vph)	50	1388	63	55	1462	50	68	5	79	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		60.0	60.0		130.0	60.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	1		0	0		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.97			0.97	0.99	0.98			0.99	
Frt			0.850			0.850		0.859			0.946	
Flt Protected	0.950			0.950			0.950				0.980	
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	1789	1590	0	0	1733	0
Flt Permitted	0.158			0.173			0.741				0.873	
Satd. Flow (perm)	298	3579	1545	326	3579	1545	1387	1590	0	0	1540	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			50			50		60			10	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		571.8			278.8			154.9			123.0	
Travel Time (s)		34.3			16.7			9.3			7.4	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	1388	63	55	1462	50	68	5	79	10	5	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	1388	63	55	1462	50	68	84	0	0	25	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	8			4		
Detector Phase	2	2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	40.0	40.0		40.0	40.0	
Total Split (s)	103.0	103.0	103.0	103.0	103.0	103.0	47.0	47.0		47.0	47.0	
Total Split (%)	68.7%	68.7%	68.7%	68.7%	68.7%	68.7%	31.3%	31.3%		31.3%	31.3%	
Maximum Green (s)	97.0	97.0	97.0	97.0	97.0	97.0	41.0	41.0		41.0	41.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	Min	Min		Min	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0	18.0	27.0	27.0		27.0	27.0	
Pedestrian Calls (#/hr)	5	5	5	5	5	5	5	5		5	5	
Act Effct Green (s)	121.6	121.6	121.6	121.6	121.6	121.6	16.4	16.4			16.4	
Actuated g/C Ratio	0.81	0.81	0.81	0.81	0.81	0.81	0.11	0.11			0.11	
v/c Ratio	0.21	0.48	0.05	0.21	0.50	0.04	0.45	0.37			0.14	
Control Delay	2.5	1.5	0.1	7.2	6.3	1.5	69.5	24.7			39.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Total Delay	2.5	1.5	0.1	7.2	6.3	1.5	69.5	24.7			39.4	
LOS	A	A	A	A	A	A	E	C			D	
Approach Delay		1.5			6.2			44.7			39.4	
Approach LOS		A			A			D			D	
Queue Length 50th (m)	0.6	8.6	0.0	2.8	54.1	0.0	20.9	7.1			4.4	
Queue Length 95th (m)	m2.3	m37.6	m0.3	15.8	164.0	5.3	36.3	25.7			14.0	
Internal Link Dist (m)		547.8			254.8			130.9			99.0	
Turn Bay Length (m)	130.0		60.0	60.0		130.0	60.0					
Base Capacity (vph)	241	2900	1261	264	2900	1261	379	478			428	
Starvation Cap Reductn	0	0	0	0	0	0	0	0			0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0			0	
Storage Cap Reductn	0	0	0	0	0	0	0	0			0	
Reduced v/c Ratio	0.21	0.48	0.05	0.21	0.50	0.04	0.18	0.18			0.06	

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Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 91 (61%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 6.1		Intersection LOS: A	
Intersection Capacity Utilization 67.1%		ICU Level of Service C	
Analysis Period (min) 60			

m Volume for 95th percentile queue is metered by upstream signal.

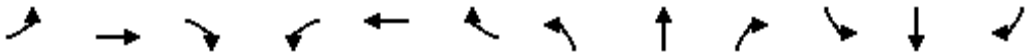
Splits and Phases: 1: Hwy 16 (44 St) & 37 Ave



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	551	522	520	512	508	497	555	667	615	408	476	304
Future Volume (vph)	551	522	520	512	508	497	555	667	615	408	476	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		120.0	120.0		0.0	100.0		100.0	100.0		100.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	0.99		0.98	1.00		0.98	0.99		0.98	0.99		0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3471	3579	1601	3471	3579	1601	3471	3579	1601	3471	3579	1601
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3449	3579	1572	3454	3579	1570	3451	3579	1569	3453	3579	1571
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65			309			395			109
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		786.6			571.8			287.0			465.2	
Travel Time (s)		47.2			34.3			17.2			27.9	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	551	522	520	512	508	497	555	667	615	408	476	304
Shared Lane Traffic (%)												
Lane Group Flow (vph)	551	522	520	512	508	497	555	667	615	408	476	304
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		9.0			9.0			9.0			9.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6		3	8		7	4	5

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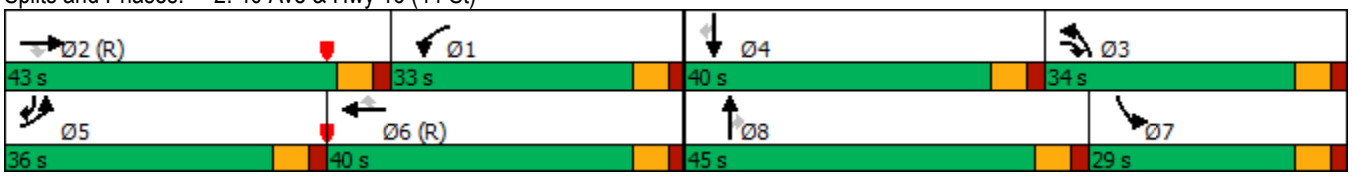
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			2			6			8			4
Detector Phase	5	2	3	1	6	6	3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	15.0	7.0	7.0	15.0	15.0	7.0	10.0	10.0	7.0	10.0	7.0
Minimum Split (s)	13.0	43.0	13.0	13.0	35.0	35.0	13.0	34.0	34.0	13.0	40.0	13.0
Total Split (s)	36.0	43.0	34.0	33.0	40.0	40.0	34.0	45.0	45.0	29.0	40.0	36.0
Total Split (%)	24.0%	28.7%	22.7%	22.0%	26.7%	26.7%	22.7%	30.0%	30.0%	19.3%	26.7%	24.0%
Maximum Green (s)	30.0	37.0	28.0	27.0	34.0	34.0	28.0	39.0	39.0	23.0	34.0	30.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	None	C-Max	C-Max	None	Min	Min	None	Min	None
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		30.0			22.0	22.0		21.0	21.0		27.0	
Pedestrian Calls (#/hr)		5			5	5		5	5		5	
Act Effct Green (s)	27.8	42.3	73.2	27.0	41.5	41.5	30.9	35.2	35.2	21.5	25.8	53.6
Actuated g/C Ratio	0.19	0.28	0.49	0.18	0.28	0.28	0.21	0.23	0.23	0.14	0.17	0.36
v/c Ratio	0.86	0.52	0.65	0.82	0.51	0.76	0.78	0.79	0.92	0.82	0.77	0.48
Control Delay	75.1	48.7	27.2	66.5	45.1	23.2	64.7	61.8	44.9	78.0	68.4	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.1	48.7	27.2	66.5	45.1	23.2	64.7	61.8	44.9	78.0	68.4	13.8
LOS	E	D	C	E	D	C	E	E	D	E	E	B
Approach Delay		50.8			45.2			57.0			57.7	
Approach LOS		D			D			E			E	
Queue Length 50th (m)	85.8	75.9	94.8	80.8	76.1	62.2	81.7	101.7	76.8	63.8	76.3	20.8
Queue Length 95th (m)	#131.4	110.0	183.6	#128.7	110.4	#167.7	#140.8	142.3	#205.4	#102.0	102.6	39.3
Internal Link Dist (m)		762.6			547.8			263.0			441.2	
Turn Bay Length (m)	120.0		120.0	120.0			100.0		100.0	100.0		100.0
Base Capacity (vph)	694	1008	810	624	990	657	724	930	700	534	811	659
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.52	0.64	0.82	0.51	0.76	0.77	0.72	0.88	0.76	0.59	0.46

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection			
Natural Cycle: 130			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 52.6		Intersection LOS: D	
Intersection Capacity Utilization 96.8%		ICU Level of Service F	
Analysis Period (min) 60			

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95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

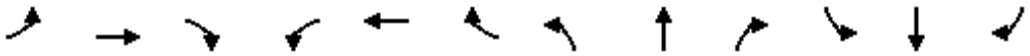
Splits and Phases: 2: 40 Ave & Hwy 16 (44 St)



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	331	7	120	230	7	279	121	1226	141	379	665	320
Future Volume (vph)	331	7	120	230	7	279	121	1226	141	379	665	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.753			0.753			0.399			0.167		
Satd. Flow (perm)	1412	1883	1575	1412	1883	1575	749	3579	1554	314	3579	1556
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			149			279			94			320
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		224.2			386.6			519.4			287.0	
Travel Time (s)		13.5			23.2			31.2			17.2	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	331	7	120	230	7	279	121	1226	141	379	665	320
Shared Lane Traffic (%)												
Lane Group Flow (vph)	331	7	120	230	7	279	121	1226	141	379	665	320
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			6.0			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	

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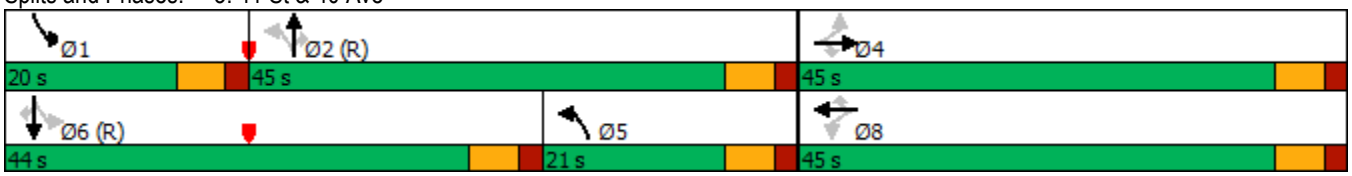
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	45.0	45.0	45.0	44.0	44.0	44.0	21.0	35.0	35.0	13.0	40.0	40.0
Total Split (s)	45.0	45.0	45.0	45.0	45.0	45.0	21.0	45.0	45.0	20.0	44.0	44.0
Total Split (%)	40.9%	40.9%	40.9%	40.9%	40.9%	40.9%	19.1%	40.9%	40.9%	18.2%	40.0%	40.0%
Maximum Green (s)	39.0	39.0	39.0	39.0	39.0	39.0	15.0	39.0	39.0	14.0	38.0	38.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag							Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	32.0	32.0	32.0	31.0	31.0	31.0		22.0	22.0		27.0	27.0
Pedestrian Calls (#/hr)	5	5	5	5	5	5		5	5		5	5
Act Effct Green (s)	30.7	30.7	30.7	30.7	30.7	30.7	39.0	39.0	39.0	46.3	46.3	46.3
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28	0.28	0.35	0.35	0.35	0.42	0.42	0.42
v/c Ratio	0.84	0.01	0.22	0.58	0.01	0.44	0.30	0.97	0.23	0.88	0.44	0.38
Control Delay	58.8	24.7	3.1	39.4	24.7	5.3	30.5	63.6	10.5	58.0	25.1	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.8	24.7	3.1	39.4	24.7	5.3	30.5	63.6	10.5	58.0	25.1	4.2
LOS	E	C	A	D	C	A	C	E	B	E	C	A
Approach Delay		43.7			20.8			55.8			29.3	
Approach LOS		D			C			E			C	
Queue Length 50th (m)	69.9	1.1	0.0	44.4	1.1	0.0	18.8	141.7	7.0	66.7	55.7	0.0
Queue Length 95th (m)	#113.0	4.7	11.2	73.2	4.7	26.3	37.2	#228.6	26.0	#180.7	93.9	29.8
Internal Link Dist (m)		200.2			362.6			495.4			263.0	
Turn Bay Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	500	667	654	500	667	738	407	1268	611	430	1505	839
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.01	0.18	0.46	0.01	0.38	0.30	0.97	0.23	0.88	0.44	0.38

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Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 72 (65%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 40.2		Intersection LOS: D	
Intersection Capacity Utilization 96.0%		ICU Level of Service F	
Analysis Period (min) 60			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

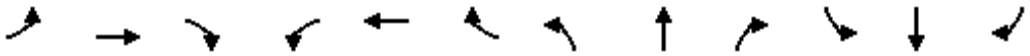
Splits and Phases: 3: 41 St & 40 Ave



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	276	11	148	104	6	67	187	1145	66	129	680	207
Future Volume (vph)	276	11	148	104	6	67	187	1145	66	129	680	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00		0.98				1.00					0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.754			0.750			0.370			0.190		
Satd. Flow (perm)	1415	1883	1576	1413	1883	1601	695	3579	1601	358	3579	1557
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			119			36			63			207
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		241.7			166.9			418.8			519.4	
Travel Time (s)		14.5			10.0			25.1			31.2	
Confl. Peds. (#/hr)	5		5				5					5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	276	11	148	104	6	67	187	1145	66	129	680	207
Shared Lane Traffic (%)												
Lane Group Flow (vph)	276	11	148	104	6	67	187	1145	66	129	680	207
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			6.0			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	35		25	35		25	35		25	35		25
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	43.0	43.0	43.0	45.0	45.0	45.0	40.0	40.0	40.0	35.0	35.0	35.0
Total Split (s)	47.0	47.0	47.0	47.0	47.0	47.0	43.0	43.0	43.0	43.0	43.0	43.0
Total Split (%)	52.2%	52.2%	52.2%	52.2%	52.2%	52.2%	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%
Maximum Green (s)	41.0	41.0	41.0	41.0	41.0	41.0	37.0	37.0	37.0	37.0	37.0	37.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	30.0	30.0	30.0	32.0	32.0	32.0	27.0	27.0	27.0	22.0	22.0	22.0
Pedestrian Calls (#/hr)	5	5	5	5	5	5	5	5	5	5	5	5
Act Effct Green (s)	24.8	24.8	24.8	24.8	24.8	24.8	53.2	53.2	53.2	53.2	53.2	53.2
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28	0.28	0.59	0.59	0.59	0.59	0.59	0.59
v/c Ratio	0.71	0.02	0.28	0.27	0.01	0.14	0.46	0.54	0.07	0.61	0.32	0.21
Control Delay	38.8	18.6	7.2	24.6	18.3	11.7	18.7	14.2	7.0	33.0	11.4	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	18.6	7.2	24.6	18.3	11.7	18.7	14.2	7.0	33.0	11.4	2.7
LOS	D	B	A	C	B	B	B	B	A	C	B	A
Approach Delay		27.6			19.5			14.4			12.4	
Approach LOS		C			B			B			B	
Queue Length 50th (m)	46.2	1.5	4.0	15.1	0.8	4.3	13.9	48.4	0.0	13.2	29.0	0.0
Queue Length 95th (m)	65.8	4.7	17.3	24.7	3.2	12.5	#65.6	116.0	m12.0	#64.8	68.2	16.6
Internal Link Dist (m)		217.7			142.9			394.8			495.4	
Turn Bay Length (m)	80.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	644	857	782	643	857	748	410	2115	972	211	2115	1005
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.01	0.19	0.16	0.01	0.09	0.46	0.54	0.07	0.61	0.32	0.21

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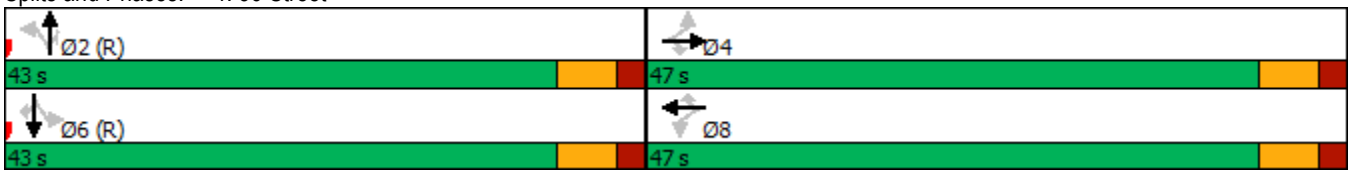
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 15.9		Intersection LOS: B	
Intersection Capacity Utilization 82.5%		ICU Level of Service E	

Analysis Period (min) 60

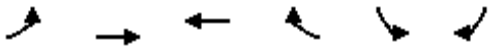
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: 36 Street



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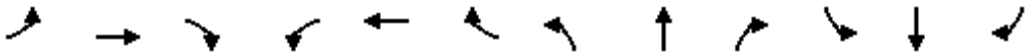
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	109	96	100	24	8	80
Future Volume (vph)	109	96	100	24	8	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.974		0.877	
Flt Protected		0.974			0.995	
Satd. Flow (prot)	0	1834	1834	0	1644	0
Flt Permitted		0.974			0.995	
Satd. Flow (perm)	0	1834	1834	0	1644	0
Link Speed (k/h)		60	60		60	
Link Distance (m)		166.9	484.2		199.3	
Travel Time (s)		10.0	29.1		12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	109	96	100	24	8	80
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	205	124	0	88	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	35			25	35	25
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 33.2%		ICU Level of Service A	
Analysis Period (min) 60			

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	2	53	50	5	139	50	1165	20	49	819	77
Future Volume (vph)	156	2	53	50	5	139	50	1165	20	49	819	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00		0.98				1.00					0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.754			0.757			0.321			0.202		
Satd. Flow (perm)	1415	1883	1576	1426	1883	1601	603	3579	1601	380	3579	1556
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			53			36			36			77
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		252.3			554.0			792.9			418.8	
Travel Time (s)		15.1			33.2			47.6			25.1	
Confl. Peds. (#/hr)	5		5				5					5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	156	2	53	50	5	139	50	1165	20	49	819	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	2	53	50	5	139	50	1165	20	49	819	77
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			6.0			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	35		25	35		25	35		25	35		25
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm

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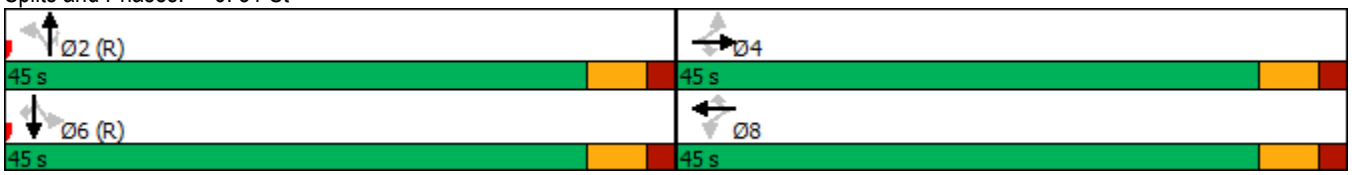
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	43.0	43.0	43.0	45.0	45.0	45.0	40.0	40.0	40.0	33.0	33.0	33.0
Total Split (s)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	30.0	30.0	30.0	32.0	32.0	32.0	27.0	27.0	27.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)	5	5	5	5	5	5	5	5	5	5	5	5
Act Effct Green (s)	19.0	19.0	19.0	19.0	19.0	19.0	59.0	59.0	59.0	59.0	59.0	59.0
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.21	0.66	0.66	0.66	0.66	0.66	0.66
v/c Ratio	0.52	0.01	0.14	0.17	0.01	0.38	0.13	0.50	0.02	0.20	0.35	0.07
Control Delay	35.6	20.5	6.6	26.1	21.0	22.6	10.9	11.1	2.5	10.4	7.3	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.6	20.5	6.6	26.1	21.0	22.6	10.9	11.1	2.5	10.4	7.3	2.1
LOS	D	C	A	C	C	C	B	B	A	B	A	A
Approach Delay		28.2			23.5			11.0			7.0	
Approach LOS		C			C			B			A	
Queue Length 50th (m)	26.8	0.3	0.0	7.9	0.8	16.8	2.6	43.4	0.0	2.2	19.4	0.0
Queue Length 95th (m)	35.9	1.7	8.0	13.6	2.9	26.5	15.6	139.1	3.2	10.7	51.0	3.2
Internal Link Dist (m)		228.3			530.0			768.9			394.8	
Turn Bay Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	613	815	712	617	815	714	395	2344	1061	248	2344	1045
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.00	0.07	0.08	0.01	0.19	0.13	0.50	0.02	0.20	0.35	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 11.9		Intersection LOS: B	
Intersection Capacity Utilization 69.2%		ICU Level of Service C	

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Analysis Period (min) 60

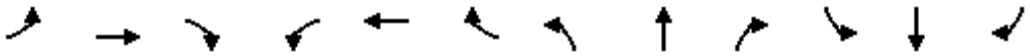
Splits and Phases: 6: 31 St



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	555	11	410	11	11	28	276	584	11	11	504	356
Future Volume (vph)	555	11	410	11	11	28	276	584	11	11	504	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Storage Lanes	1		0	0		0	2		0	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor	0.99	0.98			0.99		0.99	1.00			1.00	0.98
Frt		0.854			0.924			0.997				0.850
Flt Protected	0.950				0.989		0.950				0.999	
Satd. Flow (prot)	3471	1578	0	0	1703	0	3471	3566	0	0	3575	1601
Flt Permitted	0.950				0.820		0.950				0.937	
Satd. Flow (perm)	3431	1578	0	0	1410	0	3449	3566	0	0	3353	1570
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		405			28			2				356
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		293.2			157.4			231.2			792.9	
Travel Time (s)		17.6			9.4			13.9			47.6	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	555	11	410	11	11	28	276	584	11	11	504	356
Shared Lane Traffic (%)												
Lane Group Flow (vph)	555	421	0	0	50	0	276	595	0	0	515	356
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			8.0			8.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm	NA		Prot	NA		Perm	NA	Perm
Protected Phases	7	4			8		5	2			6	

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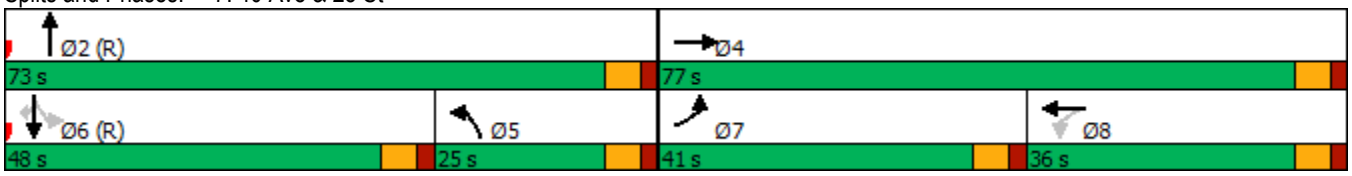


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8						6		6
Detector Phase	7	4		8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	15.0		15.0	15.0	15.0
Minimum Split (s)	13.0	36.0		36.0	36.0		13.0	33.0		35.0	35.0	35.0
Total Split (s)	41.0	77.0		36.0	36.0		25.0	73.0		48.0	48.0	48.0
Total Split (%)	27.3%	51.3%		24.0%	24.0%		16.7%	48.7%		32.0%	32.0%	32.0%
Maximum Green (s)	35.0	71.0		30.0	30.0		19.0	67.0		42.0	42.0	42.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0			6.0		6.0	6.0			6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lag			Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	C-Max
Walk Time (s)		7.0		7.0	7.0			7.0		7.0	7.0	7.0
Flash Dont Walk (s)		23.0		23.0	23.0			20.0		22.0	22.0	22.0
Pedestrian Calls (#/hr)		5		5	5			5		5	5	5
Act Effct Green (s)	29.1	45.9			14.0		19.0	92.1			67.1	67.1
Actuated g/C Ratio	0.19	0.31			0.09		0.13	0.61			0.45	0.45
v/c Ratio	0.83	0.55			0.32		0.63	0.27			0.34	0.40
Control Delay	69.8	6.0			36.3		69.4	16.2			31.0	4.9
Queue Delay	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Delay	69.8	6.0			36.3		69.4	16.2			31.0	4.9
LOS	E	A			D		E	B			C	A
Approach Delay		42.3			36.3			33.0			20.3	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	86.8	3.6			6.7		42.9	42.6			54.2	0.0
Queue Length 95th (m)	118.5	38.2			21.3		66.5	91.4			105.1	44.0
Internal Link Dist (m)		269.2			133.4			207.2			768.9	
Turn Bay Length (m)	60.0						60.0					60.0
Base Capacity (vph)	809	960			304		439	2190			1500	899
Starvation Cap Reductn	0	0			0		0	0			0	0
Spillback Cap Reductn	0	0			0		0	0			0	0
Storage Cap Reductn	0	0			0		0	0			0	0
Reduced v/c Ratio	0.69	0.44			0.16		0.63	0.27			0.34	0.40

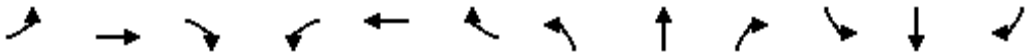
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Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 32.4		Intersection LOS: C	
Intersection Capacity Utilization 88.1%		ICU Level of Service E	
Analysis Period (min) 60			

Splits and Phases: 7: 40 Ave & 25 St

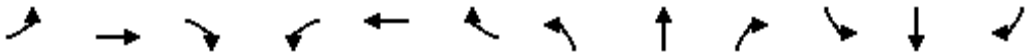


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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	1330	338	185	1587	50	211	10	160	50	10	50
Future Volume (vph)	50	1330	338	185	1587	50	211	10	160	50	10	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		60.0	60.0		130.0	60.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	1		0	0		0
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.97	1.00		0.98	1.00	0.98			0.99	
Frt			0.850			0.850		0.859			0.939	
Flt Protected	0.950			0.950			0.950				0.978	
Satd. Flow (prot)	1789	3579	1601	1789	3579	1601	1789	1593	0	0	1717	0
Flt Permitted	0.155			0.086			0.706				0.774	
Satd. Flow (perm)	292	3579	1559	162	3579	1562	1325	1593	0	0	1356	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			217			50		160			25	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		571.8			278.8			154.9			123.0	
Travel Time (s)		34.3			16.7			9.3			7.4	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	1330	338	185	1587	50	211	10	160	50	10	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	1330	338	185	1587	50	211	170	0	0	110	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	8			4		
Detector Phase	2	2	2	1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	31.0	31.0	31.0	21.0	31.0	31.0	40.0	40.0		40.0	40.0	
Total Split (s)	48.0	48.0	48.0	21.0	69.0	69.0	41.0	41.0		41.0	41.0	
Total Split (%)	43.6%	43.6%	43.6%	19.1%	62.7%	62.7%	37.3%	37.3%		37.3%	37.3%	
Maximum Green (s)	42.0	42.0	42.0	15.0	63.0	63.0	35.0	35.0		35.0	35.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0			6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Min	Min		Min	Min	
Act Effct Green (s)	40.6	40.6	40.6	61.8	61.8	61.8	20.3	20.3			20.3	
Actuated g/C Ratio	0.43	0.43	0.43	0.66	0.66	0.66	0.22	0.22			0.22	
v/c Ratio	0.40	0.86	0.43	0.50	0.68	0.05	0.74	0.36			0.35	
Control Delay	32.8	32.8	9.1	20.2	12.9	2.5	52.1	8.1			27.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Total Delay	32.8	32.8	9.1	20.2	12.9	2.5	52.1	8.1			27.2	
LOS	C	C	A	C	B	A	D	A			C	
Approach Delay		28.2			13.3			32.4			27.2	
Approach LOS		C			B			C			C	
Queue Length 50th (m)	6.4	117.2	13.8	14.8	87.8	0.0	38.5	1.5			13.9	
Queue Length 95th (m)	#25.7	#228.9	52.3	50.8	185.5	5.7	73.3	22.9			33.4	
Internal Link Dist (m)		547.8			254.8			130.9			99.0	
Turn Bay Length (m)	130.0		60.0	60.0		130.0	60.0					
Base Capacity (vph)	131	1610	820	367	2415	1070	496	697			524	
Starvation Cap Reductn	0	0	0	0	0	0	0	0			0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0			0	
Storage Cap Reductn	0	0	0	0	0	0	0	0			0	
Reduced v/c Ratio	0.38	0.83	0.41	0.50	0.66	0.05	0.43	0.24			0.21	

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Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 94.2
Natural Cycle: 105
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 21.8 Intersection LOS: C
Intersection Capacity Utilization 96.4% ICU Level of Service F
Analysis Period (min) 60
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

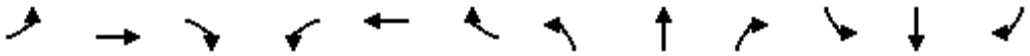
Splits and Phases: 1: Hwy 16 (44 St) & 37 Ave



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	304	661	733	688	688	418	677	510	474	486	774	551
Future Volume (vph)	304	661	733	688	688	418	677	510	474	486	774	551
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		120.0	120.0		0.0	100.0		100.0	100.0		100.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00		0.98	0.99		0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3471	3579	1601	3471	3579	1601	3471	3579	1601	3471	3579	1601
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3454	3579	1572	3457	3579	1570	3458	3579	1569	3448	3579	1571
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			380			342			65
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		786.6			571.8			287.0			465.2	
Travel Time (s)		47.2			34.3			17.2			27.9	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	304	661	733	688	688	418	677	510	474	486	774	551
Shared Lane Traffic (%)												
Lane Group Flow (vph)	304	661	733	688	688	418	677	510	474	486	774	551
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		9.0			9.0			9.0			9.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6		3	8		7	4	5

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			2			6			8			4
Detector Phase	5	2	3	1	6	6	3	8	8	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	15.0	7.0	7.0	15.0	15.0	7.0	10.0	10.0	7.0	10.0	7.0
Minimum Split (s)	13.0	43.0	13.0	13.0	35.0	35.0	13.0	34.0	34.0	13.0	40.0	13.0
Total Split (s)	32.0	43.0	33.0	34.0	45.0	45.0	33.0	43.0	43.0	30.0	40.0	32.0
Total Split (%)	21.3%	28.7%	22.0%	22.7%	30.0%	30.0%	22.0%	28.7%	28.7%	20.0%	26.7%	21.3%
Maximum Green (s)	26.0	37.0	27.0	28.0	39.0	39.0	27.0	37.0	37.0	24.0	34.0	26.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max	None	None	Max	Max	None	Min	Min	None	Min	None
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		30.0			22.0	22.0		21.0	21.0		27.0	
Pedestrian Calls (#/hr)		5			5	5		5	5		5	
Act Effct Green (s)	23.2	37.0	64.0	28.0	41.8	41.8	27.0	37.4	37.4	23.4	33.7	56.9
Actuated g/C Ratio	0.15	0.25	0.43	0.19	0.28	0.28	0.18	0.25	0.25	0.16	0.23	0.38
v/c Ratio	0.57	0.75	0.99	1.06	0.69	0.59	1.08	0.57	0.73	0.90	0.96	0.86
Control Delay	62.6	58.4	81.1	203.5	53.1	10.1	236.4	52.3	21.8	87.4	92.8	35.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.6	58.4	81.1	203.5	53.1	10.1	236.4	52.3	21.8	87.4	92.8	35.6
LOS	E	E	F	F	D	B	F	D	C	F	F	D
Approach Delay		69.0			100.7			118.6			73.9	
Approach LOS		E			F			F			E	
Queue Length 50th (m)	45.2	101.4	106.0	~121.8	104.0	9.0	~122.0	74.4	38.5	77.6	127.1	73.8
Queue Length 95th (m)	69.0	143.4	#355.7	#192.4	147.4	67.4	#192.2	107.3	#119.3	#129.2	#202.3	#157.1
Internal Link Dist (m)		762.6			547.8			263.0			441.2	
Turn Bay Length (m)	120.0		120.0	120.0			100.0		100.0	100.0		100.0
Base Capacity (vph)	602	884	739	648	999	712	625	892	648	556	812	670
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.75	0.99	1.06	0.69	0.59	1.08	0.57	0.73	0.87	0.95	0.82

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 149.7			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.08			
Intersection Signal Delay: 90.3		Intersection LOS: F	
Intersection Capacity Utilization 112.2%		ICU Level of Service H	
Analysis Period (min) 60			

~ Volume exceeds capacity, queue is theoretically infinite.

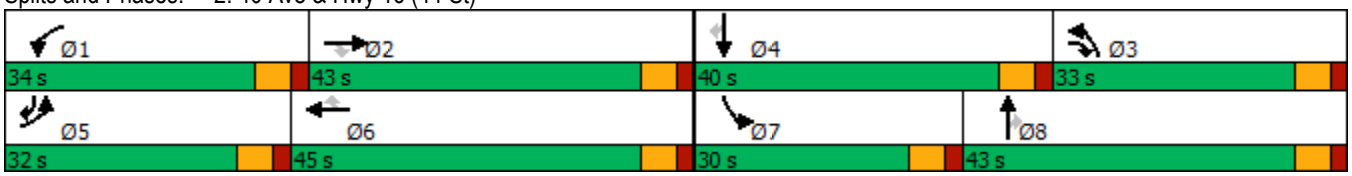
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Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

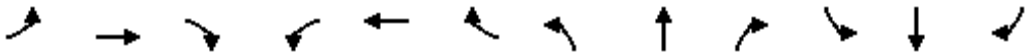
Splits and Phases: 2: 40 Ave & Hwy 16 (44 St)



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	320	8	122	237	8	506	121	839	236	519	1343	331
Future Volume (vph)	320	8	122	237	8	506	121	839	236	519	1343	331
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99		0.98	0.99		0.98	1.00		0.97			0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.752			0.752			0.175			0.092		
Satd. Flow (perm)	1408	1883	1573	1408	1883	1572	329	3579	1549	173	3579	1552
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			153			479			153			154
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		224.2			386.6			519.4			287.0	
Travel Time (s)		13.5			23.2			31.2			17.2	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	320	8	122	237	8	506	121	839	236	519	1343	331
Shared Lane Traffic (%)												
Lane Group Flow (vph)	320	8	122	237	8	506	121	839	236	519	1343	331
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			6.0			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

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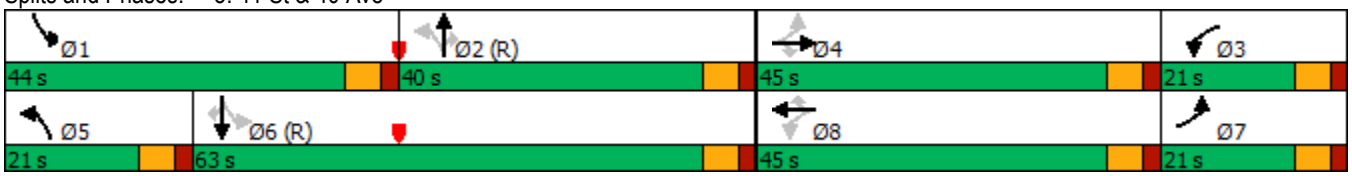
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	21.0	45.0	45.0	21.0	44.0	44.0	21.0	35.0	35.0	13.0	40.0	40.0
Total Split (s)	21.0	45.0	45.0	21.0	45.0	45.0	21.0	40.0	40.0	44.0	63.0	63.0
Total Split (%)	14.0%	30.0%	30.0%	14.0%	30.0%	30.0%	14.0%	26.7%	26.7%	29.3%	42.0%	42.0%
Maximum Green (s)	15.0	39.0	39.0	15.0	39.0	39.0	15.0	34.0	34.0	38.0	57.0	57.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		32.0	32.0		31.0	31.0		22.0	22.0		27.0	27.0
Pedestrian Calls (#/hr)		5	5		5	5		5	5		5	5
Act Effct Green (s)	36.4	15.8	15.8	38.6	17.0	17.0	53.3	42.2	42.2	94.4	77.3	77.3
Actuated g/C Ratio	0.24	0.11	0.11	0.26	0.11	0.11	0.36	0.28	0.28	0.63	0.52	0.52
v/c Ratio	0.81	0.04	0.40	0.57	0.04	0.84	0.54	0.83	0.43	0.86	0.73	0.38
Control Delay	69.7	53.6	6.7	50.7	52.0	21.1	32.0	59.0	25.0	55.2	33.4	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.7	53.6	6.7	50.7	52.0	21.1	32.0	59.0	25.0	55.2	33.4	14.6
LOS	E	D	A	D	D	C	C	E	C	E	C	B
Approach Delay		52.3			30.8			49.5			35.7	
Approach LOS		D			C			D			D	
Queue Length 50th (m)	89.1	2.4	0.0	62.4	2.4	8.2	14.0	94.0	10.8	129.0	159.2	29.1
Queue Length 95th (m)	124.3	7.4	14.1	89.7	7.4	75.8	m47.3	#224.7	m74.3	#259.6	#313.0	84.1
Internal Link Dist (m)		200.2			362.6			495.4			263.0	
Turn Bay Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	403	489	522	429	489	763	275	1007	545	606	1844	874
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.02	0.23	0.55	0.02	0.66	0.44	0.83	0.43	0.86	0.73	0.38

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Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 40.1		Intersection LOS: D	
Intersection Capacity Utilization 93.6%		ICU Level of Service F	
Analysis Period (min) 60			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

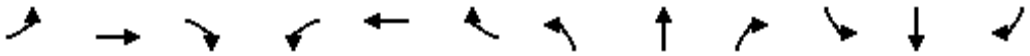
Splits and Phases: 3: 41 St & 40 Ave



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	24	189	124	23	277	151	739	130	281	1101	277
Future Volume (vph)	204	24	189	124	23	277	151	739	130	281	1101	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99		0.98									0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.742			0.742			0.198			0.308		
Satd. Flow (perm)	1390	1883	1572	1398	1883	1601	373	3579	1601	580	3579	1549
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			189			277			122			174
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		241.7			166.9			418.8			519.4	
Travel Time (s)		14.5			10.0			25.1			31.2	
Confl. Peds. (#/hr)	5		5				5					5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	204	24	189	124	23	277	151	739	130	281	1101	277
Shared Lane Traffic (%)												
Lane Group Flow (vph)	204	24	189	124	23	277	151	739	130	281	1101	277
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			6.0			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	35		25	35		25	35		25	35		25
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	13.0	43.0	43.0	13.0	45.0	45.0	13.0	40.0	40.0	13.0	35.0	35.0
Total Split (s)	15.0	47.0	47.0	13.0	45.0	45.0	18.0	72.0	72.0	18.0	72.0	72.0
Total Split (%)	10.0%	31.3%	31.3%	8.7%	30.0%	30.0%	12.0%	48.0%	48.0%	12.0%	48.0%	48.0%
Maximum Green (s)	9.0	41.0	41.0	7.0	39.0	39.0	12.0	66.0	66.0	12.0	66.0	66.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		30.0	30.0		32.0	32.0		27.0	27.0		22.0	22.0
Pedestrian Calls (#/hr)		5	5		5	5		5	5		5	5
Act Effct Green (s)	27.4	15.4	15.4	28.3	15.8	15.8	95.0	85.1	85.1	101.4	88.3	88.3
Actuated g/C Ratio	0.18	0.10	0.10	0.19	0.11	0.11	0.63	0.57	0.57	0.68	0.59	0.59
v/c Ratio	0.72	0.12	0.57	0.42	0.12	0.66	0.46	0.36	0.14	0.57	0.52	0.28
Control Delay	68.1	57.9	13.8	52.2	57.0	13.9	16.5	16.3	6.2	15.3	8.7	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	57.9	13.8	52.2	57.0	13.9	16.5	16.3	6.2	15.3	8.7	1.4
LOS	E	E	B	D	E	B	B	B	A	B	A	A
Approach Delay		42.9			27.4			15.1			8.6	
Approach LOS		D			C			B			A	
Queue Length 50th (m)	57.7	7.3	0.0	33.4	7.0	0.0	14.6	54.6	2.6	14.4	32.4	1.4
Queue Length 95th (m)	79.4	15.5	29.5	49.7	15.0	37.1	44.2	76.6	18.9	m51.2	46.8	m5.9
Internal Link Dist (m)		217.7			142.9			394.8			495.4	
Turn Bay Length (m)	80.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	295	514	567	295	489	621	359	2029	960	503	2106	983
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.05	0.33	0.42	0.05	0.45	0.42	0.36	0.14	0.56	0.52	0.28

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Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 115			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 16.8		Intersection LOS: B	
Intersection Capacity Utilization 73.7%		ICU Level of Service D	

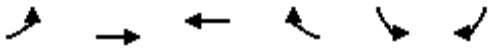
Analysis Period (min) 60

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: 36 Street



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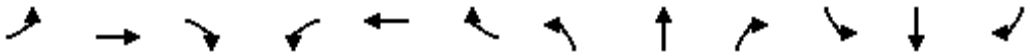
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	192	244	246	16	29	179
Future Volume (vph)	192	244	246	16	29	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.992		0.884	
Flt Protected		0.978			0.993	
Satd. Flow (prot)	0	1842	1868	0	1653	0
Flt Permitted		0.978			0.993	
Satd. Flow (perm)	0	1842	1868	0	1653	0
Link Speed (k/h)		60	60		60	
Link Distance (m)		166.9	484.2		199.3	
Travel Time (s)		10.0	29.1		12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	192	244	246	16	29	179
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	436	262	0	208	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	35			25	35	25
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 60.0%		ICU Level of Service B	
Analysis Period (min) 60			

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	8	50	36	6	88	40	875	59	156	1215	95
Future Volume (vph)	66	8	50	36	6	88	40	875	59	156	1215	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99		0.98				1.00					0.97
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1883	1601	1789	1883	1601	1789	3579	1601	1789	3579	1601
Flt Permitted	0.754			0.752			0.212			0.314		
Satd. Flow (perm)	1412	1883	1572	1416	1883	1601	399	3579	1601	591	3579	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			50			88			59			87
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		252.3			554.0			792.9			418.8	
Travel Time (s)		15.1			33.2			47.6			25.1	
Confl. Peds. (#/hr)	5		5				5					5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	66	8	50	36	6	88	40	875	59	156	1215	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	8	50	36	6	88	40	875	59	156	1215	95
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			6.0			6.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	35		25	35		25	35		25	35		25
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	43.0	43.0	43.0	45.0	45.0	45.0	40.0	40.0	40.0	33.0	33.0	33.0
Total Split (s)	46.0	46.0	46.0	46.0	46.0	46.0	104.0	104.0	104.0	104.0	104.0	104.0
Total Split (%)	30.7%	30.7%	30.7%	30.7%	30.7%	30.7%	69.3%	69.3%	69.3%	69.3%	69.3%	69.3%
Maximum Green (s)	40.0	40.0	40.0	40.0	40.0	40.0	98.0	98.0	98.0	98.0	98.0	98.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	30.0	30.0	30.0	32.0	32.0	32.0	27.0	27.0	27.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)	5	5	5	5	5	5	5	5	5	5	5	5
Act Effct Green (s)	17.2	17.2	17.2	17.2	17.2	17.2	120.8	120.8	120.8	120.8	120.8	120.8
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11	0.11	0.81	0.81	0.81	0.81	0.81	0.81
v/c Ratio	0.41	0.04	0.22	0.22	0.03	0.34	0.12	0.30	0.05	0.33	0.42	0.08
Control Delay	66.1	51.9	14.2	59.0	51.3	12.6	3.8	2.8	0.2	5.0	3.5	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.1	51.9	14.2	59.0	51.3	12.6	3.8	2.8	0.2	5.0	3.5	0.6
LOS	E	D	B	E	D	B	A	A	A	A	A	A
Approach Delay		44.2			27.2			2.6			3.4	
Approach LOS		D			C			A			A	
Queue Length 50th (m)	20.3	2.4	0.0	10.8	1.8	0.0	1.0	13.0	0.0	5.2	21.5	0.2
Queue Length 95th (m)	33.7	7.4	13.8	20.8	6.2	18.6	m5.6	40.1	m1.1	14.0	42.7	2.6
Internal Link Dist (m)		228.3			530.0			768.9			394.8	
Turn Bay Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	376	502	455	377	502	491	321	2881	1300	475	2881	1262
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.02	0.11	0.10	0.01	0.18	0.12	0.30	0.05	0.33	0.42	0.08

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Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 6.2		Intersection LOS: A	
Intersection Capacity Utilization 74.6%		ICU Level of Service D	

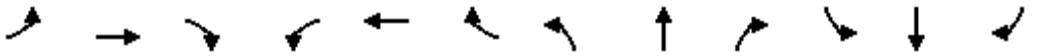
Analysis Period (min) 60

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: 31 St

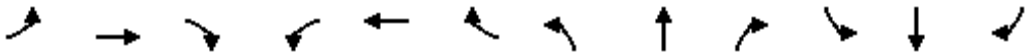


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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	391	11	276	11	11	19	410	551	11	28	604	587
Future Volume (vph)	391	11	276	11	11	19	410	551	11	28	604	587
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	60.0		60.0	60.0		60.0
Storage Lanes	1		0	0		0	2		0	0		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor	0.99	0.98			0.99		0.99	1.00			1.00	0.98
Frt		0.856			0.937			0.997				0.850
Flt Protected	0.950				0.987		0.950				0.998	
Satd. Flow (prot)	3471	1579	0	0	1726	0	3471	3565	0	0	3571	1601
Flt Permitted	0.950				0.825		0.950				0.902	
Satd. Flow (perm)	3426	1579	0	0	1440	0	3450	3565	0	0	3227	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		276			19			2				490
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		293.2			157.4			231.2			792.9	
Travel Time (s)		17.6			9.4			13.9			47.6	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	391	11	276	11	11	19	410	551	11	28	604	587
Shared Lane Traffic (%)												
Lane Group Flow (vph)	391	287	0	0	41	0	410	562	0	0	632	587
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			8.0			8.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Perm	NA		Prot	NA		Perm	NA	Perm
Protected Phases	7	4			8		5	2			6	

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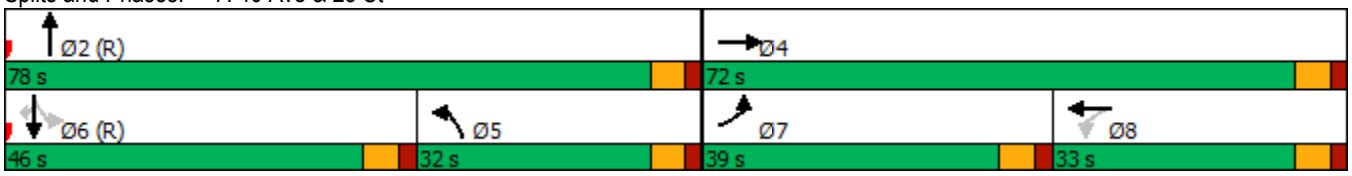


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8						6		6
Detector Phase	7	4		8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	15.0		15.0	15.0	15.0
Minimum Split (s)	13.0	30.0		33.0	33.0		13.0	30.0		32.0	32.0	32.0
Total Split (s)	39.0	72.0		33.0	33.0		32.0	78.0		46.0	46.0	46.0
Total Split (%)	26.0%	48.0%		22.0%	22.0%		21.3%	52.0%		30.7%	30.7%	30.7%
Maximum Green (s)	33.0	66.0		27.0	27.0		26.0	72.0		40.0	40.0	40.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0			6.0		6.0	6.0			6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lag			Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	C-Max
Walk Time (s)		7.0		7.0	7.0			7.0		7.0	7.0	7.0
Flash Dont Walk (s)		17.0		20.0	20.0			17.0		19.0	19.0	19.0
Pedestrian Calls (#/hr)		5		5	5			5		5	5	5
Act Effct Green (s)	22.2	38.4			13.4		26.0	99.6			67.6	67.6
Actuated g/C Ratio	0.15	0.26			0.09		0.17	0.66			0.45	0.45
v/c Ratio	0.76	0.47			0.28		0.68	0.24			0.43	0.60
Control Delay	72.0	7.0			42.3		64.9	12.2			41.4	19.6
Queue Delay	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Delay	72.0	7.0			42.3		64.9	12.2			41.4	19.6
LOS	E	A			D		E	B			D	B
Approach Delay		44.4			42.3			34.4			30.9	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	61.4	2.6			6.7		62.8	34.3			63.6	37.0
Queue Length 95th (m)	87.3	32.5			20.3		92.7	73.9			144.7	142.5
Internal Link Dist (m)		269.2			133.4			207.2			768.9	
Turn Bay Length (m)	60.0						60.0					60.0
Base Capacity (vph)	763	849			274		601	2368			1454	976
Starvation Cap Reductn	0	0			0		0	0			0	0
Spillback Cap Reductn	0	0			0		0	0			0	0
Storage Cap Reductn	0	0			0		0	0			0	0
Reduced v/c Ratio	0.51	0.34			0.15		0.68	0.24			0.43	0.60

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Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 31 (21%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 35.4		Intersection LOS: D	
Intersection Capacity Utilization 82.4%		ICU Level of Service E	
Analysis Period (min) 60			

Splits and Phases: 7: 40 Ave & 25 St



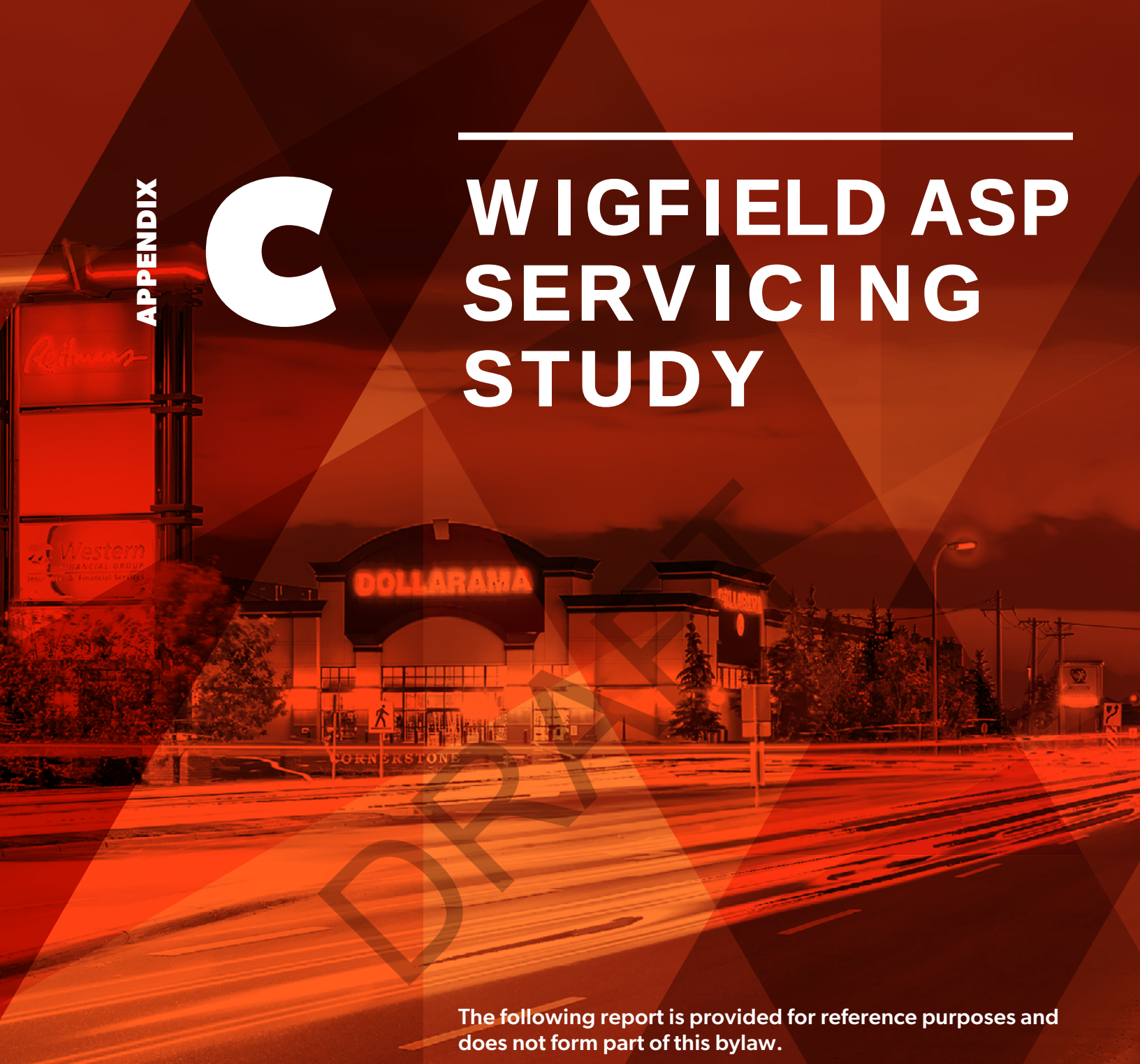
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APPENDIX

C

WIGFIELD ASP SERVICING STUDY



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The following report is provided for reference purposes and does not form part of this bylaw.



LLOYDMINSTER

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WIGFIELD AREA STRUCTURE PLAN SERVICING STUDY

Final Report
April 2023

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CORPORATE AUTHORIZATION

This document entitled "Wigfield ASP Servicing Study" has been prepared by the City of Lloydminster's Engineering Services department for the explicit use of the City of Lloydminster. The information and data provided herein represent Engineering Services professional judgment at the time of preparation. Engineering Services denies any liability whatsoever to any other parties who may obtain this report and use it, or any of its contents, without prior written consent from Engineering Services.

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James Rogers, P. Eng.
Senior Manager, Capital Infrastructure

Terry Burton, P.L. (Eng.), Engineering Licensee
Director, Planning & Engineering

01 INTENT & BACKGROUND

PART 1.1
INTENT

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The City of Lloydminster's (City) Land Division Department has engaged Engineering Services to complete an Area Structure Plan level servicing study encompassing the required water, wastewater, and stormwater infrastructure to support the preparation of the Wigfield Area Structure Plan (ASP). The ultimate intent of the Wigfield ASP Servicing Study is to provide a high-level evaluation of the potential future water and wastewater servicing systems in the area as well as potential future stormwater drainage systems.

This report includes commentary associated with the necessary parameters for the design, including high-level recommendations associated with the alignment and placement of water distribution, wastewater collection, and stormwater management and conveyance infrastructure.

The Wigfield ASP Servicing Study represents an investment in the infrastructure and will help support sustainable and cost-effective growth within the Wigfield ASP study area.

It should be noted that this document is considered a high-level servicing study to show intent and is not intended to replace more detailed analyses as may be required further into the design process including, but not limited to, the preparation of Neighbourhood Structure Plan(s) and associated detailed servicing studies.

PART 1.2

BACKGROUND

Within the Wigfield Industrial Area Structure Plan, dated: January 13, 2014 (Select Engineering Consultants Ltd.) the Wigfield Industrial area included all lands as identified below, hereinafter referred to as the Wigfield ASP study area, as well as the lands bound by 44 Street to the north, 41 Street to the south, 40 Avenue to the west and the City corporate limits to the east. These lands north of 41 Street will not be included within this Servicing Study as the lands contained therein are developed with existing water, wastewater, and stormwater/drainage infrastructure installed. As such, no servicing of these lands is to be contemplated.

The Wigfield ASP study area is comprised of approximately 92 ha of land within current city boundaries. The Wigfield ASP study area is bound by 41 Street to the north, the city corporate limits to the south and to the east, and 40 Avenue to the west.

The setting of the Wigfield ASP study area, being situated along the City's eastern most corporate limits, introduces a number of servicing opportunities. These opportunities will be addressed as part of this Servicing Study.

The City of Lloydminster's Water, Sanitary Sewer, and Stormwater Master Plans were adopted in 2016, 2016, and 2015, respectively. These documents outline how existing infrastructure systems are to be upgraded or expanded in Lloydminster for future development opportunities and were used to formulate the commentary contained herein. The Wigfield ASP study area is to incorporate the following Land Uses:

- Open Space
- Recreation
- Event Facility
- Commercial
- Neighbourhood Commercial
- Mixed Use
- Medium Density Residential
- Low Density Residential

A sound, high-level servicing strategy is useful for both administration and elected officials, as well as future developers in carrying out short-term and long-term infrastructure planning and budgeting as well as to support the systematic efficient development of the Wigfield ASP study area.

The update to the Wigfield ASP Servicing Study was initiated to accommodate the proposed Event Facility as well as commercial and recreation land uses within the north part of the study area with mixed commercial, residential, and open space land uses within the south part of the study area. The north part of the study area would be considered all lands north of the future 36 Street extension, with the south part of the study area being considered all lands south of the future 36 Street extension.

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PART 1.3

WIGFIELD ASP — LOCATION

The Wigfield ASP study area lies within the city along the eastern most corporate limits of the city. The study area is bound by bound by 41 Street to the north, the city corporate limits to the south and to the east, and 40 Avenue to the west. The Wigfield ASP study area includes the following three (3) parcels:

- 3911 – 41 Street (Lot: 2, Block: 5, Plan: 102062810)
  Owner: City of Lloydminster

- Northwest quarter section of 36-49-28-W3
  Owner: City of Lloydminster

- Southwest quarter section of 36-49-28-W3
  Owner: Little Pine Business Developments Inc.*

* Understood ownership at the time of preparing this report.

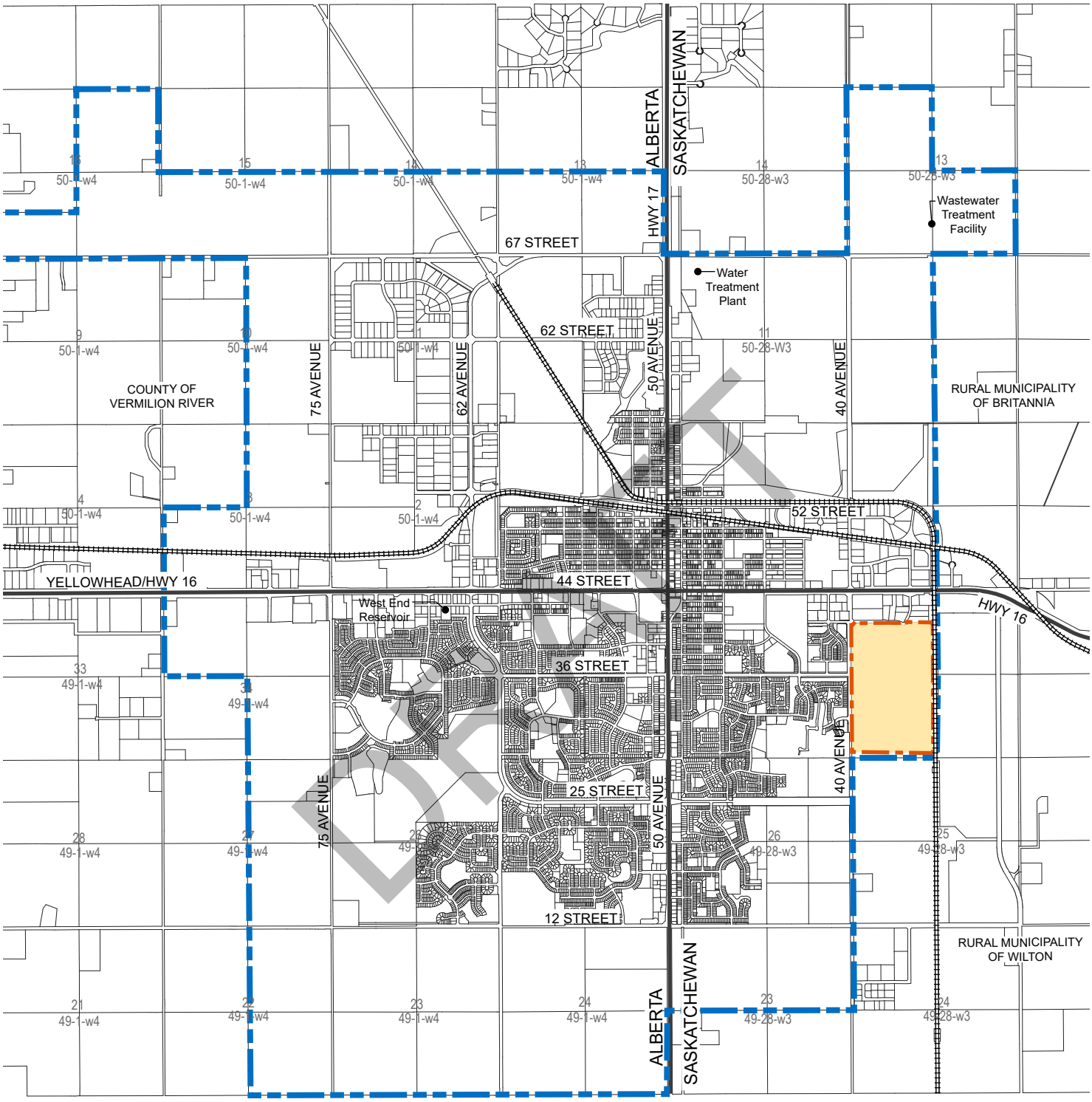
The study area encompasses approximately 92 ha of area.

The Wigfield ASP study area generally drains toward the northeast corner of the study area with portions draining to the southeast delineated by a ridge along the extension of 34 Street. Elevations within the study area range from a high point of approximately 650 m in the southeast to a low point of approximately 640 m in the northeast.

The study area is located within the Central North Saskatchewan River Watershed, which is part of the Nelson Churchill (Hudson Bay) continental drainage basin.

The eastern most City corporate limits also parallel the Canadian Pacific Railway Right-of-Way as identified within the Future Land Use Concept.

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Legend

City Boundary

ASP Boundary

FIGURE 1

Plan Location

02 EXISTING CONDITIONS

PART 2.1
WIGFIELD ASP

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EXISTING DEVELOPMENT

In accordance with the latest City of Lloydminster Land Use Bylaw (Bylaw: 05-2016), the land use covering the entire Wigfield ASP study area is currently Urban Transition. Other land uses surrounding the study area include light and medium industrial as well as direct control (Gold Horse Casino) parcels north of the study area. West of the Wingfield ASP study area, adjacent to 40 Avenue, are the Larsen Grove and Aurora residential and commercial developments. The future land use within the Wigfield ASP study area is currently identified as Future Industrial however it is anticipated that this will change as development is contemplated.

The Wigfield ASP study area is predominantly undeveloped with much of the lands currently used for agricultural or stormwater management purposes. Within the northeast corner of northwest quarter section of 36-49-28-W3 resides an existing Stormwater Management Facility (Lake K), which is connected to the 36 Street and 40 Avenue intersection via a portion of the East Drainage Channel which parallels both 40 Avenue and 41 Street.

Three (3) residences are located in the southwest portion of Wigfield ASP study area within the Little Pine Business Developments Inc. land ownership.

No other formal development within the Wigfield ASP study area has been initiated.



FIGURE 2

Plan Area Context



FIGURE 3

Future Land Use Concept

ADJACENT DEVELOPMENT

As the lands directly south of the Wigfield ASP study area are not currently within the City's corporate limits, rather they are located within the Rural Municipality of Wilton, minimal comment is contained herein other then the recommendation to account for potential future servicing for if and when these lands are incorporated into the City's corporate limits.

With respect to the lands to the east of the Wigfield ASP study area, these lands are also located within the Rural Municipality of Wilton and as such will not be included within the recommendations of this Servicing Study. This direction is further strengthened through the presence of the Canadian Pacific Rail Right-of-Way and the complications there imposed associated with extending services through rail corridors.

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PART 2.2
WATER – EXISTING

EXISTING WATER SOURCES

The City's existing water distribution system is supplied by raw water which is drawn from the North Saskatchewan River located approximately 37 kilometres north of Lloydminster. The raw water from the North Saskatchewan River is supplied to the City's existing Water Treatment Plant (WTP), the Cenovus Energy Upgrader, as well as other smaller users. The City's current license for raw water withdrawal from the North Saskatchewan River is 9,000 acre-feet or approximately 30,500 m3/day based on gross diversion, with a current average daily demand for treated water of approximately 11,000 m3, Water Master Plan (ISL, 2016).

Other raw water users account for an estimated 14,000 m3 of the permissible 30,500 m3/day diversion volume.

EXISTING WATER INFRASTRUCTURE

Water Treatment Plant

The existing WTP is located northwest of the study area along 67 Street, east of 50 Avenue. The WTP is typically operated from 6:00 am to 11:00 pm except during peak days when it may operate up to 24 hours per day. The WTP has an average flow of 11,000 m3/day with a net production capacity of 21,125 m3/day, Water Master Plan (ISL, 2016).

During non-operational times, the water distribution system is fed through the West End Reservoir.

Along with providing potable water to Lloydminster, the WTP also provides potable water to the Saskatchewan Water Corporation (SaskWater) and the Alberta Central East Water Corporation (ACE) through separate Potable Water Sales Agreements.

West End Reservoir

The City currently stores potable water at the West End Reservoir, located along 43 Street west of 62 Avenue, which is comprised of a 4,545 m3 above ground reservoir built in 1971 and a 20,201 m3 underground reservoir built in 2006, has a combined capacity of 24,746 m3.

The WTP also has 1,090 m3 of storage located within the clearwell; however, this volume is not considered part of the overall water system storage capacity, Water Master Plan (ISL, 2016).

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Water Distribution System

The Wigfield ASP study area is largely undeveloped; therefore, minimal water distribution infrastructure exists within the study area. There is, however, existing infrastructure located along 40 Avenue on the west side of the study area and through existing developments north of the Wigfield ASP study area along 41 Street/37 Avenue. An existing 300 mm diameter potable watermain bisects the northern portion of the Wigfield ASP study area which connects infrastructure from 36 Street to 41 Street as well as provides potable water service to the Cenovus Energy Upgrader via a 250 mm diameter potable watermain connected to the City's water distribution system within the future 36 Street extension.

An existing 350 mm diameter raw water watermain runs along 40 Avenue and through the Wigfield ASP study area within the future the 36 Street right-of-way connecting the Cenovus Energy Upgrader to the Upgrader Booster Station (UBS) located within the WTP. The 350 mm diameter raw water watermain which connects the UBS to the Cenovus Energy Upgrader is a Cenovus Energy dedicated line with limited connections providing raw water to tertiary users.

The potable watermain which bisects the northern portion of the Wigfield ASP study area, as well as the watermain within the future 36 Street extension, are contained within the following easements: Plans 90B 12739 and 92B 07259.

The existing water distribution system has been included within the figure associated with the proposed water distribution system.

EXISTING CAPACITIES

Water Treatment Plant

It was anticipated that a major upgrade to the existing WTP would be required in 2026 based on population and potable water demand projections in conjunction with the assessment performed as part of the 2016 Water Master Plan. As much of the Wigfield ASP study area was considered to be outside of this growth horizon at the time of the 2016 Water Master Plan, it was anticipated that an upgrade would be required to facilitate the development of the Wigfield ASP study area.

It is recommended that as part of future Water Master Plan updates that the Wigfield ASP study area be included within the analysis to determine impacts on the available capacity of the WTP as well as the capacity implications to the WTP be confirmed through the preparation of the Neighbourhood Structure Plan(s) and future detailed designs.

West End Reservoir

Based on the projected treated water storage volume required in 2019, the existing reservoir facility is already being over utilized and is out of available capacity, Water Master Plan (ISL, 2016).

It is recommended that as part of future Water Master Plan update that the Wigfield ASP study area be included within the analysis to determine impacts on the available capacity of the West End Reservoir as well as the capacity implications to the WER be confirmed through the preparation of the Neighbourhood Structure Plan(s) and future detailed designs.

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PART 2.3

WASTEWATER – EXISTING

EXISTING WASTEWATER INFRASTRUCTURE

Wastewater Collection System

The existing wastewater system collects and conveys flows to the Wastewater Treatment Plant (WWTP) located north of 67 Street and approximately 800 m east of 40 Avenue. The Wigfield ASP study area is serviced by the East Trunk. The East Trunk is one of two primary wastewater trunks in the city. The East Trunk, which runs along the eastern boundary of the city, is connected to the Wigfield ASP study area via a 900 mm diameter wastewater main within 37 Avenue. Within the Wigfield ASP study area, the East Trunk downsizes to a 750mm diameter wastewater main which bisects the northern portion of the study area and connects 36 Street to 41 Street.

Downstream of the Wigfield ASP study area, the 750mm diameter wastewater main provides service to developed lands west of 40 Avenue, south of 36 Street.

The wastewater system within the study area and surrounding it are part of the East Trunk system.

The wastewater main which bisects the northern portion of the Wigfield ASP study area, as well as the wastewater main within the future 36 Street extension, are contained within the following easements: Plans 90B 12739 and 92B 07259.

The existing wastewater collection system has been included within the figure associated with the proposed wastewater collection system.

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EXISTING CAPACITIES

East Trunk

As per the 2016 Sanitary Sewer Master Plan it is understood that there is minimal existing capacity within the East Trunk, as such it was recommended that this trunk be twinned in order to service future development. After completion of the proposed twinning, the existing East Trunk is intended to maintain its service of the current collection area with the exception of the 19 Street Trunk and South Trunk flows in order to accommodate future development in the Wigfield NSP area within the existing East Trunk, Sanitary Sewer Master Plan (AECOM, 2016).

It is recommended that the timeline and growth triggers for the East Trunk Twin project and other upgrade requirements be reviewed as part of future Sanitary Sewer Master Plan updates to incorporate development or projects completed since the preparation of the 2016 Sanitary Sewer Master Plan as well as revisions to future development areas and growth horizons. Capacity implications to the East trunk must be confirmed through the preparation of the Neighbourhood Structure Plan(s) and future detailed designs.

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PART 2.4
STORMWATER – EXISTING

EXISTING DRAINAGE PATTERNS AND INFRASTRUCTURE

Under existing conditions, stormwater generally drains toward the northeast where it is intercepted by an existing Stormwater Management Facility (SWMF) known as Lake K. Lake K functions as a wet pond. Downstream of Lake K is Lake N which is also a SWMF that functions as a wet pond which is located north of 44 Street (Highway 16). Lake N discharges into the East Drainage Channel. The East Drainage Channel crosses 67 Street near the City's WWTP and ultimately flows into the Neale Edmunds Wetland Complex. Lake K is connected to Lake N via an outlet control structure, and a series of culverts and overland drainage channel sections.

Upstream of Lake K is the continuance of the East Drainage Channel which connects Lake K to the box culvert crossing at the 36 Street and 40 Avenue intersection and the catchment areas west of 40 Avenue. Within this catchment upstream of Lake K is Lake J, another SWMF that functions as a wet pond. The East Drainage Channel through the Wigfield ASP study area parallels both 41 Street and 40 Avenue along the north and west limits of the study area respectively. It is understood that this section of East Drainage Channel is scheduled to be rehabilitated in 2023 to ensure a 1:100-year storm event can be efficiently accommodated within the channel.

Other then Lake K and a section of the East Drainage Channel there is minimal existing drainage infrastructure within the Wigfield ASP study area.

The operating parameters of the Lake K Storm Water Management Facility are as follows:

- Pond Bottom 632.0 m
- Normal Water Level 634.5 m
- High Water Level 637.0 m
- Overflow Water Level 637.0 m
- Freeboard 637.4 m

The Lake K SWMF is managed by an outlet control structure located within the northeast corner of the lake. The control structure manages both the water levels within Lake K as well as the release rate from the lake during peak flow. The release rate from Lake K is controlled by a weir and an orifice and would fluctuate within the permissible release rates dependent upon the ambient water level within the lake. The maximum release rate of Lake K is 5.7 m3/s as per the East Drainage Channel Upgrades, Technical Design Brief, Sameng Inc., 2018.

The existing storm water collection and drainage systems have been included within the figure associated with the proposed stormwater management.

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03 DESIGN CRITERIA

PART 3.1
MUNICIPAL DEVELOPMENT STANDARDS

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WATER

The design criteria used when considering the water distribution network shall be derived from the City of Lloydminster Municipal Development Standards Section 6 – Water Distribution Systems, Saskatchewan Ministry of Environment's Design Standards, and the recommendations outlined within the City's 2016 Water Master Plan

WASTEWATER

The design criteria used when considering the wastewater collection network shall be derived from the City of Lloydminster Municipal Development Standards Section 4 – Sanitary Sewer Systems, Saskatchewan Ministry of Environment's Design Standards, and the recommendations outlined within the City's 2016 Sanitary Sewer Master Plan.

STORMWATER AND DRAINAGE

The design criteria used when considering the stormwater management and site drainage shall be derived from the City of Lloydminster Municipal Development Standards Section 5 – Storm Drainage Systems, Saskatchewan Ministry of Environment's Design Standards, and the recommendations outlined within the City's 2015 Stormwater Master Plan

According to the 2015 Stormwater Master Plan, the maximum unit area release rate based on predevelopment runoff conditions to be applied to future developments is 1.5 L/s/ha. The release rate from the Stormwater Management Facilities within the Wigfield ASP study area, excluding Lake K, shall adhere to the more stringent release rate of either the City of Lloydminster's Municipal Development Standards or the Stormwater Master Plan as at the time of development.

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PART 3.2
ADDITIONAL DEVELOPMENT GUIDELINES

In addition to the requirements outlined within the City of Lloydminster's Municipal Development Standards, the developer shall also adhere to, where applicable, the latest version of the following in conjunction with the development of future Neighborhood Structure Plan(s) and future detailed design stages:

- Water Main Code Chapter – Saskatchewan Environmental Code
- Sewage Main Code Chapter – Saskatchewan Environmental Code
- Waterworks Design Standard – EPB 501
- Sewage Works Design Standard – EPB 503
- Stormwater Design Guidelines – EPB 322

The above list of other applicable development/design guidelines shall not be deemed a complete list and relieve the developer from adhering to all relevant and applicable development/design guidelines associated with the design, construction, and operation of water, wastewater, and stormwater/drainage infrastructure.

04 PROPOSED SERVICING

PART 4.1

DISCLAIMER

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Due to the nature and intent of this Servicing Study, detailed analysis associated with pipe capacity, pipe sizing, serviceability parameters, i.e., fire flows, for water distribution, wastewater collection, and piped stormwater collection infrastructure are beyond the scope of this Servicing Study and as such are not included herein. This analysis is understood to be a requirement to be completed during the development of the Neighbourhood Structure Plan(s) and future detailed designs.

The recommendations contained herein are for reference purposes only and shall not be relied upon without prior written consent from the City of Lloydminster's Engineering Services department.

PART 4.2

WATER DISTRIBUTION SYSTEM – PROPOSED

WATER DISTRIBUTION SYSTEM

The proposed water distribution system for the Wigfield ASP study area is to be connected to the City's existing water distribution system within the future 36 Street extension as well as the north-south line which connects 36 Street to 41 Street.

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Alignment

Due to the complexities identified with the two zones of the Wigfield ASP study area, the recommendations associated with the alignments of the proposed water distribution systems have been split into the north part and the south part.

- **North Part – Wigfield ASP study area between 36 Street and 41 Street**
  Due to the presence of the existing 300 mm diameter watermain which bisects the north part, it is recommended that the proposed developments within the north part use this watermain as the backbone from which all other servicing is connected to. The alignments of the water distribution system within the north part shall adhere to future Neighbourhood Structure Plan(s) as well as site development detailed designs. Servicing of developments within the north part could be accommodated through either individual connection to the north-south 300 mm diameter watermain or through a single connection with a branch type network. If a branch type network is being implemented, it is further recommended that the branch be looped in order to ensure fire flows, capacity, as well as to protect against service interruptions in the event of a watermain failure.

- **South Part – Wigfield ASP study area between south City Boundary and 36 Street**
  Due to the presence of the 300mm diameter and 250mm diameter watermain within the future 36 Street extension, the south part shall use this watermain as the backbone from which all other servicing is connected to. At a high level it is recommended that the 250 mm diameter watermain which currently services the Cenovus Energy Upgrader, be reviewed and upsized as needed between the connection to the existing 300 mm diameter watermain and the eastern most City boundary. Upon connecting to the watermain within the 36 Street extension, the watermain servicing the south part of the Wigfield ASP study area shall follow any proposed Collector Roads as identified within the Future Land Use Concept plan. In order to ensure fire flows, capacity,

as well as to protect against service interruptions in the event of a watermain failure the proposed watermain shall be connected to the existing watermain within the 31 Street road right-of-way west of 40 Avenue within the Aurora residential neighbourhood as well as along the western boundary between the Low Density Residential and the Medium Density Residential and the Commercial land uses along 40 Avenue.

Future servicing to the south of the Wigfield ASP study area shall be contemplated during the preparation of the Neighbourhood Structure Plan(s) and future detailed designs to provide future connectivity of these lands.

For both the north part and south part of the Wigfield ASP study area, dead ends shall be kept to a minimum due to the location of the study area in relation to the systems feeding the study area as well as adjacent development.

Watermains internal to the development, which are required to service the development area and are expected to be connected to the City's existing system, are the responsibility of the developer. Therefore, the internal network layout has not been developed nor sized at this stage.

Sizing

The sizing of the watermains within the Wigfield ASP study area shall be confirmed through the development of the Neighborhood Structure Plan (s) and future detailed design stages as the determination of pipe sizing is beyond the scope of this study. At a minimum, the pipe sizing shall adhere to the latest version of the City of Lloydminster's Municipal Development Standards Section 4 – Water Distribution Systems as well as the Water Security Agency (WSA) requirements.

Water Treatment Plant and West End Reservoir Capacity

It is recommended that the available capacity of both the reservoir storage and the WTP be evaluated to confirm whether additional upgrades are required to facilitate the proposed Wigfield ASP study area and land uses through the development of the Neighborhood Structure Plan(s) and future detailed design stages.

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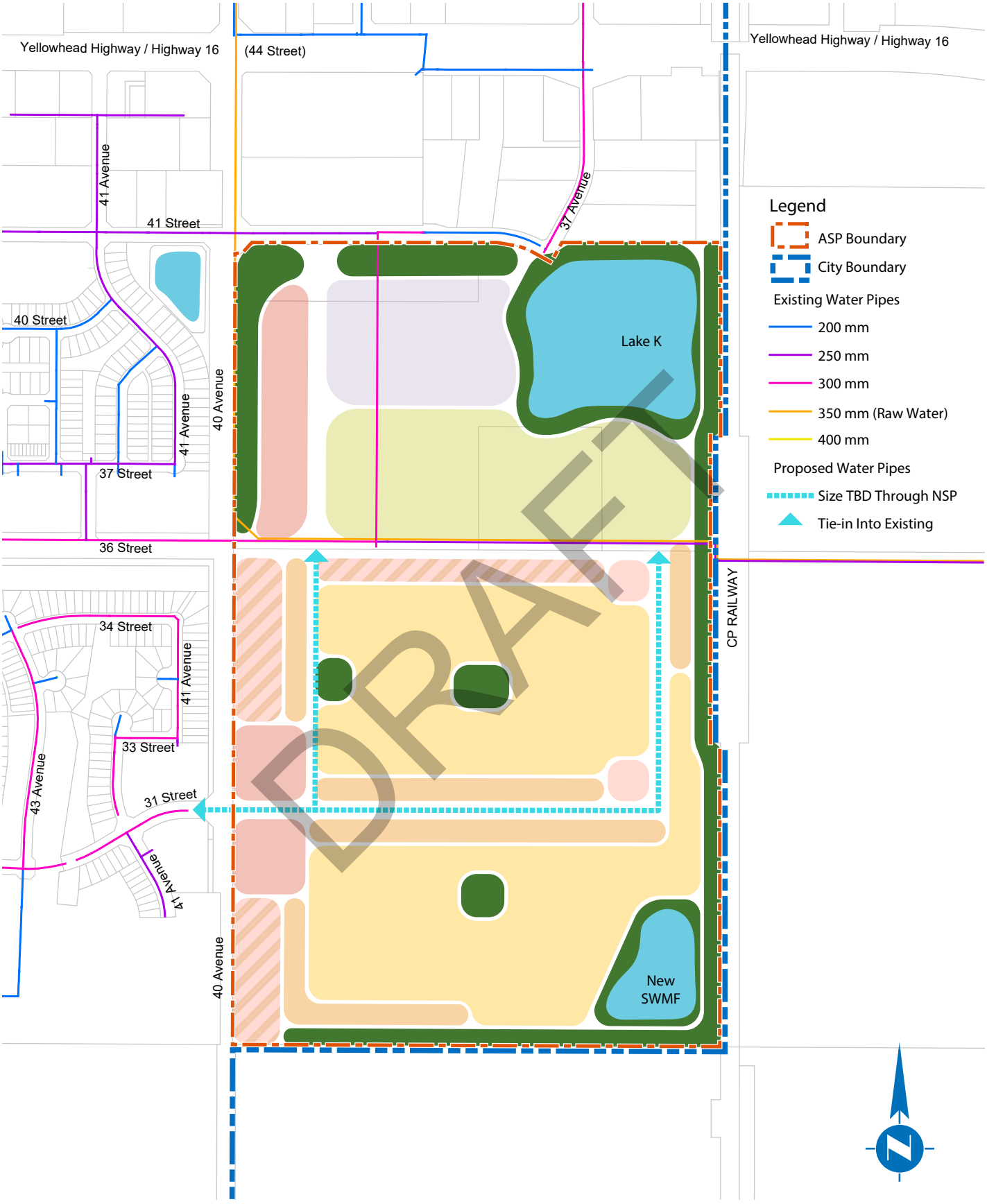


FIGURE 4

Water Distribution System

PART 4.3

WASTEWATER COLLECTION SYSTEM – PROPOSED

WASTEWATER COLLECTION SYSTEM

The proposed wastewater collection system for the Wigfield ASP study area is to be connected to the City's existing wastewater system within the future 36 Street extension as well as the north-south line which connects 36 Street to 41 Street.

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Alignment

Due to the complexities identified with the two zones of the Wigfield ASP study area, the recommendations associated with the alignments of the proposed wastewater collection systems have been split into the north part and the south part.

- **North Part – Wigfield ASP study area between 36 Street and 41 Street**
  Due to the presence of the existing 750 mm diameter wastewater main which bisects the north part, it is recommended that the proposed developments within the north part use this wastewater main as the backbone from which all other servicing is connected to. The alignments of the wastewater system within the north part shall adhere to future Neighbourhood Structure Plan(s) as well as site development detailed designs. Servicing of developments within the north part could be accommodated through either individual connection to the north-south 750 mm diameter wastewater main or through a single connection with a branch type network.

- **South Part – Wigfield ASP study area between south City Boundary and 36 Street**
  Due to the presence of the 750 mm diameter and 250mm diameter wastewater mains within the future 36 Street extension, the south part shall use this wastewater main as the backbone from which all other servicing is connected to. At a high level it is recommended that the 250 mm diameter wastewater main which currently services the Cenovus Energy Upgrader, be reviewed for capacity and upsized as necessary between the connection to the existing 750 mm diameter wastewater main and the eastern most City boundary. Upon connecting to the wastewater main within the 36 Street extension, the wastewater main servicing the south part of the Wigfield ASP study area shall follow any proposed Collector Roads as identified within the Future Land Use Concept plan. Connection to the existing wastewater main within the 31 Street road right-of-way west of 40 Avenue within the Aurora residential neighbourhood will not be required. Depending on the final elevation of the development, in

conjunction with the depth of the wastewater main, a secondary connection may be required along the western boundary between the Low Density Residential and the Medium Density Residential and the Commercial land uses along 40 Avenue.

Future servicing to the south of the Wigfield ASP study area shall be contemplated during the preparation of the Neighbourhood Structure Plan(s) and future detailed designs to provide future connectivity of these lands.

Wastewater mains internal to the development, which are required to service the development area and are expected to be connected to the City's existing system, are the responsibility of the developer. Therefore, the internal network layout has not been developed nor sized at this stage.

Sizing

The sizing of the wastewater collection system within the Wigfield ASP study area shall be confirmed through the development of the Neighborhood Structure Plan(s) and future detailed design stages as the determination of pipe sizing is beyond the scope of this study. At a minimum, the pipe sizing shall adhere to the latest version of the City of Lloydminster's Municipal Development Standards Section 4 – Sanitary Sewer Systems as well as the Water Security Agency (WSA) requirements.

East Trunk Capacity

Due to the location of the Wigfield ASP study area in relation to existing development and servicing, the Wigfield ASP study area must be serviced entirely by the existing East Trunk. In alignment with the capacity concerns identified within the 2016 Sanitary Sewer Master Plan associated with the East Trunk, in-depth analysis of the East Trunk and the timing triggers for the East Trunk Twin shall be monitored.

Based on the 2016 Sanitary Sewer Master Plan there was adequate capacity for the Wigfield ASP area (with the proposed land use being solely industrial land use) to be serviced via the existing East Trunk after the implementation of the East Trunk Twin project. Therefore, the Wigfield ASP study area is proposed to be connected to the existing wastewater system. The East Trunk Twin project is intended to intercept the flows from the proposed South Trunk and 19 Street Trunk in order to reduce the capacity constraints of the existing East Trunk as a result of development further to the south of the Wigfield Area study area.

The East Trunk Twin was deemed necessary in the 10-year horizon to accommodate upstream growth as well as to allow for the connection of the Wigfield ASP study area to the existing East Trunk.

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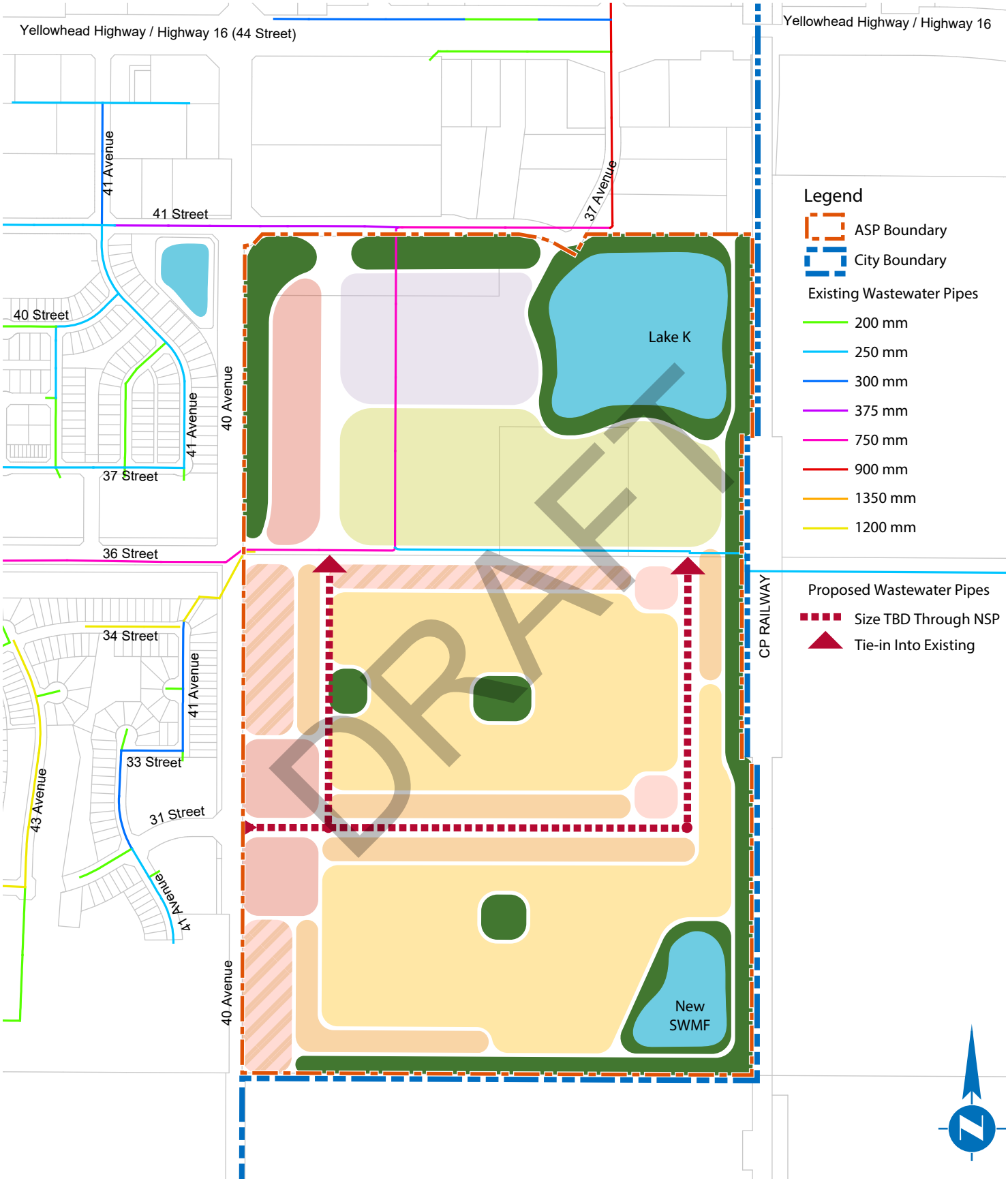


FIGURE 5

Wastewater Collection System

PART 4.4

STORMWATER MANAGEMENT – PROPOSED

STORMWATER SYSTEM AND DRAINAGE

It is understood that the existing drainage patterns are generally going to be maintained for the Wigfield ASP study area under proposed conditions due to site topography and current drainage patterns. The existing catchment area west of 40 Avenue will continue draining to the northeast through the East Drainage Channel to Lake K. Furthermore, as limited natural drainage courses either cross 40 Avenue from west to east or are present within the 40 Avenue east ditch, the need to accommodate offsite drainage within the Wigfield ASP study area is anticipated to be minimal. Therefore, it anticipated that the natural drainage patters and stormwater systems will continue to provide service to their respective catchment areas.

Due to the existing topography and drainage within the Wigfield ASP study area, the recommendations associated with the alignments of the proposed stormwater systems and site drainage have been split into the north part and the south part. However, unlike, the water and wastewater, the south part has been further split into South 1 and South 2.

- **North Part – Wigfield ASP study area between 36 Street and 41 Street**
  Due to the presence of the East Drainage Channel and the expanded Lake K, anticipated to be completed in 2023, the entire north part shall drain to either the East Drainage Channel or directly to Lake K through a mixture of both overland drainage and piped connections. As previously mentioned, there exists minimal stormwater infrastructure within the north part and as such connections, alignments, and catchment areas will need to be derived during the preparation of the Neighbourhood Structure Plan(s) and future detailed designs.

The 2015 Stormwater Master Plan outlines proposed Stormwater Management Facility (SWMF) locations based on the minimum elevations of each quarter section. As the low point of the south quarter section within the Wigfield ASP boundary is near 40 Avenue and would be surrounded by proposed development whereas the new SWMF for the south part of the Wigfield ASP is proposed to be located in the southeast corner of the ASP area. Therefore, the south service area was divided into two catchments by a ridge line running east-west between 31 Street and 36 Street.

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- **South Part: 1– Wigfield ASP study area between approximately 33 Street and 36 Street**
  The south 1 catchment area will predominantly drain towards the north. As such, it is recommended that the south 1 catchment area be drained internally through a piped network and discharged into the East Drainage Channel near the intersection of 36 Street and 40 Avenue. As the design parameters of Lake K have accounted for the additional flows from the south 1 part, flow restrictions or other control devises are not to be implemented but rather the area be permitted to free drain to the East Drainage Channel at which point the release rate will be addressed through the release of Lake K.

  At a high-level, as the proposed extension of 36 Street will include an urban cross-section inclusive of stormwater collection infrastructure, i.e., catch basins, the stormwater main shall be installed within the road right-of-way and be used as the backbone from which the servicing of the south 1 catchment area is connected to. From this corridor, storm water collected from within the south 1 catchment area can be directed either west to the East Drainage Channel or east and connected to Lake K directly. In order to avoid potential pumping of the stormwater from the South 1 catchment area to the SWMF in the south 2 part, due to the lack of grade between the low point in the south 1 part and the proposed south 2 SWMF location, it is proposed that stormwater from the south 1 catchment area be conveyed to Lake K via the East Drainage Channel.

- **South Part: 2– Wigfield ASP study area between south City Boundary and 33 Street**
  The south 2 catchment area will predominantly drain towards the south. As such, it is recommended that the south 2 part be drained internally through a piped network and discharged into a proposed SWMF located within the southeast corner of the Wigfield ASP study area.

  The proposed SWMF within the south 2 part would be connected to Lake K through a piped connection along the eastern most City boundary.

Within the Wigfield ASP study area, piped stormwater mains shall follow the proposed Collector Roads as identified within the Future Land Use Concept plan. The drainage of open spaces and developed lots shall be determined through the development of the Neighborhood Structure Plan(s) and future detailed design stages.

Stormwater mains internal to the development, which are required to service the development area and are expected to be connected to the City's existing system, are the responsibility of the developer. Therefore, the internal network layout has not been developed nor sized at this stage.

All new SWMF's have been considered to be constructed as wet ponds at this time to act as community amenities as well as functional stormwater system elements and to accommodate the shallow grade across the Wigfield ASP study area.

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Location

The potential SWMF locations were selected based primarily on existing wetland areas proposed to be converted into SWMF's. Within the 2015 Stormwater Master Plan, the SWMF for the south catchment area was to be located within the northwest corner of the quarter section however the location of the SWMF within the southeast corner was based on the following additional considerations:

- Minimizing the number/size of facilities situated in the core build areas to leverage open spaces and support the densification of development and achieve construction/ maintenance economies for the City. This is balanced by the dedication of open space areas.

- Maintaining the existing topography as much as possible to minimize the required re-grading of the study area as well as cut and fill necessary for the facility construction.

- Utilizing existing flow paths and natural drainage courses to minimize the extent of conveyance ditches or storm sewer that would need to be added to link the facilities in the study area.

It should be noted that the SWMF layout and location with the south 2 part can be revised as development proceeds with facilities being combined as desired to integrate best with the actual development plans of the area or separated into multiple facilities to provide additional community amenity area. This could be accomplished through the use of Staged Master Drainage Plans or Subdivision Stormwater Management Reports that are normally developed to provide a greater level of detail than this study is able to provide as an overall planning document.

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Sizing

The sizing of the stormwater mains and SWMF's within the Wigfield ASP study area shall be confirmed through the development of the Neighborhood Structure Plan(s) and future detailed design stages as the determination of pipe sizing and pond capacity is beyond the scope of this study. At a minimum, the pipe sizing shall adhere to the latest version of the City of Lloydminster's Municipal Development Standards Section 5 – Storm Drainage Systems as well as the Water Security Agency (WSA) requirements.

The release rate from the new SWMF's, i.e., excluding Lake K, within the Wigfield ASP study area shall adhere to the more stringent release rate of either the City of Lloydminster's Municipal Development Standards or the Stormwater Master Plan as at the time of development.

The existing downstream system, including Lake N and the remainder of the East Drainage Channel, was not assessed in detail as the analysis is beyond the scope of this study

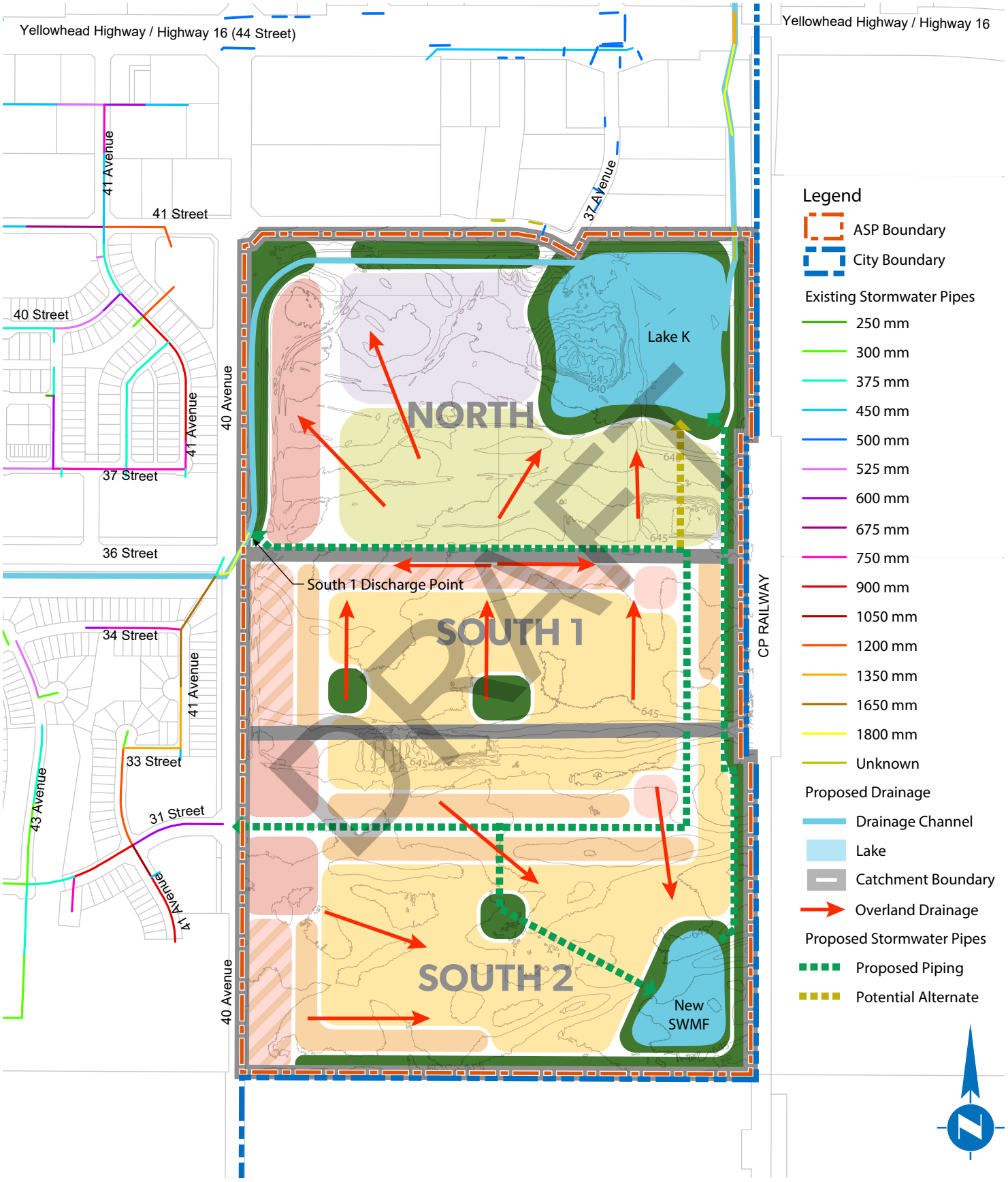


FIGURE 6

Stormwater Management and Drainage Collection

shall be confirmed through the development of the Neighborhood Structure Plan(s) and future detailed design stages.

PART 4.5

SHALLOW UTILITIES

Shallow utility servicing, i.e., power, gas, telephone, fibreoptic, has not been reviewed as part of this scope of work as the provision of these services is beyond the scope of this Servicing Study.

The Developer shall confirm through the development of the Neighborhood Structure Plan(s) and future detailed design stages the servicing requirements associated with each utility provider.

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05 SUMMARY

In summary, the Wigfield ASP study area is situated such that servicing of the study area is simplistic and quickly achievable. The presence and alignment of existing water distribution and wastewater collection infrastructure provides ample opportunity for connection and routing. The mains within the future 36 Street extension will form the backbone from which much of the servicing will be derived and as such is situated very well within the proposed Future Land Use Concept.

Where possible, the watermain distribution system shall be looped with existing developments adjacent to the Wigfield ASP study area to ensure efficient delivery of potable water as well as safeguard the study area from being isolated in the event of a watermain failure.

With respect to wastewater collection, the presence of the existing mains within the future 36 Street extension will provide tie-in locations which, depending on depth of cover, should be able to provide service to the study area through a complete gravity system where pumping requirements are minimized.

With respect to stormwater management and site drainage, the existing topography of the Wigfield ASP study area shall be maintained as much as practicably possible to limit the need for extensive earthworks and site grading. Lake K provides an effective discharge point for much of the catchment areas within the study area with the development of a new SWMF within the southeast corner of the study area providing opportunities for enhanced neighbourhood amenity space, as well as future connectivity for lands south of the study area.

Through simple piped connections the servicing of the Wigfield ASP study area shall be achieved.

The final review and determination of pipe sizing and final routing shall be confirmed through the development of the Neighborhood Structure Plan(s) and future detailed design stages as this level of analysis is beyond the scope of this Servicing Study.

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The more significant constraints associated with the development of the Wigfield ASP study area will be the available Water Treatment Plant and West End Reservoir capacity as well as the timing for the East Trunk Twin and the remaining available capacity in the existing East trunk. As such, Neighborhood Structure Plan(s) and future detailed design associated with the Wigfield ASP study area, shall be complimented by in depth analysis of these systems, i.e., West End Reservoir, WTP, and East Trunk, to ensure the remaining capacity of these systems is adequate and can continue to provide service to existing development as well as proposed development, or provide comment on expansion of capacity.

CLOSURE

The recommendations presented in this report are based on the review of data available at the time of the Servicing Study.

This report has been prepared for the exclusive use of City of Lloydminster and their authorized users for the specific application outlined in this Servicing Study. No other warranties expressed or implied are provided. This report has been prepared within generally accepted engineering practices.

Respectfully submitted,
City of Lloydminster

James Rogers, P. Eng.
Senior Manager, Capital Infrastructure

Reviewed By:
City of Lloydminster

Terry Burton, P.L. (Eng.), Engineering Licensee
Director, Planning & Engineering

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REFERENCE DOCUMENTS

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- AECOM. 2016. City of Lloydminster Sanitary Sewer Master Plan. Saskatoon, Saskatchewan.
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