City of North Battleford

Yellow Sky Master Plan

October 9, 2018

North Battleford

URBAN systems

Prepared for

CITY OF NORTH BATTLEFORD

1291-101st Street
PO Box 460
North Battleford, SK, S9A 2Y6

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Project number: 3911.0004.01

October 9, 2018 File: 3911.0004.01

City of North Battleford
1291 – 101st Street, Box 460
North Battleford, SK S9A 2Y6

Attention: Ryan Mackrell, R.P.P., M.C.I.P.

RE: Yellow Sky Master Plan

Please find enclosed the final report for the Yellow Sky Master Plan. The goal of this project was to design a complete neighbourhood to facilitate growth in the south east area of the City. The Master Plan provides the City with an implementable strategy to support growth and development in the Yellow Sky Neighbourhood.

We trust this meets the needs of the City to move forward with detail design. However, we would be happy to provide support with further information as development progresses.

We enjoyed working on this project and would like to thank the City for giving us this opportunity. If you have any questions or concerns, please feel free to contact the undersigned.

Sincerely,

URBAN SYSTEMS LTD.

Grant Campbell, P.Eng.
Project Manager/Engineer

Bryan Gray, MCIP
Project Planner

/gc

cc: Jennifer Niesink, City of North Battleford; Bob Anthony, City of North Battleford

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URBAN SYSTEMS SIGNATURE PAGE

Association of Professional Engineers & Geoscientists of Saskatchewan

CERTIFICATE OF AUTHORIZATION
Urban Systems Ltd.
Number C1454

Permission to Consult held by:

Discipline	Sk. Reg. No.	Signature
Civil Engineering	35320	

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APPENDICES

1 INTRODUCTION

The City of North Battleford (City) continues to experience moderate growth due to its competitive cost of living, diversified economy, convenient location along Highway #16 between Saskatoon and Edmonton, and its ability to provide desirable services and community amenities. North Battleford is a regional hub in northwest Saskatchewan with a pressing demand for commercial property throughout the city and a shortage of large serviced commercial lots in its southeast. This demand for commercial lots is the driving force for the conceptual planning of the Yellow Sky Neighborhood in southeastern North Battleford. Yellow Sky will meet the needs for immediate commercial development in the city while also creating the foundation for a future mixed-use neighborhood with a range of commercial, residential, and recreational land uses.

In September 2017, the City awarded the Yellow Sky Master Planning project to Urban Systems. The approach for the project emphasized engagement with land owners, City staff, and the public. Additionally, several existing city-wide reports and our own studies informed the design of the servicing and land use Master Plan. The purpose of this study was to produce a useable document with supporting background data to inform the future detailed engineering design carried out by City staff.

2 HIGHEST AND BEST USE

One of the main drivers for the creation of the Yellow Sky Master Plan is the demand for large sized commercial lots in the southeast of the City. Yellow Sky is currently home to a variety of regional commercial tenants. Understanding the City's need for future commercial land and incorporating this need with a mixture of residential densities will provide a product that the market will accept. An analysis of the commercial and residential market in North Battleford and surrounding region was completed to determine the optimal land use mix for Yellow Sky. This study can be found in **Appendix A**.

2.1 FINDINGS

North Battleford has historically prioritized the development of residential neighborhoods in the northern part of the city (Killdeer Park and Fairview Heights). These neighbourhoods are expected to absorb the majority of population growth between 2017 and 2040. Any new residential that is prioritized for Yellow Sky should be geared towards addressing demands for affordable housing.

The City has also prioritized the revitalization of the downtown to make it a safer and livelier "urban living room" for City residents. The revitalization of the downtown is expected to absorb much of the new demand for retail space between 2017 and 2040.

Based on the City's growth priority areas and the residential occupancy demand projected over the next 20 years, there is unlikely to be significant residential demand in Yellow Sky. It is recommended that Yellow Sky allow for some multi-family affordable housing to the order of approximately 100 units, as well as potential market single and multi-family housing in the long term (i.e. after Killdeer Park and Fairview Heights are built out).

Yellow Sky already functions as a centre for regional retail. Through our analysis, we predict most new regional retail space should continue to be directed to this area based on the suitable characteristics of the location, existing retail-commercial critical mass, and market demand. We modeled two possible outcomes:

- One scenario in which current retail capture rates (by trade area) persist; and
- One scenario in which new growth attracts greater spending capture within the City (i.e. reduced "outflow" spending to larger centres in select categories).

Under the status quo capture scenario, we project net new retail demand for 500,000 square feet citywide, of which 328,000 square feet (66%) will land in Yellow Sky. This translates to between 30 and 34 gross acres of required land.

Under the higher inflow scenario, we project net new retail demand for 600,000 square feet citywide, of which 393,000 square feet (66%) will land in Yellow Sky. This translates to between 36 and 41 gross acres of required land.

3 ENVIRONMENTAL REVIEW

The environmental review of the Yellow Sky neighbourhood is based on desktop research and includes descriptions of environmental values, summary of applicable environmental regulatory requirements, evaluation of environmental opportunities and constraints, and recommendations for environmental mitigation and conservation planning considerations. The findings of the environmental review informed the development of the Master Plan, are summarized below, and included in **Appendix B**.

3.1 FINDINGS

The most effective form of mitigating potential environmental impacts arising from development is through the avoidance of sensitive habitats. Environmentally sensitive habitats include the aquatic and riparian habitats of the streams and shallow open-water features of Yellow Sky. The preservation and enhancement of these habitats is strongly recommended as they are sensitive to adverse effects, and likely unsuitable for development due to substrate or topography. The following mitigation measures are aimed at minimizing adverse environmental effects to these areas.

- Environmental approval processes should be initiated as early as possible in the planning stages of any proposed development, to ensure the environment is appropriately considered and any adverse effects are mitigated;
- Protect the ecological values of environmentally sensitive areas by restricting access and by establishing buffer areas comprised of coarse woody debris, plantings, signs and fencing;
- Options to maintain/enhance habitat connectivity and accommodate wildlife movement through the study area should be explored;
- Design new infrastructure to utilize existing footprints of disturbed areas (i.e., existing trails and other cleared areas) whenever possible to minimize the removal of native vegetation from the study area and reduce the fragmentation of habitat;
- Prior to any ground disturbance or vegetation clearing activities, have a qualified professional conduct a field investigation to identify areas where species at risk and their critical habitat may be present;
- Use low impact development techniques (e.g., maintain topography and manage stormwater on site) to avoid impacts on downslope aquatic and riparian habitats;
- Maintain snags and woody debris in buffer areas and environmentally sensitive areas to provide habitat for a diversity of wildlife;

- Prevent the spread of invasive species by incorporating native plants;
- Where development of sensitive areas is unavoidable, incorporate native trees and vegetation into the re-vegetation plan;
- Have a qualified professional prepare an avoidance/mitigation strategy for any species at risk likely to be present on site;
- Confirm presence and determine wetland values on the landscape. Avoid the development or disturbance of wetland habitat;
- Minimize vegetation and land clearing activities to within the project footprint only;
- Conduct all land-clearing activities during the period of September 1 to March 15 to avoid impacting birds during the nesting season and to maintain compliance with the federal *Migratory Birds Convention Act*. Alternatively, have a qualified environmental professional conduct an active nest survey if land clearing is to be conducted outside of the recommended work window;
- Implement appropriate erosion and sediment controls to prevent sedimentation in sensitive aquatic habitats;
- Develop a contingency and response plan for spills, accidents and malfunctions in accordance with applicable standards and best practices;
- Further investigation is required to determine potential environmental contamination concerns, risks and implications associated with past development in Yellow Sky. Any areas of potential concern should be properly assessed and, if required, remediated; and
- Have a qualified professional undertake an appropriate level of archaeological assessment prior to commencing development activities.

4 ENGAGEMENT

4.1 ENGAGEMENT STRATEGY

There are many land owners and key stakeholders in the Yellow Sky neighbourhood. Many of the key stakeholders have been established in the area for decades and will continue to shape the Yellow Sky neighbourhood in the future. The approach to Public & Stakeholder Engagement considered techniques for communicating with and soliciting feedback from residents and stakeholders. The first Public and Stakeholder Session, one on one interviews, focused on existing land owners, users, and associations within the neighbourhood. The second Public and Stakeholder Session, an Open House, was an opportunity for the citizens to discuss the Master Plan and provide feedback.

4.2 STAKEHOLDER INTERVIEWS

The intent of the stakeholder interviews was to share information about the process and timing of the Master Plan, understand stakeholder perspectives regarding opportunities and constraints, and understand stakeholders long term interests in the neighborhood. A list of stakeholders was created in consultation with the City. Interviews were conducted in person and over the phone to give stakeholders an opportunity to provide their input for the Master Plan. All the identified stakeholders were given an opportunity to be interviewed, however, not all were interested in participating.

Stakeholders were asked five questions:

1. What opportunities/constraints do you perceive for us to achieve to intended project outcome?
2. What are your long-term interests/plans in the study area?
3. What are your “must haves” to achieve your long-term interests/plans.
4. What current features/businesses in the study area are important to the identify/theme/function of the neighbourhood moving forward?
5. Are there any question you have for the City regarding this project? Additional Comments?

The general themes emerging from responses included:

- Environmental concerns from existing uses;
- Flooding, drainage, and high-water table;
- General accessibility of the neighbourhood and road sizes;

- Maintaining / enhancing the diversity of uses in the neighbourhood; and
- Building on the amenities of the neighbourhood (Cu-Plex) and complimentary uses.

4.3 OPEN HOUSE

A 'come and go' style Open House was hosted on March 8th from 5pm to 8pm at the Agrivilla. The Open House provided an informal setting with multiple display boards where participants from the public discussed the Master Plan with project staff. The intent of the Open House was to improve public understanding of the project and receive public input. The materials displayed at the Open House communicated the project context, existing conditions, environmental considerations, residential and retail opportunity assessment, concept plan, and next steps. See **Appendix C** for the materials displayed at the open house.

Representatives from the City and Urban Systems walked approximately 30 participants through the display boards and answered questions. Many of the attendees represented the Battleford Agricultural Society and Battleford Tribal Council (BTC). As a result, most of the discussion was regarding the future of the Battleford Agricultural Society lands and economic development on BTC's land holding in the Yellow Sky neighbourhood.

5 SITE PLANNING AND CONTEXT

5.1 REGIONAL CONTEXT

The City is a regional hub in northwest Saskatchewan, located on Hwy #16 between Edmonton and Saskatoon. Travel times to the cities of Edmonton and Saskatoon are 3 hours, 50 minutes (387 km) and 1 hour, 25 minutes (137 km), respectively.

The City of Lloydminster is 1 hour, 20 minutes driving time (139 km) along Highway #16. Both Lloydminster and Saskatoon are easily accessible regional retail-service centres North Battleford area residents will continue to travel to for goods and services. Over time, as the City and surrounding area continue to grow, market population thresholds will be met and exceeded leading to an increased interest in development from a growing list of retailers and service providers.

5.2 LOCAL CONTEXT

The Yellow Sky Master Plan covers approximately 400 acres of land situated adjacent to Highway #40 along the south boundary and adjacent to Highway #16 and Territorial Drive along the west boundary. The Average Annual Daily Traffic (AADT) volumes along Highway #16 and Territorial Drive are 12,200 and 8,400 vehicles respectively. Additionally, the City's municipal airport is located immediately northeast of, and adjacent to, the Yellow Sky neighbourhood.

According to the City's Official Community Plan, land uses within the Yellow Sky Master Plan consist of:

- Existing Regional Commercial;
- Existing Urban Reserve;
- Future Regional Commercial;
- Existing Community Service; and
- Future Residential.

One of the drivers of the Yellow Sky Master Plan is to assess market potential for large retail-commercial uses, which build on the existing regional-serving retail development. One of the key outcomes of this report is a determination of the appropriate extent of additional retail lands to serve the needs of the City and its regional trade area over the foreseeable future. An important consideration in this regard is the extent to which existing North Battleford and trade area residents are likely to shop in larger, more mature retail markets of Saskatoon and Lloydminster. This spending outflow from the local North Battleford market will be challenging to recapture given the greater critical mass and range of offerings (particularly in terms of comparison retail shopping) in adjacent markets, particularly Saskatoon.

5.2.1 ROADWAYS AND NEIGHBORHOOD ACCESS

Yellow Sky is bounded by several major roadways including Highway #40 and Railway Avenue to the south, Territorial Drive to the west, and Airport Road to the north. **Figure 5.2.1** shows the Yellow Sky area and its surrounding major roadways. Highway #40 is a 2-lane undivided highway carrying both regional and local traffic and providing connections to The Battlefords and other municipalities along the provincial highway network. Railway Avenue is a 4-lane divided highway, which provides access to the rest of North Battleford as well as regional access to the areas west of the City. Territorial Drive is a 4-lane arterial road, which acts as a perimeter road for North Battleford and allows local traffic to bypass the downtown core of the City. Airport Road is a 2-lane local road, which provides access to the North Battleford Airport.

Additionally, Carlton Trail and Heritage Way are roadways existing within the Yellow Sky area. These roadways are the primary entry points for the area and provide access to existing commercial properties, the CUPlex recreational facility, and the fair grounds. Refer to **Appendix D** for more information regarding the existing transportation infrastructure adjacent to Yellow Sky.

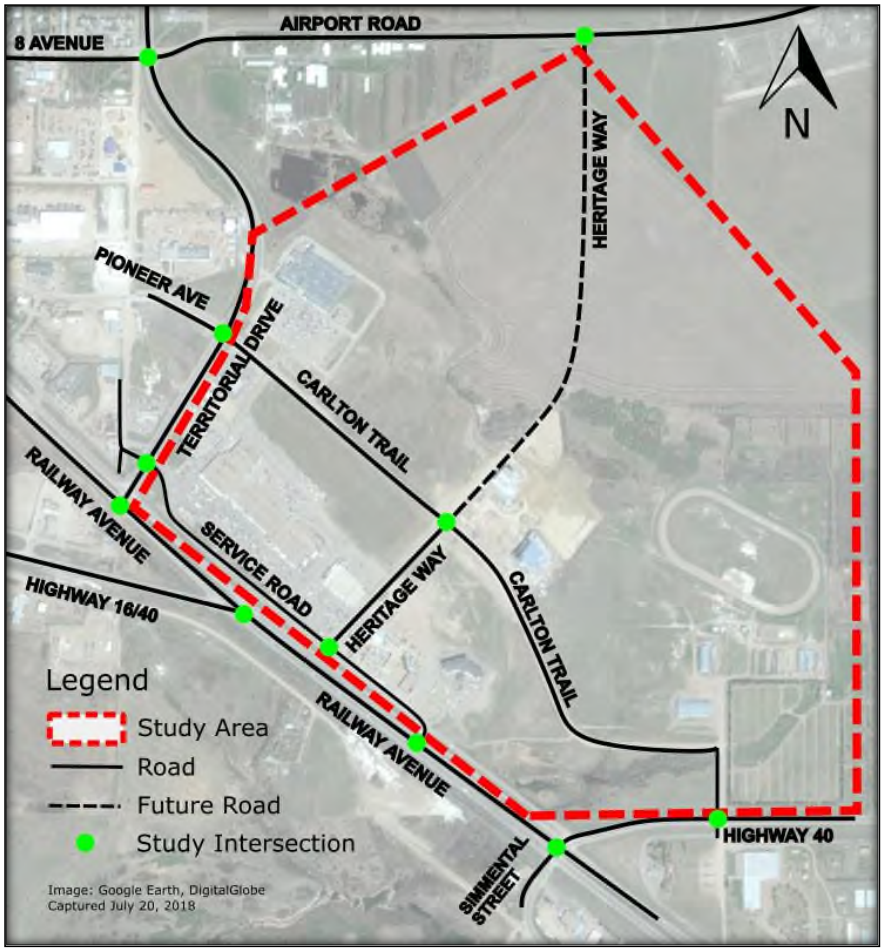

Figure 5.2.1 Yellow Sky and Adjacent Road Network

5.2.2 TOPOGRAPHY AND DRAINAGE

Yellow Sky contains several notable topographic features as shown in **Figure 5.2.2.** The northeastern portion of the neighborhood features a change in elevation of approximately 20m. This change in elevation creates a constraint for servicing designs in all underground water and sewer infrastructure. A drainage channel extends from a natural wetland area in the northwest of Yellow Sky and discharges flow into the existing storm sewer infrastructure near the CUplex. The wetland and channel drain an area of approximately 80 hectares north of Yellow Sky, which provides a major constraint for stormwater management in the neighborhood.

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YELLOW SKY MASTER PLAN

DATE: October 2018
INFO SOURCE : City of North Battleford

City of North Battleford

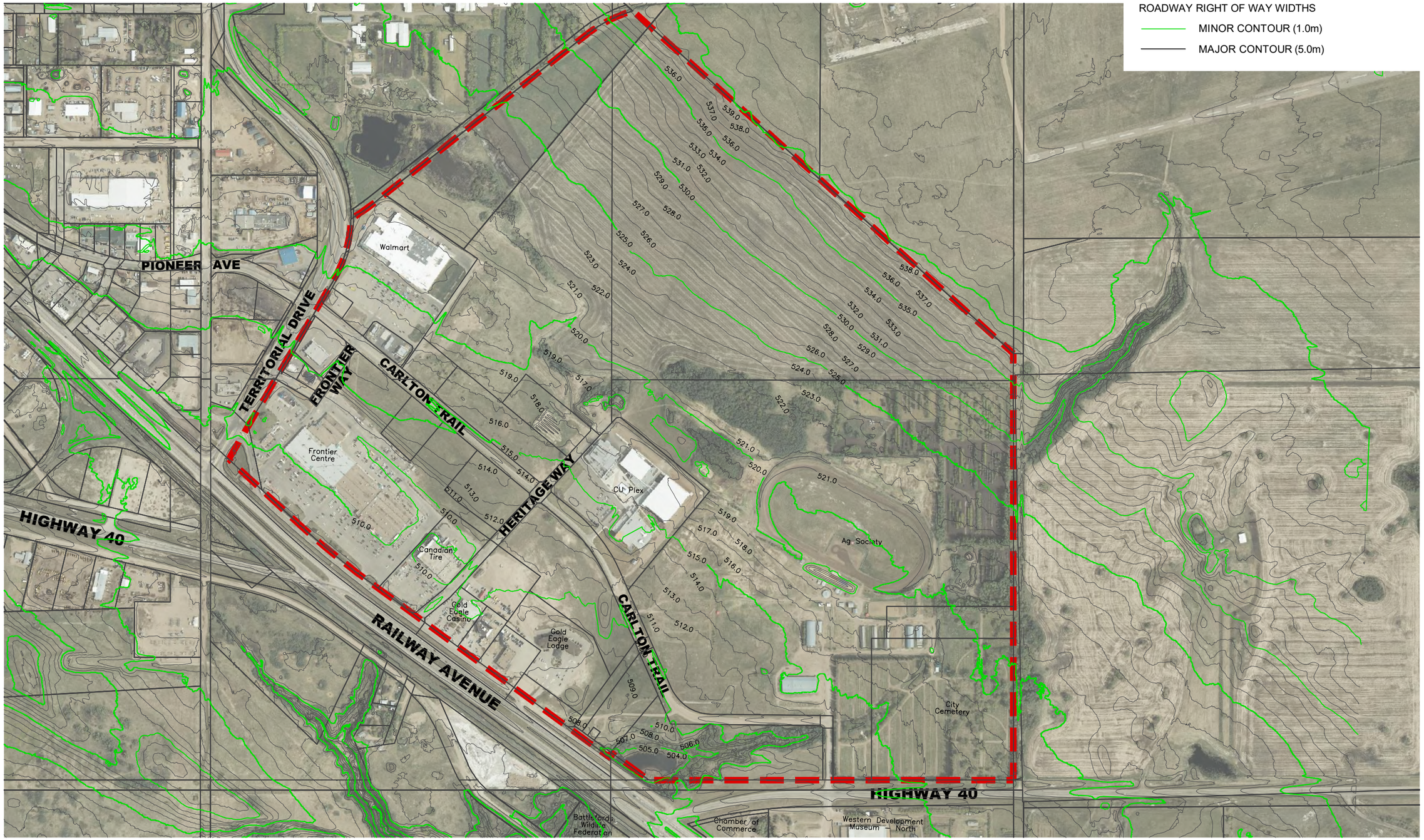
Scale 1:7500

KEY

ROADWAY RIGHT OF WAY WIDTHS

MINOR CONTOUR (1.0m)

MAJOR CONTOUR (5.0m)



existing site conditions

FIGURE 5.2.2

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5.3 CURRENT USES

The existing developments in Yellow Sky include a mix of regional commercial and community service land uses. Yellow Sky is home to the Frontier Centre, a shopping mall anchored by No Frills, Peavey Mart (hardware store) and Prairie North Medical Clinic. Other major businesses acting as anchors in Yellow Sky include Walmart and Canadian Tire. Directly north of the mall and adjacent to the Walmart are vacant and zoned as Future Development Districts. The CUplex indoor recreation facility, the Battlefords Agricultural Society, and the Golden Eagle Casino and hotel are also located in Yellow Sky.

5.4 SURROUNDING USES

There is a mix of light industrial, community service, and regional-serving retail land uses surrounding Yellow Sky. There are a variety of light industrial businesses on the west side of Territorial Drive (truck route) and the south side of Railway Ave/Highway 16 including industrial service yards, storage and logistics buildings, and automotive parts and sales centres. The North Battleford Municipal Airport is located north of Yellow Sky.

5.5 POLICY CONTEXT

5.5.1 OFFICIAL COMMUNITY PLAN

The City's Official Community Plan (OCP) applies to all matters related to the physical, social, and economic development within the City. The polices are intended to provide the City with direction and guidelines for establishing bylaws, programs, and decision making on future land and development in the City. Yellow Sky contains the following land use designations:

Regional Commercial

Most of Yellow Sky is designated as Regional Commercial in the OCP. The intent is to provide sufficient commercial space for the City and the surrounding region at locations with optimal transportation access. Regional Commercial is located along Railway Avenue and Territorial Drive. The OCP identifies areas along Highway 16 south of the Frontier Centre as Potential Regional Commercial expansion areas (Crosby, Hanna & Associates, 2013).

Residential

Growth in the City over the next 20 years will require new residential development and new residential areas. Potential new residential areas identified in the OCP are mostly extensions to existing neighbourhoods. The northern portion of the Yellow Sky has been identified as a new residential area. New residential development will incorporate a range of housing including infill, affordable, and alternative housing. New neighbourhoods will be consciously designed to promote walkability, public space, and flexibility.

Urban Reserves

Urban Reserves are First Nations Reserves within municipal boundaries. The Urban Reserve in Yellow Sky belongs to the Mosquito, Grizzly Bear's Head, and Lean Man First Nations and are governed separately from the rest of the lands in North Battleford.

5.5.2 ZONING BYLAW

Yellow Sky is made up of several zones that regulate present-day land use.

CS – Community Service District

The Community Service District is reserved for a range of community services and compatible uses. Examples include medical services, community-oriented retail (farmers market), daycare, recreation facilities, cultural institutions amongst others. The Community Service District sits on the northern edge of Yellow Sky.

C4 - Regional Commercial District

The Regional Commercial District provides a consolidated area where large-format retailers, outlets, and other commercial establishments and offices can be developed. The intention is to create a regional node for shopping services in North Battleford and its surrounding area. The C4 zone occupies a central position along Highway #16 in Yellow Sky and is critical to the future of the area.

FUD – Future Urban Development District

The Future Urban Development District is a holding zone intended to reserve lands for future development. Interim land uses are allowed until market demand warrants a transition to the redevelopment. Examples of permitted interim uses include sports fields, community gardens and golf courses. The intent is to have interim uses that have a low impact on the land to make the transition to new developments easier.

YQW – Airport District (adjacent to Yellow Sky Master Plan)

The Airport District provides space for the North Battleford Municipal Airport, and airport-related land uses such as storage and mechanical services. The Airport District is adjacent to the north-eastern portion of Yellow Sky and will have a limited impact on the retail and residential zones in the neighbourhood. The close proximity to the airport will limit the maximum building height in areas of Yellow Sky within the airport's approach surface to 16.5 metres (See **Figure 5.5.2**). This height constraint will not have a significant impact on Yellow Sky as structures in the residential and retail zones adjacent to the YQW zone are unlikely to reach this height. Developers and the City will need to coordinate with the Airport and Transport Canada to ensure new developments are advanced according to the North Battleford Airport Zoning Regulations (SOR/92-648).

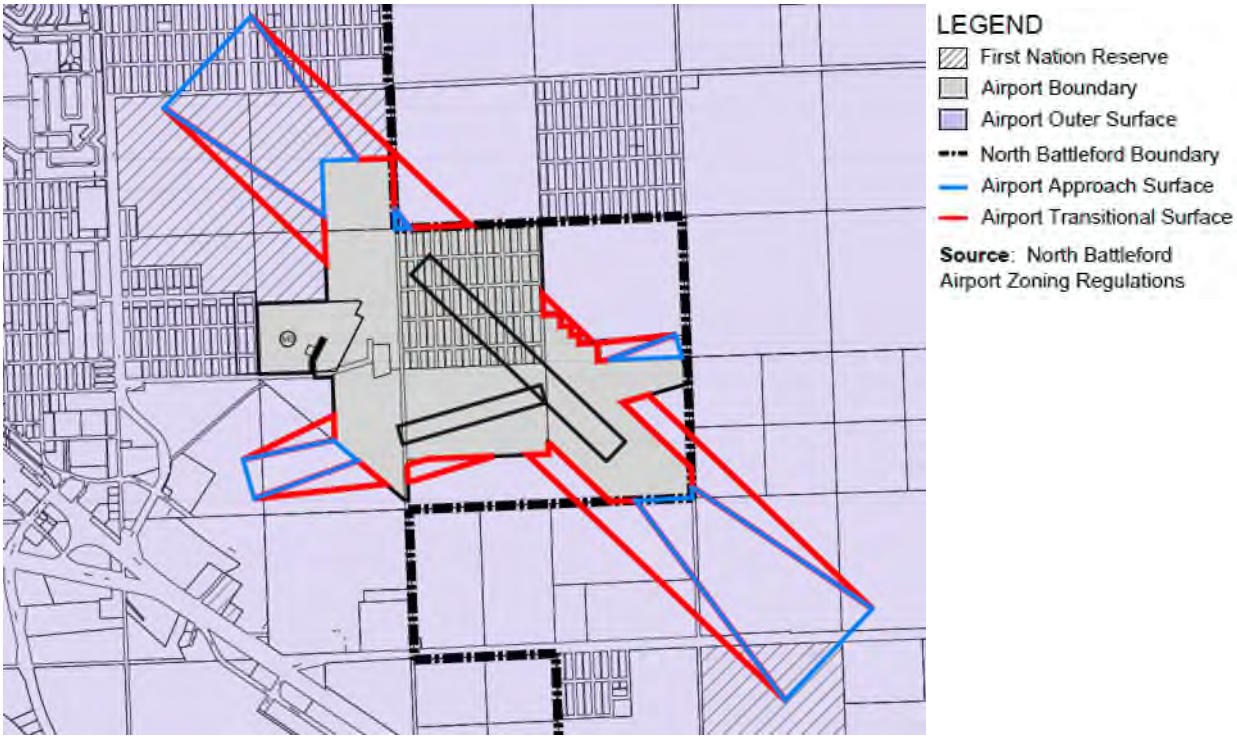

Figure 5.5.2 Diagram of North Battleford Airport and Approach Surfaces

6 LAND USE MASTER PLAN

6.1 OVERVIEW

The Yellow Sky Master Plan provides for a range of housing types and densities in close proximity to neighbourhood and regional commercial amenities. Community service amenities, parks, and open space are central to the Master Plan. **Table 6.1** provides a summary of land use densities for each land use in Yellow Sky. The Master Plan is shown in **Figure 6.1.**

Table 6.1 Summary of Land Uses

Land Use	Hectares	% of Neighbourhood	Units / Hectare	Units	People / Unit	Elementary Student Population (0.48 SU & 0.19 MU)	Population
Single-Family Residential	15.07	9%	19.5	294	3	142	882
Street Townhouse	3.68	2%	37	136	2.8	26	381
Group Townhouse	6.88	4%	49	337	2.8	65	944
Multi-Family (Apartment)	4.41	3%	100	441	1.5	84	662
Neighbourhood Commercial	1.05	1%					
Regional Commercial	42.70	26%					
Municipal Reserve	15.52	10%					
Community Service	15.90	10%					
Direct Control District (Ag Society)	29.91	18%					
Pond	6.50	4%					
Roadway	19.71	12%					
Utility Parcel	1.64	1%					
Total	**162.97**	**100%**		**1,208**		***317**	**2,869**

*Elementary student population is based on the Saskatoon Board of Education multiple.

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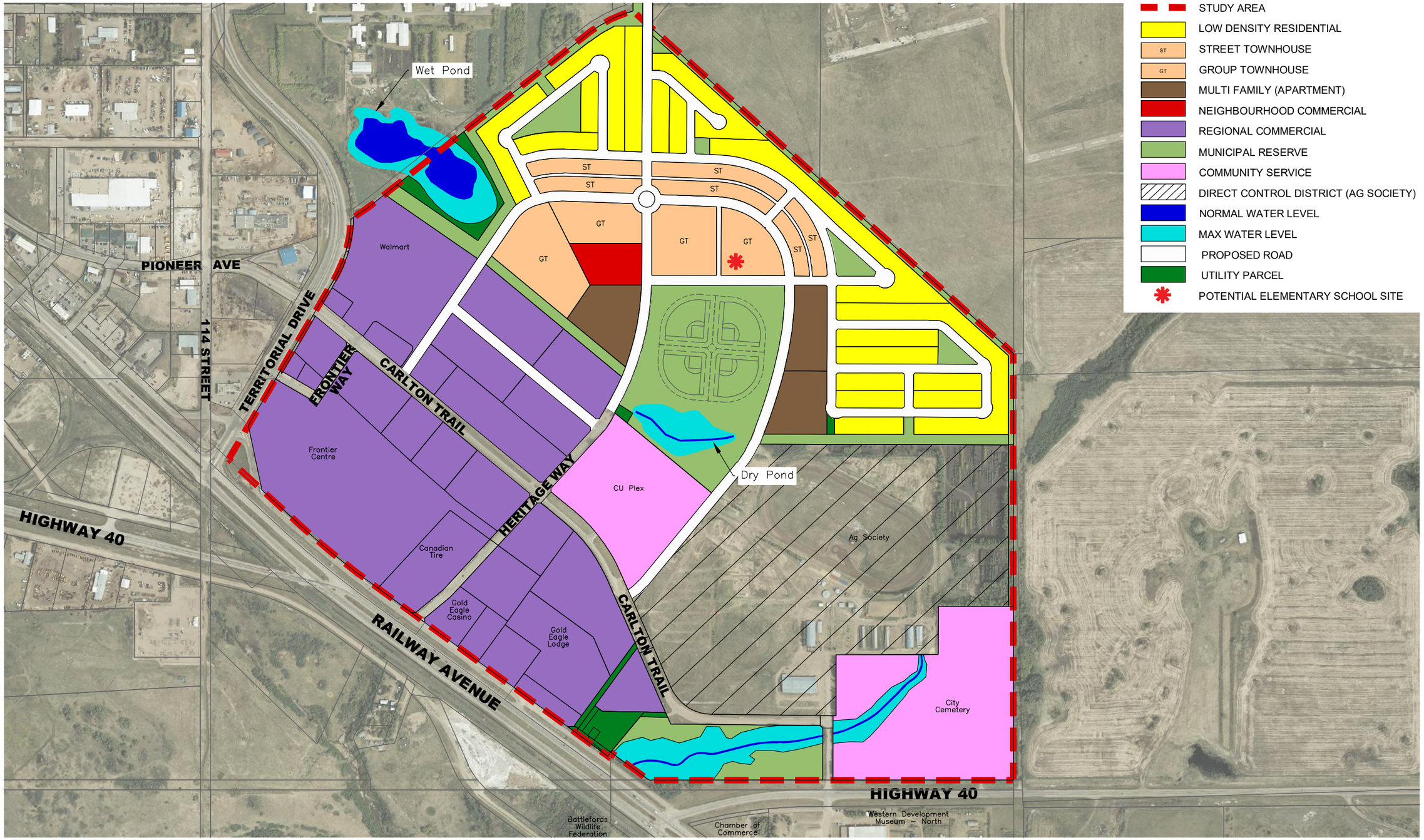
YELLOW SKY MASTER PLAN

DATE: October 2018
INFO SOURCE : City of North Battleford

City of North Battleford

Scale 1:7500



land use master plan

FIGURE 6.1

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6.2 Crime Prevention Through Environmental Design

Crime prevention through environmental design (CPTED) is a design philosophy built around a core set of principles based on the belief that the proper design and effective use of the built environment can lead to a reduction in the perception and incidence of crime as well as an improvement in quality of life. CPTED has three main principles:

- **Natural surveillance** is a design strategy directed at keeping intruders under observation based on the premise that a person inclined to engage in criminal activity will be less likely to act on their impulse if they can be seen.
- **Natural access control** is a design concept directed at decreasing crime opportunity based on the premise that a person who is confronted with a clearly defined or strategically developed boundary will typically show it some deference by respecting the way it guides and influences their movement as they transition between public and private space.
- **Territorial reinforcement** is a design concept that realizes physical design can create or extend a sphere of influence so that users develop a sense of ownership that is noticeable to the offender.

Much of the value of incorporating CPTED principles in design is during the detailed site planning stage when decisions are being made about the placement of buildings, access control/fencing, lighting, window placement, landscaping, and many other design features. A detailed CPTED review should be completed on proposed developments as the Yellow Sky Neighbourhood builds out.

At the neighbourhood conceptual planning level there are some basic CPTED design elements to consider. They include land use mix, connectivity, and movement predictors. The Yellow Sky Neighbourhood has many off street multi-use pathways. These pathways can be movement predictors for those using them, having only one point of egress once on the pathway. Consideration should be given to providing appropriate lighting and fencing in multi-use pathway areas to allow for natural surveillance and connectivity to adjacent developments (e.g. gates providing additional points of egress). The Yellow Sky Neighbourhood has a mix of complementary land uses, ensuring the neighbourhood will not be unused for extended periods during the day, which can be a crime generator.

7 UNDERGROUND SERVICING

The City does not have design standards for servicing infrastructure. The master servicing plans for the City have recently been completed by AECOM for water and sanitary systems. These servicing plans have specified most of the parameters required to complete the servicing analysis for the Yellow Sky neighbourhood. To maintain consistency, we have adopted many of the same parameters in our analysis. Any changes or assumptions made in the servicing designs of Yellow Sky have been included in the sections below.

7.1 WATER

The water distribution system that supplies the existing development in the Yellow Sky neighbourhood is routed along Carlton Trail and Heritage Way. This will provide the main connection to the future areas of the neighborhood. The existing watermain that runs along Airport Road to the north of Yellow Sky needs to be replaced and upgraded. The Yellow Sky water distribution system will connect to the replaced Airport Road watermain to loop the system.

7.1.1 EXISTING CONDITIONS

The information for the existing water distribution network that is being expanded was provided by AECOM (2016b) and was based off the city-wide model developed for North Battleford's Water Distribution Master Plan.

7.1.2 DESIGN PARAMETERS

The design parameters used in this analysis were based on the Fairview Heights Master Plan to ensure consistency of design within the City and are summarized below in **Table 7.1.2a** and **Table 7.1.1b**.

Table 7.1.2a Water Demand Calculation Parameters

Land Use	Equivalent Population per hectare	Required Fire Flow
Single Family	58.5 p/ha	90 L/s
Townhouse	137.2 p/ha	150 L/s
Apartment	150 p/ha	220 L/s
Commercial	65 p/ha	220 L/s

Source: Fairview Heights Master Plan (AECOM, 2016b, p. 7)

Table 7.1.1b Water Analysis Design Parameters	
Parameter	**Value**
Average Water Demand	415 L/cap/day
Maximum Daily Demand (MDD) Peaking Factor	2.1
Peak Hourly Demand (PHD) Peaking Factor	3.15
Critical Residual Pressure: MDD + Fire Flow	20 psi
Minimum Residual Pressure: PHD	40 psi
Minimum Average Daily Pressure	100 psi

Source: Fairview Heights Master Plan (AECOM, 2016b, p. 7)

The proposed water distribution network was designed based on the Master Plan presented in Section 6 of this report. Flow rate demands were calculated based on the land uses surrounding each of the nodes identified in the model and the parameters summarized above. The elevation used for each node was based on the existing ground LiDar data provided by the City. The catchment area figure for the water system is illustrated in **Figure 7.1.2.**

7.1.3 ANALYSIS SUMMARY

The initial analysis of Yellow Sky's proposed water distribution system shows sufficient flow to achieve minimum fire flow requirements, however, due to the elevation difference across the area, the pressures within the system fail to meet residual pressure requirements. To increase the system pressure within the neighbourhood, a booster station was modelled to create two pressure zones and provide an acceptable level of service to all areas of the neighbourhood. The design for the pump station and pressure sustaining valves is summarized in **Table 7.1.3**.

Table 7.1.3 Pump Station Parameters	
Pump Station	**Design Parameter**
1 Duty Pump	46 L/s @ 20 m head
1 Standby Pump	46 L/s @ 20 m head
1 Fire Flow Pump	100 L/s @ 20 m head
Pressure Sustaining Valve (PSV)	
PSV 1	80 psi
PSV 2	70 psi

The resulting network designed to service the Yellow Sky neighbourhood is illustrated in **Figure 7.1.3**. Refer to **Section 9: Phasing Plan** for more details.

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YELLOW SKY MASTER PLAN

DATE: October 2018
INFO SOURCE : City of North Battleford

City of North Battleford

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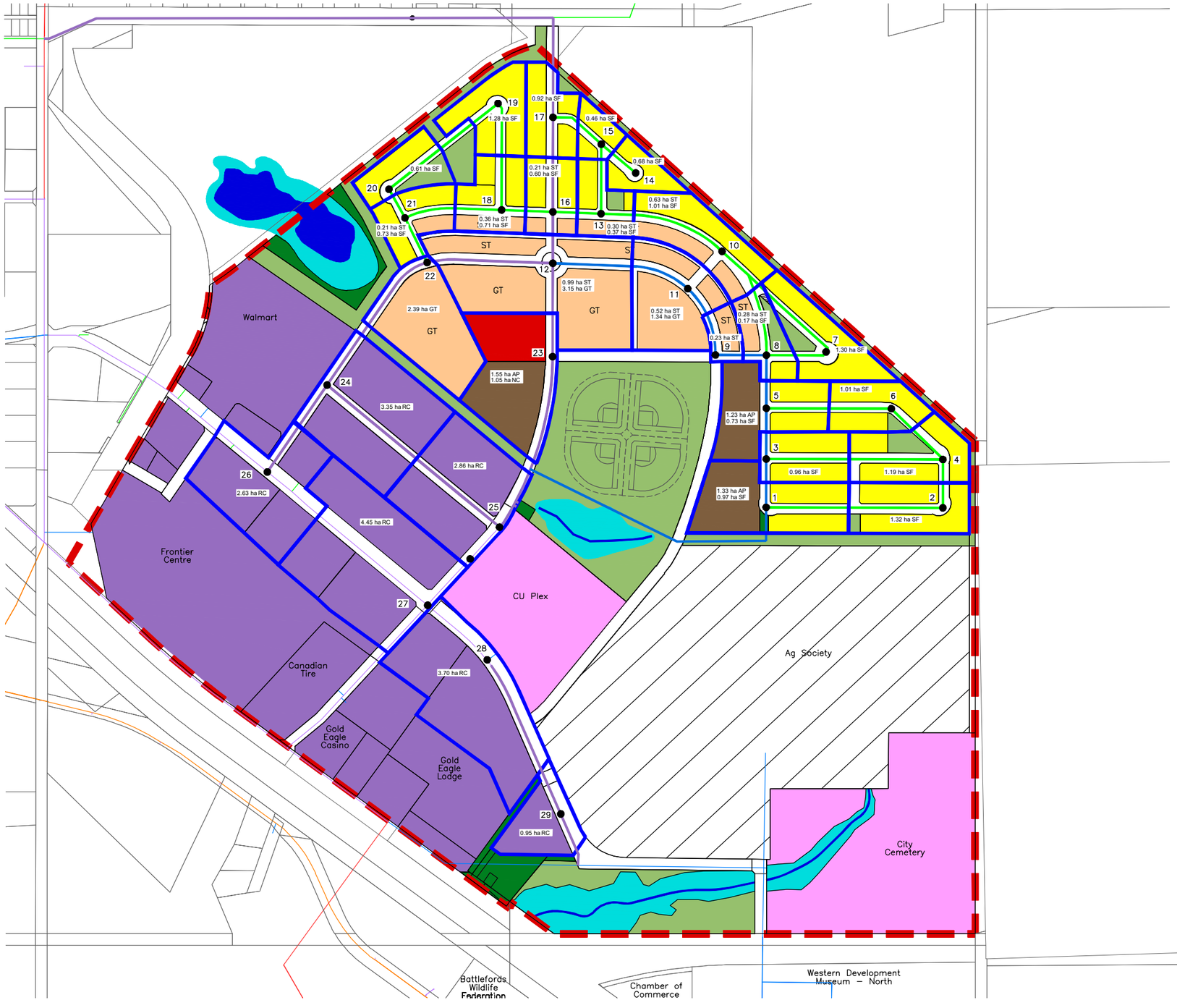

KEY

- WATERMAIN CATCHMENTS
- PROPOSED Ø150mm WM
- PROPOSED Ø200mm WM
- PROPOSED Ø250mm WM
- EXISTING Ø150mm WM
- EXISTING Ø200mm WM
- EXISTING Ø250mm WM
- EXISTING Ø300mm WM
- EXISTING Ø450mm WM
- 1 WATERMAIN CATCHMENT NODES

SF	SINGLE FAMILY
ST	STREET TOWNHOUSE
GT	GROUP TOWNHOUSE
AP	APARTMENT
PB	PARK/BUFFER
NC	NEIGHBOURHOOD COMMERCIAL
RC	REGIONAL COMMERCIAL
IN	INSTITUTIONAL
RW	RIGHT OF WAY
ED	EXTERNAL DRAINAGE

water servicing catchments

FIGURE
7.1.2

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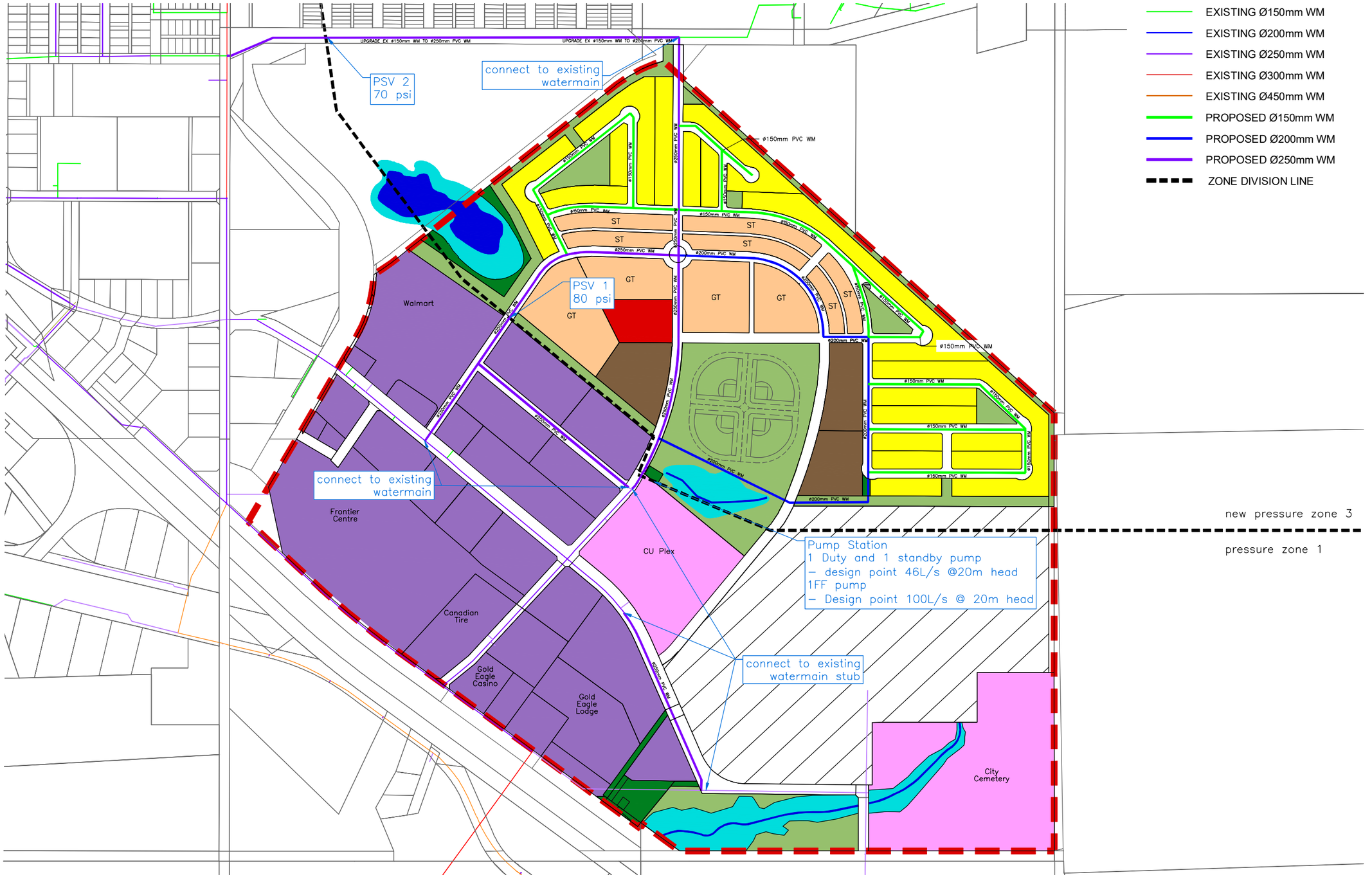

water servicing design

FIGURE 7.1.3

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7.2 SANITARY

There are several upgrades still required to the existing City sanitary system, which have been identified in the Sanitary Sewer System Master Plan completed by AECOM (2016a). The existing development within the Yellow Sky neighbourhood is currently serviced by 200 mm PVC sanitary sewer mains beneath Carlton Trail, Heritage Way, and through privately owned land. The City has recently installed a 375mm diameter trunk beneath Highway #16 connecting the Yellow Sky neighbourhood to the City's main 675mm diameter truck sewer. The flow capacity of the recently installed 375mm diameter sewer was considered the primary design constraint for the sanitary sewer servicing design and the sanitary model was created according to this constraint. Due to capacity issues in the existing pipes upstream of the 375mm trunk, several upgrades are required to service the Yellow Sky neighborhood as described in **Section 7.2.3**.

7.2.1 EXISTING CONDITIONS

The existing network information was provided by the City. Further information regarding capacities was provided by AECOM and was based off the city-wide model they developed as part of North Battleford's Sanitary Sewer System Master Plan (AECOM, 2016a).

7.2.2 DESIGN PARAMETERS

The design parameters used in this analysis were drawn from the Fairview Heights Master Plan (AECOM 2016c) to ensure consistency with the rest of the City's new infrastructure. City of Saskatoon (2018) design standards were also referenced where necessary. The parameters are summarized in **Table 7.2.2.a** below.

Table 7.2.2a Parameters Used for Sanitary Design

Parameter	Value	Source
Average Dry Weather Flow (ADWF)	300 L/cap/day	Fairview Heights Master Plan
Manning's Roughness (Plastic Pipe)	0.013	City of Saskatoon Standard
Inflow/Infiltration Rate	0.17 L/s/ha	City of Saskatoon Standard
Minimum Pipe Full Flow Velocity	0.6 m/s	City of Saskatoon Standard
Maximum Pipe Full Flow Velocity	3.0 m/s	City of Saskatoon Standard
Minimum depth of cover	3.45 m	City of Saskatoon Standard
Maximum manhole spacing	120 m	City of Saskatoon Standard

Source: Fairview Heights Master Plan (AECOM, 2016c, p. 7)

The sanitary sewer master plan calculates usage rates for existing commercial and institutional land use types based on the square footage of the respective building as summarized in **Table 7.2.2b**. These values were used to model sanitary sewer requirements for existing structures.

Table 7.2.2b Commercial and Institutional Design Values	
Type of Building	**Average Daily Flow (l/day/m^2 of Floor area)**
Shopping Centres	4
Car Dealers, Repair, and Service	6
Office Building, Neighbourhood Stores, Service Stations, Supermarkets, Trade Business (e.g. Plumber)	8
Banks, Medical Clinics, Lounges	12
Restaurants	20
Schools, Churches, Libraries, and other Places of Assembly	24
Dry Cleaners	41
Carwashes	77
Hospitals	1700 L/bed/day
Source: Sanitary Sewer Master Plan (AECOM, 2016a, p. 12)	

The proposed sanitary sewer servicing for Yellow Sky includes upgrades to the City's existing sanitary sewer infrastructure and a major expansion of the network. The design of the sanitary servicing was divided into the following stages:

- An investigation of the existing sewer network;
- A demand assessment of the proposed development; and
- An analysis of required upgrades for the existing network due to this additional demand.

The proposed sanitary layout for Yellow Sky was designed with consideration of the Master Plan, prevailing surface grades, and the proposed development phasing. Catchment areas used for the sizing of the sanitary system have been illustrated in **Figure 7.2.2**.

The sewer flows in existing development were calculated using the flow per area values outlined in the Sanitary Sewer System Master Plan (AECOM, 2016a) and referenced in **Table 7.2.2.b.** The sewer flows for future development were calculated based on an equivalent population per area outlined in **Table 7.2.2c**. The Harmon peaking factor was applied based on the cumulative population to provide the Peak Design Flow. Infiltration and inflow rates were calculated using the area of land contributing to the system and design flow rate. Manning's equation was used to calculate flow capacity through the pipe network. A complete summary of the sanitary model and design is included for reference in **Appendix E**.

URBAN systems

YELLOW SKY MASTER PLAN

DATE: October 2018
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City of North Battleford

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KEY

SANITARY SEWER CATCHMENT

sanitary servicing catchments

FIGURE 7.2.2

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Table 7.2.2c Summary of Parameters Used for Sanitary Demand	
Land Use	**Equivalent Population per hectare**
Single Family	58.5
Street Townhouse	103.6
Group Townhouse	137.2
Apartment	150
Neighborhood Commercial*	160
Regional Commercial*	160
**Taken from City of Saskatoon Design Guidelines*	

7.2.3 ANALYSIS SUMMARY

The flow from the proposed development within the Yellow Sky sanitary system will require upgrades in the existing downstream sanitary network within Yellow Sky to meet flow capacity requirements. The required upgrades are summarized in **Table 7.2.3** and shown visually in **Figure 7.2.3.** Refer to **Figure 9b** and **Figure 9d** for more detail.

Table 7.2.3 Summary of Recommended Sanitary Upgrades		
Location (MH ref.)	**Current Pipe Size**	**Required Pipe Size**
Heritage Way (3040-3017)	200mm @ 0.79%	**250mm @ 1.50%**
Heritage Way (3017-3038)	200mm @ 3.11%	**250mm @ 3.11%**
Heritage Way (3038-3016)	200mm @ 1.39%	**300mm @ 1.35%**
Heritage Way (3016-3015)	200mm @ 0.88%	**375mm @ 0.82%**
Heritage Way (3015-3014)	200mm @ 0.37%	**375mm @ 0.36%**
Service Road (3014-3013)	250mm @ 0.26%	**375mm @ 0.36%**
Service Road (3013-3056)	250mm @ 0.41%	**375mm @ 0.37%**

URBAN systems

YELLOW SKY MASTER PLAN

DATE: October 2018
INFO SOURCE: City of North Battleford

City of North Battleford

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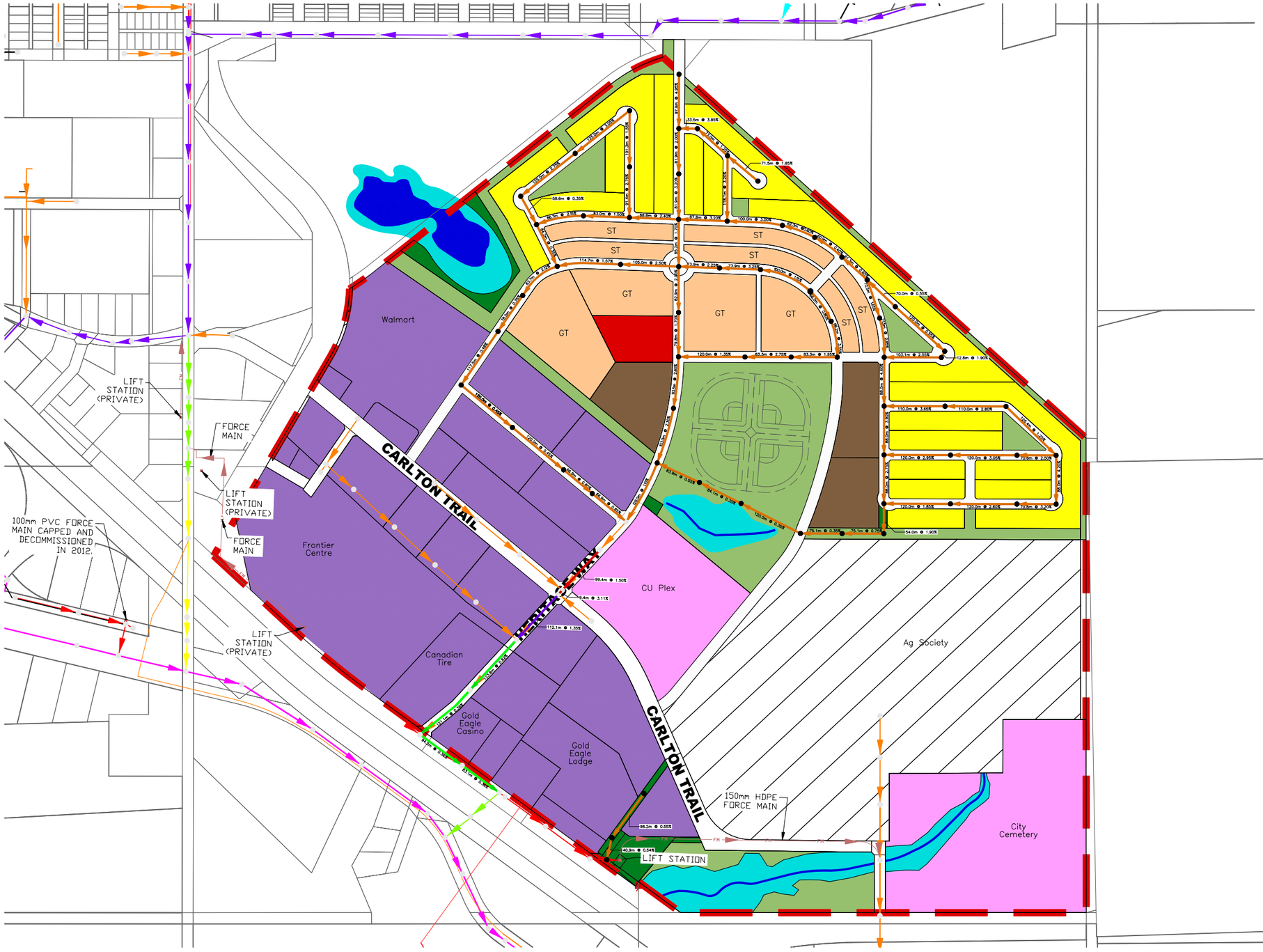

sanitary servicing design

FIGURE 7.2.3

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7.3 STORMWATER MANAGEMENT

The stormwater system currently servicing the existing area within the Yellow Sky neighbourhood collects flows from the developed parcels along Carlton Trail and the undeveloped land to the north. The water is conveyed through a piped system down Carlton Trail before discharging to an existing drainage swale, which flows beneath Highway #16 and on towards the North Saskatchewan River.

Further development in Yellow Sky will increase runoff volumes that will need to be conveyed through the existing infrastructure. Stormwater retention facilities are recommended to minimize the effect of future development on the established area within the neighbourhood by attenuating peak flows. The sewer system that drains the existing drainage swale will therefore be utilized as the primary drainage outlet for Yellow Sky.

7.3.1 EXISTING CONDITONS

Information on the existing storm system servicing Yellow Sky is referenced from the City's map book and as-built drawings. The recent development around the CUplex has created a surface channel to accept overland flow from the undeveloped area to the north which is then conveyed through a 1350 mm diameter sewer main on Heritage Way. This main connects to a smaller downstream 1050 mm diameter main on Carlton Trail, which directs the flow toward the outlet into the ditch south of Carlton Trail. This 1050mm diameter main is the only portion of the existing system which has been slated for upgrades prior to this report and analysis.

7.3.2 DESIGN PARAMETERS

The design parameters used in this Master Plan intentionally matched the AECOM (2012) parameters such that the model of the neighbourhood can be incorporated easily with the overall city-wide model. Where the parameters used in the storm water analysis were not clear, Urban Systems deferred to the City of Saskatoon standards for design.

DESIGN STORMS

In accordance with City of Saskatoon (2018) and AECOM (2012), the minor system is designed to accommodate a 1-in-2-year storm of 1-hour duration. The major system, which includes the storm ponds, is designed to accommodate a 1-in-100-year storm of 24-hour duration. The rainfall intensity information for these storms is shown in **Table 7.3.2a**. These values are taken directly from the AECOM report (2012) and accompanying XPSWMM model. The system response to these storms was modeled using XPSWMM.

Table 7.3.2a Storm Parameters			
1-in-2-year storm (1-hour duration)		**1-in-100-year storm (24-hour duration)**	
Time (min)	**Rainfall Intensity (mm/hr)**	**Time (hour)**	**Value (mm/hr)**
0	0	0	0
5	6.34	1	1.13
10	9.34	2	1.19
15	17.78	3	2.24
20	89.65	4	3.41
25	42.13	5	4.56
30	20.69	6	6.24
35	13.39	7	7.29
40	9.85	8	8.37
45	7.79	9	8.19
50	6.45	10	7.9
55	5.51	11	7.74
60	4.82	12	7.15
65	0	13	6.02
		14	4.51
		15	3.46
		16	2.71
		17	2.08
		18	1.35
		19	1.06
		20	.93
		21	.86
		22	.74
		23	.59
		24	.52
		25	0

RATIONAL METHOD PARAMETERS

The Rational Method was used to initially size the pipes based on peak runoff flows before confirming the design in XPSWMM. The Rational Method uses runoff coefficients (C) to estimate the runoff from a parcel while the XPSWMM model uses impervious percentage. Runoff coefficients were assigned to land uses based on City of Saskatoon standards and converted to percent impervious with the following equation:

$$\%Impervious._{LAND} = \frac{(C_{LAND} - C_{Pervious})}{(C_{Impervious} - C_{Pervious})}$$

The percent impervious values for land uses are summarized in **Table 7.3.2b**. Existing runoff parameters provided by AECOM (2012) for previously developed parcels that do not conform to these values have been maintained. Yellow Sky was divided into many surface water catchment areas as shown in **Figure 7.3.2.**

URBAN systems

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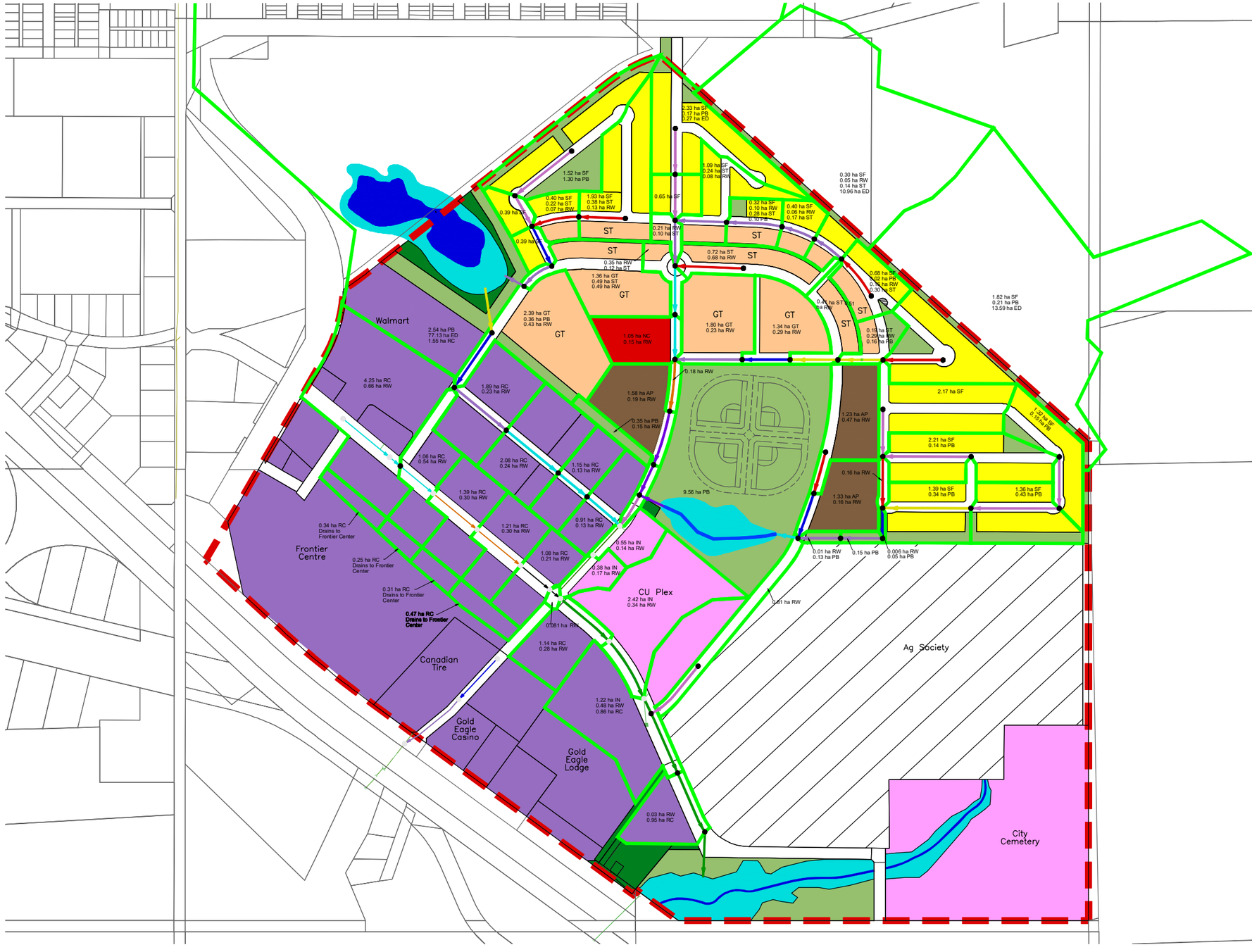
KEY

	STORM SEWER CATCHMENTS
SF	SINGLE FAMILY
ST	STREET TOWNHOUSE
GT	GROUP TOWNHOUSE
AP	APARTMENT
PB	PARK/BUFFER
NC	NEIGHBOURHOOD COMMERCIAL
RC	REGIONAL COMMERCIAL
IN	INSTITUTIONAL
RW	RIGHT OF WAY
ED	EXTERNAL DRAINAGE



stormwater servicing cathcments

FIGURE
7.3.2

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Table 7.3.2b Run-off Coefficient Values

Land Use Type	Runoff Coefficient, C	% Impervious
Single family residential (includes ROW)	0.30	23.5%
Street Townhouse	0.60	58.8%
Group Townhouse	0.60	58.8%
Apartment	0.60	58.8%
Commercial	0.60	58.8%
Roadway Right-of-Way	0.70	70.6%
Parks/Buffer/Undeveloped	0.15	5.9%
Pervious	0.15	5.9%
Impervious	0.95	100.0%

Source: City of Saskatoon Design and development Standards Manual

IDF coefficients used in the rational method are summaized in **Table 7.3.2c**.

Table 7.3.2c Summary of IDF Coefficients

Return Period (years)	Coefficients		
	a	b	c
2	570.47	5.0	0.812
100	1784.80	6.6	0.879

STORM SYSTEM DESIGN PARAMETERS

Storm sewer design parameters used for the proposed Yellow Sky system are summarized in **Table 7.3.2.d**.

Table 7.3.2d Parameters Used for Storm Analysis

Parameter	Value
Manning's Roughness Coefficient for pipe flow	0.013
Minimum Flow Speed	0.9 m/s
Maximum Flow Speed	3.0 m/s
Minimum Depth of Cover	1.85 m
Maximum Distance Between Manholes	120 m
Maximum Distance High Point to Catch Basin	200 m

Source: City of Saskatoon Design and development Standards Manual (2018)

XPSWMM MODEL PARAMETERS

For consistency, the infiltration values used in the XPSWMM model are adopted from those used by AECOM (2012). These values are summarized in **Table 7.3.2e**.

Table 7.3.2e Infiltration Parameters Used in XPSWMM Model

Parameter	Impervious Area	Pervious Area
Depression Storage (mm)	0.55	2.5
Manning's Roughness Coefficient	0.016	0.03
Zero Detention (%)	25	N/A

Source: City of North Battleford's City-Wide Storm Sewer Analysis (AECOM, 2012)

7.3.3 ANALYSIS SUMMARY

The proposed storm water management design consists of a typical system of pipes and overland flow routes through municipal rights-of-way and is illustrated in **Figure 7.3.3**. There are two storage facilities proposed which reduce the impact of the proposed system on the existing infrastructure. The first is an existing wetland north of Walmart, which currently accepts an eighty-hectare area of surface flow. This wetland will provide the water retention required for a portion of the proposed development in western Yellow Sky. The second proposed storage facility is located at the south end of the large central park. This is a dry-pond facility, which utilizes a reduction in pipe size along the main running south on Heritage Way to limit its outflow. The restriction causes the flow to surcharge into a low-lying area within the park during high flow events. Some of the later phases of development discharge to the low-lying area from the east and are routed to the main that runs south along Heritage Way through a surface channel. **Table 7.3.3** summarises the storage requirement for each of these facilities.

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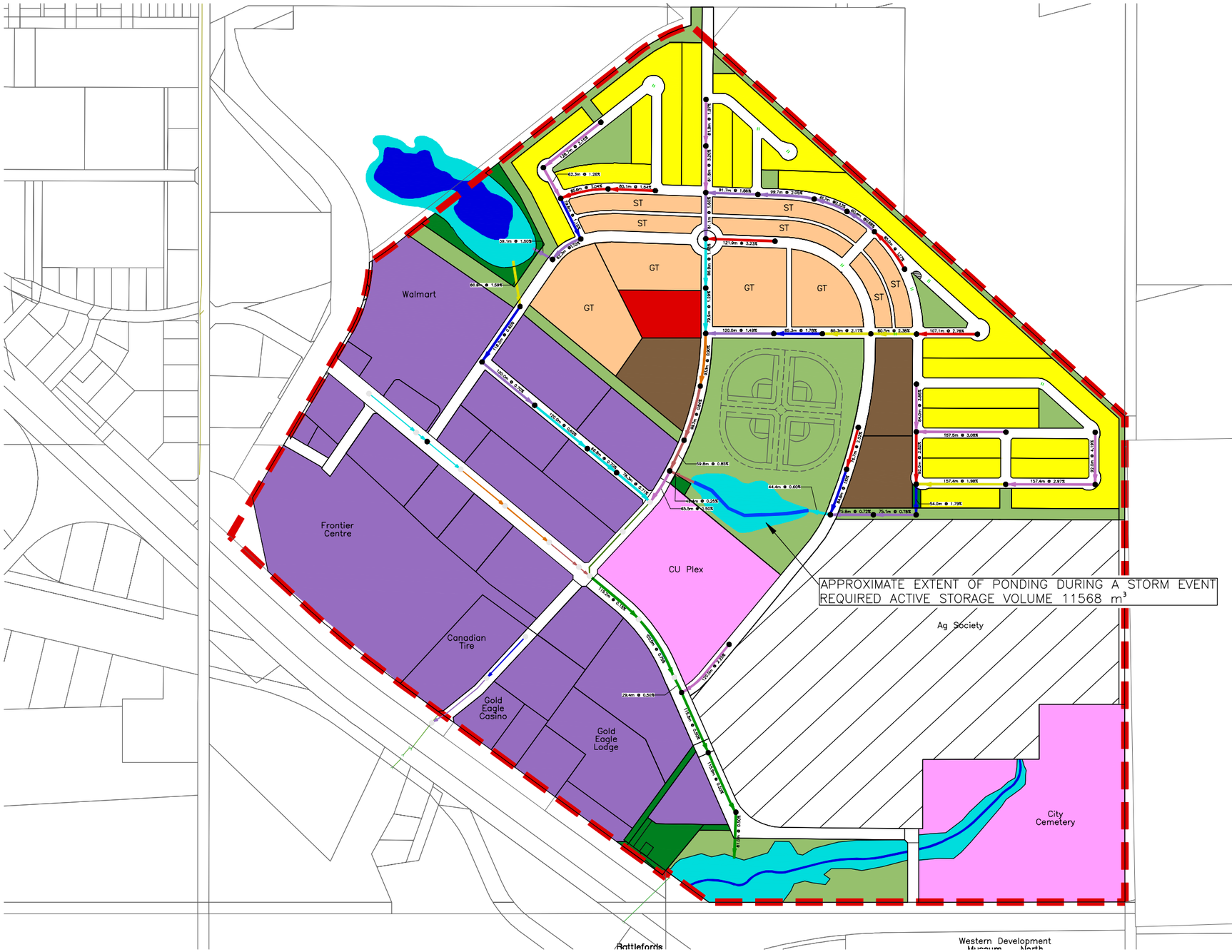

stormwater servicing design

FIGURE
7.3.3

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Table 7.3.3 Stormwater Retention Requirements		
	West Wet Pond	**Park Dry Pond**
Pond Bottom	516.8 masl	515.8 masl
Normal Water Level	519.3 masl	N/A
High Water Level (100 year 24-hour)	520.8 masl	517.6 masl
Top of Pond	521.3 elev	517.8 masl
Active Storage Volume	5502 m^3	22302 m^3
Flow Control Device	200 mm vertical orifice	300 mm pipe
Elevation of Flow Control	519.3 m	515.6 m

The flow from the Yellow Sky sanitary sewers will require upgrades in the existing downstream storm system to meet flow capacity requirements. The required upgrades consist of upsizing the existing 1050mm storm main on Carlton Trail south of the CUPlex to a 1350mm main. This main will be extended south into an existing wetland. This upgrade is shown in **Figure 7.3.3** and **Figure 9d.**

7.4 Shallow Utilities

Shallow utilities will require the coordination of local service providers during the detailed design stage of Yellow Sky.

7.5 Earthworks & Grading

Design of all infrastructure servicing elements has considered the existing topography as provided by the City. Specific cut and fill drawings will need to be developed for each phase during the detailed design process.

8 TRANSPORTATION SERVICING

8.1 SUMMARY OF TRANSPORTATION IMPACT ASSESSMENT

As part of the Yellow Sky Master Plan, a Transportation Impact Assessment (TIA) was completed. The purpose of the TIA is to provide an understanding of the required transportation investments needed to accommodate the change in traffic patterns due to the development of the Yellow Sky neighbourhood. The TIA examined the impacts of the proposed residential and commercial development on the existing and future roadway network within and adjacent to the neighbourhood. The complete TIA report can be viewed in **Appendix D**.

Three traffic scenarios were analysed as part of the TIA: the existing 2018 background traffic, the forecasted 2038 background traffic, and the 2038 post-development traffic. For the 2038 background scenario, recommended improvements from North Battleford's Transportation Master Plan (TMP) were included in the analysis. The recommended improvements for each of these three scenarios are summarized in **Table 8.1** and **Figure 8.1a**. Recommended improvements for the 2018 and 2038 Background scenarios should be completed regardless of the development of Yellow Sky and include a combination of recommendations from the TMP (CIMA, 2017) and this TIA analysis. 2038 Post Development improvements will only be necessary if Yellow Sky is developed and include recommendations from the TMP. The recommended TIA improvements have been divided between the development phases as shown in **Section 9: Phasing.**

Table 8.1 Summary of TIA Results

Scenario	Recommended Improvement

2018 Background	**Territorial Drive and Service Road**
	• Close eastbound approach
	• Reconfigure westbound approach to right-in/right-out
	• Existing movements no longer permitted under new intersection configuration to be re-routed via Pioneer Avenue and Carlton Trail
	• Adopt TMP lane configurations:
	  ○ WB: right-turn only
	  ○ NB: through lane and shared through/right
	  ○ SB: two through lanes

2038 Background	2018 background scenario improvements, and: **Simmental Street/Highway #40 and Railway Avenue** • Add dedicated left-turning lanes on northbound and southbound approaches • For northbound and southbound approaches, reconfigure existing lanes to shared through/right lanes • All approaches adopt protected left-turning phase with permissive left turns during respective through phases

Scenario	Recommended Improvement

2038 Post-Development	**Territorial Drive and Service Road (adopt TMP recommended improvement)**
	• Close eastbound approach
	• Reconfigure westbound approach to right-in/right-out
	• Existing movements no longer permitted under new intersection configuration to be re-routed via Pioneer Avenue and Carlton Trail
	• Adopt TMP lane configurations:
	  ○ WB: right-turn only
	  ○ NB: through lane and shared through/right
	  ○ SB: two through lanes
	
	Simmental Street/Highway #40 and Railway Avenue
	• Add dedicated left-turning lanes on northbound and southbound approaches
	• For northbound and southbound approaches, reconfigure existing lanes to shared through/right lanes
	• All approaches adopt protected left-turning phase (with permissive left turns during respective through phases)
	
	Heritage Way and Carlton Trail
	• Signalize the intersection
	
	Territorial Drive and Airport Road/8 Avenue
	
	• Add dedicated left-turning lanes on northbound and southbound approaches
	• For northbound and southbound approaches, reconfigure existing lanes to one through lane and one shared through/right lane
	• Add dedicated right-turning lane on westbound approach
	• For westbound approach, reconfigure existing lane to shared left/through lane
	• All approaches adopt protected left-turning phase with permissive left turns (during respective through phases)
	
	Territorial Drive and Carlton Trail
	• Protect left turns at all approaches, no permissive left-turning movements are allowed
	
	Railway Avenue and Territorial Drive
	• Eastbound left-turns and southbound left-turns adopt protected left-turning phase (with permissive left turns during respective through phases). Northbound and westbound left-turn movements retain permissive left-turns.
	• TMP geometry for southbound approach is rejected and the proposed lane configuration is as follows:
	  ○ Dedicated left-turn lane
	  ○ Through lane
	  ○ Channelized right-turn lane
	
	Carlton Trail (east development access) and Highway #40
	• Add dedicated left-turning lane for southbound approach
	• For southbound approach, reconfigure existing lane to shared through/right lane

The recommended improvements have been proposed based on forecasted traffic data from the 2018 horizon and trips generated from the most recent revision of the ITE Trip Generation Manual. Traffic for communities are highly dynamic and can change based on economics, technological advancements, weather, access, and other macro factors. As developer interest changes for this area, the applicant (as part of the development submission) must provide a transportation update for the proposed site to capture the current traffic conditions and travel patterns. The transportation update shall include a review of the study intersection operations and must meet the standards of the approving authority.

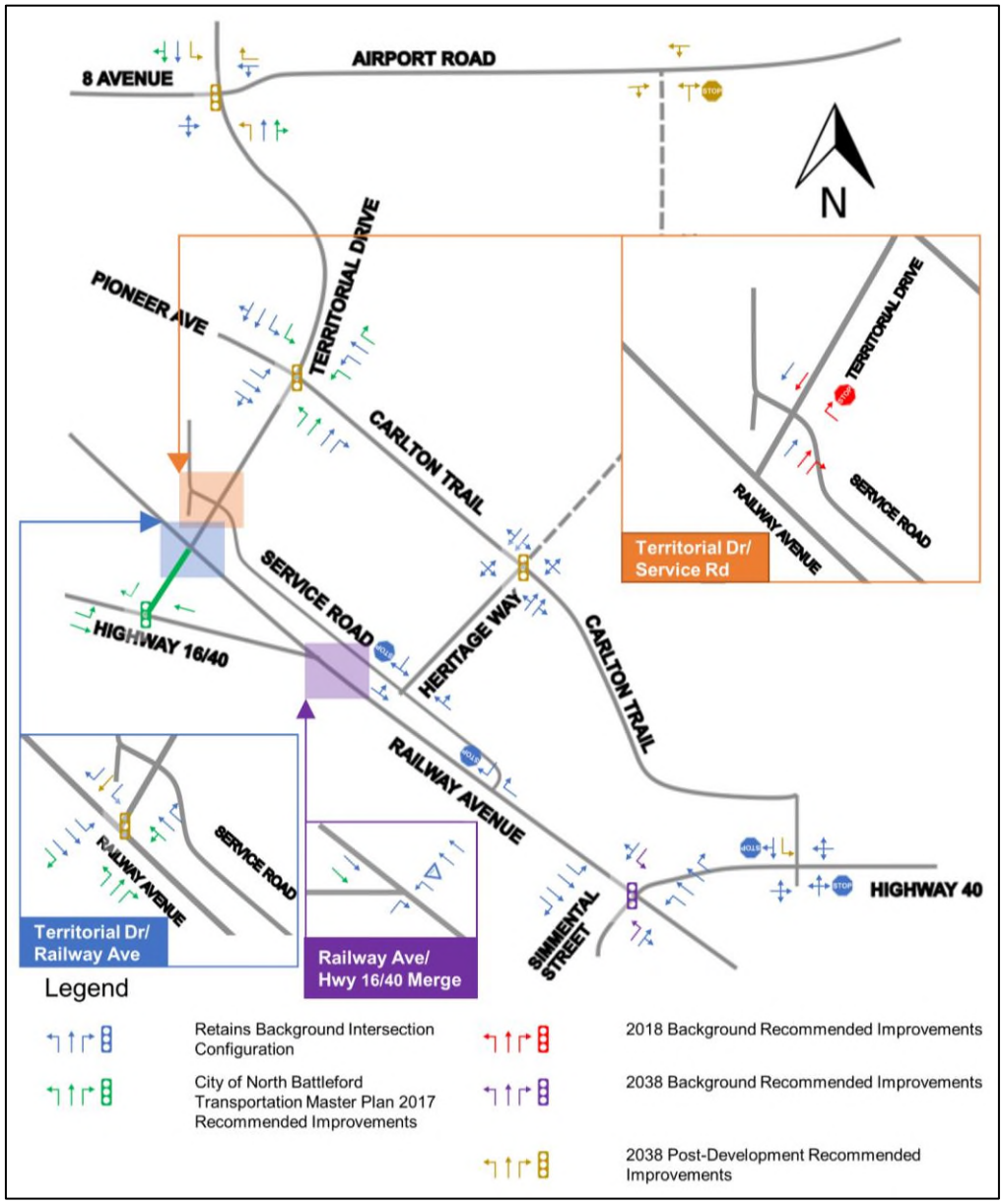

Figure 8.1a Recommended Transportation Improvements

The right-of-way widths within the Yellow Sky Neighbourhood were specified based on the roadway classification and the existing roadway widths throughout the area. Recommended right-of-way widths are illustrated in **Figure 8.1b**.

8.2 ACTIVE TRANSPORTATION

The active transportation infrastructure in the Yellow SKy neighbourhood features an interconnected system of sidewalks and pathways connecting the area's residential neighbourhoods to commercial and recreational land uses. Proposed pathways extend beyond the boundaries of the neighbourhood at the intersections of Carlton Trial & Territorial Drive and Heritage Way & Airport Road. These regional pathways will be designed to accommodate multiple forms of active transportation including cycling and pedestrians. **Figure 8.2** shows the proposed path network in Yellow Sky.

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YELLOW SKY MASTER PLAN

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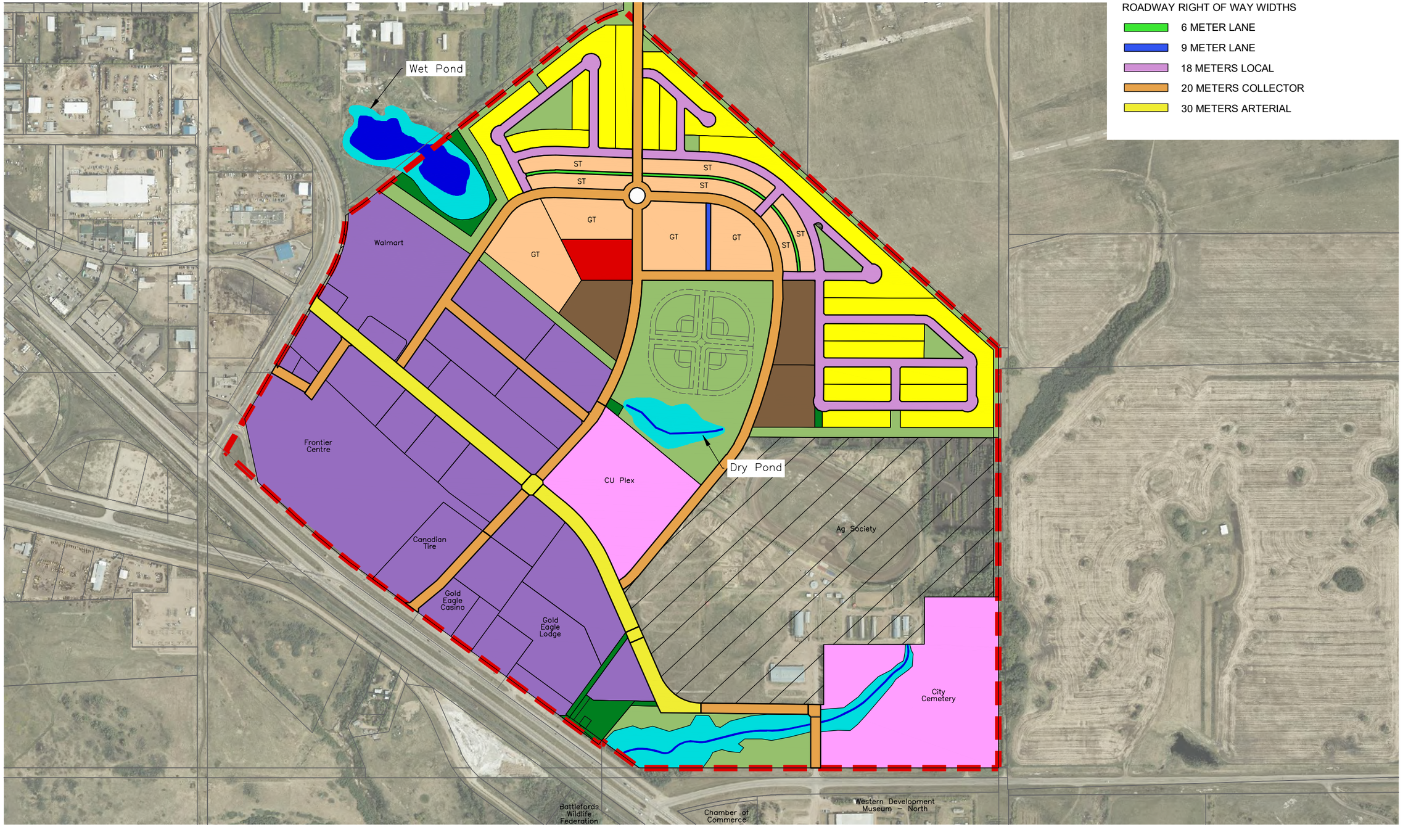

proposed roadway right of way

FIGURE
8.1b

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KEY

- EXISTING PATHWAY
- PROPOSED PATHWAY
- PROPOSED SIDEWALK
- (P) PROPOSED PLAYGROUND

Wet Pond

Walmart

Frontier Centre

CU Plex

Dry Pond

Canadian Tire

Gold Eagle Casino

Gold Eagle Lodge

Ag Society

City Cemetery

Battlefords Wildlife Federation

Chamber of Commerce

Western Development Museum – North

PIONEER AVE

114 STREET

TERRITORIAL DRIVE

FRONTIER WAY

CARLTON TRAIL

HERITAGE WAY

HIGHWAY 40

RAILWAY AVENUE

ST

GT

proposed active transportatoin plan

FIGURE 8.2

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9 PHASING & COST ESTIMATE

9.1 PHASING PLAN

The Yellow Sky neighbourhood has been divided into 12 phases to build out the Master Plan based on the servicing design of the subdivision. This phasing strategy ensures each phase has the necessary infrastructure in place for development without overbuilding and therefore optimizes capital funding requirements. Due to the servicing requirements of each area of Yellow Sky, phases 1 to 6 should be developed consecutively. The order of development for phases 7 through 12 is flexible and can vary based on municipal priorities at the time of development.

As development progresses in Yellow Sky, temporary circulation stations will be installed in the water distribution system to avoid water stagnation in areas which are not yet looped or in areas which do not have adequate draws on the system. These circulation stations will be removed as development in Yellow Sky progresses.

The phasing plan for Yellow Sky is summarized in **Table 9.1** and **Figure 9a** below. Individual figures for each phase of development are provided in the following pages. These figures also contain notes with any off-site transportation upgrade requirements that cannot be shown on the figure.

Table 9.1 Summary of Yellow Sky Phasing Plan

Phase	Land Uses	Developable Area (ha)	Required Servicing	Reference Figure
1	Regional Commercial	5.62	• Upgrade of downstream sanitary sewer • Transportation upgrades as per **Figure 9b.**	**Figure 9b**
2	Regional Commercial	2.61	• Upgrade roadway and water distribution at Carlton Trail	**Figure 9c**
3	Regional Commercial	6.90	• Construct new water, sanitary, and sewer lines & new roadways. • Excavate new wet pond and construct inlet structures. • Upgrade existing storm sewers downstream of Phase 3.	**Figure 9d**
4	Regional Commercial	1.81	• Sanitary servicing is separate from the rest of the system and connects to existing lift station.	**Figure 9e**
5	Neighborhood Commercial	1.05	• Extend water, sanitary, and storm water servicing north along Heritage Way. • Development of central park space including sports parks, dry pond, and water pressure boosting station. • Transportation upgrades as per **Figure 9f.**	**Figure 9f**
	Multi-Family (Apartment)	1.55		
6	Group Townhouse	3.74	• Construction of new water, sanitary, and storm water mains including looping of water distribution system. • Connect to new inlet into west storm pond.	**Figure 9g**
	Street Townhouse	0.58		
7	Single Family Residential	3.36	• Completion of development in the western portion of Yellow Sky. • Extend underground servicing and roadways.	**Figure 9h**
	Street Townhouse	0.69		
8	Group Townhouse	3.14	• Extensions of water, sanitary, and storm water servicing in northeast Yellow Sky. • Transportation upgrades as per **Figure 9i.**	**Figure 9i**
	Street Townhouse	1.12		
9	Multi-Family (Apartment)	2.56	• Completion of eastern water distribution loop servicing multi-family apartment parcels.	**Figure 9j**
10	Single Family Residential	2.86	• Completion of development in northeast Yellow Sky including extensions of water, sanitary, and storm mains • Upgrade Airport Road water main • Transportation upgrades as per **Figure 9k.**	**Figure 9k**
	Street Townhouse	0.83		
11	Single Family Residential	1.82	• Development in eastern Yellow Sky including extensions of water, sanitary, and storm mains	**Figure 9l**
	Street Townhouse	0.49		
12	Single Family Residential	6.16	• Completion of residential development in Yellow Sky including final extensions of new water, sanitary, and storm system	**Figure 9m**

URBAN systems

YELLOW SKY MASTER PLAN

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City of North Battleford

City of North Battleford

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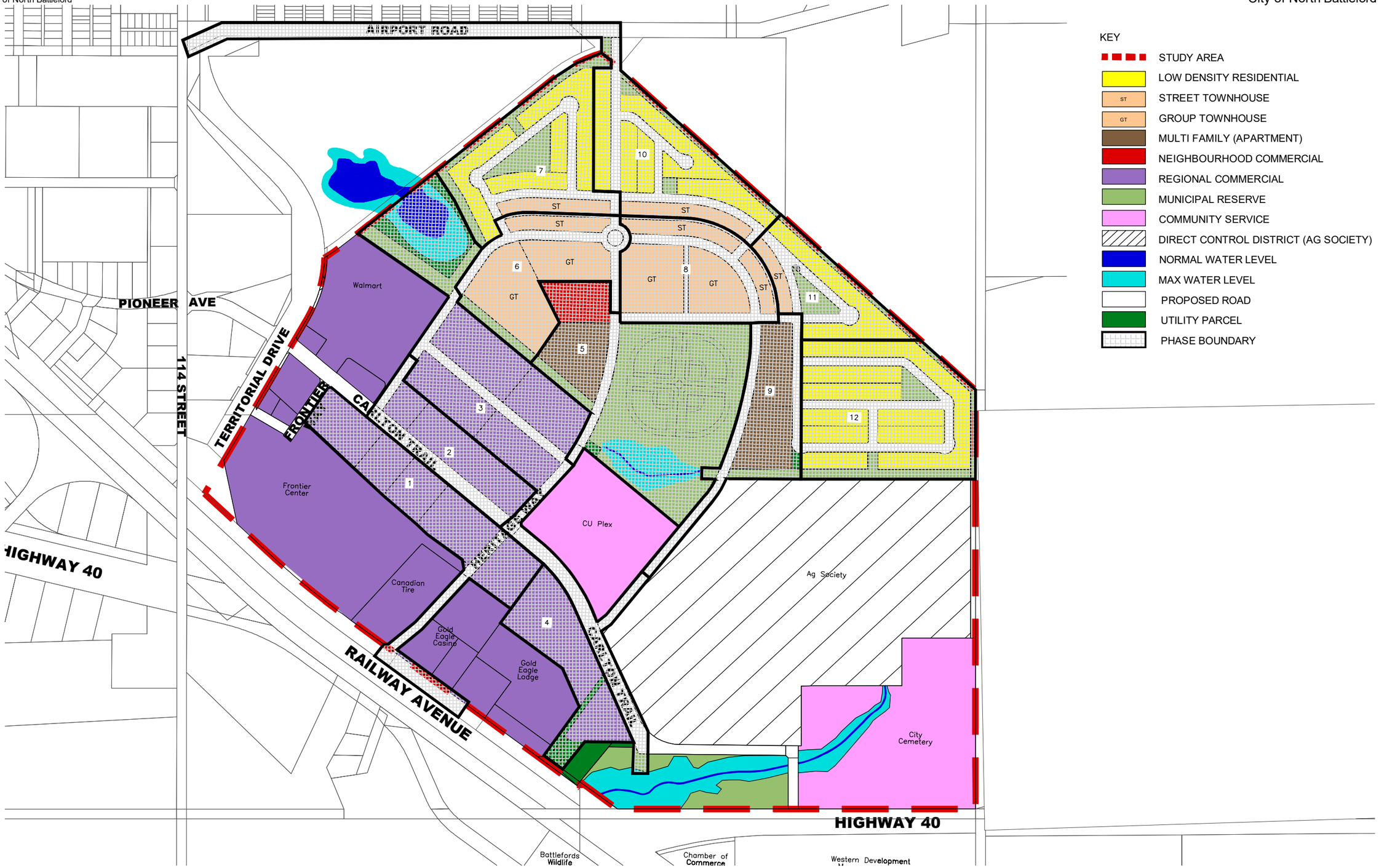

KEY

- STUDY AREA
- LOW DENSITY RESIDENTIAL
- ST — STREET TOWNHOUSE
- GT — GROUP TOWNHOUSE
- MULTI FAMILY (APARTMENT)
- NEIGHBOURHOOD COMMERCIAL
- REGIONAL COMMERCIAL
- MUNICIPAL RESERVE
- COMMUNITY SERVICE
- DIRECT CONTROL DISTRICT (AG SOCIETY)
- NORMAL WATER LEVEL
- MAX WATER LEVEL
- PROPOSED ROAD
- UTILITY PARCEL
- PHASE BOUNDARY

overall phasing plan

FIGURE 9a

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URBAN systems

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City of North Battleford

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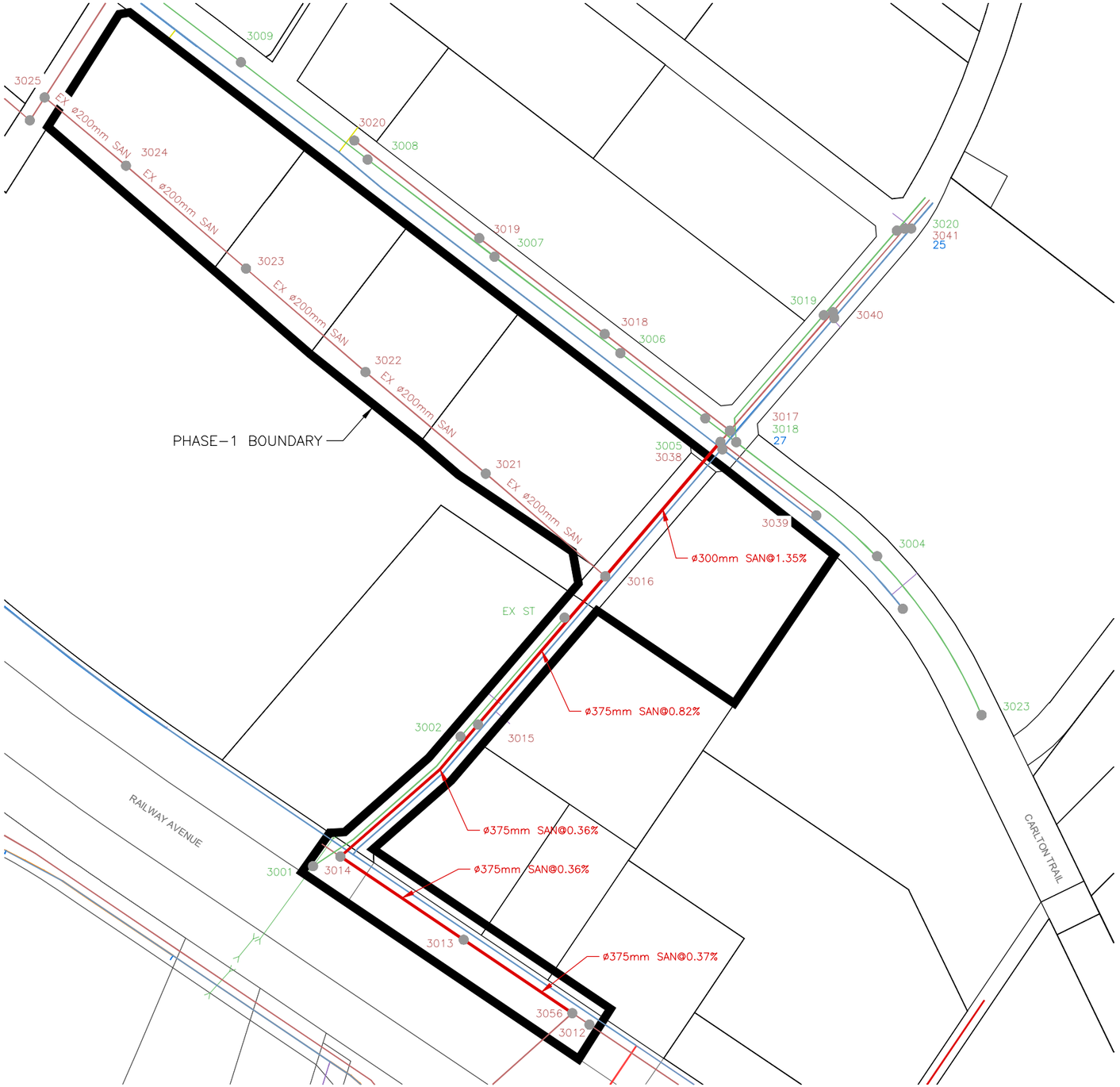

Required Transportation Upgrades:

Territorial Drive and Service Road (adopt TMP recommended improvement)

- Close eastbound approach
- Reconfigure westbound approach to right-in/right-out
- Adopt TMP lane configurations:
- WB: right-turn only
- NB: through lane and shared through/right
- SB: two through lanes

Territorial Drive and Carlton Trail

- Provide dual southbound left turn lane
- Provide dual westbound left turn lane

phase 1 plan

FIGURE 9b

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URBAN systems

DATE: October 2018
City of North Battleford

YELLOW SKY MASTER PLAN

City of North Battleford

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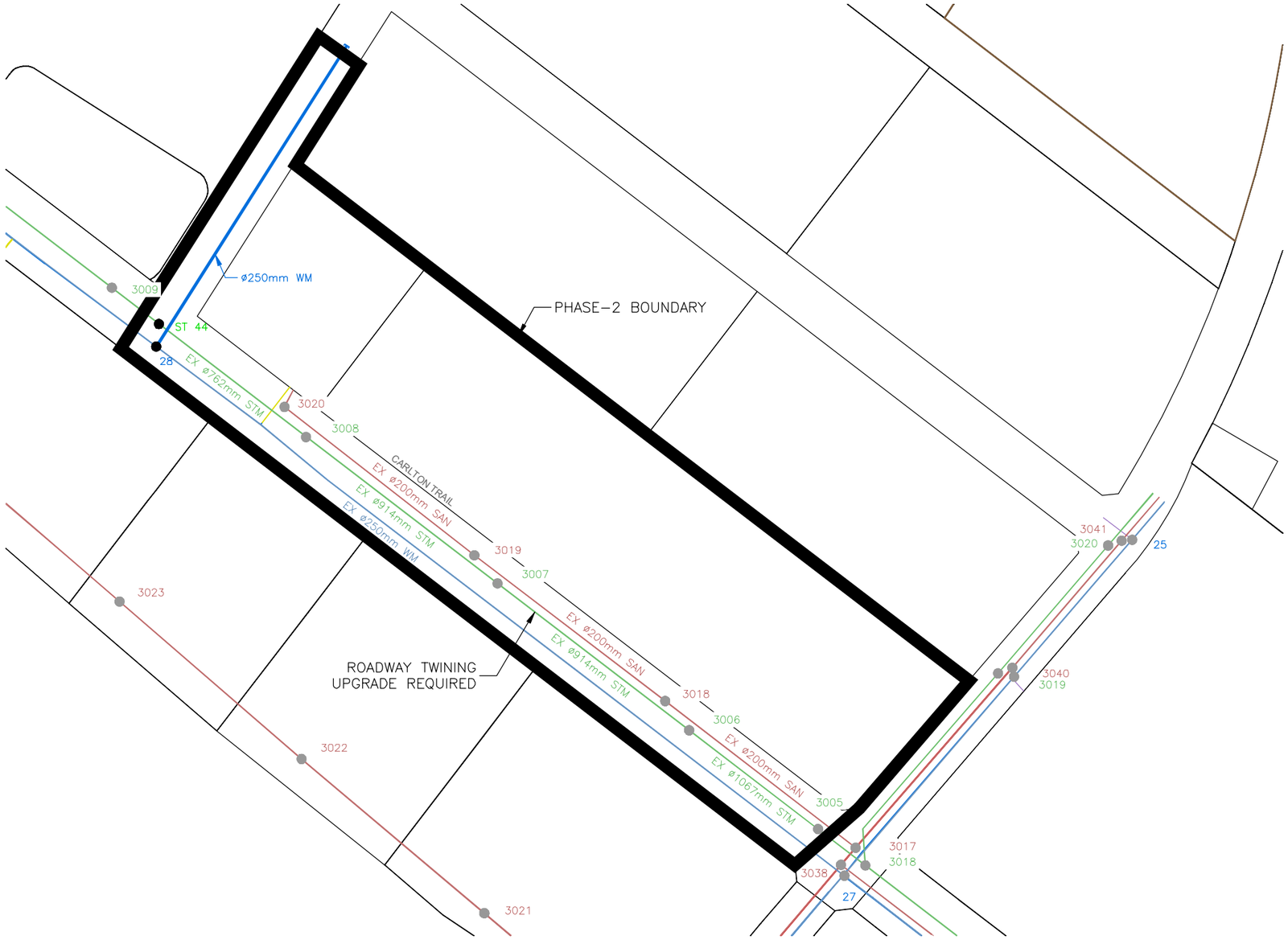

phase 2 plan

FIGURE 9c

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URBAN systems

YELLOW SKY MASTER PLAN

DATE: October 2018
City of North Battleford

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phase 3 plan

FIGURE 9d

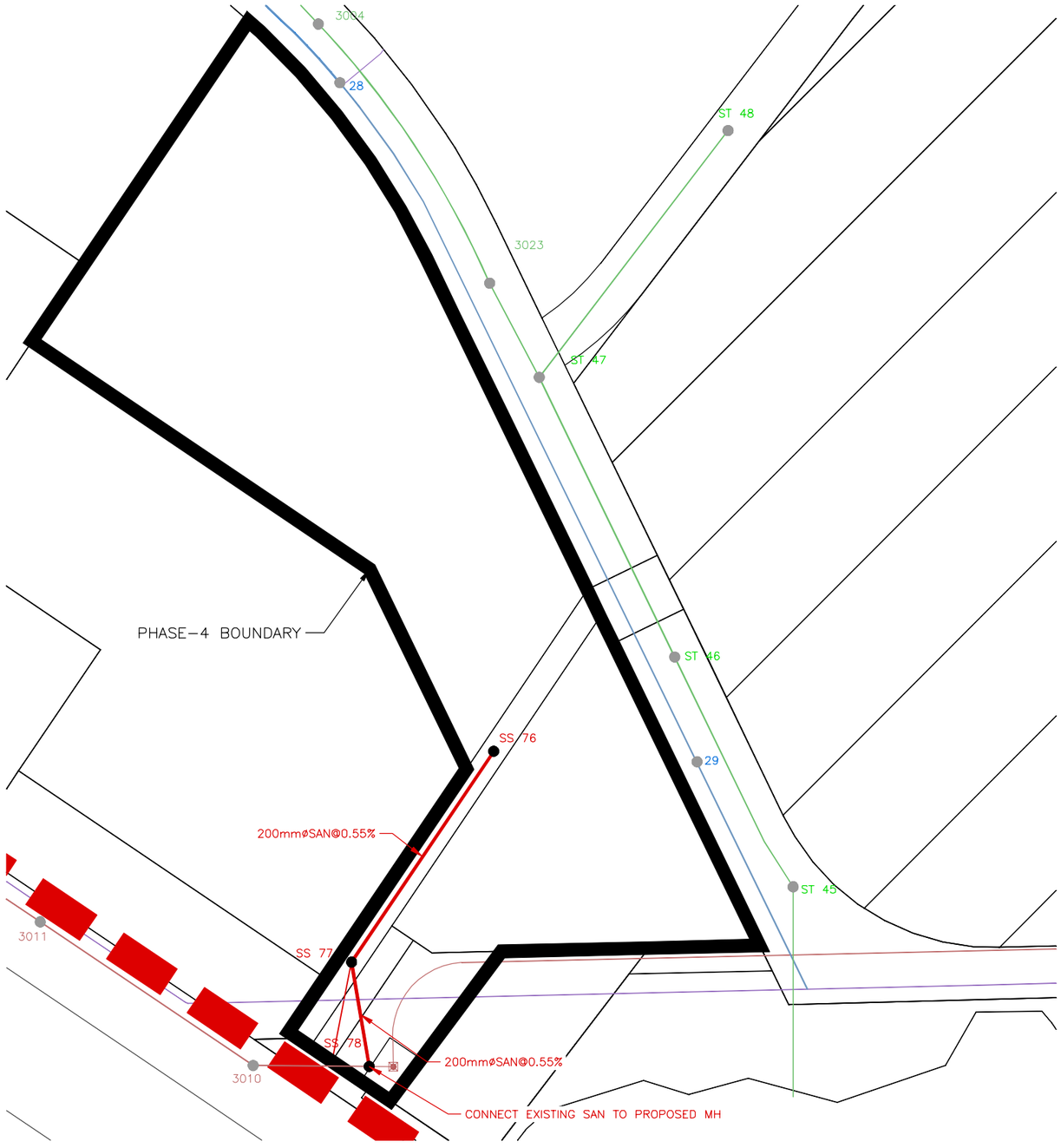
URBAN systems

DATE: July 2018
City of North Battleford

YELLOW SKY MASTER PLAN

City of North Battleford

Scale 1:2000



phase 4 plan

FIGURE 9e

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DATE: October 2018
City of North Battleford

YELLOW SKY MASTER PLAN

City of North Battleford

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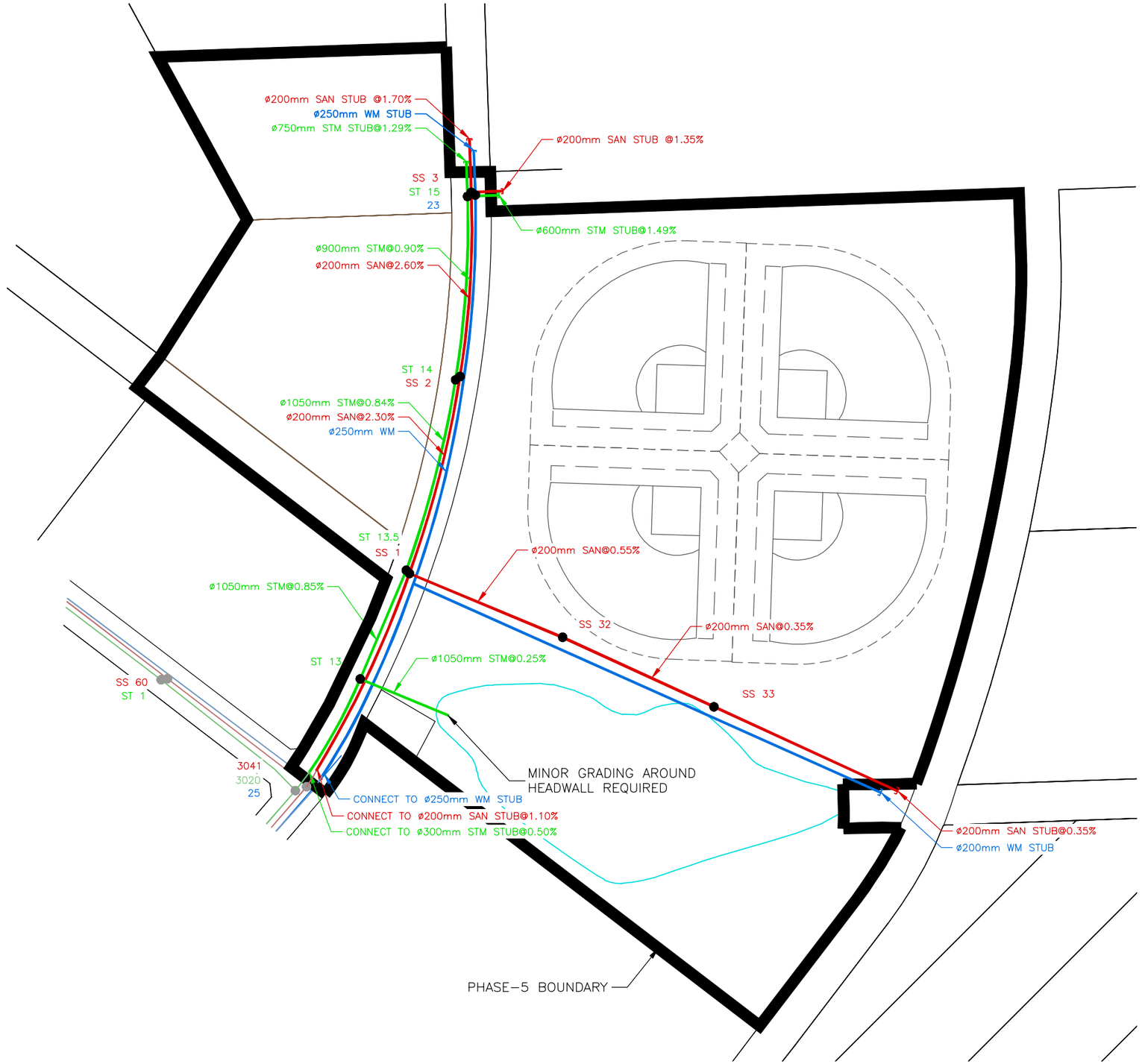

Required Transportation Upgrades:

Heritage Way and Carlton Trail

- Signalize the intersection

phase 5 plan

FIGURE 9f

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DATE: October 2018
City of North Battleford

YELLOW SKY MASTER PLAN

City of North Battleford

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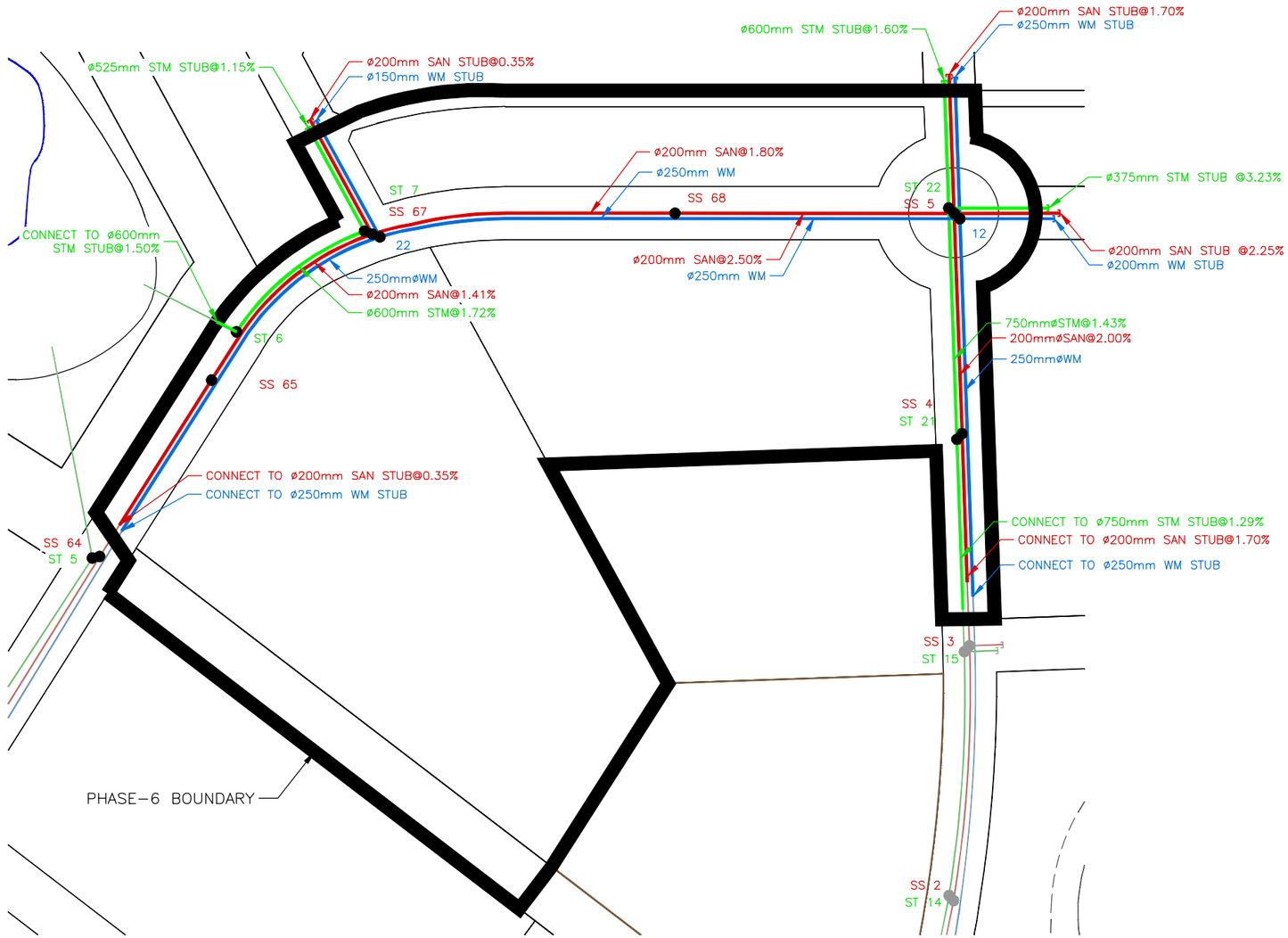

phase 6 plan

FIGURE 9g

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DATE: October 2018
City of North Battleford

YELLOW SKY MASTER PLAN

City of North Battleford

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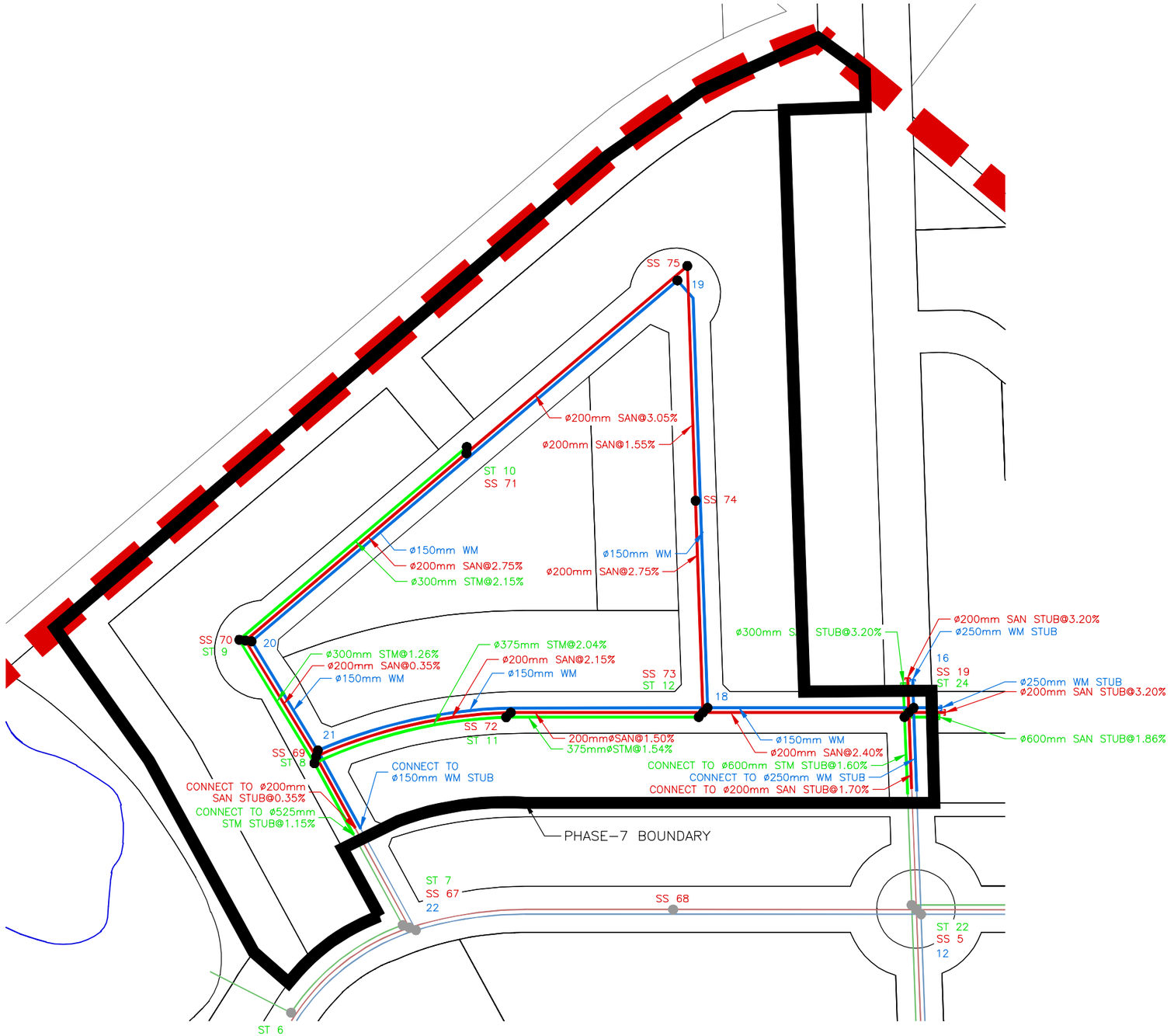

phase 7 plan

FIGURE
9h

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City of North Battleford

YELLOW SKY MASTER PLAN

City of North Battleford

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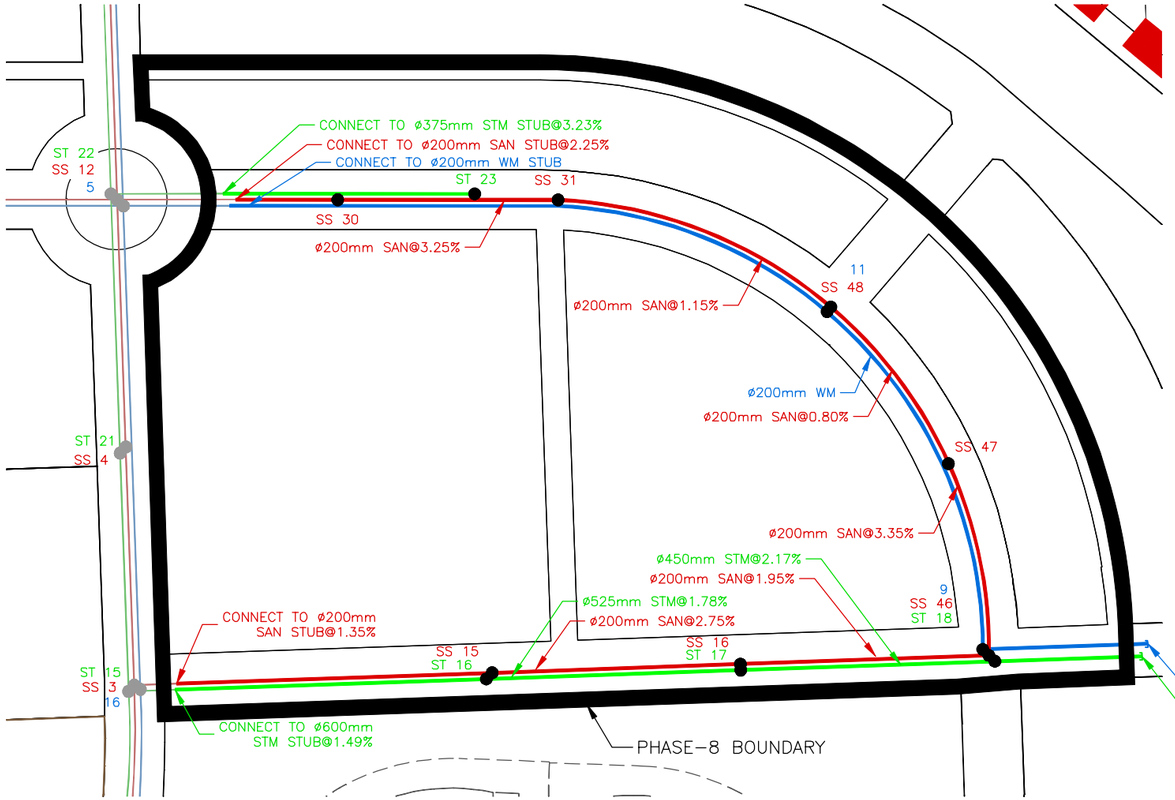

Required Transportation Upgrades:

Railway Avenue and Territorial Drive

- Optimize traffic signals to improve eastbound and southbound left turns
- Reconfigure proposed TMP geometry for southbound approach as follows:
- Separate left-turn lane
- Through lane
- Channelized right-turn lane
- Extend Territorial Drive to Highway 16/40

phase 8 plan

FIGURE 9i

URBAN systems

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City of North Battleford

YELLOW SKY MASTER PLAN

City of North Battleford

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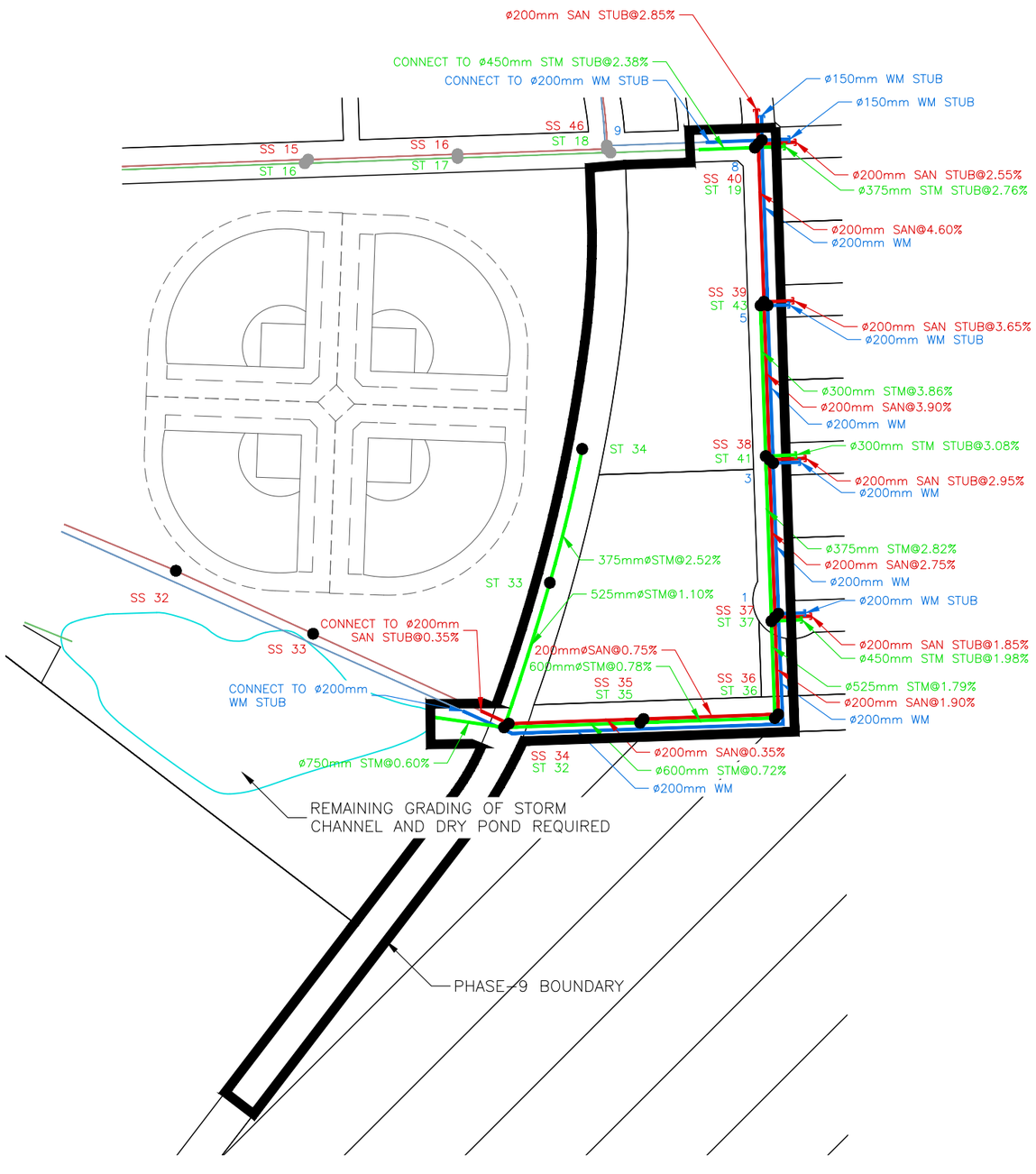

Required Transportation Upgrades:

Simmental Street/Highway 40 and Railway Avenue

- Provide northbound left turn lane
- Provide southbound left turn lane
- Provide northbound shared-through right lane
- Provide southbound shared-through right lane

Territorial Drive and Airport Road/8 Avenue

- Provide separate northbound left turn lane
- Provide separate southbound left turn lane
- Reconfigure northbound and southbound approach to include:
- One through lane
- One shared through/right lane
- Provide separate westbound right turn lane
- Reconfigure westbound approach to include: Shared left/through lane

Carlton Trail (east development access) and Highway 40

- Provide separate southbound left turn lane
- Reconfigure southbound approach to include: Shared through/right lane

phase 9 plan

FIGURE 9

URBAN systems

YELLOW SKY MASTER PLAN

DATE:October 2018
City of North Battleford

City of North Battleford

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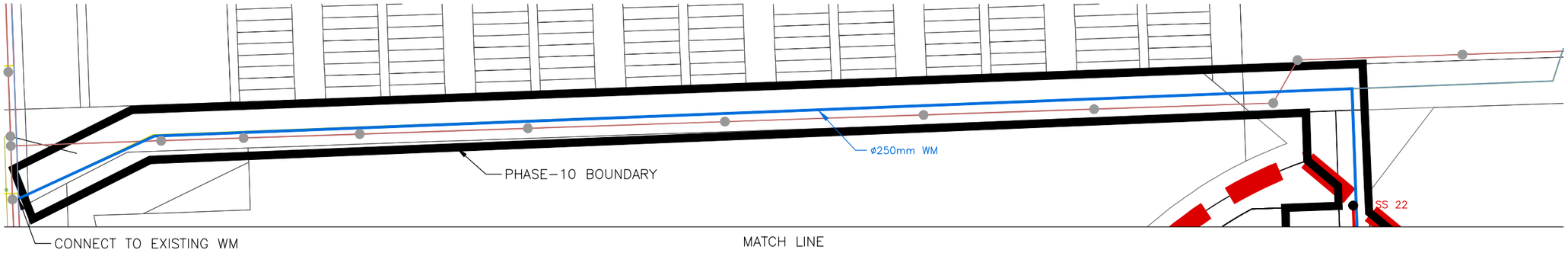

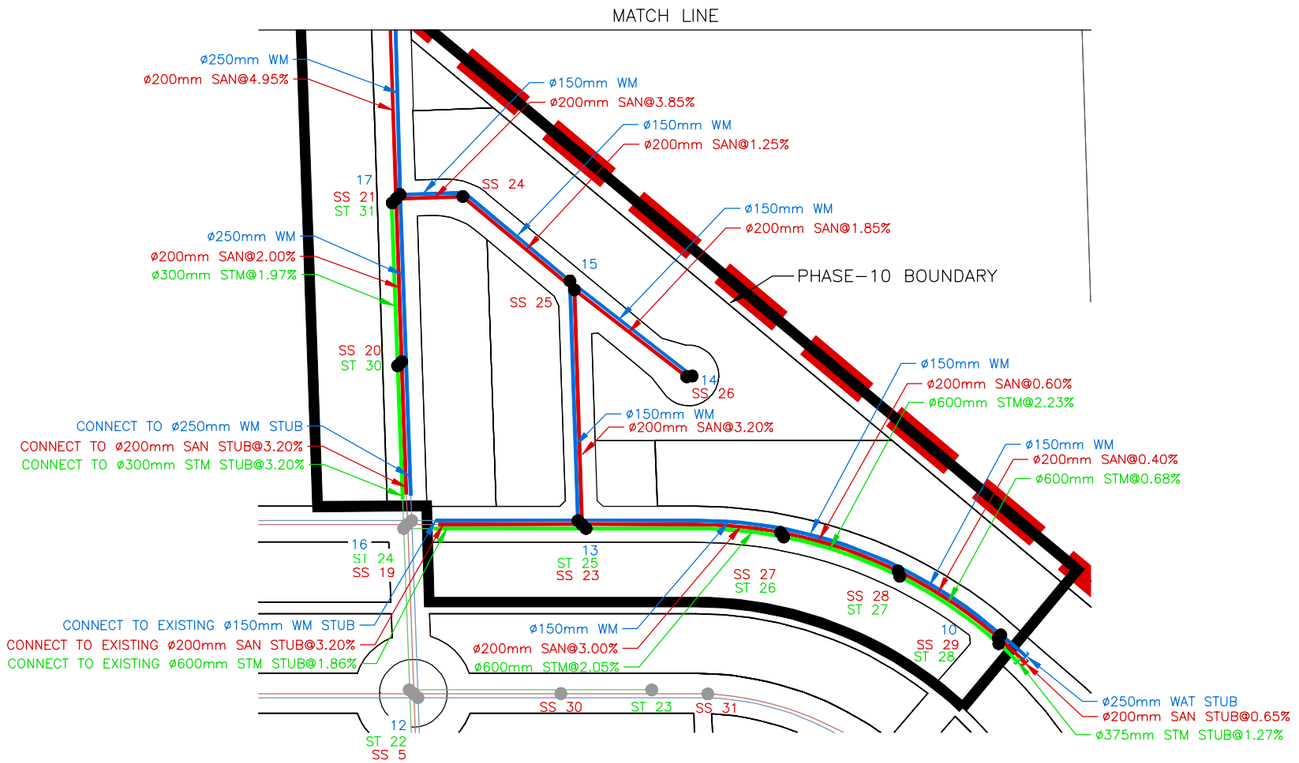

phase 10 plan

FIGURE 9k

URBAN systems

DATE: October 2018
City of North Battleford

YELLOW SKY MASTER PLAN

City of North Battleford

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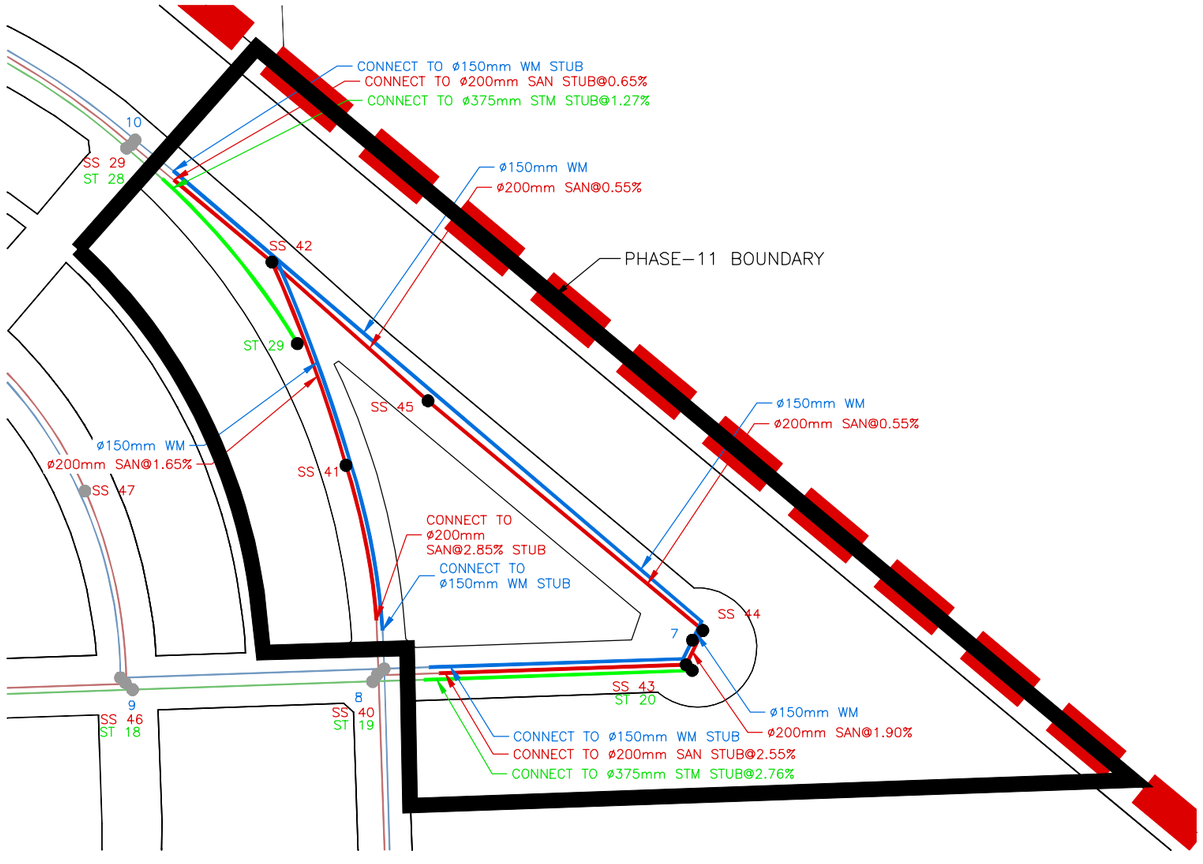

phase 11 plan

FIGURE 9

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URBAN systems

DATE: October 2018
City of North Battleford

YELLOW SKY MASTER PLAN

City of North Battleford

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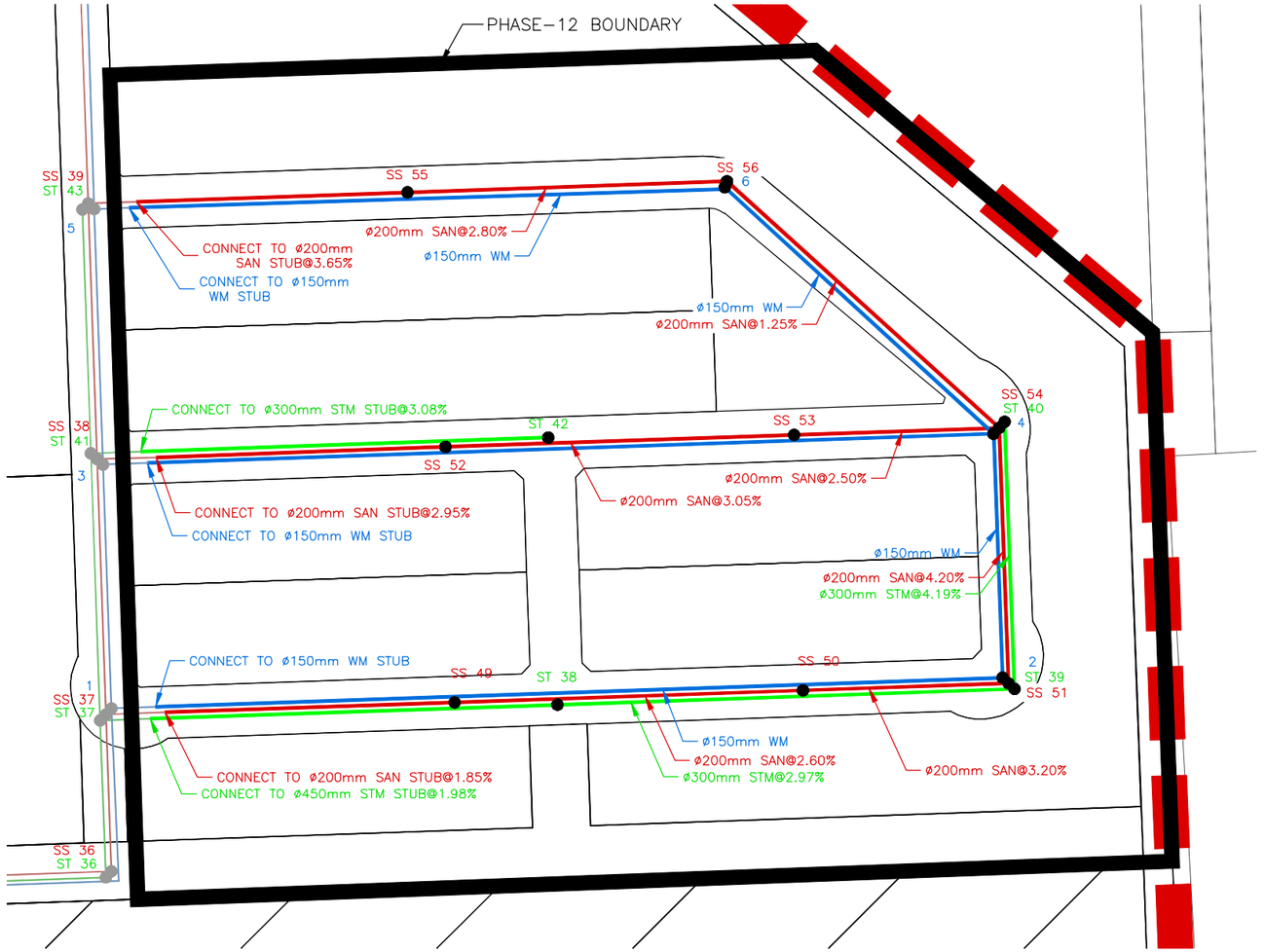

phase 12 plan

FIGURE

9m

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9.2 COST ESTIMATE

A Class D cost estimate was completed for Yellow Sky. Class D estimates are preliminary estimates which indicate the approximate magnitude of construction costs based on costs associated with other similar projects. Class D cost estimates may differ significantly from actual construction costs due to their preliminary nature and the high probability of design changes. To account for this risk, a contingency allowance of 35% has been applied to the construction costs in this estimate.

Table 9.2 summarizes the expected capital costs for development in Yellow Sky. To develop these estimates, pricing information provided by the City of North Battleford was used to generate unit rates for the required underground and surface infrastructure. These costs were calculated assuming typical roadway design standards and average spacing numbers for all underground appurtenances. The lengths of underground and surface infrastructure in Yellow Sky were then multiplied by these costs to generate an estimated construction cost. Additionally, the area of each phase was multiplied by the earthworks and landscaping costs provided by the City. These costs were combined with considerations for pond excavation to generate an expected "Earthworks and Landscaping" cost. All costs are in 2018 dollars.

Table 9.2 Estimated Capital Costs for Yellow Sky Phases

Phase	Earthworks and Landscaping	Undergrounds (Sanitary, Water Distribution, and Stormwater System)	Surface Works (Concrete and Asphalt)	Contingency	Total Cost
1	$0	$316,000	$1,084,000	$490,000	$1,890,000
2	$65,500	$196,000	$1,127,000	$486,000	$1,874,500
3	$2,863,500	$2,637,500	$3,796,500	$3,254,000	$12,551,500
4	$156,000	$99,500	$0	$89,500	$345,000
5	$3,225,000	$2,163,500	$767,000	$2,154,500	$8,310,000
6	$703,000	$1,102,000	$1,561,500	$1,178,500	$4,545,000
7	$884,500	$1,333,500	$1,759,000	$1,392,000	$5,369,000
8	$653,000	$848,500	$1,763,500	$1,143,000	$4,408,000
9	$520,000	$989,500	$1,696,500	$1,122,000	$4,328,000
10	$119,500	$2,290,000	$3,869,000	$2,197,500	$8,476,000
11	$437,500	$642,500	$1,011,500	$732,000	$2,823,000
12	$1,097,000	$1,720,500	$2,361,500	$1,812,500	$6,991,500
TOTAL	$10,724,000	$14,339,000	$20,797,000	$16,051,500	**$61,911,500**

10 CONCLUSION

The Yellow Sky neighbourhood provides the City of North Battleford with a significant amount of developable land to meet the demand for regional commercial and residential land uses for the foreseeable future. This comprehensive Master Plan provides a clear step-by-step analysis and justification for development in Yellow Sky supported by a highest and best use analysis, environmental review, and public engagement. The Master Plan and servicing plans for Yellow Sky provide a strong foundation for the future detailed design of the neighborhood. The development phasing plan for Yellow Sky has been designed with a degree of flexibility so that the order of development in Yellow Sky can be altered as municipal priorities evolve. Urban Systems looks forward to working with the City in the future as the development of Yellow Sky proceeds.

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Appendix A: South-East Quadrant – Residential and Retail Opportunity Assessment

Report to

City of North Battleford

South-East Quadrant Residential and Retail Opportunity Assessment

South-East Quadrant

January 29, 2018

North Battleford

URBAN systems

Prepared for

CITY OF NORTH BATTLEFORD

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Project number: 3911.0004.01

CONTENTS

1 INTRODUCTION

The City of North Battleford (City) is a regional hub in northwest Saskatchewan that is experiencing moderate growth due to its competitive cost of living, diversified economy, convenient location along Highway #16 between Saskatoon and Edmonton, and its ability to provide desirable services and community amenities. The City is advancing its South-East Quadrant Master Plan driven by the continued demand for commercial property throughout the City and a shortage of larger serviced commercial lots in the southeast area.

There is also, given the extent of land area within the South-East Quadrant, a need to consider the area's potential to accommodate residential uses and specifically what mix and market positioning of residential units would be optimal given residential potential in other areas of North Battleford.

This economic opportunity assessment includes residential and retail demand analyses intended to help determine the following for the South-East Quadrant:

- Review the local area's current retail representation by major category and comment on most relevant gaps in local market supply;
- Quantify city-wide retail demand by major category over a period of at least 20 years and indicate the extent to which this demand can be accommodated within the subject South-East Quadrant;
- Quantify market-supportable retail floor area that should be planned for within the South-East Quadrant and estimate retail land use needs to complement existing regional/community-serving retail uses;
- Project residential growth rate and demand by anticipated household maintainer rates in North Battleford; examining city-wide demand trends and determining implications for related growth within the South-East Quadrant;
- Recommend residential unit types most likely to align with South-East Quadrant, context and future resident demand through forecasted maintainer rates;
- Forecast the number of residential units per year by housing type the South-East Quadrant could realistically absorb given growth potential in other areas of the city; and
- Recommend retail space based on projected population growth, estimated spending levels and regional retail competitive supply.

2 SITE PLANNING AND CONTEXT

2.1 REGIONAL CONTEXT

The City is a regional hub in northwest Saskatchewan, located on Hwy #16 between Edmonton and Saskatoon. Travel times to North Battleford from the cities of Edmonton and Saskatoon are 3 hours, 50 minutes (387 km) and 1 hour, 25 minutes (137 km), respectively.

The City of Lloydminster is 1 hour, 20 minutes driving time (139 km) to North Battleford along Highway #16. Both Lloydminster and Saskatoon are easily accessible regional retail-service centres North Battleford area residents will continue to travel to for goods and services. Over time, as the City and surrounding area continue to grow, market population thresholds will be met that will generate interest from a growing list of retailers and service providers.

2.2 LOCAL CONTEXT

2.2.1 SOUTH-EAST QUADRANT STUDY AREA

The South-East Quadrant is approximately 400 acres situated adjacent to Highway #40, along the south boundary, as well as Highway #16 and Territorial Drive, along the west boundary. The Average Annual Daily Traffic (AADT) volumes along Highway #16 and Territorial Drive are 12,200 and 8,400 vehicles, respectively. In addition, the City's municipal airport is located immediately northeast of, and adjacent to, the South-East Quadrant.

According to the City's Official Community Plan, land uses within the South-East Quadrant consist of:

- Existing Regional Commercial;
- Existing Urban Reserve;
- Future Regional Commercial;
- Existing Community Service; and
- Future Residential.

One of the core drivers of the South-East Quadrant Master Plan is to assess market potential for large retail-commercial uses which build on the existing regional-serving retail cluster. One of the key outcomes of this report is a determination of the appropriate extent of additional retail lands that can serve the needs of the City and its regional trade area over the foreseeable future. An important consideration in this regard is the extent to which existing North Battleford and trade area residents are likely to shop the in larger, more mature retail markets of Saskatoon and Lloydminster. This spending outflow from the local North Battleford market will be challenging to recapture given the greater critical mass and range of offerings (particularly in terms of comparison retail shopping) in these markets, particularly Saskatoon.

2.2.2 POPULATION BASE

The City's total population was 14,315 in 2016, up from 13,190 as recorded in the 2006 Census. First Nations, Inuit and Metis people account for 18% of the City's total population. Population numbers for the City and the surrounding region have remained relatively static with small amounts of growth.

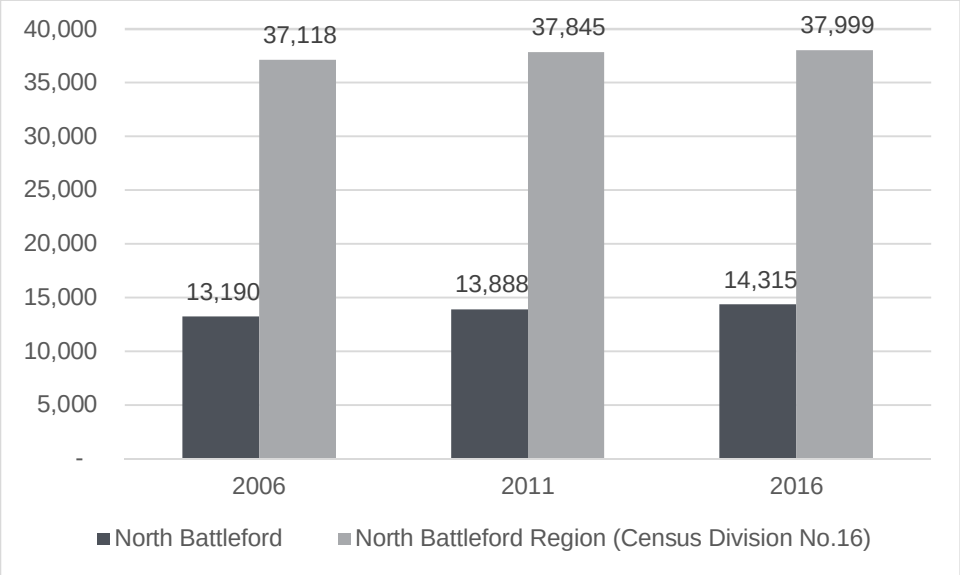


Figure 1 - Population growth in North Battleford and the surrounding region (Stats Canada 2016)

2.3 DOWNTOWN NORTH BATTLEFORD

Downtown is a priority for the City. Recent market studies and real estate trends show there are a number of buildings either unoccupied or under-occupied in the downtown and most of buildings have changed ownership since 2004. On a more positive note, the number of inactive businesses in the downtown has been decreasing over the same period. The City would like to maintain momentum and re-establish downtown as the primary business and activity centre. In 2016 the City produced the Downtown Revitalization Plan charting the path to a more vibrant future for the area. Given these priorities, it is important new development in the South-East Quadrant is designed to not impact or compete with businesses in the downtown.

Downtown Revitalization Plan (2016)

The Revitalization Plan was developed in 2016 to breath new life into the downtown. The purpose of the plan is to guide the revitalization of the economy, community, and to increase safety in the downtown over the next 25 years. The plan envisions four unique character zones and controls for form and character. The plan solidifies the City's commitment to strengthening the downtown as a major centre of activity for the community.

2.4 Official Community Plan

Regional Commercial

Most of the South-East Quadrant is designated as Regional Commercial in the OCP. The intent is to provide sufficient commercial space for North Battleford and the surrounding region at locations with optimal transportation access. Regional Commercial is located along Railway Avenue and Territorial Drive. Potential Regional Commercial expansion areas include along Highway 16 south of the Frontier Centre.

Residential

Growth in North Battleford over the next 20 years will require new residential development and new residential areas. Potential new residential areas identified in the OCP are mostly extensions to existing neighbourhoods. The northern portion of the South-East Quadrant has been identified as a new residential area. New residential development will incorporate a range of housing including infill, affordable and alternative housing. New neighbourhoods will be consciously designed to promote walkability, public space, and flexibility.

Urban Reserve

Urban Reserves are First Nations Reserves within municipal boundaries. The Urban Reserves in the South-East Quadrant belongs to the Mosquito, Grizzly Bear's Head, and Lean Man First Nations and are governed separately from the rest of the lands in North Battleford.

2.5 Zoning Bylaw

The South-East Quadrant is made up of several zones that regulate present-day land use.

CS – Community Service District

The Community Service District is reserved for a range of community services and compatible uses. Examples include medical services, community-oriented retail (farmers market), daycare, recreation facilities, cultural institutions amongst others. The Community Service District sits on the northern edge of the South-East Quadrant.

C4 - Regional Commercial District

The Regional Commercial District provides a consolidated area where large-format retailers, outlets, and other commercial establishments and offices can be developed. The intention is to create a regional node for shopping services in North Battleford and its surrounding area. The C4 zone occupies a central position along Highway 16 in the South-East Quadrant and is critical to the future of the area.

FUD – Future Urban Development District

The Future Urban Development District is a holding zone intended to reserve lands for future development. Interim land uses are allowed until market demand warrants a transition to the redevelopment. Examples of permitted interim uses include sports fields, community gardens and golf courses. The intent is to have interim uses that have a low impact on the land to make the transition to new developments easier.

YQW – Airport District

The Airport District provides space for the North Battleford municipal airport, and airport-related land uses such as storage and mechanical services. The Airport District is adjacent to the north-eastern portion of the South-East Quadrant, however, will have limited impact on the retail and residential areas in the South-East Quadrant. The approach surfaces for the airport will limit maximum building height in some areas of the South-East Quadrant to 16.5 metres. Given the intended future land uses within the approach surfaces a maximum building height of 16.5 metres is not seen to negatively affect the South-East Quadrant. Developers and the City will need to coordinate with the Airport and Transport Canada to ensure new developments are advanced according to the appropriate regulations.

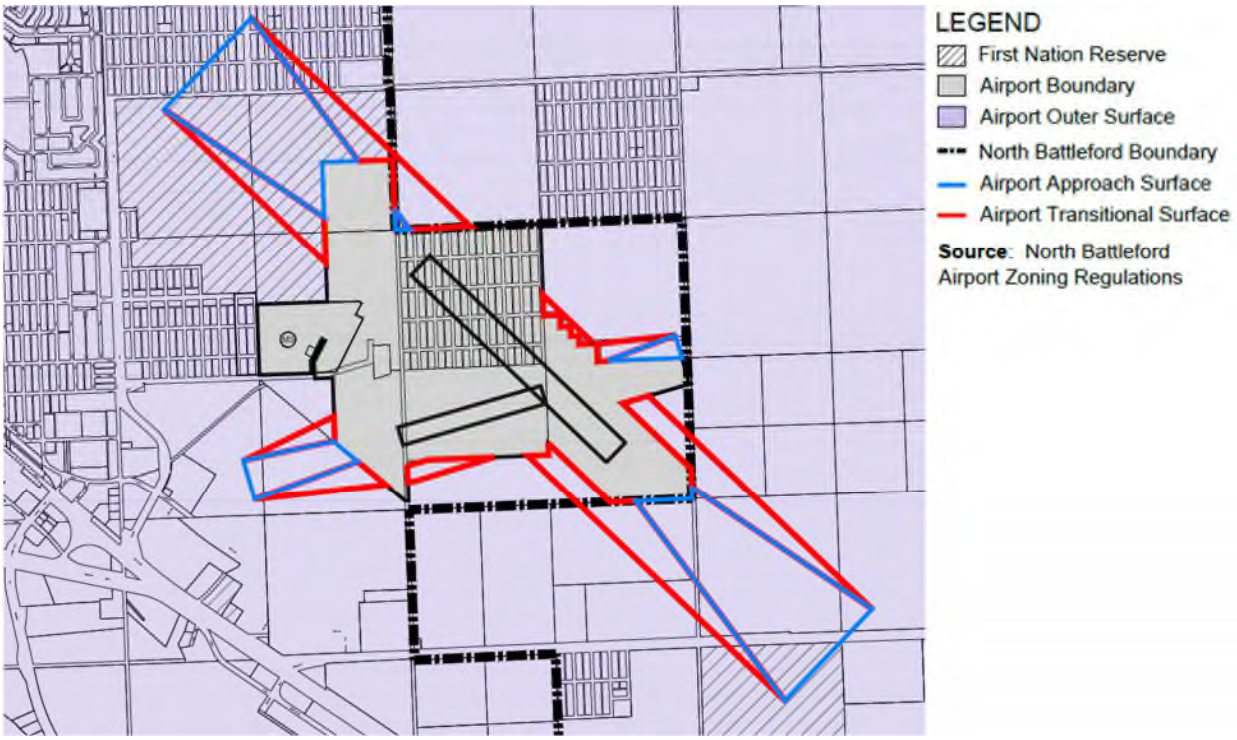


Figure 2 - Airport Approach Surfaces - North Battleford OCP

2.6 CURRENT LAND USES

The South-East Quadrant includes a mix of regional commercial, community service, and vacant lands. The South-East Quadrant is home to the Frontier Centre, a shopping mall anchored by No Frills, Peavey Mart (hardware store) and Prairie North Medical Clinic. Other major businesses acting as anchors include Walmart and Canadian Tire. Directly north of the mall and adjacent to the Walmart are vacant and zoned as Future Development Districts. The CUplex indoor recreation facility and the Battlefords Agricultural Society are also located in the South-East Quadrant.

2.7 SURROUNDING LAND USES

There is a mix of light industrial, community service, and regional-serving retail land uses surrounding the South-East Quadrant. There are a variety of light industrial businesses on the west side of Territorial Drive (a recognized truck route) and the south side of Railway Ave/Highway 16. There are industrial service yards, storage and logistics buildings, and automotive parks and sales. The North Battleford municipal airport is located north of the South-East Quadrant.

2.8 TRAFFIC COUNTS/ RAILWAY TRAFFIC

Traffic counts (average annual daily or AADT) near the South-East Quadrant are highlighted for various locations in the map below. The significantly larger volumes tracked along Territorial Drive are evidence of the importance and influence of both land uses to the north (including the airport and other areas of the City), but also this road's role as a commercial and industrial delivery route. Though it may not necessarily represent a complementary fit for the immediate area, given its role as North Battleford's premiere regional retail node, these volumes are likely to grow and suggest a need to explore further options for a gas station or card lock facilities near the South-East Quadrant.

Figure 3 - Most Recent Traffic Counts

The table below provides a detailed summary of traffic volume counts from 2011 to 2015. It is clear Carlton Trail counts on the South-East Quadrant's northern boundary are highest and have shown the most growth since 2011, indicative of the drawing power of larger on-site and off-site uses in the area.

No.	Intersection	2011	2012	2013	2014	2015	Most Recent
1	Rd_Service_Hwy #16 East: Between West and Mid Mall Entrance	n/c	3712	n/c	3508	n/c	**3508**
2	Rd_Service_Hwy #16 East: Canadian Tire Access - Heritage Way	3279	n/c	n/c	2703	n/c	**2703**
3	Rd_Service_Hwy #16 East: East of Heritage Way	2284	n/c	n/c	1926	n/c	**1926**
4	**Rd_Service_Hwy #16 East: East of Territorial Dr	n/c	8784	8587	8650	n/c	**8650**
5	Rd_Service_Hwy #16: 114th St. - Territorial Dr.	1524	1289	n/c	1274	n/c	**1274**
6	Rd_Service_Hwy#16 East: Werb St. - 114th St.	965	783	n/c	323	n/c	**323**
7	Trail_Carlton: East Walmart Access - Heritage Way	2701	4301	3684	3634	n/c	**3634**
8	Trail_Carlton: Heritage Way - CUPlex Carlton Trail Entrance	707	1225	989	1094	n/c	**1094**
9	Trail_Carlton: Territorial Dr. to Frontier Way	8749	n/c	8862	n/c	9635	**9635**
10	Trail_Carlton_Access: Walmart West Access off of Carlton Trail	5002	n/c	3958	n/c	n/c	**3958**

* n/c = Not Counted that Year

Figure 4 - Traffic Count Data 2011 – 2015

The City conducts traffic counts for priority locations each year. Traffic counts are not available for every traffic count station for each year. As mentioned previously, the highest traffic volumes were recorded on Territorial Drive near the entrances to Frontier Centre, indicative of the South-East Quadrant's ongoing role as both the local and regional shopping and service centre for the Battefords and the surrounding region. This geographic area is a direct influence on North Battleford's retail trade area, whose populations and shopping patronage drive retail sales to North Battleford generally, and then to South-East Quadrant retail offerings more specifically.

This regional influence is clear given the presence of big-box anchor Walmart and its expansion.

2.9 Other Growth Areas

When examining growth potential for the South-East Quadrant, it is vital to consider the influence of other recognized areas of North Battleford that can accommodate significant proportions of the City's growth. While these areas can be considered directly competitive from a pure growth accommodation standpoint, their market positioning and mix, as well as differing context, can help provide some indication as to how to position the South-East Quadrant in a more complementary, rather than directly competitive stance.

Killdeer Subdivision

The Killdeer Subdivision is a new development recently approved by the City in the north part of the City between Blue Jay Crescent and Commerce Drive on the west side of Highway 4. The subdivision consists of 49 new residential lots to accommodate 33 single family dwellings, ten duplexes dwellings, and six multifamily parcels. The new parcels are currently for sale. Killdeer is located just north of a Sobeys grocery store and a Tim Hortons, which will serve as the convenience lifestyle retail hub for the neighbourhood.

A lot summary for the Killdeer subdivision is as follows:

- Single Family – 33 lots;
- Duplexes – 10 lots; and
- Multifamily – 6 lots.

Figure 5 - Killdeer Subdivision

Fairview Master Plan

The Fairview Master Plan in the northeast of the City was completed in late 2013. It is expected to be prioritized once the Killdeer subdivision has sold out. A summary land use plan is excerpted below, which shows the area's envisioned residential mix and its orientation around a range of recreational, open space and (neighbourhood) commercial amenities.

Fairview differs from the South-East Quadrant is in its immediate need for additional supportive neighbourhood commercial. The extent and range of retail offerings already present within the South-East Quadrant provides an immediate opportunity to leverage these commercial amenities to support relevant forms of complementary development.

Figure 6 - Fairview Master Plan

The scale and location of the Fairview Neighbourhood, coupled with modest growth rates in the City and surrounding area, indicate the build-out will take place over a long period.

A detailed summary of lands in the Fairview Master Plan are provided below (from the 2013 AECOM report). Fairview is intended to accommodate 1,415 units, including 48% single family lots and homes.

Table 3.1: Development Parcel Details

Parcel	Area	Single Family		Multi-Family		Apartment		Total Population
		Lots	Population	Units	Population	Units	Population	
A	1.54 ha	31	93					93
B	4.82 ha			73	204	220	330	534
C	7.23 ha	85	255					255
D	5.87 ha	70	210					210
E	8.11 ha	80	240	62	174			414
F	9.59 ha	107	321	28	78			399
G	12.81 ha	148	444	41	115			559
H	8.48 ha			70	196	141	211	407
I	7.81 ha	95	285	36	101			386
J	7.10 ha	58	174	70	196			370
Total	**73.36 ha**	**674**	**2022**	**380**	**1064**	**361**	**541**	**3627**

Land uses by the proportion of total area indicate roughly 35% of total area devoted to single-family dwellings, while only 13% of the land is oriented around multi-family. This mix is more representative of greenfield developments and is geared toward the market's general preference for single-family dwellings.

Table 3.2: Land Use Summary

	Area	Proportion
Single Family Detached	30.13 ha	27.9%
Single Family Detached (Narrow Lot)	0.76 ha	0.7%
Single Family Attached (Duplex)	5.27 ha	4.9%
Single Family Attached (Townhome)	1.17 ha	1.1%
Multi-Family Parcel	10.40 ha	9.7%
Multi-Family Apartment	3.63 ha	3.3%
Neighbourhood Commercial	9.56 ha	8.9%
Mixed Use	1.70 ha	1.6%
Community Plaza	0.39 ha	0.4%
School	2.00 ha	1.9%
Municipal Reserve	17.84 ha	16.6%
Stormwater Pond	2.39 ha	2.3%
Road	17.54 ha	16.2%
Buffer Strip	4.92 ha	4.6%
Total	**107.70 ha**	**100.0%**

2.10 Regional Demand Analysis

The OCP noted North Battleford's population in 2012, according to the Saskatchewan Health Covered Population[1], was approximately 16,000 residents but serves a regional population of 69,000. This regional population includes smaller communities including Battleford on the south side of the North Saskatchewan River, but also smaller communities including Delmas, Hamlin, Denholm, Edam and Meota among others. North Battleford serves as a regional commercial goods and services node for communities that fall outside of the larger Saskatoon trade area. While residents of communities nearer to Saskatoon than North Battleford will not be travelling to North Battleford regularly for shopping and services, for many other communities further away, and in part due to the orientation of the highway network, North Battleford will remain a regional retail and service centre.

[1] Saskatchewan Health Covered Population Report is not a census. It only counts persons who are registered for provincial health coverage and not every person who may have been a resident in Saskatchewan on June 30. Saskatchewan residents moving elsewhere remain eligible for coverage for the same period, and anyone whose coverage extends through June is included in the report. In the case of death, people who had coverage any time in June are included.

3 RESIDENTIAL DEMAND ANALYSIS

3.1 CURRENT HOUSING MARKET REVIEW

3.1.1 HOUSING SUPPLY

Housing starts in the City have been declining since 2014 after strong activity across housing types in 2011, 2012 and 2014, as summarized in the following table (Canada Mortgage and Housing Corporation [CMHC]). Conversations with local realtors indicated recent changes in mortgage qualification have had a dramatic impact on local/area residents' ability to buy into this market, which has put negative pressure on demand and starts.

City of North Battleford
Housing Starts by Dwelling Type 2011 to 2017

	2011	2012	2013	2014	2015	2016	2017
Single Family	51	39	38	33	33	19	18
Semi-Detached	6	4	4	10	6	10	2
Row Housing	24	18	0	10	3	4	0
Apartments	33	102	0	60	22	0	0
Total	**114**	**163**	**42**	**113**	**64**	**33**	**20**

Source: CMHC Housing Market Information Portal

A period high in terms of new housing starts was achieved in 2012, driven by the introduction of 102 apartment dwellings.

As shown in the table below, 2017 saw the highest number of housing units completed in North Battleford since 2013, for a total of 126 completed units (vs 180 units in 2013).

City of North Battleford
Housing Unit Completions by Dwelling Type 2011 to 2017

	2011	2012	2013	2014	2015	2016	2017
Single Family	52	44	37	34	37	17	23
Semi-Detached	6	6	6	8	6	8	6
Row Housing	13	4	22	5	5	0	15
Apartments	4	32	115	8	0	0	82
Total	**75**	**86**	**180**	**55**	**48**	**25**	**126**

Source: CMHC Housing Market Information Portal

This 2017 completion volume was driven by the 60 and 22 apartment unit starts recorded in 2014 and 2015, respectively.

The number of new housing units under construction in North Battleford dropped significantly in 2017 to only seven units after over 100 units under construction in each of 2015 and 2016. The dramatic decrease in units under construction in 2017 correlates to the high number of units under construction in the previous two years, as well as to the dramatic change in local prospective buyer mortgage qualification, which has significantly impacted demand due to affordability issues.

City of North Battleford
Housing Units Under Construction by Dwelling Type 2011 to 2017

	2011	2012	2013	2014	2015	2016	2017
Single Family	17	12	13	12	8	10	7
Semi-Detached	4	2	0	2	2	4	0
Row Housing	16	30	8	13	11	15	0
Apartments	53	123	8	60	82	82	0
Total	**90**	**167**	**29**	**87**	**103**	**111**	**7**

Source: CMHC Housing Market Information Portal

Under more normal market conditions for the period (i.e. excluding 2017 figures), North Battleford saw an average of just under 100 housing units under construction every year.

As shown in Figure 7 below, the type of housing units completed over the last seven years varies by year, with peaks of apartment construction in 2013 and 2017. These spikes in multi-family activity are common in small and mid-sized markets, where the multi-family product is not the predominant form, and so new supply significantly alters the overall proportions.

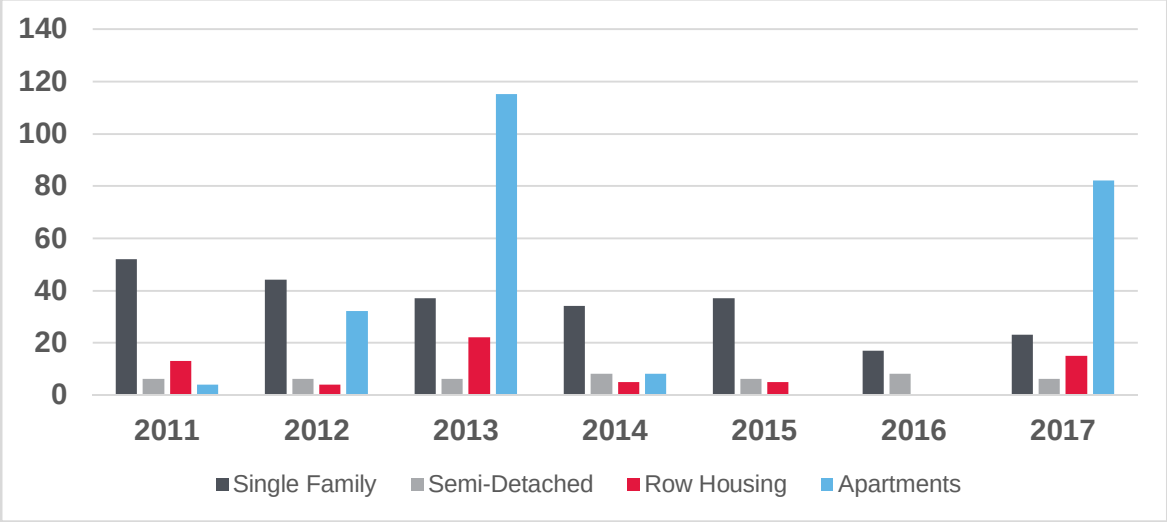


Figure 7 - North Battleford Housing Unit Completions by Type

3.1.2 RENTAL SUPPLY

The City experienced a 3.2% increase in rental vacancy rates between 2014-2017. Over the same time-period, the Saskatoon region experienced a 6.2% increase in vacancy rates.

City of North Battleford
Vacancy Rates by Unit Type (2014-17)

Geographic Area	Bachelor	1 Bedroom	2 Bedroom	3 Bedroom	All Units
City of North Battleford - 2014	0.0%	6.6%	12.0%	0.0%	9.2%
City of North Battleford - 2017	5.4%	12.6%	13.3%	0.0%	12.4%
Saskatoon CMA - 2014	4.1%	3.3%	3.5%	3.5%	3.4%
Saskatoon CMA - 2017	7.6%	9.6%	9.9%	8.4%	9.6%

Source: CMHC - Rental Market Report - Saskatchewan Highlights Reports 2014-17

As noted above, 2-bedroom units saw only a slight increase in vacancy (+ 1.3%).

Average rental costs rose by 5.6% in North Battleford across all unit types between 2014 and 2017 whereas rental rates in the larger market of Saskatoon essentially held steady over this period. Home ownership and housing affordability are likely helping to drive modest upward pressure on local rental rates.

City of North Battleford
Average Rents by Unit Type (2014-17)

Geographic Area	Bachelor	1 Bedroom	2 Bedroom	3 Bedroom	All Units
City of North Battleford - 2014	$527	$643	$836	$862	$753
City of North Battleford - 2017	$606	$698	$883	$952	$795
Saskatoon CMA - 2014	$693	$884	$1,091	$1,172	$998
Saskatoon CMA - 2017	$684	$896	$1,082	$1,129	$999

Source: CMHC - Rental Market Report - Saskatchewan Highlights Reports 2014-17

North Battleford is similar to Saskatoon in the proportion of units available by dwelling type. While Saskatoon has seen a moderate increase in rental unit stock over the last three years, North Battleford's rental stock has declined by 0.1%. There may be a greater demand for owning rather than renting homes in the City since 199 new units were completed in North Battleford between 2014-2017, but the rental stock still declined.

3.2 Real Estate Market Review

Urban Systems interviewed local realtors to develop a clearer picture of local activity drivers and trends. The table below provides a summary of residential real estate activity over the 2012 to 2017 period as sourced by realtors in the market referred to as "The Battlefords". As noted below, new listing activity has increased significantly since 2014's level of 357 units, though 2017 did see a drop from 444 units in 2016 to 418 units.

Residential sales per annum were highest during the 2013 to 2016 period, ranging from 204 to 223 units over the period. In 2017 there was a significant decrease in activity, with the market recording only 173-unit sales. As noted by local realtors, the most significant change regarding market demand drivers has been the introduction of new mortgage qualification rules, which has made it significantly more difficult for local/area residents with modest incomes to enter the market.

The Battlefords Real Estate Sales

	YTD 2012	YTD 2013	YTD 2014	YTD 2015	YTD 2016	YTD 2017
New Listings	373	371r	357	396	444	418
Firm Sales	178	204	223	206	208	173
Firm Sales to New Listings	48%	55%	62%	52%	47%	41%
Median Sales Price	$185,000	$185,000	$182,000	$189,000	$190,000	$197,000
Average Sales Price	$193,000	$201,000	$192,000	$206,000	$206,000	$208,000
Average Ask to Sell Ratio	0.951	0.956	0.951	0.961	0.948	0.947
Total Listing Inventory	84	77	50	88	97	112
Days on Market	56.6	73.5	71.26	50.67	62.87	67.14

Source: North Battleford Month Report December 2017, Saskatchewan Region Association of REALTORS

As consumer demand has been affected by the new mortgage qualification rules, it has become more difficult to sell homes in the North Battleford market. This is evidenced by the increased amount of time on the market required to turn over units. Though the length of time to sell (measured in days on market) did increase significantly over the 2012 to 2014 period (from 57 to 71 days), 2015 recorded a move back to healthier sales velocity, with an average of just over 50 days on market. Since 2015 this measure has been increasing year over year – reaching 67 days in 2017. This trend is worthy of concern and does indicate a degree of potential disconnect

between the nature (and pricing) of supply vs demand which has been constrained by the new mortgage rules.

In the face of all this change, average residential sales prices have remained remarkably steady, with 2017's figure of $208,000 being roughly in line with 2015 and 2016's mark of $206,000. There is likely a short-term disconnect between the pricing of available unit types and consumers' ability to qualify. This may indicate potential to explore a wider range of more affordable housing options in the North Battleford market.

3.3 PROJECTED UNIT DEMAND

To understand the future housing occupancy demand in North Battleford, we undertook an analysis that began with City-wide population growth projections and ended with a snapshot of market demand, by structure type, to 2042. Our approach leverages existing and available datasets compiled by Statistics Canada and CMHC. The forecasting approach can be summarized as follows:

- Establish future population forecast, City-wide, overall and by age cohort;
- Calculate and forecast age-specific primary household maintainer rates by structure type;
- Apply age and structure-specific household maintainer rates to population forecasts to determine housing occupancy demand by structure type; and
- Identify housing demand implications for the Southeast Quadrant based on remaining capacity in notable growth areas.

3.3.1 POPULATION GROWTH

The City grew by approximately 9% in the decade from 2006 to 2016, adding 1,125 new residents during this period. At the time of the 2016 Census, the City had reached 14,315 residents.

Population growth is driven primarily by economic growth and is achieved through two means: natural increase, and migration. For this report, we have adopted population growth rates to 2027 as presented in Environics Analytics "DemoStats' database and have carried growth forward at these same annual rates to 2042.[2]

Using the above forecast approach, North Battleford is projected to see net population growth of approximately 3,100 residents between 2016 and 2042, with the population reaching just over

[2] *Environics 'DemoStats'* database employs a variety of data sources, including latest Census, current economic indicators, postcensal estimates, immigration stats, and economic data such as building permits, when considering population growth.

17,000 by the final year of the projection. Population growth by 5-year period, both historic and projected, is shown in the table below.

North Battleford Population Projections, 2016 - 2042				
	Period	Pop Growth	Projected Population at End of Period	Avg. Annual Growth Rate
Historic	2006-2011	551	13,741	0.8%
	2011-2016	574	14,315	0.8%
Projected	2016-2022	607	14,922	0.7%
	2022-2027	490	15,412	0.6%
	2027-2032	516	15,928	0.7%
	2032-2037	533	16,461	0.7%
	2037-2042	551	17,012	0.7%

Source: 2016 Canadian Census and Environics Analytics population forecasts

3.3.2 POPULATION GROWTH BY AGE COHORT

While sizeable growth is projected to occur amongst the under-25 age group over the next 25+ years (21% growth projected between 2016 and 2042), growth will be more significant amongst the 65+ group:

- Under-25 growth from 2016 to 2042 is projected at 1,001 (from 4,715 to 5,716)
- Over-65 growth from 2016 to 2042 is projected at 1,143 (from 2,480 to 3,623)

There is expected to be a net decline of residents between the ages of 25 and 34, dropping from 1,950 to 1,616.

The table below provides a snapshot of the projected population growth by age group.

City of North Battleford Population Forecasts by Age Group, 2016-2042								
Year	**Under 25**	**25 to 34**	**35-44**	**45-54**	**55-64**	**65-74**	**75+**	**Total**
2016	4,715	1,950	1,780	1,610	1,770	1,135	1,345	14,305
2017	4,920	1,818	1,804	1,659	1,876	1,227	1,111	14,415
2022	5,029	1,582	2,044	1,582	1,895	1,582	1,194	14,907
2027	5,178	1,464	2,004	1,788	1,695	1,834	1,449	15,412
2032	5,352	1,513	2,071	1,848	1,752	1,895	1,497	15,928
2037	5,531	1,564	2,140	1,910	1,811	1,959	1,547	16,461
2042	5,716	1,616	2,212	1,973	1,871	2,024	1,599	17,012
% Change, 2016-42	21%	-17%	24%	23%	6%	78%	19%	19%
Net Change, 2016-42	1,001	-334	432	363	101	889	254	2,707

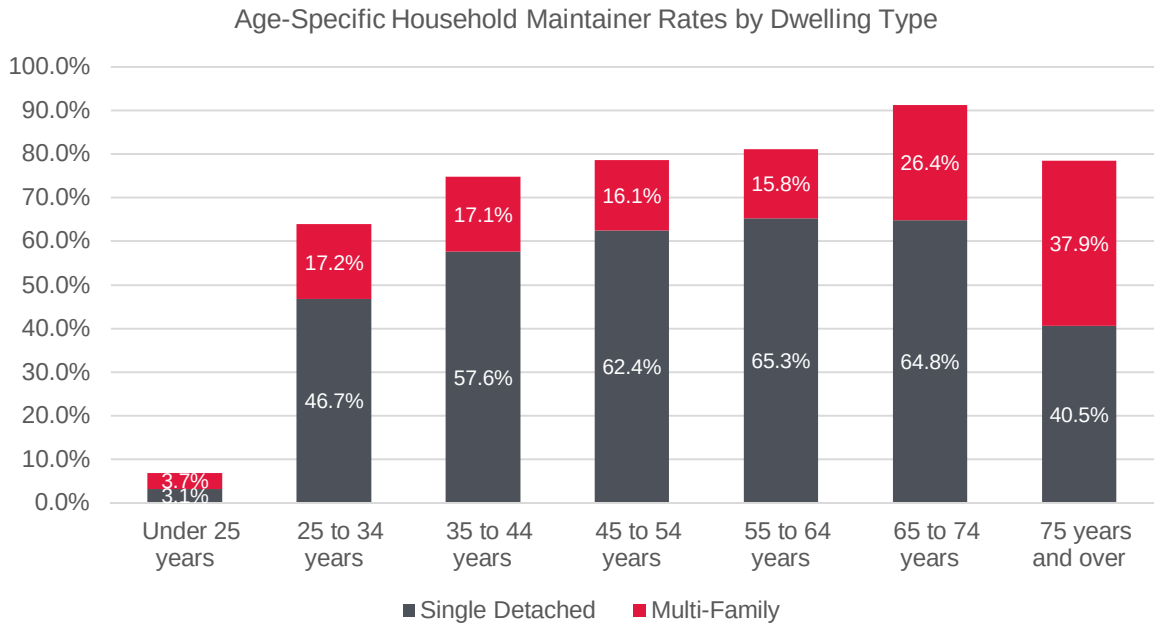
Source: 2016 Canadian Census and Environics Analytics population forecasts

3.3.3 HOUSEHOLD OCCUPANCY DEMAND

The link between age-specific population growth and housing occupancy demand is made through the percentage of people in each age group who are the *primary household maintainer*. Dividing the total number of people of a specific age who are maintainers by the total people in that group determines the household maintainer rate for that age group.

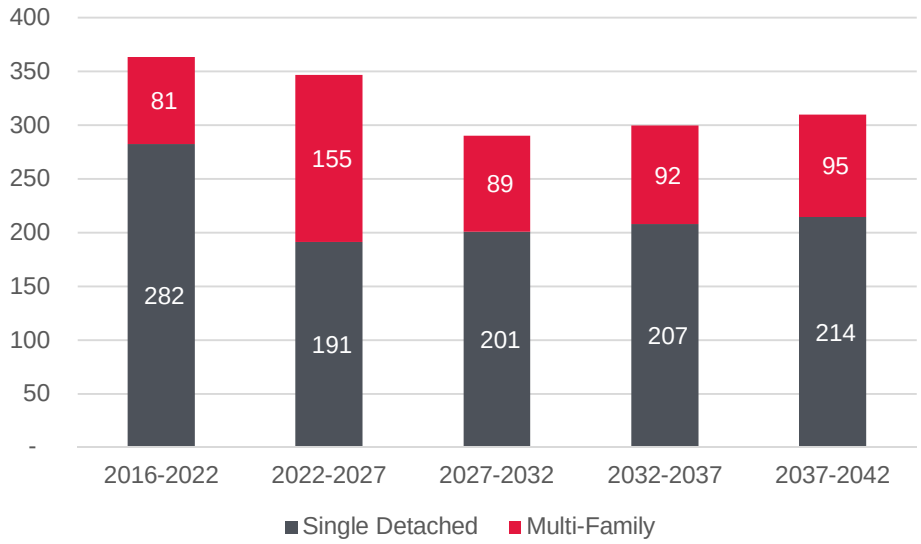
Maintainer data from the Census also allows for consideration of housing occupancy demand by structure type. For instance, the propensity to maintain a single detached dwelling rises through adulthood and the family formation years, plateaus in the 55-64 period, and then declines in the older age groups. Apartment rates increase in the younger age groups as youths move out of the family home, but then decline through the family formation years, before rising amongst the older age groups.

Figure 8:Age-Specific Household Maintainer Rates by Structure Type, City of North Battleford, 2016



By combining household maintainer rates with the pattern of demographic change projected for North Battleford to 2042, we can project City-wide household occupancy demand as follows:

Figure 9:Household Occupancy Demand by Structure Type, 2016 to 2042



The City is expected to see household occupancy demand grow by over 1,600 units over the next 26 years. This is expected to be comprised of 68% single detached dwellings, 12% ground-oriented multi-family dwellings (e.g. rowhouses, duplexes), 17% apartment units and 3% movable dwellings.

North Battleford Housing Unit Occupancy Demand, 2016-2042

Period	Single Detached	Row-house	Duplex	Apart-ment	Movable	Other Single Attached	Total	Per Year
2016-2022	282	11	38	21	9	3	**363**	61
2022-2027	191	29	22	92	12	0	**347**	69
2027-2032	201	12	15	52	8	1	**290**	58
2032-2037	207	13	16	54	9	1	**299**	60
2037-2042	214	13	16	55	9	1	**310**	62
Total	**1,096**	**78**	**107**	**275**	**46**	**7**	**1,609**	

Source: 2016 Canadian Census, Urban Systems analysis

Based on housing data from CMHC, 82 new apartments were constructed in 2017. This recent construction, along with projected demand for 275 more units over 26 years, could indicate continued demand for apartment units.

3.4 IMPLICATIONS FOR SOUTH-EAST QUADRANT

The South-East Quadrant is not the priority for new residential development in North Battleford. New residential development is designated for the Killdeer and Fairview neighbourhoods first.

The Killdeer neighbourhood is expected to absorb between 70 and 90 units, depending on the density of the multi-family lots, while the Fairview neighbourhood is expected to include 1,415 units at full build-out.

North Battleford is expected to see demand for just over 1,600 new residential units through to 2040. Based the capacity of the Killdeer and Fairview neighbourhoods, there is not much additional demand expected for the South-East Quadrant. It is likely any additional demand could be for affordable housing. It is understood homes costing $200,000 or less are currently in demand, and this trend is expected to continue.

It is recommended the South-East Quadrant allow for affordable multi-family housing, which could be an excellent fit for the area given the array of easily accessible local and regional-serving retail uses in the area. According to our forecasts, there will be demand for more single-family dwellings after the Killdeer and Fairview neighbourhoods are built out. Overall demand could be for approximately 100 or more single family units in the South-East Quadrant by the later stages of the review period. Based on the increased demand for multi-family dwellings, relative to single-family dwellings, the split could ultimately be 50–50.

4 RETAIL DEMAND ANALYSIS

Urban Systems' Land Economics team examined the South-East Quadrant from the perspective of regional retail-commercial opportunity. Determining the demand for new large serviced regional commercial lots was a core driver of the South-East Quadrant Master Plan and is essential as the city and surrounding area continue to grow and evolve.

4.1 TRADE AREA DELINEATION & DEMOGRAPHICS

To quantify anticipated incremental demand for new retail-commercial facilities, it is important to properly account for North Battleford's geographic influence from a retail goods and services perspective. In other words, given the relative proximity of larger metropolitan centres to both the northwest and southeast (Lloydminster and Saskatoon), retail demand in North Battleford will depend on the size of geographic area from which it can attract spending, and how shopping patterns (and market shares) are likely to differ across these broad areas.

Urban Systems has defined the following core retail trade areas for the South-East Quadrant:

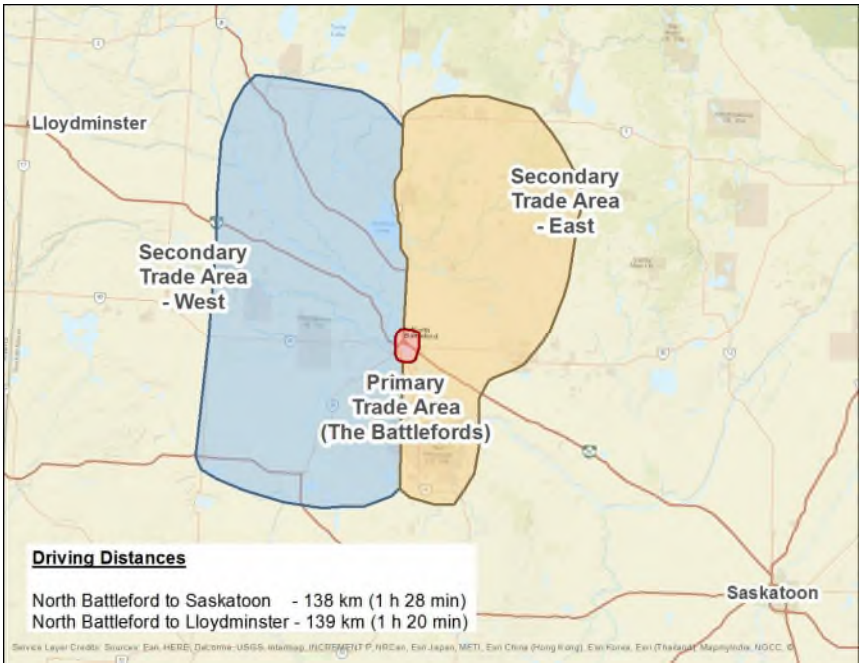


Figure 10 – South-East Quadrant– Retail Trade Area Delineation

- Primary Trade Area (PTA), which includes the City of North Battleford and the Town of Battleford (the most captive market for regional-serving retail uses in the South-East Quadrant);
- Secondary Trade Area West (STA West), which includes wider geography containing smaller population concentrations to the west, with a western boundary limited by the influence of the Lloydminster market; and
- Secondary Trade Area East (STA East), which includes a large geographical area to the east, the extent of which is limited by the relative proximity of the larger metropolitan area of Saskatoon and its greater critical mass of retail uses.

North Battleford's location on Highway 16 between Lloydminster and Saskatoon creates an interesting dynamic. Each of these centres has more services and a larger pull than North Battleford. However, due to the driving distances involved, communities closer to North Battleford will continue to attract spending from residents of the smaller communities nearby.

The demographics of the trade areas can have an important impact on spending volumes. The table below displays basic demographics for the three trade areas and compares them with Saskatchewan as a whole. The Secondary Trade Area East (STA East) has the highest average household income, though it is still lower than the Saskatchewan average. However, due to the large household sizes in the STA East, per capita spending and average disposable income are higher in the Primary Trade Area (PTA).

Trade Area Population and Spending Information

	Primary Trade Area (PTA)	Secondary Trade Area West (STA-W)	Secondary Trade Area East (STA-E)	Saskatchewan
Current Population	19,335	12,473	6,625	1,585,566
Average Household Income	$87,168	$67,903	$90,605	$98,458
Number of Households	7,807	4,869	2,306	455,333
Persons per Household	2.48	2.56	2.87	2.59
Average per Capita Income	$35,196	$26,507	$31,537	$38,015
Average per Capita Disposable Income	$30,768	$23,172	$27,569	$33,232

Source: 2016 Environics, Urban Systems Data

4.2 COMPETITIVE RETAIL SUPPLY

Existing retail in North Battleford is primarily in the area around Frontier Centre, the Discovery Mall area, and Downtown.

The following map displays the locations of big box, mid-box retailers, as well as grocery stores around the South-East Quadrant.

Figure 11 - Big box, mid box and supermarket retailers in south-east North Battleford

The majority of these retailers are located within Frontier Centre and close to the surrounding anchors. These retailers are accessed from Territorial Drive and Service Road, off of Railway Avenue (Highway 16).

The following map identifies convenience, gas stations, quick service food, and full-service restaurants in South-East North Battleford. These retailers are predominantly oriented to highway traffic and are mainly located along Railway Avenue (Highway 16), Territorial Drive, and Highway 40.

Figure 12 - Full-service restaurants, quick service restaurants and gas station/convenience stores in south-east North Battleford

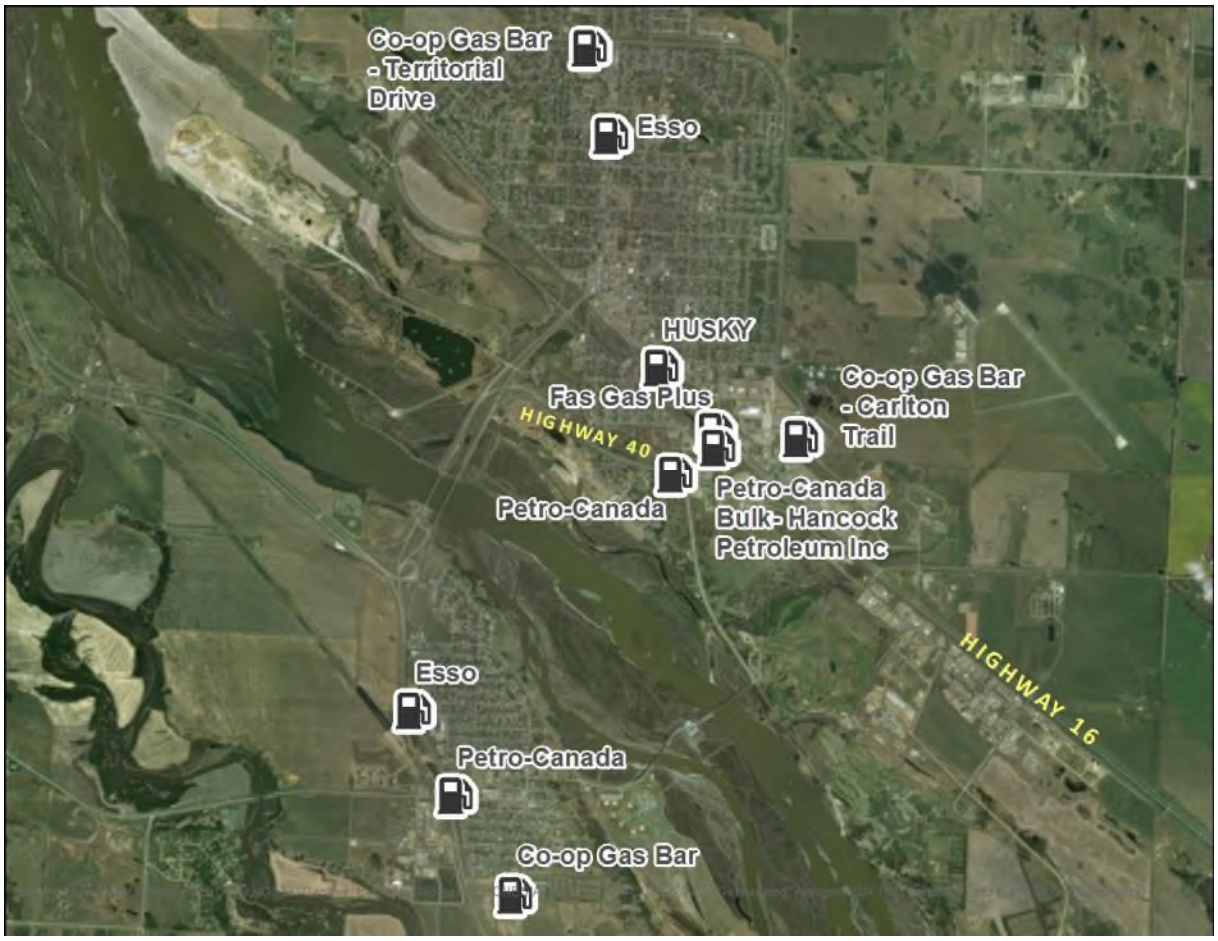


Figure 13 - Gas Stations in Battleford and North Battleford

The above map shows existing gas stations in North Battleford. With the current supply, there is currently no need to build another gas station in the area, although new stations are occasionally developed on First Nations land. There may be an opportunity to build a new gas station if existing facilities need to be replaced or if there is a demand for specialty service like a card lock. Territorial Drive is an emerging truck route through North Battleford, and there may be an opportunity to capture the traffic as it comes off the highway.

These competitive supply reviews are helpful in gauging likely consumer spending patterns, including market shares by area and the extent of likely spending outflow to larger centres to the southeast (i.e. Saskatoon) and northwest (i.e. Lloydminster).

4.3 Spending For Region

Based on the trade area delineation and expected population growth, the expected increase in retail spending in North Battleford is presented in the following table. The Status Quo Scenario assumes the spending capture rate for trade area residents does not change, which means North Battleford continues to experience the same level of outflow spending (where Trade Area residents are shopping elsewhere, for example in either Lloydminster or Saskatoon).

Incremental spending growth 2017-2040

Status Quo

	PTA	STA East	STA West
General Merchandise	$44,866,376	$6,622,016	$13,100,559
Convenience / Food and Beverage / Grocery / Liquor	$20,683,900	$3,634,470	$5,328,640
Comparison Shopping	$56,952,546	$9,222,420	$17,172,006

General Merchandise includes home and auto supply stores (such as Canadian Tire) and general department stores (such as Wal-Mart), dollar stores, etc.

Comparison Shopping includes stores that carry clothes, footwear, jewellery, books, home furnishings, and sporting goods, etc.

It is possible that as North Battleford grows and expands its retail offering, it will be able to recapture trade area retail spending that is likely currently flowing to either Saskatoon or Lloydminster. The following table assumes that North Battleford can recapture 10% of retail spending from trade area residents.

Incremental spending growth 2017-2040

More Inflow Spending Capture

	PTA	STA East	STA West
General Merchandise	$53,839,651	$7,946,419	$15,720,671
Convenience / Food and Beverage / Grocery / Liquor	$24,122,774	$4,238,337	$6,214,188
Comparison Shopping	$67,797,569	$10,974,421	$20,436,927

This level of spending recapture results in approximately $34 million of retail spending from trade area residents remaining in North Battleford.

4.4 Square Footage Demand for Region

Based on the sales estimates in the previous section, the projected demand for retail floorspace is presented in the following table:

Net New Floor Area Supportable (vs Base Year)
Status Quo

	2017-2040 (sq.ft.)
General Merchandise	296,899
Convenience / Food and Beverage / Grocery / Liquor	19,466
Comparison Shopping	183,321
Total	**499,687**

It is estimated North Battleford will warrant approximately 500,000 square feet of new retail space by 2040, assuming market capture rates remain constant.

The table below provides retail floor area estimates assuming spending outflow is reduced, and market capture rates from trade area residents increased by 10%.

Net New Floor Area Supportable (vs Base Year)
More Inflow Spending Capture

	2017-2040 (sq.ft.)
General Merchandise	356,279
Convenience / Food and Beverage / Grocery / Liquor	22,704
Comparison Shopping	219,888
Total	**598,872**

If market capture rates were to increase by 10%, demand for retail space would increase by approximately 100,000 square feet to approximately 600,000 square feet.

4.5 Square Footage Demand for SE Quadrant

The South-East Quadrant is expected to capture the majority of regional retail growth, and a lower proportion of convenience, grocery, and comparison goods. We estimate that 90% of new general merchandise space and 30% of other retail space will land in the South-East Quadrant.

The projected demand for floor area in the South-East Quadrant through to 2040 is over 325,000 square feet assuming present market capture rates.

Net New Floor Area Supportable (vs Base Year)

Status Quo

	2017-2040 (sq.ft.)
General Merchandise	267,209
Convenience / Food and Beverage / Grocery / Liquor	5,840
Comparison Shopping	54,996
Total	**328,046**

The table below provides retail floor area estimates assuming spending outflow is reduced, and market capture rates from trade area residents increased by 10%.

Net New Floor Area Supportable (vs Base Year)

More Inflow Spending Capture

	2017-2040 (sq.ft.)
General Merchandise	320,651
Convenience / Food and Beverage / Grocery / Liquor	6,811
Comparison Shopping	65,966
Total	**393,429**

In this scenario, the demand for retail space would increase by approximately 70,000 square feet to approximately 395,000 square feet.

4.6 Local Neighbourhood Retail Demand Assessment

Given the extent of existing and potential future regional-oriented retail supply in the South-East Quadrant, including large retail offering community and neighbourhood level services (e.g. supermarket goods at Walmart), demand from residents of the future South-East Quadrant for more neighbourhood commercial uses is more limited than under traditional greenfield conditions. Nevertheless, a new residential community could generate support for a more micro neighbourhood lifestyle convenience commercial hub, which could include a specialty coffee/tea/bakery shop or small convenience store.

4.7 Implications for South-East Quadrant

Assuming an average Floor Area Ratio of 0.22 to 0.25 for commercial space in the South-East Quadrant, land use requirements to accommodate additional regional-serving retail uses will range between 30 and 41 acres between 2017 and 2040, dependant on inflow capture assumptions.

5 CONCLUSION

The City has prioritized the development of the neighbourhoods in the northern part of the city (Killdeer and Fairview). These neighbourhoods are expected to absorb the majority of new growth between 2017 and 2040. Any new residential that is prioritized for the South-East Quadrant should be geared towards affordable housing of which there is a growing demand.

The City has also prioritized the revitalization of the downtown to make it a safer and livelier "urban living room" for North Battleford residents. The revitalization of the downtown is expected to absorb much of the new demand for retail space between 2017 and 2040.

Based on the City's growth priority areas and the residential occupancy demand projected over the next 20 years, there is unlikely to be significant residential demand in the South-East Quadrant. It is recommended that the South-East Quadrant allow for some multi-family affordable housing to the order of approximately 100 units, as well as potential market single and multi-family housing in the long term (i.e. after Killdeer and Fairview are built out).

The South-East Quadrant already functions as a centre for regional retail. Through our analysis, we predict most new regional retail space should continue to be directed to this area based on the suitable characteristics of the location, existing retail-commercial critical mass, and market demand. We modeled two possible outcomes:

- One scenario in which current retail capture rates (by trade area) persist; and
- One scenario in which new growth attracts greater spending capture within the City (i.e. reduced "outflow" spending to larger centres in select categories).

Under the status quo capture scenario, we project net new retail demand for 500,000 square feet citywide, of which 328,000 square feet (66%) will land in the South-East Quadrant. This translates to between 30 and 34 gross acres of required land.

Under the higher inflow scenario, we project net new retail demand for 600,000 square feet citywide, of which 393,000 square feet (66%) will land in the South-East Quadrant. This translates to between 36 and 41 gross acres of required land.

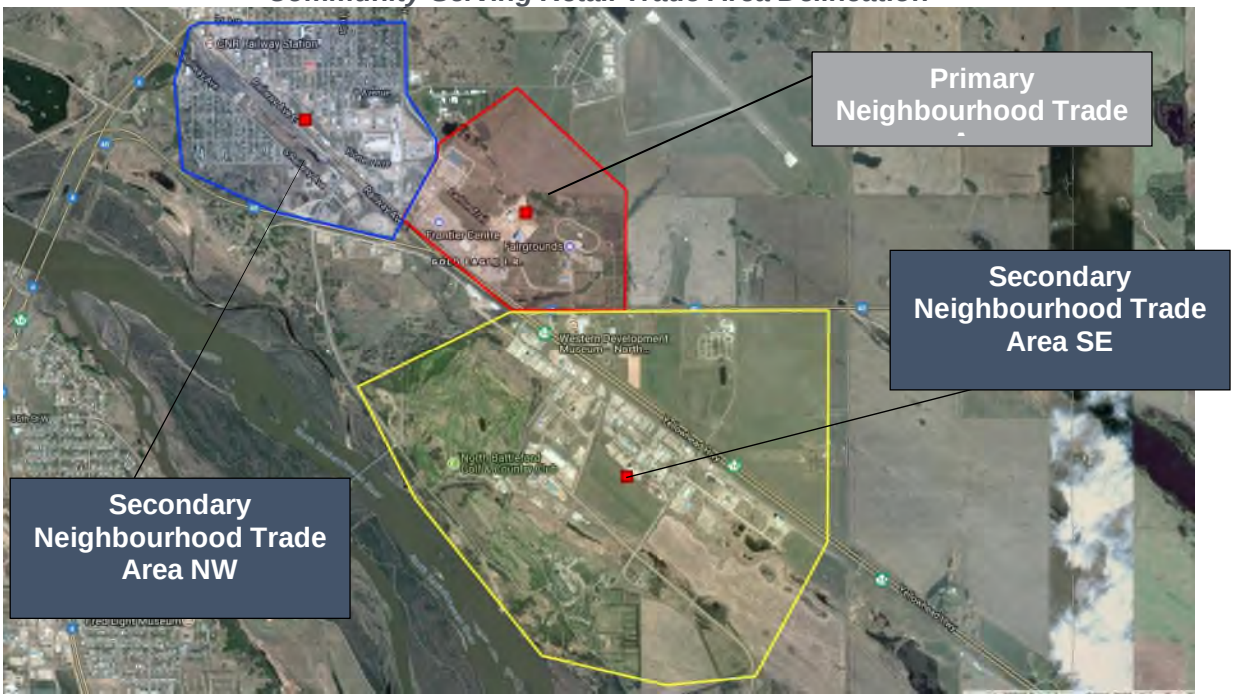
APPENDIX: NORTH BATTLEFORD – SOUTH-EAST QUADRANT TRADE AREA ANALYSIS

Understanding the more localized subject lands' context from a demographic perspective is a critical step in evaluating supporting retail-commercial potential for the area. Larger development areas with significant arterial frontage such as the South-East Quadrant lands can, effectively support a commercial node that not only serves the needs of the local population but also potentially complement market offerings in other nearby areas at a larger community or even city-wide level. Given the City of North Battleford's objectives with respect to downtown revitalization and ongoing vitality, and the presence of existing larger-scale retail-commercial uses within a short distance of the subject lands, this more localized examination of demographics is intended mainly to provide contextual information.

LOCAL AREA DEMOGRAPHIC REVIEW

Urban Systems has designated the subject properties as the Primary Trade Area (PTA) for contextual purposes. This PTA is highlighted in the map below in red. A Secondary Trade Area SE (STA SE) has been outlined in yellow to capture additional, albeit lower density, population to the south of the site. A Secondary Trade Area NW (STA NW) has also been designated to capture potential retail-commercial interest from residents within a short drive to the northwest of the subject lands.

Community-Serving Retail Trade Area Delineation



LOCAL RETAIL CONTEXT

Frontier Centre, located at 11429 Railway Avenue, at the intersection of Highway 16 and Territorial Drive, is a community-oriented shopping mall that was originally developed in 1975. The shopping centre was acquired from SRF Frontier Realty In. by Toronto-based Terracap Management Inc. in 2008. The single-level retail centre comprises 203,000 sq. ft. of gross leasable area and is anchored by:

- NoFrills supermarket (34,900 sq. ft.)
- Peavey Mart building supplies store (26,800 sq. ft.)
- Prairie North Medical Clinic (20,800 sq. ft.)

A site plan is provided below for ease of reference:

Frontier Centre Site Plan & Retail Context

The mall is shadow-anchored by two major off-site big-box retailers, namely Canadian Tire and Walmart North Battleford Supercentre, as outlined in this larger context map:

LOCAL AREA POPULATION GROWTH

While the South-East Quadrant lands (i.e. the Primary Trade Area) have yet to be developed for residential purposes, and so offer no existing population base, it is worth noting the extent of population growth for the above-outlined trade areas, much like that for the City and Metro area of North Battleford is very modest.

Population Growth by Area	STA NW		STA SE		North Battleford (CY), SK		North Battleford, SK		Saskatchewan	
		AAGR %		AAGR %		AAGR %		AAGR %		AAGR %
Total Population										
2012 estimated	1,733		181		14,352		19,899		1,082,381	
2017 estimated	1,763	0.3%	190	1.0%	14,790	0.6%	20,751	0.8%	1,158,566	1.4%
2022 Projected	1,807	0.5%	198	0.8%	15,295	0.7%	21,555	0.8%	1,225,679	1.1%
% Pop. Change (2012-2017)	1.7%		4.7%		3.1%		4.3%		7.0%	
% Pop. Change (2017-2022)	2.5%		4.0%		3.4%		3.9%		5.8%	

Source: Environics Research, Urban Systems defined STA areas

- The STA NW population is growing at only 0.3% per year, with a slight increase to 0.5 % expected over the next 5 years.
- The STA SE area contains very little population but is seeing some modest growth.
- The City of North Battleford population is estimated at just under 14,800 for 2017, indicating an average annual growth rate of only 0.6% relative to 2012
- The North Battleford metro area population is estimated at roughly 20,750 residents in 2017, reflecting annual growth of 0.8% relative to 2012; this growth rate is expected to stay relatively constant over the next 5 years.
- The province as a whole, driven in part by growth in its larger urban centres, has recorded a more significant rate of growth since 2012 (1.4% per year) and is expected to grow by 1.1% per year over the next 5 years.

Residential growth and demand for housing unit types within the SE Quadrant lands, which is reviewed as a distinct land use opportunity elsewhere in this report, will be the main driver of demand for additional neighbourhood-serving retail uses and will account for the bulk of on-site sales volume.

As referenced in the site planning implications section of this report, an effective way of orienting a master planned community with significant (existing and future) retail components is to orient the highest density uses closest to the retail amenities. This orientation tends to promote non-vehicular modes of travel, including walking and cycling and tends to be an effective marketing tool for developers looking to differentiate their projects from others in the market.

LOCAL AREA DEMOGRAPHICS

As the subject SE Quadrant lands have yet to be developed for residential purposes, it is important to have an understanding of local area – and city-wide – demographic characteristics as the anticipated population within the SE Quadrant area, will likely exhibit similar characteristics. A summary of key demographic characteristics for the trade areas and North Battleford relative to the province of Saskatchewan is presented in the subsections below:

2017 HOUSEHOLD SIZE PROFILE

2017 Household Size Profile	STA NW		STA SE		North Battleford (CY), SK		North Battleford, SK		Saskatchewan	
		%		%		%		%		%
2017 Households by Size of Household	**746**	**%base**	**10**	**%base**	**6,074**	**%base**	**8,290**	**%base**	**455,333**	**%base**
1 person	267	35.8%	2	17.5%	2,038	33.6%	2,555	30.8%	126,077	27.7%
2 persons	246	33.0%	2	16.2%	1,966	32.4%	2,816	34.0%	162,100	35.6%
3 persons	93	12.5%	1	6.6%	840	13.8%	1,191	14.4%	64,300	14.1%
4 persons	70	9.4%	0	3.8%	720	11.9%	1,036	12.5%	59,640	13.1%
5 persons	41	5.5%	0	2.8%	302	5.0%	424	5.1%	26,001	5.7%
6 or more persons	29	3.9%	5	53.2%	208	3.4%	268	3.2%	17,215	3.8%
2017 Persons in Households	1,751		51		14,551		20,245		1,132,825	
Persons per household	**2.35**		**5.22**		**2.40**		**2.44**		**2.49**	

Source: Environics Research, Urban Systems defined STA areas

STA NW: The area to the north of the subject lands, namely STA NW, has a housing profile more in line with that of the City of North Battleford as a whole, with an average household size of nearly 2.4 and roughly two-thirds of the population in 1 or 2-person households. 80% of STA NW households are 3 persons or less. Larger households of 4 or more account for under 20% of the total.

STA SE: The area to the southeast of the SE Quadrant lands features significantly larger households, with roughly 60% of all households having 4 or more persons. Over 50% of households in this area have 6 or more persons. With a very small concentration of homes and population and a household size of over 5.2, this area is less reflective of City-wide conditions.

The City of North Battleford's average household size (2.4) and profile is very similar to that of the metro region and roughly in line with the province of Saskatchewan as a whole. City-wide, roughly one-third of households are single-person, with another third 2-person, and one third 3 or more persons.

2017 HOUSING TYPOLOGY TYPE PROFILE

While single-family homes do account for the majority of home types locally and throughout the city, there is nevertheless a significant and growing proportion of multi-family housing in this market. (See Residential Listings Context for examples surrounding the subject lands.)

2017 Housing Type Profile	STA NW		STA SE		North Battleford (CY), SK		North Battleford, SK		Saskatchewan	
		%		%		%		%		%
2017 Occupied Private	**746**	**%base**	**10**	**%base**	**6,074**	**%base**	**8,290**	**%base**	**455,333**	**%base**
Houses	626	83.9%	10	96.7%	4,586	75.5%	6,470	78.0%	362,523	79.6%
Single-detached house	**594**	**79.6%**	**9**	**92.4%**	**4,145**	**68.2%**	**5,911**	**71.3%**	**330,013**	**72.5%**
Semi-detached house	16	2.1%	0	0.0%	196	3.2%	268	3.2%	14,248	3.1%
Row house	16	2.2%	0	4.3%	245	4.0%	291	3.5%	18,262	4.0%
Apartment, building low and	**115**	**15.4%**	**0**	**2.0%**	**1,443**	**23.8%**	**1,583**	**19.1%**	**82,844**	**18.2%**
Less than five	84	11.2%	0	0.0%	1,119	18.4%	1,256	15.2%	61,786	13.6%
Five or more floors	0	0.0%	0	0.0%	231	3.8%	231	2.8%	12,752	2.8%
Detached duplex	31	4.2%	0	2.0%	93	1.5%	96	1.2%	8,306	1.8%
Other Dwelling Types	5	0.6%	0	1.3%	45	0.7%	237	2.9%	9,966	2.2%
Other single-attached house	5	0.6%	0	1.3%	5	0.1%	5	0.1%	732	0.2%
Movable dwelling	0	0.0%	0	0.0%	40	0.7%	232	2.8%	9,234	2.0%

Source: Environics Research, Urban Systems defined STA areas

Nearly 80% of homes within the defined STA NW area are single-family detached homes – well above both the city-wide (71%) and provincial (73%) averages. This single-family proportion is even higher within the less urban STA SE area (92%), though the very small population base in this area makes this more of a geographic reference area than a driver of future retail demand.

2017 HOUSING TYPOLOGY TYPE PROFILE

Homeownership rates within the defined secondary trade areas (62% STA NW, 42% STA SE) are well below the city-wide average of 69%, which is generally indicative of a lower than average income profile.

2017 Housing Tenure Profile	STA NW		STA SE		North Battleford (CY), SK		North Battleford, SK		Saskatchewan	
		%		%		%		%		%
2017 Occupied Private Dwellings	**746**	**%base**	**10**	**%base**	**6,074**	**%base**	**8,290**	**%base**	**455,333**	**%base**
Owned	459	61.5%	4	42.1%	4,182	68.9%	6,071	73.2%	332,714	73.1%
Rented	287	38.5%	6	57.9%	1,892	31.1%	2,219	26.8%	110,644	24.3%
Band housing	0	0.0%	0	0.0%	0	0.0%	0	0.0%	11,975	2.6%

Source: Environics Research, Urban Systems defined STA areas

As the subject lands have yet to be developed for residential purposes, these existing areas may, in fact, be relatively poor proxies for future on-site population. In this case, these secondary areas would simply represent additional, albeit small, pools of potential patrons for additional retail-commercial goods and services.

2017 HOUSING AGE OF CONSTRUCTION PROFILE

The majority of homes in the STA NW (69%) were constructed before 1960, with an additional 22% of the housing stock added during the 1961-1980 period. Only 9% of homes in this area were developed after 1980, including only 3% (infill) after 2012.

2017 Housing Age of Construction	STA NW		STA SE		North Battleford (CY), SK		North Battleford, SK		Saskatchewan	
		%		%		%		%		%
2017 Occupied Private Dwellings	**746**	**%base**	**10**	**%base**	**6,074**	**%base**	**8,290**	**%base**	**455,333**	**%base**
Before 1960	512	68.6%	4	42.3%	1,779	29.3%	2,002	24.1%	109,485	24.0%
1961-1980	167	22.4%	0	1.3%	2,658	43.8%	3,583	43.2%	157,350	34.6%
1981-1990	19	2.5%	0	0.8%	914	15.0%	1,428	17.2%	69,829	15.3%
1991-2000	22	3.0%	0	1.8%	301	5.0%	467	5.6%	33,626	7.4%
2001-2005	0	0.0%	0	0.0%	77	1.3%	140	1.7%	19,050	4.2%
2006-2012	3	0.4%	0	0.3%	180	3.0%	377	4.5%	30,126	6.6%
After 2012	23	3.1%	5	53.7%	165	2.7%	293	3.5%	35,867	7.9%

Source: Environics Research, Urban Systems defined STA areas

By contrast, of the small concentration of homes in the STA SE, more than half have been constructed since 2012.

At the city-wide level, over 70% of the housing stock is pre-1980, with an additional 20% having been built during the 1980s and 1990s.

2017 POPULATION BY AGE PROFILE

The age profile of STA NW area residents is very nearly in line with the city-wide profile, with roughly 28% of residents under the age of 20, 19% in the 20-34 bracket and 18-19% in the prime working year's range of 35 to 49 years.

The median age for both the STA NW and the city as a whole is about 37 years, up from 36 in 2006.

2017 Estimates Population by Age Group	STA NW		STA SE		North Battleford (CY), SK		North Battleford, SK		Saskatchewan	
		%		%		%		%		%
2017 Total Population by Age	**1,763**	**%base**	**190**	**%base**	**14,790**	**%base**	**20,751**	**%base**	**1,158,566**	**%base**
0 to 19 years	489	27.7%	14	7.4%	4,141	28.0%	5,645	27.2%	294,221	25.4%
20 to 34 years	344	19.5%	42	22.1%	2,795	18.9%	3,731	18.0%	249,058	21.5%
35 to 49 years	329	18.7%	46	24.2%	2,623	17.7%	3,698	17.8%	213,354	18.4%
50 to 64 years	362	20.5%	51	26.8%	2,840	19.2%	4,196	20.2%	225,720	19.5%
65 to 74 years	145	8.2%	27	14.2%	1,258	8.5%	1,854	8.9%	95,953	8.3%
75 years and over	97	5.5%	12	6.3%	1,133	7.7%	1,627	7.8%	80,260	6.9%
Median Age - Total	**37.1**		**48.3**		**37.3**		**38.7**		**37.3**	

Source: Environics Research, Urban Systems defined STA areas.

The area south of the primary trade area contains an older demographic, with a median age of 48 years (46 years in 2006) driven by a 65+ proportion of over 20%.

2017 HIGHEST LEVEL OF EDUCATION PROFILE

As outlined in the table below, university education levels are markedly lower within the STA NW area than are evident at the City of North Battleford level, with roughly 9% of this area's population having a university-level certificate diploma or degree vs 16% city-wide. The small population making up the STA SE exhibits higher levels of post-secondary education, with roughly 23% in this category.

2017 Estimates - Highest Level of Education Profile	STA NW		STA SE		North Battleford (CY), SK		North Battleford, SK		Saskatchewan	
		%		%		%		%		%
2017 Household Population 15	**1,364**	**%base**	**47**	**%base**	**11,406**	**%base**	**15,974**	**%base**	**910,479**	**%base**
No certificate, diploma or degree	450	33.0%	9	19.2%	3,197	28.0%	4,025	25.2%	211,430	23.2%
High school certificate or equivalent	388	28.4%	10	21.2%	2,661	23.3%	3,782	23.7%	248,823	27.3%
Apprenticeship or trades certificate or diploma	105	7.7%	4	9.4%	1,181	10.4%	1,838	11.5%	102,483	11.3%
College, CEGEP or other non-university certificate or diploma	225	16.5%	5	11.5%	1,960	17.2%	2,750	17.2%	139,503	15.3%
University certificate or diploma	74	5.4%	7	15.4%	605	5.3%	797	5.0%	44,231	4.9%
University certificate, diploma or	**122**	**8.9%**	**11**	**23.3%**	**1,802**	**15.8%**	**2,782**	**17.4%**	**164,009**	**18.0%**
Bachelor's degree	88	6.5%	4	8.1%	1,285	11.3%	2,104	13.2%	119,480	13.1%
Above Bachelor's	34	2.5%	7	15.3%	517	4.5%	678	4.2%	44,529	4.9%

Source: Environics Research, Urban Systems defined STA areas.

As mentioned earlier, city-wide rates are likely more illustrative of future resident characteristics for a larger growth area such as the SE Quadrant.

2017 LABOUR BY INDUSTRY SECTOR PROFILE

Labour force by industry sector for the identified trade areas is summarized in the table below.

2017 Estimates Labour Force by Industry	STA NW		STA SE		North Battleford (CY), SK		North Battleford, SK		Saskatchewan	
		%		%		%		%		%
2017 Labour Force 15 years and over by	**971**	**%base**	**26**	**%base**	**7,907**	**%base**	**11,219**	**%base**	**636,889**	**%base**
All industries	957	98.6%	22	84.3%	7,776	98.3%	10,990	98.0%	628,050	98.6%
11 Agriculture, forestry, fishing and hunting	11	1.1%	0	0.2%	127	1.6%	369	3.3%	48,181	7.6%
21 Mining, quarrying, and oil and gas	26	2.7%	0	1.2%	213	2.7%	282	2.5%	27,535	4.3%
22 Utilities	3	0.3%	4	15.3%	41	0.5%	87	0.8%	6,778	1.1%
23 Construction	**163**	**16.8%**	**3**	**9.8%**	**538**	**6.8%**	**731**	**6.5%**	**50,225**	**7.9%**
31-33 Manufacturing	**83**	**8.5%**	**4**	**15.4%**	**416**	**5.3%**	**498**	**4.4%**	**30,729**	**4.8%**
41 Wholesale trade	20	2.1%	4	15.7%	144	1.8%	208	1.9%	25,179	4.0%
44-45 Retail trade	72	7.4%	0	0.0%	1,084	13.7%	1,380	12.3%	68,455	10.7%
48-49 Transportation and warehousing	**81**	**8.3%**	**0**	**0.2%**	**245**	**3.1%**	**428**	**3.8%**	**29,405**	**4.6%**
51 Information and cultural industries	23	2.3%	0	0.0%	38	0.5%	121	1.1%	12,617	2.0%
52 Finance and insurance	8	0.8%	0	0.3%	261	3.3%	385	3.4%	24,193	3.8%
53 Real estate and rental and leasing	12	1.2%	0	0.4%	125	1.6%	160	1.4%	8,708	1.4%
54 Professional, scientific and technical services	29	3.0%	4	16.3%	213	2.7%	313	2.8%	27,729	4.4%
55 Management of companies and	0	0.0%	0	0.0%	0	0.0%	0	0.0%	666	0.1%
56 Administrative and support, waste management and remediation services	15	1.5%	0	0.8%	135	1.7%	156	1.4%	15,381	2.4%
61 Educational services	5	0.5%	0	0.1%	881	11.1%	1,118	10.0%	49,765	7.8%
62 Health care and social assistance	178	18.3%	0	1.0%	1,465	18.5%	2,041	18.2%	74,048	11.6%
71 Arts, entertainment and recreation	11	1.1%	0	0.4%	423	5.3%	616	5.5%	10,971	1.7%
72 Accommodation and food services	**178**	**18.3%**	**2**	**6.8%**	**595**	**7.5%**	**832**	**7.4%**	**38,841**	**6.1%**
81 Other services (except Public Admin.)	21	2.1%	0	0.6%	440	5.6%	594	5.3%	29,254	4.6%
91 Public administration	19	2.0%	0	0.0%	392	5.0%	671	6.0%	49,390	7.8%

Source: Environics Research, Urban Systems defined STA areas.

Key sectors – those with higher than city-wide proportions – include Construction (17% for the STA NW vs. less than 7% city-wide and 8% for the province), Transportation and Warehousing (8% for STA NW vs. 3% for North Battleford), and Accommodation and Food Services (18% relative to just over 7% for the city). Manufacturing is another key sector, accounting for nearly 9% of the STA NW labour force (relative to 5% city-wide) and over 15% of the STA SE pool.

2017 VISIBLE MINORITY PROFILE

As indicated below, local areas are fairly homogeneous in terms of their ethnic profile, with only 8% of the STA NW population representing a visible minority (2% within the STA SE).

2017 Estimates Visible Minority	STA NW		STA SE		North Battleford (CY), SK		North Battleford, SK		Saskatchewan	
		%		%		%		%		%
2017 Household Population by visible minority groups	**1,751**	**%base**	**51**	**%base**	**14,551**	**%base**	**20,245**	**%base**	**1,132,825**	**%base**
Total visible minority population	140	8.0%	1	2.1%	1,275	8.8%	1,384	6.8%	98,972	8.7%
Chinese	25	1.4%	0	0.4%	278	1.9%	311	1.5%	14,643	1.3%
South Asian	17	1.0%	0	0.5%	233	1.6%	249	1.2%	22,813	2.0%
Black	29	1.7%	0	0.0%	237	1.6%	241	1.2%	10,311	0.9%
Filipino	**40**	**2.3%**	**0**	**0.0%**	**390**	**2.7%**	**404**	**2.0%**	**27,557**	**2.4%**
Latin American	3	0.2%	0	0.0%	57	0.4%	67	0.3%	4,006	0.4%
Southeast Asian	24	1.4%	1	1.2%	50	0.3%	52	0.3%	7,728	0.7%
Arab	0	0.0%	0	0.0%	5	0.0%	10	0.0%	3,100	0.3%
West Asian	0	0.0%	0	0.0%	0	0.0%	1	0.0%	2,520	0.2%
Korean	2	0.1%	0	0.0%	25	0.2%	38	0.2%	1,806	0.2%
Not a visible minority	***1,611***	***92.0%***	***50***	***97.9%***	***13,276***	***91.2%***	***18,861***	***93.2%***	***1,033,853***	***91.3%***

Source: Environics Research, Urban Systems defined STA areas.

2017 HOUSEHOLD & PER CAPITA INCOME PROFILE

Per capita income levels are a critical input for retail demand modeling. The table below outlines household incomes by income strata, as well as average household/per capita incomes areas:

2017 Estimates Household/Per Capita Income	STA NW		STA SE		North Battleford (CY), SK		North Battleford, SK		Saskatchewan	
		%		%		%		%		%
2017 Households by Income (Current Year $)	**746**	**%base**	**10**	**%base**	**6,074**	**%base**	**8,290**	**%base**	**455,333**	**%base**
Under $10,000	0	0.0%	0	0.0%	0	0.0%	26	0.3%	6,132	1.3%
$ 10,000 - $19,999	36	4.8%	0	1.3%	290	4.8%	406	4.9%	29,804	6.5%
$ 20,000 - $29,999	76	10.2%	0	4.3%	572	9.4%	732	8.8%	39,281	8.6%
$ 30,000 - $39,999	115	15.4%	1	8.1%	794	13.1%	953	11.5%	39,621	8.7%
$ 40,000 - $49,999	106	14.2%	2	19.5%	686	11.3%	859	10.4%	40,319	8.9%
$ 50,000 - $59,999	76	10.2%	2	18.0%	526	8.7%	696	8.4%	36,329	8.0%
$ 60,000 - $69,999	22	2.9%	0	1.5%	68	1.1%	194	2.3%	19,131	4.2%
$ 70,000 - $79,999	53	7.1%	0	4.3%	517	8.5%	675	8.1%	28,160	6.2%
$ 80,000 - $89,999	53	7.0%	1	14.0%	450	7.4%	604	7.3%	30,180	6.6%
$ 90,000 - $99,999	42	5.6%	1	12.7%	385	6.3%	525	6.3%	27,849	6.1%
$ 100,000 - $ 124,999	70	9.3%	0	2.3%	733	12.1%	1,005	12.1%	53,486	11.7%
$ 125,000 - $ 149,999	43	5.7%	1	11.9%	450	7.4%	654	7.9%	40,125	8.8%
$ 150,000 - $ 174,999	10	1.4%	0	0.3%	29	0.5%	145	1.7%	15,457	3.4%
$ 175,000 - $ 199,999	16	2.1%	0	0.8%	265	4.4%	348	4.2%	17,043	3.7%
$ 200,000 - $ 249,999	18	2.4%	0	0.5%	207	3.4%	286	3.4%	16,995	3.7%
$ 250,000 and over	12	1.6%	0	0.5%	102	1.7%	182	2.2%	15,421	3.4%
Average income	$ 75,305		$ 74,433		$ 83,264		$ 88,525		$ 98,458	
Average per capita income	***$ 32,045***		***$ 14,259***		***$ 34,693***		***$ 36,281***		***$ 39,541***	
Provincial per capita income index	***81.0***		***36.1***		***87.7***		***91.8***		***100.0***	
Median Income	$ 55,308		$ 59,312		$ 71,954		$ 74,133		$ 76,055	

Source: Environics Research, Urban Systems defined STA areas.

Income levels within the more populated *STA NW trade area* are relatively close to those for the City of North Battleford as a whole, but well below provincial levels:

- Average household income of $75,000 vs. $83,000 city-wide and $98,000 provincially.
- Average per capita income within this STA NW area is estimated at just over $32,000 – which places it roughly in line with the City of North Battleford mark of $34,700 but 19% below the Saskatchewan-wide figure of $39,500.

While household income levels within the less populated STA SE area south of the subject lands are roughly in line with STA NW figures, they are much lower on a per capita income basis due to much larger average household sizes.

Appendix B: South-East Quadrant – Environmental Review

MEMORANDUM

Date:	January 31, 2018
To:	Grant Campbell, Urban Systems
cc:	Bryan Gray, Urban Systems
From:	Graeme Hayward, Urban Systems
File:	3911.0004.01-E
Subject:	North Battleford South East Quadrant - Environmental Review

Attention: Grant Campbell, PEng

RE: North Battleford South East Quadrant - Environmental Constraints and Opportunities Review

This memo has been prepared to summarize the findings of the desktop environmental review that was conducted for the South East Quadrant (study area) situated within the City of North Battleford, Saskatchewan. The results of this desktop study will inform the concept plan for the study area. Key considerations for maintaining the natural systems and ecological values of the study area are outlined in **Section 6.0**.

1.0 Scope of Environmental Review

The environmental review of the study area is based on desktop research and includes:

- Description of environmental values;
- Summary of applicable environmental regulatory requirements;
- Evaluation of environmental opportunities and constraints; and,
- Recommendations for environmental mitigation and conservation planning considerations.

2.0 Environmental Regulatory Framework

The following is a summary of legislation containing environmental direction and requirements relevant to the development of the South East Quadrant. Given the presence of the Gold Eagle reserve lands within the study area, applicable federal environmental assessment requirements have been highlighted.

2.1 Provincial Legislation and Requirements

a) Wildlife Act

The Wildlife Act governs the protection and management of wildlife in Saskatchewan. The Act deals with the protection and maintenance of suitable habitat and the conservation of wild species, in particular, those species that may be at risk of extinction.

b) Water Security Agency Act

The Water Security Agency Act is responsible for managing the provinces water supply, protecting water quality and aquatic habitat, and ensuring safe drinking water. The Act ensures the sustainability and quality of Saskatchewan's surface and ground water while protecting drinking water supplies. Any adverse impacts to aquatic habitat will likely require approval under Water Security Agency Act.

c) Environmental Management and Protection Act, 2010

The Environmental Management and Protection Act, 2010 protects the air, land and water resources of the province through regulating and controlling potentially harmful activities and substances. The need to obtain an Aquatic Habitat Protection Permit before conducting work in or near water is an important component of this legislation. The primary goal of the Aquatic Habitat Protection Program is to ensure aquatic habitat is preserved and maintained at the productive level which existed prior to the development activities.

2.2 Federal Legislation and Requirements

a) Canadian Environmental Assessment Act, 2012

The Canadian Environmental Assessment Act, 2012 (CEAA) and its regulations establish the legislative basis for federal environmental assessment. Section 67 of the CEAA requires that Indigenous and Northern Affairs Canada (INAC) must conduct a review to determine whether a project is likely to cause significant adverse environmental effects before making any decision that would allow a project to proceed. The CEAA defines a "project" as involving a physical activity in relation to a physical work, located on federal land.

b) Fisheries Act

The Fisheries Act, which was amended November 25, 2013, was established to manage and protect Canada's fisheries resources. Section 35 of the Act may apply to any works where fish (or fish habitat) may be affected by a proposed development. Any project with the potential to result in serious harm to fish must be reviewed by Fisheries and Oceans Canada through a Request for Review Application Form.

c) Migratory Birds Convention Act

Most migrating birds found in Canada are protected under the Migratory Birds Convention Act. The Canadian government has the authority to pass and enforce regulations to protect those species of migratory birds which are included in the Convention. By conducting land clearing activities outside of the nesting season for birds (i.e. September 1 to March 15, and possibly earlier for owls), a proponent is able to maintain compliance under this Act.

d) Species at Risk Act

The federal Species at Risk Act provides protection to species at risk included on Schedule 1 under the Act and their critical habitat, both of which may be found on federal lands. It also provides protection to aquatic species and migratory birds (covered by the Migratory Birds Convention Act), wherever they are found.

3.0 Contaminated Sites Records

A search of the Saskatchewan Spills and the Saskatchewan Hazardous Substance Storage Facility databases revealed no recorded sites within the study area. A search of the Treasury Board of Canada's Contaminated Site Registry also resulted in no records of contaminated sites within the study area. A Phase I Environmental Site Assessment would be required to determine if areas of potential environmental concern may exist within the study area.

4.0 Environmental Description

The South East Quadrant study area is situated within the Maymont Plain landscape area of the Aspen Parkland region within the Prairie Ecozone (SK CDC, 2018). This ecoregion extends in a broad arc from southwestern Manitoba, northwestward through Saskatchewan into central Alberta. The ecoregion is classified as having a transitional grassland ecoclimate that is characterized by short, warm summers and long, cold winters with continuous snow cover. The mean annual temperature is approximately 1.5°C. The mean summer temperature is 15°C and the mean winter temperature is -12.5°C. The mean annual precipitation range is 400-500 mm.

4.1 Surficial Geology and Hydrogeology

North Battleford is located within the Western Sedimentary Basin of the Interior Plains physiographic region. The Plains region is underlain by Cretaceous shale, covered by undulating to kettled, calcareous, glacial till with significant areas of level lacustrine and hummocky to ridged fluvioglacial deposits. The study area slopes gently to the southwest toward the North Saskatchewan River and ranges in elevation from approximately 510 m to 540 m above sea level. The Aspen Parkland region is dominated by loamy black Chernozemic soils within upland areas and Gleysolic soils in poorly drained areas (Ecological Framework of Canada, 2018).

The study area is underlain by the Buried Valleys Aquifer System, which occurs across Canada, incised into bedrock and buried by glacial till. A search of the Natural Resources Canada Groundwater Information Network was conducted on January 31, 2018 to determine the location of groundwater wells in relation to the study area. The search results revealed two (2) recorded well records within the study area and three (3) recorded well records within a 1 km radius of the study area. The well reports within the study area are for domestic water use. The approximate depths of the water wells were 4 m and 10 m and the static water levels were 3.66 m and 9.75 m respectively. According to the drill logs, the area is generally underlain by fine soil (0.3 m in thickness) over a layer of sand (1.22 m to 3.36 m) and till.

4.2 Vegetation and Plant Communities

Most of the Aspen Parkland region has been converted to agricultural production. In undisturbed areas, the native vegetation is characterized by trembling aspen, oak groves, mixed tall shrubs, and intermittent fescue grasslands. Open stands of trembling aspen and shrubs are common and bur oak and grassland communities occupy increasingly drier sites on loamy Black Chernozemic soils. Poorly drained, Gleysolic soils support willow and sedge species (Ecological Framework of Canada, 2018).

4.3 Surface Water and Fisheries Resources

Based on a review of the Saskatchewan Conservation Data Centre (CDC) databases and Canadian Wetland Inventory, there appears to be two unnamed streams that intersect the site and flow southwest, converging downstream of Highway 16 before connecting with the North Saskatchewan River. A shallow/open water feature also appears to form the headwaters of one of the streams within the western boundary of the study area. The identified streams and shallow surface water feature present within the study area contribute to biodiversity and other ecological functions. No recorded fish records were available for the identified water features within the study area. A search of the Saskatchewan CDC

indicated that the North Saskatchewan River provides habitat to a variety of fish species, including Lake Sturgeon, an endangered species listed on Schedule 1 of the Species at Risk Act.

4.4 Wildlife and Habitat

The Aspen Parkland region is part of the Prairie Pothole region which is comprised of some of the most threatened waterfowl habitat in North America. The region also provides habitat for white-tailed deer, coyote, snowshoe hare, cottontail, red fox, northern pocket gopher, Franklin's ground squirrel, and bird species like sharp-tailed grouse and black-billed magpie. Due to current and past commercial, agricultural and other land uses, much of the habitat encompassing the study area has been disturbed to various degrees. Important wildlife habitat within the study area includes the small water features and associated aquatic and riparian vegetation. A search of the Saskatchewan Terrestrial Wildlife Habitat Inventory was conducted to determine the location of mapped wildlife areas in relation to the study area. The closest mapped species occurrences are in excess of 4 km to the southwest of the study area. The species records are for beaver, mule deer, white-tailed deer, ruffed grouse and sharp-tailed grouse.

4.5 Species of Management Concern and Environmentally Significant Areas

A search of the Saskatchewan Conservation Data Centre (CDC) databases revealed no recorded historic occurrences of rare and endangered species within a 1 km radius of the study area. The absence of information provided by the Saskatchewan CDC does not necessarily confirm the absence of sensitive species. Review of the CDC mapping revealed several rare and endangered species records concentrated within the vicinity of the North Saskatchewan River to the south of the study area. The species occurrence records include:

- Nevada rush (*Juncus nevadensis*) - S3 provincial rank (vulnerable/rare to uncommon) vascular plant
- Narrow-leaved water plantain (*Alisma gramineum*) – S3 provincial rank (vulnerable/rare to uncommon) vascular plant
- Sandhills cinquefoil (*Potentilla lasiodonta*) – S2 provincial rank (imperiled/very rare) vascular plant
- Tall beggar's-ticks (*Bidens frondosa*) - S3 provincial rank (vulnerable/rare to uncommon) vascular plant
- White lettuce (*Prenanthes alba*) - S3 provincial rank (vulnerable/rare to uncommon) vascular plant
- Lake sturgeon (*Acipenser fulvescens*) - S2 provincial rank (imperiled/very rare); Species at Risk Act - Schedule 1 (endangered) vertebrate animal
- Little brown myotis (*Myotis lucifugus*) – S4 provincial rank (apparently secure); Species at Risk Act - Schedule 1 (endangered) vertebrate animal
- Yellow rail (*Coturnicops noveboracensis*) S3 provincial rank (vulnerable/rare to uncommon); Species at Risk Act - Schedule 1 (special concern) vertebrate animal

4.6 Recorded Environmentally Significant Areas

Environmentally Significant Areas (ESAs) are generally defined as areas that are important to the long-term maintenance of biological diversity, physical landscape features and/or other natural processes, both locally and within a larger spatial context. A search of the Saskatchewan CDC databases revealed no recorded historic occurrences of environmentally significant areas within a 1 km radius of the study area. A review of the available species and habitat mapping identified terrestrial wildlife habitat areas and fish and wildlife development fund reserves located to the south of the study area along the North Saskatchewan River.

5.0 Environmental Constraints and Opportunities

Based on a review of relevant ecosystem information, areas of environmental sensitivity within the study area include the stream/shallow open water features and their aquatic/riparian habitats. There is potential for sensitive wetland habitat to be present in the small low-lying areas along the stream corridors within the southeast limits and northwest limits of the study area. Wetlands are dynamic, complex habitats that contribute to biodiversity and other ecological functions. Wetlands improve water quality by facilitating sedimentation and filtering pollutants. They are important as areas of groundwater recharge and discharge. Wetlands also help reduce flooding and soil erosion by storing runoff and slowing its downstream release. Given the close proximity of the study area to the North Saskatchewan River, it is likely that the natural streams and drainages provide a corridor for wildlife movement.

6.0 Recommended Mitigation and Planning Considerations

The most effective form of mitigating potential environmental impacts arising from development is through the avoidance of the most important habitats. Environmentally sensitive habitats include the aquatic and riparian habitats of the streams and shallow open-water features. The preservation and enhancement of these habitats is strongly recommended as they are sensitive to adverse effects, and likely unsuitable for development due to substrate or topography. The following mitigation measures are aimed at minimizing adverse environmental effects to these areas.

- Environmental approval processes should be initiated as early as possible in the planning stages of any proposed improvements, to ensure the environment is appropriately considered and any adverse effects are mitigated;
- Protect the ecological values of environmentally sensitive areas by restricting access and by establishing buffer areas comprised of coarse woody debris, plantings, signs and fencing;
- Options to maintain/enhance habitat connectivity and accommodate wildlife movement through the study area should be explored;
- Design new infrastructure to utilize existing footprints of disturbed areas (i.e., existing trails and other cleared areas) whenever possible to minimize the removal of native vegetation from the study area and reduce the fragmentation of habitat;
- Prior to any ground disturbance or vegetation clearing activities, have a qualified professional conduct a field investigation to identify areas where species at risk and their critical habitat may be present;

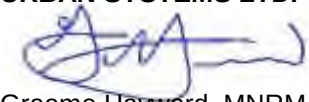
- Use low impact development techniques (e.g., maintain topography and manage stormwater on site) to avoid impacts on downslope aquatic and riparian habitats;
- Maintain snags and woody debris in buffer areas and environmentally sensitive areas to provide habitat for a diversity of wildlife;
- Prevent the spread of invasive species by incorporating native plants;
- Where development of sensitive areas is unavoidable, incorporate native trees and vegetation into the re-vegetation plan;
- Have a qualified professional prepare an avoidance/mitigation strategy for any species at risk likely to be present on site;
- Confirm presence and determine wetland values on the landscape. Avoid the development or disturbance of wetland habitat;
- Minimize vegetation and land clearing activities to within the project footprint only;
- Conduct all land-clearing activities during the period of September 1 to March 15 to avoid impacting birds during the nesting season and to maintain compliance with the federal *Migratory Birds Convention Act*. Alternatively, have a qualified environmental professional conduct an active nest survey if land clearing is to be conducted outside of the recommended work window;
- Implement appropriate erosion and sediment controls to prevent sedimentation of sensitive aquatic habitats;
- Develop a contingency and response plan for spills, accidents and malfunctions in accordance with applicable standards and best practices; and,
- Further investigation is required to determine potential environmental contamination concerns, risks and implications associated with past development of the study area. Any areas of potential concern should be properly assessed and, if required, remediated.
- Have a qualified professional undertake an appropriate level of archaeological assessment prior to commencing development activities.

7.0 Closure

I trust this memo will inform the development of the concept plan for the study area. Please contact the undersigned if you have any questions or require further information.

Sincerely,

URBAN SYSTEMS LTD.



Graeme Hayward, MNRM, PAg, EP, CESA
Associate Environmental Consultant

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Appendix C: Open House Display Boards

North Battleford

Welcome

to the

South East Quadrant Master Plan Open House

Project Context

e City of North Battleford is undertaking a master plan for the area known as the South East Quadrant.

e plan will provide a feasibility study and a preliminary land use plan for the area.

e South East Quadrant Master Plan is being driven by the continued demand for commercial property throughout the City and in particular, a shortage of larger, serviced commercial lots in the southeast area.

e study area consists of approximately 400 acres of land and is situated adjacent to Highway #40 along the south boundary as well as Highway #16 and Territorial Drive along the west boundary. In addition, the City's municipal airport is located immediately northeast of and adjacent to the study area.

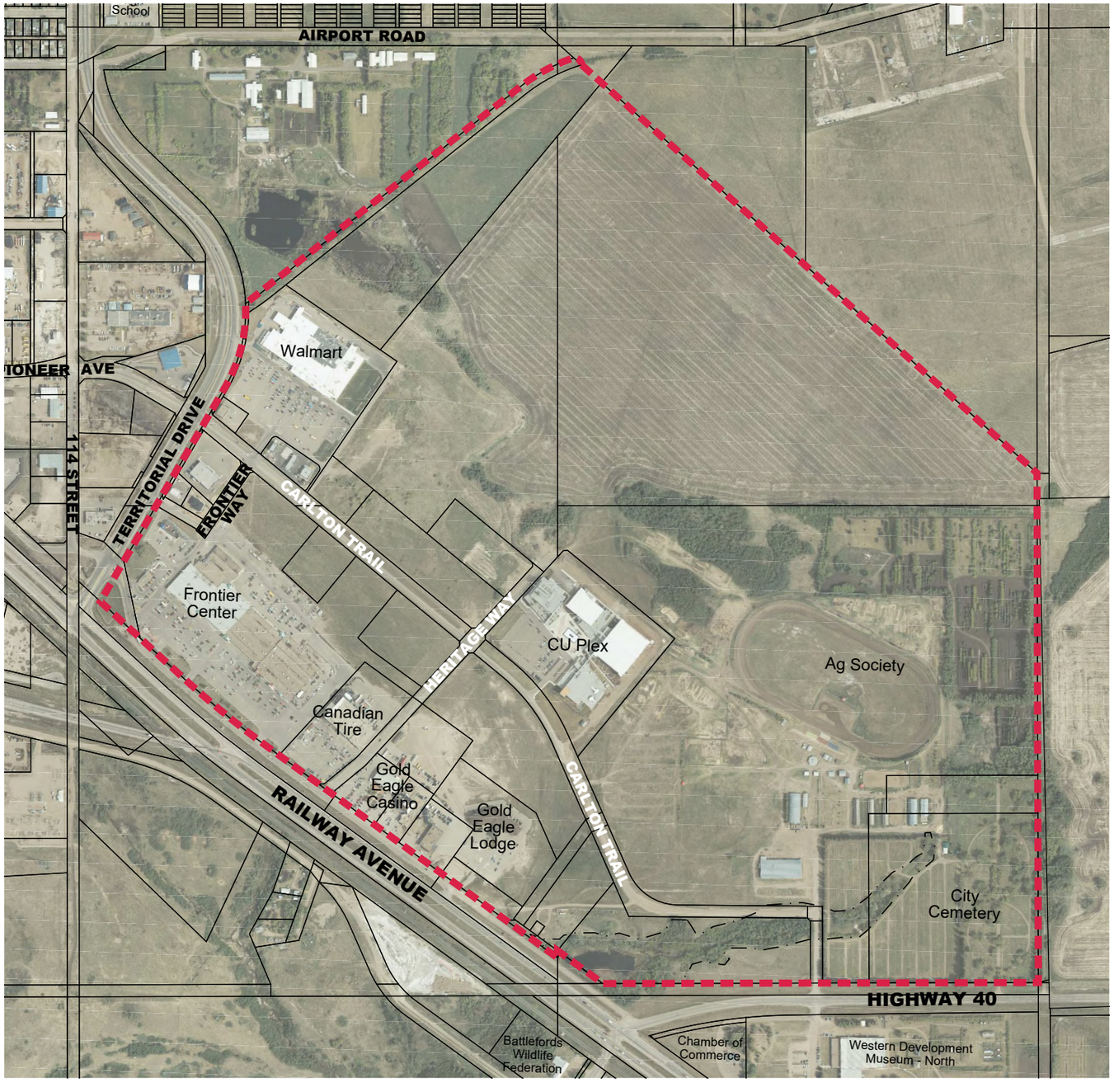
As noted in the City's O cial Community Plan, land uses within the study area are generally summarized as follows:

- Existing Regional Commercial;
- Existing Community Service;
- Existing Urban Reserve;
- Future Residential; and
- Future Regional Commercial.

North Battleford

South East Quadrant

Existing Conditions



North Battleford

South East Quadrant

Environmental Considerations

Constraints and Opportunities

Based on a review of relevant ecosystem information, areas of environmental sensitivity within the study area include the stream/shallow open water features and their aquatic/riparian habitats.

Wetlands are dynamic, complex habitats that contribute to biodiversity and other ecological functions;

Wetlands improve water quality by facilitating sedimentation and ltering pollutants. ey are important as areas of groundwater recharge and discharge;

Wetlands also help reduce ooding and soil erosion by storing runo and slowing its downstream release; and

Given the proximity of the study area to the North Saskatchewan River, it is likely that the natural streams and drainages provide a corridor for wildlife movement.

Recommended Mitigation and Planning Considerations

Protect the ecological values of environmentally sensitive areas by restricting access and by establishing bu er areas comprised of coarse woody debris, plantings, signs, and fencing;

Options to maintain/enhance habitat connectivity and accommodate wildlife movement through the study area will be explored;

Design new infrastructure to utilize existing footprints of disturbed areas (i.e., existing trails and other cleared areas) whenever possible to minimize the removal of native vegetation from the study area and reduce the fragmentation of habitat;

Use low impact development techniques (e.g., maintain topography and manage stormwater on site) to avoid impacts on downslope aquatic and riparian habitats;

Prevent the spread of invasive species by incorporating native plants;

Where development of sensitive areas is unavoidable, incorporate native trees and vegetation into the re-vegetation plan;

Minimize vegetation and land clearing activities to within the project footprint;

Develop a contingency and response plan for spills, accidents and malfunctions in accordance with applicable standards and best practices; and

Have a quali ed professional undertake an appropriate level of archaeological assessment prior to commencing deelopment activities.

North Battleford

South East Quadrant

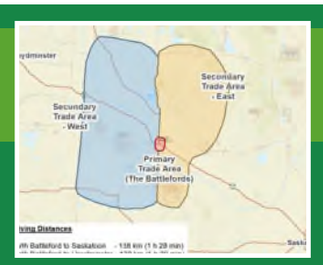
Residential and Retail Opportunity Assessment

Full-service restaurants, quick service restaurants and gas station/convenience stores in south-east North Battleford

RecGas Stations in Battleford and North Battleford

Big box, mid box and supermarket retailers in south-east North Battleford

Our economic study assessed residential and retail demand to help determine the following for the South East Quadrant:



e current retail representation by major category and relevant gaps in local market;

Quantify city-wide retail demand by major category over a period of at least 20 years;

Quantify market-supportable retail that should be planned for the South-East Quadrant and estimate retail land use needs to complement existing regional/community uses;

Project residential growth rate and demand in North Battleford and examine the implications for related growth within the South-East Quadrant;

Recommend residential unit types most likely to align with South-East Quadrant;

Forecast the number of residential units per year by housing type the South-East Quadrant could realistically absorb given growth potential in other areas of the city; and

Recommend retail space based on projected population growth, estimated spending levels and regional retail competitive supply.

Findings and Recommendations:

e Killdeer and Fairview neighbourhoods are expected to absorb most of new residential growth between 2017 and 2040. Residential that is prioritized for the South-East Quadrant should be geared towards a ordable housing, of which there is a growing demand;

Based on the City's growth priority areas and the residential occupancy demand projected over the next 20 years, there is unlikely to be signi cant residential demand in the South-East Quadrant. It is recommended that the South-East Quadrant allow for some multi-family a ordable housing, as well as potential market single and multi-family housing in the long term;

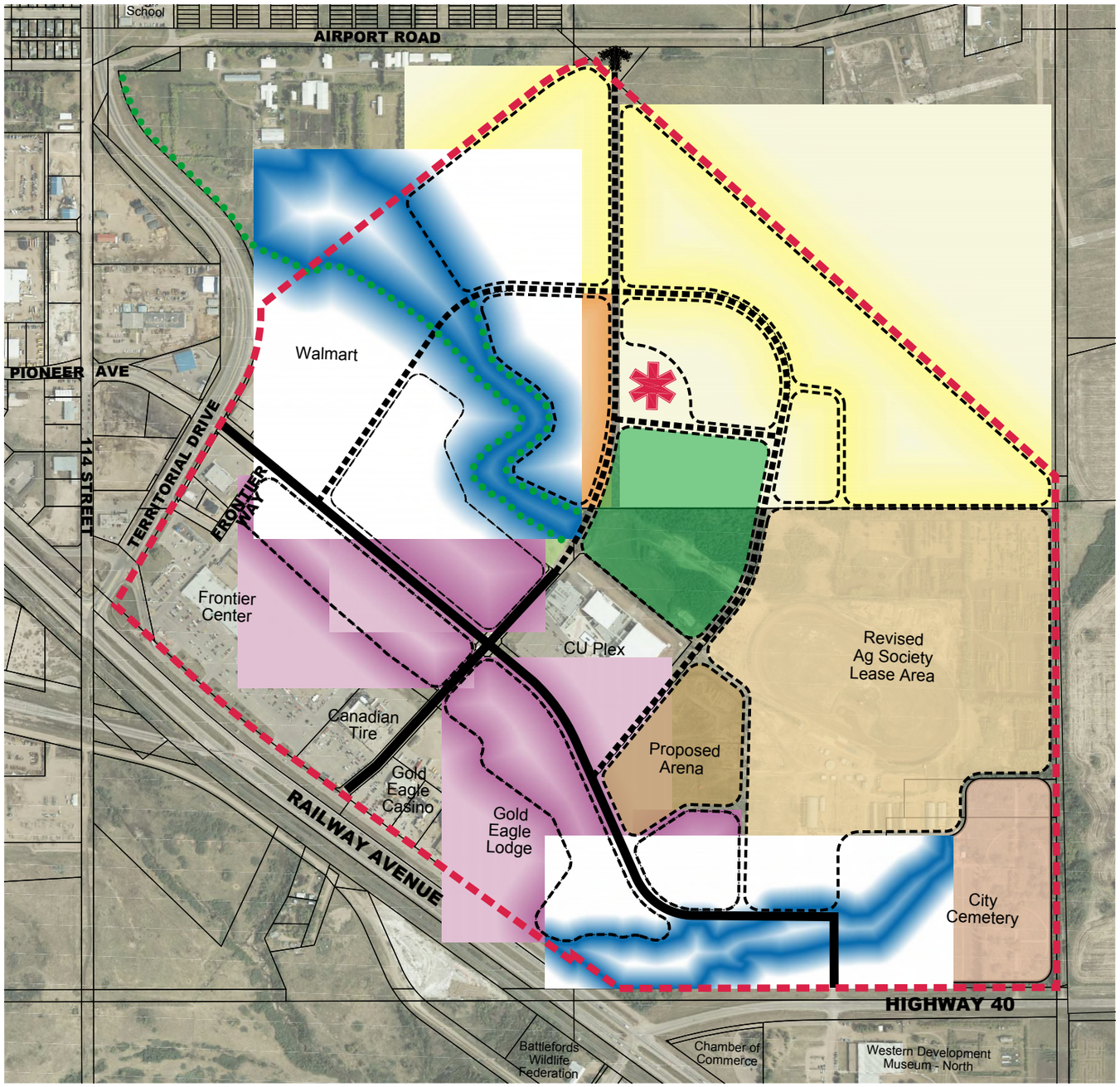
e City has also prioritized the revitalization of the downtown to make it a safer and livelier "urban living room" for North Battleford residents. e revitalization of the downtown is expected to absorb much of the new demand for retail space between 2017 and 2040.

e South-East Quadrant already functions as a centre for regional retail and new regional retail space should continue to be directed to this area based on the suitable characteristics of the location, existing retail-commercial critical mass, and market demand.

North Battleford

South East Quadrant

Concept Plan



KEY

- STUDY AREA
- LOW DENSITY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- NEIGHBOURHOOD COMMERCIAL
- REGIONAL COMMERCIAL
- PROGRAMMABLE GREENSPACE
- PARK SPACE
- PROPOSED ARENA
- REVISED AG SOCIETY LEASE AREA
- CITY CEMETERY
- STORMWATER AREA
- PROPOSED REGIONAL PATHWAY
- EXISTING ROADS
- PROPOSED ROADS

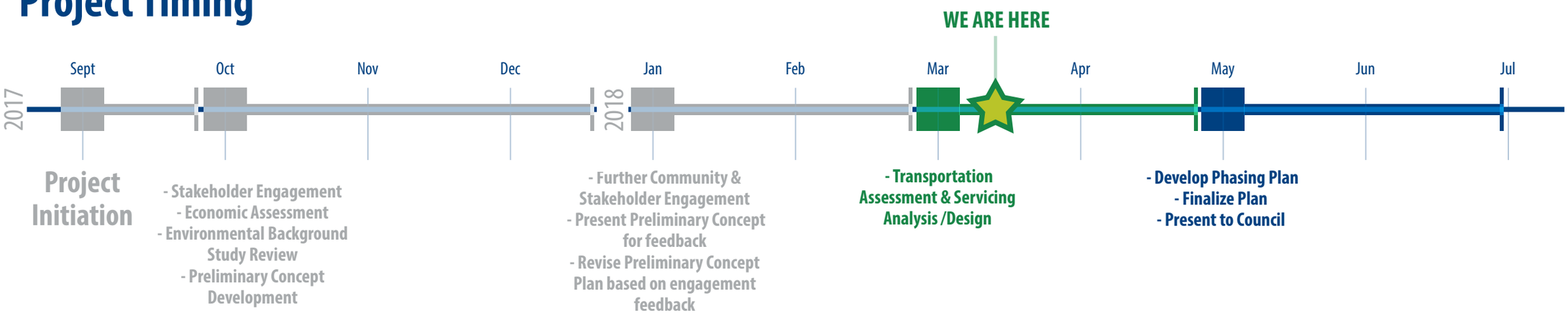
North Battleford

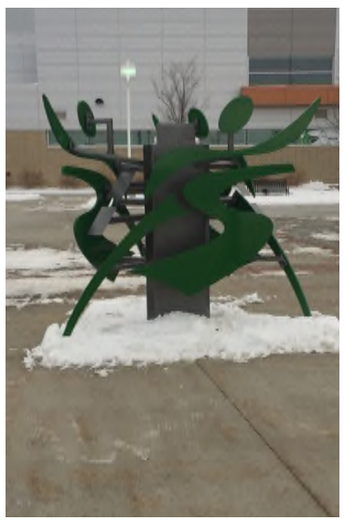
Thank you for your feedback!

South East Quadrant

Next Steps

Project Timing





Project Outcome

Neighbourhood level master plan laying out land-uses including all commercial, residential, institutional land, parks and open space, roads, stormwater detention/retention ponds, and other utility parcels. e South East Quadrant Master Plan Report will articulate:

- Conceptual dwelling unit count and population projections;
- Commercial area program;
- Location of institutional facilities;
- Location of public amenities;
- Open space network;
- Cold climate design considerations; and
- Habitat and ecosystems conservation considerations.

Appendix D: South-East Quadrant – Master Plan Transportation Impact Assessment

FINAL DRAFT REPORT

PREPARED FOR THE CITY OF NORTH BATTLEFORD

SE Quadrant Master Plan Transportation Impact Assessment

URBAN systems

134 11 Avenue SE
Calgary, AB, T2G 0X5

Contact: Chun Man, P.Eng.
T: 403.291.1193
E: cman@urbansystems.ca

urbansystems.ca

August 2018 | File: 3911.0004.01

TABLE OF CONTENTS

1.0 Introduction

1.1 Background and Study Objectives

Urban Systems Ltd. (USL) was retained by the City of North Battleford to complete a Transportation Impact Assessment (TIA) to support the South East Quadrant Master Plan. The purpose of this TIA is to provide an understanding of the required transportation investments that are needed to support the expected development traffic. This study will examine the impacts of the proposed residential and commercial development on the existing and future roadway network within and around the South East Quadrant.

The objectives of this study include:

- Review previously completed traffic studies, planned upgrades to surrounding infrastructure, and traffic volume data near the proposed development;
- Identify and apply a linear factored growth rate to traffic volumes at key intersections near the development for analysis of existing and forecasted background volumes on road network;
- Trip generation, distribution, and assignment of proposed development traffic based on ITE trip generation rates and adjacent trip generators;
- Evaluate the traffic conditions at the following key intersections:
    1. Railway Avenue at Territorial Drive,
    2. Service Road at Territorial Drive,
    3. Carlton Trail/Pioneer Avenue at Territorial Drive,
    4. 8 Avenue/Airport Road at Territorial Drive,
    5. Service Road at Heritage Way,
    6. Carlton Trail at Heritage Way,
    7. Airport Road at Heritage Way (future access),
    8. Highway 16/40 Merge at Railway Avenue,
    9. Service Road (right-in/right-out) at Railway Avenue,
    10. Highway 40/Simmental Street at Railway Avenue,
    11. Carlton Trail (development east access) at Highway 40.
- Examine the impacts of the background traffic in the current year (2018), the 20-year horizon (2038), and post-development traffic in the assumed development year (2038); and
- Recommendation of improvements to the impacted roadway network based on assumed level of service (LOS) ‘E’ and traffic volume to capacity ratio ‘0.95’ threshold.

1.2 Site Characteristics

The study area is situated to the southeast corner of the City of North Battleford. The development planned for this land is residential- and commercial-oriented, providing additional housing and career opportunities for residents. **Figure 1-1** depicts the study area. The study area is bounded to the south by Highway 40 and Railway Avenue (Highway 16/40), to the west by Territorial Drive, and to the north by Airport Road.

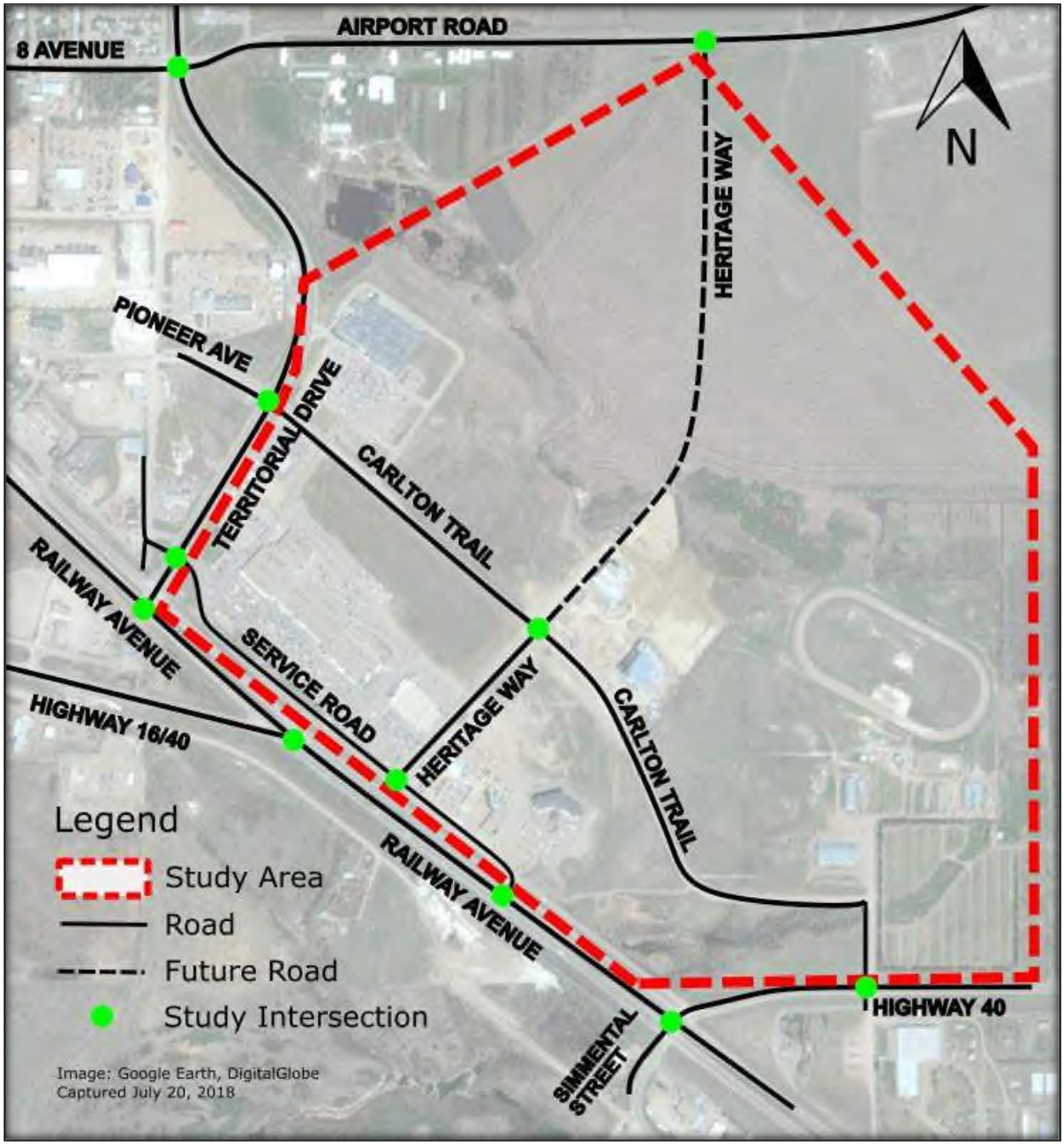


Figure 1-1 Study Area

Highway 40 runs alongside the southeast boundary of the study area as a 2-lane undivided highway with a posted speed of 80 km/h. Highway 40 carries both regional and local traffic west into The Battlefords and east into other municipalities along the provincial highway network.

Railway Avenue continues Highway 40 westward along the south boundary of the study area. Highway 40 along Railway Avenue is also concurrent with Highway 16, otherwise known as the Yellowhead section of the Trans-Canada Highway. Railway Avenue is a 4-lane divided highway with a posted speed of 60 km/h west of Simmental Street and 80km/h east of Simmental Street. Regional traffic use Railway Avenue to head west from the city toward the junctions of Highway 4, Highway 29, Highway 40, to the Town of

Battleford, or to the Alberta border. Regional travellers may head east to various municipalities on Highway 40 or toward Saskatoon via Highway 16. Local traffic use Railway Avenue to head west into North Battleford's city centre or east toward the industrial developments in the southeast of the city, accessed by Simmental Street and Hereford Street.

Territorial Drive is 4-lane arterial road with a posted speed of 60 km/h carrying local traffic around the perimeter of North Battleford's city centre and serves as a bypass for regional traffic to access Highway 4 to the north. The study area is bounded to the west by Territorial Drive.

Airport Road is a 2-lane local road that currently provides access to North Battleford Airport. The study area is bounded to the north by Airport Road.

Roadways within the study site currently exist. Carlton Trail runs west-east from Territorial Drive (a signalized intersection) to the west and Highway 40 to the southeast (an unsignalized intersection). Service Road runs generally parallel to Railway Avenue, and accessed from a right-in/right-out intersection on Railway Avenue westbound. Service Road has an additional unsignalized intersection at Territorial Drive to the west. Heritage Way and Frontier Way connects Carlton Trail to the north (an unsignalized intersection) and Service Road to the south (an unsignalized intersection).

The study area contains existing commercial and recreational developments. Along the Service Road adjacent to Railway Avenue to the south boundary of the study site, there currently exists the Gold Eagle Lodge hotel, Gold Eagle Casino, a Canadian Tire retail store, and the Frontier Centre shopping mall. Along Territorial Drive to the west boundary of the study site, a Walmart serves as a general-purpose retail and grocery store, and a CO-OP gas station/convenience store is situated nearby along Carlton Trail. There are also various standalone retail stores on this site. On the west side of Frontier Way, a Tim Hortons and Burger King fast food restaurant exist with drive-through bays. The Battleford Agricultural Society is situated toward the east side of the study site as a recreational and exhibition facility. An aquatics centre and a performing arts theatre exists on the northeast corner of Carlton Trail and Heritage Way. These developments have commercial accesses throughout the existing road network. In this study, these lands are assumed to remain unchanged throughout the analysis period.

In addition to the existing road network, the proposed development will include the extension of Heritage Way to Airport Road, creating a new access to the site.

1.3 Study Methodology

This section describes the methodology used to complete the analysis documented in this TIA.

Analysis Horizons and Land Uses

To maintain a conservative approach to the traffic impact assessment, it is assumed that all areas would be completed concurrently, with full build-out completed by 2038. Analysis horizons for the background (pre-development) scenarios are 2018 (present-day) and 2038 (20-year horizon).

For the 2018 background horizon, the roadway network was modeled with existing geometry and laneage. The 2038 background and post-development horizons were modeled with the geometric improvements recommended in the City of North Battleford Transportation Master Plan 2017 (TMP).

The developments at the study site would occupy the following land uses:

- 19.38 hectares of regional commercial shopping centres
- 1.05 hectares of neighbourhood commercial shopping centres
- 8.88 hectares of cemetery
- 15.07 hectares of low density residential for approximately 893 residents
- 10.10 hectares of residential townhomes for approximately 1266 residents
- 4.41 hectares of residential apartments for approximately 663 residents

Existing Traffic Data Collection

The analysis traffic data was collected and compiled from multiple sources. For this study, traffic data refers to both AM and PM peak hour intersection turning movement volumes.

For 6 of 11 study intersections, existing traffic data largely originated from the City of North Battleford Transportation Master Plan 2017, with the counts being conducted by ME2 in 2015. The traffic data for Carlton Trail and Heritage Way was referenced from the 2016 Carlton Trail Commercial Development TIA and conducted by the City in 2015. The intersections of Highway 40/East development access and Service Road/Heritage Way had no existing or current counts, and USL collected Miovision data on these two intersections in May 2018. The detailed traffic data is compiled in Appendix A, and the data sources are summarized in Table 1-1.

Table 1-1: TIA Traffic Data Sources

Intersection	Traffic Count Reference	Date Conducted
Railway Avenue at Territorial Drive	City of North Battleford Transportation Master Plan 2017	June 2015
Service Road at Territorial Drive	City of North Battleford Transportation Master Plan 2017	June 2015
Carlton Trail/Pioneer Avenue at Territorial Drive	City of North Battleford Transportation Master Plan 2017	June 2015
Airport Road at Territorial Drive	City of North Battleford Transportation Master Plan 2017	June 2015
Service Road at Heritage Way	Urban Systems Ltd.	May 2018
Carlton Trail at Heritage Way	Carlton Trail Commercial Development TIA	October 2015
Airport Road at Heritage Way	*Future intersection*	-
Highway 16/40 Merge at Railway Avenue	City of North Battleford Transportation Master Plan 2017	June 2015
Service Road at Railway Avenue	*Via balancing (detailed below)*	-
Highway 40/Simmental Street at Railway Avenue	City of North Battleford Transportation Master Plan 2017	June 2015
Development east access at Highway 40	Urban Systems Ltd.	May 2018

Since the existing traffic data were collected during different periods of time, traffic volumes were balanced to reduce the discrepancy from the number of vehicles counted exiting an intersection and the number of vehicles counted entering a downstream intersection and adjusted where needed to maintain a realistic scenario.

Two study intersections did not have existing traffic data: Airport Road at Heritage Way and the Service Road (right-in/right-out) along westbound Railway Avenue. The Airport Road at Heritage Way intersection does not currently exist but will be developed by 2038. This intersection was included for analysis because of the concentration of residential developments toward the north of the study site, and the potential for traveler use of Airport Road to access the Territorial Drive arterial.

Traffic volumes at the Service Road right-in/right-out to westbound Railway Avenue were estimated based on the corridor volumes on Railway Avenue, westbound entry counts to Service Road/Heritage Way, and eastbound exit counts from Service Road/Heritage Way.

Traffic Forecast

Background traffic forecasts were developed by applying a linear growth factor to existing traffic data. Three linear growth rates were identified from the City of North Battleford Transportation Master Plan 2017. Table 1-2 summarizes three linear growth rates used in this study.

Table 1-2: Linear Growth Rate Factors Used

Roadway	Growth Rate	Reference
Highway 16	3%	City of North Battleford Transportation Master Plan 2017
Highway 40	2%	City of North Battleford Transportation Master Plan 2017
Other municipal roads	1%	Regional context and City of North Battleford Transportation Master Plan 2017

Intersections with data collected in 2015 required forecasting to the 2018 analysis horizon to determine present-day background traffic. All intersections were then applied with their respective linear growth rates to the 2038 analysis horizon to forecast background traffic in 20 years.

Trip Generation

Trip generation rates were assigned to the various land uses of the proposed development in accordance with the Institute of Transportation Engineers (ITE) *Trip Generation Manual (10th Edition).* ITE trip generation rates represent land-use specific averages that have been determined through years of traffic studies and background research. Directionality is also indicated in the ITE *Trip Generation Manual* and specifies a split percentage of trips entering a development (inbound trips) and leaving a development (outbound trips).

The proposed commercial land uses along Carlton Trail were assumed to attract pass-by trips along Territorial Drive during the PM peak hour. The pass-by trip reduction factor of 25% was established from the ITE *Trip Generation Manual*. In addition, it is unlikely that trips made to the site will be conducted modes

other than automobiles. This is due to an industrial land use due west of the study site, and Railway Avenue and Highway 40 having highway geometry and speed limits. Therefore, no further reduction in the vehicle trips were made to account for the use of alternative modes.

Trip Distribution and Assignment

This study assumes that development trips are distributed externally to four general directions. To and from the development, trips can be distributed:

- North via Airport Road or Territorial Drive toward North Battleford and Highway 4,
- West via Pioneer Avenue or Railway Avenue toward North Battleford and Highways 4, 16, and 40,
- South via Railway Avenue toward Highway 16, and
- East via Highway 40.

The proportion of total trips generated by the development split into each direction was established by the 2016 Carleton Trail Commercial Development TIA and will be used for this study due to the similarity in proposed developments and subject study sites. Additionally, to best capture the mixed-use nature of this development, an internal capture reduction factor of 15% was applied to account for trips that begin and end within the study site. This effectively reduces the proportion of external trips to each direction and lessens the impact of forecasted traffic on existing roadways. This factor was determined from engineering judgement and use in previous studies. Table 1-3 summarizes the trip distribution of development trips entering and exiting the study site.

Table 1-3: Trip Distribution Summary

Location Trips Distributed To/From	Proportion of Trips AM (PM)	
Internally	15% (15%)	15% (15%)
	Entering Development	Exiting Development
North	53% (41%)	19% (27%)
East	3% (4%)	24% (13%)
South	9% (14%)	17% (15%)
West	20% (26%)	25% (30%)
TOTAL	**100% (100%)**	**100% (100%)**

Development trips are assigned on various roadways around the study site. New trips to/from the site are expected to enter/exit the development based on the most convenient route, depending on the general direction of the trip's origin/destination. Some trip assignments enter the development via one route and exit via another; this is due to turn restrictions at Service Road/Railway Avenue and Railway Avenue/the Highway 16/40 merge.

Analysis of Operating Conditions

Synchro Studio 10 was used to assess intersection operational conditions by modeling traffic volumes on roadway geometry. The performance of a lane group is measured by the volume-to-capacity (V/C) ratios and control delay. V/C ratio compares roadway demand (vehicle volumes) with roadway supply (carrying capacity). Control delay is the increase in travel time due to traffic control devices. Together, V/C ratio and control delay summarize the level of service (LOS) of the lane group. Table 1-4 summarizes the LOS criteria used in this study, as defined by the *Highway Capacity Manual, 5th Edition* (2010).

Table 1-4: Level of Service Criteria for Signalized Intersections (Left) and Unsignalized Intersections (Right)

Signalized Intersection	
Control Delay (sec/veh)	**LOS**
≤10	A
>10-20	B
>20-35	C
>35-55	D
>55-80	E
>80	F

Unsignalized Intersection	
Control Delay (sec/veh)	**LOS**
≤10	A
>10-15	B
>15-25	C
>25-35	D
>35-50	E
>50	F

Source: *Highway Capacity Manual, 5th Edition* (Transportation Research Board 2010)

For this study, the threshold for deficient operating conditions for a lane group is LOS E and LOS F, and V/C ratio of 0.9 or greater. LOS E represents conditions where cycle failures (one or more queueing vehicles are unable to clear the intersection) are frequent and LOS F represents “failing” conditions where cycle failures are guaranteed and/or traffic demand exceeds capacity.

2.0 Background Horizons

The background condition for this study evaluates the network without development traffic to understand the operating conditions without the addition of the proposed development. The purpose of evaluating the background scenario at each study horizon is to capture the estimated regional and surrounding growth on the transportation network. Two background scenarios are evaluated in this study. The 2018 and 2038 (20 Year) background scenarios are estimated by factoring the traffic volume counts collected at key study intersections.

2.1 2018 Background Traffic

The existing conditions analysis provides an understanding of current traffic performance under today's existing roadway geometry.

Existing Traffic Volumes

For the 11 intersections evaluated for this study, each intersection count for the 2018 background scenario originated from various sources and time periods. The traffic volumes that were inputted for analysis were forecasted to the 2018 horizon and then balanced. The 2018 background scenario volumes are illustrated in Figure 2-1. Note that due to traffic volume forecasting and balancing, the 2018 background scenario volumes used for analysis do not necessarily equal the field data that was collected.

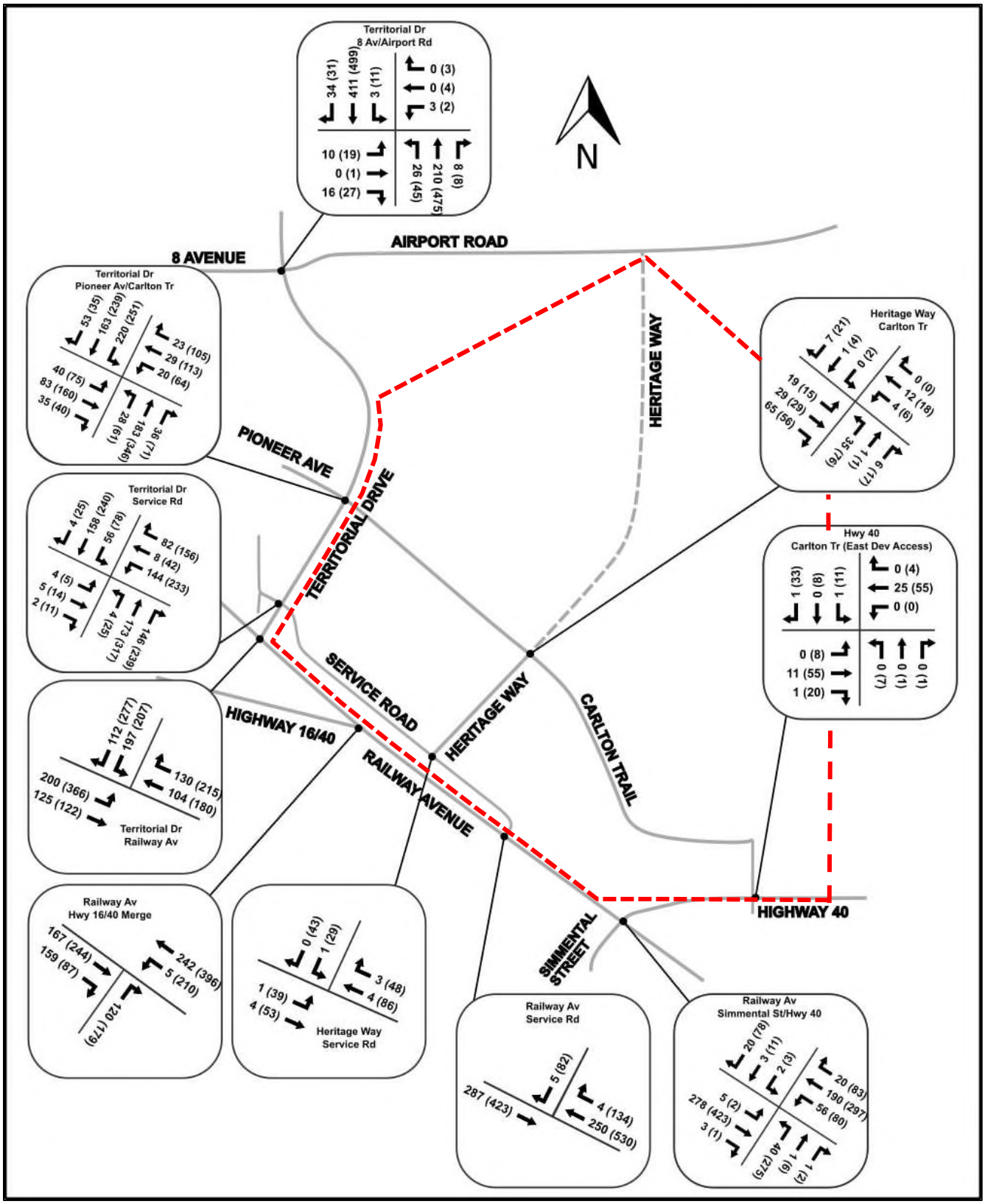


Figure 2-1: 2018 Background AM (PM) Traffic Volumes

Existing Operating Conditions

The results of the Synchro analysis on the existing roadway network under background conditions in 2018 is attached in Appendix B and shown below in Table 2-1. Overall, most of the existing intersections are operating at acceptable levels of service with moderate delays, except for Territorial Drive and Service Road. This intersection's westbound approach experiences failure in the PM peak hour, with vehicles experiencing a control delay of over 270 seconds.

Table 2-1: 2018 Background AM (PM) Operating Conditions

Approach	Movement	Control	v/c ratio	Delay (s)	LOS	95th % Queue (m)
Territorial Drive & Airport Road/8 Avenue*						
Eastbound 8 Avenue	Left, Thru, Right	Stop	0.06 (0.20)	13.4 (22.1)	B (C)	1.6 (5.7)
Westbound Airport Road	Left, Thru, Right	Stop	0.01 (0.04)	16.7 (22.1)	C (C)	0.2 (1.1)
Northbound Territorial Drive	Left		0.03 (0.05)	8.4 (8.8)	A (A)	0.6 (1.2)
Northbound Territorial Drive	Thru	Free	0.13 (0.30)	0 (0)	A (A)	0 (0)
Northbound Territorial Drive	Right		0.01 (0.01)	0 (0)	A (A)	0 (0)
Southbound Territorial Drive	Left		0 (0.01)	7.7 (8.5)	A (A)	0.1 (0.3)
Southbound Territorial Drive	Thru	Free	0.26 (0.32)	0 (0)	A (A)	0 (0)
Southbound Territorial Drive	Right		0.02 (0.02)	0 (0)	A (A)	0 (0)
Territorial Drive & Pioneer Avenue/Carlton Trail						
Eastbound Pioneer Avenue	Left		0.18 (0.33)	13.1 (14.9)	B (B)	6.8 (11.4)
Eastbound Pioneer Avenue	Thru, Right		0.2 (0.27)	9.5 (9.6)	A (A)	6.2 (9.8)
Westbound Carlton Trail	Left		0.09 (0.27)	11.8 (13.8)	B (B)	4.3 (10)
Westbound Carlton Trail	Thru, Right	Signal	0.09 (0.29)	7.9 (7)	A (A)	3.4 (8.5)
Northbound Territorial Drive	Left		0.04 (0.1)	4.4 (5.7)	A (A)	2.9 (6.6)
Northbound Territorial Drive	Thru, Right		0.11 (0.21)	3.5 (4.6)	A (A)	5.8 (13.2)
Southbound Territorial Drive	Left		0.33 (0.49)	6.3 (12)	A (B)	17.6 (40.2)
Southbound Territorial Drive	Thru, Right		0.11 (0.14)	3.2 (4.5)	A (A)	5.4 (9.1)
Territorial Drive & Service Road						
Eastbound Service Road	Left, Thru, Right	Stop	0.02 (0.1)	12.8 (17.8)	B (C)	0.6 (2.7)
Westbound Service Road	Left, Thru, Right	Stop	0.47 **(1.5)**	17.2 **(272.2)**	**C (F)**	19.7 (210.1)
Northbound Territorial Drive	Left		0 (0.02)	7.6 (7.9)	A (A)	0.1 (0.5)
Northbound Territorial Drive	Thru	Free	0.07 (0.14)	0 (0)	A (A)	0 (0)
Northbound Territorial Drive	Right		0.13 (0.22)	0 (0)	A (A)	0 (0)
Southbound Territorial Drive	Left, Thru	Free	0.04 (0.07)	4.7 (4.9)	A (A)	1.1 (1.8)
Southbound Territorial Drive	Right		0.05 (0.08)	0 (0)	A (A)	0 (0)
Territorial Drive & Railway Avenue						
Eastbound Railway Avenue	Left		0.58 (0.88)	17.9 (38.2)	B (D)	26.5 (#70.9)
Eastbound Railway Avenue	Thru		0.13 (0.1)	9.6 (8.7)	A (A)	7.3 (7.2)
Westbound Railway Avenue	Thru	Signal	0.11 (0.14)	9.5 (9)	A (A)	6.3 (9.8)
Westbound Railway Avenue	Right		0.25 (0.31)	3.6 (3)	A (A)	7.3 (9.5)
Southbound Territorial Drive	Left		0.11 (0.16)	7.1 (9)	A (A)	10.4 (10.9)
Southbound Territorial Drive	Right		0.13 (0.36)	2.7 (3)	A (A)	6.9 (10.7)
Railway Avenue & Highway 16/40 Merge						
Eastbound Railway Avenue	Thru, Right	Free	0.14 (0.11)	0 (0)	A (A)	0 (0)
Westbound Railway Avenue	Left	Yield	0 (0.18)	7.6 (8.4)	A (A)	0.1 (5.1)
Westbound Railway Avenue	Thru	Free	0.08 (0.13)	0 (0)	A (A)	0 (0)
Northbound Highway 16/40	Right	EB Merge	0.16 (0.23)	10.1 (10.6)	B (B)	4.4 (7.3)
Railway Avenue & Service Road (right-in/right-out)						
Westbound Railway Avenue	Thru, Right	Free	0.08 (0.17)	0 (0)	A (A)	0 (0)
Southbound Service Road	Right	Stop	0.01 (0.13)	9.1 (10.8)	A (B)	0.1 (3.4)
Railway Avenue & Simmental Street/Highway 40						
Eastbound Railway Avenue	Left		0.02 (0.01)	10.2 (9.5)	B (A)	1.7 (1.1)
Eastbound Railway Avenue	Thru	Signal	0.37 (0.48)	12.8 (12.9)	B (B)	14.8 (21.7)
Eastbound Railway Avenue	Right		0.01 (0)	0 (0)	A (A)	0 (0)

Approach	Movement	Control	v/c ratio	Delay (s)	LOS	95th % Queue (m)
Railway Avenue & Simmental Street/Highway 40 (continued)						
Westbound Railway Avenue	Left	Signal	0.25 (0.35)	13.7 (15)	B (B)	9.1 (12.5)
Westbound Railway Avenue	Thru		0.26 (0.33)	11.8 (11.6)	B (B)	10.7 (15.5)
Westbound Railway Avenue	Right		0.06 (0.18)	3.9 (4)	A (A)	2.4 (6.2)
Northbound Simmental Street	Left, Thru, Right		0.06 (0.52)	5 (11.4)	A (B)	4.4 (35)
Southbound Highway 40	Left, Thru, Right		0.03 (0.12)	3.1 (3)	A (A)	2.4 (6.1)
Highway 40 & Carlton Trail (East development access)						
Eastbound Highway 40	Left, Thru, Right	Free	0 (0.01)	0 (0.8)	A (A)	0 (0.1)
Westbound Highway 40	Left, Thru, Right	Free	0 (0)	0 (0)	A (A)	0 (0)
Northbound Museum Access	Left, Thru, Right	Stop	0 (0)	0 (0)	A (A)	0 (0)
Southbound Dev Access	Left, Thru, Right	Stop	0 (0.06)	8.6 (9.3)	A (A)	0 (1.6)
Heritage Way & Carlton Trail						
Eastbound Carlton Trail	Left, Thru, Right	Free	0.01 (0.01)	1.3 (1.1)	A (A)	0.3 (0.2)
Westbound Carlton Trail	Left, Thru, Right	Free	0 (0)	1.8 (1.9)	A (A)	0.1 (0.1)
Northbound Heritage Way	Left	Stop	0.05 (0.11)	9.6 (10.1)	A (B)	1.2 (2.9)
Northbound Heritage Way	Thru	Stop	0.05 (0.11)	9.2 (9.4)	A (A)	1.2 (2.9)
Northbound Heritage Way	Right	Stop	0.01 (0.02)	8.7 (8.7)	A (A)	0.2 (0.5)
Southbound Heritage Way	Left	Stop	0 (0)	0 (0)	A (A)	0 (0)
Southbound Heritage Way	Thru	Stop	0.01 (0.02)	9.3 (9.2)	A (A)	0.2 (0.6)
Southbound Heritage Way	Right	Stop	0.01 (0.02)	8.5 (8.6)	A (A)	0.2 (0.6)
Heritage Way & Service Road						
Eastbound Service Road	Left, Thru	Free	0 (0.03)	1.5 (3.3)	A (A)	0 (0.7)
Westbound Service Road	Thru, Right	Free	0 (0.09)	0 (0)	A (A)	0 (0)
Southbound Heritage Way	Left, Right	Stop	0 (0.1)	8.6 (9.8)	A (A)	0 (2.5)

*Note: Airport Road/8 Avenue at Territorial Drive has traffic signal masts installed in the northbound and southbound direction only. Based on the available imagery for the analysis it was assumed that the existing installation is a pedestrian activated signal to facilitate people walking to the high school. In the analysis, this intersection in the 2018 background scenario was modelled to give free-flowing conditions for northbound/southbound traffic, and westbound/eastbound traffic is subject to a stop sign.

Improvement to Existing Conditions

From the City of North Battleford Transportation Master Plan 2017, the Service Road west at Territorial Drive will be closed and the east side will be converted to a right-in/right-out. This configuration relieves the congestion that the intersection currently experiences in its existing geometry.

The study analyzes the 2018 background scenario with the Service Road/Territorial Drive right-in/right-out as part of the upgrades needed to improve traffic flow. Turning movement volumes from the existing configuration are re-routed to match intersection improvement geometry. Existing turning movements that require access to the closed eastbound approach are re-routed to Pioneer Avenue and left turns (from any approach) are re-routed to Carlton Trail. For this analysis, the intersection of Pioneer Avenue/Carlton Trail/Territorial Drive maintains its existing configuration. The modified turning movements used in the improvement scenario analysis are shown in Figure 2-2.

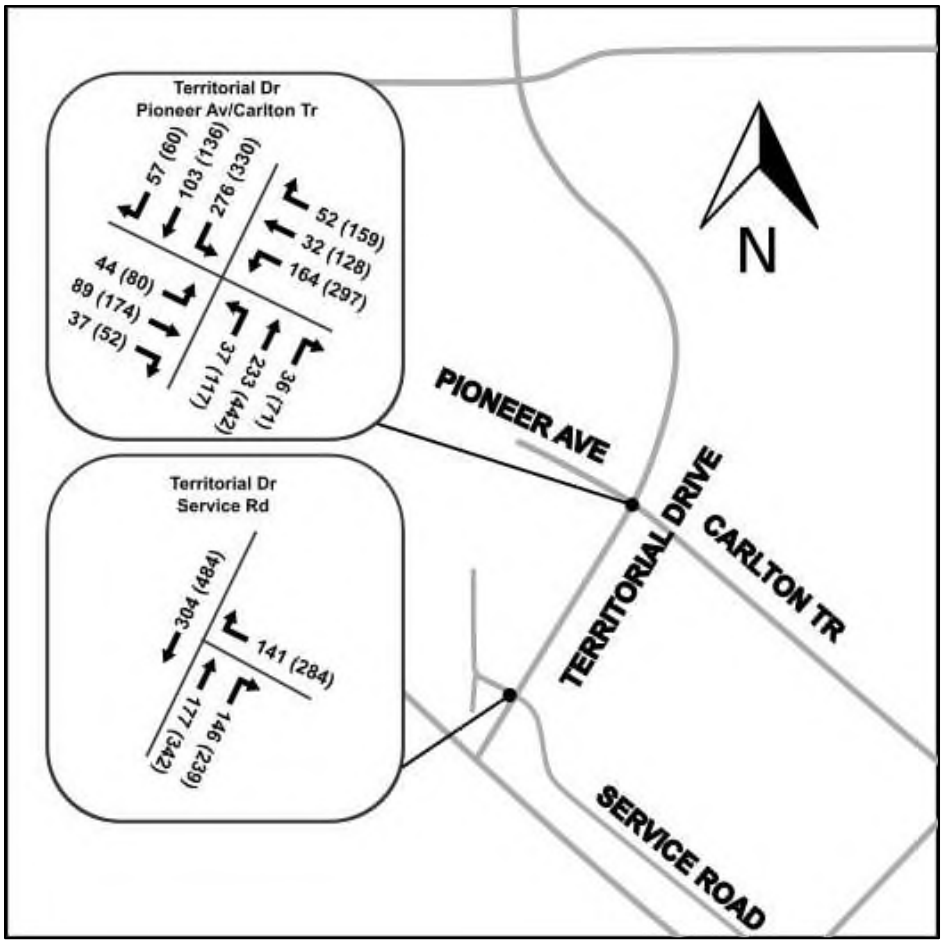


Figure 2-2: Revised Traffic Volumes for Territorial Drive/Service Road Improvement (2018 Background)

The results from the improved Synchro analysis for the 2018 background conditions is included in Appendix C and shown below in Table 2-2. The analysis is performed on the Service Road/Territorial Drive intersection after changing the model geometry to right-in/right-out at the intersection.

Overall, the Service Road/Territorial Drive intersection with previously failing turning movements has improved to an acceptable LOS B. The v/c ratio of the right-in/right-out has dropped to 0.45 and delay to 14.6 seconds. The added traffic impact onto Territorial Drive/Carlton Trail/Pioneer Avenue results in LOS D or better.

Table 2-2: 2018 Background Improved AM (PM) Operating Conditions

Approach	Movement	Control	v/c ratio	Delay (s)	LOS	95th % Queue (m)
Territorial Drive & Pioneer Avenue/Carlton Trail						
Eastbound Pioneer Avenue	Left	Signal	0.16 (0.26)	17.5 (23.1)	B (C)	10.8 (23.0)
Eastbound Pioneer Avenue	Thru, Right		0.17 (0.21)	12.6 (16.3)	B (B)	9.7 (21.4)
Westbound Carlton Trail	Left		0.61 (0.88)	28.0 (52.2)	C (D)	33.5 (99.1)
Westbound Carlton Trail	Thru, Right		0.11 (0.26)	8.4 (9.6)	A (A)	6.0 (18.1)
Northbound Territorial Drive	Left		0.21 (0.56)	27.1 (45.9)	C (D)	12.5 (40.0)
Northbound Territorial Drive	Thru, Right		0.24 (0.61)	13.4 (31.4)	B (C)	20.6 (65.8)
Southbound Territorial Drive	Left		0.82 (0.83)	46.1 (47.8)	D (D)	78.3 (103.9)
Southbound Territorial Drive	Thru, Right		0.09 (0.15)	6.7 (13.5)	A (B)	9.6 (17.6)
Territorial Drive & Service Road						
Westbound Service Road	Right	Yield	0.18 (0.45)	10.3 (14.6)	**B (B)**	5.3 (19.0)
Northbound Territorial Drive	Thru	Free	0.13 (0.23)	0 (0)	A (A)	0 (0)
Northbound Territorial Drive	Right	Yield	0.13 (0.23)	0 (0)	A (A)	0 (0)
Southbound Territorial Drive	Thru	Free	0.10 (0.15)	0 (0)	A (A)	0 (0)

2.2 2038 Background Traffic

City of North Battleford Transportation Master Plan 2017 Intersection Improvements

The 2017 City of North Battleford Transportation Master Plan was prepared for a 25,000 regional population horizon, expected to occur around 2038. The 2038 (20-year) background scenario forecasts the volumes from the 2018 horizon by a linear growth rate factor. This horizon was also analyzed under the geometry of an improved road network outlined by the City of North Battleford Transportation Master Plan 2017 (TMP). The improvements detailed in the TMP are considered for implementation within ten years of the report (by 2027). Thus, this study implements "TMP-improved geometry" for analysis at the 2038 horizon. Figure 2-3 shows the existing lane configuration of the network. Figure 2-4 illustrates the TMP-recommended improvements for the network.

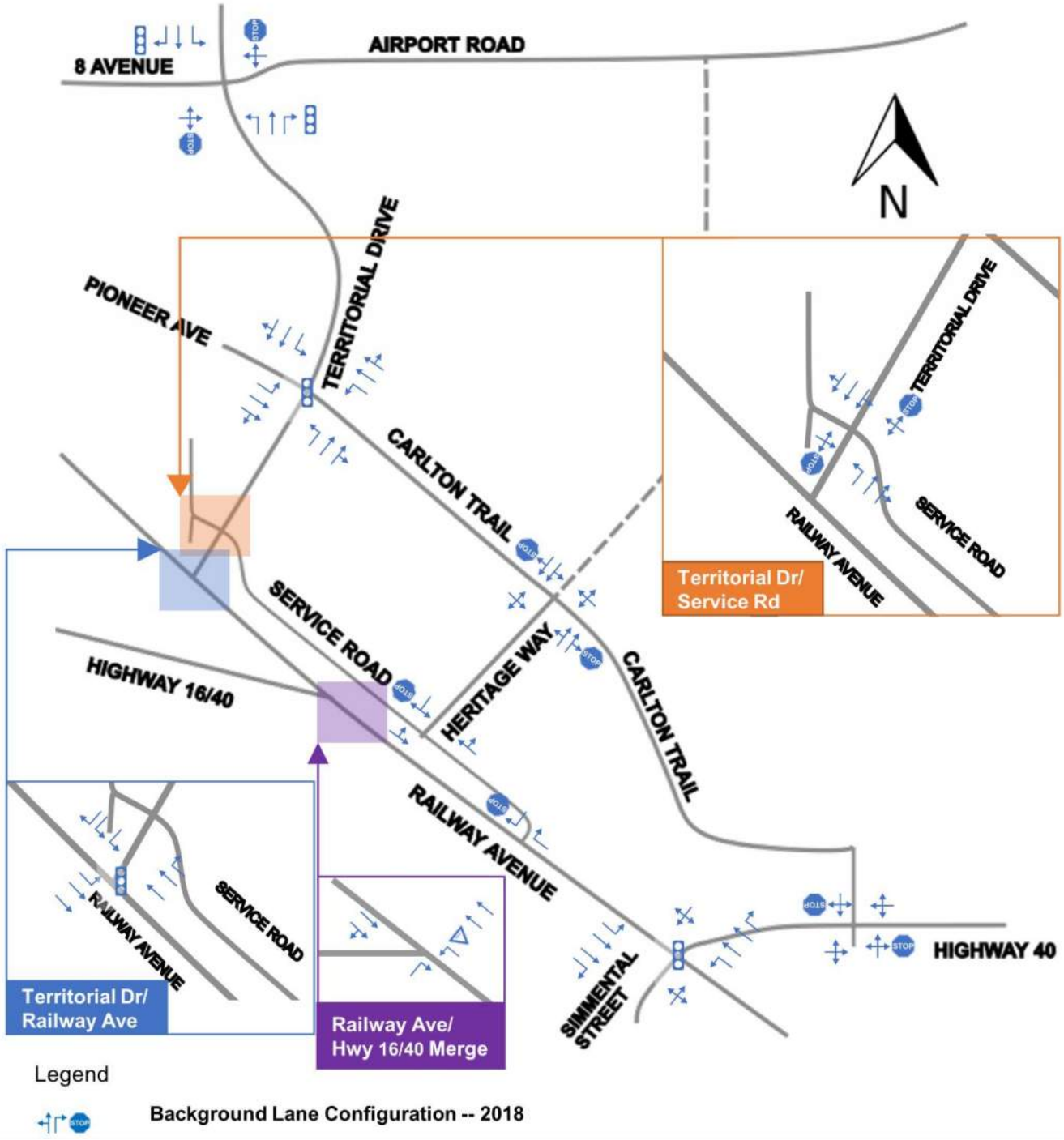


Figure 2-3: Existing (2018) Lane Configuration of Roadway Network

Figure 2-4: Recommended Lane Improvements from City of North Battleford Transportation Master Plan 2017

For all analyses of the 2038 horizon, the geometry of each study intersection will adopt the improvements outlined in the TMP.

Forecasted Traffic Volumes

For the 2038 background scenario, Figure 2-5 summarizes the turning movement volumes inputted into the Synchro model. To account for the new intersection at Territorial Drive and Highway 16/40, some volumes had to be re-routed. Re-routed turning movements include:

- At the Highway 16/40 merge with Railway Avenue, eastbound right-turn movements are eliminated. Traffic is re-routed to the new intersection.
- Assume half of the forecasted eastbound left-turns at Territorial Drive and Railway Avenue will be re-routed to the new intersection. This amount of traffic will also become northbound through traffic at Railway Avenue and Territorial Drive.

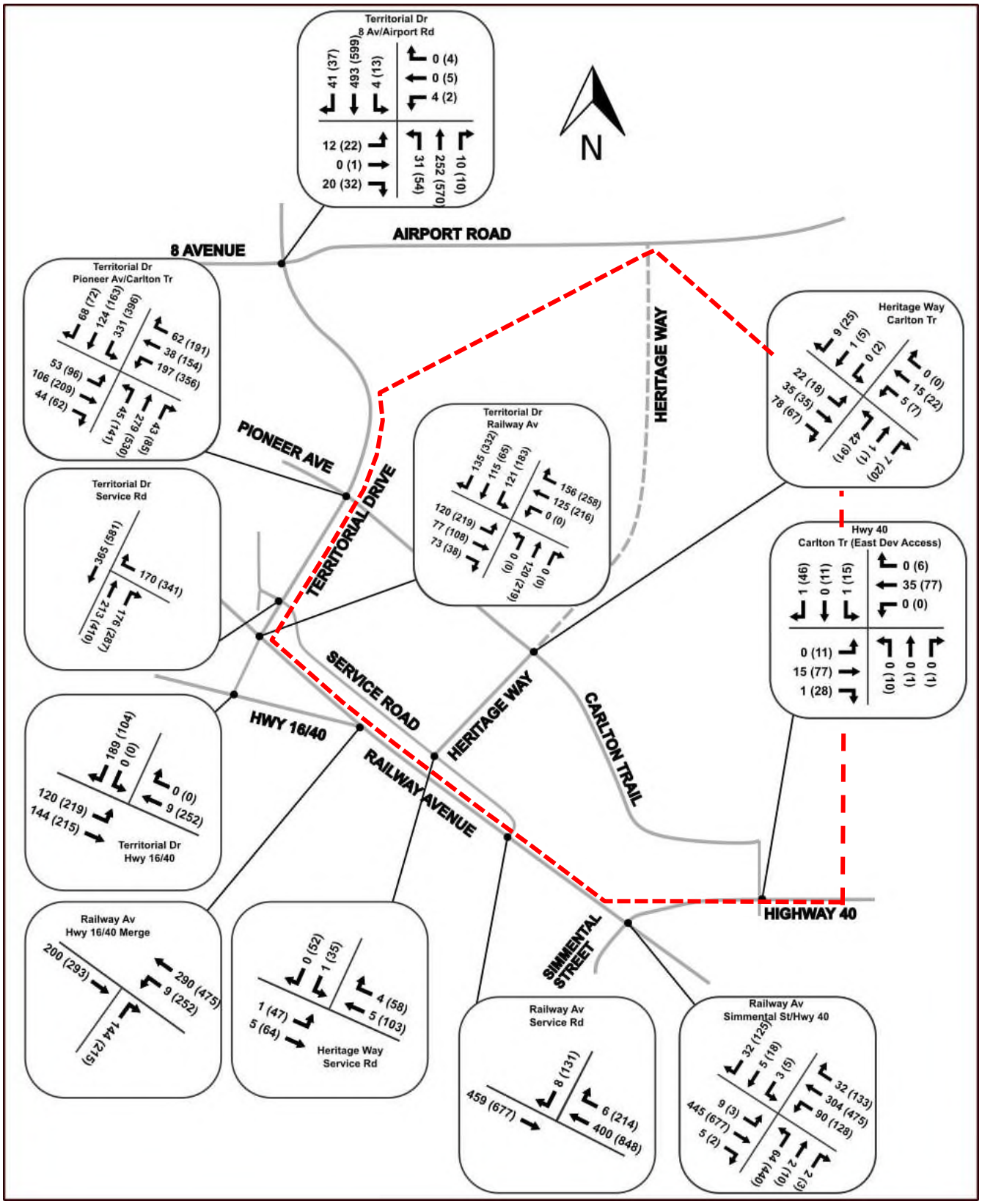


Figure 2-5: 2038 Background AM (PM) Traffic Volumes

Operating Conditions

The results of the Synchro analysis on the roadway network with TMP improved geometry under background volumes in 2038 is attached in Appendix D and shown below in Table 2-4. Overall, most of the existing intersections are operating at acceptable levels of service with moderate delays, except for Simmental Street and Railway Avenue. The northbound approach experiences LOS 'E' in the PM peak hour, where the volume to capacity ratio is 0.98.

Table 2-3: 2038 Background AM (PM) Operating Conditions

Approach	Movement	Control	v/c ratio	Delay (s)	LOS	95th % Queue (m)
Territorial Drive & Airport Road/8 Avenue						
Eastbound 8 Avenue	Left, Thru, Right	Signal	0.12 (0.2)	7.5 (9.5)	A (A)	5 (6.6)
Westbound Airport Road	Left, Thru, Right		0.01 (0.04)	14 (10.9)	B (B)	2 (2.6)
Northbound Territorial Drive	Left, Thru, Right		0.11 (0.27)	1.3 (3)	A (A)	7.4 (18.5)
Southbound Territorial Drive	Left, Thru, Right		0.19 (0.26)	1.4 (2.8)	A (A)	13.3 (17.8)
Territorial Drive & Pioneer Avenue/Carlton Trail						
Eastbound Pioneer Avenue	Left	Signal	0.19 (0.27)	12 (11.5)	B (B)	8.4 (13.2)
Eastbound Pioneer Avenue	Thru, Right		0.2 (0.26)	8.5 (7.8)	A (A)	7.4 (11.9)
Westbound Carlton Trail	Left		0.39 (0.58)	13.5 (14.9)	B (B)	11.5 (20.7)
Westbound Carlton Trail	Thru		0.09 (0.28)	10.8 (11)	B (B)	6.4 (18.2)
Westbound Carlton Trail	Right		0.16 (0.34)	4.7 (4.8)	A (A)	5.5 (11.5)
Northbound Territorial Drive	Left		0.07 (0.31)	5.6 (10.6)	A (B)	5.1 (19.4)
Northbound Territorial Drive	Thru		0.14 (0.36)	5.1 (8.9)	A (A)	10.1 (26.9)
Northbound Territorial Drive	Right		0.05 (0.12)	2.4 (3.1)	A (A)	3.1 (6)
Southbound Territorial Drive	Left		0.29 (0.61)	6.3 (14.7)	A (B)	13.5 (#32.6)
Southbound Territorial Drive	Thru, Right		0.1 (0.16)	3.7 (5.7)	A (A)	5.8 (10)
Territorial Drive & Service Road						
Westbound Service Road	Right	Stop	0.23 (0.60)	10.9 (19.1)	B (C)	7.2 (31.8)
Northbound Territorial Drive	Thru, Right	Free	0.16 (0.27)	0 (0)	A (A)	0 (0)
Southbound Territorial Drive	Thru	Free	0.12 (0.19)	0 (0)	A (A)	0 (0)
Territorial Drive & Railway Avenue						
Eastbound Railway Avenue	Left	Signal	0.51 (0.8)	25.9 (44.2)	C (D)	26.4 (65.2)
Eastbound Railway Avenue	Thru		0.11 (0.13)	17 (18.1)	B (B)	8.5 (12)
Eastbound Railway Avenue	Right		0.2 (0.08)	4.9 (0.7)	A (A)	6.8 (0.9)
Westbound Railway Avenue	Left, Thru		0.19 (0.25)	17.6 (18.9)	B (B)	12.3 (21.5)
Westbound Railway Avenue	Right		0.37 (0.45)	6.2 (5.5)	A (A)	12.3 (16.4)
Northbound Territorial Drive	Left, Thru, Right		0.4 (0.61)	23.7 (28.9)	C (C)	26.6 (46.4)
Southbound Territorial Drive	Left		0.2 (0.26)	15 (20)	B (C)	23.2 (29.1)
Southbound Territorial Drive	Thru		0.22 (0.26)	15.1 (19.9)	B (B)	26.1 (29.7)
Southbound Territorial Drive	Right		0.22 (0.5)	4.5 (5.3)	A (A)	11 (18.3)
Territorial Drive & Highway 16/40						
Eastbound Highway 16/40	Left	Signal	0.23 (0.55)	10.4 (16.4)	B (B)	15.5 (32.1)
Eastbound Highway 16/40	Thru		0.21 (0.31)	9.8 (10.7)	A (B)	17.2 (24.8)
Westbound Highway 16/40	Thru		0.01 (0.37)	8.2 (11.3)	A (B)	2.4 (29.1)
Southbound Territorial Drive	Right		0.16 (0.12)	0.3 (0.3)	A (A)	0 (0)

Approach	Movement	Control	v/c ratio	Delay (s)	LOS	95th % Queue (m)
Railway Avenue & Highway 16/40 Merge						
Eastbound Railway Avenue	Thru, Right	Free	0.09 (0.12)	0 (0)	A (A)	0 (0)
Westbound Railway Avenue	Left	Yield	0.01 (0.22)	7.7 (8.7)	A (A)	0.2 (6.8)
Westbound Railway Avenue	Thru	Free	0.09 (0.15)	0 (0)	A (A)	0 (0)
Northbound Highway 16/40	Right	EB Merge	0.17 (0.27)	9.7 (10.8)	A (B)	4.9 (8.9)
Railway Avenue & Service Road (right-in/right-out)						
Westbound Railway Avenue	Thru	Free	0.13 (0.27)	0 (0)	A (A)	0 (0)
Westbound Railway Avenue	Right	Free	0 (0.14)	0 (0)	A (A)	0 (0)
Southbound Service Road	Right	Stop	0.01 (0.24)	9.6 (13.1)	A (B)	0.3 (7.5)
Railway Avenue & Simmental Street/Highway 40						
Eastbound Railway Avenue	Left	Signal	0.03 (0.01)	9.6 (8.3)	A (A)	2.6 (1.2)
Eastbound Railway Avenue	Thru		0.49 (0.6)	12.9 (13.2)	B (B)	22.7 (35.3)
Eastbound Railway Avenue	Right		0.01 (0)	0 (0)	A (A)	0 (0)
Westbound Railway Avenue	Left		0.4 (0.72)	15.8 (36.8)	B (D)	13.9 (31.1)
Westbound Railway Avenue	Thru		0.33 (0.42)	11.5 (11.2)	B (B)	15.8 (24)
Westbound Railway Avenue	Right		0.07 (0.22)	4.5 (3.2)	A (A)	3.7 (7.5)
Northbound Simmental Street	Left, Thru, Right		0.11 **(0.98)**	6.8 (56.1)	**A (E)**	8.6 (94.5)
Southbound Highway 40	Left, Thru, Right		0.05 (0.21)	3.8 (3.7)	A (A)	4.1 (9.3)
Highway 40 & Carlton Trail (East development access)						
Eastbound Highway 40	Left, Thru, Right	Free	0 (0.01)	0 (0.8)	(A)	0 (0.2)
Westbound Highway 40	Left, Thru, Right	Free	0 (0)	0 (0)	A (A)	0 (0)
Northbound Museum Access	Left, Thru, Right	Stop	0 (0)	0 (0)	A (A)	0 (0)
Southbound Dev Access	Left, Thru, Right	Stop	0 (0.09)	8.7 (9.6)	A (A)	0 (2.4)
Heritage Way & Carlton Trail						
Eastbound Carlton Trail	Left, Thru, Right	Free	0.02 (0.01)	4.1 (3.8)	A (A)	0.4 (0.3)
Westbound Carlton Trail	Left, Thru, Right	Free	0 (0.01)	1.8 (1.9)	A (A)	0.1 (0.1)
Northbound Heritage Way	Left	Stop	0.06 (0.14)	10 (10.7)	B (B)	1.6 (3.8)
Northbound Heritage Way	Thru	Stop	0.01 (0.02)	8.7 (8.7)	A (A)	0.2 (0.6)
Northbound Heritage Way	Right	Stop	0.06 (0.14)	10 (10.7)	B (B)	1.6 (3.8)
Southbound Heritage Way	Left	Stop	0 (0.01)	0 (9.9)	A (A)	0 (0.1)
Southbound Heritage Way	Thru	Stop	0.01 (0.03)	8.5 (8.7)	A (A)	0.2 (0.7)
Southbound Heritage Way	Right	Stop	0 (0.03)	10.3 (8.7)	B (A)	0 (0.7)
Heritage Way & Service Road						
Eastbound Service Road	Left, Thru	Free	0 (0.04)	1.2 (3.4)	A (A)	0 (0.9)
Westbound Service Road	Thru, Right	Free	0.01 (0.1)	0 (0)	A (A)	0 (0)
Southbound Heritage Way	Left, Right	Stop	0 (0.12)	8.6 (10.2)	A (B)	0 (3.3)

Improvements to 2038 Background Conditions

The 2018 background scenario recommended that Territorial Drive and Service Road be converted to a right-in/right-out intersection. At the 2038 background scenario, the recommended configuration performs at acceptable conditions and no further improvements are required at this intersection.

As observed from the analysis of the 2038 background scenario, the intersection of Simmental Street/Highway 40 and Railway Avenue is operating near capacity at a volume to capacity ratio of 0.98 for the northbound movement. The following improvements are proposed:

- A dedicated left-turn lane on Simmental Street to accommodate the significant volume of northbound left-turning traffic observed at the 2038 background forecast
- A dedicated left-turn lane on Highway 40 (southbound approach)
- All approaches will allow protected and permissive left turns per cycle

The results of the Synchro analysis for the improved condition of Simmental Street/Highway 40 and Railway Avenue is attached in Appendix E and shown below in Table 2-5. Overall, the addition of a dedicated left-turn lane at Simmental Street and Highway 40 and protected/permissive left turns have improved the operating conditions of this intersection. The northbound left-turning movement v/c ratio decreases to 0.76 in the PM peak (LOS E to C), and the westbound left-turning movement v/c ratio decreases to 0.62 (LOS D to C). All other traffic movements maintain acceptable conditions (LOS C or better and volume to capacity ratio 0.82 or lower).

Table 2-4: 2038 Background Improved AM (PM) Operating Conditions

Approach	Movement	Control	v/c ratio	Delay (s)	LOS	95th % Queue (m)
Railway Avenue & Simmental Street/Highway 40						
Eastbound Railway Avenue	Left	Signal	0.03 (0.01)	11.1 (13.3)	B (B)	3.1 (1.7)
Eastbound Railway Avenue	Thru		0.58 (0.82)	22.4 (33.4)	C (C)	40.2 (76.4)
Eastbound Railway Avenue	Right		0.01 (0)	0 (0)	A (A)	0 (0)
Westbound Railway Avenue	Left		0.29 (0.62)	13.5 (29.6)	B (C)	15.2 (28.9)
Westbound Railway Avenue	Thru		0.27 (0.44)	14.3 (19.2)	B (B)	27.2 (47.4)
Westbound Railway Avenue	Right		0.05 (0.21)	0.2 (1.3)	A (A)	0 (2.5)
Northbound Simmental Street	Left		0.12 (0.76)	10.9 (23.7)	**B (C)**	11.8 (85.9)
Northbound Simmental Street	Thru, Right		0.01 (0.02)	12.0 (11.6)	B (B)	2.1 (4.5)
Southbound Highway 40	Left		0 (0.01)	10.3 (10.4)	B (B)	1.5 (1.9)
Southbound Highway 40	Thru, Right		0.07 (0.28)	8.0 (7.2)	A (A)	6.6 (15.2)

3.0 Site-Generated Traffic

3.1 Trip Generation

Trip generation rates have been assigned to the study site with respect to the various land uses proposed for the development. This report assumes that the following land uses are developed:

- 19.38 hectares of regional commercial shopping centres
- 1.05 hectares of neighbourhood commercial shopping centres
- 8.88 hectares of cemetery
- 15.07 hectares of low density residential for approximately 893 residents
- 10.10 hectares of residential townhomes for approximately 1266 residents
- 4.41 hectares of residential apartments for approximately 663 residents

From the above list, as a conservative assumption, this report assumes that the above land uses are developed simultaneously by the 2038 horizon.

Per the South East Quadrant Residential and Retail Opportunity Assessment (Urban Systems Ltd. 2018), a floor area ratio of 0.25 is applied to the proposed neighbourhood commercial/regional commercial land uses to determine a gross leasable area (GLA) value.

Additionally, appropriate conversion factors were applied to convert the proposed land allocations from hectares (ha) to acres (ac) or per thousand square feet (KSF).

For the proposed residential land uses, dwelling units were determined from the factors established in the Fairview Heights Master Plan (AECOM 2016).

A summary of conversion factors is found below in Table 3-1.

Table 3-1: Conversion Summary/Analysis Quantities

Proposed Land Use	Parameter (units)	Conversion Factor	Reference	*Analysis Quantities*
Regional commercial	19.38 ha	0.25 Floor-to-area ratio 1 ha = 107.639 KSF	South East Quadrant Residential and Retail Opportunity Assessment Metric to imperial conversion	522 KSF GLA
Neighbourhood commercial	1.05 ha	0.25 Floor-to-area ratio 1 ha = 107.64 KSF	South East Quadrant Residential and Retail Opportunity Assessment Metric to imperial conversion	28 KSF GLA
Cemetery	8.88 ha	1 ha = 2.47 ac	Metric to imperial conversion	22 ac
Low density residential	15.07 ha	1 ha = 19.5 dwelling units	Fairview Master Plan	294 dwelling units
Multi-family townhouse	10.10 ha	1 ha = 49 dwelling units	Fairview Master Plan	495 dwelling units
Multi-family apartment	4.41 ha	1 ha = 100 dwelling units	Fairview Master Plan	441 dwelling units

Table 3-2 summarizes the trip generation for this development.

Table 3-2: Trip Generation for Proposed Development

Proposed Land Use	Equivalent Land Use in *Trip Gen. Manual*	ITE Code	Unit	Quantity	Trip Generation Rate (vph/unit)	Vehicle Trips				
						In	Out	In	Out	Total
AM Peak Hour										
Regional Commercial	Shopping centre	820	KSF GLA	522	0.94	62%	38%	304	186	490
Cemetery	Cemetery	566	Acres	22	0.17	80%	20%	3	1	4
Multi-family townhouse	Multi-family housing (low-rise)	220	Dwelling units	495	0.46	23%	77%	52	175	228
Neighbourhood commercial	Shopping centre	820	KSF GLA	28	0.94	62%	38%	16	10	27
Multi-family apartment	Multi-family housing (midrise)	221	Dwelling units	441	0.36	26%	74%	41	118	159
Low density residential	Single-family detached housing	210	Dwelling units	294	0.74	25%	75%	55	163	218
PM Peak Hour										
Regional Commercial	Shopping centre	820	KSF GLA	522	3.81	48%	52%	954	1033	1987
Cemetery	Cemetery	566	Acres	22	0.46	31%	69%	3	7	10
Multi-family townhouse	Multi-family housing (low-rise)	220	Dwelling units	495	0.56	63%	37%	175	103	277
Neighbourhood commercial	Shopping centre	820	KSF GLA	28	3.81	48%	52%	52	56	108
Multi-family apartment	Multi-family housing (midrise)	221	Dwelling units	441	0.44	61%	39%	118	76	194
Low density residential	Single-family detached housing	210	Dwelling units	294	0.99	63%	37%	183	108	291

3.2 Pass-by Trips

For the proposed regional commercial land uses along the perimeter of the study site (accessed from Territorial Drive), the trip generation rate is reduced according to a factor that yields an acceptable amount of pass-by traffic. Pass-by traffic are trips that is otherwise on the network (accounted for in background traffic counts) but accesses the development and later continues in the direction of original travel. The number of trips generated have been reduced accordingly to account for pass-by traffic that is not newly site-generated traffic to the network. This deduction applies to overall through traffic on Territorial Drive. Pass-by traffic deductions have been based on ITE *Trip Generation Manual* recommendations.

A pass-by reduction factor of 35% was applied to the proposed regional commercial land use and the deductions are applied to background through traffic on Territorial Drive at Carlton Trail/Pioneer Avenue, as well as turning traffic from Pioneer Avenue (eastbound approach) onto Territorial Drive. Other site accesses, such as the intersections at Service Road or east development access at Highway 40 were not considered for pass-by

reductions. The site accesses from Service Road (either from Territorial Drive or Railway Avenue) were not considered for reduction because pass-by traffic must have been accounted for in the background traffic forecasts. The site access at Carlton Trail (east development access) and Highway 40 was not considered because of the intersection's far proximity from the proposed commercial land uses.

3.3 Internalization and Trip Distribution

As the proposed development is mixed-use with residential and commercial land uses, an estimated 15% internalization rate was assumed for synergies between the proposed land uses. This value accounts for internalization of trips within the study area and reduces the site-generated traffic impacts on the intersections external to the development. Per the City of North Battleford Transportation Master Plan 2017, site-generated trips are distributed to the four general directions: north, west, south, and east.

3.4 Trip Assignment

Development trips are assigned on various roadways around the study site. New trips to/from the site are expected to enter/exit the development based on the most convenient route, depending on the general direction of the trip's origin/destination. Some trip assignments enter the development via one route and exit via another due to turn restrictions at Service Road/Railway Avenue and Railway Avenue/the Highway 16/40 merge. Notably, since the site-generated trips coincide with the expected build-out of the development in 2038, trips were assigned along the future extension of Heritage Way to Airport Road, allowing access to Territorial Drive and 8 Avenue for trips generally destined north and west of the study site. Based on the trip distribution assumptions outlined above, the site generated volumes are calculated throughout the surrounding road network of the study site. Figure 3-1 illustrates the total development peak hour volumes under the full build-out horizon (2038).

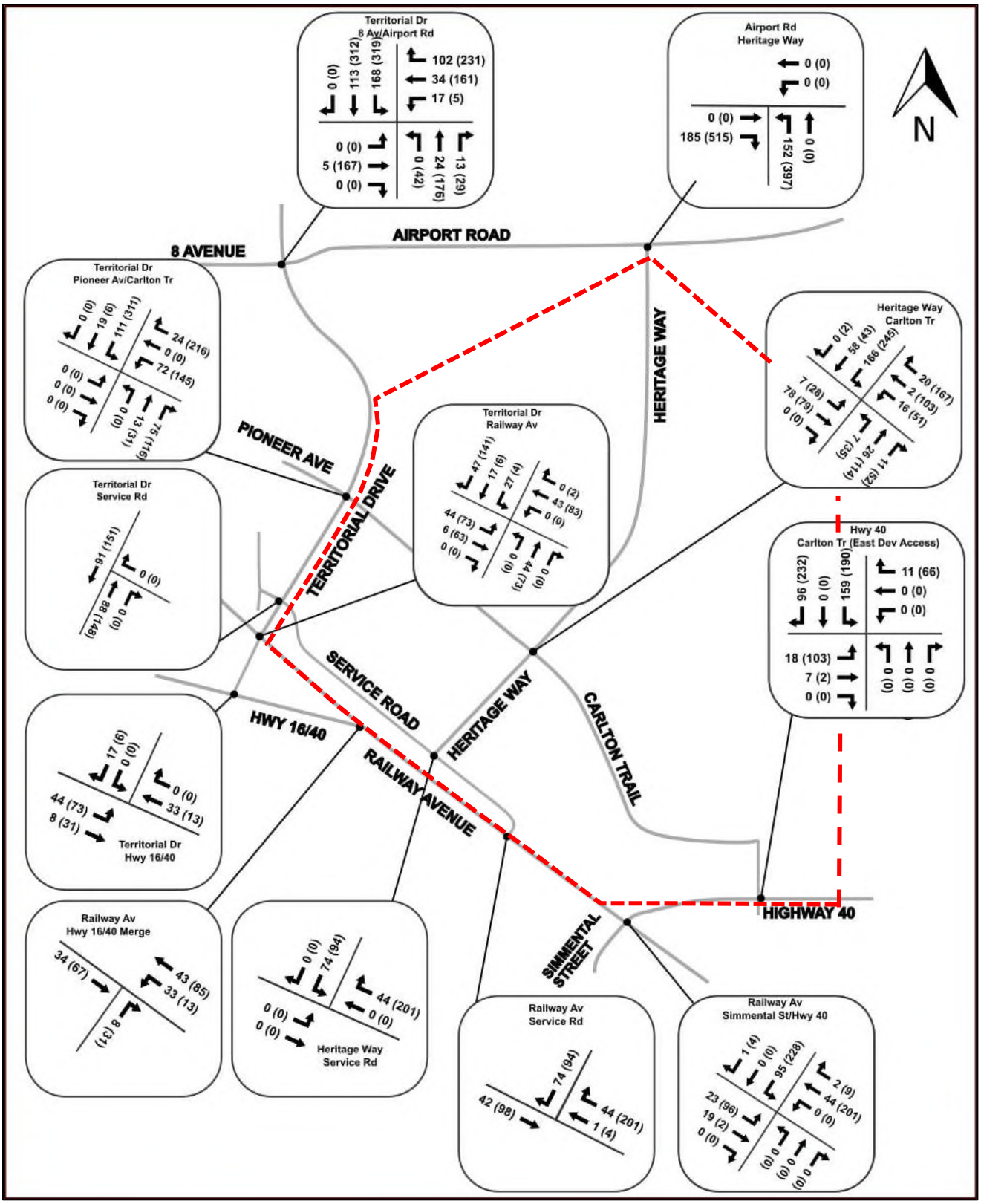


Figure 3-1 Site Generated Trips AM (PM)

4.0 Post-Development Horizon

Post-Development Traffic Volumes

This section provides a summary of traffic analysis of post-development scenarios under the 2038 horizon. Post-development (sum of background and development) traffic volumes are illustrated in Figure 4-1.

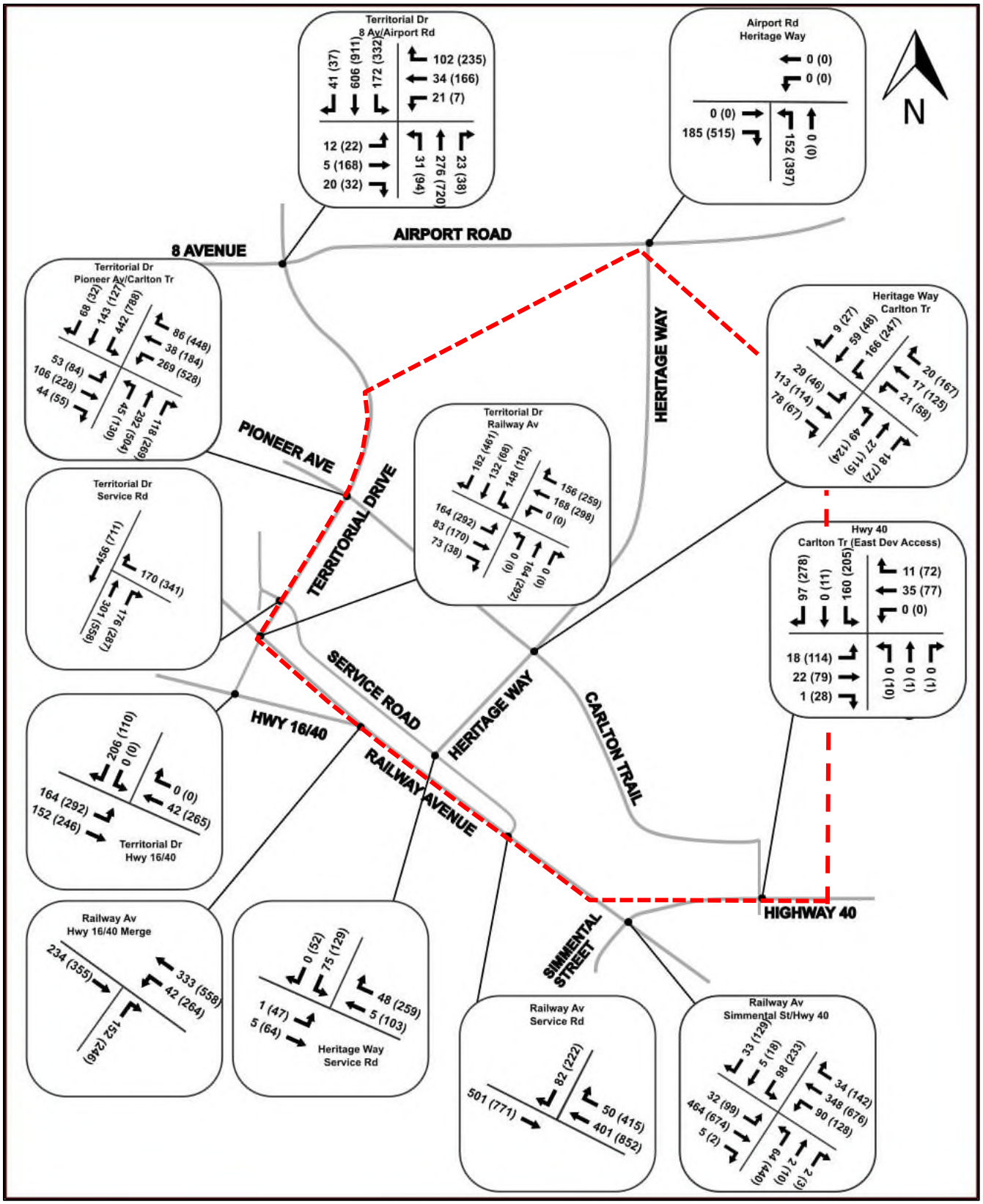


Figure 4-1 2038 Post-Development Trips AM (PM)

Operating Conditions

Traffic analysis was conducted for the 2038 post-development scenario assuming TMP improved geometry, but not including the improvements recommended under the 2038 background scenario at Simmental Street/Highway 40 and Railway Avenue. The results of the analysis are attached in Appendix F and shown below in Table 4-1.

Table 4-1: 2038 Post-Development AM (PM) Operating Conditions

Approach	Movement	Control	v/c ratio	Delay (s)	LOS	95th % Queue (m)
Territorial Drive & Airport Road/8 Avenue						
Eastbound 8 Avenue	Left, Thru, Right	Signal	0.12 (0.41)	8 (11.5)	A (B)	5.2 (24.4)
Westbound Airport Road	Left, Thru, Right		0.42 (0.72)	8.6 (16.9)	A (B)	12.3 (44.7)
Northbound Territorial Drive	Left, Thru, Right		0.19 (0.99)	4.4 (44)	A (D)	10.7 (79.8)
Southbound Territorial Drive	Left, Thru, Right		0.50 **(1.74)**	6.7 **(258.2)**	**A (F)**	32.8 (132.3)
Territorial Drive & Pioneer Avenue/Carlton Trail						
Eastbound Pioneer Avenue	Left	Signal	0.17 (0.21)	11.2 (10.4)	B (B)	8.4 (11.8)
Eastbound Pioneer Avenue	Thru, Right		0.18 (0.23)	7.9 (7.7)	A (A)	7.3 (12.6)
Westbound Carlton Trail	Left		0.48 (0.76)	14.3 (19.6)	B (B)	15.2 (35.4)
Westbound Carlton Trail	Thru		0.09 (0.29)	10.1 (10.6)	B (B)	6.3 (21.4)
Westbound Carlton Trail	Right		0.19 (0.69)	4.2 (12.9)	A (B)	6.3 (43.3)
Northbound Territorial Drive	Left		0.08 (0.28)	6.6 (11.1)	A (B)	6.2 (17.4)
Northbound Territorial Drive	Thru		0.18 (0.37)	6.2 (10.1)	A (B)	12.6 (25.5)
Northbound Territorial Drive	Right		0.15 (0.35)	2.3 (2.9)	A (A)	6.1 (10.5)
Southbound Territorial Drive	Left		0.47 **(1.29)**	8.8 **(160.7)**	**A (F)**	22.7 (79.0)
Southbound Territorial Drive	Thru, Right		0.13 (0.12)	4.4 (7.2)	A (A)	7.6 (7.9)
Territorial Drive & Service Road						
Westbound Service Road	Right	Stop	0.25 (0.68)	11.5 (24.2)	B (C)	7.9 (40.8)
Northbound Territorial Drive	Thru, Right	Free	0.18 (0.30)	0 (0)	A (A)	0 (0)
Southbound Territorial Drive	Thru	Free	0.15 (0.23)	0 (0)	A (A)	0 (0)
Territorial Drive & Railway Avenue						
Eastbound Railway Avenue	Left	Signal	0.65 **(1.12)**	31.5 **(118.8)**	**C (F)**	37.8 (96.9)
Eastbound Railway Avenue	Thru		0.11 (0.19)	17.3 (19.1)	B (B)	9.3 (17.4)
Eastbound Railway Avenue	Right		0.18 (0.08)	4.6 (0.6)	A (A)	6.9 (0.9)
Westbound Railway Avenue	Left, Thru		0.22 (0.33)	18.1 (20.2)	B (C)	16.4 (28.6)
Westbound Railway Avenue	Right		0.34 (0.44)	5.8 (5.3)	A (A)	12.5 (16.5)
Northbound Territorial Drive	Left, Thru, Right		0.5 (0.73)	26 (33.7)	C (C)	35.5 (62.2)
Southbound Territorial Drive	Left		0.26 (0.29)	17.8 (21.3)	B (C)	30 (29.5)
Southbound Territorial Drive	Thru		0.27 (0.28)	17.8 (21.1)	B (C)	32.3 (29.7)
Southbound Territorial Drive	Right		0.3 (0.62)	4.8 (6.2)	A (A)	13.5 (21.2)
Territorial Drive & Highway 16/40						
Eastbound Highway 16/40	Left	Signal	0.33 (0.76)	11.5 (27.3)	B (C)	21 (56.8)
Eastbound Highway 16/40	Thru		0.22 (0.36)	9.9 (11.2)	A (B)	18 (28.2)
Westbound Highway 16/40	Thru		0.06 (0.39)	8.7 (11.5)	A (B)	6.6 (30.5)
Southbound Territorial Drive	Right		0.19 (0.13)	0.3 (0.3)	A (A)	0 (0)

Approach	Movement	Control	v/c ratio	Delay (s)	LOS	95th % Queue (m)
Railway Avenue & Highway 16/40 Merge						
Eastbound Railway Avenue	Thru, Right	Free	0.1 (0.15)	0 (0)	A (A)	0 (0)
Westbound Railway Avenue	Left	Yield	0.04 (0.25)	7.9 (9.1)	A (A)	0.9 (7.7)
Westbound Railway Avenue	Thru	Free	0.11 (0.18)	0 (0)	A (A)	0 (0)
Northbound Highway 16/40	Right	EB Merge	0.18 (0.33)	9.9 (11.5)	A (B)	5.4 (11.4)
Railway Avenue & Service Road (right-in/right-out)						
Westbound Railway Avenue	Thru	Free	0.13 (0.27)	0 (0)	A (A)	0 (0)
Westbound Railway Avenue	Right	Free	0.03 (0.27)	0 (0)	A (A)	0 (0)
Southbound Service Road	Right	Stop	0.11 (0.4)	10.1 (14.8)	B (B)	3 (15.2)
Railway Avenue & Simmental Street/Highway 40						
Eastbound Railway Avenue	Left	Signal	0.12 (0.55)	10.7 (22.6)	B (C)	5.9 (22.5)
Eastbound Railway Avenue	Thru		0.5 (0.58)	12.9 (12.9)	B (B)	23.7 (35.1)
Eastbound Railway Avenue	Right		0.01 (0)	0 (0)	A (A)	0 (0)
Westbound Railway Avenue	Left		0.4 (0.7)	16.1 (34.2)	B (C)	14 (30.8)
Westbound Railway Avenue	Thru		0.37 (0.59)	11.7 (13)	B (B)	17.8 (35.3)
Westbound Railway Avenue	Right		0.08 (0.23)	4.5 (3.2)	A (A)	3.9 (7.7)
Northbound Simmental Street	Left, Thru, Right		0.12 **(1.15)**	7.1 **(111.2)**	**A (F)**	8.9 (100.8)
Southbound Highway 40	Left, Thru, Right		0.22 (0.72)	6.5 (20)	A (B)	13.7 (64.9)
Highway 40 & Carlton Trail (East development access)						
Eastbound Highway 40	Left, Thru, Right	Free	0.01 (0.09)	3.3 (4.4)	A (A)	0.3 (2.3)
Westbound Highway 40	Left, Thru, Right	Free	0 (0)	0 (0)	A (A)	0 (0)
Northbound Museum Access	Left, Thru, Right	Stop	0 (0)	0 (0)	A (A)	0 (0)
Southbound Dev Access	Left, Thru, Right	Stop	0.3 (0.83)	10.6 (32)	B (D)	10.3 (71.4)
Heritage Way & Carlton Trail						
Eastbound Carlton Trail	Left	Free	0.02 (0.04)	2.6 (3.8)	A (A)	0.5 (1)
Eastbound Carlton Trail	Thru, Right	Free	0.09 (0.08)	0 (0)	A (A)	0 (0)
Westbound Carlton Trail	Left, Thru, Right	Free	0.02 (0.05)	2.9 (1.6)	A (A)	0.4 (1.2)
Northbound Heritage Way	Left	Stop	0.13 (0.68)	12.9 **(40.2)**	**B (E)**	3.5 (36.7)
Northbound Heritage Way	Thru	Stop	0.05 (0.27)	10.1 (14.6)	B (B)	1.2 (8.8)
Northbound Heritage Way	Right	Stop	0.05 (0.27)	10.1 (14.6)	B (B)	1.2 (8.8)
Southbound Heritage Way	Left	Stop	0.34 **(1.33)**	13.7 **(219.5)**	**B (F)**	12 (128.2)
Southbound Heritage Way	Thru	Stop	0.34 **(1.33)**	12.4 **(116.3)**	**B (F)**	12 (128.2)
Southbound Heritage Way	Right	Stop	0.07 (0.11)	11.2 (13.2)	B (B)	1.7 (3)
Heritage Way & Service Road						
Eastbound Service Road	Left, Thru	Free	0 (0.04)	1.2 (3.7)	A (A)	0 (1.1)
Westbound Service Road	Thru, Right	Free	0.03 (0.23)	0 (0)	A (A)	0 (0)
Southbound Heritage Way	Left, Right	Stop	0.08 (0.32)	9 (13.7)	A (B)	2.2 (11.7)
Heritage Way & Airport Road						
Eastbound Airport Road	Thru, Right	Free	0.12 (0.33)	0 (0)	A (A)	0 (0)
Northbound Heritage Way	Left, Right	Stop	0.18 (0.61)	9.9 (17.6)	A (C)	5.4 (33.2)

The northbound movement of Simmental Street/Highway 40/Railway Avenue is failing (LOS F) at a volume to capacity ratio of 1.15 and control delay of 110 seconds during the PM peak hour.

The southbound movement of Territorial Drive and Airport Road/8 Avenue also fails (LOS F) in the PM peak hour with a volume to capacity ratio of 1.74 and control delay of approximately 260 seconds.

The southbound left-turn movement of Territorial Drive onto Carlton Trail fails (LOS F) at a volume to capacity ratio of 1.29 and control delay of approximately 160 seconds in the PM peak hour.

The eastbound left-turn movement of Railway Avenue onto Territorial Drive fails (LOS F) at a volume to capacity ratio of 1.12 and control delay of approximately 120 seconds in the PM peak hour.

The southbound left-turning and through movements of Heritage Way at Carlton Trail (unsignalized intersection) are failing (LOS F) at a volume to capacity ratio of 1.33 for each movement in the PM peak hour. The control delay for the left-turning movement is approximately 220 seconds and for the through movement approximately 120 seconds in the PM peak hour. The northbound left-turning movement at this intersection is approaching failure due to a control delay of approximately 40 seconds.

Improvements to 2038 Post-Development Conditions

The intersection of Simmental Street/Highway 40 and Railway Avenue is operating beyond capacity for the 2038 post-development scenario. It is proposed that the northbound and southbound approaches be re-configured to include a dedicated left-turning lane to accommodate the significant volume of left-turning traffic for the northbound approach. Additionally, a signal phasing improvement of each approach adopting a permissive and protected left turn is implemented in the analysis.

Territorial Drive and Airport Road/8 Avenue is an important intersection for 2038 post-development traffic as the north development access at Airport Road and Heritage Way is accessed via Territorial Drive. To accommodate the significant volume of left-turning volumes at the southbound approach, as well as the significant volume of right-turning traffic at the westbound approach, the following improvements are proposed:

- Dedicated left-turning lanes at the northbound and southbound approaches
- Dedicated right-turning lane at the westbound approach
- All left turns in the signal cycle are protected and permissive

Territorial Drive and Carlton Trail is an important intersection for 2038 post-development traffic as it functions as the western development access for the study site. For the 2038 post-development scenario, the southbound left-turning movement fails at v/c 1.29 with a control delay of 160 seconds. The proposed improvement is to protect all left turns while maintaining TMP-recommended geometry. Since the westbound and southbound approaches allow dual left-turns (as recommended by TMP), no permissive left-turning movements should be allowed.

The eastbound left-turning movement from Railway Avenue onto Territorial Drive operates beyond capacity for the 2038 post-development scenario (v/c 1.15) and control delay of 130 seconds. The TMP-recommended geometry for the southbound approach includes a dedicated left-turn lane, a shared left/through lane, and a channelized right-turn lane. The proposed intersection improvements to alleviate the congestion for the eastbound left-turn movement is as follows:

- Eastbound left-turns and southbound left-turns will undergo a protected and permissive phase in the signal cycle. Northbound and westbound movements will remain permissive.
- The TMP geometry for the southbound approach is **rejected** and the proposed laneage is a dedicated left-turning lane, through lane, and channelized right-turning lane. This proposed improvement is suggested to avoid the TMP recommendation bottlenecking through traffic movements on a shared left/through lane.

The unsignalized intersection of Heritage Way and Carlton Trail has multiple movements approaching or exceeding capacity. The intersection is proposed to be signalized to alleviate the congestion experienced by traffic in the post-development scenario.

Further to the above proposed changes, the southbound approach for Carlton Trail (east development access) and Highway 40 is approaching capacity at a v/c ratio of 0.85. To accommodate the post-development traffic demand for trips heading east along Highway 40, a dedicated left-turn lane for the southbound approach is proposed.

The results of the Synchro analysis for the improved condition is attached in Appendix G and shown below in Table 4-2. Overall, the proposed recommendations improve the operating conditions of the network overall (LOS E/F to LOS D or better), with one exception. Upon improving the previously failing Territorial Drive and Pioneer Avenue/Carlton Trail southbound left-turning movement by protecting all left turns, the eastbound and northbound left-turning movements experience a control delay of approximately 60-70 seconds (LOS E). Since the southbound left-turning movements are more significant in quantity (790 vehicles for SB LT compared to 130 for NB LT and 80 for EB LT), and the control delay does not fail the turning movement operation, geometric improvements are not required for eastbound and northbound left-turns.

Table 4-2: 2038 Post-Development Improved AM (PM) Operating Conditions

Approach	Movement	Control	v/c ratio	Delay (s)	LOS	95th % Queue (m)
Territorial Drive & Airport Road/8 Avenue						
Eastbound 8 Avenue	Left, Thru, Right	Signal	0.16 (0.65)	12.1 (31.6)	B (C)	7.3 (49)
Westbound Airport Road	Left, Thru		0.24 (0.49)	18.8 (27.5)	B (C)	12 (39)
Westbound Airport Road	Right		0.28 (0.48)	3.2 (6.7)	A (A)	4.5 (16.4)
Northbound Territorial Drive	Left		0.06 (0.3)	3.8 (9.4)	A (A)	3 (10.6)
Northbound Territorial Drive	Thru, Right		0.17 (0.62)	8.2 (20.2)	A (C)	15.4 (72.7)
Southbound Territorial Drive	Left		0.26 (0.69)	4.5 (15.6)	**A (B)**	11.4 (49)
Southbound Territorial Drive	Thru, Right		0.3 (0.55)	5.7 (12.6)	**A (B)**	33.4 (71.2)
Territorial Drive & Pioneer Avenue/Carlton Trail						
Eastbound Pioneer Avenue	Left	Signal	0.33 (0.64)	30 **(70.8)**	**C (E)**	17.6 (45.3)
Eastbound Pioneer Avenue	Thru, Right		0.37 (0.65)	21.1 (48.4)	C (D)	15.2 (48.5)
Westbound Carlton Trail	Left		0.73 (0.85)	40.6 (54.6)	D (D)	36.7 (95.2)
Westbound Carlton Trail	Thru		0.11 (0.43)	24.9 (37.2)	C (D)	12.5 (60.6)
Westbound Carlton Trail	Right		0.19 (0.64)	0.8 (7.3)	A (A)	0 (27.2)
Northbound Territorial Drive	Left		0.29 (0.64)	32.6 **(58.9)**	**C (E)**	15.8 (52.5)
Northbound Territorial Drive	Thru		0.3 (0.71)	18.9 (46.3)	B (D)	27.1 (86.2)
Northbound Territorial Drive	Right		0.21 (0.51)	1.2 (8.1)	A (A)	2 (23.7)
Southbound Territorial Drive	Left		0.74 (0.88)	33 (48.5)	**C (D)**	50.3 (126.6)
Southbound Territorial Drive	Thru, Right		0.15 (0.13)	8.7 (20)	A (C)	13.5 (20.7)
Territorial Drive & Railway Avenue						
Eastbound Railway Avenue	Left	Signal	0.53 (0.88)	25.8 (48.4)	**C (D)**	35.2 (79.6)
Eastbound Railway Avenue	Thru		0.09 (0.15)	18.2 (17.3)	B (B)	9.7 (16.9)
Eastbound Railway Avenue	Right		0.15 (0.07)	5.4 (1.4)	A (A)	8.3 (2)
Westbound Railway Avenue	Left, Thru		0.41 (0.56)	31.3 (33.2)	C (C)	21.8 (36.6)
Westbound Railway Avenue	Right		0.49 (0.57)	10.3 (8.8)	B (A)	15.9 (19.4)
Northbound Territorial Drive	Left, Thru, Right		0.37 (0.71)	24.6 (38.3)	C (D)	38.7 (85.4)
Southbound Territorial Drive	Left		0.22 (0.35)	8.2 (11.9)	A (B)	19.2 (29.2)
Southbound Territorial Drive	Thru		0.13 (0.07)	7.6 (9.7)	A (A)	17.2 (12.4)
Southbound Territorial Drive	Right		0.2 (0.47)	1.8 (3)	A (A)	8.1 (16.4)
Railway Avenue & Simmental Street/Highway 40						
Eastbound Railway Avenue	Left	Signal	0.09 (0.46)	12 (20.8)	B (C)	7 (19.2)
Eastbound Railway Avenue	Thru		0.6 (0.82)	23.5 (33.1)	C (C)	41.9 (76.0)
Eastbound Railway Avenue	Right		0.01 (0)	0 (0)	A (A)	0 (0)
Westbound Railway Avenue	Left		0.31 (0.59)	14.5 (26.4)	B (C)	15.3 (25.2)
Westbound Railway Avenue	Thru		0.35 (0.82)	17.4 (33.3)	B (C)	31.1 (76.4)
Westbound Railway Avenue	Right		0.06 (0.3)	0.2 (5.3)	A (A)	0 (11.6)
Northbound Simmental Street	Left		0.12 (0.78)	10.9 (25.6)	**B (C)**	11.7 (90.1)
Northbound Simmental Street	Thru, Right		0.01 (0.03)	13.8 (16.5)	**B (B)**	2.1 (5)
Southbound Highway 40	Left		0.18 (0.41)	11.3 (13.6)	B (B)	16.5 (34.7)
Southbound Highway 40	Thru, Right		0.07 (0.29)	7.8 (7.2)	A (A)	6.7 (15.3)
Highway 40 & Carlton Trail (East development access)						
Eastbound Highway 40	Left, Thru, Right	Free	0.01 (0.09)	3.3 (4.4)	A (A)	0.3 (2.3)
Westbound Highway 40	Left, Thru, Right	Free	0 (0)	0 (0)	A (A)	0 (0)
Northbound Museum Access	Left, Thru, Right	Stop	0 (0)	0 (0)	A (A)	0 (0)
Southbound Dev Access	Left	Stop	0.2 (0.48)	10.2 (19.6)	B (C)	6 (20.3)
Southbound Dev Access	Thru, Right	Stop	0 (0.35)	0 (11.2)	A (B)	0 (12.8)

Approach	Movement	Control	v/c ratio	Delay (s)	LOS	95th % Queue (m)
Heritage Way & Carlton Trail						
Eastbound Carlton Trail	Left, Thru, Right	Free	0.27 (0.23)	5.4 (5.6)	A (A)	5.8 (8.7)
Westbound Carlton Trail	Left, Thru, Right	Free	0.16 (0.60)	5.9 (10.1)	A (B)	4.6 (29.4)
Northbound Heritage Way	Left, Thru, Right	Stop	0.08 (0.38)	5 (7.9)	**A (A)**	3.1 (14.5)
Southbound Heritage Way	Left, Thru, Right	Stop	0.20 (0.41)	6 (9.5)	**A (A)**	7.0 (17.1)

5.0 Recommendations and Conclusions

Three scenarios were analyzed in this study: 2018 background, 2038 background, and 2038 post-development. Traffic analysis indicates that the existing road network will be sufficient to support existing background volumes, with the exception that Service Road and Territorial Drive be converted to a right-in/right-out intersection.

TMP-recommended geometry was adopted for intersection configurations studied at the 2038 horizon. Generally, traffic analysis indicates that this improved road network will be sufficient to support forecasted 2038 background volumes, with the exception that Railway Avenue and Simmental Street include a dedicated left-turn lane to accommodate significant left-turning volumes.

With the addition of development traffic at the 2038 horizon, delays and traffic demand exceeding capacity was introduced on the TMP-improved roadway network. Several improvements were identified, proposed, and analyzed to ensure the acceptable operational conditions of the 2038 post-development scenario. A summary of the background scenario improvements proposed throughout this study is included below in Table 5-1. A summary of post-development scenario improvements is included in Table 5-2.

Table 5-1: Summary of Recommended Improvements (Background Scenario)

Scenario	Improvement

2018 Background	**Territorial Drive and Service Road**
	• Close eastbound approach
	• Reconfigure westbound approach to right-in/right-out
	• Existing movements no longer permitted under new intersection configuration to be re-routed via Pioneer Avenue and Carlton Trail
	• Adopt TMP lane configurations:
	  ○ WB: right-turn only
	  ○ NB: through lane and shared through/right
	  ○ SB: two through lanes

2038 Background	2018 background scenario improvements, and: **Simmental Street/Highway 40 and Railway Avenue** • Add dedicated left-turning lanes on northbound and southbound approaches • For northbound and southbound approaches, reconfigure existing lanes to shared through/right lanes • All approaches adopt protected left-turning phase with permissive left turns during respective through phases

Table 5-2 Summary of Recommended Improvements (Post-Development Scenario)

Scenario	Improvement

2038 Post-Development	**Territorial Drive and Service Road (adopt TMP recommended improvement)**
	• Close eastbound approach
	• Reconfigure westbound approach to right-in/right-out
	• Existing movements no longer permitted under new intersection configuration to be re-routed via Pioneer Avenue and Carlton Trail
	• Adopt TMP lane configurations:
	  ○ WB: right-turn only
	  ○ NB: through lane and shared through/right
	  ○ SB: two through lanes
	
	Simmental Street/Highway 40 and Railway Avenue
	• Add dedicated left-turning lanes on northbound and southbound approaches
	• For northbound and southbound approaches, reconfigure existing lanes to shared through/right lanes
	• All approaches adopt protected left-turning phase (with permissive left turns during respective through phases)
	
	Heritage Way and Carlton Trail
	• Signalize the intersection
	
	Territorial Drive and Airport Road/8 Avenue
	• Add dedicated left-turning lanes on northbound and southbound approaches
	• For northbound and southbound approaches, reconfigure existing lanes to one through lane and one shared through/right lane
	• Add dedicated right-turning lane on westbound approach
	• For westbound approach, reconfigure existing lane to shared left/through lane
	• All approaches adopt protected left-turning phase with permissive left turns (during respective through phases)
	
	Territorial Drive and Carlton Trail
	• Protect left turns at all approaches, no permissive left-turning movements are allowed
	
	Railway Avenue and Territorial Drive
	• Eastbound left-turns and southbound left-turns adopt protected left-turning phase (with permissive left turns during respective through phases). Northbound and westbound left-turn movements retain permissive left-turns.
	• TMP geometry for southbound approach is rejected and the proposed lane configuration is as follows:
	  ○ Dedicated left-turn lane
	  ○ Through lane
	  ○ Channelized right-turn lane
	
	Carlton Trail (east development access) and Highway 40
	• Add dedicated left-turning lane for southbound approach
	• For southbound approach, reconfigure existing lane to shared through/right lane

The recommended improvements have been proposed based on forecasted traffic data from the 2018 horizon and trips generated from the most recent revision of the ITE *Trip Generation Manual*. Traffic for communities are highly dynamic and can change based on economics, technological advancements, weather, access, and other macro factors. As developer interest changes for this area, the applicant (as part of the development submission) must provide a transportation update for the proposed site to capture the current traffic conditions and travel patterns. The transportation update shall include a review of the study intersection operations and must meet the standards of the approving authority.

Recommended improvements for each scenario is illustrated in Figure 5-1.

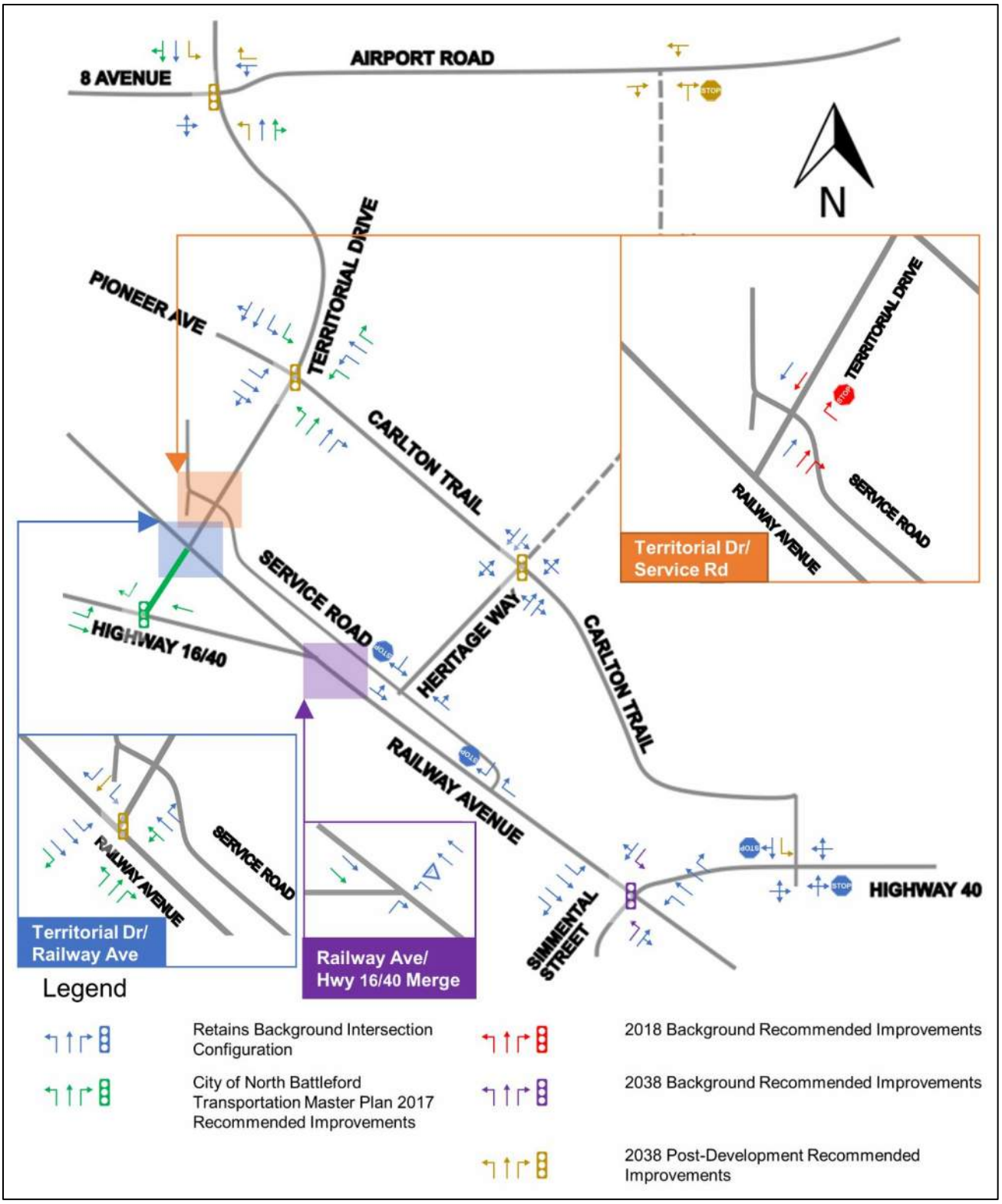


Figure 5-1: Summary of Recommended Improvements

6.0 Authorization and Closing

This report, entitled “South East Quadrant Master Plan Transportation Impact Assessment”, was prepared for the City of North Battleford by Urban Systems Ltd. The material in this report reflects the best judgment of Urban Systems Ltd. based on the information available at the time of preparation. Any use that a third party makes of this report, or reliance on or decisions made based on it is the responsibility of the third party. Urban Systems Ltd. accepts no responsibility for damages, if any, suffered by a third party because of decisions made or actions taken based on this report.

URBAN SYSTEMS LTD.

Reviewed and Prepared By

Chun Man, P. Eng
Transportation Engineer

APPENDIX A

Traffic Data

Referenced from: Carlton Trail Commercial Development TIA
CIMA+ 2016

Territorial Drive & Pioneer Avenue **June 3 2015**

	Eastbound						Westbound						Northbound						Southbound								
	LT	TH	RT	TR	PED	APP TOT	LT	TH	RT	TR	PED	APP TOT	LT	TH	RT	TR	PED	APP TOT	LT	TH	RT	TR	PED	APP TOT	INT TOT	HOUR TOT	PHF
7:00	0	5	1	0	0	6	4	5	3	0	1	12	2	23	3	2	2	28	14	25	7	1	2	46	92	649	
7:15	2	12	3	0	0	17	5	5	5	0	0	15	4	21	4	2	0	29	28	40	9	3	1	77	138	742	
7:30	2	11	3	1	0	16	3	4	0	0	0	7	3	29	8	12	0	40	41	61	13	4	1	115	178	814	
7:45	4	9	3	2	0	16	0	4	1	0	0	5	7	42	13	10	1	62	50	91	17	2	0	158	241	875	
8:00	5	14	8	1	1	27	9	9	4	3	1	22	5	27	0	5	0	32	49	40	15	4	1	104	185	898	0.85
8:15	5	19	11	2	0	35	3	6	4	0	0	13	9	44	7	11	2	60	50	40	12	5	2	102	210		
8:30	13	25	6	3	1	44	5	5	4	1	0	14	2	51	12	4	2	65	60	44	12	9	4	116	239		
8:45	16	23	11	8	2	50	3	8	10	1	0	21	11	56	16	6	1	83	55	43	12	3	1	110	264		
4:00	6	38	18	1	0	62	12	19	11	1	1	42	28	115	29	9	3	172	83	63	11	8	2	157	433	1534	
4:15	7	35	16	0	0	58	19	12	11	1	1	42	36	69	18	10	0	123	58	41	5	4	1	104	327	1545	
4:30	14	41	21	1	0	76	10	18	20	2	0	48	23	112	26	12	0	161	56	51	9	12	0	116	401	1580	0.89
4:45	5	39	14	0	2	58	14	25	21	5	0	60	12	89	29	13	0	130	62	57	6	9	3	125	373	1536	
5:00	12	34	21	2	0	67	19	26	39	4	0	84	25	117	15	5	0	157	62	63	11	1	0	136	444	1501	
5:15	5	41	17	1	1	63	15	41	22	2	0	78	11	82	11	4	0	104	64	45	8	5	1	117	362		
5:30	2	27	17	2	0	46	11	22	16	0	0	49	15	87	21	5	0	123	80	50	9	3	0	139	357		
5:45	10	30	22	0	0	62	14	10	20	1	0	44	14	79	19	2	0	112	74	40	6	5	1	120	338		
AM	39	81	36	14	4	156	20	28	22	5	1	70	27	178	35	26	5	240	214	167	51	21	8	432	898		
PM	36	155	73	4	3	264	58	110	102	13	0	270	71	400	81	34	0	552	244	216	34	27	4	494	1580		
HV%	4	3	4	3			4	4	4	4			8	8	7	8			4	4	4	4					

Count Name: Carlton Tr and Frontier Way **Start Date: 10/01/2015**

	Eastbound						Westbound						Northbound						Southbound								
	LT	TH	RT	U	PED	APP TOT	LT	TH	RT	U	PED	APP TOT	LT	TH	RT	U	PED	APP TOT	LT	TH	RT	U	PED	APP TOT	INT TOT	HOUR TOT	PHF
7:00	10	7	20	0	0	37	1	8	0	0	0	9	2	1	0	0	0	3	0	1	12	0	0	13	62	295	
7:15	3	8	27	0	0	38	0	5	0	0	0	5	0	1	0	0	0	1	0	1	1	0	0	2	46	338	
7:30	9	20	31	0	0	60	0	1	0	0	0	1	2	0	0	0	0	2	0	0	5	0	0	5	68	409	
7:45	22	24	44	0	0	90	2	6	0	0	0	8	5	2	2	0	0	9	2	1	9	0	0	12	119	480	
8:00	23	14	44	0	1	81	2	6	0	0	0	8	5	2	1	0	0	8	0	1	7	0	0	8	105	499	0.90
8:15	21	17	48	0	0	86	1	7	0	0	2	8	3	5	1	0	0	9	0	5	9	0	0	14	117		
8:30	20	30	46	0	0	96	2	15	0	0	0	17	5	1	1	0	0	7	2	4	13	0	0	19	139		
8:45	29	28	49	0	1	106	1	7	1	0	2	9	2	4	2	0	1	8	1	6	8	0	0	15	138		
4:00	57	36	35	0	3	128	2	33	5	0	1	40	6	11	2	0	0	19	5	15	29	0	1	49	236	942	
4:15	50	29	43	0	0	122	1	24	4	0	0	29	5	11	2	0	0	18	4	16	31	0	0	51	220	974	
4:30	54	40	41	0	1	135	3	25	0	0	0	28	11	12	1	0	0	24	2	7	29	0	1	38	225	1005	0.94
4:45	51	47	54	0	1	152	3	40	1	0	1	44	8	12	1	0	0	21	1	9	34	0	0	44	261	1005	
5:00	65	42	51	0	0	158	1	42	2	0	1	45	7	11	4	0	0	22	5	11	27	0	2	43	268	1001	
5:15	69	38	38	0	0	145	4	31	2	0	1	37	6	13	2	0	0	21	0	12	36	0	4	48	251		
5:30	47	43	34	0	0	124	2	30	2	0	1	34	10	9	6	0	0	25	3	7	32	0	0	42	225		
5:45	48	44	44	0	0	136	1	50	1	0	1	52	17	79	1	0	0	24	3	10	32	0	0	45	257		
AM	93	89	187	0	2	369	6	35	1	0	4	42	15	12	5	0	1	32	3	16	37	0	0	56	499		
PM	239	167	184	0	2	590	11	138	5	0	3	154	32	48	8	0	0	88	8	39	126	0	7	173	1005		
HV%	1	2	2				4	3	2				4	1	2				2	1	2						

Count Name: Carlton Tr and Wal-Mart E **Start Date: 10/09/2015**

	Eastbound						Westbound						Northbound						Southbound								
	LT	TH	RT	U	PED	APP TOT	LT	TH	RT	U	PED	APP TOT	LT	TH	RT	U	PED	APP TOT	LT	TH	RT	U	PED	APP TOT	INT TOT	HOUR TOT	PHF
7:00	0	2	0	0	0	2	0	4	1	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	7	99	
7:15	0	10	0	0	0	10	0	9	0	0	0	9	0	0	0	0	0	0	1	0	1	0	0	2	21	123	
7:30	1	17	0	0	0	18	0	10	2	0	0	12	0	0	0	0	0	0	1	0	1	0	0	2	32	140	
7:45	1	15	0	0	0	16	0	11	6	0	0	17	0	0	0	0	0	0	3	0	3	0	0	6	39	143	
8:00	0	12	0	0	0	12	0	10	4	0	0	14	0	0	0	0	0	0	3	0	2	0	0	5	31	141	0.93
8:15	0	20	0	0	0	20	0	7	8	0	0	15	0	0	0	0	0	0	3	0	0	0	0	3	38		
8:30	1	17	0	0	0	18	0	7	8	0	0	15	0	0	0	0	0	0	2	0	0	0	0	2	35		
8:45	0	21	0	0	0	21	0	7	5	0	0	12	0	0	0	0	0	0	2	0	2	0	0	4	37		
4:00	3	29	0	1	0	33	0	38	12	0	0	50	0	0	0	0	0	0	11	0	4	0	2	15	98	427	
4:15	13	48	0	0	0	61	0	31	18	0	0	49	0	0	0	0	0	0	13	0	10	0	0	23	133	434	
4:30	10	33	0	0	0	43	0	30	9	0	0	39	0	0	0	0	0	0	10	0	14	0	0	24	106	387	0.91
4:45	1	34	0	0	0	35	0	21	14	0	0	35	0	0	0	0	0	0	9	0	11	0	1	20	90	357	
5:00	9	29	0	0	0	38	0	36	12	0	0	48	0	0	0	0	0	0	6	0	13	0	0	19	105	359	
5:15	1	36	0	1	0	38	0	19	12	0	0	31	0	0	0	0	0	0	6	0	11	0	0	17	86		
5:30	2	33	0	0	0	35	0	19	7	1	3	27	0	0	0	0	0	0	5	0	9	0	4	14	76		
5:45	2	44	0	0	0	46	0	24	9	0	0	33	0	0	0	0	0	0	8	0	5	0	0	13	92		
AM	1	70	0	0	0	71	0	31	25	0	0	56	0	0	0	0	0	0	10	0	4	0	0	14	141		
PM	21	132	0	1	0	154	0	106	47	0	0	153	0	0	0	0	0	0	31	0	49	0	1	80	387		
HV%	5	2	0	0		3	0	3	5	0		4	0	0	0	0		0	2	0	5	0		4			

Count Name: Carlton Tr and Heritage Way **Start Date: 10/09/2015**

	Eastbound						Westbound						Northbound						Southbound								
	LT	TH	RT	U	PED	APP TOT	LT	TH	RT	U	PED	APP TOT	LT	TH	RT	U	PED	APP TOT	LT	TH	RT	U	PED	APP TOT	INT TOT	HOUR TOT	PHF
7:00	1	0	3	0	0	4	0	2	0	0	0	2	3	0	0	0	0	3	0	0	2	0	0	2	11	114	
7:15	5	4	4	0	0	13	0	5	0	0	0	5	2	1	0	0	0	3	0	0	5	0	0	5	26	131	
7:30	2	6	13	0	0	21	3	3	0	0	0	6	4	0	0	0	0	4	0	1	7	0	0	8	39	138	
7:45	0	7	15	0	0	22	1	5	0	0	0	6	8	0	1	0	0	9	0	0	1	0	0	1	38	147	
8:00	3	6	5	0	0	14	2	2	0	0	0	4	6	0	2	0	0	8	0	1	1	0	0	2	28	174	0.67
8:15	0	10	12	0	0	22	0	4	0	0	0	4	6	0	0	0	0	6	0	0	1	0	0	1	33		
8:30	9	4	16	0	0	29	2	2	0	0	0	4	9	0	2	0	0	11	0	0	4	0	0	4	48		
8:45	6	8	30	0	0	44	0	4	0	0	0	4	13	1	2	0	0	16	0	0	1	0	0	1	65		
4:00	9	12	25	0	0	46	1	5	0	0	0	6	34	1	5	0	0	40	0	1	5	0	0	6	98	384	
4:15	3	12	34	0	0	49	1	5	0	0	0	6	22	0	2	0	0	24	0	0	7	0	0	7	86	385	
4:30	4	5	30	0	0	39	2	6	0	0	0	8	24	1	11	0	0	36	0	1	9	0	0	10	93	387	0.90
4:45	8	14	17	0	0	39	1	11	0	0	0	12	36	0	7	0	0	43	1	3	9	0	1	13	107	372	
5:00	9	14	24	0	0	47	5	4	0	0	0	9	27	1	1	0	0	29	1	2	11	0	0	14	99	360	
5:15	3	13	17	0	0	33	1	7	0	0	0	8	34	0	8	0	0	42	0	0	5	0	0	5	88		
5:30	5	15	23	0	0	43	0	6	0	0	0	6	13	0	8	0	0	21	0	1	7	0	0	8	78		
5:45	4	6	34	0	0	44	0	4	0	0	0	4	36	79	6	0	0	42	0	2	3	0	0	5	95		
AM	18	28	63	0	0	109	4	12	0	0	0	16	34	1	6	0	0	41	0	1	7	0	0	8	174		
PM	24	46	88	0	0	158	9	28	0	0	0	37	121	2	27	0	0	150	2	6	34	0	1	42	387		
HV%	2	5	2	0		3	4	5	0	0		5	2	3	12	0		4	0	3	10	0		9			

3911.0004.01 Exhibition Park & Highway 40 - TMC

Wed May 16, 2018
Full Length (6AM-9AM)
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)
All Movements
ID: 525961, Location: 52.754575, -108.259494

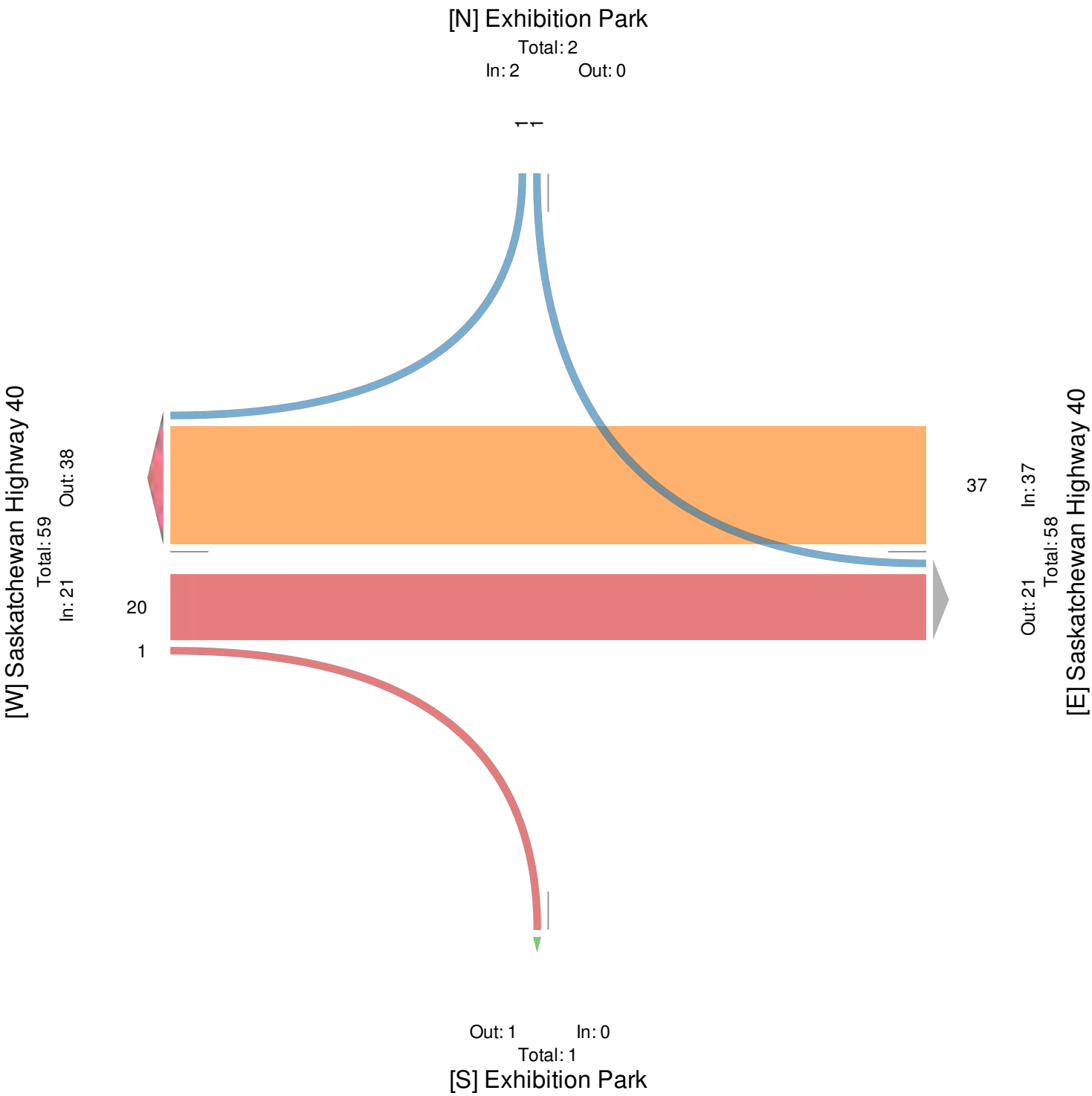
Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA

Leg / Direction	Exhibition Park Southbound					Saskatchewan Highway 40 Westbound					Exhibition Park Northbound					Saskatchewan Highway 40 Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2018-05-16 6:00AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**
6:15AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	1	0	0	**1**	**1**
6:30AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	1	0	0	**1**	**1**
6:45AM	0	0	0	0	**0**	0	3	0	0	**3**	0	0	0	0	**0**	0	1	0	0	**1**	**4**
Hourly Total	0	0	0	0	**0**	0	3	0	0	**3**	0	0	0	0	**0**	0	3	0	0	**3**	**6**
7:00AM	0	0	0	0	**0**	0	1	0	0	**1**	0	0	0	0	**0**	0	1	0	0	**1**	**2**
7:15AM	0	0	0	0	**0**	0	2	0	0	**2**	0	0	0	0	**0**	0	0	0	0	**0**	**2**
7:30AM	0	0	0	0	**0**	0	3	0	0	**3**	0	0	0	0	**0**	0	2	0	0	**2**	**5**
7:45AM	0	0	0	0	**0**	0	3	0	0	**3**	0	0	0	0	**0**	0	3	0	0	**3**	**6**
Hourly Total	0	0	0	0	**0**	0	9	0	0	**9**	0	0	0	0	**0**	0	6	0	0	**6**	**15**
8:00AM	0	0	0	0	**0**	0	7	0	0	**7**	0	0	0	0	**0**	0	1	0	0	**1**	**8**
8:15AM	0	0	0	0	**0**	0	4	0	0	**4**	0	0	0	0	**0**	1	3	0	0	**4**	**8**
8:30AM	1	0	1	0	**2**	0	8	0	0	**8**	0	0	0	0	**0**	0	2	0	0	**2**	**12**
8:45AM	0	0	0	0	**0**	0	6	0	0	**6**	0	0	0	0	**0**	0	5	0	0	**5**	**11**
Hourly Total	1	0	1	0	**2**	0	25	0	0	**25**	0	0	0	0	**0**	1	11	0	0	**12**	**39**
9:00AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**
Hourly Total	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**
Total	1	0	1	0	**2**	0	37	0	0	**37**	0	0	0	0	**0**	1	20	0	0	**21**	**60**
% Approach	50.0%	0%	50.0%	0%	-	0%	100%	0%	0%	-	0%	0%	0%	0%	-	4.8%	95.2%	0%	0%	-	-
% Total	1.7%	0%	1.7%	0%	**3.3%**	0%	61.7%	0%	0%	**61.7%**	0%	0%	0%	0%	**0%**	1.7%	33.3%	0%	0%	**35.0%**	-
Motorcycles	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0
% Motorcycles	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	-	0%	0%	0%	0%	**0%**	0%
Cars	0	0	1	0	**1**	0	33	0	0	**33**	0	0	0	0	**0**	1	16	0	0	**17**	51
% Cars	0%	0%	100%	0%	**50.0%**	0%	89.2%	0%	0%	**89.2%**	0%	0%	0%	0%	-	100%	80.0%	0%	0%	**81.0%**	85.0%
Light Goods Vehicles	1	0	0	0	**1**	0	2	0	0	**2**	0	0	0	0	**0**	0	3	0	0	**3**	6
% Light Goods Vehicles	100%	0%	0%	0%	**50.0%**	0%	5.4%	0%	0%	**5.4%**	0%	0%	0%	0%	-	0%	15.0%	0%	0%	**14.3%**	10.0%
Single-Unit Trucks	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	-	0%	0%	0%	0%	**0%**	0%
Articulated Trucks	0	0	0	0	**0**	0	2	0	0	**2**	0	0	0	0	**0**	0	0	0	0	**0**	2
% Articulated Trucks	0%	0%	0%	0%	**0%**	0%	5.4%	0%	0%	**5.4%**	0%	0%	0%	0%	-	0%	0%	0%	0%	**0%**	3.3%
Buses	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	1	0	0	**1**	1
% Buses	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	-	0%	5.0%	0%	0%	**4.8%**	1.7%
Bicycles on Road	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	-	0%	0%	0%	0%	**0%**	0%

*L: Left, R: Right, T: Thru, U: U-Turn

3911.0004.01 Exhibition Park & Highway 40 - TMC
Wed May 16, 2018
Full Length (6AM-9AM)
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)
All Movements
ID: 525961, Location: 52.754575, -108.259494

Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA



3911.0004.01 Exhibition Park & Highway 40 - TMC

Wed May 16, 2018
AM Peak (8AM - 9AM) - Overall Peak Hour
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)
All Movements
ID: 525961, Location: 52.754575, -108.259494

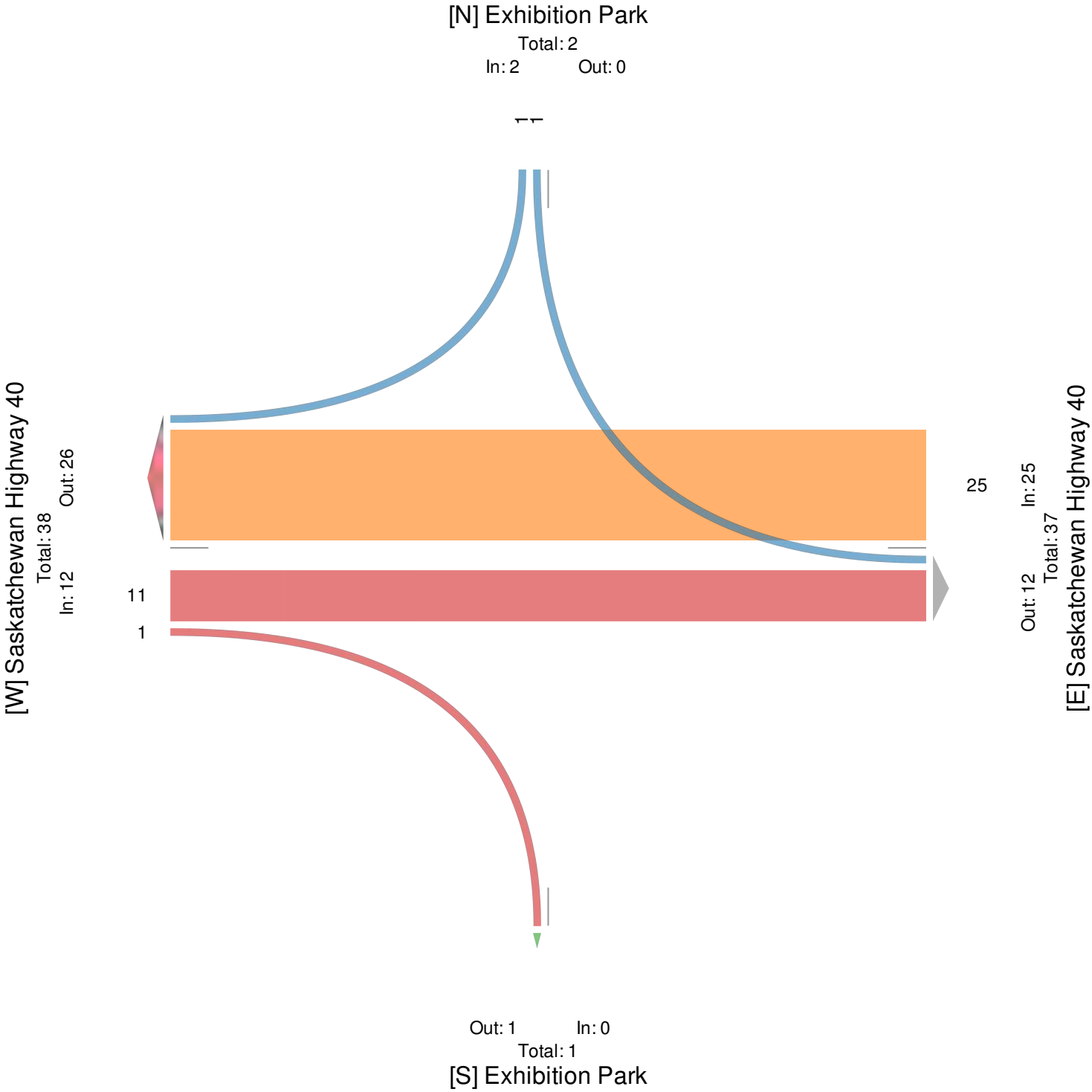
Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA

Leg Direction	Exhibition Park Southbound					Saskatchewan Highway 40 Westbound					Exhibition Park Northbound					Saskatchewan Highway 40 Eastbound					
Time	R	T	L	U	**App**	R	T	L	U	**App**	R	T	L	U	**App**	R	T	L	U	**App**	**Int**
2018-05-16 8:00AM	0	0	0	0	**0**	0	7	0	0	**7**	0	0	0	0	**0**	0	1	0	0	**1**	**8**
8:15AM	0	0	0	0	**0**	0	4	0	0	**4**	0	0	0	0	**0**	1	3	0	0	**4**	**8**
8:30AM	1	0	1	0	**2**	0	8	0	0	**8**	0	0	0	0	**0**	0	2	0	0	**2**	**12**
8:45AM	0	0	0	0	**0**	0	6	0	0	**6**	0	0	0	0	**0**	0	5	0	0	**5**	**11**
Total	1	0	1	0	**2**	0	25	0	0	**25**	0	0	0	0	**0**	1	11	0	0	**12**	**39**
% Approach	50.0%	0%	50.0%	0%	-	0%	100%	0%	0%	-	0%	0%	0%	0%	-	8.3%	91.7%	0%	0%	-	-
% Total	2.6%	0%	2.6%	0%	**5.1%**	0%	64.1%	0%	0%	**64.1%**	0%	0%	0%	0%	**0%**	2.6%	28.2%	0%	0%	**30.8%**	-
PHF	0.250	-	0.250	-	**0.250**	-	0.781	-	-	**0.781**	-	-	-	-	-	0.250	0.550	-	-	**0.600**	0.813
Motorcycles	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0
% Motorcycles	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	-	0%	0%	0%	0%	**0%**	0%
Cars	0	0	1	0	**1**	0	24	0	0	**24**	0	0	0	0	**0**	1	7	0	0	**8**	33
% Cars	0%	0%	100%	0%	**50.0%**	0%	96.0%	0%	0%	**96.0%**	0%	0%	0%	0%	-	100%	63.6%	0%	0%	**66.7%**	84.6%
Light Goods Vehicles	1	0	0	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**	0	3	0	0	**3**	4
% Light Goods Vehicles	100%	0%	0%	0%	**50.0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	-	0%	27.3%	0%	0%	**25.0%**	10.3%
Single-Unit Trucks	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	-	0%	0%	0%	0%	**0%**	0%
Articulated Trucks	0	0	0	0	**0**	0	1	0	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**	1
% Articulated Trucks	0%	0%	0%	0%	**0%**	0%	4.0%	0%	0%	**4.0%**	0%	0%	0%	0%	-	0%	0%	0%	0%	**0%**	2.6%
Buses	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	1	0	0	**1**	1
% Buses	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	-	0%	9.1%	0%	0%	**8.3%**	2.6%
Bicycles on Road	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	-	0%	0%	0%	0%	**0%**	0%

*L: Left, R: Right, T: Thru, U: U-Turn

3911.0004.01 Exhibition Park & Highway 40 - TMC
Wed May 16, 2018
AM Peak (8AM - 9AM) - Overall Peak Hour
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)
All Movements
ID: 525961, Location: 52.754575, -108.259494

Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA



3911.0004.01 Exhibition Park & Highway 40 - TMC

Tue May 15, 2018
Full Length (3PM-7PM)
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)
All Movements
ID: 525960, Location: 52.754575, -108.259494

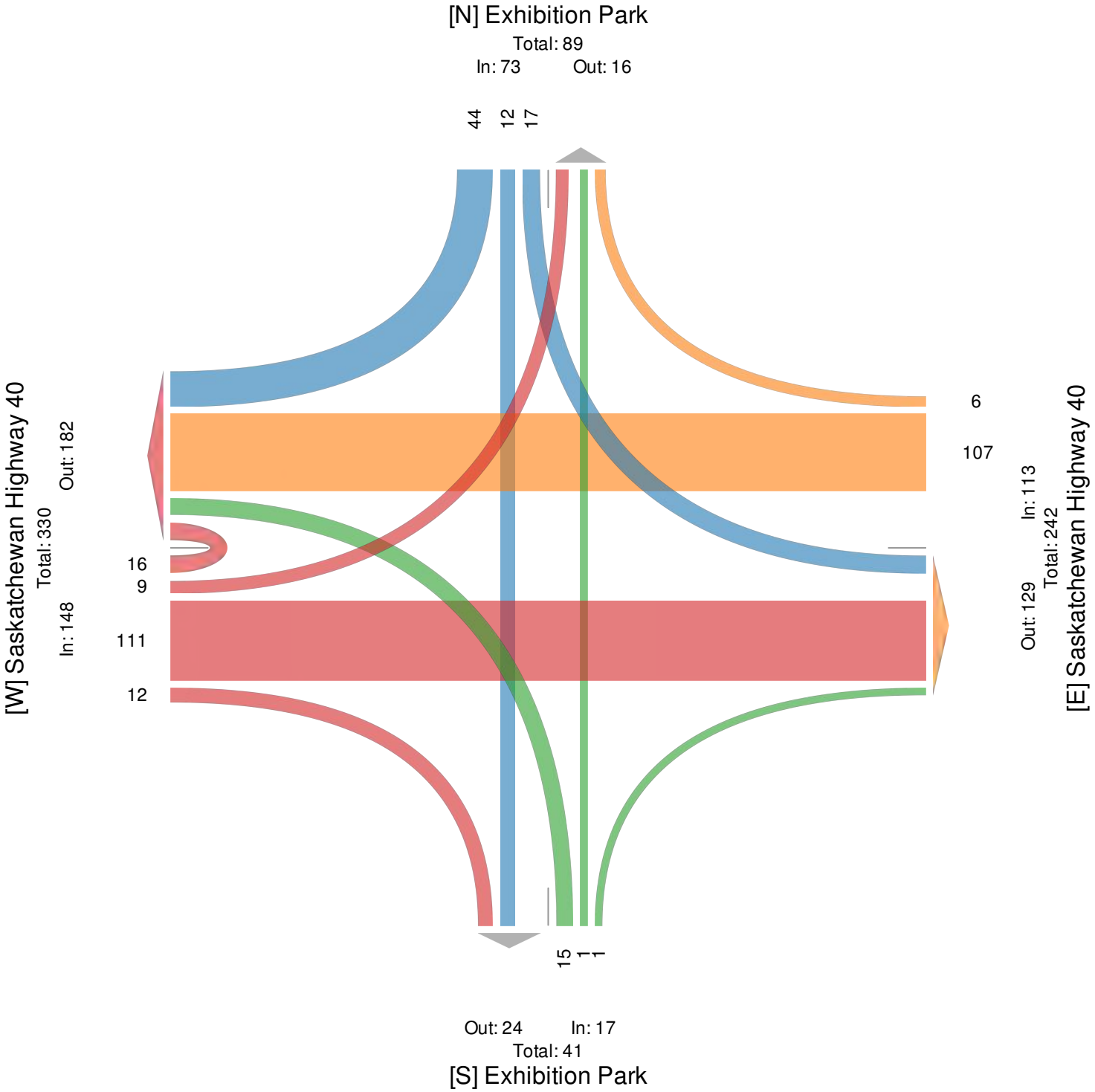
Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA

Leg	Exhibition Park					Saskatchewan Highway 40					Exhibition Park					Saskatchewan Highway 40					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2018-05-15 3:00PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**
3:15PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**
3:30PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**
3:45PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**
Hourly Total	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**
4:00PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**
4:15PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**
4:30PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**
4:45PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**
Hourly Total	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**
5:00PM	11	1	4	0	**16**	1	18	0	0	**19**	0	1	0	0	**1**	1	14	3	0	**18**	**54**
5:15PM	9	2	3	0	**14**	0	8	0	0	**8**	1	0	0	0	**1**	2	16	2	2	**22**	**45**
5:30PM	9	3	3	0	**15**	2	18	0	0	**20**	0	0	1	0	**1**	5	15	1	4	**25**	**61**
5:45PM	4	2	1	0	**7**	1	11	0	0	**12**	0	0	6	0	**6**	1	10	2	5	**18**	**43**
Hourly Total	33	8	11	0	**52**	4	55	0	0	**59**	1	1	7	0	**9**	9	55	8	11	**83**	**203**
6:00PM	3	1	2	0	**6**	0	8	0	0	**8**	0	0	0	0	**0**	1	12	1	3	**17**	**31**
6:15PM	3	1	1	0	**5**	1	15	0	0	**16**	0	0	6	0	**6**	1	11	0	1	**13**	**40**
6:30PM	4	0	3	0	**7**	1	15	0	0	**16**	0	0	2	0	**2**	0	16	0	1	**17**	**42**
6:45PM	1	2	0	0	**3**	0	14	0	0	**14**	0	0	0	0	**0**	1	17	0	0	**18**	**35**
Hourly Total	11	4	6	0	**21**	2	52	0	0	**54**	0	0	8	0	**8**	3	56	1	5	**65**	**148**
Total	44	12	17	0	**73**	6	107	0	0	**113**	1	1	15	0	**17**	12	111	9	16	**148**	**351**
% Approach	60.3%	16.4%	23.3%	0%	-	5.3%	94.7%	0%	0%	-	5.9%	5.9%	88.2%	0%	-	8.1%	75.0%	6.1%	10.8%	-	-
% Total	12.5%	3.4%	4.8%	0%	**20.8%**	1.7%	30.5%	0%	0%	**32.2%**	0.3%	0.3%	4.3%	0%	**4.8%**	3.4%	31.6%	2.6%	4.6%	**42.2%**	-
Motorcycles	0	1	0	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	1
% Motorcycles	0%	8.3%	0%	0%	**1.4%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0.3%
Cars	26	8	7	0	**41**	3	78	0	0	**81**	1	1	13	0	**15**	11	100	3	13	**127**	264
% Cars	59.1%	66.7%	41.2%	0%	**56.2%**	50.0%	72.9%	0%	0%	**71.7%**	100%	100%	86.7%	0%	**88.2%**	91.7%	90.1%	33.3%	81.3%	**85.8%**	75.2%
Light Goods Vehicles	18	3	9	0	**30**	2	11	0	0	**13**	0	0	2	0	**2**	0	1	6	3	**10**	55
% Light Goods Vehicles	40.9%	25.0%	52.9%	0%	**41.1%**	33.3%	10.3%	0%	0%	**11.5%**	0%	0%	13.3%	0%	**11.8%**	0%	0.9%	66.7%	18.8%	**6.8%**	15.7%
Single-Unit Trucks	0	0	1	0	**1**	1	6	0	0	**7**	0	0	0	0	**0**	1	5	0	0	**6**	14
% Single-Unit Trucks	0%	0%	5.9%	0%	**1.4%**	16.7%	5.6%	0%	0%	**6.2%**	0%	0%	0%	0%	**0%**	8.3%	4.5%	0%	0%	**4.1%**	4.0%
Articulated Trucks	0	0	0	0	**0**	0	10	0	0	**10**	0	0	0	0	**0**	0	5	0	0	**5**	15
% Articulated Trucks	0%	0%	0%	0%	**0%**	0%	9.3%	0%	0%	**8.8%**	0%	0%	0%	0%	**0%**	0%	4.5%	0%	0%	**3.4%**	4.3%
Buses	0	0	0	0	**0**	0	2	0	0	**2**	0	0	0	0	**0**	0	0	0	0	**0**	2
% Buses	0%	0%	0%	0%	**0%**	0%	1.9%	0%	0%	**1.8%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0.6%
Bicycles on Road	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%

*L: Left, R: Right, T: Thru, U: U-Turn

3911.0004.01 Exhibition Park & Highway 40 - TMC
Tue May 15, 2018
Full Length (3PM-7PM)
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)
All Movements
ID: 525960, Location: 52.754575, -108.259494

Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA



3911.0004.01 Exhibition Park & Highway 40 - TMC

Tue May 15, 2018

PM Peak (5PM - 6PM) - Overall Peak Hour

All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)

All Movements

ID: 525960, Location: 52.754575, -108.259494

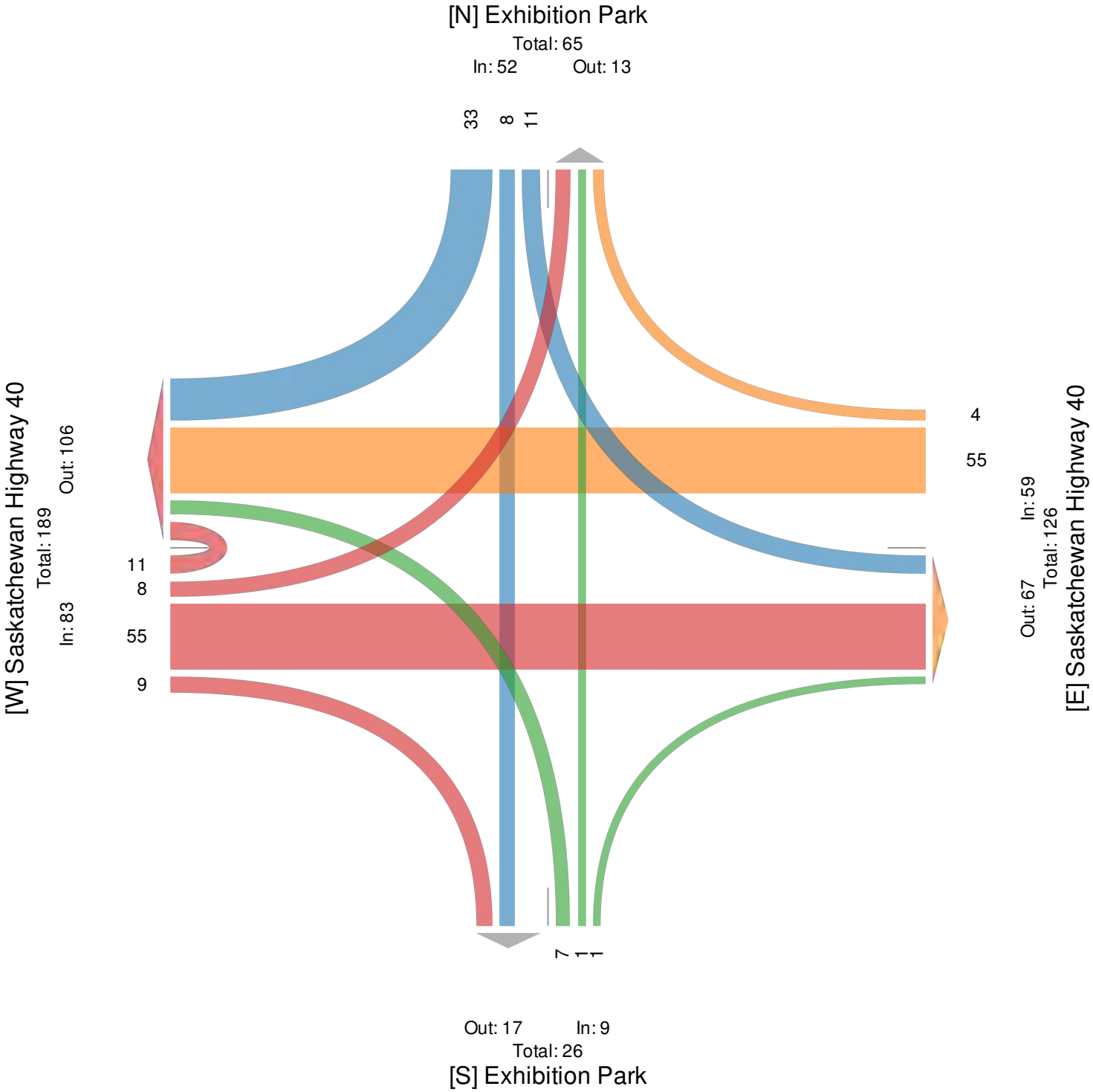
Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA

Leg	Exhibition Park Southbound					Saskatchewan Highway 40 Westbound					Exhibition Park Northbound					Saskatchewan Highway 40 Eastbound					
Direction																					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2018-05-15 5:00PM	11	1	4	0	**16**	1	18	0	0	**19**	0	1	0	0	**1**	1	14	3	0	**18**	**54**
5:15PM	9	2	3	0	**14**	0	8	0	0	**8**	1	0	0	0	**1**	2	16	2	2	**22**	**45**
5:30PM	9	3	3	0	**15**	2	18	0	0	**20**	0	0	1	0	**1**	5	15	1	4	**25**	**61**
5:45PM	4	2	1	0	**7**	1	11	0	0	**12**	0	0	6	0	**6**	1	10	2	5	**18**	**43**
Total	33	8	11	0	**52**	4	55	0	0	**59**	1	1	7	0	**9**	9	55	8	11	**83**	**203**
% Approach	63.5%	15.4%	21.2%	0%	-	6.8%	93.2%	0%	0%	-	11.1%	11.1%	77.8%	0%	-	10.8%	66.3%	9.6%	13.3%	-	-
% Total	16.3%	3.9%	5.4%	0%	**25.6%**	2.0%	27.1%	0%	0%	**29.1%**	0.5%	0.5%	3.4%	0%	**4.4%**	4.4%	27.1%	3.9%	5.4%	**40.9%**	-
PHF	0.750	0.667	0.688	-	**0.813**	0.500	0.764	-	-	**0.738**	0.250	0.250	0.292	-	**0.375**	0.450	0.859	0.667	0.550	**0.830**	0.832
Motorcycles	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0
% Motorcycles	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%
Cars	19	6	4	0	**29**	2	45	0	0	**47**	1	1	6	0	**8**	8	49	2	9	**68**	152
% Cars	57.6%	75.0%	36.4%	0%	**55.8%**	50.0%	81.8%	0%	0%	**79.7%**	100%	100%	85.7%	0%	**88.9%**	88.9%	89.1%	25.0%	81.8%	**81.9%**	74.9%
Light Goods Vehicles	14	2	7	0	**23**	2	1	0	0	**3**	0	0	1	0	**1**	0	1	6	2	**9**	36
% Light Goods Vehicles	42.4%	25.0%	63.6%	0%	**44.2%**	50.0%	1.8%	0%	0%	**5.1%**	0%	0%	14.3%	0%	**11.1%**	0%	1.8%	75.0%	18.2%	**10.8%**	17.7%
Single-Unit Trucks	0	0	0	0	**0**	0	3	0	0	**3**	0	0	0	0	**0**	1	3	0	0	**4**	7
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	0%	5.5%	0%	0%	**5.1%**	0%	0%	0%	0%	**0%**	11.1%	5.5%	0%	0%	**4.8%**	3.4%
Articulated Trucks	0	0	0	0	**0**	0	6	0	0	**6**	0	0	0	0	**0**	0	2	0	0	**2**	8
% Articulated Trucks	0%	0%	0%	0%	**0%**	0%	10.9%	0%	0%	**10.2%**	0%	0%	0%	0%	**0%**	0%	3.6%	0%	0%	**2.4%**	3.9%
Buses	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0
% Buses	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%
Bicycles on Road	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0%

*L: Left, R: Right, T: Thru, U: U-Turn

3911.0004.01 Exhibition Park & Highway 40 - TMC
Tue May 15, 2018
PM Peak (5PM - 6PM) - Overall Peak Hour
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)
All Movements
ID: 525960, Location: 52.754575, -108.259494

Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA



3911.0004.01 Heritage Way & Service Road - TMC

Wed May 16, 2018

Full Length (6AM-9AM)

All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)

All Movements

ID: 525959, Location: 52.757717, -108.271659

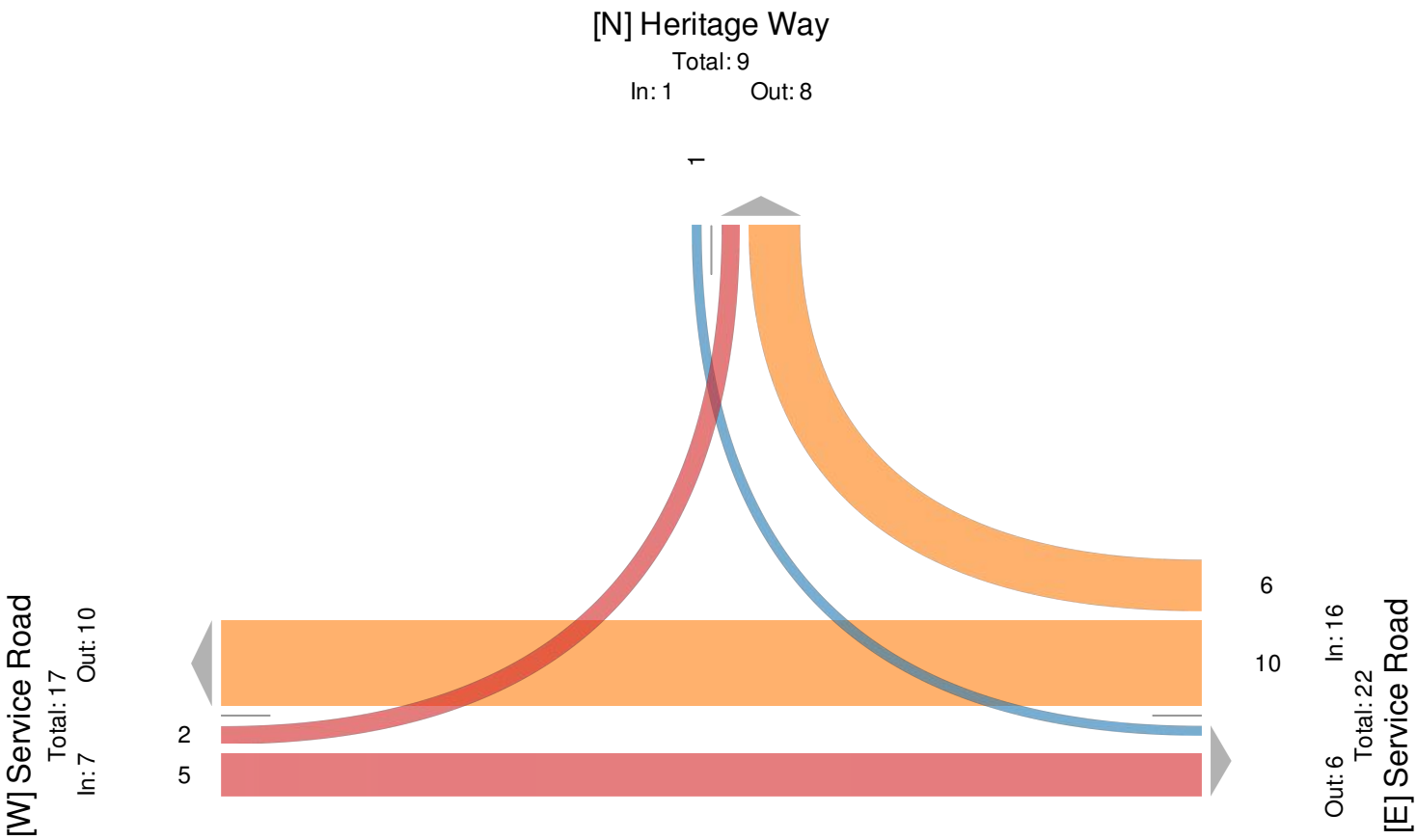
Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA

Leg Direction	Heritage Way Southbound				Service Road Westbound				Service Road Eastbound				
Time	R	L	U	**App**	R	T	U	**App**	T	L	U	**App**	**Int**
2018-05-16 6:00AM	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	**0**
6:15AM	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	**0**
6:30AM	0	0	0	**0**	1	0	0	**1**	0	0	0	**0**	**1**
6:45AM	0	0	0	**0**	2	0	0	**2**	0	0	0	**0**	**2**
Hourly Total	0	0	0	**0**	3	0	0	**3**	0	0	0	**0**	**3**
7:00AM	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	**0**
7:15AM	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	**1**
7:30AM	0	0	0	**0**	0	1	0	**1**	1	1	0	**2**	**3**
7:45AM	0	0	0	**0**	0	4	0	**4**	0	0	0	**0**	**4**
Hourly Total	0	0	0	**0**	0	6	0	**6**	1	1	0	**2**	**8**
8:00AM	0	0	0	**0**	1	1	0	**2**	0	0	0	**0**	**2**
8:15AM	0	0	0	**0**	0	1	0	**1**	1	0	0	**1**	**2**
8:30AM	0	1	0	**1**	0	1	0	**1**	0	1	0	**1**	**3**
8:45AM	0	0	0	**0**	2	1	0	**3**	3	0	0	**3**	**6**
Hourly Total	0	1	0	**1**	3	4	0	**7**	4	1	0	**5**	**13**
9:00AM	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	**0**
Hourly Total	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	**0**
Total	0	1	0	**1**	6	10	0	**16**	5	2	0	**7**	**24**
% Approach	0%	100%	0%	-	37.5%	62.5%	0%	-	71.4%	28.6%	0%	-	-
% Total	0%	4.2%	0%	**4.2%**	25.0%	41.7%	0%	**66.7%**	20.8%	8.3%	0%	**29.2%**	-
Motorcycles	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Motorcycles	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Cars	0	1	0	**1**	4	4	0	**8**	1	2	0	**3**	12
% Cars	0%	100%	0%	**100%**	66.7%	40.0%	0%	**50.0%**	20.0%	100%	0%	**42.9%**	50.0%
Light Goods Vehicles	0	0	0	**0**	1	5	0	**6**	1	0	0	**1**	7
% Light Goods Vehicles	0%	0%	0%	**0%**	16.7%	50.0%	0%	**37.5%**	20.0%	0%	0%	**14.3%**	29.2%
Single-Unit Trucks	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Single-Unit Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Articulated Trucks	0	0	0	**0**	1	1	0	**2**	3	0	0	**3**	5
% Articulated Trucks	0%	0%	0%	**0%**	16.7%	10.0%	0%	**12.5%**	60.0%	0%	0%	**42.9%**	20.8%
Buses	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Buses	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Bicycles on Road	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Bicycles on Road	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%

*L: Left, R: Right, T: Thru, U: U-Turn

3911.0004.01 Heritage Way & Service Road - TMC
Wed May 16, 2018
Full Length (6AM-9AM)
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)
All Movements
ID: 525959, Location: 52.757717, -108.271659

Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA



3911.0004.01 Heritage Way & Service Road - TMC

Wed May 16, 2018
AM Peak (8AM - 9AM) - Overall Peak Hour
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)
All Movements
ID: 525959, Location: 52.757717, -108.271659

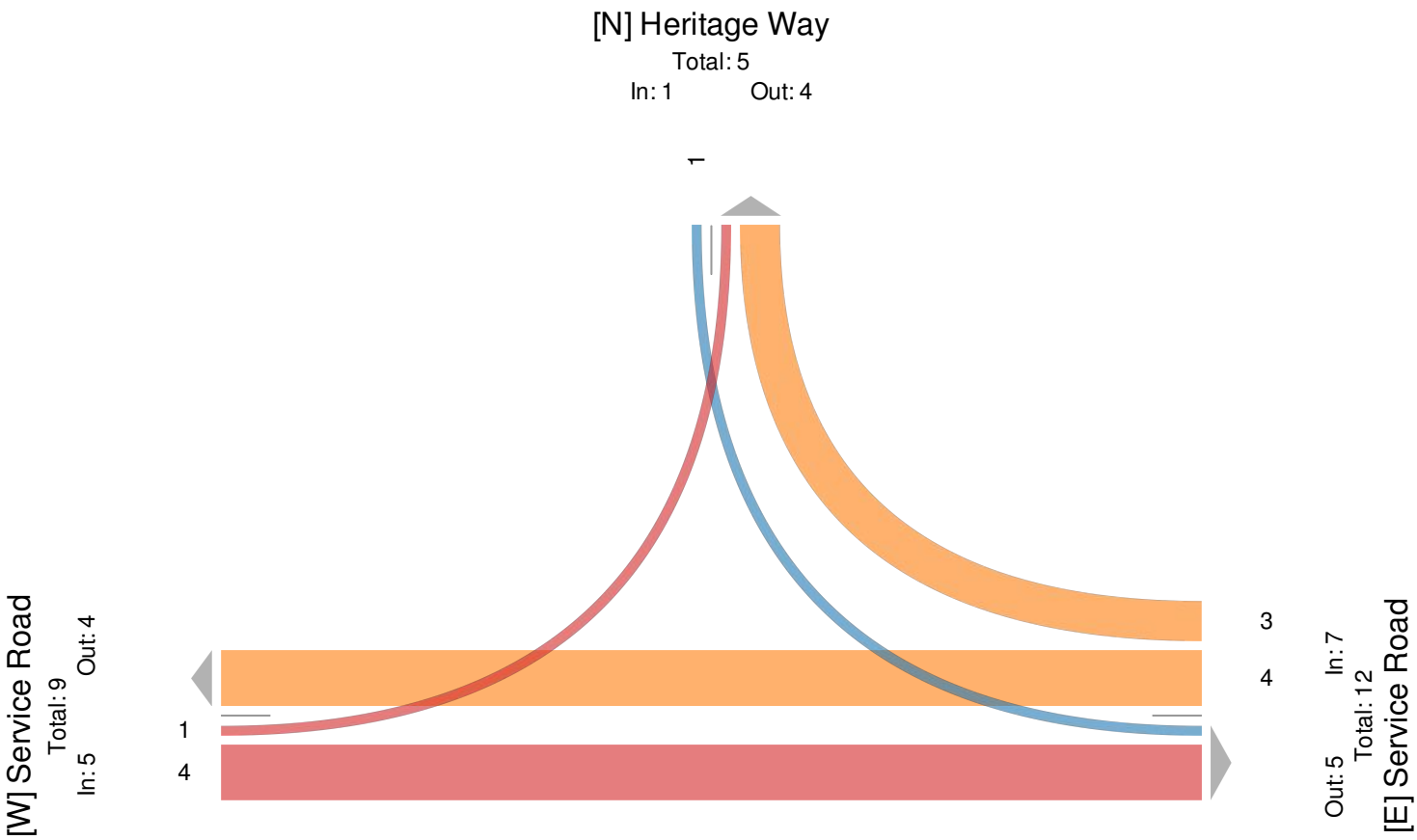
Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA

Leg Direction	Heritage Way Southbound				Service Road Westbound				Service Road Eastbound				
Time	R	L	U	**App**	R	T	U	**App**	T	L	U	**App**	**Int**
2018-05-16 8:00AM	0	0	0	**0**	1	1	0	**2**	0	0	0	**0**	**2**
8:15AM	0	0	0	**0**	0	1	0	**1**	1	0	0	**1**	**2**
8:30AM	0	1	0	**1**	0	1	0	**1**	0	1	0	**1**	**3**
8:45AM	0	0	0	**0**	2	1	0	**3**	3	0	0	**3**	**6**
Total	0	1	0	**1**	3	4	0	**7**	4	1	0	**5**	**13**
% Approach	0%	100%	0%	-	42.9%	57.1%	0%	-	80.0%	20.0%	0%	-	-
% Total	0%	7.7%	0%	**7.7%**	23.1%	30.8%	0%	**53.8%**	30.8%	7.7%	0%	**38.5%**	-
PHF	-	0.250	-	**0.250**	0.375	1.000	-	**0.583**	0.333	0.250	-	**0.417**	0.542
Motorcycles	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Motorcycles	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Cars	0	1	0	**1**	3	3	0	**6**	1	1	0	**2**	9
% Cars	0%	100%	0%	**100%**	100%	75.0%	0%	**85.7%**	25.0%	100%	0%	**40.0%**	69.2%
Light Goods Vehicles	0	0	0	**0**	0	1	0	**1**	1	0	0	**1**	2
% Light Goods Vehicles	0%	0%	0%	**0%**	0%	25.0%	0%	**14.3%**	25.0%	0%	0%	**20.0%**	15.4%
Single-Unit Trucks	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Single-Unit Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Articulated Trucks	0	0	0	**0**	0	0	0	**0**	2	0	0	**2**	2
% Articulated Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	50.0%	0%	0%	**40.0%**	15.4%
Buses	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Buses	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Bicycles on Road	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Bicycles on Road	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%

*L: Left, R: Right, T: Thru, U: U-Turn

3911.0004.01 Heritage Way & Service Road - TMC
Wed May 16, 2018
AM Peak (8AM - 9AM) - Overall Peak Hour
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)
All Movements
ID: 525959, Location: 52.757717, -108.271659

Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA



3911.0004.01 Heritage Way & Service Road - TMC

Tue May 15, 2018

Full Length (3PM-7PM)

All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)

All Movements

ID: 525957, Location: 52.757717, -108.271659

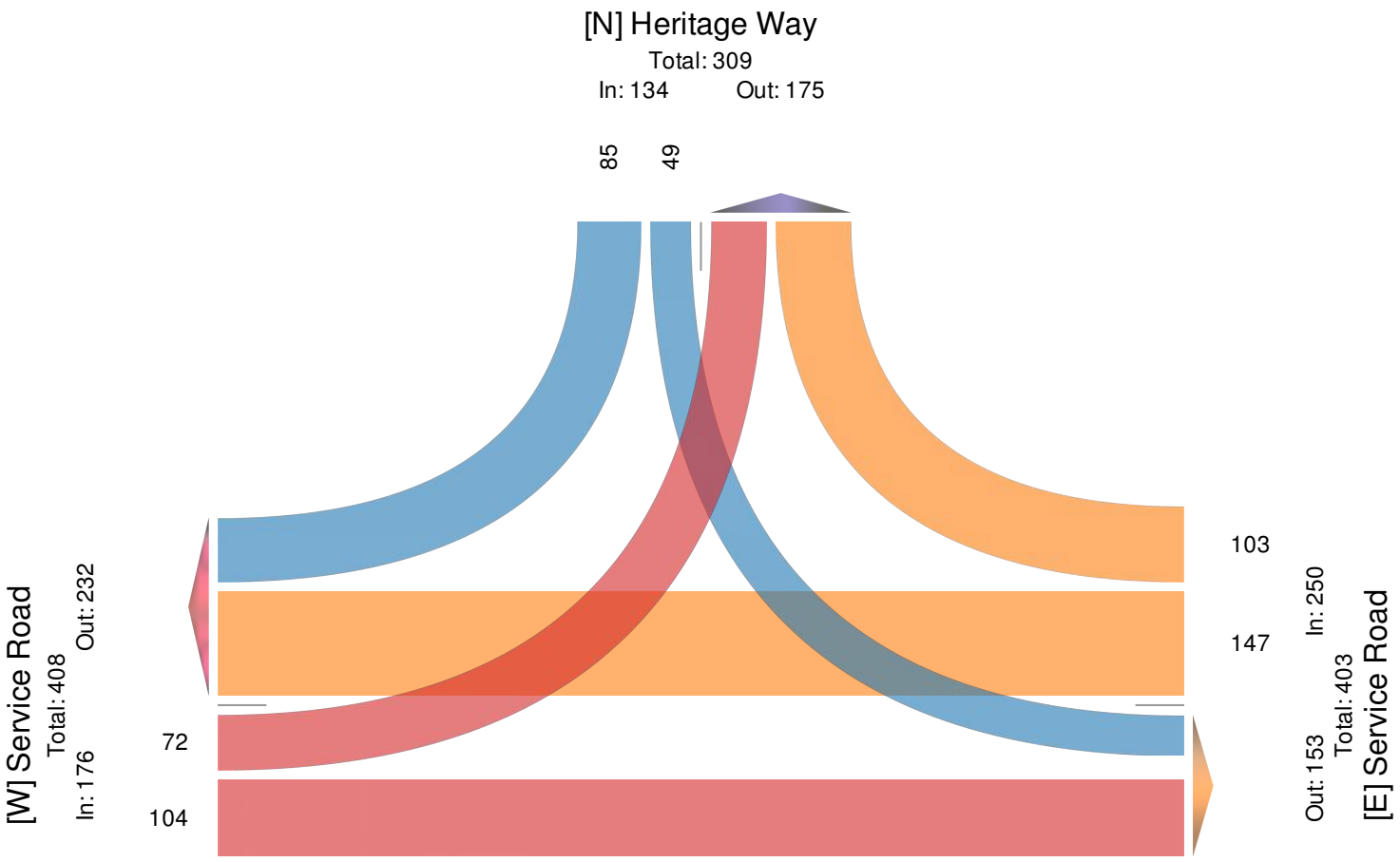
Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA

Leg Direction	Heritage Way Southbound				Service Road Westbound				Service Road Eastbound				
Time	R	L	U	**App**	R	T	U	**App**	T	L	U	**App**	**Int**
2018-05-15 3:00PM	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	**0**
3:15PM	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	**0**
3:30PM	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	**0**
3:45PM	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	**0**
Hourly Total	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	**0**
4:00PM	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	**0**
4:15PM	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	**0**
4:30PM	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	**0**
4:45PM	3	2	0	**5**	5	3	0	**8**	7	1	0	**8**	**21**
Hourly Total	3	2	0	**5**	5	3	0	**8**	7	1	0	**8**	**21**
5:00PM	10	4	0	**14**	17	19	0	**36**	18	9	0	**27**	**77**
5:15PM	10	5	0	**15**	10	14	0	**24**	10	8	0	**18**	**57**
5:30PM	8	4	0	**12**	15	11	0	**26**	8	5	0	**13**	**51**
5:45PM	11	5	0	**16**	8	14	0	**22**	8	10	0	**18**	**56**
Hourly Total	39	18	0	**57**	50	58	0	**108**	44	32	0	**76**	**241**
6:00PM	9	9	0	**18**	12	22	0	**34**	13	7	0	**20**	**72**
6:15PM	10	9	0	**19**	11	19	0	**30**	11	13	0	**24**	**73**
6:30PM	16	5	0	**21**	14	26	0	**40**	12	10	0	**22**	**83**
6:45PM	8	6	0	**14**	11	19	0	**30**	17	9	0	**26**	**70**
Hourly Total	43	29	0	**72**	48	86	0	**134**	53	39	0	**92**	**298**
Total	85	49	0	**134**	103	147	0	**250**	104	72	0	**176**	**560**
% Approach	63.4%	36.6%	0%	-	41.2%	58.8%	0%	-	59.1%	40.9%	0%	-	-
% Total	15.2%	8.8%	0%	**23.9%**	18.4%	26.3%	0%	**44.6%**	18.6%	12.9%	0%	**31.4%**	-
Motorcycles	0	1	0	**1**	1	0	0	**1**	0	0	0	**0**	2
% Motorcycles	0%	2.0%	0%	**0.7%**	1.0%	0%	0%	**0.4%**	0%	0%	0%	**0%**	0.4%
Cars	61	36	0	**97**	68	100	0	**168**	90	48	0	**138**	403
% Cars	71.8%	73.5%	0%	**72.4%**	66.0%	68.0%	0%	**67.2%**	86.5%	66.7%	0%	**78.4%**	72.0%
Light Goods Vehicles	21	12	0	**33**	31	38	0	**69**	12	22	0	**34**	136
% Light Goods Vehicles	24.7%	24.5%	0%	**24.6%**	30.1%	25.9%	0%	**27.6%**	11.5%	30.6%	0%	**19.3%**	24.3%
Single-Unit Trucks	3	0	0	**3**	1	1	0	**2**	1	2	0	**3**	8
% Single-Unit Trucks	3.5%	0%	0%	**2.2%**	1.0%	0.7%	0%	**0.8%**	1.0%	2.8%	0%	**1.7%**	1.4%
Articulated Trucks	0	0	0	**0**	2	5	0	**7**	1	0	0	**1**	8
% Articulated Trucks	0%	0%	0%	**0%**	1.9%	3.4%	0%	**2.8%**	1.0%	0%	0%	**0.6%**	1.4%
Buses	0	0	0	**0**	0	2	0	**2**	0	0	0	**0**	2
% Buses	0%	0%	0%	**0%**	0%	1.4%	0%	**0.8%**	0%	0%	0%	**0%**	0.4%
Bicycles on Road	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	1
% Bicycles on Road	0%	0%	0%	**0%**	0%	0.7%	0%	**0.4%**	0%	0%	0%	**0%**	0.2%

*L: Left, R: Right, T: Thru, U: U-Turn

3911.0004.01 Heritage Way & Service Road - TMC
Tue May 15, 2018
Full Length (3PM-7PM)
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)
All Movements
ID: 525957, Location: 52.757717, -108.271659

Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA



3911.0004.01 Heritage Way & Service Road - TMC

Tue May 15, 2018

PM Peak (6PM - 7PM) - Overall Peak Hour

All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)

All Movements

ID: 525957, Location: 52.757717, -108.271659

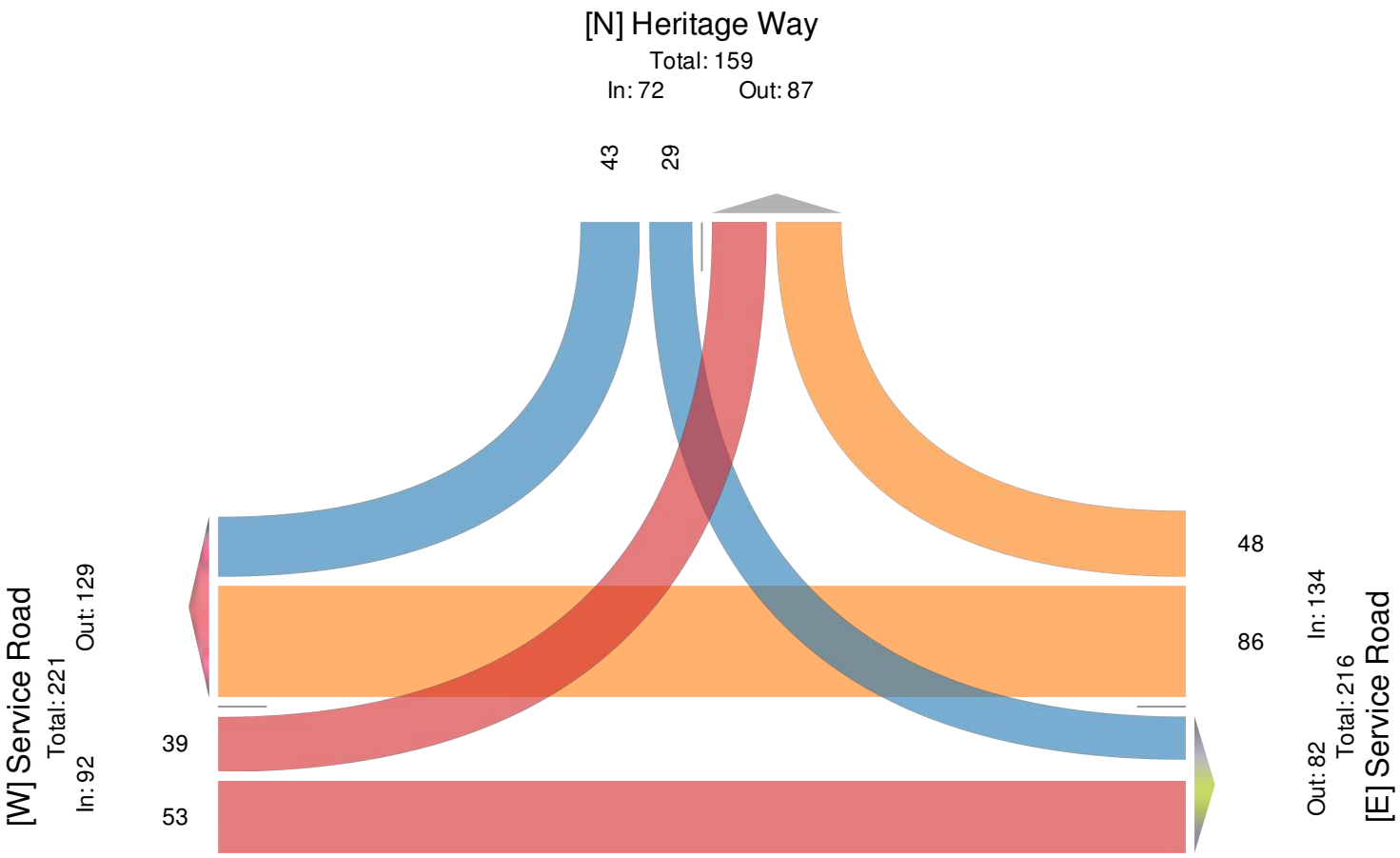
Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA

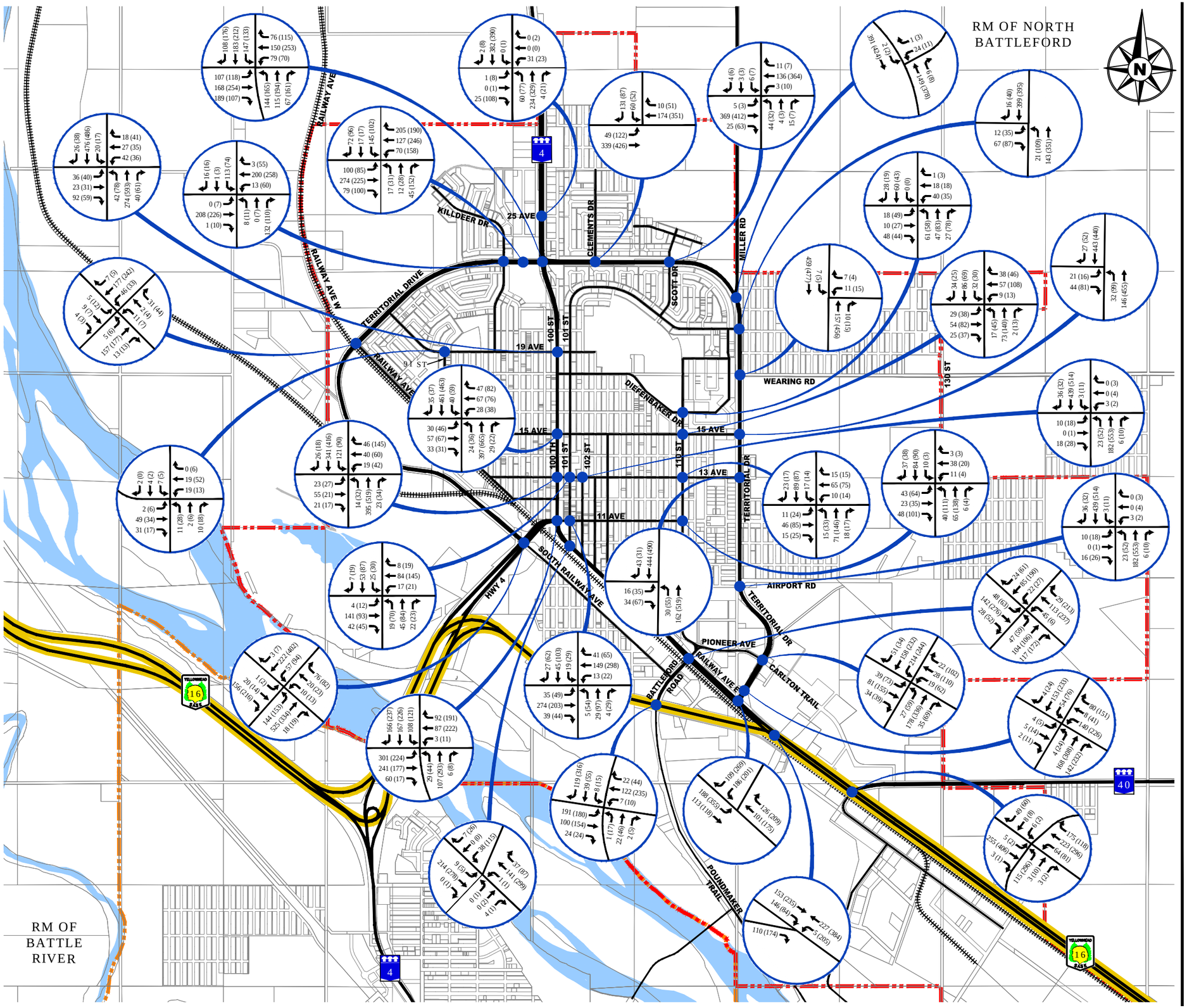
Leg Direction	Heritage Way Southbound				Service Road Westbound				Service Road Eastbound				
Time	R	L	U	**App**	R	T	U	**App**	T	L	U	**App**	**Int**
2018-05-15 6:00PM	9	9	0	**18**	12	22	0	**34**	13	7	0	**20**	**72**
6:15PM	10	9	0	**19**	11	19	0	**30**	11	13	0	**24**	**73**
6:30PM	16	5	0	**21**	14	26	0	**40**	12	10	0	**22**	**83**
6:45PM	8	6	0	**14**	11	19	0	**30**	17	9	0	**26**	**70**
Total	43	29	0	**72**	48	86	0	**134**	53	39	0	**92**	**298**
% Approach	59.7%	40.3%	0%	-	35.8%	64.2%	0%	-	57.6%	42.4%	0%	-	-
% Total	14.4%	9.7%	0%	**24.2%**	16.1%	28.9%	0%	**45.0%**	17.8%	13.1%	0%	**30.9%**	-
PHF	0.672	0.806	-	**0.857**	0.857	0.827	-	**0.838**	0.779	0.750	-	**0.885**	0.898
Motorcycles	0	1	0	**1**	1	0	0	**1**	0	0	0	**0**	2
% Motorcycles	0%	3.4%	0%	**1.4%**	2.1%	0%	0%	**0.7%**	0%	0%	0%	**0%**	0.7%
Cars	32	23	0	**55**	29	53	0	**82**	45	24	0	**69**	206
% Cars	74.4%	79.3%	0%	**76.4%**	60.4%	61.6%	0%	**61.2%**	84.9%	61.5%	0%	**75.0%**	69.1%
Light Goods Vehicles	11	5	0	**16**	16	25	0	**41**	7	15	0	**22**	79
% Light Goods Vehicles	25.6%	17.2%	0%	**22.2%**	33.3%	29.1%	0%	**30.6%**	13.2%	38.5%	0%	**23.9%**	26.5%
Single-Unit Trucks	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Single-Unit Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Articulated Trucks	0	0	0	**0**	2	5	0	**7**	1	0	0	**1**	8
% Articulated Trucks	0%	0%	0%	**0%**	4.2%	5.8%	0%	**5.2%**	1.9%	0%	0%	**1.1%**	2.7%
Buses	0	0	0	**0**	0	2	0	**2**	0	0	0	**0**	2
% Buses	0%	0%	0%	**0%**	0%	2.3%	0%	**1.5%**	0%	0%	0%	**0%**	0.7%
Bicycles on Road	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	1
% Bicycles on Road	0%	0%	0%	**0%**	0%	1.2%	0%	**0.7%**	0%	0%	0%	**0%**	0.3%

*L: Left, R: Right, T: Thru, U: U-Turn

3911.0004.01 Heritage Way & Service Road - TMC
Tue May 15, 2018
PM Peak (6PM - 7PM) - Overall Peak Hour
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses, Bicycles on Road)
All Movements
ID: 525957, Location: 52.757717, -108.271659

Provided by: Urban Systems
304 - 1353 Ellis Street,
Kelowna, BC, V1Y 1Z9, CA





City of North Battleford
TRANSPORTATION
MASTER PLAN

LEGEND

- CITY OF NORTH BATTLEFORD BOUNDARY
- TOWN OF BATTLEFORD BOUNDARY
- EXISTING RAILWAY
- AM (PM) PEAK HOUR TRAFFIC VOLUME
- INTERSECTION

DRAFT

FOR DISCUSSION PURPOSES ONLY

FIGURE 5

2015 MORNING AND AFTERNOON PEAK HOUR TURNING MOVEMENT VOLUMES

North Battleford

Government of Saskatchewan

CIMA

Project No. CA000196 Drawn by: JJC

Date: NOVEMBER 23, 2016 Checked by: RLD

NOT TO SCALE

Count Type: TMC
Collected by: ME2 TRANSPORTATION DATA CORP.
Location: Territorial Drive & Pioneer Avenue
Date: June 3 2015
Observers: Toni JL
Notes:

START TIME	EASTBOUND Pioneer Avenue						WESTBOUND Pioneer Avenue						NORTHBOUND Territorial Drive						SOUTHBOUND Territorial Drive					
	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE
7:00	0	5	1	0	0	0	4	5	3	0	1	0	2	23	3	2	2	0	14	25	7	1	2	0
7:15	2	12	3	0	0	1	5	5	5	0	0	0	4	21	4	2	0	1	28	40	9	3	1	0
7:30	2	11	3	1	0	1	3	4	0	0	0	0	3	29	8	12	0	0	41	61	13	4	1	2
7:45	4	9	3	2	0	0	0	4	1	0	0	0	7	42	13	10	1	0	50	91	17	2	0	2
8:00	5	14	8	1	1	1	9	9	4	3	1	0	5	27	0	5	0	0	49	40	15	4	1	0
8:15	5	19	11	2	0	0	3	6	4	0	0	0	9	44	7	11	2	0	50	40	12	5	2	1
8:30	13	25	6	3	1	0	5	5	4	1	0	0	2	51	12	4	2	0	60	44	12	9	4	0
8:45	16	23	11	8	2	0	3	8	10	1	0	0	11	56	16	6	1	0	55	43	12	3	1	1
2 hr total	47	118 211	46	17 8%	4	3	32	46 109	31	5 5%	2	0	43	293 399	63	52 13%	8	1	347	384 828	97	31 4%	12	6
peak hour	39	81 156	36		4		20	28 70	22		1		27	178 240	35		5		214	167 432	51		8	
peak hour	39	81 156	36	14 9%			20	28 70	22	5 7%			27	178 240	35	26 11%			214	167 432	51	21 5%		

16:00	18	38	6	1	0	1	12	19	11	1	1	0	28	76	29	9	3	1	83	63	11	8	2	1
16:15	16	35	7	0	0	0	19	12	11	1	1	1	36	69	18	10	0	3	58	41	5	4	1	0
16:30	21	41	14	1	0	0	10	18	20	2	0	0	23	112	26	12	0	1	56	51	9	12	0	2
16:45	14	39	5	0	2	1	14	25	21	5	0	3	12	89	29	13	0	1	62	57	6	9	3	2
17:00	21	34	12	2	0	0	19	26	39	4	0	2	25	117	15	5	0	0	62	63	11	1	0	4
17:15	17	41	5	1	1	0	15	41	22	2	0	0	11	82	11	4	0	0	64	45	8	5	1	0
17:30	17	27	2	2	0	0	11	22	16	0	0	0	15	87	21	5	0	0	80	50	9	3	0	0
17:45	22	30	10	0	0	0	14	10	20	1	0	1	14	79	19	2	0	0	74	40	6	5	1	0
2 hr total	146	285 492	61	7 1%	3	2	114	173 447	160	16 4%	2	7	164	711 1043	168	60 6%	3	6	539	410 1014	65	47 5%	8	9
peak hour	73	155 264	36		1		58	110 270	102		0		71	400 552	81		0		244	216 494	34		2	
peak hour	73	155 264	36	4 2%			58	110 270	102	13 5%			71	400 552	81	34 6%			244	216 494	34	27 5%		

Intersection peak hour
Overall peak hour

Count Type: TMC
Collected by: ME2 TRANSPORTATION DATA CORP.
Location: Territorial Drive / South Railway Avenue & Highway 4
Date: June 3 2015
Observers: Germaine
Notes:

START TIME	EASTBOUND Territorial Drive						WESTBOUND South Railway Avenue						NORTHBOUND Highway 4						SOUTHBOUND Highway 4					
	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE
7:00	1	3	12	2	0	0	1	1	6	1	0	0	16	39	1	3	0	0	6	16	3	2	0	0
7:15	1	5	12	3	0	0	4	4	3	1	0	0	25	55	0	3	0	0	3	18	1	3	0	0
7:30	0	2	35	8	0	0	2	4	5	2	0	0	45	81	4	7	0	0	10	24	0	1	0	0
7:45	0	4	35	1	0	0	3	6	13	2	0	0	58	153	10	9	0	0	24	47	0	3	0	0
8:00	1	5	30	3	0	0	3	4	10	4	0	0	24	117	7	10	0	0	14	36	1	2	0	0
8:15	0	6	33	4	0	0	1	7	40	4	0	0	34	149	7	14	0	0	29	62	0	9	0	0
8:30	0	4	47	11	0	0	1	5	21	3	0	0	37	182	2	18	0	0	13	99	0	18	0	0
8:45	0	5	46	9	0	0	5	4	14	2	0	0	49	135	2	9	0	0	11	64	3	11	0	0
2 hr total	3	34 287	250	41 14%	0	0	20	35 167	112	19 11%	0	0	288	911 1232	33	73 6%	0	0	110	366 484	8	49 10%	0	0
peak hour	1	19 165	145		0		8	22 114	84		0		153	601 780	26		0		80	244 325	1		0	
peak hour	1	20 177	156	27 15%			10	20 115	85	13 11%			144	583 745	18	51 7%			67	261 332	4	40 12%		

16:00	1	8	47	11	0	0	5	5	21	4	0	0	37	76	3	5	0	0	15	89	2	9	0	0
16:15	2	4	54	12	0	0	2	6	14	3	0	0	41	81	1	8	0	0	11	69	3	2	0	0
16:30	0	4	53	8	0	0	5	7	16	2	0	0	48	95	3	12	0	0	20	93	0	2	0	0
16:45	0	5	41	6	0	0	2	7	21	2	0	0	36	76	3	9	0	0	21	93	3	2	0	0
17:00	2	1	53	3	0	1	4	2	27	1	0	0	35	82	8	7	0	0	30	128	2	0	0	0
17:15	0	4	69	3	1	1	2	7	19	0	1	1	34	84	5	8	0	0	21	85	2	1	0	0
17:30	0	3	39	9	0	0	6	1	14	0	0	0	43	86	4	9	0	0	24	97	0	2	0	0
17:45	2	8	48	5	1	0	3	9	12	1	0	0	40	78	8	2	0	0	13	76	1	2	0	0
2 hr total	7	37 448	404	57 13%	2	2	29	44 217	144	13 6%	1	1	314	658 1007	35	60 6%	0	0	155	730 898	13	20 2%	0	0
peak hour	2	14 232	216		1		13	23 119	83		1		153	337 509	19		0		92	399 498	7		0	
peak hour	2	14 232	216	20 9%			13	23 119	83	5 4%			153	337 509	19	36 7%			92	399 498	7	5 1%		

Intersection peak hour
Overall peak hour

Count Type: TMC
Collected by: ME2 TRANSPORTATION DATA CORP.
Location: 110 Street & 11 Avenue
Date: Tuesday 2 June 2015
Observers: Linda
Notes:

START TIME	EASTBOUND 11 Avenue						WESTBOUND 11 Avenue						NORTHBOUND 110 Street						SOUTHBOUND 110 Street					
	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE
7:00	3	0	2	0	0	0	0	8	0	0	0	0	5	7	0	1	0	1	0	6	5	1	0	0
7:15	7	1	8	0	0	0	1	5	0	0	0	0	8	6	0	1	0	0	1	18	6	0	0	0
7:30	2	3	8	0	0	0	0	9	1	0	0	0	9	3	0	0	0	0	0	18	12	0	1	2
7:45	7	1	11	1	0	0	1	11	1	0	0	0	15	16	1	1	0	0	0	24	12	0	0	0
8:00	9	6	11	1	0	0	2	9	0	0	0	0	7	12	1	1	1	0	3	12	5	1	0	0
8:15	8	5	13	2	0	0	4	13	1	2	0	0	13	19	2	2	1	0	2	21	8	5	0	0
8:30	16	5	7	7	0	0	2	7	1	0	1	0	12	21	1	3	0	0	3	21	14	4	0	0
8:45	10	7	17	4	0	0	3	9	1	0	0	0	8	13	2	2	0	0	2	30	10	4	0	0
2 hr total	62	28 167	77	15 9%	0	0	13	71 89	5	2 2%	1	0	77	97 181	7	11 6%	2	1	11	150 233	72	15 6%	1	2
peak hour	43	23 114	48		0		11	38 52	3		1		40	65 111	6		2		10	84 131	37		0	
peak hour	43	23 114	48	14 12%			11	38 52	3	2 4%			40	65 111	6	8 7%			10	84 131	37	14 11%		
16:00	18	13	21	1	0	0	1	13	2	4	0	0	32	76	2	2	0	1	0	18	8	2	1	0
16:15	12	11	22	1	0	0	3	4	1	0	0	0	22	27	3	1	0	1	2	23	8	1	0	0
16:30	17	12	36	0	3	0	0	3	0	0	0	0	28	37	1	1	1	0	1	17	10	2	2	0
16:45	12	6	22	1	0	0	2	5	1	0	1	0	24	32	1	1	0	0	1	37	9	0	0	0
17:00	21	8	28	1	0	0	0	8	1	0	0	0	38	34	2	0	0	0	1	19	8	0	0	0
17:15	14	9	15	1	0	0	2	4	1	1	0	1	21	35	0	1	0	0	0	17	11	0	0	0
17:30	7	10	22	0	2	0	2	3	0	0	1	1	17	27	1	1	0	1	1	15	4	1	0	1
17:45	8	7	14	1	1	0	1	6	0	0	0	0	12	21	0	0	1	1	1	23	12	0	1	1
2 hr total	109	76 365	180	6 2%	6	0	11	46 63	6	5 8%	2	2	194	289 493	10	7 1%	2	4	7	169 246	70	6 2%	4	2
peak hour	62	37 207	108		3		5	20 28	3		1		112	130 249	7		1		5	96 136	35		1	
peak hour	64	35 200	101	3 2%			4	20 27	3	1 4%			111	138 253	4	3 1%			3	90 131	38	2 2%		

Intersection peak hour
Overall peak hour

Count Type: TMC
Collected by: ME2 TRANSPORTATION DATA CORP.
Location: Territorial Drive & Railway Avenue WEST
Date: June 4 2015
Observers: LJM
Notes:

START TIME	EASTBOUND Railway Avenue						WESTBOUND Railway Avenue						NORTHBOUND Territorial Drive						SOUTHBOUND Territorial Drive					
	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE
7:00	0	0	1	0	0	0	1	0	1	0	0	0	1	21	1	1	0	0	5	21	2	1	0	0
7:15	0	1	0	0	0	0	1	0	1	0	0	0	1	31	1	1	0	0	6	28	0	1	0	0
7:30	1	2	0	0	0	0	1	1	11	0	0	0	1	49	2	10	0	0	10	45	2	8	0	0
7:45	2	1	2	1	0	0	1	5	12	3	0	0	3	64	0	7	0	0	13	31	6	3	0	0
8:00	1	2	2	2	0	0	1	1	8	1	0	0	1	26	1	5	0	0	8	41	2	2	0	0
8:15	1	3	0	0	0	0	2	0	6	0	0	0	0	40	3	5	0	0	13	27	2	4	0	0
8:30	0	3	1	1	0	0	3	0	11	1	0	0	1	43	3	6	0	0	8	55	1	11	0	0
8:45	3	1	1	1	0	0	5	1	6	1	0	0	3	48	6	9	0	0	17	54	2	8	0	0
2 hr total	8	13 28	7	5 18%	0	0	15	8 79	56	6 8%	0	0	11	322 350	17	44 13%	0	0	80	302 399	17	38 10%	0	0
peak hour	5	9 18	4		0		11	2 44	31		0		5	157 175	13		0		46	177 230	7		0	
peak hour	5	9 18	4	4 22%			11	2 44	31	3 7%			5	157 175	13	25 14%			46	177 230	7	25 11%		
16:00	1	0	2	1	0	0	1	2	6	1	0	0	1	76	2	6	0	0	5	47	3	2	0	0
16:15	1	1	3	2	0	0	2	2	5	0	0	1	1	47	2	8	0	0	6	58	5	11	0	0
16:30	5	0	1	3	0	0	0	1	14	0	0	0	1	55	2	9	0	0	6	56	1	7	0	1
16:45	1	3	0	0	0	0	3	0	10	0	0	1	1	45	8	0	0	0	12	52	2	7	0	0
17:00	4	1	1	1	0	0	3	2	10	1	0	0	2	36	2	7	0	0	6	77	2	4	0	0
17:15	2	3	1	0	0	0	1	1	10	0	0	0	2	41	1	5	0	2	9	57	0	5	0	0
17:30	2	0	0	0	0	0	1	0	12	2	0	0	0	38	3	0	5	0	6	53	1	9	0	0
17:45	4	2	1	0	0	0	1	1	2	0	0	0	1	55	0	0	5	0	6	54	8	9	0	0
2 hr total	20	10 39	9	7 18%	0	0	12	9 90	69	4 4%	0	2	9	393 422	20	35 8%	10	2	56	454 532	22	54 10%	0	1
peak hour	11	5 21	5		0		8	5 52	39		0		5	183 202	14		10		30	243 283	10		0	
peak hour	12	7 22	3	4 18%			7	4 55	44	1 2%			6	177 196	13	21 11%			33	242 280	5	23 8%		

Intersection peak hour
Overall peak hour

Count Type: TMC
Collected by: ME2 TRANSPORTATION DATA CORP.
Location: Territorial Drive & Service Road Tim Hortons
Date: June 2 2015
Observers: LJM Gary
Notes:

START TIME	EASTBOUND Service Road						WESTBOUND Service Road (Tim Horton)						NORTHBOUND Territorial Drive						SOUTHBOUND Territorial Drive					
	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE
7:00	0	1	0	0	0	0	14	0	8	2	0	0	0	23	10	5	0	0	3	29	0	4	0	0
7:15	0	1	0	0	0	0	22	2	7	6	0	0	0	29	17	6	0	0	5	40	1	7	0	0
7:30	0	1	1	0	0	0	28	1	15	2	0	0	1	24	30	6	0	0	7	63	0	8	1	1
7:45	0	0	1	0	0	0	37	1	14	2	0	0	2	36	41	6	1	0	4	95	1	4	0	0
8:00	3	0	0	1	0	0	36	1	27	1	0	0	0	26	31	5	0	1	19	45	2	6	0	0
8:15	0	1	1	0	0	0	36	3	23	3	0	0	3	47	39	17	0	0	7	38	0	4	0	0
8:30	1	3	1	2	0	0	38	2	13	1	0	0	1	58	35	8	1	0	13	36	1	3	0	0
8:45	0	1	0	0	0	0	30	2	17	2	0	0	0	46	44	13	0	0	15	34	1	4	0	1
2 hr total	4	8	4	3	0	0	241	12	124	19	0	0	7	289	247	66	2	1	73	380	6	40	1	2
		16		19%				377		5%				543		12%				459		9%		
peak hour	4	4	3		0		147	7	77		0		6	167	146		2		43	214	4		0	
		11						231						319						261				
peak hour	4	5	2	3			140	8	80	7			4	177	149	43			54	153	4	17		
		11		27%				228		3%				330		13%				211		8%		
16:00	0	1	2	0	0	0	64	4	14	1	0	1	4	76	59	5	0	1	22	53	4	4	1	1
16:15	1	2	1	0	0	0	49	3	35	1	0	0	1	65	49	4	0	2	20	51	3	6	2	0
16:30	2	5	2	0	0	0	53	9	29	1	0	0	7	76	55	5	1	0	25	58	4	4	0	1
16:45	2	3	4	0	0	0	65	12	32	2	0	2	3	63	64	3	0	0	23	44	8	2	0	0
17:00	1	5	3	0	0	0	46	15	51	2	0	0	4	89	49	6	0	0	16	70	7	5	1	0
17:15	0	1	2	0	0	0	59	5	39	0	1	1	10	77	62	0	0	0	12	58	5	5	1	0
17:30	1	3	7	0	0	0	49	6	34	1	0	0	6	61	39	4	0	0	14	39	8	3	0	0
17:45	1	9	3	0	1	0	50	4	27	2	0	0	5	58	45	1	0	0	18	47	2	3	0	0
2 hr total	8	29	24	0	1	0	435	58	261	10	1	4	40	565	422	28	1	3	150	420	41	32	5	2
		61		0%				754		1%				1027		3%				611		5%		
peak hour	5	14	11		0		223	41	151		1		24	305	230		0		76	230	24		2	
		30						415						559						330				
peak hour	5	14	11	0			223	41	151	5			24	305	230	14			76	230	24	16		
		30		0%				415		1%				559		3%				330		5%		

Intersection peak hour
Overall peak hour

Count Type: TMC
Collected by: ME2 TRANSPORTATION DATA CORP.
Location: Yellowhead Highway & Highway 40/ Simmental Street
Date: Wednesday 3 June 2015
Observers: Sandra Ken
Notes:

START TIME	~~EASTBOUND~~ ~~Simmental Street~~						~~WESTBOUND~~ ~~Highway 40~~						~~NORTHBOUND~~ ~~Yellowhead Highway~~						~~SOUTHBOUND~~ ~~Yellowhead Highway~~					
	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE
7:00	5	40	35	9	0	0	0	34	0	6	0	0	33	1	0	5	0	0	0	1	4	0	0	1
7:15	10	40	46	13	0	0	0	30	0	12	0	0	13	1	0	7	0	0	0	2	15	0	0	0
7:30	10	70	61	12	0	0	0	45	0	6	0	0	23	0	1	7	0	0	0	1	16	0	0	2
7:45	13	82	106	22	0	1	2	63	0	14	0	0	18	0	2	5	0	0	0	4	22	0	0	1
8:00	10	49	43	5	0	0	3	55	0	14	0	0	17	0	0	3	0	0	1	2	10	1	0	1
8:15	10	40	40	7	0	0	2	70	2	20	0	0	28	1	0	6	0	0	2	2	19	3	0	0
8:30	24	75	45	24	0	0	0	56	0	5	0	0	32	1	0	1	0	0	2	1	11	0	0	0
8:45	20	59	47	14	0	0	0	74	1	21	0	0	38	1	3	4	0	0	1	3	9	3	0	0
2 hr total	102	455	423	106	0	1	7	427	3	98	0	0	202	5	6	38	0	0	6	16	106	7	0	5
		980		11%				437		22%				213		18%				128		5%		
peak hour	57	246	234		0		7	244	2		0		95	2	2		0		5	9	62		0	
		537						253						99						76				
peak hour	64	223	175	50			5	255	3	60			115	3	3	14			6	8	49	7		
		462		11%				263		23%				121		12%				63		11%		
16:00	11	76	48	15	0	0	0	76	0	12	0	0	82	76	0	3	0	1	0	2	10	0	0	0
16:15	16	59	48	13	0	0	0	73	0	20	0	0	55	0	0	1	0	0	0	2	8	0	0	0
16:30	17	80	50	18	0	0	0	85	0	16	0	1	66	0	1	1	0	1	1	2	18	2	0	0
16:45	23	68	34	27	0	0	1	124	1	19	0	0	68	4	1	3	0	1	0	4	15	1	0	0
17:00	21	75	23	16	0	0	1	114	0	17	0	0	118	4	0	1	0	1	1	1	11	2	0	0
17:15	20	73	11	14	0	0	0	83	0	16	0	0	44	2	0	2	0	1	0	1	16	1	0	0
17:30	17	64	7	12	0	0	1	76	0	12	0	0	41	1	2	1	1	0	1	1	12	0	1	0
17:45	22	75	9	16	0	0	0	76	0	14	0	0	20	0	1	1	0	0	1	2	4	0	0	0
2 hr total	147	570	230	131	0	0	3	707	1	126	0	1	494	87	5	13	1	5	4	15	94	6	1	0
		947		14%				711		18%				586		2%				113		5%		
peak hour	77	282	155		0		2	396	1		0		307	8	2		1		2	9	52		1	
		514						399						317						63				
peak hour	81	296	118	75			2	406	1	68			296	10	2	7			2	8	60	6		
		495		15%				409		17%				308		2%				70		9%		

Intersection peak hour
Overall peak hour

Count Type: TMC
Collected by: ME2 TRANSPORTATION DATA CORP.
Location: Territorial Drive & Railway Avenue EAST
Date: Tuesday 2 June 2015
Observers: Sandra Ken
Notes:

START TIME	EASTBOUND Railway Avenue EAST						WESTBOUND Railway Avenue EAST						NORTHBOUND						SOUTHBOUND Territorial Drive					
	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE
7:00	20	19	0	3	0	0	0	20	20	4	0	0	0	0	0	0	0	0	38	0	11	4	0	0
7:15	18	23	0	3	0	0	0	14	26	5	0	0	0	0	0	0	0	0	45	0	17	8	0	0
7:30	36	49	0	3	0	1	0	18	18	5	0	0	0	0	0	0	0	0	56	0	26	8	0	0
7:45	52	63	0	2	0	0	0	46	29	6	0	0	0	0	0	0	0	0	98	0	33	4	0	0
8:00	31	26	0	1	0	0	0	23	25	5	0	0	0	0	0	0	0	0	68	0	17	6	0	0
8:15	46	32	0	6	0	0	0	33	42	12	0	0	0	0	0	0	0	0	46	0	26	3	0	0
8:30	54	34	0	5	0	0	0	39	41	5	0	0	0	0	0	0	0	0	38	0	38	2	0	0
8:45	57	21	0	5	0	0	0	22	38	10	0	0	0	0	0	0	0	0	34	0	28	4	0	0
2 hr total	314	267 581	0	28 5%	0	1	0	215 454	239	52 11%	0	0	0	0 0	0	0	0	0	423	0 619	196	39 6%	0	0
peak hour	183	155 338	0		0		0	141 278	137		0		0	0 0	0		0		250	0 364	114		0	
peak hour	188	113 301	0	17 6%			0	117 263	146	32 12%			0	0 0	0	0			186	0 295	109	15 5%		

16:00	110	31	0	2	0	0	0	45	62	4	0	0	0	76	0	0	0	0	56	0	73	7	0	0
16:15	76	31	0	4	0	0	0	38	44	2	0	0	0	0	0	0	0	0	46	0	55	6	0	0
16:30	94	35	0	2	0	0	0	47	47	5	0	0	0	0	0	0	0	0	48	0	63	5	0	0
16:45	92	26	0	2	0	0	0	46	36	4	0	0	0	0	0	0	0	0	42	0	68	5	0	0
17:00	72	28	0	2	0	0	0	50	76	5	0	0	0	0	0	0	0	0	60	0	66	11	0	0
17:15	97	29	0	1	0	0	0	32	50	1	0	0	0	0	0	0	0	0	51	0	72	9	0	0
17:30	67	22	0	1	0	0	0	37	40	3	0	0	0	0	0	0	0	0	38	0	55	4	0	0
17:45	62	30	0	4	0	0	0	21	39	2	0	0	0	0	0	0	0	0	50	0	54	9	0	0
2 hr total	670	232 902	0	18 2%	0	0	0	316 710	394	26 4%	0	0	0	76 76	0	0	0	0	391	0 897	506	56 6%	0	0
peak hour	355	118 473	0		0		0	175 384	209		0		0	0 0	0		0		201	0 470	269		0	
peak hour	355	118 473	0	7 1%			0	175 384	209	15 4%			0	0 0	0	0			201	0 470	269	30 6%		

Intersection peak hour
Overall peak hour

Count Type: TMC
Collected by: CITY OF NORTH BATTLEFORD
Location: 100th St & 11th Ave
Date: 17-Jul-14
Observers: afriesen
Notes: Data has been factored by 1% linear annual growth rate to 2015 volumes

START TIME	EASTBOUND						WESTBOUND						NORTHBOUND						SOUTHBOUND					
	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE
7:00	22	18	6	0	1	0	0	6	6	0	0	0	1	12	2	0	0	0	15	26	12	0	0	0
7:15	16	22	5	0	2	0	0	4	8	0	0	0	2	16	0	0	0	0	19	25	14	0	1	0
7:30	44	35	12	0	1	0	0	7	7	0	0	0	3	14	0	0	0	0	30	57	28	0	1	0
7:45	63	77	35	0	0	0	0	13	16	0	0	0	17	26	2	0	0	0	33	39	36	0	0	0
8:00	29	28	7	0	0	0	1	11	20	0	0	0	7	19	1	0	0	0	11	30	25	0	1	0
8:15	37	47	17	0	0	0	0	12	13	0	0	0	6	31	0	0	0	0	19	39	21	0	1	0
8:30	45	33	7	0	2	0	2	15	12	0	1	0	7	36	0	0	0	0	20	37	36	0	3	0
8:45	61	40	13	0	0	0	5	16	23	0	1	0	18	23	2	0	0	0	25	25	22	0	3	0
2 hr total	317	300 719	102	0 0%	6	0	8	84 197	105	0 0%	2	0	61	177 245	7	0 0%	0	0	172	278 644	194	0 0%	10	0
peak hour	174	185 425	66		2		3	51 115	61		1		37	112 152	3		0		83	145 346	118		5	
peak hour	172	148 364	44	0 0%			8	54 130	68	0 0%			38	109 150	3	0 0%			75	131 310	104	0 0%		

16:00	36	41	17	0	0	0	3	35	47	0	1	0	14	76	1	0	0	0	26	36	37	0	0	0
16:15	40	33	4	0	0	0	0	26	34	0	0	0	13	55	1	0	1	0	23	49	54	0	0	0
16:30	60	36	16	0	0	0	2	48	35	0	0	0	9	65	0	0	0	0	25	49	44	0	0	0
16:45	58	35	15	0	0	0	1	36	42	0	0	0	13	64	2	0	0	0	26	52	55	0	0	0
17:00	57	38	11	0	0	0	1	60	51	0	0	0	17	78	2	0	0	0	26	48	69	0	0	0
17:15	59	15	10	0	0	0	0	46	25	0	0	0	11	53	0	0	2	0	19	46	53	0	0	0
17:30	57	27	7	0	0	0	0	11	17	0	1	0	5	48	1	0	1	0	25	41	43	0	2	0
17:45	29	36	14	0	0	0	1	27	31	0	0	0	40	36	2	0	0	0	16	39	55	0	0	0
2 hr total	396	261 751	94	0 0%	0	0	8	289 579	282	0 0%	2	0	122	475 606	9	0 0%	4	0	186	360 956	410	0 0%	2	0
peak hour	234	124 410	52		0		4	190 347	153		1		50	260 314	4		3		96	195 512	221		2	
peak hour	234	124 410	52	0 0%			4	190 347	153	0 0%			50	260 314	4	0 0%			96	195 512	221	0 0%		

Intersection peak hour
Overall peak hour

INTERSECTION TRAFFIC FLOW ANALYSIS REPORT

CITY OF NORTH BATTLEFORD

Location Territorial Drive & 8th Avenue
Date 07-Dec-16
Observers alriesen

time starting	EASTBOUND						WESTBOUND						NORTHBOUND						SOUTHBOUND									
	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE	LT	ST	RT	CV	PED	BIKE				
7:00	5	0	5	0	0		0	0	0	0	0		6	34	1	6	0		0	50	2	1	0		103			
7:15	5	0	8	0	0		0	0	0	0	0		0	31	0	3	0		1	84	7	4	0		136			
7:30	3	0	2	1	0		0	0	0	0	0		3	38	1	9	0		2	134	14	3	0		197			
7:45	3	0	5	0	0		1	0	0	0	0		3	42	0	3	0		1	107	23	5	0		185	621		
8:00	0	0	4	0	0		0	0	0	0	0		5	47	1	6	0		0	96	3	3	0		156	674		
8:15	8	0	3	2	2		0	0	0	0	0		7	48	0	3	0		1	73	6	2	0		146	684		
8:30	1	0	6	1	0		1	0	0	0	0		5	67	1	9	0		1	94	12	6	0		188	675		
8:45	3	0	3	2	0		2	0	0	0	0		6	61	4	7	0		0	79	7	1	0		165	655		
2 hr total	28	0	36	6	2	0	4	0	0	0	0	0	35	368	8	46	0	0	6	717	74	25	0	0	1276			
		64		9%				4		0%				411		11%				797		3%						
peak hour	14	0	14		2		1	0	0		0		18	175	2		0		4	410	46		0			684		
		28						1						195						460								
peak hour	12	0	16	5			3	0	0	0			23	223	6	25			2	342	28	12			188	655	0.87	6%
		28		18%				3		0%				252		10%				372		3%			MAX15	HR-TOT	PHF	%HV
16:00	3	0	9	0	0		1	1	2	0	0		11	163	1	1	0		1	112	7	3	0		311			
16:15	6	2	8	0	0		0	0	1	0	0		11	170	1	1	0		1	125	7	6	0		332			
16:30	7	0	3	1	0		2	2	0	1	0		12	158	2	2	0		2	124	8	8	0		320			
16:45	6	1	10	0	0		0	0	0	0	0		19	168	2	2	0		1	114	9	4	0		330	1293		
17:00	5	0	4	0	0		0	2	2	0	1		10	199	2	2	0		5	123	8	4	1		360	1342		
17:15	4	0	9	0	0		0	0	2	0	0		11	164	4	1	0		2	103	4	1	1		303	1313		
17:30	2	0	6	1	0		0	3	4	0	0		8	158	1	3	0		1	122	8	4	0		313	1306		
17:45	3	0	8	0	0		1	0	2	0	0		8	139	2	6	0		3	113	7	5	0		286	1262		
2 hr total	36	3	57	2	0	0	4	8	13	1	1	0	90	1319	15	18	0	0	16	936	58	35	2	0	2555			
		96		2%				25		4%				1424		1%				1010		3%						
peak hour	24	3	25		0		2	4	3		1		52	695	7		0		9	486	32		2			1342		
		52						9						754						527								
peak hour	22	1	26	1			2	4	4	1			52	689	10	7			10	464	29	17			360	1313	0.91	2%
		49		1%				10		10%				751		4%				503		4%			MAX15	HR-TOT	PHF	%HV
4 hour total	64	3	93	8			8	8	13	1			125	1687	23	64			22	1653	132	60						
		160		5%				29		3%				1835		3%				1807		3%						
2 direct L	EB	160	38%				WB	29	38%				NB	1835	51%				SB	1807	51%							
total	WB	265	62%				EB	48	62%				SB	1754	49%				NB	1764	49%							
		425						77						3589						3571								

observed peak hour
overall peak hour

ME2 TRANSPORTATION DATA CORP.
Vehicle Counts

VehicleCount-32 -- English (ENU)

Datasets:
Site: **2 battleford - territorial drive n of railway**
Profile:
Filter time: **12:14 Monday, June 01, 2015 => 11:18 Thursday, June 04, 2015 (2.96146)**
Direction: North (bound), P = North
In profile: Vehicles = 7983 / 16752 (47.65%)

*** Monday, June 01, 2015 - Total=1620 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**120**	**158**	**145**	**228**	**236**	**213**	**150**	**103**	**110**	**93**	**46**	**18**	
-	-	-	-	-	-	-	-	-	-	-	-	4	51	40	45	**64**	73	40	23	32	32	12	3	3
-	-	-	-	-	-	-	-	-	-	-	-	34	41	38	53	**66**	49	38	26	20	21	11	7	5
-	-	-	-	-	-	-	-	-	-	-	-	34	33	31	**86**	62	45	36	25	21	24	14	1	2
-	-	-	-	-	-	-	-	-	-	-	-	48	33	36	**44**	44	46	36	29	37	16	9	7	5

PM Peak 1530 - 1630 (260), PM PHF=0.76

*** Tuesday, June 02, 2015 - Total=2798, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
15	**8**	**3**	**1**	**5**	**25**	**66**	**176**	**190**	**172**	**145**	**177**	**214**	**167**	**155**	**212**	**240**	**220**	**152**	**131**	**137**	**106**	**56**	**25**	
3	3	0	0	2	3	16	16	41	49	39	37	**61**	44	41	36	52	**65**	41	34	48	31	18	8	1
5	1	3	0	1	3	9	36	45	34	32	34	**50**	41	33	51	**49**	48	37	34	20	25	23	8	2
2	3	0	1	2	6	9	50	42	48	31	36	**53**	33	35	69	**82**	50	35	34	27	25	5	6	4
5	1	0	0	0	13	32	74	62	41	43	**70**	50	49	46	56	**57**	57	39	29	42	25	10	3	3

AM Peak 1145 - 1245 (234), AM PHF=0.84 PM Peak 1615 - 1715 (253), PM PHF=0.77

*** Wednesday, June 03, 2015 - Total=2740, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
10	**5**	**3**	**1**	**5**	**21**	**66**	**179**	**200**	**170**	**141**	**152**	**205**	**156**	**175**	**179**	**228**	**219**	**167**	**112**	**134**	**118**	**71**	**23**	
1	0	1	0	2	3	13	18	**44**	49	41	26	61	42	42	35	51	**57**	49	29	32	37	25	9	9
2	3	1	0	1	5	11	31	**45**	34	40	34	49	30	41	31	**51**	50	40	33	25	33	20	5	4
4	0	0	1	1	6	14	**57**	52	46	31	35	45	45	41	70	**72**	56	48	31	39	17	13	3	4
3	2	1	0	1	7	28	**73**	59	41	29	57	50	39	51	43	**54**	56	30	19	38	31	13	6	2

AM Peak 0730 - 0830 (219), AM PHF=0.75 PM Peak 1615 - 1715 (234), PM PHF=0.81

*** Thursday, June 04, 2015 - Total=825 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
19	**2**	**4**	**2**	**4**	**25**	**56**	**145**	**193**	**171**	**154**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	
9	0	2	0	1	6	9	14	50	45	33	42	-	-	-	-	-	-	-	-	-	-	-	-	-
4	1	0	0	1	3	9	32	45	38	47	8	-	-	-	-	-	-	-	-	-	-	-	-	-
4	1	1	0	2	4	11	36	39	52	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	0	1	2	0	12	27	63	59	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-

ME2 TRANSPORTATION DATA CORP.
Vehicle Counts

VehicleCount-32 -- English (ENU)

Datasets:
Site: **2 battleford - territorial drive n of railway**

Profile:
Filter time: **12:14 Monday, June 01, 2015 => 11:18 Thursday, June 04, 2015 (2.96146)**
Direction: South (bound), P = North
In profile: Vehicles = 8715 / 16752 (52.02%)

*** Monday, June 01, 2015 - Total=1940 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**150**	**187**	**176**	**224**	**251**	**257**	**191**	**164**	**135**	**116**	**52**	**37**	
-	-	-	-	-	-	-	-	-	-	-	-	2	44	51	47	66	**82**	42	47	35	40	12	7	3
-	-	-	-	-	-	-	-	-	-	-	-	41	44	37	52	58	**78**	62	30	31	23	18	14	6
-	-	-	-	-	-	-	-	-	-	-	-	55	51	48	67	**65**	57	46	38	27	34	13	6	1
-	-	-	-	-	-	-	-	-	-	-	-	52	48	40	58	**62**	40	41	49	42	19	9	10	3

PM Peak 1630 - 1730 (287), PM PHF=0.88

*** Tuesday, June 02, 2015 - Total=2962, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
13	**12**	**4**	**3**	**4**	**27**	**72**	**143**	**216**	**138**	**156**	**168**	**233**	**153**	**164**	**200**	**252**	**283**	**245**	**163**	**119**	**104**	**66**	**24**	
3	5	3	0	0	3	21	14	44	40	32	40	**70**	33	45	46	56	**85**	63	51	24	41	19	7	2
6	5	0	1	2	4	11	30	46	30	36	47	**51**	42	44	47	65	**74**	77	40	29	32	22	4	2
1	0	0	2	0	6	15	43	52	25	46	33	**50**	44	40	49	**64**	53	46	35	33	12	14	7	1
3	2	1	0	2	14	25	56	74	43	42	**48**	62	34	35	58	**67**	71	59	37	33	19	11	6	3

AM Peak 1145 - 1245 (219), AM PHF=0.78 PM Peak 1630 - 1730 (290), PM PHF=0.85

*** Wednesday, June 03, 2015 - Total=2994, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
8	**5**	**1**	**2**	**4**	**30**	**76**	**138**	**226**	**144**	**148**	**171**	**209**	**178**	**165**	**220**	**252**	**278**	**200**	**189**	**146**	**116**	**65**	**23**	
2	1	0	0	0	5	18	15	**49**	47	39	39	41	52	28	50	61	**82**	53	56	26	35	22	5	7
2	2	0	0	0	2	14	18	**44**	33	32	42	50	35	36	61	63	**67**	60	51	40	30	21	9	2
1	1	0	2	2	8	21	50	**60**	16	36	45	59	44	50	53	63	**63**	46	46	41	31	17	4	1
3	1	1	0	2	15	23	55	**73**	48	41	45	59	47	51	56	65	**66**	41	36	39	20	5	5	1

AM Peak 0800 - 0900 (226), AM PHF=0.77 PM Peak 1700 - 1800 (278), PM PHF=0.85

*** Thursday, June 04, 2015 - Total=819 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
11	**4**	**6**	**1**	**7**	**26**	**67**	**126**	**229**	**163**	**140**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	
7	1	2	1	3	6	14	19	59	33	35	30	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1	0	0	1	3	9	21	40	36	40	9	-	-	-	-	-	-	-	-	-	-	-	-	-
1	1	3	0	1	9	17	29	62	43	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	1	1	0	2	8	27	57	68	51	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX B

2018 Background Operating Conditions

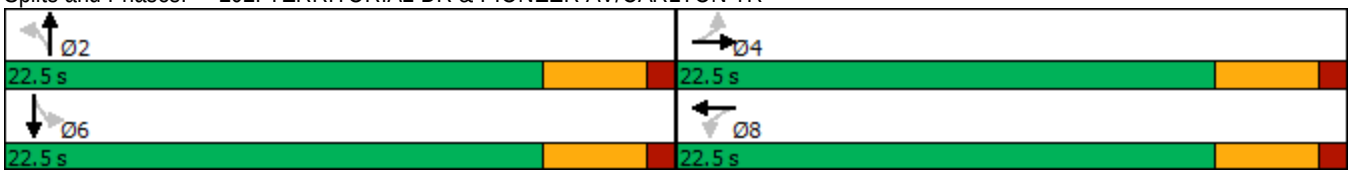
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	83	35	20	29	23	28	183	36	220	163	53
Future Volume (vph)	40	83	35	20	29	23	28	183	36	220	163	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	60.0		0.0	120.0		0.0	125.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.955			0.934			0.975			0.963	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3380	0	1770	3306	0	1770	3451	0	1770	3408	0
Flt Permitted	0.718			0.702			0.605			0.604		
Satd. Flow (perm)	1337	3380	0	1308	3306	0	1127	3451	0	1125	3408	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38			25			39			58	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		129.0			157.2			189.3			446.1	
Travel Time (s)		9.3			11.3			11.4			26.8	
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)	43	90	38	22	32	25	30	199	39	239	177	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	128	0	22	57	0	30	238	0	239	235	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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		

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)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
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		Max	Max		Max	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)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	6.8	6.8		6.8	6.8		23.8	23.8		23.8	23.8	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.65	0.65		0.65	0.65	
v/c Ratio	0.18	0.20		0.09	0.09		0.04	0.11		0.33	0.11	
Control Delay	13.1	9.5		11.8	7.9		4.4	3.5		6.3	3.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.1	9.5		11.8	7.9		4.4	3.5		6.3	3.2	
LOS	B	A		B	A		A	A		A	A	
Approach Delay		10.4			8.9			3.6			4.8	
Approach LOS		B			A			A			A	
Stops (vph)	34	67		19	30		15	75		114	68	
Fuel Used(l)	2	4		1	2		1	7		13	11	
CO Emissions (g/hr)	31	71		17	33		19	123		247	206	
NOx Emissions (g/hr)	6	14		3	6		4	24		48	40	
VOC Emissions (g/hr)	7	16		4	8		4	28		57	48	
Dilemma Vehicles (#)	0	0		0	0		0	30		0	29	
Queue Length 50th (m)	2.1	2.2		1.0	0.7		0.7	2.3		6.4	2.0	
Queue Length 95th (m)	6.8	6.2		4.3	3.4		2.9	5.8		17.6	5.4	
Internal Link Dist (m)		105.0			133.2			165.3			422.1	
Turn Bay Length (m)	50.0			60.0			120.0			125.0		
Base Capacity (vph)	660	1689		645	1645		729	2245		727	2225	
Starvation Cap Reductn	0	0		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	0.07	0.08		0.03	0.03		0.04	0.11		0.33	0.11	

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 36.8	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.33	
Intersection Signal Delay: 5.8	Intersection LOS: A
Intersection Capacity Utilization 38.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 202: TERRITORIAL DR & PIONEER AV/CARLTON TR



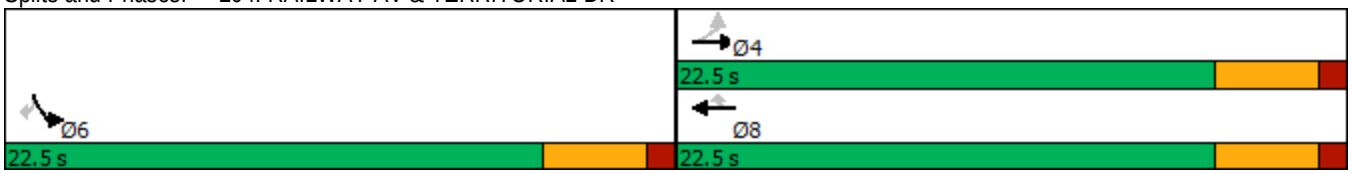
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	200	125	104	130	197	112
Future Volume (vph)	200	125	104	130	197	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0			120.0	0.0	0.0
Storage Lanes	1			1	2	1
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3539	1583	3433	1583
Flt Permitted	0.681				0.950	
Satd. Flow (perm)	1269	3539	3539	1583	3433	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				141		122
Link Speed (k/h)		60	60		60	
Link Distance (m)		204.5	226.9		61.2	
Travel Time (s)		12.3	13.6		3.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	217	136	113	141	214	122
Shared Lane Traffic (%)						
Lane Group Flow (vph)	217	136	113	141	214	122
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		10.8	
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	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	0.6	0.6	2.0	2.0	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	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Max	Max
Walk Time (s)	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
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	11.7	11.7	11.5	11.5	22.3	22.3
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.56	0.56
v/c Ratio	0.58	0.13	0.11	0.25	0.11	0.13
Control Delay	17.9	9.6	9.5	3.6	7.1	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	9.6	9.5	3.6	7.1	2.7
LOS	B	A	A	A	A	A
Approach Delay		14.7	6.2		5.5	
Approach LOS		B	A		A	
Stops (vph)	153	77	64	21	100	19
Fuel Used(l)	11	6	5	4	5	1
CO Emissions (g/hr)	209	105	91	67	100	27
NOx Emissions (g/hr)	40	20	17	13	19	5
VOC Emissions (g/hr)	48	24	21	15	23	6
Dilemma Vehicles (#)	0	15	12	0	0	0
Queue Length 50th (m)	12.2	3.4	2.8	0.0	3.8	0.0
Queue Length 95th (m)	26.5	7.3	6.3	7.3	10.4	6.9
Internal Link Dist (m)		180.5	202.9		37.2	
Turn Bay Length (m)	150.0			120.0		
Base Capacity (vph)	579	1615	1615	799	1924	941
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	0.37	0.08	0.07	0.18	0.11	0.13

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 39.7	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 9.1	Intersection LOS: A
Intersection Capacity Utilization 30.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 204: RAILWAY AV & TERRITORIAL DR



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	278	3	56	190	20	40	1	1	2	3	20
Future Volume (vph)	5	278	3	56	190	20	40	1	1	2	3	20
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	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.997			0.890	
Flt Protected	0.950			0.950				0.954			0.996	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	0	1772	0	0	1651	0
Flt Permitted	0.622			0.568				0.819			0.990	
Satd. Flow (perm)	1159	3539	1583	1058	3539	1583	0	1521	0	0	1641	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			36			36		1			22	
Link Speed (k/h)		80			80			50			80	
Link Distance (m)		231.6			229.3			141.2			218.7	
Travel Time (s)		10.4			10.3			10.2			9.8	
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)	5	302	3	61	207	22	43	1	1	2	3	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	302	3	61	207	22	0	45	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)		3.6			3.6			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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		

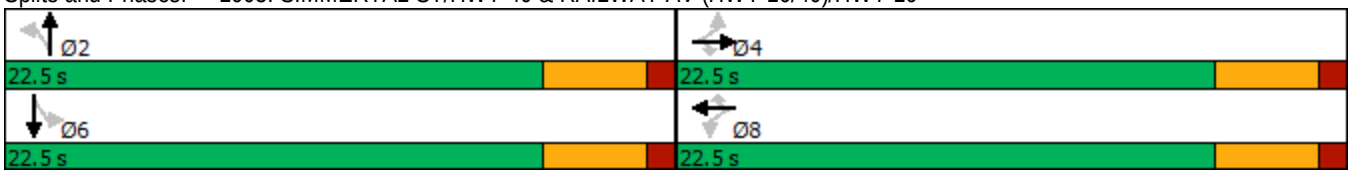
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5			4.5	
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	Max	Max		Max	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)	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	
Act Effct Green (s)	8.3	8.3	8.3	8.3	8.3	8.3		19.0			19.0	
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23	0.23		0.52			0.52	
v/c Ratio	0.02	0.37	0.01	0.25	0.26	0.06		0.06			0.03	
Control Delay	10.2	12.8	0.0	13.7	11.8	3.9		5.0			3.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	10.2	12.8	0.0	13.7	11.8	3.9		5.0			3.1	
LOS	B	B	A	B	B	A		A			A	
Approach Delay		12.6			11.6			5.0			3.1	
Approach LOS		B			B			A			A	
Stops (vph)	7	208	0	47	139	6		22			8	
Fuel Used(l)	1	20	0	4	13	1		1			1	
CO Emissions (g/hr)	10	367	1	80	244	14		22			18	
NOx Emissions (g/hr)	2	71	0	15	47	3		4			3	
VOC Emissions (g/hr)	2	85	0	18	56	3		5			4	
Dilemma Vehicles (#)	0	38	0	0	26	0		0			3	
Queue Length 50th (m)	0.3	8.1	0.0	3.0	5.3	0.0		1.1			0.2	
Queue Length 95th (m)	1.7	14.8	0.0	9.1	10.7	2.4		4.4			2.4	
Internal Link Dist (m)		207.6			205.3			117.2			194.7	
Turn Bay Length (m)	120.0		120.0	120.0		120.0						
Base Capacity (vph)	575	1756	804	525	1756	804		795			868	
Starvation Cap Reductn	0	0	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	0.01	0.17	0.00	0.12	0.12	0.03		0.06			0.03	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 36.3
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.37	
Intersection Signal Delay: 11.3	Intersection LOS: B
Intersection Capacity Utilization 32.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1603: SIMMERTAL ST/HWY 40 & RAILWAY AV (HWY 16/40)/HWY 16



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	16	3	0	0	26	210	8	3	411	34
Future Volume (Veh/h)	10	0	16	3	0	0	26	210	8	3	411	34
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	11	0	17	3	0	0	28	228	9	3	447	37
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	737	737	447	754	774	228	484			228		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	737	737	447	754	774	228	484			228		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	97	99	100	100	97			100		
cM capacity (veh/h)	327	336	612	310	320	811	1079			1340		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	28	3	28	228	9	3	447	37
Volume Left	11	3	28	0	0	3	0	0
Volume Right	17	0	0	0	9	0	0	37
cSH	456	310	1079	1700	1700	1340	1700	1700
Volume to Capacity	0.06	0.01	0.03	0.13	0.01	0.00	0.26	0.02
Queue Length 95th (m)	1.6	0.2	0.6	0.0	0.0	0.1	0.0	0.0
Control Delay (s)	13.4	16.7	8.4	0.0	0.0	7.7	0.0	0.0
Lane LOS	B	C	A			A		
Approach Delay (s)	13.4	16.7	0.9			0.0		
Approach LOS	B	C						

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	31.6%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	5	2	144	8	82	4	173	146	56	158	4
Future Volume (Veh/h)	4	5	2	144	8	82	4	173	146	56	158	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	4	5	2	157	9	89	4	188	159	61	172	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								61			189	
pX, platoon unblocked												
vC, conflicting volume	492	492	59	459	574	174	176			188		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	492	492	59	459	574	174	176			188		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	100	66	98	89	100			96		
cM capacity (veh/h)	390	454	994	463	408	840	1398			1384		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	11	255	4	125	222	104	86	47
Volume Left	4	157	4	0	0	61	0	0
Volume Right	2	89	0	0	159	0	0	4
cSH	472	546	1398	1700	1700	1384	1700	1700
Volume to Capacity	0.02	0.47	0.00	0.07	0.13	0.04	0.05	0.03
Queue Length 95th (m)	0.6	19.7	0.1	0.0	0.0	1.1	0.0	0.0
Control Delay (s)	12.8	17.2	7.6	0.0	0.0	4.7	0.0	0.0
Lane LOS	B	C	A			A		
Approach Delay (s)	12.8	17.2	0.1			2.1		
Approach LOS	B	C						

Intersection Summary				
Average Delay	5.9			
Intersection Capacity Utilization	43.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	167	159	5	242	0	120
Future Volume (Veh/h)	167	159	5	242	0	120
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	182	173	5	263	0	130
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	227					
pX, platoon unblocked						
vC, conflicting volume			182		410	178
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			182		410	178
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	84
cM capacity (veh/h)			1391		568	835

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	121	234	5	132	132	130
Volume Left	0	0	5	0	0	0
Volume Right	0	173	0	0	0	130
cSH	1700	1700	1391	1700	1700	835
Volume to Capacity	0.07	0.14	0.00	0.08	0.08	0.16
Queue Length 95th (m)	0.0	0.0	0.1	0.0	0.0	4.4
Control Delay (s)	0.0	0.0	7.6	0.0	0.0	10.1
Lane LOS			A			B
Approach Delay (s)	0.0		0.1			10.1
Approach LOS						B

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	23.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	287	250	4	0	5
Future Volume (Veh/h)	0	287	250	4	0	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	312	272	4	0	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			232			
pX, platoon unblocked						
vC, conflicting volume	276				428	136
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	276				428	136
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1284				555	888

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	156	156	136	136	4	5
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	4	5
cSH	1700	1700	1700	1700	1700	888
Volume to Capacity	0.09	0.09	0.08	0.08	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.1
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.1
Lane LOS						A
Approach Delay (s)	0.0		0.0			9.1
Approach LOS						A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	16.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	11	1	0	25	0	0	0	0	1	0	1
Future Volume (Veh/h)	0	11	1	0	25	0	0	0	0	1	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	12	1	0	27	0	0	0	0	1	0	1
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		219										
pX, platoon unblocked												
vC, conflicting volume	27			13			40	40	12	40	40	27
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	27			13			40	40	12	40	40	27
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1587			1606			962	853	1068	965	852	1048

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	13	27	0	2
Volume Left	0	0	0	1
Volume Right	1	0	0	1
cSH	1587	1606	1700	1005
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	8.6
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	8.6
Approach LOS			A	A

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	13.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	29	65	4	12	0	35	1	6	0	1	7
Future Volume (Veh/h)	19	29	65	4	12	0	35	1	6	0	1	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	21	32	71	4	13	0	38	1	7	0	1	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		384										
pX, platoon unblocked												
vC, conflicting volume	13			103			139	130	68	138	166	13
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	13			103			139	130	68	138	166	13
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			95	100	99	100	100	99
cM capacity (veh/h)	1606			1489			814	748	996	816	715	1067

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	124	17	38	8	0	8
Volume Left	21	4	38	0	0	0
Volume Right	71	0	0	7	0	8
cSH	1606	1489	813	974	715	1037
Volume to Capacity	0.01	0.00	0.05	0.01	0.00	0.01
Queue Length 95th (m)	0.3	0.1	1.2	0.2	0.0	0.2
Control Delay (s)	1.3	1.8	9.6	8.7	10.0	8.5
Lane LOS	A	A	A	A	B	A
Approach Delay (s)	1.3	1.8	9.5		8.6	
Approach LOS			A		A	

Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	23.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	4	4	3	1	0
Future Volume (Veh/h)	1	4	4	3	1	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	4	4	3	1	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	7				12	6
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	7				12	6
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1614				1008	1077

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	5	7	1
Volume Left	1	0	1
Volume Right	0	3	0
cSH	1614	1700	1008
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	1.5	0.0	8.6
Lane LOS	A		A
Approach Delay (s)	1.5	0.0	8.6
Approach LOS			A

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization		13.3%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	160	40	64	113	105	61	346	71	251	239	35
Future Volume (vph)	75	160	40	64	113	105	61	346	71	251	239	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	60.0		0.0	120.0		0.0	125.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.970			0.928			0.975			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3433	0	1770	3284	0	1770	3451	0	1770	3472	0
Flt Permitted	0.604			0.616			0.570			0.491		
Satd. Flow (perm)	1125	3433	0	1147	3284	0	1062	3451	0	915	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			114			64			38	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		129.0			157.2			189.3			446.1	
Travel Time (s)		9.3			11.3			11.4			26.8	
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)	82	174	43	70	123	114	66	376	77	273	260	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	217	0	70	237	0	66	453	0	273	298	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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		

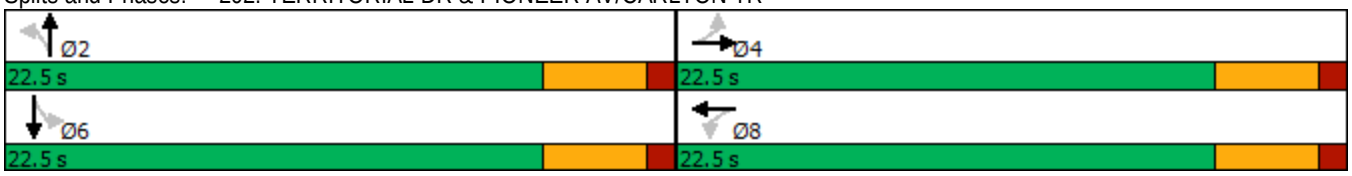
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
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		Max	Max		Max	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)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	8.0	8.0		8.0	8.0		21.8	21.8		21.8	21.8	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.61	0.61		0.61	0.61	
v/c Ratio	0.33	0.27		0.27	0.29		0.10	0.21		0.49	0.14	
Control Delay	14.9	9.6		13.8	7.0		5.7	4.6		12.0	4.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.9	9.6		13.8	7.0		5.7	4.6		12.0	4.5	
LOS	B	A		B	A		A	A		B	A	
Approach Delay		11.0			8.6			4.7			8.1	
Approach LOS		B			A			A			A	
Stops (vph)	59	116		51	89		33	166		159	108	
Fuel Used(l)	3	7		3	6		2	14		17	15	
CO Emissions (g/hr)	58	121		52	120		43	254		319	280	
NOx Emissions (g/hr)	11	23		10	23		8	49		62	54	
VOC Emissions (g/hr)	13	28		12	28		10	59		74	65	
Dilemma Vehicles (#)	0	0		0	0		0	53		0	36	
Queue Length 50th (m)	4.1	4.5		3.5	3.1		1.7	5.5		9.4	3.5	
Queue Length 95th (m)	11.4	9.8		10.0	8.5		6.6	13.2		#40.2	9.1	
Internal Link Dist (m)		105.0			133.2			165.3			422.1	
Turn Bay Length (m)	50.0			60.0			120.0			125.0		
Base Capacity (vph)	563	1740		574	1700		642	2111		553	2114	
Starvation Cap Reductn	0	0		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	0.15	0.12		0.12	0.14		0.10	0.21		0.49	0.14	

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 36	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 7.7	Intersection LOS: A
Intersection Capacity Utilization 51.4%	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: 202: TERRITORIAL DR & PIONEER AV/CARLTON TR



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	366	122	180	215	207	277
Future Volume (vph)	366	122	180	215	207	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0			120.0	0.0	0.0
Storage Lanes	1			1	2	1
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3539	1583	3433	1583
Flt Permitted	0.629				0.950	
Satd. Flow (perm)	1172	3539	3539	1583	3433	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				234		301
Link Speed (k/h)		60	60		60	
Link Distance (m)		204.5	226.9		61.2	
Travel Time (s)		12.3	13.6		3.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	398	133	196	234	225	301
Shared Lane Traffic (%)						
Lane Group Flow (vph)	398	133	196	234	225	301
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		10.8	
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	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	0.6	0.6	2.0	2.0	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	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6

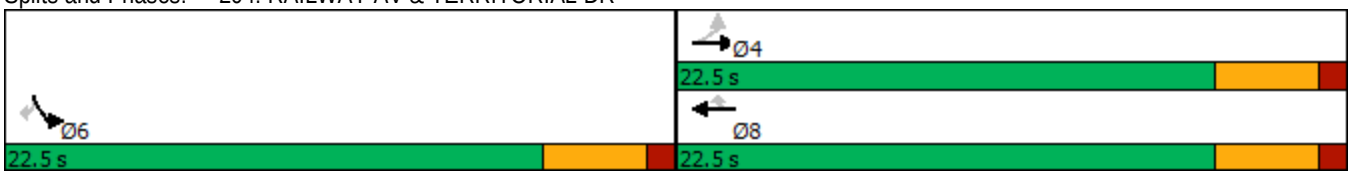
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Max	Max
Walk Time (s)	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
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	17.0	17.0	17.0	17.0	18.0	18.0
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.41	0.41
v/c Ratio	0.88	0.10	0.14	0.31	0.16	0.36
Control Delay	38.2	8.7	9.0	3.0	9.0	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	8.7	9.0	3.0	9.0	3.0
LOS	D	A	A	A	A	A
Approach Delay		30.8	5.7		5.6	
Approach LOS		C	A		A	
Stops (vph)	282	70	103	28	120	34
Fuel Used(l)	26	5	8	6	6	3
CO Emissions (g/hr)	490	98	151	105	119	60
NOx Emissions (g/hr)	95	19	29	20	23	12
VOC Emissions (g/hr)	113	22	35	24	27	14
Dilemma Vehicles (#)	0	14	20	0	0	0
Queue Length 50th (m)	28.1	3.4	5.1	0.0	5.7	0.0
Queue Length 95th (m)	#70.9	7.2	9.8	9.5	10.9	10.7
Internal Link Dist (m)		180.5	202.9		37.2	
Turn Bay Length (m)	150.0			120.0		
Base Capacity (vph)	479	1449	1449	786	1406	825
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	0.83	0.09	0.14	0.30	0.16	0.36

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 44	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 14.6	Intersection LOS: B
Intersection Capacity Utilization 42.4%	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: 204: RAILWAY AV & TERRITORIAL DR



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	423	1	80	297	83	275	6	2	3	11	78
Future Volume (vph)	2	423	1	80	297	83	275	6	2	3	11	78
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	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.999			0.885	
Flt Protected	0.950			0.950				0.954			0.999	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	0	1775	0	0	1647	0
Flt Permitted	0.556			0.487				0.660			0.991	
Satd. Flow (perm)	1036	3539	1583	907	3539	1583	0	1228	0	0	1634	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			36			90		1			85	
Link Speed (k/h)		80			80			50			80	
Link Distance (m)		231.6			229.3			141.2			218.7	
Travel Time (s)		10.4			10.3			10.2			9.8	
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)	2	460	1	87	323	90	299	7	2	3	12	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	460	1	87	323	90	0	308	0	0	100	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)		3.6			3.6			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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		

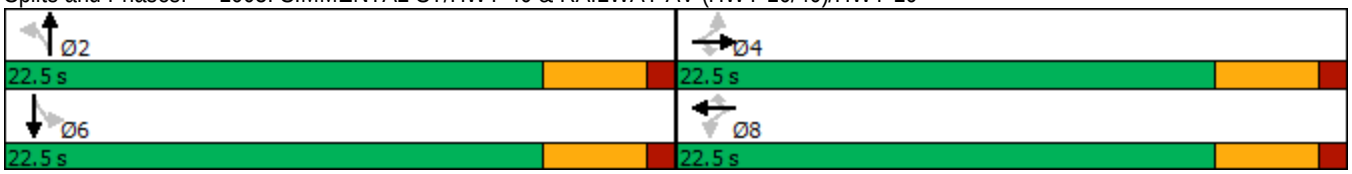
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5			4.5	
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	Max	Max		Max	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)	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	
Act Effct Green (s)	10.2	10.2	10.2	10.2	10.2	10.2		18.1			18.1	
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27	0.27		0.49			0.49	
v/c Ratio	0.01	0.48	0.00	0.35	0.33	0.18		0.52			0.12	
Control Delay	9.5	12.9	0.0	15.0	11.6	4.0		11.4			3.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	9.5	12.9	0.0	15.0	11.6	4.0		11.4			3.0	
LOS	A	B	A	B	B	A		B			A	
Approach Delay		12.9			10.9			11.4			3.0	
Approach LOS		B			B			B			A	
Stops (vph)	3	315	0	63	210	18		191			20	
Fuel Used(l)	0	30	0	6	20	3		11			3	
CO Emissions (g/hr)	4	558	0	111	373	52		196			55	
NOx Emissions (g/hr)	1	108	0	21	72	10		38			11	
VOC Emissions (g/hr)	1	129	0	26	86	12		45			13	
Dilemma Vehicles (#)	0	55	0	0	39	0		0			12	
Queue Length 50th (m)	0.1	13.0	0.0	4.5	8.7	0.0		11.8			0.5	
Queue Length 95th (m)	1.1	21.7	0.0	12.5	15.5	6.2		35.0			6.1	
Internal Link Dist (m)		207.6			205.3			117.2			194.7	
Turn Bay Length (m)	120.0		120.0	120.0		120.0						
Base Capacity (vph)	501	1714	785	439	1714	813		595			835	
Starvation Cap Reductn	0	0	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	0.00	0.27	0.00	0.20	0.19	0.11		0.52			0.12	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 37.3
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 11.1	Intersection LOS: B
Intersection Capacity Utilization 49.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1603: SIMMENTAL ST/HWY 40 & RAILWAY AV (HWY 16/40)/HWY 16



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	1	27	2	4	3	45	475	8	11	499	31
Future Volume (Veh/h)	19	1	27	2	4	3	45	475	8	11	499	31
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	21	1	29	2	4	3	49	516	9	12	542	34
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1185	1180	542	1210	1214	516	576			516		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1185	1180	542	1210	1214	516	576			516		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	99	95	99	98	99	95			99		
cM capacity (veh/h)	155	179	540	143	171	559	997			1050		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	51	9	49	516	9	12	542	34
Volume Left	21	2	49	0	0	12	0	0
Volume Right	29	3	0	0	9	0	0	34
cSH	261	211	997	1700	1700	1050	1700	1700
Volume to Capacity	0.20	0.04	0.05	0.30	0.01	0.01	0.32	0.02
Queue Length 95th (m)	5.7	1.1	1.2	0.0	0.0	0.3	0.0	0.0
Control Delay (s)	22.1	22.9	8.8	0.0	0.0	8.5	0.0	0.0
Lane LOS	C	C	A			A		
Approach Delay (s)	22.1	22.9	0.8			0.2		
Approach LOS	C	C						

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	44.5%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	14	11	233	42	156	25	317	239	78	240	25
Future Volume (Veh/h)	5	14	11	233	42	156	25	317	239	78	240	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	5	15	12	253	46	170	27	345	260	85	261	27
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								61			189	
pX, platoon unblocked												
vC, conflicting volume	864	844	100	806	987	302	288			345		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	864	844	100	806	987	302	288			345		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	94	99	0	79	75	98			93		
cM capacity (veh/h)	147	272	935	241	224	694	1271			1211		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	32	469	27	230	375	150	130	92
Volume Left	5	253	27	0	0	85	0	0
Volume Right	12	170	0	0	260	0	0	27
cSH	314	313	1271	1700	1700	1211	1700	1700
Volume to Capacity	0.10	1.50	0.02	0.14	0.22	0.07	0.08	0.05
Queue Length 95th (m)	2.7	210.1	0.5	0.0	0.0	1.8	0.0	0.0
Control Delay (s)	17.8	272.2	7.9	0.0	0.0	4.9	0.0	0.0
Lane LOS	C	F	A			A		
Approach Delay (s)	17.8	272.2	0.3			2.0		
Approach LOS	C	F						

Intersection Summary				
Average Delay	85.8			
Intersection Capacity Utilization	64.5%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	244	87	210	396	0	179
Future Volume (Veh/h)	244	87	210	396	0	179
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	265	95	228	430	0	195
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	227					
pX, platoon unblocked						
vC, conflicting volume			265		984	180
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			265		984	180
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			82		100	77
cM capacity (veh/h)			1296		202	832

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	177	183	228	215	215	195
Volume Left	0	0	228	0	0	0
Volume Right	0	95	0	0	0	195
cSH	1700	1700	1296	1700	1700	832
Volume to Capacity	0.10	0.11	0.18	0.13	0.13	0.23
Queue Length 95th (m)	0.0	0.0	5.1	0.0	0.0	7.3
Control Delay (s)	0.0	0.0	8.4	0.0	0.0	10.6
Lane LOS			A			B
Approach Delay (s)	0.0		2.9			10.6
Approach LOS						B

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	423	530	134	0	82
Future Volume (Veh/h)	0	423	530	134	0	82
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	460	576	146	0	89
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			232			
pX, platoon unblocked						
vC, conflicting volume	722				806	288
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	722				806	288
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	87
cM capacity (veh/h)	876				320	709

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	230	230	288	288	146	89
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	146	89
cSH	1700	1700	1700	1700	1700	709
Volume to Capacity	0.14	0.14	0.17	0.17	0.09	0.13
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	3.4
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	10.8
Lane LOS						B
Approach Delay (s)	0.0		0.0			10.8
Approach LOS						B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	55	20	0	55	4	7	1	1	11	8	33
Future Volume (Veh/h)	8	55	20	0	55	4	7	1	1	11	8	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	9	60	22	0	60	4	8	1	1	12	9	36
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		219										
pX, platoon unblocked												
vC, conflicting volume	64			82			192	153	71	152	162	62
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			82			192	153	71	152	162	62
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	100	100	99	99	96
cM capacity (veh/h)	1538			1515			730	734	991	809	726	1003

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	91	64	10	57
Volume Left	9	0	8	12
Volume Right	22	4	1	36
cSH	1538	1515	751	903
Volume to Capacity	0.01	0.00	0.01	0.06
Queue Length 95th (m)	0.1	0.0	0.3	1.6
Control Delay (s)	0.8	0.0	9.9	9.3
Lane LOS	A		A	A
Approach Delay (s)	0.8	0.0	9.9	9.3
Approach LOS			A	A

Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	21.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	29	56	6	18	0	76	1	17	2	4	21
Future Volume (Veh/h)	15	29	56	6	18	0	76	1	17	2	4	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	16	32	61	7	20	0	83	1	18	2	4	23
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		384										
pX, platoon unblocked												
vC, conflicting volume	20			93			154	128	62	147	159	20
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	20			93			154	128	62	147	159	20
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			89	100	98	100	99	98
cM capacity (veh/h)	1596			1501			784	751	1002	797	722	1058

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	109	27	84	18	4	25
Volume Left	16	7	83	0	2	0
Volume Right	61	0	0	18	0	23
cSH	1596	1501	783	993	758	1020
Volume to Capacity	0.01	0.00	0.11	0.02	0.01	0.02
Queue Length 95th (m)	0.2	0.1	2.9	0.5	0.1	0.6
Control Delay (s)	1.1	1.9	10.1	8.7	9.8	8.6
Lane LOS	A	A	B	A	A	A
Approach Delay (s)	1.1	1.9	9.9		8.8	
Approach LOS			A		A	

Intersection Summary					
Average Delay	5.4				
Intersection Capacity Utilization	24.3%	ICU Level of Service		A	
Analysis Period (min)	15				

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	39	53	86	48	29	43
Future Volume (Veh/h)	39	53	86	48	29	43
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	58	93	52	32	47
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	145				261	119
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	145				261	119
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				95	95
cM capacity (veh/h)	1437				707	933

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	100	145	79
Volume Left	42	0	32
Volume Right	0	52	47
cSH	1437	1700	826
Volume to Capacity	0.03	0.09	0.10
Queue Length 95th (m)	0.7	0.0	2.5
Control Delay (s)	3.3	0.0	9.8
Lane LOS	A		A
Approach Delay (s)	3.3	0.0	9.8
Approach LOS			A

Intersection Summary			
Average Delay		3.4	
Intersection Capacity Utilization		26.6%	ICU Level of Service A
Analysis Period (min)		15	

APPENDIX C

2018 Background Improved Operating Conditions

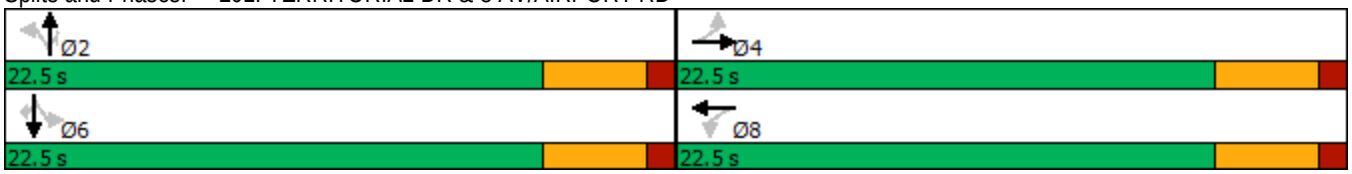
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	16	3	0	0	26	210	8	3	411	34
Future Volume (vph)	10	0	16	3	0	0	26	210	8	3	411	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	70.0		80.0	50.0		50.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.918							0.850			0.850
Flt Protected		0.981			0.950		0.950			0.950		
Satd. Flow (prot)	0	1678	0	0	1770	0	1770	1863	1583	1770	1863	1583
Flt Permitted							0.504			0.616		
Satd. Flow (perm)	0	1710	0	0	1863	0	939	1863	1583	1147	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36							36			37
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		141.9			556.9			446.1			117.3	
Travel Time (s)		10.2			40.1			26.8			7.0	
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	0	17	3	0	0	28	228	9	3	447	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	28	0	0	3	0	28	228	9	3	447	37
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			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		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
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	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
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	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5	4.5	4.5	4.5	4.5
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		Max	Max	Max	Max	Max	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)	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
Act Effct Green (s)		5.8			5.8		35.9	35.9	35.9	35.9	35.9	35.9
Actuated g/C Ratio		0.15			0.15		0.93	0.93	0.93	0.93	0.93	0.93
v/c Ratio		0.10			0.01		0.03	0.13	0.01	0.00	0.26	0.03
Control Delay		7.1			15.0		1.7	1.5	0.2	1.7	1.8	1.0
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		7.1			15.0		1.7	1.5	0.2	1.7	1.8	1.0
LOS		A			B		A	A	A	A	A	A
Approach Delay		7.1			15.0			1.4			1.7	
Approach LOS		A			B			A			A	
Stops (vph)		11			6		6	28	0	1	60	4
Fuel Used(l)		1			0		1	9	0	0	7	1
CO Emissions (g/hr)		14			6		23	173	6	1	124	9
NOx Emissions (g/hr)		3			1		4	33	1	0	24	2
VOC Emissions (g/hr)		3			1		5	40	1	0	29	2
Dilemma Vehicles (#)		0			0		0	9	0	0	15	0
Queue Length 50th (m)		0.0			0.2		0.0	0.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)		4.3			1.8		2.4	11.4	0.3	0.6	23.7	1.8
Internal Link Dist (m)		117.9			532.9			422.1			93.3	
Turn Bay Length (m)							70.0		80.0	50.0		50.0
Base Capacity (vph)		816			869		871	1728	1471	1064	1728	1471
Starvation Cap Reductn		0			0		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		0.03			0.00		0.03	0.13	0.01	0.00	0.26	0.03

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 38.7	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.26	
Intersection Signal Delay: 1.9	Intersection LOS: A
Intersection Capacity Utilization 33.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 201: TERRITORIAL DR & 8 AV/AIRPORT RD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	89	37	164	32	52	37	233	36	276	103	57
Future Volume (vph)	44	89	37	164	32	52	37	233	36	276	103	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	60.0		0.0	120.0		0.0	125.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.956			0.907			0.980			0.947	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3383	0	1770	3210	0	1770	3468	0	1770	3352	0
Flt Permitted	0.694			0.665			0.950			0.950		
Satd. Flow (perm)	1293	3383	0	1239	3210	0	1770	3468	0	1770	3352	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			57			29			62	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		129.0			157.2			189.3			446.1	
Travel Time (s)		9.3			11.3			11.4			26.8	
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)	48	97	40	178	35	57	40	253	39	300	112	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	137	0	178	92	0	40	292	0	300	174	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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								

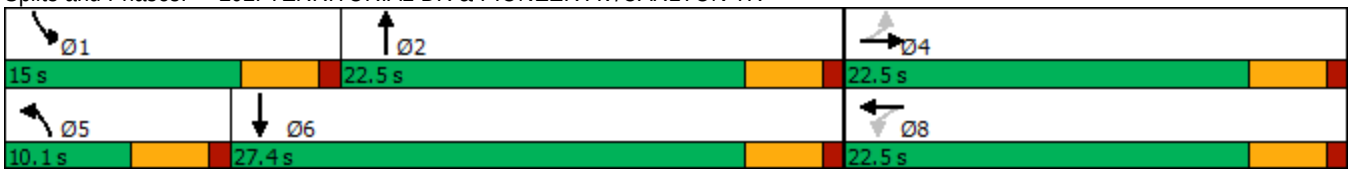
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		10.1	22.5		15.0	27.4	
Total Split (%)	37.5%	37.5%		37.5%	37.5%		16.8%	37.5%		25.0%	45.7%	
Maximum Green (s)	18.0	18.0		18.0	18.0		5.6	18.0		10.5	22.9	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	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	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)	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	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	12.1	12.1		12.4	12.4		5.7	18.5		10.8	31.6	
Actuated g/C Ratio	0.23	0.23		0.24	0.24		0.11	0.35		0.21	0.60	
v/c Ratio	0.16	0.17		0.61	0.11		0.21	0.24		0.82	0.09	
Control Delay	17.5	12.6		28.0	8.4		27.1	13.4		46.1	6.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.5	12.6		28.0	8.4		27.1	13.4		46.1	6.7	
LOS	B	B		C	A		C	B		D	A	
Approach Delay		13.9			21.3			15.1			31.6	
Approach LOS		B			C			B			C	
Stops (vph)	35	66		135	30		37	162		212	56	
Fuel Used(l)	2	4		13	4		3	12		27	9	
CO Emissions (g/hr)	36	79		233	80		48	231		508	164	
NOx Emissions (g/hr)	7	15		45	16		9	45		98	32	
VOC Emissions (g/hr)	8	18		54	19		11	53		117	38	
Dilemma Vehicles (#)	0	0		0	0		0	24		0	14	
Queue Length 50th (m)	4.0	4.2		16.6	1.4		3.9	10.3		30.8	2.1	
Queue Length 95th (m)	10.8	9.7		33.5	6.0		12.5	20.6		#78.3	9.6	
Internal Link Dist (m)		105.0			133.2			165.3			422.1	
Turn Bay Length (m)	50.0			60.0			120.0			125.0		
Base Capacity (vph)	455	1218		436	1168		194	1241		364	2042	
Starvation Cap Reductn	0	0		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	0.11	0.11		0.41	0.08		0.21	0.24		0.82	0.09	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 52.5	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 22.5	Intersection LOS: C
Intersection Capacity Utilization 51.1%	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: 202: TERRITORIAL DR & PIONEER AV/CARLTON TR



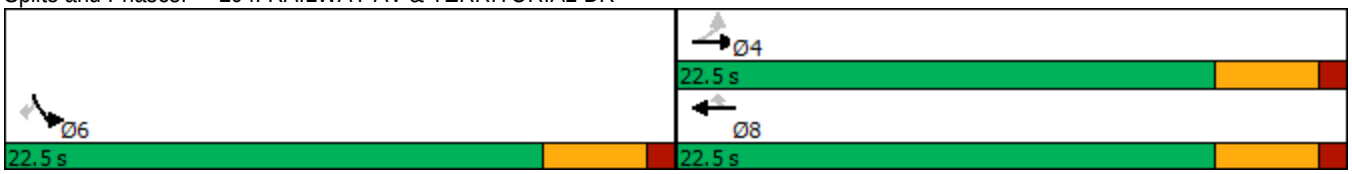
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	200	125	104	130	197	112
Future Volume (vph)	200	125	104	130	197	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0			120.0	0.0	0.0
Storage Lanes	1			1	2	1
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3539	1583	3433	1583
Flt Permitted	0.681				0.950	
Satd. Flow (perm)	1269	3539	3539	1583	3433	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				141		122
Link Speed (k/h)		60	60		60	
Link Distance (m)		204.5	226.9		61.2	
Travel Time (s)		12.3	13.6		3.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	217	136	113	141	214	122
Shared Lane Traffic (%)						
Lane Group Flow (vph)	217	136	113	141	214	122
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	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	0.6	0.6	2.0	2.0	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	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Max	Max
Walk Time (s)	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
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	11.7	11.7	11.5	11.5	22.3	22.3
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.56	0.56
v/c Ratio	0.58	0.13	0.11	0.25	0.11	0.13
Control Delay	17.9	9.6	9.5	3.6	7.1	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	9.6	9.5	3.6	7.1	2.7
LOS	B	A	A	A	A	A
Approach Delay		14.7	6.2		5.5	
Approach LOS		B	A		A	
Stops (vph)	153	77	64	21	100	19
Fuel Used(l)	11	6	5	4	5	1
CO Emissions (g/hr)	209	105	91	67	100	27
NOx Emissions (g/hr)	40	20	17	13	19	5
VOC Emissions (g/hr)	48	24	21	15	23	6
Dilemma Vehicles (#)	0	15	12	0	0	0
Queue Length 50th (m)	12.2	3.4	2.8	0.0	3.8	0.0
Queue Length 95th (m)	26.5	7.3	6.3	7.3	10.4	6.9
Internal Link Dist (m)		180.5	202.9		37.2	
Turn Bay Length (m)	150.0			120.0		
Base Capacity (vph)	579	1615	1615	799	1924	941
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	0.37	0.08	0.07	0.18	0.11	0.13

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 39.7	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 9.1	Intersection LOS: A
Intersection Capacity Utilization 30.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 204: RAILWAY AV & TERRITORIAL DR



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	278	3	56	190	20	40	1	1	2	3	20
Future Volume (vph)	5	278	3	56	190	20	40	1	1	2	3	20
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	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.997			0.890	
Flt Protected	0.950			0.950				0.954			0.996	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	0	1772	0	0	1651	0
Flt Permitted	0.622			0.568				0.819			0.990	
Satd. Flow (perm)	1159	3539	1583	1058	3539	1583	0	1521	0	0	1641	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			36			36		1			22	
Link Speed (k/h)		80			80			50			80	
Link Distance (m)		231.6			229.3			141.2			218.7	
Travel Time (s)		10.4			10.3			10.2			9.8	
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)	5	302	3	61	207	22	43	1	1	2	3	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	302	3	61	207	22	0	45	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)		3.6			3.6			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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		

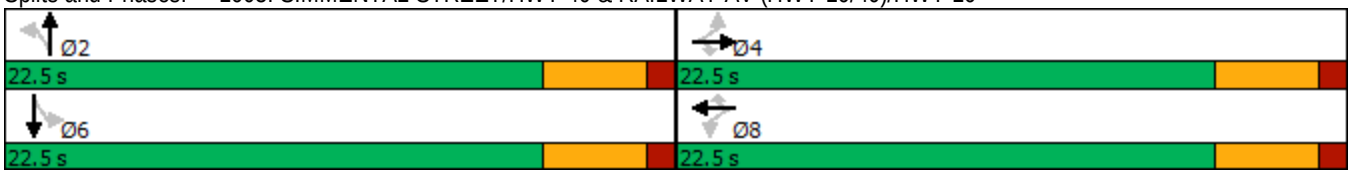
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5			4.5	
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	Max	Max		Max	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)	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	
Act Effct Green (s)	8.3	8.3	8.3	8.3	8.3	8.3		19.0			19.0	
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23	0.23		0.52			0.52	
v/c Ratio	0.02	0.37	0.01	0.25	0.26	0.06		0.06			0.03	
Control Delay	10.2	12.8	0.0	13.7	11.8	3.9		5.0			3.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	10.2	12.8	0.0	13.7	11.8	3.9		5.0			3.1	
LOS	B	B	A	B	B	A		A			A	
Approach Delay		12.6			11.6			5.0			3.1	
Approach LOS		B			B			A			A	
Stops (vph)	7	208	0	47	139	6		22			8	
Fuel Used(l)	1	20	0	4	13	1		1			1	
CO Emissions (g/hr)	10	367	1	80	244	14		22			18	
NOx Emissions (g/hr)	2	71	0	15	47	3		4			3	
VOC Emissions (g/hr)	2	85	0	18	56	3		5			4	
Dilemma Vehicles (#)	0	38	0	0	26	0		0			3	
Queue Length 50th (m)	0.3	8.1	0.0	3.0	5.3	0.0		1.1			0.2	
Queue Length 95th (m)	1.7	14.8	0.0	9.1	10.7	2.4		4.4			2.4	
Internal Link Dist (m)		207.6			205.3			117.2			194.7	
Turn Bay Length (m)	120.0		120.0	120.0		120.0						
Base Capacity (vph)	575	1756	804	525	1756	804		795			868	
Starvation Cap Reductn	0	0	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	0.01	0.17	0.00	0.12	0.12	0.03		0.06			0.03	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 36.3
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.37	
Intersection Signal Delay: 11.3	Intersection LOS: B
Intersection Capacity Utilization 32.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1603: SIMMENTAL STREET/HWY 40 & RAILWAY AV (HWY 16/40)/HWY 16



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	284	342	239	0	484
Future Volume (Veh/h)	0	284	342	239	0	484
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	309	372	260	0	526
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			61			189
pX, platoon unblocked						
vC, conflicting volume	765	316			372	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	765	316			372	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	55			100	
cM capacity (veh/h)	340	680			1183	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	309	248	384	263	263
Volume Left	0	0	0	0	0
Volume Right	309	0	260	0	0
cSH	680	1700	1700	1700	1700
Volume to Capacity	0.45	0.15	0.23	0.15	0.15
Queue Length 95th (m)	19.0	0.0	0.0	0.0	0.0
Control Delay (s)	14.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	14.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	287	250	4	0	5
Future Volume (Veh/h)	0	287	250	4	0	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	312	272	4	0	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			232			
pX, platoon unblocked						
vC, conflicting volume	276				428	136
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	276				428	136
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1284				555	888

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	156	156	136	136	4	5
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	4	5
cSH	1700	1700	1700	1700	1700	888
Volume to Capacity	0.09	0.09	0.08	0.08	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.1
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.1
Lane LOS						A
Approach Delay (s)	0.0		0.0			9.1
Approach LOS						A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	16.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	11	1	0	25	0	0	0	0	1	0	1
Future Volume (Veh/h)	0	11	1	0	25	0	0	0	0	1	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	12	1	0	27	0	0	0	0	1	0	1
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		219										
pX, platoon unblocked												
vC, conflicting volume	27			13			40	40	12	40	40	27
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	27			13			40	40	12	40	40	27
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1587			1606			962	853	1068	965	852	1048

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	13	27	0	2
Volume Left	0	0	0	1
Volume Right	1	0	0	1
cSH	1587	1606	1700	1005
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	8.6
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	8.6
Approach LOS			A	A

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	29	65	4	12	0	35	1	6	0	1	7
Future Volume (Veh/h)	19	29	65	4	12	0	35	1	6	0	1	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	21	32	71	4	13	0	38	1	7	0	1	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		384										
pX, platoon unblocked												
vC, conflicting volume	13			103			139	130	68	138	166	13
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	13			103			139	130	68	138	166	13
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			95	100	99	100	100	99
cM capacity (veh/h)	1606			1489			814	748	996	816	715	1067

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	124	17	38	8	0	8
Volume Left	21	4	38	0	0	0
Volume Right	71	0	0	7	0	8
cSH	1606	1489	813	974	715	1037
Volume to Capacity	0.01	0.00	0.05	0.01	0.00	0.01
Queue Length 95th (m)	0.3	0.1	1.2	0.2	0.0	0.2
Control Delay (s)	1.3	1.8	9.6	8.7	10.0	8.5
Lane LOS	A	A	A	A	B	A
Approach Delay (s)	1.3	1.8	9.5		8.6	
Approach LOS			A		A	

Intersection Summary					
Average Delay	3.6				
Intersection Capacity Utilization	23.1%	ICU Level of Service		A	
Analysis Period (min)	15				

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	4	4	3	1	0
Future Volume (Veh/h)	1	4	4	3	1	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	4	4	3	1	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	7				12	6
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	7				12	6
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1614				1008	1077

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	5	7	1
Volume Left	1	0	1
Volume Right	0	3	0
cSH	1614	1700	1008
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	1.5	0.0	8.6
Lane LOS	A		A
Approach Delay (s)	1.5	0.0	8.6
Approach LOS			A

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization		13.3%	ICU Level of Service A
Analysis Period (min)		15	

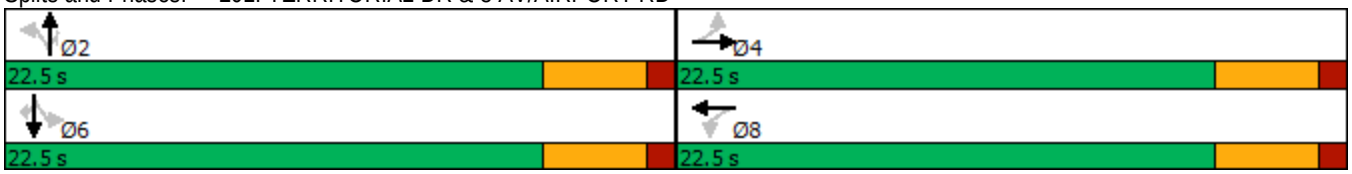
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	1	27	2	4	3	45	475	8	11	499	31
Future Volume (vph)	19	1	27	2	4	3	45	475	8	11	499	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	70.0		80.0	50.0		50.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.923			0.955				0.850			0.850
Flt Protected		0.980			0.989		0.950			0.950		
Satd. Flow (prot)	0	1685	0	0	1759	0	1770	1863	1583	1770	1863	1583
Flt Permitted					0.909		0.453			0.469		
Satd. Flow (perm)	0	1719	0	0	1617	0	844	1863	1583	874	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			3				36			36
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		141.9			556.9			446.1			117.3	
Travel Time (s)		10.2			40.1			26.8			7.0	
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)	21	1	29	2	4	3	49	516	9	12	542	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	51	0	0	9	0	49	516	9	12	542	34
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			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		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
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	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
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	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5	4.5	4.5	4.5	4.5
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		Max	Max	Max	Max	Max	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)	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
Act Effct Green (s)		6.3			6.2		32.4	32.4	32.4	32.4	32.4	32.4
Actuated g/C Ratio		0.16			0.16		0.84	0.84	0.84	0.84	0.84	0.84
v/c Ratio		0.17			0.03		0.07	0.33	0.01	0.02	0.35	0.03
Control Delay		10.0			11.9		3.2	3.6	0.5	3.2	3.7	1.7
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		10.0			11.9		3.2	3.6	0.5	3.2	3.7	1.7
LOS		B			B		A	A	A	A	A	A
Approach Delay		10.0			11.9			3.5			3.6	
Approach LOS		B			B			A			A	
Stops (vph)		27			9		16	145	1	6	156	6
Fuel Used(l)		2			1		2	24	0	0	12	1
CO Emissions (g/hr)		30			13		44	454	6	6	215	10
NOx Emissions (g/hr)		6			3		9	88	1	1	41	2
VOC Emissions (g/hr)		7			3		10	105	1	1	50	2
Dilemma Vehicles (#)		0			0		0	33	0	0	34	0
Queue Length 50th (m)		1.3			0.4		0.0	0.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)		6.4			2.5		4.1	32.3	0.4	1.5	34.5	1.9
Internal Link Dist (m)		117.9			532.9			422.1			93.3	
Turn Bay Length (m)							70.0		80.0	50.0		50.0
Base Capacity (vph)		818			756		707	1561	1333	732	1561	1333
Starvation Cap Reductn		0			0		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		0.06			0.01		0.07	0.33	0.01	0.02	0.35	0.03

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 38.7	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.35	
Intersection Signal Delay: 3.9	Intersection LOS: A
Intersection Capacity Utilization 46.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 201: TERRITORIAL DR & 8 AV/AIRPORT RD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	174	52	297	128	159	117	442	71	330	136	60
Future Volume (vph)	80	174	52	297	128	159	117	442	71	330	136	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	60.0		0.0	120.0		0.0	125.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.965			0.917			0.979			0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3415	0	1770	3245	0	1770	3465	0	1770	3376	0
Flt Permitted	0.538			0.599			0.950			0.950		
Satd. Flow (perm)	1002	3415	0	1116	3245	0	1770	3465	0	1770	3376	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49			173			18			65	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		129.0			157.2			189.3			446.1	
Travel Time (s)		9.3			11.3			11.4			26.8	
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)	87	189	57	323	139	173	127	480	77	359	148	65
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	246	0	323	312	0	127	557	0	359	213	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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								

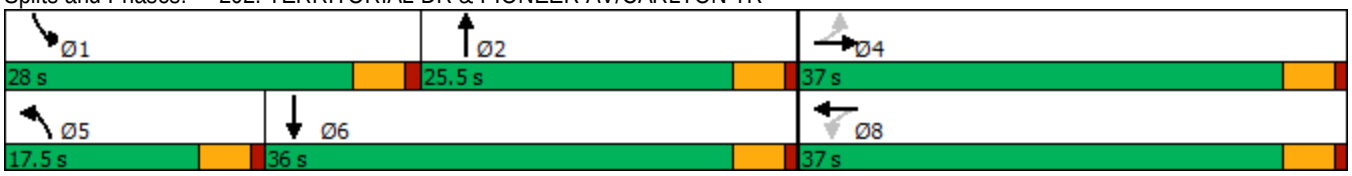
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	37.0	37.0		37.0	37.0		17.5	25.5		28.0	36.0	
Total Split (%)	40.9%	40.9%		40.9%	40.9%		19.3%	28.2%		30.9%	39.8%	
Maximum Green (s)	32.5	32.5		32.5	32.5		13.0	21.0		23.5	31.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	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	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)	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	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	27.5	27.5		27.5	27.5		10.6	21.5		20.4	34.2	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.13	0.26		0.25	0.41	
v/c Ratio	0.26	0.21		0.88	0.26		0.56	0.61		0.83	0.15	
Control Delay	23.1	16.3		52.2	9.6		45.9	31.4		47.8	13.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.1	16.3		52.2	9.6		45.9	31.4		47.8	13.5	
LOS	C	B		D	A		D	C		D	B	
Approach Delay		18.1			31.3			34.1			35.0	
Approach LOS		B			C			C			D	
Stops (vph)	54	119		253	86		104	422		289	86	
Fuel Used(l)	4	8		28	15		9	34		34	12	
CO Emissions (g/hr)	67	154		529	270		175	640		637	231	
NOx Emissions (g/hr)	13	30		102	52		34	123		123	45	
VOC Emissions (g/hr)	15	36		122	62		40	148		147	53	
Dilemma Vehicles (#)	0	0		0	0		0	30		0	11	
Queue Length 50th (m)	11.0	12.7		52.6	8.8		22.0	47.2		60.6	9.2	
Queue Length 95th (m)	23.0	21.4		#99.1	18.1		40.0	65.8		#103.9	17.6	
Internal Link Dist (m)		105.0			133.2			165.3			422.1	
Turn Bay Length (m)	50.0			60.0			120.0			125.0		
Base Capacity (vph)	397	1383		442	1391		280	910		507	1425	
Starvation Cap Reductn	0	0		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	0.22	0.18		0.73	0.22		0.45	0.61		0.71	0.15	

Intersection Summary	
Area Type:	Other
Cycle Length: 90.5	
Actuated Cycle Length: 83.2	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 31.1	Intersection LOS: C
Intersection Capacity Utilization 70.7%	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: 202: TERRITORIAL DR & PIONEER AV/CARLTON TR



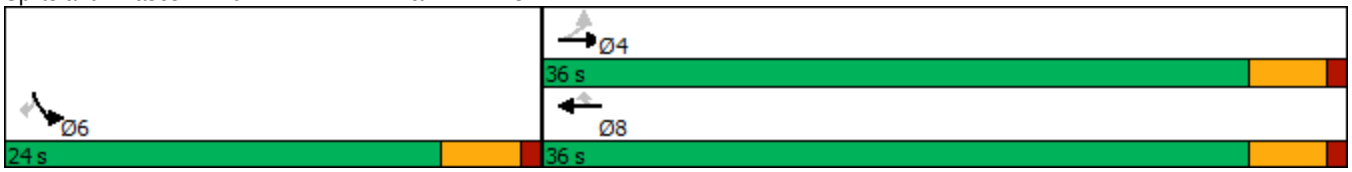
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	366	122	180	215	207	277
Future Volume (vph)	366	122	180	215	207	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0			120.0	0.0	0.0
Storage Lanes	1			1	2	1
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3539	1583	3433	1583
Flt Permitted	0.629				0.950	
Satd. Flow (perm)	1172	3539	3539	1583	3433	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				234		301
Link Speed (k/h)		60	60		60	
Link Distance (m)		204.5	226.9		61.2	
Travel Time (s)		12.3	13.6		3.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	398	133	196	234	225	301
Shared Lane Traffic (%)						
Lane Group Flow (vph)	398	133	196	234	225	301
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	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	0.6	0.6	2.0	2.0	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	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	36.0	36.0	36.0	36.0	24.0	24.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%
Maximum Green (s)	31.5	31.5	31.5	31.5	19.5	19.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Max	Max
Walk Time (s)	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
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	21.1	21.1	21.1	21.1	19.9	19.9
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.40	0.40
v/c Ratio	0.81	0.09	0.13	0.29	0.17	0.37
Control Delay	26.0	8.0	8.3	2.4	12.3	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	8.0	8.3	2.4	12.3	3.8
LOS	C	A	A	A	B	A
Approach Delay		21.5	5.1		7.4	
Approach LOS		C	A		A	
Stops (vph)	290	59	88	19	126	33
Fuel Used(l)	23	5	8	5	7	3
CO Emissions (g/hr)	431	90	140	98	132	62
NOx Emissions (g/hr)	83	17	27	19	26	12
VOC Emissions (g/hr)	99	21	32	23	31	14
Dilemma Vehicles (#)	0	11	16	0	0	0
Queue Length 50th (m)	30.1	3.6	5.4	0.0	6.7	0.0
Queue Length 95th (m)	58.8	7.1	9.7	8.4	16.5	14.5
Internal Link Dist (m)		180.5	202.9		37.2	
Turn Bay Length (m)	150.0			120.0		
Base Capacity (vph)	750	2265	2265	1097	1360	808
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	0.06	0.09	0.21	0.17	0.37

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 50.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 11.8	Intersection LOS: B
Intersection Capacity Utilization 42.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 204: RAILWAY AV & TERRITORIAL DR



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	423	1	80	297	83	275	6	2	3	11	78
Future Volume (vph)	2	423	1	80	297	83	275	6	2	3	11	78
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	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.999			0.885	
Flt Protected	0.950			0.950				0.954			0.999	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	0	1775	0	0	1647	0
Flt Permitted	0.556			0.487				0.660			0.991	
Satd. Flow (perm)	1036	3539	1583	907	3539	1583	0	1228	0	0	1634	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			36			90		1			85	
Link Speed (k/h)		80			80			50			80	
Link Distance (m)		231.6			229.3			141.2			218.7	
Travel Time (s)		10.4			10.3			10.2			9.8	
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)	2	460	1	87	323	90	299	7	2	3	12	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	460	1	87	323	90	0	308	0	0	100	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)		3.6			3.6			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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		

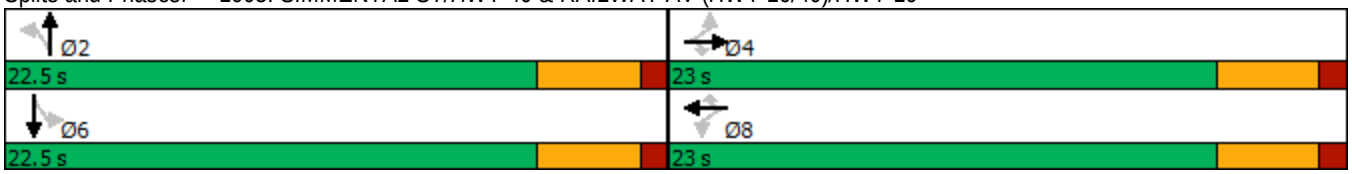
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	22.5	22.5		22.5	22.5	
Total Split (%)	50.5%	50.5%	50.5%	50.5%	50.5%	50.5%	49.5%	49.5%		49.5%	49.5%	
Maximum Green (s)	18.5	18.5	18.5	18.5	18.5	18.5	18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5			4.5	
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	Max	Max		Max	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)	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	
Act Effct Green (s)	10.2	10.2	10.2	10.2	10.2	10.2		18.1			18.1	
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27	0.27		0.49			0.49	
v/c Ratio	0.01	0.48	0.00	0.35	0.33	0.18		0.52			0.12	
Control Delay	9.5	12.9	0.0	15.0	11.6	4.0		11.3			3.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	9.5	12.9	0.0	15.0	11.6	4.0		11.3			3.0	
LOS	A	B	A	B	B	A		B			A	
Approach Delay		12.9			10.9			11.3			3.0	
Approach LOS		B			B			B			A	
Stops (vph)	3	315	0	63	210	18		190			20	
Fuel Used(l)	0	30	0	6	20	3		11			3	
CO Emissions (g/hr)	4	558	0	111	373	52		196			55	
NOx Emissions (g/hr)	1	108	0	21	72	10		38			11	
VOC Emissions (g/hr)	1	129	0	26	86	12		45			13	
Dilemma Vehicles (#)	0	55	0	0	39	0		0			12	
Queue Length 50th (m)	0.1	13.0	0.0	4.5	8.7	0.0		11.8			0.5	
Queue Length 95th (m)	1.1	21.7	0.0	12.5	15.6	6.2		34.7			6.1	
Internal Link Dist (m)		207.6			205.3			117.2			194.7	
Turn Bay Length (m)	120.0		120.0	120.0		120.0						
Base Capacity (vph)	515	1762	806	451	1762	833		595			835	
Starvation Cap Reductn	0	0	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	0.00	0.26	0.00	0.19	0.18	0.11		0.52			0.12	

Intersection Summary

Area Type: Other
Cycle Length: 45.5
Actuated Cycle Length: 37.3
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 11.1	Intersection LOS: B
Intersection Capacity Utilization 49.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1603: SIMMENTAL ST/HWY 40 & RAILWAY AV (HWY 16/40)/HWY 16



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	284	342	239	0	484
Future Volume (Veh/h)	0	284	342	239	0	484
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	309	372	260	0	526
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			61			189
pX, platoon unblocked						
vC, conflicting volume	765	316			372	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	765	316			372	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	55			100	
cM capacity (veh/h)	340	680			1183	

Direction, Lane #	NB 1	NB 2	SB 1	SB 2
Volume Total	248	384	263	263
Volume Left	0	0	0	0
Volume Right	0	260	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.15	0.23	0.15	0.15
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0		0.0	
Approach LOS				

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	423	530	134	0	82
Future Volume (Veh/h)	0	423	530	134	0	82
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	460	576	146	0	89
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			232			
pX, platoon unblocked						
vC, conflicting volume	722				806	288
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	722				806	288
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	87
cM capacity (veh/h)	876				320	709

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	230	230	288	288	146	89
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	146	89
cSH	1700	1700	1700	1700	1700	709
Volume to Capacity	0.14	0.14	0.17	0.17	0.09	0.13
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	3.4
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	10.8
Lane LOS						B
Approach Delay (s)	0.0		0.0			10.8
Approach LOS						B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	55	20	0	55	4	7	1	1	11	8	33
Future Volume (Veh/h)	8	55	20	0	55	4	7	1	1	11	8	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	9	60	22	0	60	4	8	1	1	12	9	36
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		219										
pX, platoon unblocked												
vC, conflicting volume	64			82			192	153	71	152	162	62
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			82			192	153	71	152	162	62
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	100	100	99	99	96
cM capacity (veh/h)	1538			1515			730	734	991	809	726	1003

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	91	64	10	57
Volume Left	9	0	8	12
Volume Right	22	4	1	36
cSH	1538	1515	751	903
Volume to Capacity	0.01	0.00	0.01	0.06
Queue Length 95th (m)	0.1	0.0	0.3	1.6
Control Delay (s)	0.8	0.0	9.9	9.3
Lane LOS	A		A	A
Approach Delay (s)	0.8	0.0	9.9	9.3
Approach LOS			A	A

Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	21.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	29	56	6	18	0	76	1	17	2	4	21
Future Volume (Veh/h)	15	29	56	6	18	0	76	1	17	2	4	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	16	32	61	7	20	0	83	1	18	2	4	23
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		384										
pX, platoon unblocked												
vC, conflicting volume	20			93			154	128	62	147	159	20
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	20			93			154	128	62	147	159	20
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			89	100	98	100	99	98
cM capacity (veh/h)	1596			1501			784	751	1002	797	722	1058

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	109	27	84	18	4	25
Volume Left	16	7	83	0	2	0
Volume Right	61	0	0	18	0	23
cSH	1596	1501	783	993	758	1020
Volume to Capacity	0.01	0.00	0.11	0.02	0.01	0.02
Queue Length 95th (m)	0.2	0.1	2.9	0.5	0.1	0.6
Control Delay (s)	1.1	1.9	10.1	8.7	9.8	8.6
Lane LOS	A	A	B	A	A	A
Approach Delay (s)	1.1	1.9	9.9		8.8	
Approach LOS			A		A	

Intersection Summary					
Average Delay	5.4				
Intersection Capacity Utilization	24.3%	ICU Level of Service		A	
Analysis Period (min)	15				

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	39	53	86	48	29	43
Future Volume (Veh/h)	39	53	86	48	29	43
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	58	93	52	32	47
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	145				261	119
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	145				261	119
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				95	95
cM capacity (veh/h)	1437				707	933

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	100	145	79
Volume Left	42	0	32
Volume Right	0	52	47
cSH	1437	1700	826
Volume to Capacity	0.03	0.09	0.10
Queue Length 95th (m)	0.7	0.0	2.5
Control Delay (s)	3.3	0.0	9.8
Lane LOS	A		A
Approach Delay (s)	3.3	0.0	9.8
Approach LOS			A

Intersection Summary			
Average Delay		3.4	
Intersection Capacity Utilization		26.6%	ICU Level of Service
Analysis Period (min)		15	

APPENDIX D

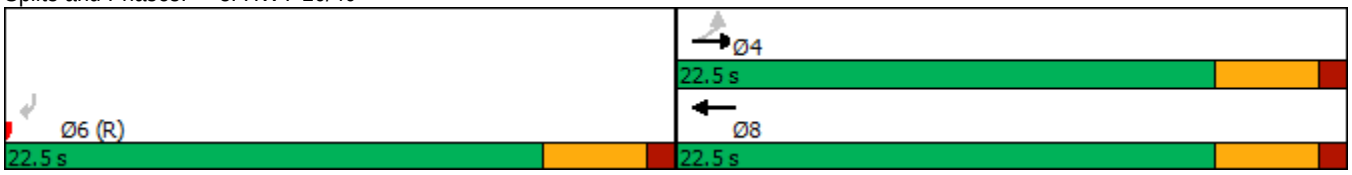
2038 Background Operating Conditions

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	120	144	9	0	0	189
Future Volume (vph)	120	144	9	0	0	189
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)	1770	1863	1863	0	0	1611
Flt Permitted	0.751					
Satd. Flow (perm)	1399	1863	1863	0	0	1611
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						1057
Link Speed (k/h)		60	60		50	
Link Distance (m)		239.0	215.2		100.4	
Travel Time (s)		14.3	12.9		7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	157	10	0	0	205
Shared Lane Traffic (%)						
Lane Group Flow (vph)	130	157	10	0	0	205
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Turn Type	Perm	NA	NA			Perm
Protected Phases		4	8			
Permitted Phases	4					6
Minimum Split (s)	22.5	22.5	22.5			22.5
Total Split (s)	22.5	22.5	22.5			22.5
Total Split (%)	50.0%	50.0%	50.0%			50.0%
Maximum Green (s)	18.0	18.0	18.0			18.0
Yellow Time (s)	3.5	3.5	3.5			3.5
All-Red Time (s)	1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	4.5	4.5	4.5			4.5
Lead/Lag						
Lead-Lag Optimize?						
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)	0	0	0			0
Act Effct Green (s)	18.0	18.0	18.0			18.0
Actuated g/C Ratio	0.40	0.40	0.40			0.40
v/c Ratio	0.23	0.21	0.01			0.16
Control Delay	10.4	9.8	8.2			0.3
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	10.4	9.8	8.2			0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
LOS	B	A	A			A
Approach Delay		10.1	8.2		0.3	
Approach LOS		B	A		A	
Stops (vph)	75	86	8			0
Fuel Used(l)	6	7	0			2
CO Emissions (g/hr)	109	127	9			34
NOx Emissions (g/hr)	21	25	2			7
VOC Emissions (g/hr)	25	29	2			8
Dilemma Vehicles (#)	0	16	1			0
Queue Length 50th (m)	6.7	8.0	0.5			0.0
Queue Length 95th (m)	15.5	17.2	2.4			0.0
Internal Link Dist (m)		215.0	191.2		76.4	
Turn Bay Length (m)						
Base Capacity (vph)	559	745	745			1278
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	0.21	0.01			0.16

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2: and 6:SBR, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.23			
Intersection Signal Delay: 6.0		Intersection LOS: A	
Intersection Capacity Utilization 23.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: HWY 16/40



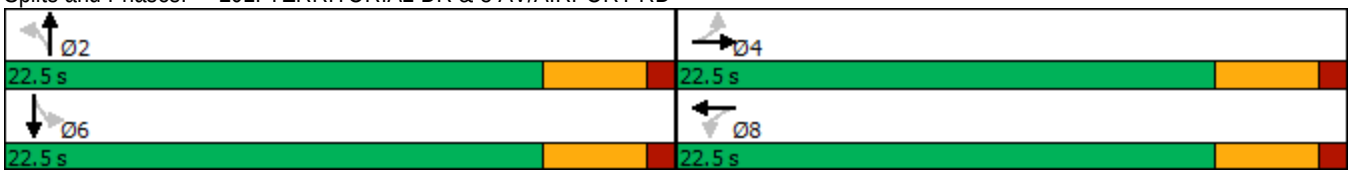
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	0	20	4	0	0	31	252	10	4	493	41
Future Volume (vph)	12	0	20	4	0	0	31	252	10	4	493	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	70.0		80.0	50.0		50.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.915						0.995			0.988	
Flt Protected		0.982			0.950			0.995				
Satd. Flow (prot)	0	1674	0	0	1770	0	0	3504	0	0	3497	0
Flt Permitted								0.886			0.953	
Satd. Flow (perm)	0	1704	0	0	1863	0	0	3120	0	0	3332	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36						9			23	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		141.9			556.9			446.1			117.3	
Travel Time (s)		10.2			40.1			26.8			7.0	
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)	13	0	22	4	0	0	34	274	11	4	536	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	35	0	0	4	0	0	319	0	0	585	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			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		

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)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
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		Max	Max		Max	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)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		5.9			5.9			35.2			35.2	
Actuated g/C Ratio		0.15			0.15			0.92			0.92	
v/c Ratio		0.12			0.01			0.11			0.19	
Control Delay		7.5			14.0			1.3			1.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.5			14.0			1.3			1.4	
LOS		A			B			A			A	
Approach Delay		7.5			14.0			1.3			1.4	
Approach LOS		A			B			A			A	
Stops (vph)		14			7			38			68	
Fuel Used(l)		1			0			13			8	
CO Emissions (g/hr)		17			8			240			153	
NOx Emissions (g/hr)		3			1			46			30	
VOC Emissions (g/hr)		4			2			55			35	
Dilemma Vehicles (#)		0			0			12			20	
Queue Length 50th (m)		0.0			0.3			0.0			0.0	
Queue Length 95th (m)		5.0			2.0			7.4			13.3	
Internal Link Dist (m)		117.9			532.9			422.1			93.3	
Turn Bay Length (m)												
Base Capacity (vph)		822			879			2876			3072	
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		0.04			0.00			0.11			0.19	

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 38.2	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.19	
Intersection Signal Delay: 1.6	Intersection LOS: A
Intersection Capacity Utilization 38.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 201: TERRITORIAL DR & 8 AV/AIRPORT RD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	106	44	197	38	62	45	279	43	331	124	68
Future Volume (vph)	53	106	44	197	38	62	45	279	43	331	124	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	60.0		0.0	120.0		110.0	125.0		0.0
Storage Lanes	1		0	2		1	1		1	2		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.956				0.850			0.850		0.947	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3383	0	3433	1863	1583	1770	3539	1583	3433	3352	0
Flt Permitted	0.730			0.649			0.621			0.567		
Satd. Flow (perm)	1360	3383	0	2345	1863	1583	1157	3539	1583	2049	3352	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48				67			47		74	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		129.0			383.9			189.3			446.1	
Travel Time (s)		9.3			27.6			11.4			26.8	
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)	58	115	48	214	41	67	49	303	47	360	135	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	58	163	0	214	41	67	49	303	47	360	209	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)		7.2			7.2			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	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	0.6	2.0	2.0	0.6	2.0	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	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		

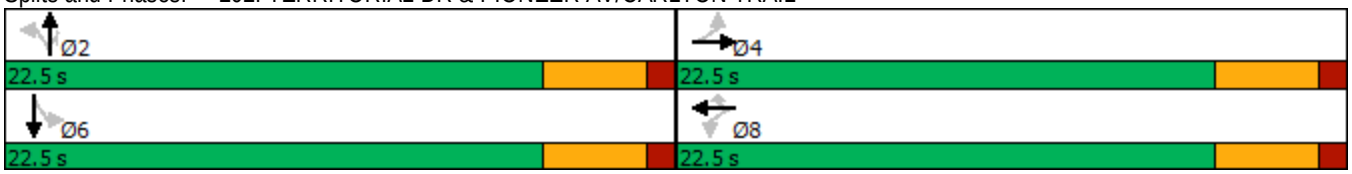
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
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	Max	Max	Max	Max	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)	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	
Act Effct Green (s)	8.4	8.4		8.5	8.5	8.5	21.8	21.8	21.8	21.8	21.8	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.60	0.60	0.60	0.60	0.60	
v/c Ratio	0.19	0.20		0.39	0.09	0.16	0.07	0.14	0.05	0.29	0.10	
Control Delay	12.0	8.5		13.5	10.8	4.7	5.6	5.1	2.4	6.3	3.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	12.0	8.5		13.5	10.8	4.7	5.6	5.1	2.4	6.3	3.7	
LOS	B	A		B	B	A	A	A	A	A	A	
Approach Delay		9.4			11.3			4.9			5.3	
Approach LOS		A			B			A			A	
Stops (vph)	42	78		149	31	19	25	126	10	170	62	
Fuel Used(l)	2	5		13	2	3	2	10	1	20	10	
CO Emissions (g/hr)	39	85		234	45	54	32	181	21	370	186	
NOx Emissions (g/hr)	7	16		45	9	10	6	35	4	71	36	
VOC Emissions (g/hr)	9	20		54	10	12	7	42	5	85	43	
Dilemma Vehicles (#)	0	0		0	0	0	0	36	0	0	25	
Queue Length 50th (m)	2.8	2.9		5.6	2.0	0.0	1.3	4.4	0.0	5.7	1.8	
Queue Length 95th (m)	8.4	7.4		11.5	6.4	5.5	5.1	10.1	3.1	13.5	5.8	
Internal Link Dist (m)		105.0			359.9			165.3			422.1	
Turn Bay Length (m)	50.0			60.0			120.0		110.0	125.0		
Base Capacity (vph)	673	1699		1161	922	817	693	2120	967	1227	2038	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		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	0.09	0.10		0.18	0.04	0.08	0.07	0.14	0.05	0.29	0.10	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 36.4
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.39	
Intersection Signal Delay: 7.1	Intersection LOS: A
Intersection Capacity Utilization 42.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 202: TERRITORIAL DR & PIONEER AV/CARLTON TRAIL



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	77	73	0	125	156	0	120	0	121	115	135
Future Volume (vph)	120	77	73	0	125	156	0	120	0	121	115	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	0.0		120.0	50.0		0.0	0.0		0.0
Storage Lanes	1		1	0		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950									0.950	0.995	
Satd. Flow (prot)	1770	3539	1583	0	3539	1583	1863	1863	1863	1681	1761	1583
Flt Permitted	0.666									0.950	0.995	
Satd. Flow (perm)	1241	3539	1583	0	3539	1583	1863	1863	1863	1681	1761	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			97			170						147
Link Speed (k/h)		60			60			50			60	
Link Distance (m)		204.5			226.9			100.4			61.2	
Travel Time (s)		12.3			13.6			7.2			3.7	
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)	130	84	79	0	136	170	0	130	0	132	125	147
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	130	84	79	0	136	170	0	130	0	119	138	147
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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		NA	Perm	Perm	NA	Perm	Split	NA	Perm
Protected Phases		4			8			2		6	6	
Permitted Phases	4		4	8		8	2		2			6

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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
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)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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	Min	Min	Min	Max	Max	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)	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)	10.7	10.7	10.7		10.7	10.7		9.0		18.2	18.2	18.2
Actuated g/C Ratio	0.21	0.21	0.21		0.21	0.21		0.17		0.35	0.35	0.35
v/c Ratio	0.51	0.11	0.20		0.19	0.37		0.40		0.20	0.22	0.22
Control Delay	25.9	17.0	4.9		17.6	6.2		23.7		15.0	15.1	4.5
Queue Delay	0.0	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	25.9	17.0	4.9		17.6	6.2		23.7		15.0	15.1	4.5
LOS	C	B	A		B	A		C		B	B	A
Approach Delay		17.7			11.2			23.7			11.2	
Approach LOS		B			B			C			B	
Stops (vph)	98	57	12		91	26		97		73	86	23
Fuel Used(l)	8	4	2		7	5		6		4	5	2
CO Emissions (g/hr)	143	78	36		132	87		102		78	92	36
NOx Emissions (g/hr)	28	15	7		25	17		20		15	18	7
VOC Emissions (g/hr)	33	18	8		30	20		24		18	21	8
Dilemma Vehicles (#)	0	7	0		11	0		0		0	12	0
Queue Length 50th (m)	11.1	3.4	0.0		5.6	0.0		11.2		8.1	9.4	0.0
Queue Length 95th (m)	26.4	8.5	6.8		12.3	12.3		26.6		23.2	26.1	11.0
Internal Link Dist (m)		180.5			202.9			76.4			37.2	
Turn Bay Length (m)	50.0		50.0			120.0						
Base Capacity (vph)	438	1251	622		1251	669		658		594	622	654
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	0.30	0.07	0.13		0.11	0.25		0.20		0.20	0.22	0.22

Intersection Summary

Area Type: Other

Cycle Length: 67.5

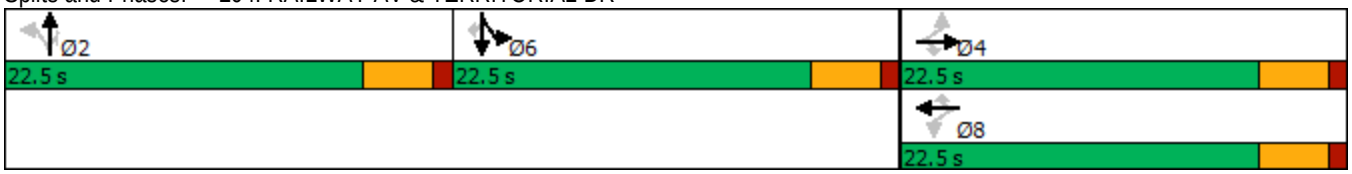
Actuated Cycle Length: 51.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 14.3	Intersection LOS: B
Intersection Capacity Utilization 35.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 204: RAILWAY AV & TERRITORIAL DR



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	445	5	90	304	32	64	2	2	3	5	32
Future Volume (vph)	9	445	5	90	304	32	64	2	2	3	5	32
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	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.996			0.890	
Flt Protected	0.950			0.950				0.955			0.997	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	0	1772	0	0	1653	0
Flt Permitted	0.553			0.476				0.778			0.989	
Satd. Flow (perm)	1030	3539	1583	887	3539	1583	0	1443	0	0	1640	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			36			36		2			35	
Link Speed (k/h)		80			80			50			80	
Link Distance (m)		231.6			229.3			141.2			218.7	
Travel Time (s)		10.4			10.3			10.2			9.8	
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)	10	484	5	98	330	35	70	2	2	3	5	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	484	5	98	330	35	0	74	0	0	43	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)		3.6			3.6			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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		

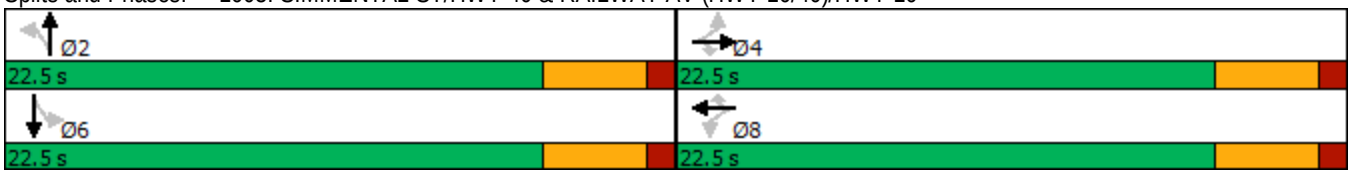
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5			4.5	
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	Max	Max		Max	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)	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	
Act Effct Green (s)	10.6	10.6	10.6	10.6	10.6	10.6		18.1			18.1	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28	0.28		0.48			0.48	
v/c Ratio	0.03	0.49	0.01	0.40	0.33	0.07		0.11			0.05	
Control Delay	9.6	12.9	0.0	15.8	11.5	4.5		6.8			3.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	9.6	12.9	0.0	15.8	11.5	4.5		6.8			3.8	
LOS	A	B	A	B	B	A		A			A	
Approach Delay		12.7			11.9			6.8			3.8	
Approach LOS		B			B			A			A	
Stops (vph)	9	329	0	70	212	11		37			13	
Fuel Used(l)	1	31	0	7	20	1		2			2	
CO Emissions (g/hr)	14	584	2	125	378	25		39			29	
NOx Emissions (g/hr)	3	113	0	24	73	5		8			6	
VOC Emissions (g/hr)	3	135	0	29	87	6		9			7	
Dilemma Vehicles (#)	0	58	0	0	39	0		0			5	
Queue Length 50th (m)	0.5	13.7	0.0	5.2	8.9	0.0		2.2			0.3	
Queue Length 95th (m)	2.6	22.7	0.0	13.9	15.8	3.7		8.6			4.1	
Internal Link Dist (m)		207.6			205.3			117.2			194.7	
Turn Bay Length (m)	120.0		120.0	120.0		120.0						
Base Capacity (vph)	494	1697	778	425	1697	778		693			804	
Starvation Cap Reductn	0	0	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	0.02	0.29	0.01	0.23	0.19	0.04		0.11			0.05	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 37.7
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 11.6	Intersection LOS: B
Intersection Capacity Utilization 39.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1603: SIMMENTAL ST/HWY 40 & RAILWAY AV (HWY 16/40)/HWY 16



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	170	213	176	0	365
Future Volume (Veh/h)	0	170	213	176	0	365
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	185	232	191	0	397
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			61			189
pX, platoon unblocked						
vC, conflicting volume	526	212			232	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	526	212			232	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	77			100	
cM capacity (veh/h)	482	794			1333	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	185	155	268	198	198
Volume Left	0	0	0	0	0
Volume Right	185	0	191	0	0
cSH	794	1700	1700	1700	1700
Volume to Capacity	0.23	0.09	0.16	0.12	0.12
Queue Length 95th (m)	7.2	0.0	0.0	0.0	0.0
Control Delay (s)	10.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.9	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	200	0	9	290	0	144
Future Volume (Veh/h)	200	0	9	290	0	144
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	217	0	10	315	0	157
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	227					
pX, platoon unblocked						
vC, conflicting volume			217		394	108
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			217		394	108
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	83
cM capacity (veh/h)			1350		578	924

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	145	72	10	158	158	157
Volume Left	0	0	10	0	0	0
Volume Right	0	0	0	0	0	157
cSH	1700	1700	1350	1700	1700	924
Volume to Capacity	0.09	0.04	0.01	0.09	0.09	0.17
Queue Length 95th (m)	0.0	0.0	0.2	0.0	0.0	4.9
Control Delay (s)	0.0	0.0	7.7	0.0	0.0	9.7
Lane LOS			A			A
Approach Delay (s)	0.0		0.2			9.7
Approach LOS						A

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	21.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	459	400	6	0	8
Future Volume (Veh/h)	0	459	400	6	0	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	499	435	7	0	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			232			
pX, platoon unblocked	1.00				1.00	1.00
vC, conflicting volume	442				684	218
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	432				675	206
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1120				386	797

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	250	250	218	218	7	9
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	7	9
cSH	1700	1700	1700	1700	1700	797
Volume to Capacity	0.15	0.15	0.13	0.13	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.3
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.6
Lane LOS						A
Approach Delay (s)	0.0		0.0			9.6
Approach LOS						A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	21.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	15	1	0	35	0	0	0	0	1	0	1
Future Volume (Veh/h)	0	15	1	0	35	0	0	0	0	1	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	16	1	0	38	0	0	0	0	1	0	1
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		219										
pX, platoon unblocked												
vC, conflicting volume	38			17			56	54	16	54	55	38
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	38			17			56	54	16	54	55	38
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1572			1600			941	837	1063	943	836	1034

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	17	38	0	2
Volume Left	0	0	0	1
Volume Right	1	0	0	1
cSH	1572	1600	1700	987
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	8.7
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	8.7
Approach LOS			A	A

Intersection Summary					
Average Delay	0.3				
Intersection Capacity Utilization	13.3%	ICU Level of Service		A	
Analysis Period (min)	15				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	35	78	5	15	0	42	1	7	0	1	9
Future Volume (Veh/h)	22	35	78	5	15	0	42	1	7	0	1	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	24	38	85	5	16	0	46	1	8	0	1	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		384										
pX, platoon unblocked												
vC, conflicting volume	16			123			165	154	62	102	197	16
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	16			123			165	154	62	102	197	16
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			94	100	99	100	100	99
cM capacity (veh/h)	1600			1462			765	723	991	849	685	1059

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	43	104	21	46	8	0	10
Volume Left	24	0	5	46	0	0	0
Volume Right	0	85	0	0	8	0	10
cSH	1600	1700	1462	764	970	685	1032
Volume to Capacity	0.02	0.06	0.00	0.06	0.01	0.00	0.01
Queue Length 95th (m)	0.4	0.0	0.1	1.6	0.2	0.0	0.2
Control Delay (s)	4.1	0.0	1.8	10.0	8.7	10.3	8.5
Lane LOS	A		A	B	A	B	A
Approach Delay (s)	1.2		1.8	9.8		8.6	
Approach LOS				A		A	

Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	20.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	5	5	4	1	0
Future Volume (Veh/h)	1	5	5	4	1	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	5	5	4	1	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	9				14	7
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	9				14	7
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1611				1004	1075

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	6	9	1
Volume Left	1	0	1
Volume Right	0	4	0
cSH	1611	1700	1004
Volume to Capacity	0.00	0.01	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	1.2	0.0	8.6
Lane LOS	A		A
Approach Delay (s)	1.2	0.0	8.6
Approach LOS			A

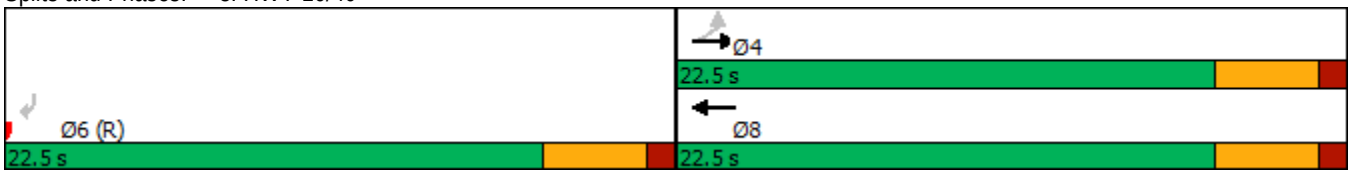
Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	219	215	252	0	0	104
Future Volume (vph)	219	215	252	0	0	104
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)	1770	1863	1863	0	0	1611
Flt Permitted	0.579					
Satd. Flow (perm)	1079	1863	1863	0	0	1611
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						452
Link Speed (k/h)		60	60		50	
Link Distance (m)		239.0	215.2		100.4	
Travel Time (s)		14.3	12.9		7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	238	234	274	0	0	113
Shared Lane Traffic (%)						
Lane Group Flow (vph)	238	234	274	0	0	113
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Turn Type	Perm	NA	NA			Perm
Protected Phases		4	8			
Permitted Phases	4					6
Minimum Split (s)	22.5	22.5	22.5			22.5
Total Split (s)	22.5	22.5	22.5			22.5
Total Split (%)	50.0%	50.0%	50.0%			50.0%
Maximum Green (s)	18.0	18.0	18.0			18.0
Yellow Time (s)	3.5	3.5	3.5			3.5
All-Red Time (s)	1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	4.5	4.5	4.5			4.5
Lead/Lag						
Lead-Lag Optimize?						
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)	0	0	0			0
Act Effct Green (s)	18.0	18.0	18.0			18.0
Actuated g/C Ratio	0.40	0.40	0.40			0.40
v/c Ratio	0.55	0.31	0.37			0.12
Control Delay	16.4	10.7	11.3			0.3
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	16.4	10.7	11.3			0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
LOS	B	B	B			A
Approach Delay		13.6	11.3		0.3	
Approach LOS		B	B		A	
Stops (vph)	167	138	164			0
Fuel Used(l)	13	11	12			1
CO Emissions (g/hr)	236	199	227			19
NOx Emissions (g/hr)	46	38	44			4
VOC Emissions (g/hr)	54	46	52			4
Dilemma Vehicles (#)	0	24	28			0
Queue Length 50th (m)	14.3	12.5	15.0			0.0
Queue Length 95th (m)	32.1	24.8	29.1			0.0
Internal Link Dist (m)		215.0	191.2		76.4	
Turn Bay Length (m)						
Base Capacity (vph)	431	745	745			915
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	0.55	0.31	0.37			0.12

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2: and 6:SBR, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 11.1		Intersection LOS: B	
Intersection Capacity Utilization 32.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: HWY 16/40



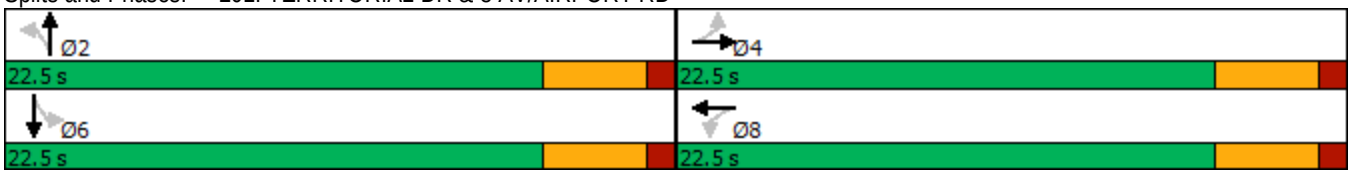
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	1	32	2	5	4	54	570	10	13	599	37
Future Volume (vph)	22	1	32	2	5	4	54	570	10	13	599	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	70.0		80.0	50.0		50.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.921			0.951			0.998			0.991	
Flt Protected		0.980			0.991			0.996			0.999	
Satd. Flow (prot)	0	1681	0	0	1756	0	0	3518	0	0	3504	0
Flt Permitted		0.933			0.922			0.866			0.942	
Satd. Flow (perm)	0	1601	0	0	1633	0	0	3059	0	0	3304	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			4			4			16	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		141.9			556.9			446.1			117.3	
Travel Time (s)		10.2			40.1			26.8			7.0	
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)	24	1	35	2	5	4	59	620	11	14	651	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	60	0	0	11	0	0	690	0	0	705	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			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		

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)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
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		Max	Max		Max	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)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		6.4			6.3			31.4			31.4	
Actuated g/C Ratio		0.17			0.17			0.83			0.83	
v/c Ratio		0.20			0.04			0.27			0.26	
Control Delay		9.5			10.9			3.0			2.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.5			10.9			3.0			2.8	
LOS		A			B			A			A	
Approach Delay		9.5			10.9			3.0			2.8	
Approach LOS		A			B			A			A	
Stops (vph)		29			11			174			169	
Fuel Used(l)		2			1			32			13	
CO Emissions (g/hr)		33			16			589			251	
NOx Emissions (g/hr)		6			3			114			48	
VOC Emissions (g/hr)		8			4			136			58	
Dilemma Vehicles (#)		0			0			45			45	
Queue Length 50th (m)		1.5			0.4			0.0			0.0	
Queue Length 95th (m)		6.6			2.6			18.5			17.8	
Internal Link Dist (m)		117.9			532.9			422.1			93.3	
Turn Bay Length (m)												
Base Capacity (vph)		781			779			2533			2738	
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		0.08			0.01			0.27			0.26	

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 37.9	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.27	
Intersection Signal Delay: 3.2	Intersection LOS: A
Intersection Capacity Utilization 53.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 201: TERRITORIAL DR & 8 AV/AIRPORT RD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	209	62	356	154	191	141	530	85	396	163	72
Future Volume (vph)	96	209	62	356	154	191	141	530	85	396	163	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	60.0		0.0	120.0		110.0	125.0		0.0
Storage Lanes	1		0	2		1	1		1	2		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.966				0.850			0.850		0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3419	0	3433	1863	1583	1770	3539	1583	3433	3376	0
Flt Permitted	0.651			0.572			0.594			0.435		
Satd. Flow (perm)	1213	3419	0	2067	1863	1583	1106	3539	1583	1572	3376	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		67				164			92		78	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		129.0			383.9			189.3			446.1	
Travel Time (s)		9.3			27.6			11.4			26.8	
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)	104	227	67	387	167	208	153	576	92	430	177	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	294	0	387	167	208	153	576	92	430	255	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)		7.2			7.2			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	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	0.6	2.0	2.0	0.6	2.0	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	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
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	Max	Max	Max	Max	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)	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	
Act Effct Green (s)	12.9	12.9		12.9	12.9	12.9	18.2	18.2	18.2	18.2	18.2	
Actuated g/C Ratio	0.32	0.32		0.32	0.32	0.32	0.45	0.45	0.45	0.45	0.45	
v/c Ratio	0.27	0.26		0.58	0.28	0.34	0.31	0.36	0.12	0.61	0.16	
Control Delay	11.5	7.8		14.9	11.0	4.8	10.6	8.9	3.1	14.7	5.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	11.5	7.8		14.9	11.0	4.8	10.6	8.9	3.1	14.7	5.7	
LOS	B	A		B	B	A	B	A	A	B	A	
Approach Delay		8.8			11.3			8.5			11.4	
Approach LOS		A			B			A			B	
Stops (vph)	64	129		264	99	42	88	318	17	281	91	
Fuel Used(l)	3	8		23	9	9	6	23	2	29	13	
CO Emissions (g/hr)	64	146		428	170	160	117	420	40	537	243	
NOx Emissions (g/hr)	12	28		83	33	31	23	81	8	104	47	
VOC Emissions (g/hr)	15	34		99	39	37	27	97	9	124	56	
Dilemma Vehicles (#)	0	0		0	0	0	0	65	0	0	28	
Queue Length 50th (m)	5.3	6.0		11.4	8.6	2.1	6.4	13.0	0.0	11.0	3.5	
Queue Length 95th (m)	13.2	11.9		20.7	18.2	11.5	19.4	26.9	6.0	#32.6	10.0	
Internal Link Dist (m)		105.0			359.9			165.3			422.1	
Turn Bay Length (m)	50.0			60.0			120.0		110.0	125.0		
Base Capacity (vph)	548	1582		934	842	805	500	1600	765	710	1568	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		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	0.19	0.19		0.41	0.20	0.26	0.31	0.36	0.12	0.61	0.16	

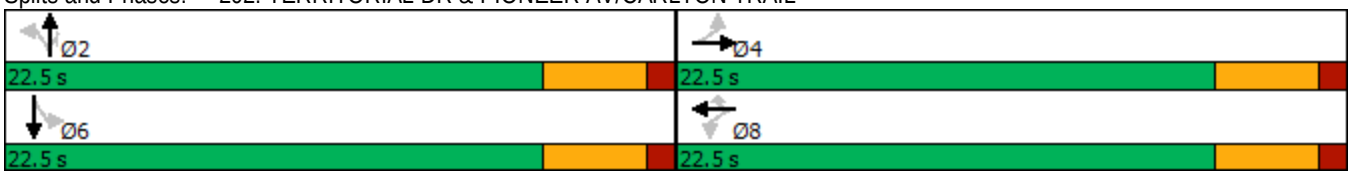
Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 40.2
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 10.1	Intersection LOS: B
Intersection Capacity Utilization 58.9%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 202: TERRITORIAL DR & PIONEER AV/CARLTON TRAIL



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	219	108	38	0	216	258	0	219	0	183	65	332
Future Volume (vph)	219	108	38	0	216	258	0	219	0	183	65	332
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	0.0		120.0	50.0		0.0	0.0		0.0
Storage Lanes	1		1	0		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950									0.950	0.976	
Satd. Flow (prot)	1770	3539	1583	0	3539	1583	1863	1863	1863	1681	1727	1583
Flt Permitted	0.605									0.950	0.976	
Satd. Flow (perm)	1127	3539	1583	0	3539	1583	1863	1863	1863	1681	1727	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			97			280						361
Link Speed (k/h)		60			60			50			60	
Link Distance (m)		204.5			226.9			100.4			61.2	
Travel Time (s)		12.3			13.6			7.2			3.7	
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)	238	117	41	0	235	280	0	238	0	199	71	361
Shared Lane Traffic (%)										33%		
Lane Group Flow (vph)	238	117	41	0	235	280	0	238	0	133	137	361
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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		NA	Perm	Perm	NA	Perm	Split	NA	Perm
Protected Phases		4			8			2		6	6	
Permitted Phases	4		4	8		8	2		2			6

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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
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)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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	Min	Min	Min	Max	Max	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)	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)	16.0	16.0	16.0		16.0	16.0		12.8		18.2	18.2	18.2
Actuated g/C Ratio	0.26	0.26	0.26		0.26	0.26		0.21		0.30	0.30	0.30
v/c Ratio	0.80	0.13	0.08		0.25	0.45		0.61		0.26	0.26	0.50
Control Delay	44.2	18.1	0.7		18.9	5.5		28.9		20.0	19.9	5.3
Queue Delay	0.0	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	44.2	18.1	0.7		18.9	5.5		28.9		20.0	19.9	5.3
LOS	D	B	A		B	A		C		C	B	A
Approach Delay		32.0			11.6			28.9			11.6	
Approach LOS		C			B			C			B	
Stops (vph)	179	75	1		157	34		184		89	93	41
Fuel Used(l)	17	6	1		12	7		11		5	6	4
CO Emissions (g/hr)	318	109	14		232	135		206		100	104	83
NOx Emissions (g/hr)	61	21	3		45	26		40		19	20	16
VOC Emissions (g/hr)	73	25	3		53	31		48		23	24	19
Dilemma Vehicles (#)	0	8	0		17	0		0		0	10	0
Queue Length 50th (m)	25.9	5.4	0.0		11.3	0.0		26.4		13.0	13.4	0.0
Queue Length 95th (m)	#65.2	12.0	0.9		21.5	16.4		46.4		29.1	29.7	18.3
Internal Link Dist (m)		180.5			202.9			76.4			37.2	
Turn Bay Length (m)	50.0		50.0			120.0						
Base Capacity (vph)	337	1060	542		1060	670		558		503	517	727
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	0.71	0.11	0.08		0.22	0.42		0.43		0.26	0.26	0.50

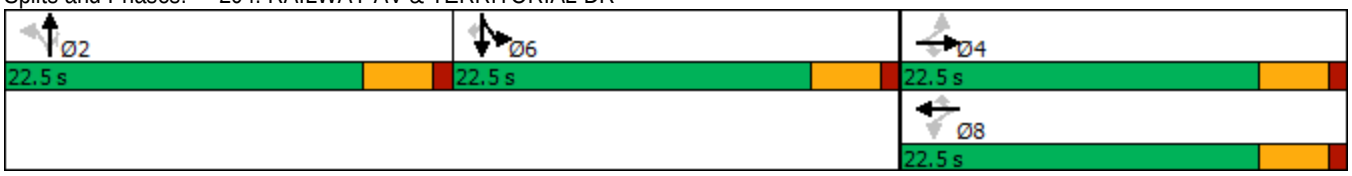
Intersection Summary

Area Type: Other
Cycle Length: 67.5
Actuated Cycle Length: 60.7
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 18.5	Intersection LOS: B
Intersection Capacity Utilization 51.4%	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: 204: RAILWAY AV & TERRITORIAL DR



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	677	2	128	475	133	440	10	3	5	18	125
Future Volume (vph)	3	677	2	128	475	133	440	10	3	5	18	125
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	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.999			0.886	
Flt Protected	0.950			0.950				0.954			0.998	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	0	1775	0	0	1647	0
Flt Permitted	0.451			0.297				0.620			0.985	
Satd. Flow (perm)	840	3539	1583	553	3539	1583	0	1154	0	0	1626	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			36			145		1			136	
Link Speed (k/h)		80			80			50			80	
Link Distance (m)		231.6			229.3			141.2			218.7	
Travel Time (s)		10.4			10.3			10.2			9.8	
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)	3	736	2	139	516	145	478	11	3	5	20	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	736	2	139	516	145	0	492	0	0	161	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)		3.6			3.6			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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		

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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5			4.5	
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	Max	Max		Max	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)	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	
Act Effct Green (s)	14.6	14.6	14.6	14.6	14.6	14.6		18.1			18.1	
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35	0.35		0.43			0.43	
v/c Ratio	0.01	0.60	0.00	0.72	0.42	0.22		0.98			0.21	
Control Delay	8.3	13.2	0.0	36.8	11.2	3.2		56.1			3.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	8.3	13.2	0.0	36.8	11.2	3.2		56.1			3.7	
LOS	A	B	A	D	B	A		E			A	
Approach Delay		13.1			14.2			56.1			3.7	
Approach LOS		B			B			E			A	
Stops (vph)	4	492	0	99	318	21		318			31	
Fuel Used(l)	0	47	0	12	31	4		33			5	
CO Emissions (g/hr)	6	882	1	216	575	73		610			88	
NOx Emissions (g/hr)	1	170	0	42	111	14		118			17	
VOC Emissions (g/hr)	1	203	0	50	133	17		141			20	
Dilemma Vehicles (#)	0	80	0	0	56	0		0			17	
Queue Length 50th (m)	0.2	22.8	0.0	8.7	14.8	0.0		~40.6			1.1	
Queue Length 95th (m)	1.2	35.3	0.0	#31.1	24.0	7.5		#94.5			9.3	
Internal Link Dist (m)		207.6			205.3			117.2			194.7	
Turn Bay Length (m)	120.0		120.0	120.0		120.0						
Base Capacity (vph)	364	1536	707	240	1536	769		501			782	
Starvation Cap Reductn	0	0	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	0.01	0.48	0.00	0.58	0.34	0.19		0.98			0.21	

Intersection Summary

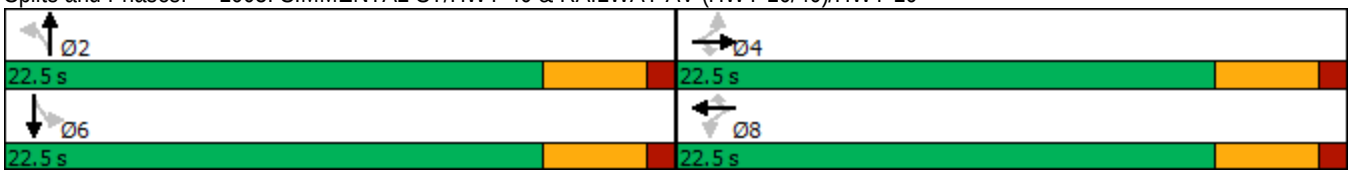
Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 41.8
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 22.5	Intersection LOS: C
Intersection Capacity Utilization 74.8%	ICU Level of Service D
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
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: 1603: SIMMENTAL ST/HWY 40 & RAILWAY AV (HWY 16/40)/HWY 16



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	341	410	287	0	581
Future Volume (Veh/h)	0	341	410	287	0	581
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	371	446	312	0	632
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			61			189
pX, platoon unblocked	0.98					
vC, conflicting volume	918	379			446	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	875	379			446	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	40			100	
cM capacity (veh/h)	283	619			1111	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	371	297	461	316	316
Volume Left	0	0	0	0	0
Volume Right	371	0	312	0	0
cSH	619	1700	1700	1700	1700
Volume to Capacity	0.60	0.17	0.27	0.19	0.19
Queue Length 95th (m)	31.8	0.0	0.0	0.0	0.0
Control Delay (s)	19.1	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	19.1	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	293	0	252	475	0	215
Future Volume (Veh/h)	293	0	252	475	0	215
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	318	0	274	516	0	234
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	227					
pX, platoon unblocked						
vC, conflicting volume			318		1124	159
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			318		1124	159
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			78		100	73
cM capacity (veh/h)			1239		155	858

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	212	106	274	258	258	234
Volume Left	0	0	274	0	0	0
Volume Right	0	0	0	0	0	234
cSH	1700	1700	1239	1700	1700	858
Volume to Capacity	0.12	0.06	0.22	0.15	0.15	0.27
Queue Length 95th (m)	0.0	0.0	6.8	0.0	0.0	8.9
Control Delay (s)	0.0	0.0	8.7	0.0	0.0	10.8
Lane LOS			A			B
Approach Delay (s)	0.0		3.0			10.8
Approach LOS						B

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	677	848	214	0	131
Future Volume (Veh/h)	0	677	848	214	0	131
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	736	922	233	0	142
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			232			
pX, platoon unblocked	0.97				0.97	0.97
vC, conflicting volume	1155				1290	461
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1108				1246	396
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	76
cM capacity (veh/h)	610				162	588

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	368	368	461	461	233	142
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	233	142
cSH	1700	1700	1700	1700	1700	588
Volume to Capacity	0.22	0.22	0.27	0.27	0.14	0.24
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	7.5
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	13.1
Lane LOS						B
Approach Delay (s)	0.0		0.0			13.1
Approach LOS						B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	77	28	0	77	6	10	1	1	15	11	46
Future Volume (Veh/h)	11	77	28	0	77	6	10	1	1	15	11	46
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	12	84	30	0	84	7	11	1	1	16	12	50
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		219										
pX, platoon unblocked												
vC, conflicting volume	91			114			266	214	99	212	226	88
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	91			114			266	214	99	212	226	88
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			98	100	100	98	98	95
cM capacity (veh/h)	1504			1475			638	678	957	739	668	971

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	126	91	13	78
Volume Left	12	0	11	16
Volume Right	30	7	1	50
cSH	1504	1475	658	856
Volume to Capacity	0.01	0.00	0.02	0.09
Queue Length 95th (m)	0.2	0.0	0.5	2.4
Control Delay (s)	0.8	0.0	10.6	9.6
Lane LOS	A		B	A
Approach Delay (s)	0.8	0.0	10.6	9.6
Approach LOS			B	A

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	23.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	35	67	7	22	0	91	1	20	2	5	25
Future Volume (Veh/h)	18	35	67	7	22	0	91	1	20	2	5	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	20	38	73	8	24	0	99	1	22	2	5	27
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		384										
pX, platoon unblocked												
vC, conflicting volume	24			111			184	154	56	122	191	24
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24			111			184	154	56	122	191	24
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			86	100	98	100	99	97
cM capacity (veh/h)	1589			1477			726	723	999	810	690	1047

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	39	92	32	100	22	4	30
Volume Left	20	0	8	99	0	2	0
Volume Right	0	73	0	0	22	0	27
cSH	1589	1700	1477	726	991	739	1003
Volume to Capacity	0.01	0.05	0.01	0.14	0.02	0.01	0.03
Queue Length 95th (m)	0.3	0.0	0.1	3.8	0.6	0.1	0.7
Control Delay (s)	3.8	0.0	1.9	10.7	8.7	9.9	8.7
Lane LOS	A		A	B	A	A	A
Approach Delay (s)	1.1		1.9	10.4		8.9	
Approach LOS				B		A	

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	25.6%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	47	64	103	58	35	52
Future Volume (Veh/h)	47	64	103	58	35	52
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	51	70	112	63	38	57
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	175				316	144
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	175				316	144
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				94	94
cM capacity (veh/h)	1401				653	904

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	121	175	95
Volume Left	51	0	38
Volume Right	0	63	57
cSH	1401	1700	783
Volume to Capacity	0.04	0.10	0.12
Queue Length 95th (m)	0.9	0.0	3.3
Control Delay (s)	3.4	0.0	10.2
Lane LOS	A		B
Approach Delay (s)	3.4	0.0	10.2
Approach LOS			B

Intersection Summary			
Average Delay		3.5	
Intersection Capacity Utilization		30.1%	ICU Level of Service A
Analysis Period (min)		15	

APPENDIX E

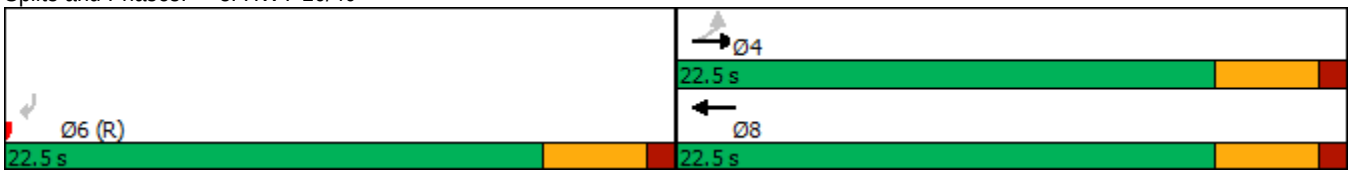
2038 Background Improved Operating Conditions

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	120	144	9	0	0	189
Future Volume (vph)	120	144	9	0	0	189
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)	1770	1863	1863	0	0	1611
Flt Permitted	0.751					
Satd. Flow (perm)	1399	1863	1863	0	0	1611
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						1057
Link Speed (k/h)		60	60		50	
Link Distance (m)		239.0	215.2		100.4	
Travel Time (s)		14.3	12.9		7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	157	10	0	0	205
Shared Lane Traffic (%)						
Lane Group Flow (vph)	130	157	10	0	0	205
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Turn Type	Perm	NA	NA			Perm
Protected Phases		4	8			
Permitted Phases	4					6
Minimum Split (s)	22.5	22.5	22.5			22.5
Total Split (s)	22.5	22.5	22.5			22.5
Total Split (%)	50.0%	50.0%	50.0%			50.0%
Maximum Green (s)	18.0	18.0	18.0			18.0
Yellow Time (s)	3.5	3.5	3.5			3.5
All-Red Time (s)	1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	4.5	4.5	4.5			4.5
Lead/Lag						
Lead-Lag Optimize?						
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)	0	0	0			0
Act Effct Green (s)	18.0	18.0	18.0			18.0
Actuated g/C Ratio	0.40	0.40	0.40			0.40
v/c Ratio	0.23	0.21	0.01			0.16
Control Delay	10.4	9.8	8.2			0.3
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	10.4	9.8	8.2			0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
LOS	B	A	A			A
Approach Delay		10.1	8.2		0.3	
Approach LOS		B	A		A	
Stops (vph)	75	86	8			0
Fuel Used(l)	6	7	0			2
CO Emissions (g/hr)	109	127	9			34
NOx Emissions (g/hr)	21	25	2			7
VOC Emissions (g/hr)	25	29	2			8
Dilemma Vehicles (#)	0	16	1			0
Queue Length 50th (m)	6.7	8.0	0.5			0.0
Queue Length 95th (m)	15.5	17.2	2.4			0.0
Internal Link Dist (m)		215.0	191.2		76.4	
Turn Bay Length (m)						
Base Capacity (vph)	559	745	745			1278
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	0.21	0.01			0.16

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2: and 6:SBR, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.23			
Intersection Signal Delay: 6.0		Intersection LOS: A	
Intersection Capacity Utilization 23.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: HWY 16/40



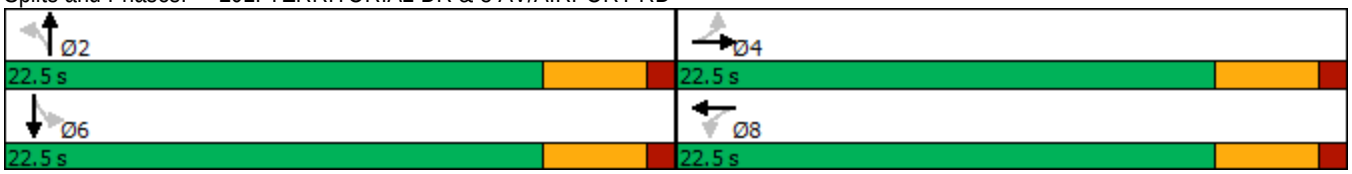
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	0	20	4	0	0	31	252	10	4	493	41
Future Volume (vph)	12	0	20	4	0	0	31	252	10	4	493	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	70.0		80.0	50.0		50.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.915						0.995			0.988	
Flt Protected		0.982			0.950			0.995				
Satd. Flow (prot)	0	1674	0	0	1770	0	0	3504	0	0	3497	0
Flt Permitted								0.886			0.953	
Satd. Flow (perm)	0	1704	0	0	1863	0	0	3120	0	0	3332	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36						9			23	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		141.9			556.9			446.1			117.3	
Travel Time (s)		10.2			40.1			26.8			7.0	
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)	13	0	22	4	0	0	34	274	11	4	536	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	35	0	0	4	0	0	319	0	0	585	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			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		

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)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
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		Max	Max		Max	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)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		5.9			5.9			35.2			35.2	
Actuated g/C Ratio		0.15			0.15			0.92			0.92	
v/c Ratio		0.12			0.01			0.11			0.19	
Control Delay		7.5			14.0			1.3			1.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.5			14.0			1.3			1.4	
LOS		A			B			A			A	
Approach Delay		7.5			14.0			1.3			1.4	
Approach LOS		A			B			A			A	
Stops (vph)		14			7			38			68	
Fuel Used(l)		1			0			13			8	
CO Emissions (g/hr)		17			8			240			153	
NOx Emissions (g/hr)		3			1			46			30	
VOC Emissions (g/hr)		4			2			55			35	
Dilemma Vehicles (#)		0			0			12			20	
Queue Length 50th (m)		0.0			0.3			0.0			0.0	
Queue Length 95th (m)		5.0			2.0			7.4			13.3	
Internal Link Dist (m)		117.9			532.9			422.1			93.3	
Turn Bay Length (m)												
Base Capacity (vph)		822			879			2876			3072	
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		0.04			0.00			0.11			0.19	

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 38.2	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.19	
Intersection Signal Delay: 1.6	Intersection LOS: A
Intersection Capacity Utilization 38.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 201: TERRITORIAL DR & 8 AV/AIRPORT RD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	106	44	197	38	62	45	279	43	331	124	68
Future Volume (vph)	53	106	44	197	38	62	45	279	43	331	124	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	60.0		0.0	120.0		110.0	125.0		0.0
Storage Lanes	1		0	2		1	1		1	2		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.956				0.850			0.850		0.947	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3383	0	3433	1863	1583	1770	3539	1583	3433	3352	0
Flt Permitted	0.730			0.649			0.621			0.567		
Satd. Flow (perm)	1360	3383	0	2345	1863	1583	1157	3539	1583	2049	3352	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48				67			47		74	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		129.0			383.9			189.3			446.1	
Travel Time (s)		9.3			27.6			11.4			26.8	
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)	58	115	48	214	41	67	49	303	47	360	135	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	58	163	0	214	41	67	49	303	47	360	209	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)		7.2			7.2			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	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	0.6	2.0	2.0	0.6	2.0	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	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		

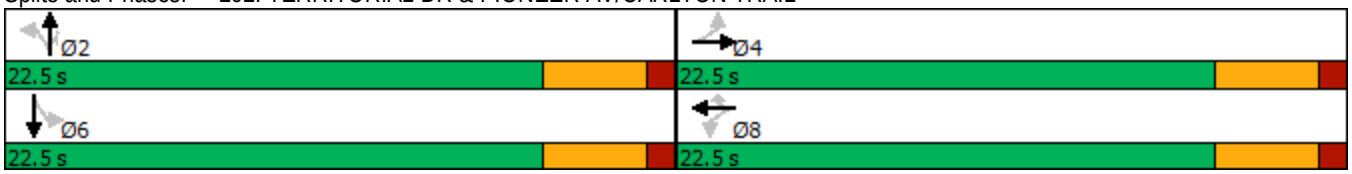
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
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	Max	Max	Max	Max	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)	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	
Act Effct Green (s)	8.4	8.4		8.5	8.5	8.5	21.8	21.8	21.8	21.8	21.8	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.60	0.60	0.60	0.60	0.60	
v/c Ratio	0.19	0.20		0.39	0.09	0.16	0.07	0.14	0.05	0.29	0.10	
Control Delay	12.0	8.5		13.5	10.8	4.7	5.6	5.1	2.4	6.3	3.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	12.0	8.5		13.5	10.8	4.7	5.6	5.1	2.4	6.3	3.7	
LOS	B	A		B	B	A	A	A	A	A	A	
Approach Delay		9.4			11.3			4.9			5.3	
Approach LOS		A			B			A			A	
Stops (vph)	42	78		149	31	19	25	126	10	170	62	
Fuel Used(l)	2	5		13	2	3	2	10	1	20	10	
CO Emissions (g/hr)	39	85		234	45	54	32	181	21	370	186	
NOx Emissions (g/hr)	7	16		45	9	10	6	35	4	71	36	
VOC Emissions (g/hr)	9	20		54	10	12	7	42	5	85	43	
Dilemma Vehicles (#)	0	0		0	0	0	0	36	0	0	25	
Queue Length 50th (m)	2.8	2.9		5.6	2.0	0.0	1.3	4.4	0.0	5.7	1.8	
Queue Length 95th (m)	8.4	7.4		11.5	6.4	5.5	5.1	10.1	3.1	13.5	5.8	
Internal Link Dist (m)		105.0			359.9			165.3			422.1	
Turn Bay Length (m)	50.0			60.0			120.0		110.0	125.0		
Base Capacity (vph)	673	1699		1161	922	817	693	2120	967	1227	2038	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		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	0.09	0.10		0.18	0.04	0.08	0.07	0.14	0.05	0.29	0.10	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 36.4
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.39	
Intersection Signal Delay: 7.1	Intersection LOS: A
Intersection Capacity Utilization 42.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 202: TERRITORIAL DR & PIONEER AV/CARLTON TRAIL



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	77	73	0	125	156	0	120	0	121	115	135
Future Volume (vph)	120	77	73	0	125	156	0	120	0	121	115	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	0.0		120.0	50.0		0.0	0.0		0.0
Storage Lanes	1		1	0		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950									0.950	0.995	
Satd. Flow (prot)	1770	3539	1583	0	3539	1583	1863	1863	1863	1681	1761	1583
Flt Permitted	0.666									0.950	0.995	
Satd. Flow (perm)	1241	3539	1583	0	3539	1583	1863	1863	1863	1681	1761	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			97			170						147
Link Speed (k/h)		60			60			50			60	
Link Distance (m)		204.5			226.9			100.4			61.2	
Travel Time (s)		12.3			13.6			7.2			3.7	
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)	130	84	79	0	136	170	0	130	0	132	125	147
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	130	84	79	0	136	170	0	130	0	119	138	147
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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		NA	Perm	Perm	NA	Perm	Split	NA	Perm
Protected Phases		4			8			2		6	6	
Permitted Phases	4		4	8		8	2		2			6

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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
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)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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	Min	Min	Min	Max	Max	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)	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)	10.7	10.7	10.7		10.7	10.7		9.0		18.2	18.2	18.2
Actuated g/C Ratio	0.21	0.21	0.21		0.21	0.21		0.17		0.35	0.35	0.35
v/c Ratio	0.51	0.11	0.20		0.19	0.37		0.40		0.20	0.22	0.22
Control Delay	25.9	17.0	4.9		17.6	6.2		23.7		15.0	15.1	4.5
Queue Delay	0.0	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	25.9	17.0	4.9		17.6	6.2		23.7		15.0	15.1	4.5
LOS	C	B	A		B	A		C		B	B	A
Approach Delay		17.7			11.2			23.7			11.2	
Approach LOS		B			B			C			B	
Stops (vph)	98	57	12		91	26		97		73	86	23
Fuel Used(l)	8	4	2		7	5		6		4	5	2
CO Emissions (g/hr)	143	78	36		132	87		102		78	92	36
NOx Emissions (g/hr)	28	15	7		25	17		20		15	18	7
VOC Emissions (g/hr)	33	18	8		30	20		24		18	21	8
Dilemma Vehicles (#)	0	7	0		11	0		0		0	12	0
Queue Length 50th (m)	11.1	3.4	0.0		5.6	0.0		11.2		8.1	9.4	0.0
Queue Length 95th (m)	26.4	8.5	6.8		12.3	12.3		26.6		23.2	26.1	11.0
Internal Link Dist (m)		180.5			202.9			76.4			37.2	
Turn Bay Length (m)	50.0		50.0			120.0						
Base Capacity (vph)	438	1251	622		1251	669		658		594	622	654
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	0.30	0.07	0.13		0.11	0.25		0.20		0.20	0.22	0.22

Intersection Summary

Area Type: Other

Cycle Length: 67.5

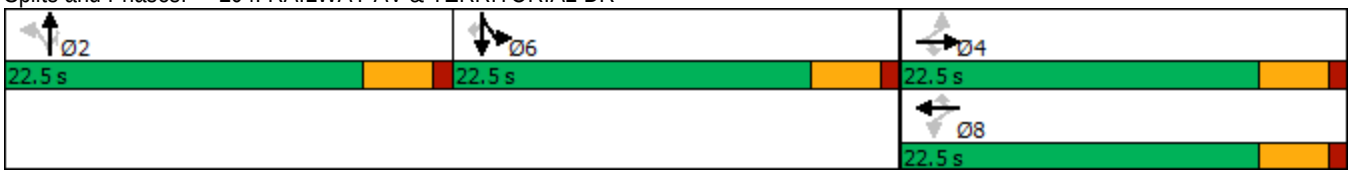
Actuated Cycle Length: 51.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 14.3	Intersection LOS: B
Intersection Capacity Utilization 35.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 204: RAILWAY AV & TERRITORIAL DR



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	445	5	90	304	32	64	2	2	3	5	32
Future Volume (vph)	9	445	5	90	304	32	64	2	2	3	5	32
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	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.925			0.869	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1723	0	1770	1619	0
Flt Permitted	0.553			0.311			0.673			0.755		
Satd. Flow (perm)	1030	3539	1583	579	3539	1583	1254	1723	0	1406	1619	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			176			176		2			35	
Link Speed (k/h)		80			80			50			80	
Link Distance (m)		231.6			229.3			141.2			218.7	
Travel Time (s)		10.4			10.3			10.2			9.8	
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)	10	484	5	98	330	35	70	2	2	3	5	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	484	5	98	330	35	70	4	0	3	40	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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		

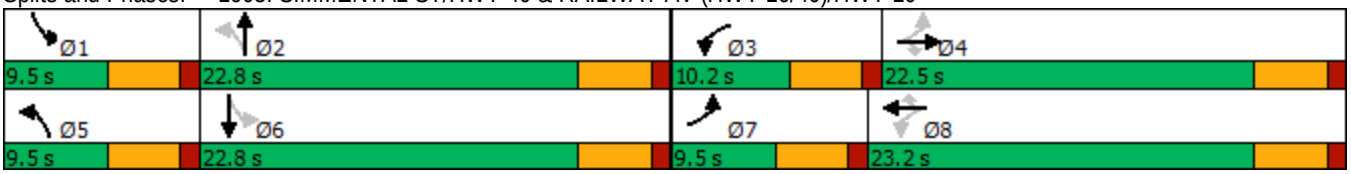
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	22.5	10.2	23.2	23.2	9.5	22.8		9.5	22.8	
Total Split (%)	14.6%	34.6%	34.6%	15.7%	35.7%	35.7%	14.6%	35.1%		14.6%	35.1%	
Maximum Green (s)	5.0	18.0	18.0	5.7	18.7	18.7	5.0	18.3		5.0	18.3	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	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	
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	
Walk Time (s)		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	
Pedestrian Calls (#/hr)		0	0		0	0		0			0	
Act Effct Green (s)	16.5	12.8	12.8	19.8	18.8	18.8	23.5	22.6		21.9	19.3	
Actuated g/C Ratio	0.30	0.24	0.24	0.37	0.35	0.35	0.43	0.42		0.40	0.36	
v/c Ratio	0.03	0.58	0.01	0.29	0.27	0.05	0.12	0.01		0.00	0.07	
Control Delay	11.2	22.4	0.0	13.5	14.3	0.2	10.9	12.0		10.3	8.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	11.2	22.4	0.0	13.5	14.3	0.2	10.9	12.0		10.3	8.0	
LOS	B	C	A	B	B	A	B	B		B	A	
Approach Delay		21.9			13.1			11.0			8.1	
Approach LOS		C			B			B			A	
Stops (vph)	8	359	0	52	195	0	37	4		3	13	
Fuel Used(l)	1	36	0	6	20	1	2	0		0	2	
CO Emissions (g/hr)	13	676	2	103	372	11	41	3		5	30	
NOx Emissions (g/hr)	3	131	0	20	72	2	8	1		1	6	
VOC Emissions (g/hr)	3	156	0	24	86	2	10	1		1	7	
Dilemma Vehicles (#)	0	40	0	0	27	0	0	0		0	3	
Queue Length 50th (m)	0.7	26.9	0.0	7.1	13.1	0.0	4.3	0.1		0.2	0.4	
Queue Length 95th (m)	3.1	40.2	0.0	15.2	27.2	0.0	11.8	2.1		1.5	6.6	
Internal Link Dist (m)		207.6			205.3			117.2			194.7	
Turn Bay Length (m)	120.0		120.0	120.0		120.0						
Base Capacity (vph)	386	1239	668	343	1447	751	593	721		603	598	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	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	0.03	0.39	0.01	0.29	0.23	0.05	0.12	0.01		0.00	0.07	

Intersection Summary

Area Type: Other
Cycle Length: 65
Actuated Cycle Length: 54.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 16.8	Intersection LOS: B
Intersection Capacity Utilization 38.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1603: SIMMENTAL ST/HWY 40 & RAILWAY AV (HWY 16/40)/HWY 16



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	170	213	176	0	365
Future Volume (Veh/h)	0	170	213	176	0	365
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	185	232	191	0	397
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			61			189
pX, platoon unblocked						
vC, conflicting volume	526	212			232	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	526	212			232	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	77			100	
cM capacity (veh/h)	482	794			1333	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	185	155	268	198	198
Volume Left	0	0	0	0	0
Volume Right	185	0	191	0	0
cSH	794	1700	1700	1700	1700
Volume to Capacity	0.23	0.09	0.16	0.12	0.12
Queue Length 95th (m)	7.2	0.0	0.0	0.0	0.0
Control Delay (s)	10.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.9	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	200	0	9	290	0	144
Future Volume (Veh/h)	200	0	9	290	0	144
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	217	0	10	315	0	157
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	227					
pX, platoon unblocked						
vC, conflicting volume			217		394	108
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			217		394	108
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	83
cM capacity (veh/h)			1350		578	924

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	145	72	10	158	158	157
Volume Left	0	0	10	0	0	0
Volume Right	0	0	0	0	0	157
cSH	1700	1700	1350	1700	1700	924
Volume to Capacity	0.09	0.04	0.01	0.09	0.09	0.17
Queue Length 95th (m)	0.0	0.0	0.2	0.0	0.0	4.9
Control Delay (s)	0.0	0.0	7.7	0.0	0.0	9.7
Lane LOS			A			A
Approach Delay (s)	0.0		0.2			9.7
Approach LOS						A

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	21.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	459	400	6	0	8
Future Volume (Veh/h)	0	459	400	6	0	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	499	435	7	0	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			232			
pX, platoon unblocked	0.96				0.96	0.96
vC, conflicting volume	442				684	218
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	328				582	94
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1176				425	904

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	250	250	218	218	7	9
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	7	9
cSH	1700	1700	1700	1700	1700	904
Volume to Capacity	0.15	0.15	0.13	0.13	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.2
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.0
Lane LOS						A
Approach Delay (s)	0.0		0.0			9.0
Approach LOS						A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	21.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	15	1	0	35	0	0	0	0	1	0	1
Future Volume (Veh/h)	0	15	1	0	35	0	0	0	0	1	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	16	1	0	38	0	0	0	0	1	0	1
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		219										
pX, platoon unblocked												
vC, conflicting volume	38			17			56	54	16	54	55	38
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	38			17			56	54	16	54	55	38
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1572			1600			941	837	1063	943	836	1034

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	17	38	0	2
Volume Left	0	0	0	1
Volume Right	1	0	0	1
cSH	1572	1600	1700	987
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	8.7
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	8.7
Approach LOS			A	A

Intersection Summary					
Average Delay	0.3				
Intersection Capacity Utilization	13.3%	ICU Level of Service		A	
Analysis Period (min)	15				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	35	78	5	15	0	42	1	7	0	1	9
Future Volume (Veh/h)	22	35	78	5	15	0	42	1	7	0	1	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	24	38	85	5	16	0	46	1	8	0	1	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		384										
pX, platoon unblocked												
vC, conflicting volume	16			123			165	154	62	102	197	16
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	16			123			165	154	62	102	197	16
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			94	100	99	100	100	99
cM capacity (veh/h)	1600			1462			765	723	991	849	685	1059

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	43	104	21	46	8	0	10
Volume Left	24	0	5	46	0	0	0
Volume Right	0	85	0	0	8	0	10
cSH	1600	1700	1462	764	970	685	1032
Volume to Capacity	0.02	0.06	0.00	0.06	0.01	0.00	0.01
Queue Length 95th (m)	0.4	0.0	0.1	1.6	0.2	0.0	0.2
Control Delay (s)	4.1	0.0	1.8	10.0	8.7	10.3	8.5
Lane LOS	A		A	B	A	B	A
Approach Delay (s)	1.2		1.8	9.8		8.6	
Approach LOS				A		A	

Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	20.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	5	5	4	1	0
Future Volume (Veh/h)	1	5	5	4	1	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	5	5	4	1	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	9				14	7
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	9				14	7
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1611				1004	1075

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	6	9	1
Volume Left	1	0	1
Volume Right	0	4	0
cSH	1611	1700	1004
Volume to Capacity	0.00	0.01	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	1.2	0.0	8.6
Lane LOS	A		A
Approach Delay (s)	1.2	0.0	8.6
Approach LOS			A

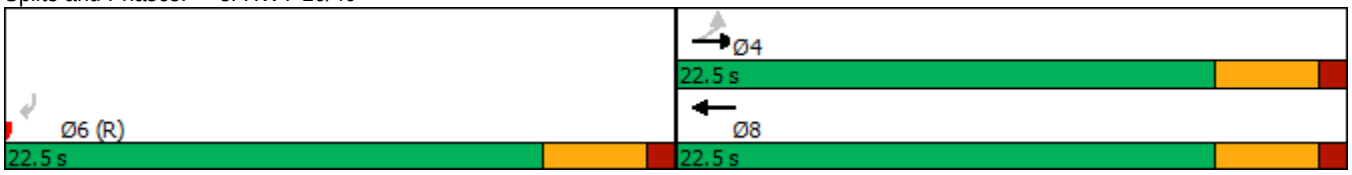
Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	219	215	252	0	0	104
Future Volume (vph)	219	215	252	0	0	104
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)	1770	1863	1863	0	0	1611
Flt Permitted	0.579					
Satd. Flow (perm)	1079	1863	1863	0	0	1611
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						452
Link Speed (k/h)		60	60		50	
Link Distance (m)		239.0	215.2		100.4	
Travel Time (s)		14.3	12.9		7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	238	234	274	0	0	113
Shared Lane Traffic (%)						
Lane Group Flow (vph)	238	234	274	0	0	113
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Turn Type	Perm	NA	NA			Perm
Protected Phases		4	8			
Permitted Phases	4					6
Minimum Split (s)	22.5	22.5	22.5			22.5
Total Split (s)	22.5	22.5	22.5			22.5
Total Split (%)	50.0%	50.0%	50.0%			50.0%
Maximum Green (s)	18.0	18.0	18.0			18.0
Yellow Time (s)	3.5	3.5	3.5			3.5
All-Red Time (s)	1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	4.5	4.5	4.5			4.5
Lead/Lag						
Lead-Lag Optimize?						
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)	0	0	0			0
Act Effct Green (s)	18.0	18.0	18.0			18.0
Actuated g/C Ratio	0.40	0.40	0.40			0.40
v/c Ratio	0.55	0.31	0.37			0.12
Control Delay	16.4	10.7	11.3			0.3
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	16.4	10.7	11.3			0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
LOS	B	B	B			A
Approach Delay		13.6	11.3		0.3	
Approach LOS		B	B		A	
Stops (vph)	167	138	164			0
Fuel Used(l)	13	11	12			1
CO Emissions (g/hr)	236	199	227			19
NOx Emissions (g/hr)	46	38	44			4
VOC Emissions (g/hr)	54	46	52			4
Dilemma Vehicles (#)	0	24	28			0
Queue Length 50th (m)	14.3	12.5	15.0			0.0
Queue Length 95th (m)	32.1	24.8	29.1			0.0
Internal Link Dist (m)		215.0	191.2		76.4	
Turn Bay Length (m)						
Base Capacity (vph)	431	745	745			915
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	0.55	0.31	0.37			0.12

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2: and 6:SBR, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 11.1		Intersection LOS: B	
Intersection Capacity Utilization 32.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: HWY 16/40



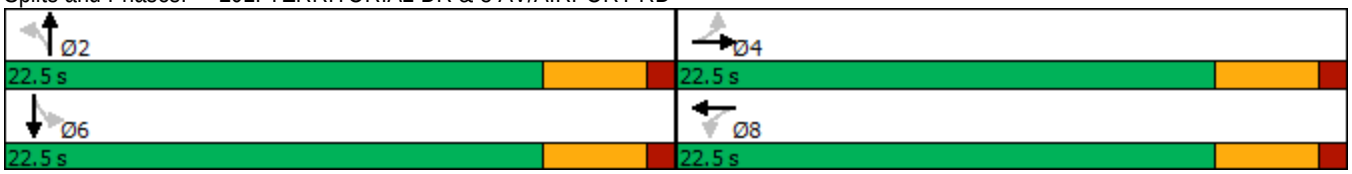
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	1	32	2	5	4	54	570	10	13	599	37
Future Volume (vph)	22	1	32	2	5	4	54	570	10	13	599	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	70.0		80.0	50.0		50.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.921			0.951			0.998			0.991	
Flt Protected		0.980			0.991			0.996			0.999	
Satd. Flow (prot)	0	1681	0	0	1756	0	0	3518	0	0	3504	0
Flt Permitted		0.933			0.922			0.866			0.942	
Satd. Flow (perm)	0	1601	0	0	1633	0	0	3059	0	0	3304	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			4			4			16	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		141.9			556.9			446.1			117.3	
Travel Time (s)		10.2			40.1			26.8			7.0	
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)	24	1	35	2	5	4	59	620	11	14	651	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	60	0	0	11	0	0	690	0	0	705	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			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		

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)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
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		Max	Max		Max	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)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		6.4			6.3			31.4			31.4	
Actuated g/C Ratio		0.17			0.17			0.83			0.83	
v/c Ratio		0.20			0.04			0.27			0.26	
Control Delay		9.5			10.9			3.0			2.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.5			10.9			3.0			2.8	
LOS		A			B			A			A	
Approach Delay		9.5			10.9			3.0			2.8	
Approach LOS		A			B			A			A	
Stops (vph)		29			11			174			169	
Fuel Used(l)		2			1			32			13	
CO Emissions (g/hr)		33			16			589			251	
NOx Emissions (g/hr)		6			3			114			48	
VOC Emissions (g/hr)		8			4			136			58	
Dilemma Vehicles (#)		0			0			45			45	
Queue Length 50th (m)		1.5			0.4			0.0			0.0	
Queue Length 95th (m)		6.6			2.6			18.5			17.8	
Internal Link Dist (m)		117.9			532.9			422.1			93.3	
Turn Bay Length (m)												
Base Capacity (vph)		781			779			2533			2738	
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		0.08			0.01			0.27			0.26	

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 37.9	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.27	
Intersection Signal Delay: 3.2	Intersection LOS: A
Intersection Capacity Utilization 53.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 201: TERRITORIAL DR & 8 AV/AIRPORT RD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	209	62	356	154	191	141	530	85	396	163	72
Future Volume (vph)	96	209	62	356	154	191	141	530	85	396	163	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	60.0		0.0	120.0		110.0	125.0		0.0
Storage Lanes	1		0	2		1	1		1	2		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.966				0.850			0.850		0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3419	0	3433	1863	1583	1770	3539	1583	3433	3376	0
Flt Permitted	0.651			0.572			0.594			0.435		
Satd. Flow (perm)	1213	3419	0	2067	1863	1583	1106	3539	1583	1572	3376	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		67				164			92		78	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		129.0			383.9			189.3			446.1	
Travel Time (s)		9.3			27.6			11.4			26.8	
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)	104	227	67	387	167	208	153	576	92	430	177	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	294	0	387	167	208	153	576	92	430	255	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)		7.2			7.2			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	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	0.6	2.0	2.0	0.6	2.0	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	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
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	Max	Max	Max	Max	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)	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	
Act Effct Green (s)	12.9	12.9		12.9	12.9	12.9	18.2	18.2	18.2	18.2	18.2	
Actuated g/C Ratio	0.32	0.32		0.32	0.32	0.32	0.45	0.45	0.45	0.45	0.45	
v/c Ratio	0.27	0.26		0.58	0.28	0.34	0.31	0.36	0.12	0.61	0.16	
Control Delay	11.5	7.8		14.9	11.0	4.8	10.6	8.9	3.1	14.7	5.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	11.5	7.8		14.9	11.0	4.8	10.6	8.9	3.1	14.7	5.7	
LOS	B	A		B	B	A	B	A	A	B	A	
Approach Delay		8.8			11.3			8.5			11.4	
Approach LOS		A			B			A			B	
Stops (vph)	64	129		264	99	42	88	318	17	281	91	
Fuel Used(l)	3	8		23	9	9	6	23	2	29	13	
CO Emissions (g/hr)	64	146		428	170	160	117	420	40	537	243	
NOx Emissions (g/hr)	12	28		83	33	31	23	81	8	104	47	
VOC Emissions (g/hr)	15	34		99	39	37	27	97	9	124	56	
Dilemma Vehicles (#)	0	0		0	0	0	0	65	0	0	28	
Queue Length 50th (m)	5.3	6.0		11.4	8.6	2.1	6.4	13.0	0.0	11.0	3.5	
Queue Length 95th (m)	13.2	11.9		20.7	18.2	11.5	19.4	26.9	6.0	#32.6	10.0	
Internal Link Dist (m)		105.0			359.9			165.3			422.1	
Turn Bay Length (m)	50.0			60.0			120.0		110.0	125.0		
Base Capacity (vph)	548	1582		934	842	805	500	1600	765	710	1568	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		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	0.19	0.19		0.41	0.20	0.26	0.31	0.36	0.12	0.61	0.16	

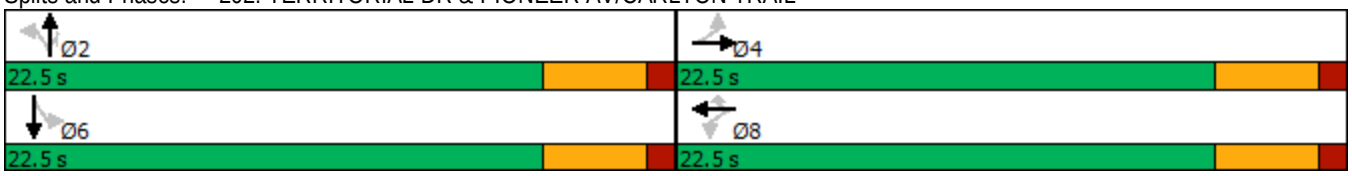
Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 40.2
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 10.1	Intersection LOS: B
Intersection Capacity Utilization 58.9%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 202: TERRITORIAL DR & PIONEER AV/CARLTON TRAIL



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	219	108	38	0	216	258	0	219	0	183	65	332
Future Volume (vph)	219	108	38	0	216	258	0	219	0	183	65	332
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	0.0		120.0	50.0		0.0	0.0		0.0
Storage Lanes	1		1	0		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950									0.950	0.976	
Satd. Flow (prot)	1770	3539	1583	0	3539	1583	1863	1863	1863	1681	1727	1583
Flt Permitted	0.605									0.950	0.976	
Satd. Flow (perm)	1127	3539	1583	0	3539	1583	1863	1863	1863	1681	1727	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			97			280						361
Link Speed (k/h)		60			60			50			60	
Link Distance (m)		204.5			226.9			100.4			61.2	
Travel Time (s)		12.3			13.6			7.2			3.7	
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)	238	117	41	0	235	280	0	238	0	199	71	361
Shared Lane Traffic (%)										33%		
Lane Group Flow (vph)	238	117	41	0	235	280	0	238	0	133	137	361
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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		NA	Perm	Perm	NA	Perm	Split	NA	Perm
Protected Phases		4			8			2		6	6	
Permitted Phases	4		4	8		8	2		2			6

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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
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)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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	Min	Min	Min	Max	Max	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)	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)	16.0	16.0	16.0		16.0	16.0		12.8		18.2	18.2	18.2
Actuated g/C Ratio	0.26	0.26	0.26		0.26	0.26		0.21		0.30	0.30	0.30
v/c Ratio	0.80	0.13	0.08		0.25	0.45		0.61		0.26	0.26	0.50
Control Delay	44.2	18.1	0.7		18.9	5.5		28.9		20.0	19.9	5.3
Queue Delay	0.0	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	44.2	18.1	0.7		18.9	5.5		28.9		20.0	19.9	5.3
LOS	D	B	A		B	A		C		C	B	A
Approach Delay		32.0			11.6			28.9			11.6	
Approach LOS		C			B			C			B	
Stops (vph)	179	75	1		157	34		184		89	93	41
Fuel Used(l)	17	6	1		12	7		11		5	6	4
CO Emissions (g/hr)	318	109	14		232	135		206		100	104	83
NOx Emissions (g/hr)	61	21	3		45	26		40		19	20	16
VOC Emissions (g/hr)	73	25	3		53	31		48		23	24	19
Dilemma Vehicles (#)	0	8	0		17	0		0		0	10	0
Queue Length 50th (m)	25.9	5.4	0.0		11.3	0.0		26.4		13.0	13.4	0.0
Queue Length 95th (m)	#65.2	12.0	0.9		21.5	16.4		46.4		29.1	29.7	18.3
Internal Link Dist (m)		180.5			202.9			76.4			37.2	
Turn Bay Length (m)	50.0		50.0			120.0						
Base Capacity (vph)	337	1060	542		1060	670		558		503	517	727
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	0.71	0.11	0.08		0.22	0.42		0.43		0.26	0.26	0.50

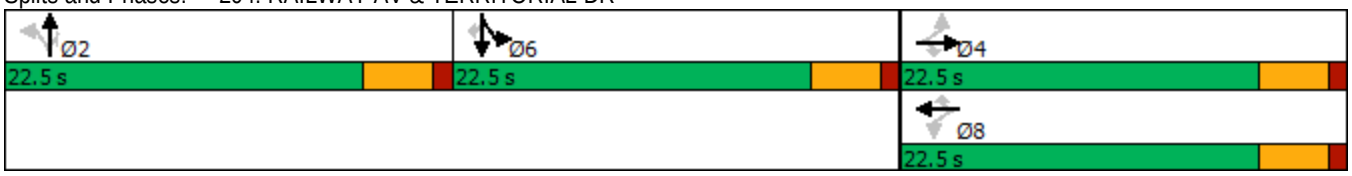
Intersection Summary

Area Type: Other
Cycle Length: 67.5
Actuated Cycle Length: 60.7
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 18.5	Intersection LOS: B
Intersection Capacity Utilization 51.4%	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: 204: RAILWAY AV & TERRITORIAL DR



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	677	2	128	475	133	440	10	3	5	18	125
Future Volume (vph)	3	677	2	128	475	133	440	10	3	5	18	125
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	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.968			0.869	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1803	0	1770	1619	0
Flt Permitted	0.416			0.179			0.537			0.748		
Satd. Flow (perm)	775	3539	1583	333	3539	1583	1000	1803	0	1393	1619	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			234			234		3			136	
Link Speed (k/h)		80			80			50			80	
Link Distance (m)		231.6			229.3			141.2			218.7	
Travel Time (s)		10.4			10.3			10.2			9.8	
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)	3	736	2	139	516	145	478	11	3	5	20	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	736	2	139	516	145	478	14	0	5	156	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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	15.0	28.5		9.5	23.0	
Total Split (%)	13.6%	32.1%	32.1%	13.6%	32.1%	32.1%	21.4%	40.7%		13.6%	32.9%	
Maximum Green (s)	5.0	18.0	18.0	5.0	18.0	18.0	10.5	24.0		5.0	18.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	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	
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	
Walk Time (s)		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	
Pedestrian Calls (#/hr)		0	0		0	0		0			0	
Act Effct Green (s)	20.8	16.9	16.9	23.4	22.4	22.4	33.8	32.0		23.7	18.7	
Actuated g/C Ratio	0.31	0.25	0.25	0.35	0.33	0.33	0.50	0.48		0.35	0.28	
v/c Ratio	0.01	0.82	0.00	0.62	0.44	0.21	0.76	0.02		0.01	0.28	
Control Delay	13.3	33.4	0.0	29.6	19.2	1.3	23.7	11.6		10.4	7.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	13.3	33.4	0.0	29.6	19.2	1.3	23.7	11.6		10.4	7.2	
LOS	B	C	A	C	B	A	C	B		B	A	
Approach Delay		33.2			17.8			23.3			7.3	
Approach LOS		C			B			C			A	
Stops (vph)	3	591	0	77	347	3	276	8		6	31	
Fuel Used(l)	0	64	0	10	35	3	20	0		0	5	
CO Emissions (g/hr)	5	1184	1	179	660	50	374	9		9	94	
NOx Emissions (g/hr)	1	228	0	35	127	10	72	2		2	18	
VOC Emissions (g/hr)	1	273	0	41	152	12	86	2		2	22	
Dilemma Vehicles (#)	0	49	0	0	35	0	0	0		0	10	
Queue Length 50th (m)	0.3	50.0	0.0	12.3	25.7	0.0	44.5	0.8		0.4	2.1	
Queue Length 95th (m)	1.7	#76.4	0.0	#28.9	47.4	2.5	#85.9	4.5		1.9	15.2	
Internal Link Dist (m)		207.6			205.3			117.2			194.7	
Turn Bay Length (m)	120.0		120.0	120.0		120.0						
Base Capacity (vph)	314	957	598	224	1244	707	625	860		520	548	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	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	0.01	0.77	0.00	0.62	0.41	0.21	0.76	0.02		0.01	0.28	

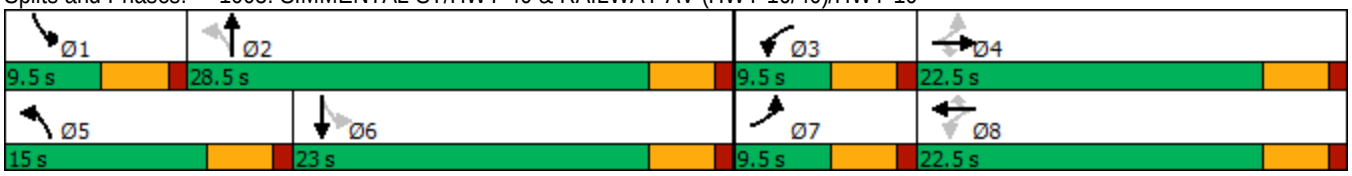
Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 67.1
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 23.5	Intersection LOS: C
Intersection Capacity Utilization 73.8%	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: 1603: SIMMENTAL ST/HWY 40 & RAILWAY AV (HWY 16/40)/HWY 16



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	341	410	287	0	581
Future Volume (Veh/h)	0	341	410	287	0	581
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	371	446	312	0	632
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			61			189
pX, platoon unblocked	0.98					
vC, conflicting volume	918	379			446	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	875	379			446	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	40			100	
cM capacity (veh/h)	283	619			1111	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	371	297	461	316	316
Volume Left	0	0	0	0	0
Volume Right	371	0	312	0	0
cSH	619	1700	1700	1700	1700
Volume to Capacity	0.60	0.17	0.27	0.19	0.19
Queue Length 95th (m)	31.8	0.0	0.0	0.0	0.0
Control Delay (s)	19.1	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	19.1	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	293	0	252	475	0	215
Future Volume (Veh/h)	293	0	252	475	0	215
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	318	0	274	516	0	234
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	227					
pX, platoon unblocked						
vC, conflicting volume			318		1124	159
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			318		1124	159
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			78		100	73
cM capacity (veh/h)			1239		155	858

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	212	106	274	258	258	234
Volume Left	0	0	274	0	0	0
Volume Right	0	0	0	0	0	234
cSH	1700	1700	1239	1700	1700	858
Volume to Capacity	0.12	0.06	0.22	0.15	0.15	0.27
Queue Length 95th (m)	0.0	0.0	6.8	0.0	0.0	8.9
Control Delay (s)	0.0	0.0	8.7	0.0	0.0	10.8
Lane LOS			A			B
Approach Delay (s)	0.0		3.0			10.8
Approach LOS						B

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	677	848	214	0	131
Future Volume (Veh/h)	0	677	848	214	0	131
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	736	922	233	0	142
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			232			
pX, platoon unblocked	0.92				0.92	0.92
vC, conflicting volume	1155				1290	461
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	991				1138	236
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	80
cM capacity (veh/h)	637				179	704

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	368	368	461	461	233	142
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	233	142
cSH	1700	1700	1700	1700	1700	704
Volume to Capacity	0.22	0.22	0.27	0.27	0.14	0.20
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	6.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	11.4
Lane LOS						B
Approach Delay (s)	0.0		0.0			11.4
Approach LOS						B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	77	28	0	77	6	10	1	1	15	11	46
Future Volume (Veh/h)	11	77	28	0	77	6	10	1	1	15	11	46
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	12	84	30	0	84	7	11	1	1	16	12	50
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		219										
pX, platoon unblocked												
vC, conflicting volume	91			114			266	214	99	212	226	88
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	91			114			266	214	99	212	226	88
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			98	100	100	98	98	95
cM capacity (veh/h)	1504			1475			638	678	957	739	668	971

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	126	91	13	78
Volume Left	12	0	11	16
Volume Right	30	7	1	50
cSH	1504	1475	658	856
Volume to Capacity	0.01	0.00	0.02	0.09
Queue Length 95th (m)	0.2	0.0	0.5	2.4
Control Delay (s)	0.8	0.0	10.6	9.6
Lane LOS	A		B	A
Approach Delay (s)	0.8	0.0	10.6	9.6
Approach LOS			B	A

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	23.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	35	67	7	22	0	91	1	20	2	5	25
Future Volume (Veh/h)	18	35	67	7	22	0	91	1	20	2	5	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	20	38	73	8	24	0	99	1	22	2	5	27
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		384										
pX, platoon unblocked												
vC, conflicting volume	24			111			184	154	56	122	191	24
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24			111			184	154	56	122	191	24
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			86	100	98	100	99	97
cM capacity (veh/h)	1589			1477			726	723	999	810	690	1047

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	39	92	32	100	22	4	30
Volume Left	20	0	8	99	0	2	0
Volume Right	0	73	0	0	22	0	27
cSH	1589	1700	1477	726	991	739	1003
Volume to Capacity	0.01	0.05	0.01	0.14	0.02	0.01	0.03
Queue Length 95th (m)	0.3	0.0	0.1	3.8	0.6	0.1	0.7
Control Delay (s)	3.8	0.0	1.9	10.7	8.7	9.9	8.7
Lane LOS	A		A	B	A	A	A
Approach Delay (s)	1.1		1.9	10.4		8.9	
Approach LOS				B		A	

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	25.6%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	47	64	103	58	35	52
Future Volume (Veh/h)	47	64	103	58	35	52
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	51	70	112	63	38	57
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	175				316	144
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	175				316	144
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				94	94
cM capacity (veh/h)	1401				653	904

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	121	175	95
Volume Left	51	0	38
Volume Right	0	63	57
cSH	1401	1700	783
Volume to Capacity	0.04	0.10	0.12
Queue Length 95th (m)	0.9	0.0	3.3
Control Delay (s)	3.4	0.0	10.2
Lane LOS	A		B
Approach Delay (s)	3.4	0.0	10.2
Approach LOS			B

Intersection Summary			
Average Delay		3.5	
Intersection Capacity Utilization		30.1%	ICU Level of Service A
Analysis Period (min)		15	

APPENDIX F

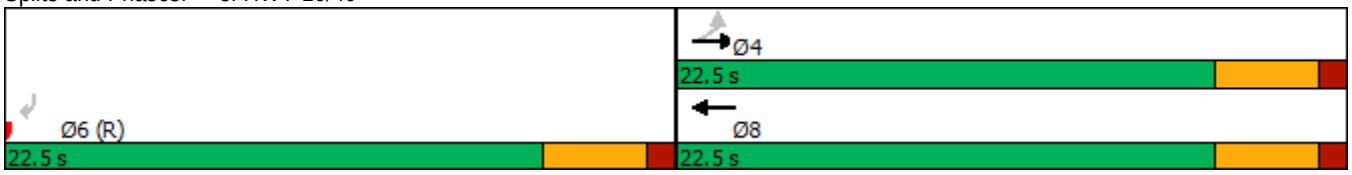
2038 Post-Development Operating Conditions

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	164	152	42	0	0	206
Future Volume (vph)	164	152	42	0	0	206
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)	1770	1863	1863	0	0	1611
Flt Permitted	0.727					
Satd. Flow (perm)	1354	1863	1863	0	0	1611
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						943
Link Speed (k/h)		60	60		50	
Link Distance (m)		239.0	215.2		100.4	
Travel Time (s)		14.3	12.9		7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	178	165	46	0	0	224
Shared Lane Traffic (%)						
Lane Group Flow (vph)	178	165	46	0	0	224
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Turn Type	Perm	NA	NA			Perm
Protected Phases		4	8			
Permitted Phases	4					6
Minimum Split (s)	22.5	22.5	22.5			22.5
Total Split (s)	22.5	22.5	22.5			22.5
Total Split (%)	50.0%	50.0%	50.0%			50.0%
Maximum Green (s)	18.0	18.0	18.0			18.0
Yellow Time (s)	3.5	3.5	3.5			3.5
All-Red Time (s)	1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	4.5	4.5	4.5			4.5
Lead/Lag						
Lead-Lag Optimize?						
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)	0	0	0			0
Act Effct Green (s)	18.0	18.0	18.0			18.0
Actuated g/C Ratio	0.40	0.40	0.40			0.40
v/c Ratio	0.33	0.22	0.06			0.19
Control Delay	11.5	9.9	8.7			0.3
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	11.5	9.9	8.7			0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
LOS	B	A	A			A
Approach Delay		10.7	8.7		0.3	
Approach LOS		B	A		A	
Stops (vph)	107	92	27			0
Fuel Used(l)	8	7	2			2
CO Emissions (g/hr)	155	135	36			38
NOx Emissions (g/hr)	30	26	7			7
VOC Emissions (g/hr)	36	31	8			9
Dilemma Vehicles (#)	0	17	5			0
Queue Length 50th (m)	9.6	8.5	2.2			0.0
Queue Length 95th (m)	21.0	18.0	6.6			0.0
Internal Link Dist (m)		215.0	191.2		76.4	
Turn Bay Length (m)						
Base Capacity (vph)	541	745	745			1210
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	0.33	0.22	0.06			0.19

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2: and 6:SBR, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.33			
Intersection Signal Delay: 6.8		Intersection LOS: A	
Intersection Capacity Utilization 24.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: HWY 16/40



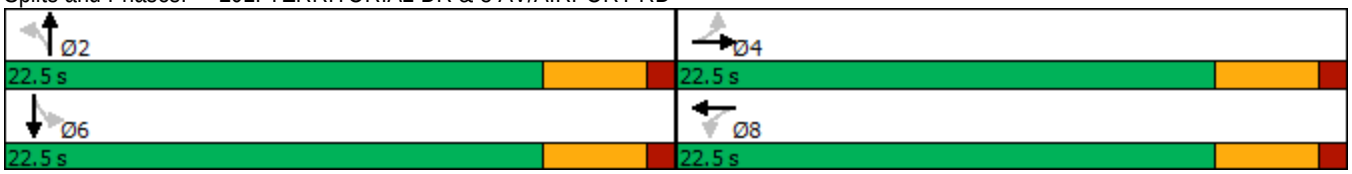
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	5	20	21	34	102	31	276	23	172	606	41
Future Volume (vph)	12	5	20	21	34	102	31	276	23	172	606	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	70.0		80.0	50.0		50.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.926			0.912			0.990			0.992	
Flt Protected		0.984			0.993			0.995			0.990	
Satd. Flow (prot)	0	1697	0	0	1687	0	0	3486	0	0	3476	0
Flt Permitted		0.896			0.945			0.860			0.789	
Satd. Flow (perm)	0	1546	0	0	1605	0	0	3013	0	0	2770	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			111			20			14	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		141.9			556.9			446.1			117.3	
Travel Time (s)		10.2			40.1			26.8			7.0	
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)	13	5	22	23	37	111	34	300	25	187	659	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	40	0	0	171	0	0	359	0	0	891	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			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		

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)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
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		Max	Max		Max	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)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		7.2			7.2			23.5			23.5	
Actuated g/C Ratio		0.20			0.20			0.64			0.64	
v/c Ratio		0.12			0.42			0.19			0.50	
Control Delay		8.0			8.6			4.4			6.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.0			8.6			4.4			6.7	
LOS		A			A			A			A	
Approach Delay		8.0			8.6			4.4			6.7	
Approach LOS		A			A			A			A	
Stops (vph)		21			58			134			445	
Fuel Used(l)		1			11			18			27	
CO Emissions (g/hr)		22			198			339			501	
NOx Emissions (g/hr)		4			38			65			97	
VOC Emissions (g/hr)		5			46			78			115	
Dilemma Vehicles (#)		0			0			42			100	
Queue Length 50th (m)		0.9			2.9			4.3			14.6	
Queue Length 95th (m)		5.2			12.3			10.7			32.8	
Internal Link Dist (m)		117.9			532.9			422.1			93.3	
Turn Bay Length (m)												
Base Capacity (vph)		769			843			1923			1767	
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		0.05			0.20			0.19			0.50	

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 36.9	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 6.4	Intersection LOS: A
Intersection Capacity Utilization 53.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 201: TERRITORIAL DR & 8 AV/AIRPORT RD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	106	44	269	38	86	45	292	118	442	143	68
Future Volume (vph)	53	106	44	269	38	86	45	292	118	442	143	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	60.0		0.0	120.0		110.0	125.0		0.0
Storage Lanes	1		0	2		1	1		1	2		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.956				0.850			0.850		0.952	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3383	0	3433	1863	1583	1770	3539	1583	3433	3369	0
Flt Permitted	0.730			0.649			0.609			0.560		
Satd. Flow (perm)	1360	3383	0	2345	1863	1583	1134	3539	1583	2024	3369	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48				93			128		74	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		129.0			383.9			189.3			446.1	
Travel Time (s)		9.3			27.6			11.4			26.8	
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)	58	115	48	292	41	93	49	317	128	480	155	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	58	163	0	292	41	93	49	317	128	480	229	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)		7.2			7.2			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	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	0.6	2.0	2.0	0.6	2.0	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	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		

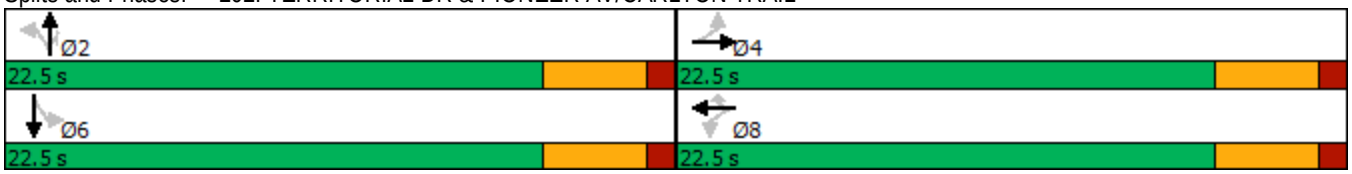
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
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	Max	Max	Max	Max	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)	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	
Act Effct Green (s)	10.1	10.1		10.1	10.1	10.1	19.9	19.9	19.9	19.9	19.9	
Actuated g/C Ratio	0.26	0.26		0.26	0.26	0.26	0.51	0.51	0.51	0.51	0.51	
v/c Ratio	0.17	0.18		0.48	0.09	0.19	0.08	0.18	0.15	0.47	0.13	
Control Delay	11.2	7.9		14.3	10.1	4.2	6.6	6.2	2.3	8.8	4.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	11.2	7.9		14.3	10.1	4.2	6.6	6.2	2.3	8.8	4.4	
LOS	B	A		B	B	A	A	A	A	A	A	
Approach Delay		8.7			11.7			5.2			7.4	
Approach LOS		A			B			A			A	
Stops (vph)	40	75		205	30	19	26	146	18	274	74	
Fuel Used(l)	2	4		17	2	4	2	11	3	29	11	
CO Emissions (g/hr)	37	82		323	44	71	34	203	51	539	210	
NOx Emissions (g/hr)	7	16		62	8	14	6	39	10	104	40	
VOC Emissions (g/hr)	9	19		75	10	16	8	47	12	124	48	
Dilemma Vehicles (#)	0	0		0	0	0	0	38	0	0	27	
Queue Length 50th (m)	2.8	2.9		8.0	2.0	0.0	1.4	5.1	0.0	9.1	2.4	
Queue Length 95th (m)	8.4	7.3		15.3	6.3	6.3	6.2	12.6	6.1	22.7	7.6	
Internal Link Dist (m)		105.0			359.9			165.3			422.1	
Turn Bay Length (m)	50.0			60.0			120.0		110.0	125.0		
Base Capacity (vph)	630	1593		1086	863	783	577	1803	869	1031	1752	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		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	0.09	0.10		0.27	0.05	0.12	0.08	0.18	0.15	0.47	0.13	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 39.1
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 8.0	Intersection LOS: A
Intersection Capacity Utilization 47.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 202: TERRITORIAL DR & PIONEER AV/CARLTON TRAIL



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	164	83	73	0	168	156	0	164	0	148	132	182
Future Volume (vph)	164	83	73	0	168	156	0	164	0	148	132	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	0.0		120.0	50.0		0.0	0.0		0.0
Storage Lanes	1		1	0		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950									0.950	0.995	
Satd. Flow (prot)	1770	3539	1583	0	3539	1583	1863	1863	1863	1681	1761	1583
Flt Permitted	0.636									0.950	0.995	
Satd. Flow (perm)	1185	3539	1583	0	3539	1583	1863	1863	1863	1681	1761	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			97			170						198
Link Speed (k/h)		60			60			50			60	
Link Distance (m)		204.5			226.9			100.4			61.2	
Travel Time (s)		12.3			13.6			7.2			3.7	
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)	178	90	79	0	183	170	0	178	0	161	143	198
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	178	90	79	0	183	170	0	178	0	145	159	198
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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		NA	Perm	Perm	NA	Perm	Split	NA	Perm
Protected Phases		4			8			2		6	6	
Permitted Phases	4		4	8		8	2		2			6

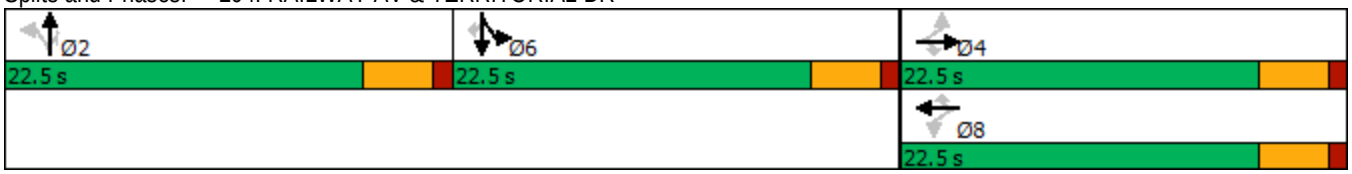
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
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)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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	Min	Min	Min	Max	Max	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)	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)	12.9	12.9	12.9		12.9	12.9		10.7		18.3	18.3	18.3
Actuated g/C Ratio	0.23	0.23	0.23		0.23	0.23		0.19		0.33	0.33	0.33
v/c Ratio	0.65	0.11	0.18		0.22	0.34		0.50		0.26	0.27	0.30
Control Delay	31.6	17.3	4.6		18.1	5.8		26.0		17.8	17.8	4.8
Queue Delay	0.0	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	31.6	17.3	4.6		18.1	5.8		26.0		17.8	17.8	4.8
LOS	C	B	A		B	A		C		B	B	A
Approach Delay		21.8			12.2			26.0			12.7	
Approach LOS		C			B			C			B	
Stops (vph)	138	59	11		121	25		135		94	104	27
Fuel Used(l)	11	4	2		10	5		8		6	6	3
CO Emissions (g/hr)	211	83	36		178	85		146		103	114	47
NOx Emissions (g/hr)	41	16	7		34	16		28		20	22	9
VOC Emissions (g/hr)	49	19	8		41	20		34		24	26	11
Dilemma Vehicles (#)	0	7	0		14	0		0		0	12	0
Queue Length 50th (m)	16.8	3.8	0.0		8.1	0.0		17.0		11.6	12.8	0.0
Queue Length 95th (m)	37.8	9.3	6.9		16.4	12.5		35.5		30.0	32.3	13.5
Internal Link Dist (m)		180.5			202.9			76.4			37.2	
Turn Bay Length (m)	50.0		50.0			120.0						
Base Capacity (vph)	389	1164	585		1164	634		613		553	579	653
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	0.46	0.08	0.14		0.16	0.27		0.29		0.26	0.27	0.30

Intersection Summary

Area Type: Other
Cycle Length: 67.5
Actuated Cycle Length: 55.6
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 16.5	Intersection LOS: B
Intersection Capacity Utilization 44.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 204: RAILWAY AV & TERRITORIAL DR



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	464	5	90	348	34	64	2	2	98	5	33
Future Volume (vph)	32	464	5	90	348	34	64	2	2	98	5	33
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	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.996			0.967	
Flt Protected	0.950			0.950				0.955			0.965	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	0	1772	0	0	1738	0
Flt Permitted	0.528			0.459				0.723			0.777	
Satd. Flow (perm)	984	3539	1583	855	3539	1583	0	1341	0	0	1400	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			36			37		2			36	
Link Speed (k/h)		80			80			50			80	
Link Distance (m)		231.6			229.3			141.2			218.7	
Travel Time (s)		10.4			10.3			10.2			9.8	
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)	35	504	5	98	378	37	70	2	2	107	5	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	35	504	5	98	378	37	0	74	0	0	148	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)		3.6			3.6			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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		

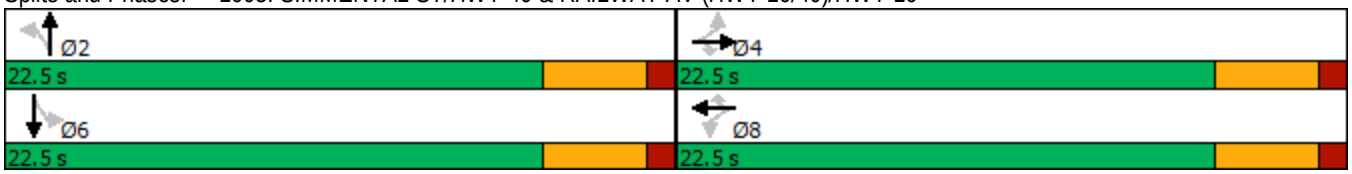
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5			4.5	
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	Max	Max		Max	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)	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	
Act Effct Green (s)	10.8	10.8	10.8	10.8	10.8	10.8		18.1			18.1	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28	0.28		0.48			0.48	
v/c Ratio	0.12	0.50	0.01	0.40	0.37	0.08		0.12			0.22	
Control Delay	10.7	12.9	0.0	16.1	11.7	4.5		7.1			6.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	10.7	12.9	0.0	16.1	11.7	4.5		7.1			6.5	
LOS	B	B	A	B	B	A		A			A	
Approach Delay		12.7			12.0			7.1			6.5	
Approach LOS		B			B			A			A	
Stops (vph)	26	342	0	70	246	11		39			62	
Fuel Used(l)	2	33	0	7	24	1		2			7	
CO Emissions (g/hr)	43	608	2	126	438	25		40			122	
NOx Emissions (g/hr)	8	117	0	24	84	5		8			24	
VOC Emissions (g/hr)	10	140	0	29	101	6		9			28	
Dilemma Vehicles (#)	0	60	0	0	45	0		0			17	
Queue Length 50th (m)	1.7	14.4	0.0	5.2	10.4	0.0		2.3			3.6	
Queue Length 95th (m)	5.9	23.7	0.0	14.0	17.8	3.9		8.9			13.7	
Internal Link Dist (m)		207.6			205.3			117.2			194.7	
Turn Bay Length (m)	120.0		120.0	120.0		120.0						
Base Capacity (vph)	468	1686	773	407	1686	773		640			686	
Starvation Cap Reductn	0	0	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	0.07	0.30	0.01	0.24	0.22	0.05		0.12			0.22	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 38
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 11.4	Intersection LOS: B
Intersection Capacity Utilization 36.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1603: SIMMENTAL ST/HWY 40 & RAILWAY AV (HWY 16/40)/HWY 16



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	170	301	176	0	456
Future Volume (Veh/h)	0	170	301	176	0	456
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	185	327	191	0	496
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			61			189
pX, platoon unblocked						
vC, conflicting volume	670	259			327	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	670	259			327	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	75			100	
cM capacity (veh/h)	390	740			1229	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	185	218	300	248	248
Volume Left	0	0	0	0	0
Volume Right	185	0	191	0	0
cSH	740	1700	1700	1700	1700
Volume to Capacity	0.25	0.13	0.18	0.15	0.15
Queue Length 95th (m)	7.9	0.0	0.0	0.0	0.0
Control Delay (s)	11.5	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.5	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	234	0	42	333	0	152
Future Volume (Veh/h)	234	0	42	333	0	152
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	254	0	46	362	0	165
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	227					
pX, platoon unblocked						
vC, conflicting volume			254		527	127
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			254		527	127
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		100	82
cM capacity (veh/h)			1308		464	900

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	169	85	46	181	181	165
Volume Left	0	0	46	0	0	0
Volume Right	0	0	0	0	0	165
cSH	1700	1700	1308	1700	1700	900
Volume to Capacity	0.10	0.05	0.04	0.11	0.11	0.18
Queue Length 95th (m)	0.0	0.0	0.9	0.0	0.0	5.4
Control Delay (s)	0.0	0.0	7.9	0.0	0.0	9.9
Lane LOS			A			A
Approach Delay (s)	0.0		0.9			9.9
Approach LOS						A

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	501	401	50	0	82
Future Volume (Veh/h)	0	501	401	50	0	82
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	545	436	54	0	89
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			232			
pX, platoon unblocked	1.00				1.00	1.00
vC, conflicting volume	490				708	218
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	485				704	212
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	89
cM capacity (veh/h)	1072				371	791

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	272	272	218	218	54	89
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	54	89
cSH	1700	1700	1700	1700	1700	791
Volume to Capacity	0.16	0.16	0.13	0.13	0.03	0.11
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	3.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	10.1
Lane LOS						B
Approach Delay (s)	0.0		0.0			10.1
Approach LOS						B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	22	1	0	35	11	0	0	0	160	0	97
Future Volume (Veh/h)	18	22	1	0	35	11	0	0	0	160	0	97
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	20	24	1	0	38	12	0	0	0	174	0	105
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		219										
pX, platoon unblocked												
vC, conflicting volume	50			25			214	114	24	108	109	44
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	50			25			214	114	24	108	109	44
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	80	100	90
cM capacity (veh/h)	1557			1589			661	766	1052	862	771	1026

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	45	50	0	279
Volume Left	20	0	0	174
Volume Right	1	12	0	105
cSH	1557	1589	1700	917
Volume to Capacity	0.01	0.00	0.00	0.30
Queue Length 95th (m)	0.3	0.0	0.0	10.3
Control Delay (s)	3.3	0.0	0.0	10.6
Lane LOS	A		A	B
Approach Delay (s)	3.3	0.0	0.0	10.6
Approach LOS			A	B

Intersection Summary				
Average Delay	8.3			
Intersection Capacity Utilization	30.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	185	0	0	152	0
Future Volume (Veh/h)	0	185	0	0	152	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	201	0	0	165	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			201		100	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			201		100	100
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		82	100
cM capacity (veh/h)			1371		898	955

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	201	0	165
Volume Left	0	0	165
Volume Right	201	0	0
cSH	1700	1700	898
Volume to Capacity	0.12	0.00	0.18
Queue Length 95th (m)	0.0	0.0	5.4
Control Delay (s)	0.0	0.0	9.9
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.9
Approach LOS			A

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	26.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	113	78	21	17	20	49	27	18	166	59	9
Future Volume (Veh/h)	29	113	78	21	17	20	49	27	18	166	59	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	32	123	85	23	18	22	53	29	20	180	64	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		384										
pX, platoon unblocked												
vC, conflicting volume	40			208			346	316	104	235	347	29
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	40			208			346	316	104	235	347	29
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			90	95	98	72	88	99
cM capacity (veh/h)	1568			1360			512	577	931	640	554	1039

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	94	146	63	68	34	212	42
Volume Left	32	0	23	53	0	180	0
Volume Right	0	85	22	0	20	0	10
cSH	1568	1700	1360	525	740	625	623
Volume to Capacity	0.02	0.09	0.02	0.13	0.05	0.34	0.07
Queue Length 95th (m)	0.5	0.0	0.4	3.5	1.2	12.0	1.7
Control Delay (s)	2.6	0.0	2.9	12.9	10.1	13.7	11.2
Lane LOS	A		A	B	B	B	B
Approach Delay (s)	1.0		2.9	11.9		13.3	
Approach LOS				B		B	

Intersection Summary				
Average Delay	7.6			
Intersection Capacity Utilization	35.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	5	5	48	75	0
Future Volume (Veh/h)	1	5	5	48	75	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	5	5	52	82	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	57				38	31
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	57				38	31
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				92	100
cM capacity (veh/h)	1547				973	1043

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	6	57	82
Volume Left	1	0	82
Volume Right	0	52	0
cSH	1547	1700	973
Volume to Capacity	0.00	0.03	0.08
Queue Length 95th (m)	0.0	0.0	2.2
Control Delay (s)	1.2	0.0	9.0
Lane LOS	A		A
Approach Delay (s)	1.2	0.0	9.0
Approach LOS			A

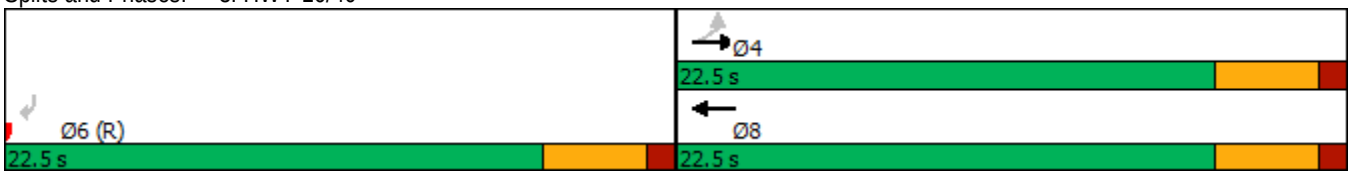
Intersection Summary			
Average Delay		5.2	
Intersection Capacity Utilization		14.2%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	292	246	265	0	0	110
Future Volume (vph)	292	246	265	0	0	110
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)	1770	1863	1863	0	0	1611
Flt Permitted	0.563					
Satd. Flow (perm)	1049	1863	1863	0	0	1611
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						431
Link Speed (k/h)		60	60		50	
Link Distance (m)		239.0	215.2		100.4	
Travel Time (s)		14.3	12.9		7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	317	267	288	0	0	120
Shared Lane Traffic (%)						
Lane Group Flow (vph)	317	267	288	0	0	120
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Turn Type	Perm	NA	NA			Perm
Protected Phases		4	8			
Permitted Phases	4					6
Minimum Split (s)	22.5	22.5	22.5			22.5
Total Split (s)	22.5	22.5	22.5			22.5
Total Split (%)	50.0%	50.0%	50.0%			50.0%
Maximum Green (s)	18.0	18.0	18.0			18.0
Yellow Time (s)	3.5	3.5	3.5			3.5
All-Red Time (s)	1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	4.5	4.5	4.5			4.5
Lead/Lag						
Lead-Lag Optimize?						
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)	0	0	0			0
Act Effct Green (s)	18.0	18.0	18.0			18.0
Actuated g/C Ratio	0.40	0.40	0.40			0.40
v/c Ratio	0.76	0.36	0.39			0.13
Control Delay	27.3	11.2	11.5			0.3
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	27.3	11.2	11.5			0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
LOS	C	B	B			A
Approach Delay		19.9	11.5		0.3	
Approach LOS		B	B		A	
Stops (vph)	225	160	175			0
Fuel Used(l)	19	12	13			1
CO Emissions (g/hr)	362	230	241			20
NOx Emissions (g/hr)	70	44	46			4
VOC Emissions (g/hr)	83	53	56			5
Dilemma Vehicles (#)	0	27	29			0
Queue Length 50th (m)	21.2	14.6	15.9			0.0
Queue Length 95th (m)	#56.8	28.2	30.5			0.0
Internal Link Dist (m)		215.0	191.2		76.4	
Turn Bay Length (m)						
Base Capacity (vph)	419	745	745			903
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	0.76	0.36	0.39			0.13

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2: and 6:SBR, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 15.1		Intersection LOS: B	
Intersection Capacity Utilization 37.6%		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: HWY 16/40



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	168	32	7	166	235	94	720	38	332	911	37
Future Volume (vph)	22	168	32	7	166	235	94	720	38	332	911	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	70.0		80.0	50.0		50.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.980			0.922			0.993			0.996	
Flt Protected		0.995			0.999			0.995			0.987	
Satd. Flow (prot)	0	1816	0	0	1716	0	0	3497	0	0	3479	0
Flt Permitted		0.948			0.993			0.594			0.578	
Satd. Flow (perm)	0	1731	0	0	1705	0	0	2088	0	0	2037	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			81			12			8	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		141.9			556.9			446.1			117.3	
Travel Time (s)		10.2			40.1			26.8			7.0	
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)	24	183	35	8	180	255	102	783	41	361	990	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	242	0	0	443	0	0	926	0	0	1391	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			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		

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)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
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		Max	Max		Max	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)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		13.3			13.3			18.2			18.2	
Actuated g/C Ratio		0.33			0.33			0.45			0.45	
v/c Ratio		0.41			0.72			0.98			1.74dl	
Control Delay		11.5			16.9			43.4			257.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.5			16.9			43.4			257.9	
LOS		B			B			D			F	
Approach Delay		11.5			16.9			43.4			257.9	
Approach LOS		B			B			D			F	
Stops (vph)		138			271			604			1039	
Fuel Used(l)		8			33			81			301	
CO Emissions (g/hr)		150			613			1505			5592	
NOx Emissions (g/hr)		29			118			291			1079	
VOC Emissions (g/hr)		35			141			347			1290	
Dilemma Vehicles (#)		0			0			90			103	
Queue Length 50th (m)		11.7			21.5			~32.4			~83.3	
Queue Length 95th (m)		24.4			44.5			#79.7			#132.3	
Internal Link Dist (m)		117.9			532.9			422.1			93.3	
Turn Bay Length (m)												
Base Capacity (vph)		787			807			941			916	
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		0.31			0.55			0.98			1.52	

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 40.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	

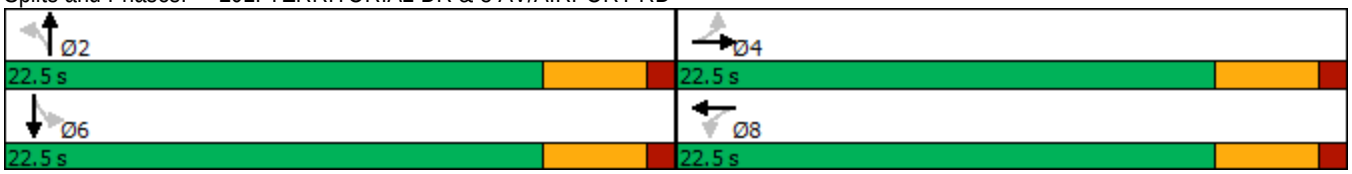
Maximum v/c Ratio: 1.52	
Intersection Signal Delay: 136.3	Intersection LOS: F
Intersection Capacity Utilization 95.8%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 201: TERRITORIAL DR & 8 AV/AIRPORT RD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	228	55	528	184	448	130	504	269	788	127	32
Future Volume (vph)	84	228	55	528	184	448	130	504	269	788	127	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	60.0		0.0	120.0		110.0	125.0		0.0
Storage Lanes	1		0	2		1	1		1	2		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.971				0.850			0.850		0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3437	0	3433	1863	1583	1770	3539	1583	3433	3433	0
Flt Permitted	0.632			0.564			0.643			0.440		
Satd. Flow (perm)	1177	3437	0	2038	1863	1583	1198	3539	1583	1590	3433	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		60				181			292		35	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		129.0			383.9			189.3			446.1	
Travel Time (s)		9.3			27.6			11.4			26.8	
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)	91	248	60	574	200	487	141	548	292	857	138	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	308	0	574	200	487	141	548	292	857	173	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)		7.2			7.2			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	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	0.6	2.0	2.0	0.6	2.0	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	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
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	Max	Max	Max	Max	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)	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	
Act Effct Green (s)	16.1	16.1		16.1	16.1	16.1	18.1	18.1	18.1	18.1	18.1	
Actuated g/C Ratio	0.37	0.37		0.37	0.37	0.37	0.42	0.42	0.42	0.42	0.42	
v/c Ratio	0.21	0.23		0.76	0.29	0.69	0.28	0.37	0.35	1.29	0.12	
Control Delay	10.4	7.7		19.6	10.6	12.9	11.1	10.1	2.9	160.7	7.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	10.4	7.7		19.6	10.6	12.9	11.1	10.1	2.9	160.7	7.2	
LOS	B	A		B	B	B	B	B	A	F	A	
Approach Delay		8.3			15.6			8.1			134.9	
Approach LOS		A			B			A			F	
Stops (vph)	54	136		417	115	234	83	316	32	601	74	
Fuel Used(l)	3	8		37	11	26	6	22	6	147	9	
CO Emissions (g/hr)	54	152		680	201	484	110	416	113	2741	175	
NOx Emissions (g/hr)	10	29		131	39	93	21	80	22	529	34	
VOC Emissions (g/hr)	12	35		157	46	112	25	96	26	632	40	
Dilemma Vehicles (#)	0	0		0	0	0	0	57	0	0	18	
Queue Length 50th (m)	4.6	6.5		19.2	10.5	17.7	7.5	15.9	0.0	~50.7	3.5	
Queue Length 95th (m)	11.8	12.6		#35.4	21.4	43.3	17.4	25.5	10.5	#79.0	7.9	
Internal Link Dist (m)		105.0			359.9			165.3			422.1	
Turn Bay Length (m)	50.0			60.0			120.0		110.0	125.0		
Base Capacity (vph)	492	1473		853	780	767	501	1481	832	665	1457	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		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	0.21		0.67	0.26	0.63	0.28	0.37	0.35	1.29	0.12	

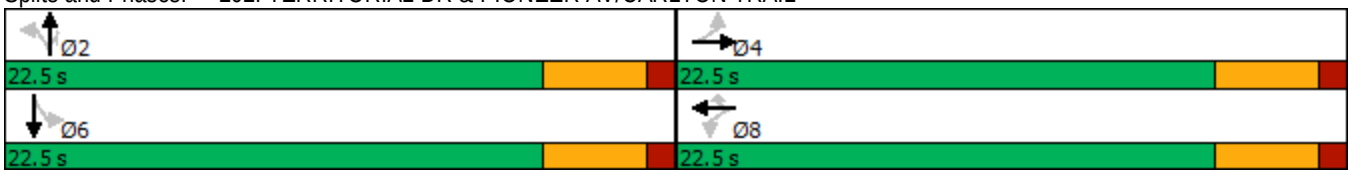
Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 43.2	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 1.29	
Intersection Signal Delay: 46.3	Intersection LOS: D
Intersection Capacity Utilization 74.5%	ICU Level of Service D
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
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: 202: TERRITORIAL DR & PIONEER AV/CARLTON TRAIL



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	292	170	38	0	298	259	0	292	0	182	68	461
Future Volume (vph)	292	170	38	0	298	259	0	292	0	182	68	461
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	0.0		120.0	50.0		0.0	0.0		0.0
Storage Lanes	1		1	0		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950									0.950	0.978	
Satd. Flow (prot)	1770	3539	1583	0	3539	1583	1863	1863	1863	1681	1731	1583
Flt Permitted	0.544									0.950	0.978	
Satd. Flow (perm)	1013	3539	1583	0	3539	1583	1863	1863	1863	1681	1731	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			97			282						501
Link Speed (k/h)		60			60			50			60	
Link Distance (m)		204.5			226.9			100.4			61.2	
Travel Time (s)		12.3			13.6			7.2			3.7	
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)	317	185	41	0	324	282	0	317	0	198	74	501
Shared Lane Traffic (%)										32%		
Lane Group Flow (vph)	317	185	41	0	324	282	0	317	0	135	137	501
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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		NA	Perm	Perm	NA	Perm	Split	NA	Perm
Protected Phases		4			8			2		6	6	
Permitted Phases	4		4	8		8	2		2			6

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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
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)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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	Min	Min	Min	Max	Max	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)	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)	18.0	18.0	18.0		18.0	18.0		15.0		18.0	18.0	18.0
Actuated g/C Ratio	0.28	0.28	0.28		0.28	0.28		0.23		0.28	0.28	0.28
v/c Ratio	1.12	0.19	0.08		0.33	0.44		0.73		0.29	0.28	0.62
Control Delay	118.8	19.1	0.6		20.2	5.3		33.7		21.3	21.1	6.2
Queue Delay	0.0	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	118.8	19.1	0.6		20.2	5.3		33.7		21.3	21.1	6.2
LOS	F	B	A		C	A		C		C	C	A
Approach Delay		75.9			13.3			33.7			11.5	
Approach LOS		E			B			C			B	
Stops (vph)	219	122	1		225	34		256		94	96	55
Fuel Used(l)	39	9	1		18	7		16		6	6	6
CO Emissions (g/hr)	724	176	13		331	135		299		106	108	120
NOx Emissions (g/hr)	140	34	3		64	26		58		21	21	23
VOC Emissions (g/hr)	167	41	3		76	31		69		25	25	28
Dilemma Vehicles (#)	0	13	0		22	0		0		0	9	0
Queue Length 50th (m)	~48.8	9.5	0.0		17.3	0.0		37.0		14.3	14.5	0.0
Queue Length 95th (m)	#96.9	17.4	0.9		28.6	16.5		62.2		29.5	29.7	21.2
Internal Link Dist (m)		180.5			202.9			76.4			37.2	
Turn Bay Length (m)	50.0		50.0			120.0						
Base Capacity (vph)	282	988	511		988	644		520		469	483	803
Starvation Cap Reductn	0	0	0		0	0		4		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	1.12	0.19	0.08		0.33	0.44		0.61		0.29	0.28	0.62

Intersection Summary

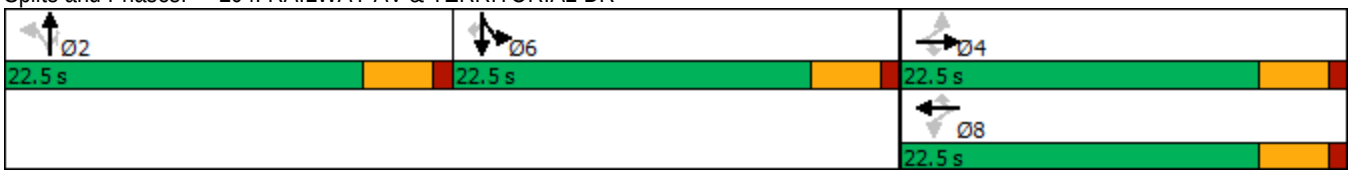
Area Type: Other
Cycle Length: 67.5
Actuated Cycle Length: 64.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.12	
Intersection Signal Delay: 30.8	Intersection LOS: C
Intersection Capacity Utilization 61.6%	ICU Level of Service B
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
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: 204: RAILWAY AV & TERRITORIAL DR



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	674	2	128	676	142	440	10	3	233	18	129
Future Volume (vph)	99	674	2	128	676	142	440	10	3	233	18	129
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	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.999			0.954	
Flt Protected	0.950			0.950				0.954			0.970	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	0	1775	0	0	1724	0
Flt Permitted	0.300			0.301				0.536			0.696	
Satd. Flow (perm)	559	3539	1583	561	3539	1583	0	997	0	0	1237	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			36			154		1			68	
Link Speed (k/h)		80			80			50			80	
Link Distance (m)		231.6			229.3			141.2			218.7	
Travel Time (s)		10.4			10.3			10.2			9.8	
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)	108	733	2	139	735	154	478	11	3	253	20	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	108	733	2	139	735	154	0	492	0	0	413	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)		3.6			3.6			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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		

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)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5			4.5	
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	Max	Max		Max	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)	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	
Act Effct Green (s)	15.0	15.0	15.0	15.0	15.0	15.0		18.1			18.1	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36		0.43			0.43	
v/c Ratio	0.55	0.58	0.00	0.70	0.59	0.23		1.15			0.72	
Control Delay	22.6	12.9	0.0	34.2	13.0	3.2		111.2			20.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	22.6	12.9	0.0	34.2	13.0	3.2		111.2			20.0	
LOS	C	B	A	C	B	A		F			B	
Approach Delay		14.1			14.4			111.2			20.0	
Approach LOS		B			B			F			B	
Stops (vph)	79	486	0	98	488	22		319			240	
Fuel Used(l)	8	47	0	11	47	4		52			26	
CO Emissions (g/hr)	150	872	1	210	873	78		967			486	
NOx Emissions (g/hr)	29	168	0	41	168	15		187			94	
VOC Emissions (g/hr)	35	201	0	48	201	18		223			112	
Dilemma Vehicles (#)	0	79	0	0	79	0		0			41	
Queue Length 50th (m)	6.3	22.7	0.0	8.6	22.8	0.0		~53.4			22.5	
Queue Length 95th (m)	#22.5	35.1	0.0	#30.8	35.3	7.7		#100.8			#64.9	
Internal Link Dist (m)		207.6			205.3			117.2			194.7	
Turn Bay Length (m)	120.0		120.0	120.0		120.0						
Base Capacity (vph)	240	1522	701	241	1522	768		429			570	
Starvation Cap Reductn	0	0	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	0.45	0.48	0.00	0.58	0.48	0.20		1.15			0.72	

Intersection Summary

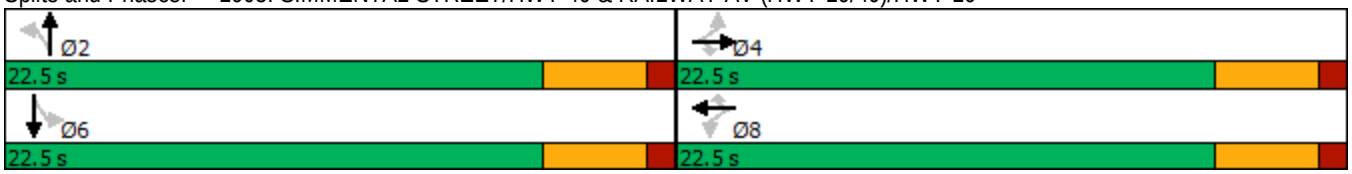
Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 42.2
Natural Cycle: 55
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.15	
Intersection Signal Delay: 32.3	Intersection LOS: C
Intersection Capacity Utilization 73.4%	ICU Level of Service D
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
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: 1603: SIMMENTAL STREET/HWY 40 & RAILWAY AV (HWY 16/40)/HWY 16



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	341	558	287	0	711
Future Volume (Veh/h)	0	341	558	287	0	711
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	371	607	312	0	773
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			61			189
pX, platoon unblocked	0.91					
vC, conflicting volume	1150	460			607	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	968	460			607	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	32			100	
cM capacity (veh/h)	229	549			967	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	371	405	514	386	386
Volume Left	0	0	0	0	0
Volume Right	371	0	312	0	0
cSH	549	1700	1700	1700	1700
Volume to Capacity	0.68	0.24	0.30	0.23	0.23
Queue Length 95th (m)	40.8	0.0	0.0	0.0	0.0
Control Delay (s)	24.2	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	24.2	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	355	0	264	558	0	246
Future Volume (Veh/h)	355	0	264	558	0	246
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	386	0	287	607	0	267
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	227					
pX, platoon unblocked						
vC, conflicting volume			386		1264	193
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			386		1264	193
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			75		100	67
cM capacity (veh/h)			1169		122	816

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	257	129	287	304	304	267
Volume Left	0	0	287	0	0	0
Volume Right	0	0	0	0	0	267
cSH	1700	1700	1169	1700	1700	816
Volume to Capacity	0.15	0.08	0.25	0.18	0.18	0.33
Queue Length 95th (m)	0.0	0.0	7.7	0.0	0.0	11.4
Control Delay (s)	0.0	0.0	9.1	0.0	0.0	11.5
Lane LOS			A			B
Approach Delay (s)	0.0		2.9			11.5
Approach LOS						B

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	771	852	415	0	222
Future Volume (Veh/h)	0	771	852	415	0	222
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	838	926	451	0	241
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			232			
pX, platoon unblocked	0.96				0.96	0.96
vC, conflicting volume	1377				1345	463
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1315				1282	366
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	60
cM capacity (veh/h)	502				151	607

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	419	419	463	463	451	241
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	451	241
cSH	1700	1700	1700	1700	1700	607
Volume to Capacity	0.25	0.25	0.27	0.27	0.27	0.40
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	15.2
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	14.8
Lane LOS						B
Approach Delay (s)	0.0		0.0			14.8
Approach LOS						B

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	114	79	28	0	77	72	10	1	1	205	11	278
Future Volume (Veh/h)	114	79	28	0	77	72	10	1	1	205	11	278
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	124	86	30	0	84	78	11	1	1	223	12	302
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		219										
pX, platoon unblocked												
vC, conflicting volume	162			116			780	511	101	474	487	123
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	162			116			780	511	101	474	487	123
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			100			94	100	100	52	97	67
cM capacity (veh/h)	1417			1473			193	425	954	466	439	928

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	240	162	13	537
Volume Left	124	0	11	223
Volume Right	30	78	1	302
cSH	1417	1473	215	646
Volume to Capacity	0.09	0.00	0.06	0.83
Queue Length 95th (m)	2.3	0.0	1.5	71.4
Control Delay (s)	4.4	0.0	22.8	32.0
Lane LOS	A		C	D
Approach Delay (s)	4.4	0.0	22.8	32.0
Approach LOS			C	D

Intersection Summary				
Average Delay	19.4			
Intersection Capacity Utilization	58.3%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	513	0	0	397	0
Future Volume (Veh/h)	0	513	0	0	397	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	558	0	0	432	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			558		279	279
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			558		279	279
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		39	100
cM capacity (veh/h)			1013		711	760

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	558	0	432
Volume Left	0	0	432
Volume Right	558	0	0
cSH	1700	1700	711
Volume to Capacity	0.33	0.00	0.61
Queue Length 95th (m)	0.0	0.0	33.2
Control Delay (s)	0.0	0.0	17.6
Lane LOS			C
Approach Delay (s)	0.0	0.0	17.6
Approach LOS			C

Intersection Summary			
Average Delay		7.7	
Intersection Capacity Utilization		60.4%	ICU Level of Service B
Analysis Period (min)		15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	114	67	58	125	167	124	115	72	247	48	27
Future Volume (Veh/h)	46	114	67	58	125	167	124	115	72	247	48	27
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	50	124	73	63	136	182	135	125	78	268	52	29
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		384										
pX, platoon unblocked												
vC, conflicting volume	318			197			668	704	98	656	650	227
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	318			197			668	704	98	656	650	227
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			95			51	62	92	0	85	96
cM capacity (veh/h)	1239			1373			275	329	938	213	354	776

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	112	135	381	198	140	294	55
Volume Left	50	0	63	135	0	268	0
Volume Right	0	73	182	0	78	0	29
cSH	1239	1700	1373	290	515	221	496
Volume to Capacity	0.04	0.08	0.05	0.68	0.27	1.33	0.11
Queue Length 95th (m)	1.0	0.0	1.2	36.7	8.8	128.2	3.0
Control Delay (s)	3.8	0.0	1.6	40.2	14.6	219.5	13.2
Lane LOS	A		A	E	B	F	B
Approach Delay (s)	1.7		1.6	29.6		187.0	
Approach LOS				D		F	

Intersection Summary				
Average Delay	58.0			
Intersection Capacity Utilization	62.7%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	47	64	103	259	129	52
Future Volume (Veh/h)	47	64	103	259	129	52
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	51	70	112	282	140	57
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	394				425	253
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	394				425	253
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				75	93
cM capacity (veh/h)	1165				560	786

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	121	394	197
Volume Left	51	0	140
Volume Right	0	282	57
cSH	1165	1700	611
Volume to Capacity	0.04	0.23	0.32
Queue Length 95th (m)	1.1	0.0	11.1
Control Delay (s)	3.7	0.0	13.7
Lane LOS	A		B
Approach Delay (s)	3.7	0.0	13.7
Approach LOS			B

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX G

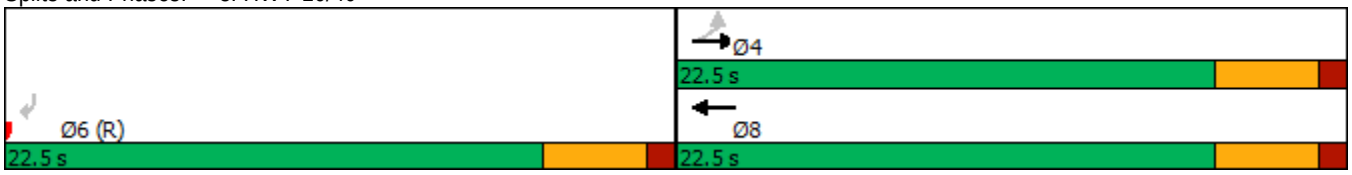
2038 Post-Development Improved Operating Conditions

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	164	152	42	0	0	206
Future Volume (vph)	164	152	42	0	0	206
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)	1770	1863	1863	0	0	1611
Flt Permitted	0.727					
Satd. Flow (perm)	1354	1863	1863	0	0	1611
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						943
Link Speed (k/h)		60	60		50	
Link Distance (m)		239.0	215.2		100.4	
Travel Time (s)		14.3	12.9		7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	178	165	46	0	0	224
Shared Lane Traffic (%)						
Lane Group Flow (vph)	178	165	46	0	0	224
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Turn Type	Perm	NA	NA			Perm
Protected Phases		4	8			
Permitted Phases	4					6
Minimum Split (s)	22.5	22.5	22.5			22.5
Total Split (s)	22.5	22.5	22.5			22.5
Total Split (%)	50.0%	50.0%	50.0%			50.0%
Maximum Green (s)	18.0	18.0	18.0			18.0
Yellow Time (s)	3.5	3.5	3.5			3.5
All-Red Time (s)	1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	4.5	4.5	4.5			4.5
Lead/Lag						
Lead-Lag Optimize?						
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)	0	0	0			0
Act Effct Green (s)	18.0	18.0	18.0			18.0
Actuated g/C Ratio	0.40	0.40	0.40			0.40
v/c Ratio	0.33	0.22	0.06			0.19
Control Delay	11.5	9.9	8.7			0.3
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	11.5	9.9	8.7			0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
LOS	B	A	A			A
Approach Delay		10.7	8.7		0.3	
Approach LOS		B	A		A	
Stops (vph)	107	92	27			0
Fuel Used(l)	8	7	2			2
CO Emissions (g/hr)	155	135	36			38
NOx Emissions (g/hr)	30	26	7			7
VOC Emissions (g/hr)	36	31	8			9
Dilemma Vehicles (#)	0	17	5			0
Queue Length 50th (m)	9.6	8.5	2.2			0.0
Queue Length 95th (m)	21.0	18.0	6.6			0.0
Internal Link Dist (m)		215.0	191.2		76.4	
Turn Bay Length (m)						
Base Capacity (vph)	541	745	745			1210
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	0.33	0.22	0.06			0.19

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2: and 6:SBR, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.33			
Intersection Signal Delay: 6.8		Intersection LOS: A	
Intersection Capacity Utilization 24.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: HWY 16/40



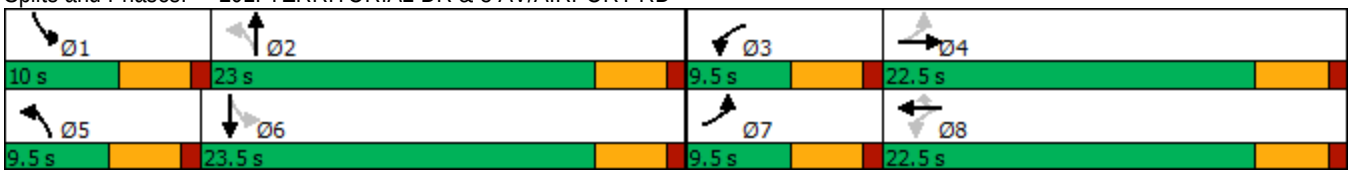
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	5	20	21	34	102	31	276	23	172	606	41
Future Volume (vph)	12	5	20	21	34	102	31	276	23	172	606	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	70.0		80.0	50.0		50.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.926				0.850		0.988			0.990	
Flt Protected		0.984			0.981		0.950			0.950		
Satd. Flow (prot)	0	1697	0	0	1827	1583	1770	3497	0	1770	3504	0
Flt Permitted		0.868			0.857		0.384			0.488		
Satd. Flow (perm)	0	1497	0	0	1596	1583	715	3497	0	909	3504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22				176		13			11	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		141.9			556.9			446.1			117.3	
Travel Time (s)		10.2			40.1			26.8			7.0	
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)	13	5	22	23	37	111	34	300	25	187	659	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	40	0	0	60	111	34	325	0	187	704	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			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		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	
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	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	
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	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	23.0		10.0	23.5	
Total Split (%)	14.6%	34.6%		14.6%	34.6%	34.6%	14.6%	35.4%		15.4%	36.2%	
Maximum Green (s)	5.0	18.0		5.0	18.0	18.0	5.0	18.5		5.5	19.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	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	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)		7.0			7.0	7.0	26.0	23.1		29.1	29.1	
Actuated g/C Ratio		0.16			0.16	0.16	0.60	0.53		0.67	0.67	
v/c Ratio		0.16			0.24	0.28	0.06	0.17		0.26	0.30	
Control Delay		12.1			18.8	3.2	3.8	8.2		4.5	5.7	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		12.1			18.8	3.2	3.8	8.2		4.5	5.7	
LOS		B			B	A	A	A		A	A	
Approach Delay		12.1			8.7			7.8			5.4	
Approach LOS		B			A			A			A	
Stops (vph)		23			50	7	13	159		62	276	
Fuel Used(l)		1			5	6	2	19		4	18	
CO Emissions (g/hr)		25			90	108	32	346		81	341	
NOx Emissions (g/hr)		5			17	21	6	67		16	66	
VOC Emissions (g/hr)		6			21	25	7	80		19	79	
Dilemma Vehicles (#)		0			0	0	0	31		0	63	
Queue Length 50th (m)		1.3			4.4	0.0	0.8	8.0		4.6	10.0	
Queue Length 95th (m)		7.3			12.0	4.5	3.0	15.4		11.4	33.4	
Internal Link Dist (m)		117.9			532.9			422.1			93.3	
Turn Bay Length (m)							70.0			50.0		
Base Capacity (vph)		633			661	759	547	1859		716	2342	
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		0.06			0.09	0.15	0.06	0.17		0.26	0.30	

Intersection Summary	
Area Type:	Other
Cycle Length: 65	
Actuated Cycle Length: 43.6	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.30	
Intersection Signal Delay: 6.6	Intersection LOS: A
Intersection Capacity Utilization 42.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 201: TERRITORIAL DR & 8 AV/AIRPORT RD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	106	44	269	38	86	45	292	118	442	143	68
Future Volume (vph)	53	106	44	269	38	86	45	292	118	442	143	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	60.0		0.0	120.0		110.0	125.0		0.0
Storage Lanes	1		0	2		1	1		1	2		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.956				0.850			0.850		0.952	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3383	0	3433	1863	1583	1770	3539	1583	3433	3369	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3383	0	3433	1863	1583	1770	3539	1583	3433	3369	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48				218			218		74	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		129.0			383.9			189.3			446.1	
Travel Time (s)		9.3			27.6			11.4			26.8	
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)	58	115	48	292	41	93	49	317	128	480	155	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	58	163	0	292	41	93	49	317	128	480	229	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)		7.2			7.2			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	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	0.6	2.0	2.0	0.6	2.0	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	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

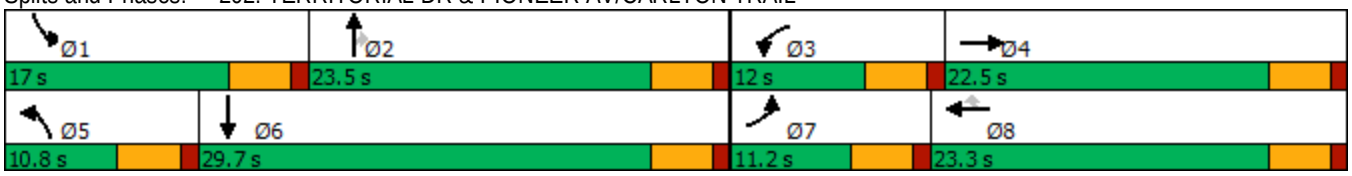
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	
Total Split (s)	11.2	22.5		12.0	23.3	23.3	10.8	23.5	23.5	17.0	29.7	
Total Split (%)	14.9%	30.0%		16.0%	31.1%	31.1%	14.4%	31.3%	31.3%	22.7%	39.6%	
Maximum Green (s)	6.7	18.0		7.5	18.8	18.8	6.3	19.0	19.0	12.5	25.2	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	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	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		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	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	6.4	7.6		7.5	13.0	13.0	6.1	19.0	19.0	12.2	29.3	
Actuated g/C Ratio	0.10	0.12		0.12	0.20	0.20	0.09	0.30	0.30	0.19	0.46	
v/c Ratio	0.33	0.37		0.73	0.11	0.19	0.29	0.30	0.21	0.74	0.15	
Control Delay	33.0	21.1		40.6	24.9	0.8	32.6	18.9	1.2	33.0	8.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	33.0	21.1		40.6	24.9	0.8	32.6	18.9	1.2	33.0	8.7	
LOS	C	C		D	C	A	C	B	A	C	A	
Approach Delay		24.2			30.4			15.7			25.2	
Approach LOS		C			C			B			C	
Stops (vph)	50	93		237	34	0	44	215	2	390	83	
Fuel Used(l)	3	6		24	3	3	3	16	2	41	12	
CO Emissions (g/hr)	58	118		437	54	59	61	297	39	761	228	
NOx Emissions (g/hr)	11	23		84	10	11	12	57	8	147	44	
VOC Emissions (g/hr)	13	27		101	12	14	14	69	9	176	53	
Dilemma Vehicles (#)	0	0		0	0	0	0	22	0	0	16	
Queue Length 50th (m)	6.9	7.1		18.6	4.7	0.0	5.9	16.1	0.0	29.4	6.3	
Queue Length 95th (m)	17.6	15.2		#36.7	12.5	0.0	15.8	27.1	2.0	#50.3	13.5	
Internal Link Dist (m)		105.0			359.9			165.3			422.1	
Turn Bay Length (m)	50.0			60.0			120.0		110.0	125.0		
Base Capacity (vph)	184	982		400	545	617	173	1046	621	668	1578	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		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	0.32	0.17		0.73	0.08	0.15	0.28	0.30	0.21	0.72	0.15	

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 64.3	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 23.7	Intersection LOS: C
Intersection Capacity Utilization 47.7%	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: 202: TERRITORIAL DR & PIONEER AV/CARLTON TRAIL



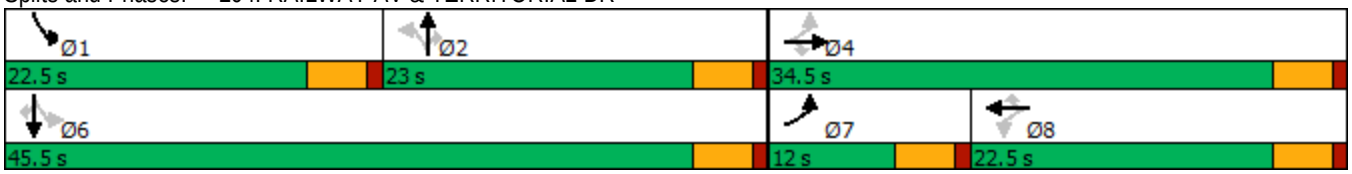
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	164	83	73	0	168	156	0	164	0	148	132	182
Future Volume (vph)	164	83	73	0	168	156	0	164	0	148	132	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	0.0		120.0	50.0		0.0	0.0		0.0
Storage Lanes	1		1	0		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	3539	1583	0	3539	1583	1863	1863	1863	1770	1863	1583
Flt Permitted	0.424									0.483		
Satd. Flow (perm)	790	3539	1583	0	3539	1583	1863	1863	1863	900	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			170						198
Link Speed (k/h)		60			60			50			60	
Link Distance (m)		204.5			226.9			100.4			61.2	
Travel Time (s)		12.3			13.6			7.2			3.7	
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)	178	90	79	0	183	170	0	178	0	161	143	198
Shared Lane Traffic (%)												
Lane Group Flow (vph)	178	90	79	0	183	170	0	178	0	161	143	198
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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	pm+pt	NA	Perm		NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	2	2	2	1	6	6
Switch Phase												
Minimum Initial (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
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	12.0	34.5	34.5	22.5	22.5	22.5	23.0	23.0	23.0	22.5	45.5	45.5
Total Split (%)	15.0%	43.1%	43.1%	28.1%	28.1%	28.1%	28.8%	28.8%	28.8%	28.1%	56.9%	56.9%
Maximum Green (s)	7.5	30.0	30.0	18.0	18.0	18.0	18.5	18.5	18.5	18.0	41.0	41.0
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)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag	Lag	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	None	None	None	None	None	None	Min	Min	Min	Max	Max	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
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
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	21.0	21.0	21.0		9.0	9.0		18.5		41.0	41.0	41.0
Actuated g/C Ratio	0.30	0.30	0.30		0.13	0.13		0.26		0.58	0.58	0.58
v/c Ratio	0.53	0.09	0.15		0.41	0.49		0.37		0.22	0.13	0.20
Control Delay	25.8	18.2	5.4		31.3	10.3		24.6		8.2	7.6	1.8
Queue Delay	0.0	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	25.8	18.2	5.4		31.3	10.3		24.6		8.2	7.6	1.8
LOS	C	B	A		C	B		C		A	A	A
Approach Delay		19.2			21.2			24.6			5.5	
Approach LOS		B			C			C			A	
Stops (vph)	123	55	14		147	28		129		64	56	14
Fuel Used(l)	10	4	2		12	5		8		4	3	2
CO Emissions (g/hr)	189	82	38		225	97		141		70	61	31
NOx Emissions (g/hr)	36	16	7		43	19		27		14	12	6
VOC Emissions (g/hr)	44	19	9		52	22		32		16	14	7
Dilemma Vehicles (#)	0	6	0		11	0		0		0	9	0
Queue Length 50th (m)	19.3	4.7	0.0		12.6	0.0		20.4		9.5	8.3	0.0
Queue Length 95th (m)	35.2	9.7	8.3		21.8	15.9		38.7		19.2	17.2	8.1
Internal Link Dist (m)		180.5			202.9			76.4			37.2	
Turn Bay Length (m)	50.0		50.0			120.0						
Base Capacity (vph)	337	1495	716		897	528		485		740	1075	997
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	0.53	0.06	0.11		0.20	0.32		0.37		0.22	0.13	0.20

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 71	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 15.4	Intersection LOS: B
Intersection Capacity Utilization 45.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 204: RAILWAY AV & TERRITORIAL DR



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	464	5	90	348	34	64	2	2	98	5	33
Future Volume (vph)	32	464	5	90	348	34	64	2	2	98	5	33
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	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.925			0.868	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1723	0	1770	1617	0
Flt Permitted	0.528			0.314			0.730			0.720		
Satd. Flow (perm)	984	3539	1583	585	3539	1583	1360	1723	0	1341	1617	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			176			176		2			36	
Link Speed (k/h)		80			80			50			80	
Link Distance (m)		231.6			229.3			141.2			218.7	
Travel Time (s)		10.4			10.3			10.2			9.8	
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)	35	504	5	98	378	37	70	2	2	107	5	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	35	504	5	98	378	37	70	4	0	107	41	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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		

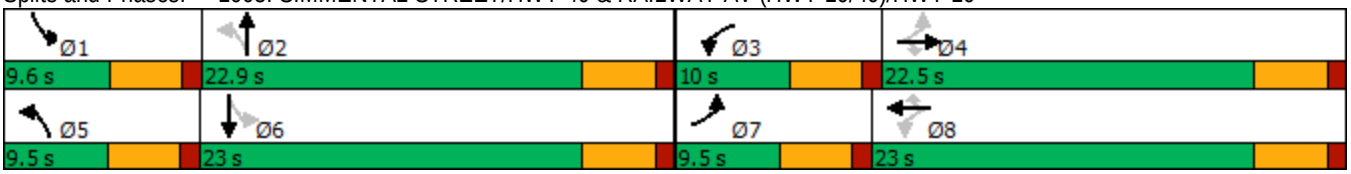
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	22.5	10.0	23.0	23.0	9.5	22.9		9.6	23.0	
Total Split (%)	14.6%	34.6%	34.6%	15.4%	35.4%	35.4%	14.6%	35.2%		14.8%	35.4%	
Maximum Green (s)	5.0	18.0	18.0	5.5	18.5	18.5	5.0	18.4		5.1	18.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	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	
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	
Walk Time (s)		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	
Pedestrian Calls (#/hr)		0	0		0	0		0			0	
Act Effct Green (s)	17.0	13.3	13.3	19.2	17.3	17.3	23.0	19.4		24.0	21.2	
Actuated g/C Ratio	0.30	0.24	0.24	0.34	0.31	0.31	0.41	0.34		0.42	0.38	
v/c Ratio	0.09	0.60	0.01	0.31	0.35	0.06	0.12	0.01		0.18	0.07	
Control Delay	12.0	23.5	0.0	14.5	17.4	0.2	10.9	13.8		11.3	7.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	12.0	23.5	0.0	14.5	17.4	0.2	10.9	13.8		11.3	7.8	
LOS	B	C	A	B	B	A	B	B		B	A	
Approach Delay		22.6			15.6			11.0			10.3	
Approach LOS		C			B			B			B	
Stops (vph)	21	380	0	55	248	0	38	4		56	13	
Fuel Used(l)	2	39	0	6	25	1	2	0		6	2	
CO Emissions (g/hr)	39	719	2	108	468	12	42	3		107	30	
NOx Emissions (g/hr)	7	139	0	21	90	2	8	1		21	6	
VOC Emissions (g/hr)	9	166	0	25	108	3	10	1		25	7	
Dilemma Vehicles (#)	0	40	0	0	30	0	0	0		0	3	
Queue Length 50th (m)	2.5	28.2	0.0	7.2	15.3	0.0	4.3	0.2		6.8	0.4	
Queue Length 95th (m)	7.0	41.9	0.0	15.3	31.1	0.0	11.7	2.1		16.5	6.7	
Internal Link Dist (m)		207.6			205.3			117.2			194.7	
Turn Bay Length (m)	120.0		120.0	120.0		120.0						
Base Capacity (vph)	369	1183	646	320	1319	700	592	591		610	630	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	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	0.09	0.43	0.01	0.31	0.29	0.05	0.12	0.01		0.18	0.07	

Intersection Summary

Area Type: Other
Cycle Length: 65
Actuated Cycle Length: 56.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 17.7	Intersection LOS: B
Intersection Capacity Utilization 41.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1603: SIMMENTAL STREET/HWY 40 & RAILWAY AV (HWY 16/40)/HWY 16



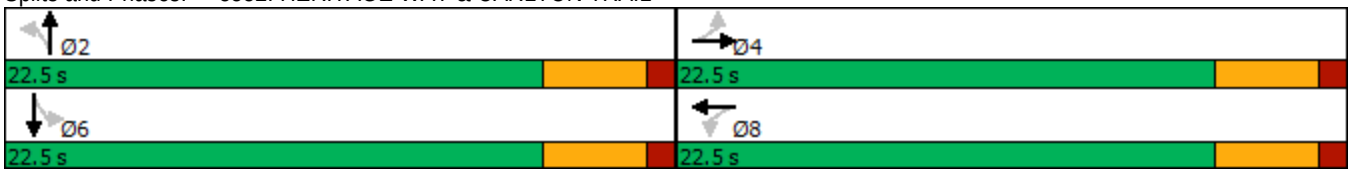
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	113	78	21	17	20	49	27	18	166	59	9
Future Volume (vph)	29	113	78	21	17	20	49	27	18	166	59	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.947			0.953			0.971			0.994	
Flt Protected		0.993			0.982			0.975			0.966	
Satd. Flow (prot)	0	3328	0	0	1743	0	0	3351	0	0	3398	0
Flt Permitted		0.907			0.776			0.781			0.740	
Satd. Flow (perm)	0	3040	0	0	1378	0	0	2684	0	0	2603	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		85			22			20			10	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		383.9			25.2			218.3			77.0	
Travel Time (s)		27.6			1.8			15.7			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)	32	123	85	23	18	22	53	29	20	180	64	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	240	0	0	63	0	0	102	0	0	254	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)		7.2			7.2			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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
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		Min	Min		Min	Min	
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)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		6.7			6.7			11.8			11.8	
Actuated g/C Ratio		0.27			0.27			0.48			0.48	
v/c Ratio		0.27			0.16			0.08			0.20	
Control Delay		5.4			5.9			5.0			6.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		5.4			5.9			5.0			6.0	
LOS		A			A			A			A	
Approach Delay		5.4			5.9			5.0			6.0	
Approach LOS		A			A			A			A	
Stops (vph)		81			26			40			111	
Fuel Used(l)		11			4			3			5	
CO Emissions (g/hr)		201			78			60			98	
NOx Emissions (g/hr)		39			15			12			19	
VOC Emissions (g/hr)		46			18			14			23	
Dilemma Vehicles (#)		0			0			0			0	
Queue Length 50th (m)		2.0			1.0			0.9			3.0	
Queue Length 95th (m)		5.8			4.6			3.1			7.0	
Internal Link Dist (m)		359.9			1.2			194.3			53.0	
Turn Bay Length (m)												
Base Capacity (vph)		2240			1011			2114			2048	
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		0.11			0.06			0.05			0.12	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 24.7			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.27			
Intersection Signal Delay: 5.6		Intersection LOS: A	
Intersection Capacity Utilization 37.7%		ICU Level of Service A	

Analysis Period (min) 15

Splits and Phases: 5552: HERITAGE WAY & CARLTON TRAIL



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	170	301	176	0	456
Future Volume (Veh/h)	0	170	301	176	0	456
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	185	327	191	0	496
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			61			189
pX, platoon unblocked						
vC, conflicting volume	670	259			327	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	670	259			327	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	75			100	
cM capacity (veh/h)	390	740			1229	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	185	218	300	248	248
Volume Left	0	0	0	0	0
Volume Right	185	0	191	0	0
cSH	740	1700	1700	1700	1700
Volume to Capacity	0.25	0.13	0.18	0.15	0.15
Queue Length 95th (m)	7.9	0.0	0.0	0.0	0.0
Control Delay (s)	11.5	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.5	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	234	0	42	333	0	152
Future Volume (Veh/h)	234	0	42	333	0	152
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	254	0	46	362	0	165
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	227					
pX, platoon unblocked						
vC, conflicting volume			254		527	127
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			254		527	127
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		100	82
cM capacity (veh/h)			1308		464	900

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	169	85	46	181	181	165
Volume Left	0	0	46	0	0	0
Volume Right	0	0	0	0	0	165
cSH	1700	1700	1308	1700	1700	900
Volume to Capacity	0.10	0.05	0.04	0.11	0.11	0.18
Queue Length 95th (m)	0.0	0.0	0.9	0.0	0.0	5.4
Control Delay (s)	0.0	0.0	7.9	0.0	0.0	9.9
Lane LOS			A			A
Approach Delay (s)	0.0		0.9			9.9
Approach LOS						A

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	501	401	50	0	82
Future Volume (Veh/h)	0	501	401	50	0	82
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	545	436	54	0	89
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			232			
pX, platoon unblocked	0.95				0.95	0.95
vC, conflicting volume	490				708	218
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	363				593	77
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	90
cM capacity (veh/h)	1135				416	921

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	272	272	218	218	54	89
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	54	89
cSH	1700	1700	1700	1700	1700	921
Volume to Capacity	0.16	0.16	0.13	0.13	0.03	0.10
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	2.6
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.3
Lane LOS						A
Approach Delay (s)	0.0		0.0			9.3
Approach LOS						A

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	22	1	0	35	11	0	0	0	160	0	97
Future Volume (Veh/h)	18	22	1	0	35	11	0	0	0	160	0	97
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	20	24	1	0	38	12	0	0	0	174	0	105
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		219										
pX, platoon unblocked												
vC, conflicting volume	50			25			214	114	24	108	109	44
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	50			25			214	114	24	108	109	44
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	80	100	90
cM capacity (veh/h)	1557			1589			661	766	1052	862	771	1026

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	45	50	0	174	105
Volume Left	20	0	0	174	0
Volume Right	1	12	0	0	105
cSH	1557	1589	1700	862	1026
Volume to Capacity	0.01	0.00	0.00	0.20	0.10
Queue Length 95th (m)	0.3	0.0	0.0	6.0	2.7
Control Delay (s)	3.3	0.0	0.0	10.2	8.9
Lane LOS	A		A	B	A
Approach Delay (s)	3.3	0.0	0.0	9.7	
Approach LOS			A	A	

Intersection Summary				
Average Delay	7.7			
Intersection Capacity Utilization	24.4%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	185	0	0	152	0
Future Volume (Veh/h)	0	185	0	0	152	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	201	0	0	165	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			201		100	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			201		100	100
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		82	100
cM capacity (veh/h)			1371		898	955

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	201	0	165
Volume Left	0	0	165
Volume Right	201	0	0
cSH	1700	1700	898
Volume to Capacity	0.12	0.00	0.18
Queue Length 95th (m)	0.0	0.0	5.4
Control Delay (s)	0.0	0.0	9.9
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.9
Approach LOS			A

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	26.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	5	5	48	75	0
Future Volume (Veh/h)	1	5	5	48	75	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	5	5	52	82	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	57				38	31
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	57				38	31
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				92	100
cM capacity (veh/h)	1547				973	1043

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	6	57	82
Volume Left	1	0	82
Volume Right	0	52	0
cSH	1547	1700	973
Volume to Capacity	0.00	0.03	0.08
Queue Length 95th (m)	0.0	0.0	2.2
Control Delay (s)	1.2	0.0	9.0
Lane LOS	A		A
Approach Delay (s)	1.2	0.0	9.0
Approach LOS			A

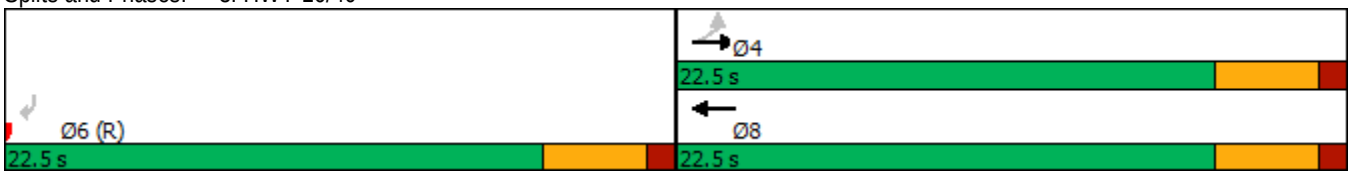
Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	14.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	292	246	265	0	0	110
Future Volume (vph)	292	246	265	0	0	110
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)	1770	1863	1863	0	0	1611
Flt Permitted	0.563					
Satd. Flow (perm)	1049	1863	1863	0	0	1611
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						431
Link Speed (k/h)		60	60		50	
Link Distance (m)		239.0	215.2		100.4	
Travel Time (s)		14.3	12.9		7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	317	267	288	0	0	120
Shared Lane Traffic (%)						
Lane Group Flow (vph)	317	267	288	0	0	120
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Turn Type	Perm	NA	NA			Perm
Protected Phases		4	8			
Permitted Phases	4					6
Minimum Split (s)	22.5	22.5	22.5			22.5
Total Split (s)	22.5	22.5	22.5			22.5
Total Split (%)	50.0%	50.0%	50.0%			50.0%
Maximum Green (s)	18.0	18.0	18.0			18.0
Yellow Time (s)	3.5	3.5	3.5			3.5
All-Red Time (s)	1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	4.5	4.5	4.5			4.5
Lead/Lag						
Lead-Lag Optimize?						
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)	0	0	0			0
Act Effct Green (s)	18.0	18.0	18.0			18.0
Actuated g/C Ratio	0.40	0.40	0.40			0.40
v/c Ratio	0.76	0.36	0.39			0.13
Control Delay	27.3	11.2	11.5			0.3
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	27.3	11.2	11.5			0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
LOS	C	B	B			A
Approach Delay		19.9	11.5		0.3	
Approach LOS		B	B		A	
Stops (vph)	225	160	175			0
Fuel Used(l)	19	12	13			1
CO Emissions (g/hr)	362	230	241			20
NOx Emissions (g/hr)	70	44	46			4
VOC Emissions (g/hr)	83	53	56			5
Dilemma Vehicles (#)	0	27	29			0
Queue Length 50th (m)	21.2	14.6	15.9			0.0
Queue Length 95th (m)	#56.8	28.2	30.5			0.0
Internal Link Dist (m)		215.0	191.2		76.4	
Turn Bay Length (m)						
Base Capacity (vph)	419	745	745			903
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	0.76	0.36	0.39			0.13

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2: and 6:SBR, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 15.1		Intersection LOS: B	
Intersection Capacity Utilization 37.6%		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: HWY 16/40



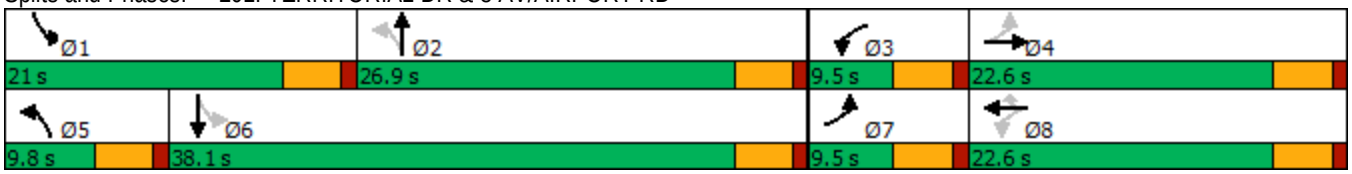
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	168	32	7	166	235	94	720	38	332	911	37
Future Volume (vph)	22	168	32	7	166	235	94	720	38	332	911	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	70.0		80.0	50.0		50.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.980				0.850		0.993			0.994	
Flt Protected		0.995			0.998		0.950			0.950		
Satd. Flow (prot)	0	1816	0	0	1859	1583	1770	3514	0	1770	3518	0
Flt Permitted		0.954			0.987		0.278			0.195		
Satd. Flow (perm)	0	1742	0	0	1839	1583	518	3514	0	363	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				255		7			6	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		141.9			556.9			446.1			117.3	
Travel Time (s)		10.2			40.1			26.8			7.0	
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)	24	183	35	8	180	255	102	783	41	361	990	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	242	0	0	188	255	102	824	0	361	1030	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			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		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	
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	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	
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	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.6		9.5	22.6	22.6	9.8	26.9		21.0	38.1	
Total Split (%)	11.9%	28.3%		11.9%	28.3%	28.3%	12.3%	33.6%		26.3%	47.6%	
Maximum Green (s)	5.0	18.1		5.0	18.1	18.1	5.3	22.4		16.5	33.6	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	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	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)		13.4			13.4	13.4	29.5	24.2		41.9	34.4	
Actuated g/C Ratio		0.21			0.21	0.21	0.46	0.38		0.65	0.53	
v/c Ratio		0.65			0.49	0.48	0.30	0.62		0.69	0.55	
Control Delay		31.5			27.5	6.7	9.4	20.2		15.6	12.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		31.5			27.5	6.7	9.4	20.2		15.6	12.6	
LOS		C			C	A	A	C		B	B	
Approach Delay		31.5			15.5			19.0			13.4	
Approach LOS		C			B			B			B	
Stops (vph)		182			142	32	50	588		159	593	
Fuel Used(l)		12			16	14	6	60		13	38	
CO Emissions (g/hr)		232			297	267	110	1118		233	706	
NOx Emissions (g/hr)		45			57	52	21	216		45	136	
VOC Emissions (g/hr)		54			69	62	25	258		54	163	
Dilemma Vehicles (#)		0			0	0	0	57		0	73	
Queue Length 50th (m)		27.5			21.6	0.0	4.1	44.4		17.0	45.0	
Queue Length 95th (m)		49.0			39.0	16.4	10.6	72.7		49.0	71.2	
Internal Link Dist (m)		117.9			532.9			422.1			93.3	
Turn Bay Length (m)							70.0			50.0		
Base Capacity (vph)		502			522	632	341	1322		600	1882	
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		0.48			0.36	0.40	0.30	0.62		0.60	0.55	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 64.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 16.9	Intersection LOS: B
Intersection Capacity Utilization 75.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 201: TERRITORIAL DR & 8 AV/AIRPORT RD



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	228	55	528	184	448	130	504	269	788	127	32
Future Volume (vph)	84	228	55	528	184	448	130	504	269	788	127	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	60.0		0.0	120.0		110.0	125.0		0.0
Storage Lanes	1		0	2		1	1		1	2		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.971				0.850			0.850		0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3437	0	3433	1863	1583	1770	3539	1583	3433	3433	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3437	0	3433	1863	1583	1770	3539	1583	3433	3433	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22				487			292		30	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		129.0			383.9			189.3			446.1	
Travel Time (s)		9.3			27.6			11.4			26.8	
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)	91	248	60	574	200	487	141	548	292	857	138	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	308	0	574	200	487	141	548	292	857	173	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)		7.2			7.2			7.2			7.2	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	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	0.6	2.0	2.0	0.6	2.0	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	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	
Total Split (s)	13.5	22.5		27.4	36.4	36.4	21.8	27.1	27.1	38.0	43.3	
Total Split (%)	11.7%	19.6%		23.8%	31.7%	31.7%	19.0%	23.6%	23.6%	33.0%	37.7%	
Maximum Green (s)	9.0	18.0		22.9	31.9	31.9	17.3	22.6	22.6	33.5	38.8	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	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	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		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	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	8.6	14.1		21.2	26.6	26.6	13.4	23.2	23.2	30.3	40.1	
Actuated g/C Ratio	0.08	0.13		0.20	0.25	0.25	0.13	0.22	0.22	0.28	0.38	
v/c Ratio	0.64	0.65		0.85	0.43	0.64	0.64	0.71	0.51	0.88	0.13	
Control Delay	70.8	48.4		54.6	37.2	7.3	58.9	46.3	8.1	48.5	20.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	70.8	48.4		54.6	37.2	7.3	58.9	46.3	8.1	48.5	20.0	
LOS	E	D		D	D	A	E	D	A	D	C	
Approach Delay		53.5			33.6			36.7			43.7	
Approach LOS		D			C			D			D	
Stops (vph)	76	241		479	147	41	119	451	30	711	84	
Fuel Used(l)	7	19		52	15	20	12	41	7	83	11	
CO Emissions (g/hr)	136	361		970	284	368	221	759	131	1541	211	
NOx Emissions (g/hr)	26	70		187	55	71	43	146	25	297	41	
VOC Emissions (g/hr)	31	83		224	66	85	51	175	30	355	49	
Dilemma Vehicles (#)	0	0		0	0	0	0	23	0	0	7	
Queue Length 50th (m)	20.6	33.2		65.2	38.4	0.0	31.1	62.8	0.0	94.1	11.1	
Queue Length 95th (m)	#45.3	48.5		#95.2	60.6	27.2	52.5	86.2	23.7	#126.6	20.7	
Internal Link Dist (m)		105.0			359.9			165.3			422.1	
Turn Bay Length (m)	50.0			60.0			120.0		110.0	125.0		
Base Capacity (vph)	150	601		741	560	816	288	767	571	1084	1306	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		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	0.61	0.51		0.77	0.36	0.60	0.49	0.71	0.51	0.79	0.13	

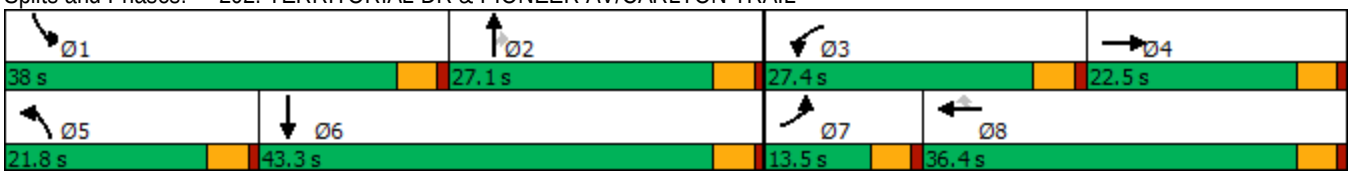
Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 106.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 39.4	Intersection LOS: D
Intersection Capacity Utilization 74.5%	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: 202: TERRITORIAL DR & PIONEER AV/CARLTON TRAIL



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	292	170	38	0	298	259	0	292	0	182	68	461
Future Volume (vph)	292	170	38	0	298	259	0	292	0	182	68	461
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	0.0		120.0	50.0		0.0	0.0		0.0
Storage Lanes	1		1	0		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	3539	1583	0	3539	1583	1863	1863	1863	1770	1863	1583
Flt Permitted	0.337									0.261		
Satd. Flow (perm)	628	3539	1583	0	3539	1583	1863	1863	1863	486	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			80			282						480
Link Speed (k/h)		60			60			50			60	
Link Distance (m)		204.5			226.9			100.4			61.2	
Travel Time (s)		12.3			13.6			7.2			3.7	
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)	317	185	41	0	324	282	0	317	0	198	74	501
Shared Lane Traffic (%)												
Lane Group Flow (vph)	317	185	41	0	324	282	0	317	0	198	74	501
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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	pm+pt	NA	Perm		NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	2	2	2	1	6	6
Switch Phase												
Minimum Initial (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
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	14.0	36.5	36.5	22.5	22.5	22.5	22.8	22.8	22.8	22.5	45.3	45.3
Total Split (%)	17.1%	44.6%	44.6%	27.5%	27.5%	27.5%	27.9%	27.9%	27.9%	27.5%	55.4%	55.4%
Maximum Green (s)	9.5	32.0	32.0	18.0	18.0	18.0	18.3	18.3	18.3	18.0	40.8	40.8
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)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag	Lag	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	None	None	None	None	None	None	Min	Min	Min	Max	Max	Max
Act Effct Green (s)	26.5	26.5	26.5		12.5	12.5		18.3		40.9	40.9	40.9
Actuated g/C Ratio	0.35	0.35	0.35		0.16	0.16		0.24		0.54	0.54	0.54
v/c Ratio	0.88	0.15	0.07		0.56	0.57		0.71		0.35	0.07	0.47
Control Delay	48.4	17.3	1.4		33.2	8.8		37.8		11.9	9.7	3.0
Queue Delay	0.0	0.0	0.0		0.0	0.0		0.6		0.0	0.0	0.0
Total Delay	48.4	17.3	1.4		33.2	8.8		38.3		11.9	9.7	3.0
LOS	D	B	A		C	A		D		B	A	A
Approach Delay		34.2			21.8			38.3			5.9	
Approach LOS		C			C			D			A	
Stops (vph)	204	108	2		259	35		252		92	33	39
Fuel Used(l)	23	9	1		22	8		17		6	2	5
CO Emissions (g/hr)	421	163	14		406	149		315		104	36	89
NOx Emissions (g/hr)	81	31	3		78	29		61		20	7	17
VOC Emissions (g/hr)	97	38	3		94	34		73		24	8	20
Dilemma Vehicles (#)	0	11	0		19	0		0		0	4	0
Queue Length 50th (m)	37.7	10.0	0.0		24.1	0.0		43.9		14.5	5.0	1.4
Queue Length 95th (m)	#79.6	16.9	2.0		36.6	19.4		#85.4		29.2	12.4	16.4
Internal Link Dist (m)		180.5			202.9			76.4			37.2	
Turn Bay Length (m)	50.0		50.0			120.0						
Base Capacity (vph)	360	1484	710		835	588		446		562	996	1069
Starvation Cap Reductn	0	0	0		0	0		17		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	0.88	0.12	0.06		0.39	0.48		0.74		0.35	0.07	0.47

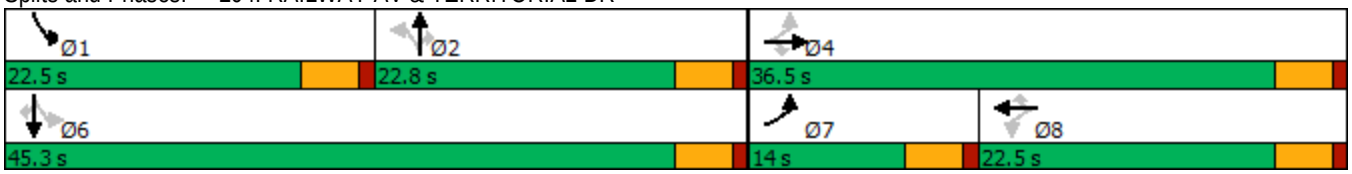
Intersection Summary			
Area Type:	Other		
Cycle Length: 81.8			
Actuated Cycle Length: 76.4			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 21.7		Intersection LOS: C	
Intersection Capacity Utilization 64.9%		ICU Level of Service C	

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 204: RAILWAY AV & TERRITORIAL DR



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	674	2	128	676	142	440	10	3	233	18	129
Future Volume (vph)	99	674	2	128	676	142	440	10	3	233	18	129
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	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.968			0.869	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1803	0	1770	1619	0
Flt Permitted	0.237			0.237			0.585			0.748		
Satd. Flow (perm)	441	3539	1583	441	3539	1583	1090	1803	0	1393	1619	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164			164		3			140	
Link Speed (k/h)		80			80			50			80	
Link Distance (m)		231.6			229.3			141.2			218.7	
Travel Time (s)		10.4			10.3			10.2			9.8	
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)	108	733	2	139	735	154	478	11	3	253	20	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	108	733	2	139	735	154	478	14	0	253	160	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)		3.6			3.6			3.6			3.6	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		

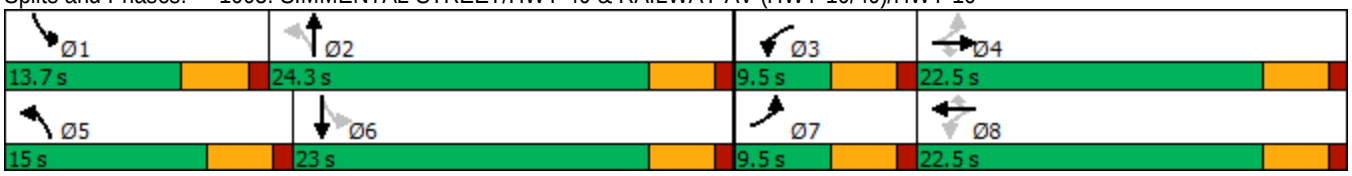
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	15.0	24.3		13.7	23.0	
Total Split (%)	13.6%	32.1%	32.1%	13.6%	32.1%	32.1%	21.4%	34.7%		19.6%	32.9%	
Maximum Green (s)	5.0	18.0	18.0	5.0	18.0	18.0	10.5	19.8		9.2	18.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	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	
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	
Walk Time (s)		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	
Pedestrian Calls (#/hr)		0	0		0	0		0			0	
Act Effct Green (s)	20.8	16.9	16.9	20.8	16.9	16.9	31.1	20.5		27.4	18.7	
Actuated g/C Ratio	0.31	0.25	0.25	0.31	0.25	0.25	0.46	0.31		0.41	0.28	
v/c Ratio	0.46	0.82	0.00	0.59	0.82	0.30	0.78	0.03		0.41	0.29	
Control Delay	20.8	33.1	0.0	26.4	33.3	5.3	25.6	16.5		13.6	7.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	20.8	33.1	0.0	26.4	33.3	5.3	25.6	16.5		13.6	7.2	
LOS	C	C	A	C	C	A	C	B		B	A	
Approach Delay		31.5			28.2			25.3			11.1	
Approach LOS		C			C			C			B	
Stops (vph)	65	589	0	87	590	19	306	9		147	32	
Fuel Used(l)	7	63	0	10	63	4	21	1		15	5	
CO Emissions (g/hr)	132	1177	1	184	1178	79	398	10		277	96	
NOx Emissions (g/hr)	26	227	0	36	227	15	77	2		53	19	
VOC Emissions (g/hr)	31	271	0	42	272	18	92	2		64	22	
Dilemma Vehicles (#)	0	49	0	0	49	0	0	0		0	11	
Queue Length 50th (m)	9.3	49.7	0.0	12.3	49.8	0.0	44.5	1.1		20.0	2.1	
Queue Length 95th (m)	19.2	#76.0	0.0	#25.2	#76.4	11.6	#90.1	5.0		34.7	15.3	
Internal Link Dist (m)		207.6			205.3			117.2			194.7	
Turn Bay Length (m)	120.0		120.0	120.0		120.0						
Base Capacity (vph)	236	957	547	236	957	547	612	553		631	551	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	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	0.46	0.77	0.00	0.59	0.77	0.28	0.78	0.03		0.40	0.29	

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 67.1	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 26.1	Intersection LOS: C
Intersection Capacity Utilization 74.0%	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: 1603: SIMMENTAL STREET/HWY 40 & RAILWAY AV (HWY 16/40)/HWY 16



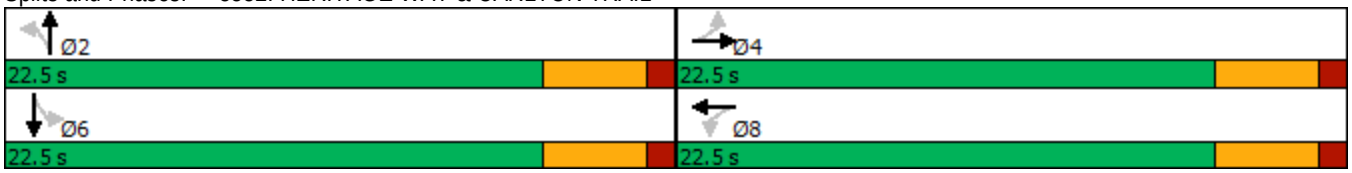
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	114	67	58	125	167	124	115	72	247	48	27
Future Volume (vph)	46	114	67	58	125	167	124	115	72	247	48	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.956			0.936			0.965			0.988	
Flt Protected		0.990			0.992			0.980			0.963	
Satd. Flow (prot)	0	3350	0	0	1730	0	0	3347	0	0	3367	0
Flt Permitted		0.857			0.899			0.726			0.712	
Satd. Flow (perm)	0	2900	0	0	1567	0	0	2480	0	0	2490	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		73			122			78			25	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		383.9			25.2			218.3			77.0	
Travel Time (s)		27.6			1.8			15.7			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)	50	124	73	63	136	182	135	125	78	268	52	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	247	0	0	381	0	0	338	0	0	349	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)		7.2			7.2			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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
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		Min	Min		Min	Min	
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)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		10.7			10.7			10.2			10.2	
Actuated g/C Ratio		0.35			0.35			0.34			0.34	
v/c Ratio		0.23			0.60			0.38			0.41	
Control Delay		5.6			10.1			7.9			9.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		5.6			10.1			7.9			9.5	
LOS		A			B			A			A	
Approach Delay		5.6			10.1			7.9			9.5	
Approach LOS		A			B			A			A	
Stops (vph)		91			169			156			195	
Fuel Used(l)		11			27			12			9	
CO Emissions (g/hr)		210			500			220			169	
NOx Emissions (g/hr)		41			96			43			33	
VOC Emissions (g/hr)		48			115			51			39	
Dilemma Vehicles (#)		0			0			0			0	
Queue Length 50th (m)		2.7			8.7			4.4			5.7	
Queue Length 95th (m)		8.7			29.4			14.5			17.1	
Internal Link Dist (m)		359.9			1.2			194.3			53.0	
Turn Bay Length (m)												
Base Capacity (vph)		1839			1025			1579			1565	
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		0.13			0.37			0.21			0.22	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 30.3			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 8.6		Intersection LOS: A	
Intersection Capacity Utilization 64.4%		ICU Level of Service C	

Analysis Period (min) 15

Splits and Phases: 5552: HERITAGE WAY & CARLTON TRAIL



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	341	558	287	0	711
Future Volume (Veh/h)	0	341	558	287	0	711
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	371	607	312	0	773
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			61			189
pX, platoon unblocked						
vC, conflicting volume	1150	460			607	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1150	460			607	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	32			100	
cM capacity (veh/h)	192	549			967	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	371	405	514	386	386
Volume Left	0	0	0	0	0
Volume Right	371	0	312	0	0
cSH	549	1700	1700	1700	1700
Volume to Capacity	0.68	0.24	0.30	0.23	0.23
Queue Length 95th (m)	40.8	0.0	0.0	0.0	0.0
Control Delay (s)	24.2	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	24.2	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	355	0	264	558	0	246
Future Volume (Veh/h)	355	0	264	558	0	246
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	386	0	287	607	0	267
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	227					
pX, platoon unblocked			1.00		1.00	1.00
vC, conflicting volume			386		1264	193
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			376		1257	183
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			76		100	68
cM capacity (veh/h)			1174		123	826

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	257	129	287	304	304	267
Volume Left	0	0	287	0	0	0
Volume Right	0	0	0	0	0	267
cSH	1700	1700	1174	1700	1700	826
Volume to Capacity	0.15	0.08	0.24	0.18	0.18	0.32
Queue Length 95th (m)	0.0	0.0	7.7	0.0	0.0	11.2
Control Delay (s)	0.0	0.0	9.1	0.0	0.0	11.4
Lane LOS			A			B
Approach Delay (s)	0.0		2.9			11.4
Approach LOS						B

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	771	852	415	0	222
Future Volume (Veh/h)	0	771	852	415	0	222
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	838	926	451	0	241
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			232			
pX, platoon unblocked	0.88				0.88	0.88
vC, conflicting volume	1377				1345	463
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1153				1117	114
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	70
cM capacity (veh/h)	529				177	807

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	419	419	463	463	451	241
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	451	241
cSH	1700	1700	1700	1700	1700	807
Volume to Capacity	0.25	0.25	0.27	0.27	0.27	0.30
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	10.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	11.4
Lane LOS						B
Approach Delay (s)	0.0		0.0			11.4
Approach LOS						B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	114	79	28	0	77	72	10	1	1	205	11	278
Future Volume (Veh/h)	114	79	28	0	77	72	10	1	1	205	11	278
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	124	86	30	0	84	78	11	1	1	223	12	302
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		219										
pX, platoon unblocked												
vC, conflicting volume	162			116			780	511	101	474	487	123
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	162			116			780	511	101	474	487	123
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			100			94	100	100	52	97	67
cM capacity (veh/h)	1417			1473			193	425	954	466	439	928

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	240	162	13	223	314
Volume Left	124	0	11	223	0
Volume Right	30	78	1	0	302
cSH	1417	1473	215	466	890
Volume to Capacity	0.09	0.00	0.06	0.48	0.35
Queue Length 95th (m)	2.3	0.0	1.5	20.3	12.8
Control Delay (s)	4.4	0.0	22.8	19.6	11.2
Lane LOS	A		C	C	B
Approach Delay (s)	4.4	0.0	22.8	14.7	
Approach LOS			C	B	

Intersection Summary				
Average Delay	9.7			
Intersection Capacity Utilization	48.4%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	513	0	0	397	0
Future Volume (Veh/h)	0	513	0	0	397	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	558	0	0	432	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			558		279	279
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			558		279	279
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		39	100
cM capacity (veh/h)			1013		711	760

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	558	0	432
Volume Left	0	0	432
Volume Right	558	0	0
cSH	1700	1700	711
Volume to Capacity	0.33	0.00	0.61
Queue Length 95th (m)	0.0	0.0	33.2
Control Delay (s)	0.0	0.0	17.6
Lane LOS			C
Approach Delay (s)	0.0	0.0	17.6
Approach LOS			C

Intersection Summary			
Average Delay		7.7	
Intersection Capacity Utilization		60.4%	ICU Level of Service B
Analysis Period (min)		15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	47	64	103	259	129	52
Future Volume (Veh/h)	47	64	103	259	129	52
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	51	70	112	282	140	57
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	394				425	253
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	394				425	253
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				75	93
cM capacity (veh/h)	1165				560	786

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	121	394	197
Volume Left	51	0	140
Volume Right	0	282	57
cSH	1165	1700	611
Volume to Capacity	0.04	0.23	0.32
Queue Length 95th (m)	1.1	0.0	11.1
Control Delay (s)	3.7	0.0	13.7
Lane LOS	A		B
Approach Delay (s)	3.7	0.0	13.7
Approach LOS			B

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix E: Summary of Sanitary Sewer Design

North Battleford - South East Quadrant Master Plan

Design Notes - Sanitary Sewer Concept Plan

Design Parameters

0.013	= n, Manning's n (no units)
300	= ADWF (L/cap/day)
0.17	= I&I (L/s/ha) Residential
0	= WTF (L/s/unit)
0.17	= I&I (L/s/ha) Commercial
0.015	=standard drop across manhole (m)
0.030	=change in direction drop across manhole

Definitions

ADWF	= Average Dry Weather Flow
PDWF	= Peak Dry Weather Flow
PF	= Peaking Factor
I/I	= Inflow & Infitration
WTF	= Weeping Tile Flow
PDF	= Peak Design Flow (ADWF * PF + I&I)

Population Densities

Single Unit Detached Dwellings		*Apartment*		*Commercial Neighbourhood*	
3	= ppl/unit	1.5	= ppl/unit		
19.50	= unit/ha	100.00	= unit/ha		
58.50	= ppl/ha	150.00	= ppl/ha	160.00	= ppl/ha
300	= ADWF (Lcd)	300	= ADWF (Lcd)	300	= ADWF (Lcd)

Low Density Street Townhousing		*Group Townhouse*		*Regional Commercial*	
2.8	= ppl/unit	2.8	= ppl/unit		
37.00	= unit/ha	49.00	= unit/ha		
103.60	= ppl/ha	137.20	= ppl/ha	160.00	= ppl/ha
300	= ADWF (Lcd)	300	= ADWF (Lcd)	300	= ADWF (Lcd)

Table E1. Calculation of Peak Daily Flow for Sanitary Sewer

From Node	To Node	Contributing Area: Single Fam (ha) 58.500	Single Fam Pop. ppl/ha	Street TH (ha) 103.60	Street TH Pop. ppl/ha	Apartment (ha) 150.00	Apartment Pop. ppl/ha	Group Townhouse (ha) 137.20	Group Townhouse Pop. ppl/ha	Com Nbhd (ha) 160.00	Com Nbhd Eq Pop. lps/ha	Reg Com (ha) 160.00	Reg Com Eq Pop ppl/ha	Area (ha)	Shopping Centre (sq.m.) 4.00	Shopping Centre Flow L/d/m2	Car Service (sq.m.) 6.00	Car Service Flow L/d/m2	Office/Store/Gas (sq.m.) 8.00	Office/Store/Gas Flow L/d/m2	Restaurants (sq.m.) 20.00	Restaurants Flow L/d/m2	Assembly Places (sq.m.) 24.00	Assembly Places Flow L/d/m2	Car Wash (sq.m.) 77.00	Car Wash Flow L/d/m2	Population Based: Area (ha)	Population (ppl)	Segment ADWF (L/s)	Existing Structure Based: Area (ha)	Segment ADWF (L/s)	Population (ppl)	Cumulative: Area (ha)	Population (ppl)	ADWF (L/s)	Peaking Factor	I/I (L/s)	PDF (L/s)	Total PDF (L/s)
SS45	SS44	0.42	24.57																								0.42	25	0.09	0.00	0.00	0	0.42	25	0.09	4.37	0.07	0.37	0.44
SS44	SS43	0.63	36.86																								0.63	37	0.13	0.00	0.00	0	1.05	61	0.21	4.30	0.18	0.92	1.09
SS43	SS40	0.33	19.31																								0.33	19	0.07	0.00	0.00	0	1.38	81	0.28	4.27	0.23	1.20	1.43
SS42	SS41			0.19	19.68																						0.19	20	0.07	0.00	0.00	0	0.19	20	0.07	4.38	0.03	0.30	0.33
SS41	SS40			0.17	17.61																						0.17	18	0.06	0.00	0.00	0	0.36	37	0.13	4.34	0.06	0.56	0.62
																																					4.50			
SS40	SS39																										0.00	0	0.00	0.00	0.00	0	1.74	118	0.41	4.22	0.30	1.73	2.03
SS56	SS55	0.78	45.63																								0.78	46	0.16	0.00	0.00	0	0.78	46	0.16	4.32	0.13	0.68	0.82
SS55	SS39	0.70	40.95																								0.70	41	0.14	0.00	0.00	0	1.48	87	0.30	4.26	0.25	1.28	1.53
																																					4.50			
SS39	SS38					1.23	184.50																				1.23	185	0.64	0.00	0.00	0	4.45	389	1.35	4.03	0.76	5.44	6.20
SS54	SS53	0.22	12.87																								0.22	13	0.04	0.00	0.00	0	0.22	13	0.04	4.40	0.04	0.20	0.23
SS53	SS52	0.68	39.78																								0.68	40	0.14	0.00	0.00	0	0.90	53	0.18	4.31	0.15	0.79	0.94
SS52	SS38	0.78	45.63																								0.78	46	0.16	0.00	0.00	0	1.68	98	0.34	4.25	0.29	1.45	1.73
SS38	SS37					1.33	199.50																				1.33	200	0.69	0.00	0.00	0	7.46	687	2.39	3.90	1.27	9.30	10.57
SS56	SS54	0.54	31.59																								0.54	32	0.11	0.00	0.00	0	0.54	32	0.11	4.35	0.09	0.48	0.57
SS54	SS51	0.42	24.57																								0.42	25	0.09	0.00	0.00	0	0.96	56	0.20	4.30	0.16	0.84	1.00
SS51	SS50	0.56	32.76																								0.56	33	0.11	0.00	0.00	0	1.52	89	0.31	4.26	0.26	1.31	1.57
SS50	SS49	0.70	40.95																								0.70	41	0.14	0.00	0.00	0	2.22	130	0.45	4.21	0.38	1.90	2.28
SS49	SS37	0.78	45.63																								0.78	46	0.16	0.00	0.00	0	3.00	176	0.61	4.17	0.51	2.54	3.05
SS37	SS36																										0.00	0	0.00	0.00	0.00	0	10.46	862	2.99	3.84	1.78	11.50	13.28
SS36	SS35																										0.00	0	0.00	0.00	0.00	0	10.46	862	2.99	3.84	1.78	11.50	13.28
SS35	SS34																										0.00	0	0.00	0.00	0.00	0	10.46	862	2.99	3.84	1.78	11.50	13.28
SS34	SS33																										0.00	0	0.00	0.00	0.00	0	10.46	862	2.99	3.84	1.78	11.50	13.28
SS33	SS32																										0.00	0	0.00	0.00	0.00	0	10.46	862	2.99	3.84	1.78	11.50	13.28
SS32	SS1																										0.00	0	0.00	0.00	0.00	0	10.46	862	2.99	3.84	1.78	11.50	13.28
SS45	SS42	0.24	14.04																								0.24	14	0.05	0.00	0.00	0	0.24	14	0.05	4.40	0.04	0.21	0.26
SS42	SS29	0.20	11.70	0.13	13.47																						0.33	25	0.09	0.00	0.00	0	0.57	39	0.14	4.33	0.10	0.59	0.69
SS29	SS28	0.21	12.29	0.14	14.50																						0.35	27	0.09	0.00	0.00	0	0.92	66	0.23	4.29	0.16	0.98	1.14
SS28	SS27	0.35	20.48	0.17	17.61																						0.52	38	0.13	0.00	0.00	0	1.44	104	0.36	4.24	0.24	1.53	1.78
SS27	SS23	0.22	12.87	0.29	30.04																						0.51	43	0.15	0.00	0.00	0	1.95	147	0.51	4.19	0.33	2.14	2.47
SS25	SS23	0.42	24.57																								0.42	25	0.09	0.00	0.00	0	0.42	25	0.09	4.37	0.07	0.37	0.44
SS23	SS19			0.23	23.83																						0.23	24	0.08	0.00	0.00	0	2.60	195	0.68	4.15	0.44	2.82	3.26
SS26	SS25	0.75	43.88																								0.75	44	0.15	0.00	0.00	0	0.75	44	0.15	4.33	0.13	0.66	0.79
SS25	SS24	0.29	16.97																								0.29	17	0.06	0.00	0.00	0	1.04	61	0.21	4.30	0.18	0.91	1.08
SS24	SS21	0.12	7.02																								0.12	7	0.02	0.00	0.00	0	1.16	68	0.24	4.29	0.20	1.01	1.21
SS22	SS21	0.34	19.89																								0.34	20	0.07	0.00	0.00	0	0.34	20	0.07	4.38	0.06	0.30	0.36
SS21	SS20	0.53	31.01																								0.53	31	0.11	0.00	0.00	0	2.03	119	0.41	4.22	0.35	1.74	2.09
SS20	SS19	0.51	29.84																								0.51	30	0.10	0.00	0.00	0	2.54	149	0.52	4.19	0.43	2.16	2.59
SS19	SS5																										0.00	0	0.00	0.00	0.00	0	5.14	344	1.19	4.05	0.87	4.84	5.71
SS48	SS31			0.33	34.19																						0.33	34	0.12	0.00	0.00	0	0.33	34	0.12	4.35	0.06	0.52	0.57
SS31	SS30			0.22	22.79																						0.22	23	0.08	0.00	0.00	0	0.55	57	0.20	4.30	0.09	0.85	0.94
SS30	SS5			0.17	17.61																						0.17	18	0.06	0.00	0.00	0	0.72	75	0.26	4.28	0.12	1.11	1.23
SS5	SS4																										0.00	0	0.00	0.00	0.00	0	5.86	419	1.45	4.01	1.00	5.83	6.83
SS4	SS3																										0.00	0	0.00	0.00	0.00	0	5.86	419	1.45	4.01	1.00	5.83	6.83
SS48	SS47			0.20	20.72																						0.20	21	0.07	0.00	0.00	0	0.20	21	0.07	4.38	0.03	0.32	0.35
SS47	SS46			0.20	20.72																						0.20	21	0.07	0.00	0.00	0	0.40	41	0.14	4.33	0.07	0.62	0.69
SS46	SS16																										0.00	0	0.00	0.00	0.00	0	0.40	41	0.14	4.33	0.07	0.62	0.69
SS16	SS15							1.34	183.85																		1.34	184	0.64	0.00	0.00	0	1.74	225	0.78	4.13	0.30	3.23	3.53
SS15	SS3							1.80	246.96																		1.80	247	0.86	0.00	0.00	0	3.54	472	1.64	3.99	0.60	6.54	7.14
SS3	SS2									1.05	168.00																1.05	168	0.58	0.00	0.00	0	10.45	1059	3.68	3.78	1.78	13.91	15.69
SS2	SS1					1.55	232.50																				1.55	233	0.81	0.00	0.00	0	12.00	1291	4.48	3.73	2.04	16.71	18.75
SS1	3041																										0.00	0	0.00	0.00	0.00	0	22.46	2154	7.48	3.56	3.82	26.63	30.44
SS75	SS74	0.73	42.71																								0.73	43	0.15	0.00	0.00	0	0.73	43	0.15	4.33	0.12	0.64	0.77
SS74	SS73	0.45	26.33																								0.45	26	0.09	0.00	0.00	0	1.18	69	0.24	4.28	0.20	1.03	1.23
SS19	SS73			0.24	24.86																						0.24	25	0.09	0.00	0.00	0	0.24	25	0.09	4.37	0.04	0.38	0.42
SS73	SS72	0.26	15.21	0.25	25.90																						0.51	41	0.14	0.00	0.00	0	1.93	135	0.47	4.21	0.33	1.97	2.30
SS72	SS69	0.31	18.14	0.20	20.72																						0.51	39	0.13	0.00	0.00	0	2.44	174	0.60	4.17	0.41	2.52	2.93
SS75	SS71	0.58	33.93																								0.58	34	0.12	0.00	0.00	0	0.58	34	0.12	4.35	0.10	0.51	0.61
SS71	SS70	0.49	28.67																								0.49	29	0.10	0.00	0.00	0	1.07	63	0.22	4.29	0.18	0.93	1.12
SS70	SS69	0.27	15.80																								0.27	16	0.05	0.00	0.00	0	1.34	78	0.27	4.27	0.23	1.16	1.39
SS69	SS67	0.25	14.63																								0.25	15	0.05	0.00	0.00	0	4.03	267	0.93	4.10	0.69	3.80	4.48

From Node	To Node	Single Fam (ha) 58.500	Single Fam Pop. ppl/ha	Street TH (ha) 103.60	Street TH Pop. ppl/ha	Apartment (ha) 150.00	Apartment Pop. ppl/ha	Group Townhouse (ha) 137.20	Group Townhouse Pop. ppl/ha	Com Nbhd (ha) 160.00	Com Nbhd Eq Pop. lps/ha	Reg Com (ha) 160.00	Reg Com Eq Pop ppl/ha	Area (ha)	Shopping Centre (sq.m.) 4.00	Shopping Centre Flow L/d/m2	Car Service (sq.m.) 6.00	Car Service Flow L/d/m2	Office/Store/Gas (sq.m.) 8.00	Office/Store/Gas Flow L/d/m2	Restaurants (sq.m.) 20.00	Restaurants Flow L/d/m2	Assembly Places (sq.m.) 24.00	Assembly Places Flow L/d/m2	Car Wash (sq.m.) 77.00	Car Wash Flow L/d/m2	Area (ha)	Population (ppl)	Segment ADWF (L/s)	Area (ha)	Segment ADWF (L/s)	Population (ppl)	Cumulative Area (ha)	Cumulative Population (ppl)	Cumulative ADWF (L/s)	Peaking Factor	I/I (L/s)	PDF (L/s)	Total PDF (L/s)
SS5	SS68			0.26	26.94			1.35	185.22																			1.61	212	0.74	0.00	0.00	0	1.61	212	0.74	4.14	0.27	3.05	3.32
SS68	SS67			0.35	36.26																							0.35	36	0.13	0.00	0.00	0	1.96	248	0.86	4.11	0.33	3.55	3.88
SS67	SS65																											0.00	0	0.00	0.00	0.00	0	5.99	515	1.79	3.97	1.02	7.10	8.12
SS65	SS64							2.39	327.91																			2.39	328	1.14	0.00	0.00	0	8.38	843	2.93	3.85	1.42	11.26	12.69
SS64	SS63																											0.00	0	0.00	0.00	0.00	0	8.38	843	2.93	3.85	1.42	11.26	12.69
SS63	SS62											3.36	537.60															3.36	538	1.87	0.00	0.00	0	11.74	1381	4.79	3.71	2.00	17.76	19.76
SS62	SS61																											0.00	0	0.00	0.00	0.00	0	11.74	1381	4.79	3.71	2.00	17.76	19.76
SS61	SS60											3.54	566.40															3.54	566	1.97	0.00	0.00	0	15.28	1947	6.76	3.59	2.60	24.30	26.90
SS60	3041																											0.00	0	0.00	0.00	0.00	0	15.28	1947	6.76	3.59	2.60	24.30	26.90
3041	3040																											0.00	0	0.00	0.00	0.00	0	37.74	4101	14.24	3.32	6.42	47.33	53.74
3040	3017													5.41										16,905	4.70			0.00	0	0.00	5.41	4.70	1352	43.15	5453	18.94	3.21	7.34	60.78	68.11
3020	3019											0.50	80.00															0.50	80	0.28	0.00	0.00	0	0.50	80	0.28	4.27	0.09	1.19	1.27
3019	3018											2.11	337.60															2.11	338	1.17	0.00	0.00	0	2.61	418	1.45	4.01	0.44	5.82	6.26
3018	3017																											0.00	0	0.00	0.00	0.00	0	2.61	418	1.45	4.01	0.44	5.82	6.26
3017	3038																											0.00	0	0.00	0.00	0.00	0	45.76	5871	20.39	3.18	7.78	64.82	72.60
3039	3038																											0.00	0	0.00	0.00	0.00	0	0.00	0	0.00	4.50	0.00	0.00	0.00
3038	3016																											0.00	0	0.00	0.00	0.00	0	45.76	5871	20.39	3.18	7.78	64.82	72.60
WalMart	3026													5.79	10,405	0.48			615	0.06						300	0.27	0.00	0	0.00	5.79	0.81	232	5.79	232	0.81	4.12	0.98	3.32	4.31
3026	3025																											0.00	0	0.00	0.00	0.00	0	5.79	232	0.81	4.12	0.98	3.32	4.31
3025	3024													0.97	1,175	0.05	255	0.02										0.00	0	0.00	0.97	0.07	21	6.76	253	0.88	4.11	1.15	3.61	4.76
3024	3023											1.32	211.20															1.32	211	0.73	0.00	0.00	0	8.08	464	1.61	3.99	1.37	6.43	7.80
3023	3022											0.81	129.60															0.81	130	0.45	0.00	0.00	0	8.89	594	2.06	3.93	1.51	8.11	9.62
3022	3021											0.92	147.20															0.92	147	0.51	0.00	0.00	0	9.81	741	2.57	3.88	1.67	9.98	11.65
3021	3016											1.42	227.20															1.42	227	0.79	0.00	0.00	0	11.23	968	3.36	3.81	1.91	12.80	14.71
3016	3015											2.39	382.40															2.39	382	1.33	0.00	0.00	0	59.38	7221	25.07	3.09	10.09	77.57	87.66
3015	3014													2.81	4,220	0.20					1,250	0.29						0.00	0	0.00	2.81	0.48	140	62.19	7361	25.56	3.09	10.57	78.86	89.43
3014	3013																											0.00	0	0.00	0.00	0.00	0	62.19	7361	25.56	3.09	10.57	78.86	89.43
3013	3056													0.51							1,425	0.33						0.00	0	0.00	0.51	0.33	95	62.70	7456	25.89	3.08	10.66	79.74	90.40
3056	3057																											0.00	0	0.00	0.00	0.00	0	62.70	7456	25.89	3.08	10.66	79.74	90.40
3057	1037																											0.00	0	0.00	0.00	0.00	0	62.70	7456	25.89	3.08	10.66	79.74	90.40
3056	3012																											0.00	0	0.00	0.00	0.00	0	0.00	0	0.00	4.50	0.00	0.00	0.00
3012	3011													0.81							860	0.20						0.00	0	0.00	0.81	0.20	57	0.81	57	0.20	4.30	0.14	0.86	0.99
3011	3010											2.59	414.40															2.59	414	1.44	0.00	0.00	0	3.40	472	1.64	3.99	0.58	6.53	7.11
3010	SS78																											0.00	0	0.00	0.00	0.00	0	3.40	472	1.64	3.99	0.58	6.53	7.11
SS76	SS77											3.50	560.00															3.50	560	1.94	0.00	0.00	0	3.50	560	1.94	3.95	0.60	7.68	8.27
SS77	SS78																											0.00	0	0.00	0.00	0.00	0	3.50	560	1.94	3.95	0.60	7.68	8.27
SS78	LIFT1																											0.00	0	0.00	0.00	0.00	0	6.90	1032	3.58	3.79	1.17	13.58	14.75

Table E2. Sanitary Sewer Design

From Node	To Node	Length (m)	Diameter (mm)	Curved Pipe	Slope	V_{full} Capacity (m/s)	Q_{full} Capacity (L/s)	Remaining Capacity (L/s)	Q/Qfull % Full (%)	y/D	V/Vfull	Velocity (m/s)	U/S Invert (m)	D/S Invert (m)	U/S Surface (m)	D/S Surface (m)	U/S Cover (m)	D/S Cover (m)	Average Cover (m)
SS45	SS44	120.0	200	n	0.55%	0.77	24	24	**1.8%**	0.094	0.386	0.30	532.68	532.02	536.33	536.04	3.45	3.82	3.64
SS44	SS43	12.8	200	n	1.90%	1.44	45	44	**2.4%**	0.107	0.419	0.60	531.99	531.75	536.04	535.43	3.85	3.48	3.67
SS43	SS40	103.1	200	n	2.55%	1.67	52	51	**2.7%**	0.114	0.436	0.73	531.72	529.09	535.43	532.87	3.51	3.58	3.55
SS42	SS41	72.5	200	n	1.65%	1.34	42	42	**0.8%**	0.065	0.305	0.41	532.42	531.22	536.07	534.92	3.45	3.50	3.47
SS41	SS40	71.5	200	n	2.85%	1.76	55	55	**1.1%**	0.075	0.334	0.59	531.21	529.17	534.92	532.87	3.51	3.50	3.51
SS40	SS39	88.0	200	n	4.60%	2.24	70	68	**2.9%**	0.117	0.443	0.99	529.06	525.01	532.87	528.78	3.61	3.57	3.59
SS56	SS55	110.0	200	n	2.80%	1.75	55	54	**1.5%**	0.086	0.364	0.64	532.24	529.16	535.89	532.84	3.45	3.49	3.47
SS55	SS39	110.0	200	n	3.65%	1.99	63	61	**2.4%**	0.107	0.419	0.84	529.14	525.13	532.84	528.78	3.50	3.45	3.48
SS39	SS38	88.0	200	n	3.90%	2.06	65	59	**9.6%**	0.209	0.631	1.30	524.99	521.56	528.78	525.34	3.58	3.58	3.58
SS54	SS53	70.6	200	n	2.50%	1.65	52	52	**0.5%**	0.053	0.267	0.44	530.66	528.90	534.31	532.55	3.45	3.45	3.45
SS53	SS52	120.0	200	n	3.05%	1.82	57	56	**1.6%**	0.089	0.373	0.68	528.88	525.22	532.55	528.89	3.47	3.47	3.47
SS52	SS38	120.0	200	n	2.95%	1.79	56	55	**3.1%**	0.121	0.452	0.81	525.21	521.67	528.89	525.34	3.48	3.47	3.48
SS38	SS37	88.0	200	n	2.75%	1.73	54	44	**19.4%**	0.298	0.773	1.34	521.55	519.13	525.34	522.92	3.59	3.59	3.59
SS56	SS54	126.4	200	n	1.25%	1.17	37	36	**1.6%**	0.089	0.373	0.43	532.24	530.66	535.89	534.31	3.45	3.46	3.45
SS54	SS51	88.0	200	n	4.20%	2.14	67	66	**1.5%**	0.086	0.364	0.78	530.63	526.93	534.31	530.62	3.49	3.49	3.49
SS51	SS50	70.8	200	n	3.20%	1.87	59	57	**2.7%**	0.114	0.436	0.81	526.90	524.63	530.62	528.30	3.52	3.46	3.49
SS50	SS49	120.0	200	n	2.60%	1.68	53	51	**4.3%**	0.142	0.500	0.84	524.62	521.50	528.30	525.16	3.48	3.46	3.47
SS49	SS37	120.0	200	n	1.85%	1.42	45	42	**6.8%**	0.177	0.572	0.81	521.48	519.26	525.16	522.92	3.48	3.46	3.47
SS37	SS36	54.0	200	n	1.90%	1.44	45	32	**29.4%**	0.371	0.869	1.25	519.11	518.08	522.92	521.86	3.61	3.57	3.59
SS36	SS35	75.1	200	n	0.75%	0.90	28	15	**46.7%**	0.480	0.983	0.89	518.05	517.49	521.86	521.26	3.60	3.57	3.59
SS35	SS34	75.1	200	n	0.35%	0.62	19	6	**68.4%**	0.607	1.077	0.66	517.48	517.21	521.26	521.36	3.59	3.95	3.77
SS34	SS33	120.0	200	n	0.35%	0.62	19	6	**68.4%**	0.607	1.077	0.66	517.18	516.76	521.36	521.20	3.98	4.23	4.11
SS33	SS32	84.1	200	n	0.35%	0.62	19	6	**68.4%**	0.607	1.077	0.66	516.75	516.45	521.20	520.18	4.25	3.53	3.89
SS32	SS1	83.9	200	n	0.55%	0.77	24	11	**54.6%**	0.527	1.022	0.79	516.44	515.98	520.18	519.67	3.54	3.49	3.52
SS45	SS42	70.0	200	n	0.55%	0.77	24	24	**1.0%**	0.072	0.325	0.25	532.68	532.30	536.33	536.07	3.45	3.57	3.51
SS42	SS29	61.3	200	n	0.65%	0.84	26	26	**2.6%**	0.112	0.431	0.36	532.28	531.88	536.07	535.55	3.59	3.47	3.53
SS29	SS28	60.9	200	n	0.40%	0.66	21	20	**5.5%**	0.159	0.536	0.35	531.87	531.62	535.55	535.50	3.48	3.68	3.58
SS28	SS27	62.3	200	n	0.60%	0.81	25	24	**7.0%**	0.179	0.576	0.47	531.61	531.24	535.50	534.90	3.69	3.47	3.58
SS27	SS23	100.0	200	n	3.00%	1.81	57	54	**4.4%**	0.143	0.502	0.91	531.22	528.22	534.90	531.89	3.48	3.46	3.47
SS25	SS23	118.1	200	n	3.20%	1.87	59	58	**0.8%**	0.065	0.305	0.57	532.00	528.22	535.65	531.89	3.45	3.47	3.46
SS23	SS19	87.8	200	n	3.20%	1.87	59	55	**5.6%**	0.161	0.540	1.01	528.19	525.38	531.89	529.06	3.50	3.48	3.49
SS26	SS25	71.5	200	n	1.85%	1.42	45	44	**1.8%**	0.094	0.386	0.55	533.29	531.97	536.94	535.65	3.45	3.48	3.46
SS25	SS24	73.0	200	n	1.25%	1.17	37	36	**3.0%**	0.119	0.448	0.52	531.95	531.04	535.65	534.72	3.49	3.48	3.49
SS24	SS21	33.5	200	n	3.85%	2.05	64	63	**1.9%**	0.096	0.391	0.80	531.01	529.72	534.72	533.38	3.51	3.46	3.48

From Node	To Node	Length (m)	Diameter (mm)	Curved Pipe	Slope	V_{full} Capacity (m/s)	Q_{full} Capacity (L/s)	Remaining Capacity (L/s)	Q/Qfull % Full (%)	y/D	V/Vfull	Velocity (m/s)	U/S Invert (m)	D/S Invert (m)	U/S Surface (m)	D/S Surface (m)	U/S Cover (m)	D/S Cover (m)	Average Cover (m)
SS22	SS21	97.9	200	n	4.95%	2.32	73	73	**0.5%**	0.053	0.267	0.62	534.52	529.67	538.17	533.38	3.45	3.50	3.48
SS21	SS20	81.9	200	n	2.00%	1.48	46	44	**4.5%**	0.145	0.506	0.75	529.66	528.02	533.38	531.70	3.52	3.48	3.50
SS20	SS19	81.9	200	n	3.20%	1.87	59	56	**4.4%**	0.143	0.502	0.94	528.00	525.38	531.70	529.06	3.50	3.47	3.48
SS19	SS5	85.2	200	n	1.70%	1.36	43	37	**13.4%**	0.247	0.696	0.95	525.35	523.90	529.06	527.58	3.51	3.48	3.49
SS48	SS31	100.0	200	n	1.15%	1.12	35	35	**1.6%**	0.089	0.373	0.42	529.16	528.01	532.81	531.71	3.45	3.49	3.47
SS31	SS30	73.9	200	n	3.25%	1.88	59	58	**1.6%**	0.089	0.373	0.70	527.98	525.58	531.71	529.27	3.52	3.49	3.50
SS30	SS5	73.9	200	n	2.25%	1.57	49	48	**2.5%**	0.110	0.426	0.67	525.57	523.90	529.27	527.58	3.50	3.47	3.49
SS5	SS4	82.9	200	n	2.00%	1.48	46	40	**14.7%**	0.259	0.715	1.06	523.87	522.21	527.58	525.90	3.50	3.49	3.50
SS4	SS3	79.8	200	n	1.70%	1.36	43	36	**16.0%**	0.270	0.732	1.00	522.20	520.84	525.90	524.55	3.51	3.51	3.51
SS48	SS47	66.2	200	n	0.80%	0.93	29	29	**1.2%**	0.078	0.342	0.32	529.16	528.63	532.81	532.31	3.45	3.47	3.46
SS47	SS46	66.2	200	n	3.35%	1.91	60	59	**1.2%**	0.078	0.342	0.65	528.62	526.40	532.31	530.08	3.49	3.47	3.48
SS46	SS16	83.3	200	n	1.95%	1.46	46	45	**1.5%**	0.086	0.364	0.53	526.37	524.75	530.08	528.82	3.50	3.87	3.69
SS16	SS15	83.3	200	n	2.75%	1.73	54	51	**6.5%**	0.173	0.564	0.98	524.73	522.44	528.82	526.16	3.89	3.52	3.70
SS15	SS3	120.0	200	n	1.35%	1.21	38	31	**18.7%**	0.293	0.766	0.93	522.43	520.81	526.16	524.55	3.53	3.54	3.54
SS3	SS2	93.5	200	n	2.60%	1.68	53	37	**29.7%**	0.373	0.871	1.47	520.78	518.35	524.55	522.03	3.57	3.49	3.53
SS2	SS1	103.0	200	n	2.30%	1.58	50	31	**37.7%**	0.425	0.929	1.47	518.33	515.96	522.03	519.67	3.50	3.51	3.51
SS1	3041	120.0	200	n	1.10%	1.10	34	4	**88.4%**	0.731	1.129	1.24	515.95	514.62	519.67	518.90	3.52	4.07	3.80
														514.65					
SS75	SS74	101.3	200	n	1.55%	1.30	41	40	**1.9%**	0.096	0.391	0.51	527.36	525.79	531.01	529.45	3.45	3.45	3.45
SS74	SS73	91.4	200	n	2.75%	1.73	54	53	**2.3%**	0.105	0.414	0.72	525.78	523.26	529.45	526.94	3.47	3.48	3.47
SS19	SS73	88.8	200	n	2.40%	1.62	51	50	**0.8%**	0.065	0.305	0.49	525.41	523.28	529.06	526.94	3.45	3.47	3.46
SS73	SS72	83.0	200	n	1.50%	1.28	40	38	**5.7%**	0.162	0.542	0.69	523.23	521.99	526.94	525.66	3.51	3.47	3.49
SS72	SS69	86.7	200	n	2.15%	1.53	48	45	**6.1%**	0.168	0.554	0.85	521.97	520.11	525.66	523.88	3.49	3.57	3.53
SS75	SS71	125.0	200	n	3.05%	1.82	57	57	**1.1%**	0.075	0.334	0.61	527.36	523.55	531.01	527.25	3.45	3.50	3.47
SS71	SS70	125.0	200	n	2.75%	1.73	54	53	**2.1%**	0.101	0.404	0.70	523.53	520.10	527.25	523.77	3.51	3.47	3.49
SS70	SS69	58.6	200	n	0.35%	0.62	19	18	**7.2%**	0.182	0.581	0.36	520.07	519.86	523.77	523.88	3.50	3.81	3.66
SS69	SS67	84.2	200	n	0.35%	0.62	19	15	**23.1%**	0.327	0.813	0.50	519.85	519.55	523.88	523.25	3.83	3.50	3.66
SS5	SS68	105.0	200	n	2.50%	1.65	52	49	**6.4%**	0.172	0.562	0.93	523.93	521.30	527.58	525.01	3.45	3.51	3.48
SS68	SS67	100.0	200	n	1.80%	1.40	44	40	**8.8%**	0.201	0.617	0.86	521.29	519.49	525.01	523.25	3.53	3.56	3.54
SS67	SS65	83.7	200	n	1.41%	1.24	39	31	**20.8%**	0.309	0.789	0.98	519.47	518.29	523.25	522.00	3.58	3.51	3.54
SS65	SS64	78.5	200	n	0.35%	0.62	19	7	**65.4%**	0.589	1.066	0.66	518.28	518.00	522.00	521.74	3.53	3.54	3.53
SS64	SS63	117.5	200	n	0.48%	0.72	23	10	**55.8%**	0.534	1.027	0.74	517.97	517.41	521.74	521.07	3.57	3.46	3.51
SS63	SS62	120.0	200	n	0.45%	0.70	22	2	**89.8%**	0.740	1.131	0.79	517.39	516.85	521.07	520.51	3.48	3.46	3.47
SS62	SS61	120.0	200	n	0.45%	0.70	22	2	**89.8%**	0.740	1.131	0.79	516.84	516.30	520.51	519.96	3.48	3.46	3.47
SS61	SS60	66.9	200	n	0.80%	0.93	29	2	**91.7%**	0.754	1.134	1.06	516.28	515.75	519.96	519.41	3.48	3.46	3.47

From Node	To Node	Length (m)	Diameter (mm)	Curved Pipe	Slope	V_{full} Capacity (m/s)	Q_{full} Capacity (L/s)	Remaining Capacity (L/s)	Q/Qfull % Full (%)	y/D	V/Vfull	Velocity (m/s)	U/S Invert (m)	D/S Invert (m)	U/S Surface (m)	D/S Surface (m)	U/S Cover (m)	D/S Cover (m)	Average Cover (m)
SS60	3041	66.9	200	n	0.85%	0.96	30	3	**89.0%**	0.735	1.130	1.09	515.73	515.16	519.41	518.90	3.48	3.53	3.50
													515.17						
3041	3040	69.8	200	n	3.79%	2.03	64	10	**84.2%**	0.703	1.121	2.28	514.65	512.00	518.90	516.11	4.05	3.91	3.98
3040	3017	99.4	250	n	1.50%	1.48	73	5	**93.5%**	0.767	1.136	1.69	511.03	509.54	516.11	513.97	4.83	4.18	4.51
3020	3019	100.0	200	n	0.54%	0.77	24	23	**5.3%**	0.157	0.531	0.41	512.31	511.77	515.58	514.98	3.07	3.01	3.04
3019	3018	100.0	200	n	0.69%	0.87	27	21	**23.0%**	0.326	0.812	0.70	511.77	511.08	514.98	514.30	3.01	3.02	3.02
3018	3017	100.0	200	n	0.64%	0.84	26	20	**23.9%**	0.333	0.821	0.69	511.08	510.44	514.30	513.97	3.02	3.33	3.18
3017	3038	9.4	250	n	3.11%	2.14	105	32	**69.2%**	0.612	1.079	2.31	509.24	508.95	513.97	513.75	4.48	4.55	4.52
3039	3038	76.1	200	n	0.55%	0.77	24	24	**0.0%**	0.017	0.126	0.10	509.40	508.98	514.02	513.75	4.42	4.57	4.49
3038	3016	112.1	300	n	1.35%	1.59	112	40	**64.6%**	0.585	1.063	1.69	508.88	507.37	513.75	511.48	4.57	3.81	4.19
WalMart	3026	20.0	150	n	0.50%	0.61	11	6	**40.0%**	0.440	0.944	0.58	512.90	512.80	517.75	517.46	4.70	4.51	4.61
3026	3025	100.5	200	n	2.75%	1.73	54	50	**7.9%**	0.190	0.597	1.03	512.66	509.90	517.46	513.34	4.60	3.24	3.92
3025	3024	67.3	200	n	0.42%	0.68	21	16	**22.4%**	0.322	0.807	0.55	509.88	509.60	513.34	513.34	3.26	3.54	3.40
3024	3023	100.1	200	n	0.52%	0.75	24	16	**33.0%**	0.395	0.897	0.67	509.60	509.08	513.34	512.84	3.54	3.56	3.55
3023	3022	100.3	200	n	0.53%	0.76	24	14	**40.3%**	0.442	0.946	0.72	509.08	508.55	512.84	512.72	3.55	3.97	3.76
3022	3021	99.7	200	n	0.66%	0.85	27	15	**43.7%**	0.462	0.966	0.82	508.56	507.90	512.72	511.81	3.97	3.71	3.84
3021	3016	99.9	200	n	0.38%	0.64	20	6	**72.8%**	0.633	1.091	0.70	507.90	507.52	511.81	511.48	3.72	3.76	3.74
3016	3015	123.8	375	n	0.82%	1.44	159	71	**55.2%**	0.530	1.024	1.47	507.29	506.28	511.48	510.12	3.81	3.47	3.64
3015	3014	121.1	375	n	0.36%	0.96	106	16	**84.6%**	0.705	1.121	1.07	506.28	505.84	510.12	510.21	3.47	3.99	3.73
3014	3013	94.2	375	n	0.36%	0.96	106	16	**84.6%**	0.705	1.121	1.07	505.81	505.46	510.21	510.04	4.02	4.20	4.11
3013	3056	83.1	375	n	0.37%	0.97	107	16	**84.6%**	0.705	1.121	1.09	505.46	505.16	510.04	509.55	4.20	4.02	4.11
3056	3057	68.6	375	n	0.27%	0.82	91	1	**99.2%**	0.812	1.140	0.94	505.14	504.96	509.55	508.29	4.03	2.96	3.50
3057	1037	59.1	375	n	0.52%	1.14	126	36	**71.5%**	0.625	1.087	1.24	504.92	504.61	508.29	507.70	3.00	2.72	2.86
3056	3012	13.0	250	n	0.41%	0.78	38	38	0.0%	0.017	0.126	0.10	505.52	505.30	509.55	509.58	3.78	4.03	3.91
3012	3011	90.7	250	n	0.38%	0.75	37	36	2.7%	0.114	0.436	0.33	505.30	504.95	509.58	508.97	4.03	3.77	3.90
3011	3010	99.0	250	n	0.34%	0.71	35	28	20.5%	0.307	0.786	0.56	504.95	504.61	508.97	508.53	3.77	3.67	3.72
3010	SS78	40.0	250	n	0.34%	0.71	35	28	20.5%	0.307	0.786	0.56	504.95	504.81	508.53	508.53	3.33	3.47	3.40
SS76	SS77	98.2	200	n	0.55%	0.77	24	16	34.0%	0.402	0.904	0.70	505.31	504.77	508.97	508.42	3.46	3.45	3.45
SS77	SS78	40.9	200	n	0.55%	0.77	24	16	34.0%	0.402	0.904	0.70	504.74	504.51	508.42	508.53	3.48	3.82	3.65
SS78	LIFT1	24.1	250	n	0.40%	0.77	38	23	39.2%	0.435	0.939	0.72	504.48	504.39	508.53	509.02	3.80	4.38	4.09

Orange indicates change in existing pipe network.