Support Documents for Bylaw 2734/D&P/26
Atim Creek Business Park Area Structure Plan

1. Engineering Design Brief
2. Stormwater Management Plan
3. Biophysical Impact Assessment
4. 100 – Year Flood Plain Delineation
5. Agricultural Impact Assessment
6. Historical Resources Act Approval
7. Traffic Impact Assessment

# 1. Engineering Design Brief

## Town of Stony Plain

# Stony Plain Area Structure Plan

ENGINEERING DESIGN BRIEF – DRAFT REPORT

February 2026

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March 2 2026

Jesse Skipworth, P.Eng.
Technical Reviewer

**PERMIT TO PRACTICE**

*ISL Engineering and Land Services Ltd.*

RM Signature: _____

RM APEGA ID: 81770

Date: 2 March 2026

PERMIT NUMBER: P 4741

The Association of Professional Engineers and Geoscientists of Alberta

Darin Hicks, P.Eng.
Project Manager

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# 1.0 Overview

## 1.1 Development Context

The Stony Plain Area Structure Plan encompasses approximately 178 hectares (440 acres) of land strategically positioned for future growth and urban integration. The area is bounded by Golf Course Road to the west, Boundary Road to the east, and Highway 16A along its southern edge, offering direct regional connectivity. This location places the development at a key interface between the Town of Stony Plain and the City of Spruce Grove, with Boundary Road serving as the jurisdictional boundary between the two municipalities.

Natural features play an important role in shaping the design. Atim Creek and Whispering Waters Creek traverse the site in a southwest-to-northeast direction, creating opportunities for integrated green corridors, enhanced stormwater management, and ecological preservation. Each quarter section within the plan is designed with a dedicated stormwater management facility to manage major flows and support sustainable drainage practices.

The transportation framework ensures strong internal and external connectivity. The southeast quarter will link to North Park Drive, Slate Avenue, Quartz Avenue, 28 Street, and Boundary Road, while the northwest quarter will connect to Keystone Drive and Golf Course Road. These planned connections will facilitate efficient movement for residents, businesses, and service providers, supporting both local and regional access.

The Stony Plain North Industrial Business Park, located in the southwest quarter section, is currently under construction and will serve as a catalyst for economic activity within the area. Its presence underscores the mixed-`use character of the broader development, balancing residential, commercial, and industrial components to create a vibrant and sustainable community.

Overall, the Stony Plain Area Structure Plan represents a significant opportunity to deliver a well-connected, environmentally responsive, and economically diverse development. The integration of natural features, transportation networks, and employment lands positions this area as a cornerstone for future growth in the region.

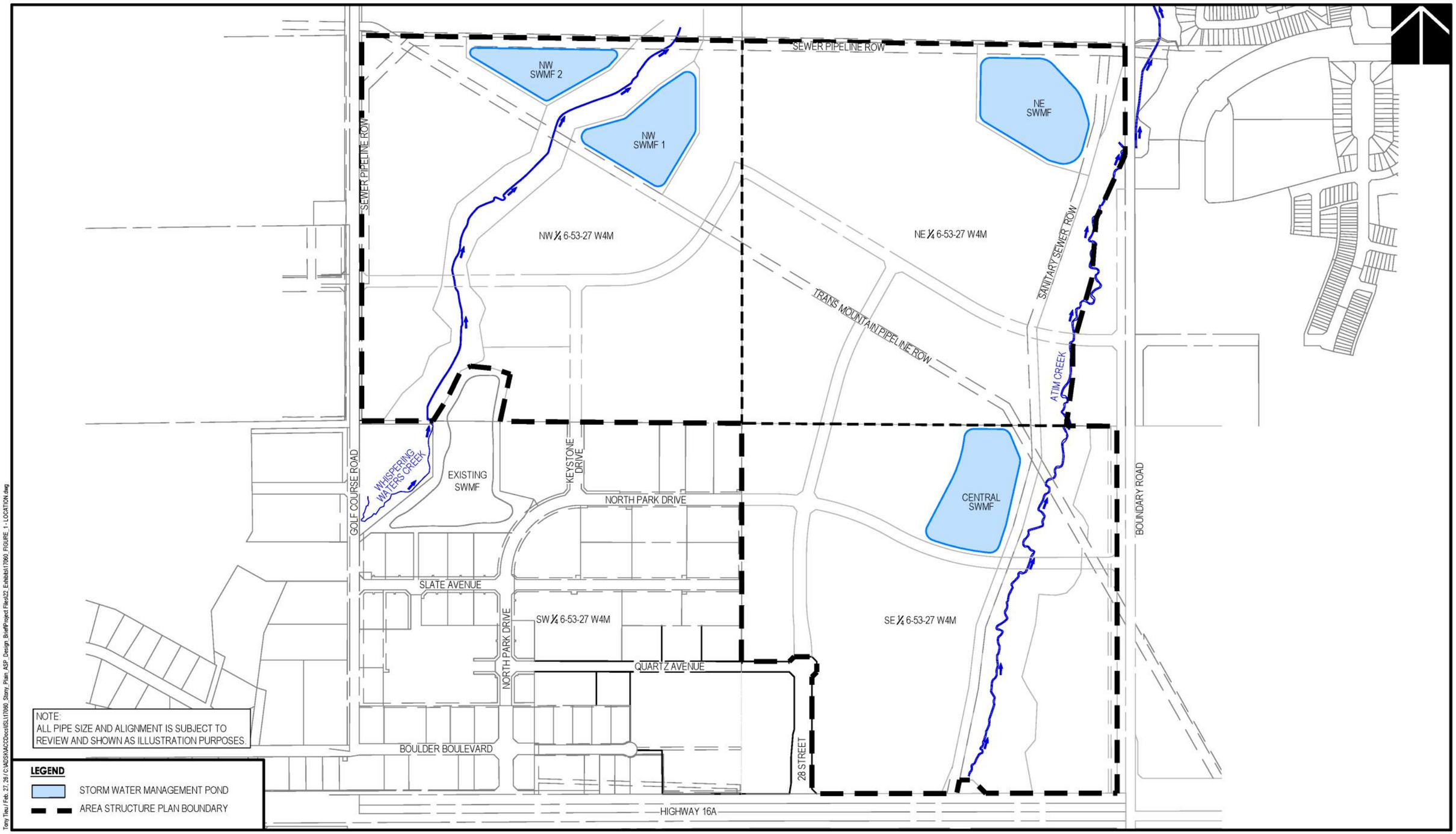
Refer to **Figure 1** for the illustrated study area.

## 1.2 Municipal Servicing Objectives

The primary objective of the Stony Plain ASP Design Brief study is to establish a comprehensive servicing strategy for the future development. This strategy ensures seamless integration with existing municipal infrastructure and strict adherence to Town of Stony Plain design standards.

The study aims to address water, sanitary sewer, and storm drainage requirements by evaluating proposing infrastructure requirements and identifying connections to existing systems. This confirms that the development can be adequately serviced without adverse impacts on downstream systems.

Furthermore, the study emphasizes compliance with municipal standards and future-proofing by recommending periodic system reviews once the project advances to the implementation phase. This ensures that future subdivision and engineering submissions align with municipal requirements and support orderly, sustainable growth.




Tony Tieu / Feb. 27, 26 / C:\ADS\KIA\CC\Docs\ISL\17060_Stony_Plan_ASP_Design_Brief\Project Files\22_Exhibits\17060_FIGURE_1 - LOCATION.dwg

# STONY PLAIN ASP

LOCATION PLAN

# FIGURE 1

1:7500 0 75 150 225m

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# 2.0 Water Network

## 2.1 Design Criteria

The design criteria applied to the water network is based on the Town of Stony Plain 2025 Design and Construction Standards and include the following:

- Equivalent population density
  - Commercial = 37 ep/ha
  - Industrial = 30 ep/ha
  - Mixed use = 25 ep/ha
- Water demand
  - Average day demand (ADD) = 300 L/c/day
  - Peak daily demand (PDD) = 600 L/c/da
  - Peak hour demand (PHD) = 900 L/c/day
- System requirements
  - Maximum allowable pressure during ADD = 550 kPa
  - Minimum pressure during PHD = 280 kPa
  - Minimum pressure during PDD + FF = 150 kPa
  - Roughness coefficient = 130
  - Minimum pipe diameter = 300mm
  - Pipe flush velocity = 1.5 m/s
- Fire flow requirements
  - Commercial (up to 2,900m$^2$; 50% exposure) = 183 L/s
  - Commercial (up to 4,200m$^2$; 50% exposure) = 233 L/s
  - Light industrial (up to 2,900m$^2$; 25% exposure) = 150 L/s
  - Light industrial (up to 2,900m$^2$; 50% exposure) = 183 L/s
  - Mixed use = 233 L/s

## 2.2 General

### 2.2.1 Overview

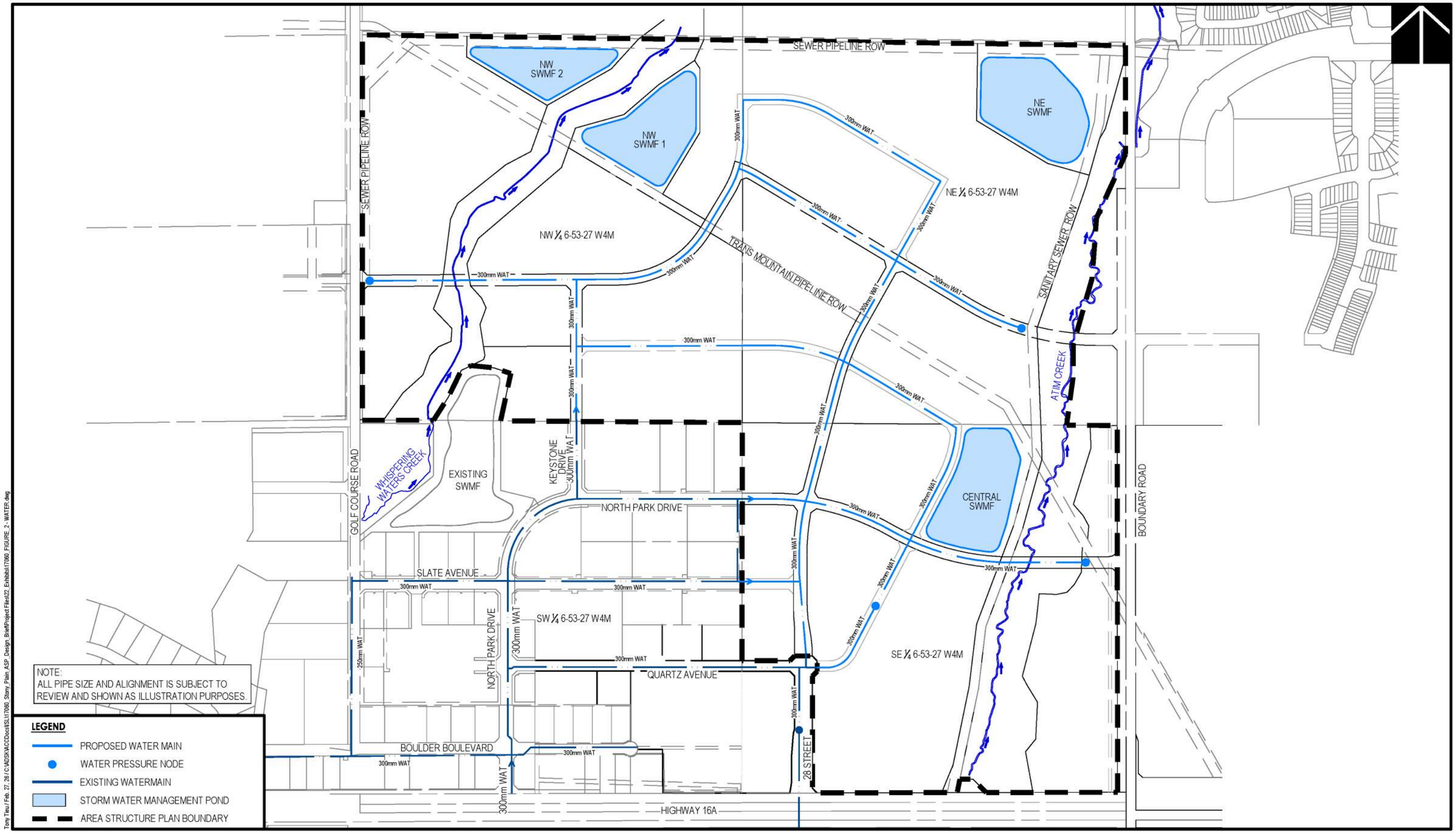
The proposed water distribution system is designed to integrate with the existing network and deliver adequate flows to service the study area under all critical operating scenarios. Specifically:

- **Capacity and Performance:**
  The system meets the Town's design criteria and pressure requirements, providing sufficient capacity during both Truckfill Operating (ADD, PDD, and PHD conditions) and Truckfill Not Operating (PDD + Fire Flow) scenarios.
- **Design Compliance:**
  In accordance with the Town of Stony Plain Design and Construction Standards:
  - All watermains will have a minimum diameter of **300 mm**.
  - Pressure requirements will be maintained as follows:
    - Minimum PHD pressure: **280 kPa**
    - Maximum ADD pressure: **550 kPa**
    - Minimum pressure during PDD + Fire Flow: **150 kPa**

- **Operational Recommendations:**
  To maintain system integrity and water quality:
  - **Pressure Management:** Ensure northeast pipes have appropriate ratings for higher pressures during ADD and PDD conditions.
  - **Periodic Flushing:** Conduct routine flushing to maintain water quality in new developments.
  - **Truckfill Control:** Suspend truckfill operations during firefighting events to preserve system pressure and reservoir volume.

If localized high pressures persist, mitigation options include creating an additional pressure zone, installing pressure-reducing valves, or site regrading.

The proposed water network layout is illustrated in **Figure 2**. The layout proposed meets the Town requirements without any connections to Boundary Road.




Tony Tieu / Feb. 27, 26 / C:\ADSK\ACCDocs\ISL\17080_Stony Plain ASP_Design_Brief\Project Files\022_Exhibits\17080_FIGURE 2 - WATER.dwg

# STONY PLAIN ASP

WATER NETWORK

**FIGURE 2**

1:7500 0 75 150 225m

FEBRUARY 2026

# 3.0 Sanitary Sewer System

## 3.1 Design Criteria

The expanded sanitary system for the study area has been evaluated using the following design criteria:

- Peak Dry Weather Flow (PDWF): Calculated according to the Current 2025 Town of Stony Plain Municipal Development Standards using the following formula:
  $Q_{PDW} = \frac{G * P * PF}{86400}$ where:
  - G = 300 L/c/d
  - P = design population
  - PF = 1+(14 /(4+pop. In thousands$^{0.5}$))
- Roughness Coefficient: A value of 0.013 was used for smooth pipe.
- Infiltration Rate: 0.28 L/s/ha.
- Allowance for manholes in sags 0.4 L/s per manhole.
- Population Density: Estimated at 37 equivalent persons per hectare for Commercial zoning and estimated at 30 equivalent persons per hectare for industrial.

## 3.2 General

### 3.2.1 Overview

All gravity sewers will have a minimum diameter of 250mm and will be sized to accommodate flows from individual lots. Flows and pipe size have been based on the design criteria in Section 3.1.

The southeast quarter (central) and the northeast section will be serviced by gravity sanitary mains that connect to an existing 900mm sanitary trunk running north–south along the west bank of Atim Creek. The 900mm trunk will connect to the existing ARROW Utilities (formally known as the Alberta Capital Region Waterwater Commission – ACRWC) trunk lines north of the site. The connection strategy follows the guidelines established in the Town of Stony Plain Water and Sanitary Master Plan Update, March 2019.

The Northwest quarter section will utilize gravity sanitary mains for servicing. The proposed sanitary mains within the section will connect directly to the existing ARROW Utilities (formerly the Alberta Capital Region Wastewater Commission [ACRWC]) sanitary trunk lines west of the site along Golf Course Road. The connection strategy follows the layout established in the Town of Stony Plain Water and Sanitary Master Plan Update being completed by ISL Engineering in 2026.

As a result, each section sanitary servicing will be fully contained within the corresponding section to reduce development restrictions from adjacent sites.

Ultimately, all sanitary flows from the development will discharge into the ARROW Utilities sanitary trunk line, which runs east to west along the north boundary of NW1/4 6-53-27 W4M and NE1/4 6-53-27 W4M.

The proposed sanitary basin layout is illustrated in **Figure 3**, with corresponding sanitary sewer calculations provided in **Table 3.1**.

### 3.2.2 Stony Plain North Industrial Surplus Sanitary Capacity

As outlined in the ISL Engineering Stony Plain North Industrial Design Brief Amendment, Dec 2024, there may be up to 5.0ha of developable land that could be diverted into the adjacent sewer system in the North Industrial Park before the existing lift station capacity is maximized. Utilizing the existing infrastructure before a new connection is made to the existing 900mm trunk sewer may be beneficial.

NOTE:
ALL PIPE SIZE AND ALIGNMENT IS SUBJECT TO REVIEW AND SHOWN AS ILLUSTRATION PURPOSES.

**LEGEND**

- SANITARY BASIN BOUNDARY
- PROPOSED SANITARY MAIN
- EXISTING SANITARY TRUNK
- EXISTING SANITARY MAIN
- EXISTING FORCE MAIN
- EXISTING ARROW SANITARY TRUNK
- MANHOLE
- STORM WATER MANAGEMENT POND
- AREA STRUCTURE PLAN BOUNDARY

# STONY PLAIN ASP

## SANITARY BASIN PLAN

**FIGURE 3**

1:7500 0 75 150 225m

FEBRUARY 2026

Tony Tieu / Feb. 27, 26 / C:\ADSKACCDocs\ISL\17060_Stony_Plain_ASP_Design_Brief\Project Files\22_Exhibits\17060_FIGURE_3 - SANITARY.dwg

**Project:** Stony Plain ASP
**Client:** Stony Plain Land Inc.
**Project #:** 17060
**Date:** March 2, 2026

# SANITARY SEWER ANALYSIS

MANNING'S n = 0.013

| FROM M.H. | TO M.H. | ROAD AREA | | POPULATION | | | | | DESIGN FLOW | | | NON-RESIDENTIAL AREA | | | DESIGN FLOW | | | | | TOTAL DWF | INFILTRATION AREA | | | | | q TOTAL DESIGN FLOW | PIPE DESIGN Q CAP. | 86% Q CAP. | q / 86% Q | PART. VEL. | FULL VEL. | NOM. DIA. | LENGTH | SLOPE | U/S RIM ELEV. | D/S RIM ELEV. | U/S INV. | D/S INV. | U/S COVER | D/S COVER | U/S INV. DEPTH | D/S INV. DEPTH | AVG INV. DEPTH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ADDED | TOTAL | UNIT | ADDED | POP | ADDED | TOTAL | FLOW | PEAKING | TOTAL | ADDED | TOTAL | POP | ADDED | TOTAL | FLOW | PEAKING | TOTAL | FLOW | AREA | I & I | SAG | MH | TOTAL | DESIGN FLOW | Q CAP. | 86% Q CAP. | q / 86% Q | PART. VEL. | FULL VEL. | NOM. DIA. | LENGTH | SLOPE | U/S RIM ELEV. | D/S RIM ELEV. | U/S INV. | D/S INV. | U/S COVER | D/S COVER | U/S INV. DEPTH | D/S INV. DEPTH | AVG INV. DEPTH |
| | | Ha | Ha | unit/ha | Units | Pop/ha | Pop | Pop | L/s | FACTOR | L/s | Ha | Ha | Pop/ha | Pop | Pop | L/s | FACTOR | L/s | L/s | Ha | L/s | Y/N | L/s | L/s | L/s | L/s | L/s | % | m/s | m/s | mm | m | % | m | m | m | m | m | m | m | m | m |
| S505 | S504 | 0.33 | 0.33 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 1.74 | 1.74 | 37.00 | 64 | 64 | 0.22 | 3.80 | 0.8 | 0.8 | 2.07 | 0.58 | N | 0.00 | 0.58 | 1.4 | 59.5 | 51.1 | 2.8% | 0.31 | 1.21 | 250 | 118.23 | 1.00% | 700.28 | 700.66 | 696.98 | 695.80 | 3.05 | 4.61 | 3.30 | 4.86 | 4.08 |
| S504 | S503 | 0.32 | 0.65 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 1.81 | 3.55 | 37.00 | 67 | 131 | 0.46 | 3.80 | 1.7 | 1.7 | 2.13 | 0.60 | N | 0.00 | 1.18 | 2.9 | 37.6 | 32.3 | 9.0% | 0.32 | 0.77 | 250 | 112.91 | 0.40% | 700.66 | 700.76 | 695.74 | 695.29 | 4.67 | 5.36 | 4.92 | 5.47 | 5.20 |
| | | | | | 0.00 | | 0 | | | | | | | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S510 | S503 | 0.41 | 0.41 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 6.66 | 6.66 | 30.00 | 200 | 200 | 0.69 | 3.80 | 2.6 | 2.6 | 7.07 | 1.98 | N | 0.00 | 1.98 | 4.6 | 59.5 | 51.1 | 9.0% | 0.51 | 1.21 | 250 | 141.97 | 1.00% | 700.57 | 700.76 | 697.27 | 695.85 | 3.05 | 4.77 | 3.30 | 4.91 | 4.10 |
| | | | | | 0.00 | | 0 | | | | | | | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S503 | S502 | 0.33 | 1.39 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | 10.21 | 37.00 | 0 | 331 | 1.15 | 3.80 | 4.4 | 4.4 | 0.33 | 0.09 | N | 0.00 | 0.09 | 4.5 | 37.6 | 32.3 | 13.8% | 0.39 | 0.77 | 250 | 150.00 | 0.40% | 700.76 | 699.83 | 695.23 | 694.63 | 5.28 | 5.05 | 5.53 | 5.20 | 5.37 |
| S502 | S501 | 0.36 | 1.75 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 4.47 | 14.68 | 37.00 | 165 | 497 | 1.72 | 3.80 | 6.6 | 6.6 | 4.83 | 1.35 | N | 0.00 | 1.35 | 7.9 | 37.6 | 32.3 | 24.4% | 0.51 | 0.77 | 250 | 150.00 | 0.40% | 699.83 | 698.81 | 694.57 | 693.97 | 5.01 | 4.69 | 5.26 | 4.84 | 5.05 |
| | | | | | 0.00 | | 0 | | | | | | | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S521 | S520 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | | 37.00 | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.0 | 0.00 | 0.00 | N | 0.00 | 0.00 | 0.0 | 59.5 | 51.1 | 0.0% | 0.00 | 1.21 | 250 | 150.00 | 1.00% | 699.88 | 699.29 | 696.58 | 695.08 | 3.05 | 4.06 | 3.30 | 4.21 | 3.75 |
| S520 | S501 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | | 37.00 | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.0 | 0.00 | 0.00 | N | 0.00 | 0.00 | 0.0 | 37.6 | 32.3 | 0.0% | 0.00 | 0.77 | 250 | 150.00 | 0.40% | 699.29 | 698.81 | 695.02 | 694.42 | 4.02 | 4.24 | 4.27 | 4.39 | 4.33 |
| | | | | | 0.00 | | 0 | | | | | | | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S501 | S500 | 0.33 | 2.08 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 13.30 | 27.98 | 37.00 | 492 | 989 | 3.43 | 3.80 | 13.0 | 13.0 | 13.63 | 3.82 | Y | 0.40 | 4.22 | 17.3 | 59.5 | 51.1 | 33.8% | 0.93 | 1.21 | 250 | 138.12 | 1.00% | 698.81 | 699.10 | 693.91 | 692.52 | 4.65 | 6.44 | 4.90 | 6.58 | 5.74 |
| | | | | | 0.00 | | 0 | | | | | | | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S534 | S533 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | | 25.00 | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.0 | 0.00 | 0.00 | N | 0.00 | 0.00 | 0.0 | 59.5 | 51.1 | 0.0% | 0.00 | 1.21 | 250 | 150.00 | 1.00% | 698.82 | 699.29 | 695.52 | 694.02 | 3.05 | 5.12 | 3.30 | 5.27 | 4.29 |
| S533 | S532 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | | 25.00 | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.0 | 0.00 | 0.00 | N | 0.00 | 0.00 | 0.0 | 37.6 | 32.3 | 0.0% | 0.00 | 0.77 | 250 | 150.00 | 0.40% | 699.29 | 698.83 | 693.96 | 693.36 | 5.08 | 5.32 | 5.33 | 5.47 | 5.40 |
| S532 | S531 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 7.87 | 7.87 | 25.00 | 197 | 197 | 0.68 | 3.80 | 2.6 | 2.6 | 7.87 | 2.20 | N | 0.00 | 2.20 | 4.8 | 37.6 | 32.3 | 14.8% | 0.40 | 0.77 | 250 | 150.00 | 0.40% | 698.83 | 699.03 | 693.30 | 692.70 | 5.28 | 6.18 | 5.53 | 6.33 | 5.93 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S540 | S531 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 1.81 | 1.81 | 25.00 | 45 | 45 | 0.16 | 3.80 | 0.6 | 0.6 | 1.81 | 0.51 | N | 0.00 | 0.51 | 1.1 | 59.5 | 51.1 | 2.2% | 0.27 | 1.21 | 250 | 150.00 | 1.00% | 700.22 | 699.03 | 696.92 | 695.42 | 3.05 | 3.46 | 3.30 | 3.61 | 3.46 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S531 | S530 | 0.24 | 0.24 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | 9.68 | 37.00 | 0 | 242 | 0.84 | 3.80 | 3.2 | 3.2 | 0.24 | 0.07 | N | 0.00 | 0.07 | 3.3 | 37.6 | 32.3 | 10.1% | 0.34 | 0.77 | 250 | 101.78 | 0.40% | 699.03 | 699.75 | 695.73 | 695.32 | 3.05 | 4.33 | 3.30 | 4.43 | 3.86 |
| S530 | S500 | 0.26 | 0.50 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | 9.68 | 37.00 | 0 | 242 | 0.84 | 3.80 | 3.2 | 3.2 | 0.26 | 0.07 | N | 0.00 | 0.07 | 3.3 | 37.6 | 32.3 | 10.1% | 0.34 | 0.77 | 250 | 108.18 | 0.40% | 699.75 | 699.10 | 695.26 | 694.83 | 4.24 | 4.16 | 4.49 | 4.27 | 4.38 |
| S500 | ET-9 | 0.00 | 2.58 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | 37.66 | 37.00 | 0 | 1231 | 4.27 | 3.74 | 16.0 | 16.0 | 0.00 | 0.00 | N | 0.00 | 0.00 | 16.0 | 1144.9 | 984.6 | 1.6% | 0.36 | 1.80 | 900 | 78.52 | 0.40% | 699.10 | 0.00 | 694.77 | 694.46 | 3.43 | -694.53 | 4.33 | -694.46 | -345.06 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S706 | S705 | 0.46 | 0.46 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 3.19 | 3.19 | 30.00 | 96 | 96 | 0.33 | 3.80 | 1.3 | 1.3 | 3.65 | 1.02 | N | 0.00 | 1.02 | 2.3 | 31.5 | 27.1 | 8.4% | 0.26 | 0.64 | 250 | 105.65 | 0.28% | 696.59 | 697.46 | 693.29 | 692.99 | 3.05 | 4.36 | 3.30 | 4.47 | 3.88 |
| S705 | S704 | 0.32 | 0.78 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 5.09 | 8.28 | 30.00 | 153 | 248 | 0.86 | 3.80 | 3.3 | 3.3 | 5.41 | 1.51 | N | 0.00 | 1.51 | 4.8 | 31.5 | 27.1 | 17.7% | 0.37 | 0.64 | 250 | 134.36 | 0.28% | 697.46 | 697.97 | 692.93 | 692.56 | 4.28 | 5.28 | 4.53 | 5.41 | 4.97 |
| S704 | S703 | 0.29 | 1.07 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | 8.28 | 30.00 | 0 | 248 | 0.86 | 3.80 | 3.3 | 3.3 | 0.29 | 0.08 | N | 0.00 | 0.08 | 3.4 | 31.5 | 27.1 | 12.4% | 0.31 | 0.64 | 250 | 120.00 | 0.28% | 697.97 | 697.19 | 692.50 | 692.16 | 5.22 | 4.91 | 5.47 | 5.03 | 5.25 |
| S703 | S702 | 0.21 | 1.28 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 5.44 | 13.72 | 37.00 | 201 | 450 | 1.56 | 3.80 | 5.9 | 5.9 | 5.65 | 1.58 | N | 0.00 | 1.58 | 7.5 | 31.5 | 27.1 | 27.8% | 0.45 | 0.64 | 250 | 89.35 | 0.28% | 697.19 | 696.66 | 692.10 | 691.85 | 4.84 | 4.72 | 5.09 | 4.81 | 4.95 |
| | | | | | 0.00 | | 0 | | | | | | | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S711 | S710 | 0.38 | 0.38 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 7.69 | 7.69 | 30.00 | 231 | 231 | 0.80 | 3.80 | 3.0 | 3.0 | 8.07 | 2.26 | N | 0.00 | 2.26 | 5.3 | 59.5 | 51.1 | 10.4% | 0.54 | 1.21 | 250 | 138.27 | 1.00% | 700.60 | 698.63 | 695.26 | 693.88 | 5.09 | 4.61 | 5.34 | 4.75 | 5.05 |
| S710 | S702 | 0.31 | 0.69 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | 7.69 | 37.00 | 0 | 231 | 0.80 | 3.80 | 3.0 | 3.0 | 0.31 | 0.09 | N | 0.00 | 0.09 | 3.1 | 37.6 | 32.3 | 9.7% | 0.33 | 0.77 | 250 | 138.27 | 0.40% | 698.63 | 696.66 | 693.82 | 693.26 | 4.56 | 3.26 | 4.81 | 3.40 | 4.10 |
| | | | | | 0.00 | | 0 | | | | | | | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S702 | S701 | 0.37 | 2.34 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 7.54 | 28.95 | 37.00 | 279 | 959 | 3.33 | 3.80 | 12.7 | 12.7 | 7.91 | 2.21 | N | 0.00 | 2.21 | 14.9 | 31.5 | 27.1 | 55.0% | 0.62 | 0.64 | 250 | 150.00 | 0.28% | 696.66 | 697.55 | 691.79 | 691.37 | 4.62 | 6.03 | 4.87 | 6.18 | 5.52 |
| S701 | S700 | 0.67 | 3.01 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 2.37 | 31.32 | 30.00 | 71 | 1030 | 3.58 | 3.79 | 13.6 | 13.6 | 3.04 | 0.85 | N | 0.00 | 0.85 | 14.4 | 31.5 | 27.1 | 53.3% | 0.61 | 0.64 | 250 | 150.00 | 0.28% | 697.55 | 698.37 | 691.31 | 690.89 | 5.99 | 7.33 | 6.24 | 7.48 | 6.86 |
| | | | | | 0.00 | | 0 | | | | | | | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S730 | S700 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 3.70 | 3.70 | 37.00 | 137 | 137 | 0.48 | 3.80 | 1.8 | 1.8 | 3.70 | 1.04 | N | 0.00 | 1.04 | 2.8 | 59.5 | 51.1 | 5.6% | 0.41 | 1.21 | 250 | 150.00 | 1.00% | 698.56 | 698.37 | 695.26 | 693.76 | 3.05 | 4.46 | 3.30 | 4.61 | 3.95 |
| | | | | | 0.00 | | 0 | | | | | | | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S722 | S721 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 1.51 | 1.51 | 37.00 | 56 | 56 | 0.19 | 3.80 | 0.7 | 0.7 | 1.51 | 0.42 | N | 0.00 | 0.42 | 1.2 | 31.5 | 27.1 | 4.3% | 0.20 | 0.64 | 250 | 148.21 | 0.28% | 697.01 | 697.18 | 693.71 | 693.30 | 3.05 | 3.74 | 3.30 | 3.88 | 3.59 |
| S721 | S720 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | 1.51 | 37.00 | 0 | 56 | 0.19 | 3.80 | 0.7 | 0.7 | 0.00 | 0.00 | N | 0.00 | 0.00 | 0.7 | 31.5 | 27.1 | 2.7% | 0.16 | 0.64 | 250 | 150.00 | 0.28% | 697.18 | 697.14 | 693.24 | 692.82 | 3.69 | 4.17 | 3.94 | 4.32 | 4.13 |
| S720 | S700 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 10.02 | 11.53 | 37.00 | 371 | 427 | 1.48 | 3.80 | 5.6 | 5.6 | 10.02 | 2.81 | N | 0.00 | 2.81 | 8.4 | 31.5 | 27.1 | 31.2% | 0.47 | 0.64 | 250 | 150.00 | 0.28% | 697.14 | 698.37 | 692.76 | 692.34 | 4.13 | 5.88 | 4.38 | 6.03 | 5.21 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S700 | R-A16 | 0.00 | 3.01 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | 46.55 | 37.00 | 0 | 1594 | 5.53 | 3.66 | 20.3 | 20.3 | 0.00 | 0.00 | N | 0.00 | 0.00 | 20.3 | 61.2 | 52.6 | 38.5% | 0.71 | 0.87 | 300 | 142.22 | 0.40% | 698.37 | 697.33 | 692.28 | 691.71 | 5.79 | 5.48 | 6.09 | 5.62 | 5.86 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S611 | S610 | 0.54 | 0.54 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | | 30.00 | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.0 | 0.54 | 0.15 | N | 0.00 | 0.15 | 0.2 | 37.6 | 32.3 | 0.5% | 0.09 | 0.77 | 250 | 150.00 | 0.40% | 695.92 | 694.97 | 692.32 | 691.72 | 3.35 | 3.10 | 3.60 | 3.25 | 3.42 |
| S610 | S603 | 0.35 | 0.89 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 4.34 | 4.34 | 30.00 | 130 | 130 | 0.45 | 3.80 | 1.7 | 1.7 | 4.69 | 1.31 | N | 0.00 | 1.31 | 3.0 | 37.6 | 32.3 | 9.4% | 0.33 | 0.77 | 250 | 150.00 | 0.40% | 694.97 | 693.89 | 691.66 | 691.06 | 3.06 | 2.68 | 3.31 | 2.83 | 3.07 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S607 | S606 | 0.32 | 0.32 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 4.46 | 4.46 | 30.00 | 134 | 134 | 0.46 | 3.80 | 1.8 | 1.8 | 4.78 | 1.34 | N | 0.00 | 1.34 | 3.1 | 59.5 | 51.1 | 6.1% | 0.43 | 1.21 | 250 | 95.00 | 1.00% | 697.78 | 697.25 | 692.67 | 691.72 | 4.86 | 5.44 | 5.11 | 5.53 | 5.32 |
| S606 | S605 | 0.16 | 0.48 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | 4.46 | 30.00 | 0 | 134 | 0.46 | 3.80 | 1.8 | 1.8 | 0.16 | 0.04 | N | 0.00 | 0.04 | 1.8 | 46.1 | 39.6 | 4.6% | 0.29 | 0.94 | 250 | 65.41 | 0.60% | 697.25 | 696.36 | 691.66 | 691.27 | 5.34 | 5.03 | 5.59 | 5.09 | 5.34 |
| S605 | S604 | 0.22 | 0.70 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 5.63 | 10.09 | 30.00 | 169 | 303 | 1.05 | 3.80 | 4.0 | 4.0 | 5.85 | 1.64 | N | 0.00 | 1.64 | 5.6 | 46.1 | 39.6 | 14.2% | 0.48 | 0.94 | 250 | 91.34 | 0.60% | 696.36 | 694.84 | 691.21 | 690.66 | 4.90 | 4.09 | 5.15 | 4.18 | 4.67 |
| S604 | S603 | 0.20 | 0.90 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | 10.09 | 30.00 | 0 | 303 | 1.05 | 3.80 | 4.0 | 4.0 | 0.20 | 0.06 | N | 0.00 | 0.06 | 4.0 | 46.1 | 39.6 | 10.2% | 0.42 | 0.94 | 250 | 78.38 | 0.60% | 694.84 | 693.89 | 690.60 | 690.13 | 3.99 | 3.68 | 4.24 | 3.76 | 4.00 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S603 | S602 | 0.25 | 2.04 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | 14.43 | 30.00 | 0 | 433 | 1.50 | 3.80 | 5.7 | 5.7 | 0.25 | 0.07 | N | 0.00 | 0.07 | 5.8 | 37.6 | 32.3 | 17.9% | 0.44 | 0.77 | 250 | 108.05 | 0.40% | 693.89 | 693.90 | 690.13 | 689.70 | 3.51 | 4.10 | 3.76 | 4.20 | 3.98 |
| S602 | S601 | 0.26 | 2.30 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | 14.43 | 30.00 | 0 | 433 | 1.50 | 3.80 | 5.7 | 5.7 | 0.26 | 0.07 | N | 0.00 | 0.07 | 5.8 | 37.6 | 32.3 | 17.9% | 0.44 | 0.77 | 250 | 107.00 | 0.40% | 693.90 | 693.81 | 689.64 | 689.21 | 4.01 | 4.50 | 4.26 | 4.60 | 4.43 |
| S601 | S600 | 0.24 | 2.54 | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 5.13 | 19.56 | 30.00 | 154 | 587 | 2.04 | 3.80 | 7.7 | 7.7 | 5.37 | 1.50 | N | 0.00 | 1.50 | 9.2 | 37.6 | 32.3 | 28.6% | 0.54 | 0.77 | 250 | 107.00 | 0.40% | 693.81 | 692.02 | 689.15 | 688.72 | 4.41 | 3.19 | 4.66 | 3.30 | 3.98 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S630 | S621 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | | 30.00 | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.0 | 0.00 | 0.00 | N | 0.00 | 0.00 | 0.0 | 59.5 | 51.1 | 0.0% | 0.00 | 1.21 | 250 | 85.04 | 1.00% | 692.48 | 691.40 | 689.12 | 688.27 | 3.11 | 3.05 | 3.36 | 3.13 | 3.25 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S624 | S623 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | | 30.00 | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.0 | 0.00 | 0.00 | N | 0.00 | 0.00 | 0.0 | 59.5 | 51.1 | 0.0% | 0.00 | 1.21 | 250 | 119.68 | 1.00% | 693.92 | 693.06 | 690.62 | 689.42 | 3.05 | 3.52 | 3.30 | 3.64 | 3.47 |
| S623 | S622 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | | 30.00 | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.0 | 0.00 | 0.00 | N | 0.00 | 0.00 | 0.0 | 46.1 | 39.6 | 0.0% | 0.00 | 0.94 | 250 | 120.32 | 0.60% | 693.06 | 692.25 | 689.36 | 688.64 | 3.45 | 3.49 | 3.70 | 3.61 | 3.65 |
| S622 | S621 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | | 30.00 | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.0 | 0.00 | 0.00 | N | 0.00 | 0.00 | 0.0 | 46.1 | 39.6 | 0.0% | 0.00 | 0.94 | 250 | 120.00 | 0.60% | 692.25 | 691.40 | 688.58 | 687.86 | 3.42 | 3.42 | 3.67 | 3.54 | 3.60 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S621 | S620 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 24.44 | 24.44 | 30.00 | 733 | 733 | 2.55 | 3.80 | 9.7 | 9.7 | 24.44 | 6.84 | N | 0.00 | 6.84 | 16.5 | 51.5 | 44.3 | 37.3% | 0.84 | 1.05 | 250 | 146.41 | 0.75% | 691.40 | 690.05 | 687.80 | 686.70 | 3.35 | 3.20 | 3.60 | 3.35 | 3.47 |
| S620 | ET-3 | 0.00 | | | 0.00 | | 0 | 0 | 0.00 | 3.80 | 0.0 | 0.00 | 24.44 | 30.00 | 0 | 733 | 2.55 | 3.80 | 9.7 | 9.7 | 0.00 | 0.00 | N | 0.00 | 0.00 | 9.7 | 51.5 | 44.3 | 21.8% | 0.66 | 1.05 | 250 | 146.41 | 0.75% | 690.05 | 690.03 | 686.64 | 685.55 | 3.16 | 4.34 | 3.41 | 4.48 | 3.95 |

**DESIGN CRITERIA:**

Residential Sewage Flow Generation Rate = 300

General Inflow / Infiltration Allowance = 0.28

Inflow Allowance (Manholes in sags) = 0.4

# 4.0 Storm Drainage System

## 4.1 General

The storm drainage system for the development will be designed in accordance with the **Town of Stony Plain Municipal Standards (2025)** to manage stormwater runoff and maintain outflow at pre-development levels. The system incorporates both **minor** and **major** components:

- **Minor System**: Underground storm sewers convey flows from storms up to the **1-in-5-year event** without surcharging. Catch basins will be installed as required to direct surface runoff into this system.
- **Major System**: Surface flood routes, including roadways, drainage parkways, and watercourses, accommodate flows from storms up to the **1-in-100-year event**, directing them toward stormwater management facilities (SWMFs).

Future development stages will maintain these standards, ensuring storm servicing for up to a **1-in-5-year event**. The proposed basin layout is shown in **Figure 4**, with supporting storm sewer calculations provided in **Table 4.1**.

## 4.2 Design Criteria

The design criteria applied to evaluate the stormwater management system are based on the Town of Stony Plain 2025 Design and Construction Standards and include the following:

- Rainfall data based on the 2025 EPCOR IDF curves.
- SWMFs are designed to accommodate the 1:100 year Huff storm event.
- Runoff Coefficient of 0.83 for roads, 0.60 for Commercial zoning, and 0.75 for Industrial zoning.
- Initial Time of Concentration (T.O.C.) of 8 minutes.
- Roughness Coefficient of 0.013 for smooth-walled pipes.
- Minor storm sewer system sized for 1:5 – Year design storm event using the rational method.
- Major storm system is designed for roadways and surface flood paths to convey flows to the proposed stormwater management facility.
- Storm sewers greater than 1050mm diameter will be classified as trunks.

## 4.3 Grading Design

The development's grading approach, illustrated in **Figure 5**, establishes a consistent strategy across all quarter sections, with minor design adjustments anticipated at the local level. Surface drainage will primarily follow overland flow paths toward designated stormwater management facilities (SWMFs), with controlled discharge to the adjacent creek in accordance with hydrological design standards.

The plan maintains hydraulic connectivity with surrounding lands in all directions, preserving existing drainage patterns. Minor short term ponding may occur along municipal rights-of-way during 1:5-year rainfall events, while major events (e.g., 1:100-year) will route excess runoff through defined overland flow routes to SWMFs within each sub-basin, ensuring compliance with municipal stormwater requirements.

Grading within each quarter section aims to minimize cut-and-fill operations and achieve balanced earthworks. Supporting earthworks analysis figures are provided in **Appendix C**.

NOTE:
ALL PIPE SIZE AND ALIGNMENT IS SUBJECT TO REVIEW AND SHOWN AS ILLUSTRATION PURPOSES.

**LEGEND**

- STORM BASIN BOUNDARY
- PROPOSED STORM TRUNK
- PROPOSED STORM MAIN
- EXISTING STORM TRUNK
- EXISTING STORM MAIN
- FUTURE STORM TRUNK
- MANHOLE
- STORM WATER MANAGEMENT POND
- AREA STRUCTURE PLAN BOUNDARY

# STONY PLAIN ASP

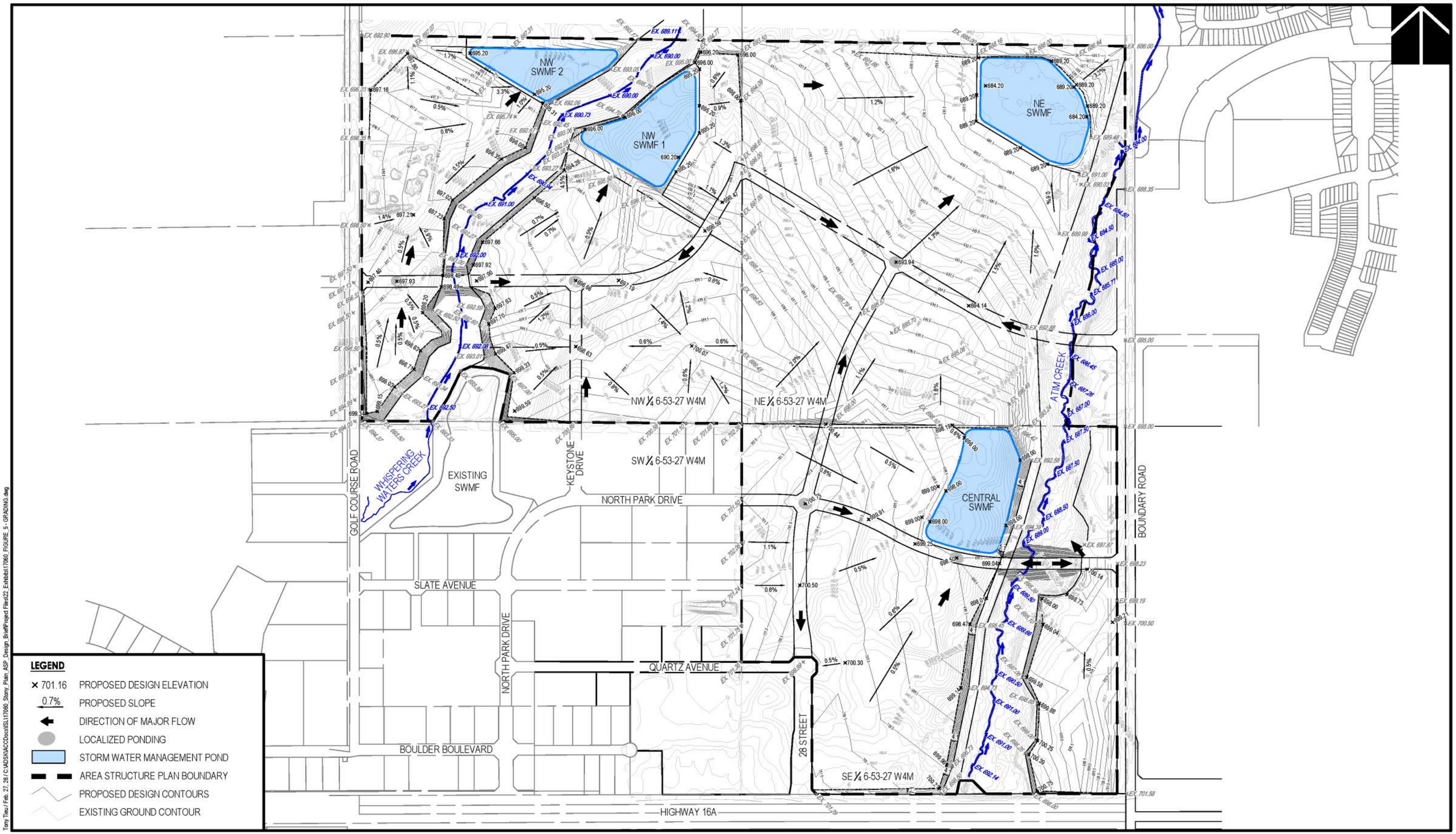
## STORM BASIN PLAN

# FIGURE 4

1:7500 0 75 150 225m

FEBRUARY 2026

Tony Tieu / Feb. 27, 26 / C:\ADSK\ACCDocs\ISL\17060_Stony_Plain_ASP_Design_Brief\Project Files\22_Exhibits\17060_FIGURE_4 - STORM.dwg




Tony Tieu / Feb. 27, 26 / C:\ADSKACCDocs\ISL\17060_Stony Plain ASP_Design_Brief\Project Files\22_Exhibits\17060_FIGURE_5 - GRADING.dwg

# STONY PLAIN ASP

## PRELIMINARY GRADING PLAN

# FIGURE 5

1:7500 0 75 150 225m

FEBRUARY 2026

**Project:** Stony Plain ASP
**Client:** Stony Plain Land Inc.
**Project #:** 17060
**Date:** March 2, 2026

# 1:5 YEAR STORM ANALYSIS

n = 0.013

| FROM M.H. | TO M.H. | DESIGN FLOW | | | | | | | | | | PIPE DESIGN | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | AREA | | C | A x C | | TIME OF CONC. | INTENSITY | DESIGN | SAFETY FACTOR | TOTAL q | CAPACITY Q | TOT/CAP q/Q | PARTIAL VELOCITY | FULL VELOCITY | NOMINAL DIAMETER | LENGTH | SLOPE | TIME OF FLOW | SUPERCRITICAL FLOW |
| | | ADDED | TOTAL | | ADDED | TOTAL | Tc | i | | | | | | | | | | | | |
| | | ha | ha | | ha | ha | min | mm/hr | L/s | | L/s | L/s | % | m/s | m/s | mm | m | % | min | YES/NO |
| ST605 | ST604 | 3.88 | 3.88 | 0.83 | 3.22 | 3.22 | 8.00 | 76.68 | 685.9 | 1.00 | 685.9 | 840.6 | 81.6% | 2.62 | 2.35 | 675 | 118.23 | 1.00% | 0.84 | YES |
| ST604 | ST603 | 0.28 | 4.16 | 0.83 | 0.23 | 3.45 | 8.84 | 73.48 | 704.8 | 1.00 | 704.8 | 862.3 | 81.7% | 2.18 | 1.95 | 750 | 113.20 | 0.60% | 0.97 | NO |
| ST610 | ST603 | 0.33 | 0.33 | 0.83 | 0.27 | 0.27 | 8.00 | 76.68 | 58.3 | 1.00 | 58.3 | 135.8 | 43.0% | 1.14 | 1.23 | 375 | 100.75 | 0.60% | 1.37 | NO |
| ST650 | ST603 | 2.50 | 2.50 | 0.65 | 1.63 | 1.63 | 8.00 | 76.68 | 346.1 | 1.00 | 346.1 | 475.6 | 72.8% | 1.84 | 1.68 | 600 | 144.82 | 0.60% | 1.43 | NO |
| ST603 | ST602 | 0.24 | 7.23 | 0.83 | 0.20 | 5.55 | 9.81 | 70.16 | 1,081.8 | 1.00 | 1,081.8 | 1,221.2 | 88.6% | 1.59 | 1.41 | 1050 | 97.65 | 0.20% | 1.15 | NO |
| ST602 | ST601 | 0.26 | 7.49 | 0.83 | 0.22 | 5.77 | 10.96 | 66.62 | 1,067.1 | 1.00 | 1,067.1 | 1,221.2 | 87.4% | 1.59 | 1.41 | 1050 | 108.56 | 0.20% | 1.28 | NO |
| ST601 | ST600 | 6.04 | 13.53 | 0.75 | 4.53 | 10.30 | 12.24 | 63.14 | 1,805.8 | 1.00 | 1,805.8 | 2,025.2 | 89.2% | 2.64 | 2.34 | 1050 | 137.58 | 0.55% | 0.98 | NO |
| ST622 | ST621 | 0.00 | 0.00 | 0.60 | 0.00 | 0.00 | 8.00 | 76.68 | 0.0 | 1.00 | 0.0 | 307.0 | 0.0% | 0.00 | 1.09 | 600 | 150.00 | 0.25% | 2.30 | NO |
| ST621 | ST620 | 0.00 | 0.00 | 0.60 | 0.00 | 0.00 | 10.30 | 68.58 | 0.0 | 1.00 | 0.0 | 556.6 | 0.0% | 0.00 | 1.26 | 750 | 150.00 | 0.25% | 1.98 | NO |
| ST620 | ST600 | 17.78 | 17.78 | 0.60 | 10.67 | 10.67 | 12.29 | 63.02 | 1,867.6 | 1.00 | 1,867.6 | 2,115.2 | 88.3% | 2.76 | 2.44 | 1050 | 150.00 | 0.60% | 1.02 | YES |
| ST600 | SWMF SE | 0.81 | 32.12 | 0.83 | 0.67 | 21.64 | 13.31 | 60.54 | 3,638.6 | 1.00 | 3,638.6 | 5,461.5 | 66.6% | 6.75 | 6.31 | 1050 | 20.00 | 4.00% | 0.05 | YES |
| SWMF SE | ST660 | 0.00 | 32.12 | 0.75 | 0.00 | 21.64 | 8.00 | 76.68 | 4,608.6 | 1.00 | 4,608.6 | 6,688.9 | 68.9% | 8.33 | 7.72 | 1050 | 12.37 | 6.00% | 0.03 | YES |
| ST660 | CREEK 1 | 0.00 | 32.12 | 0.75 | 0.00 | 21.64 | 8.03 | 76.57 | 4,602.2 | 1.00 | 4,602.2 | 6,688.9 | 68.8% | 8.33 | 7.72 | 1050 | 66.08 | 6.00% | 0.14 | YES |
| ST634 | ST633 | 0.00 | 0.00 | 0.83 | 0.00 | 0.00 | 8.00 | 76.68 | 0.0 | 1.00 | 0.0 | 475.6 | 0.0% | 0.00 | 1.68 | 600 | 100.00 | 0.60% | 0.99 | NO |
| ST633 | ST632 | 0.00 | 0.00 | 0.83 | 0.00 | 0.00 | 8.99 | 72.94 | 0.0 | 1.00 | 0.0 | 475.6 | 0.0% | 0.00 | 1.68 | 600 | 150.00 | 0.60% | 1.49 | NO |
| ST632 | ST631 | 7.87 | 7.87 | 0.83 | 6.53 | 6.53 | 10.48 | 68.05 | 1,234.7 | 1.00 | 1,234.7 | 1,819.2 | 76.3% | 2.80 | 2.55 | 900 | 150.00 | 0.80% | 0.98 | YES |
| ST640 | ST631 | 1.81 | 1.81 | 0.83 | 1.50 | 1.50 | 8.00 | 76.68 | 320.0 | 1.00 | 320.0 | 549.2 | 58.3% | 2.02 | 1.94 | 600 | 150.00 | 0.80% | 1.29 | YES |
| ST631 | ST630 | 0.26 | 9.94 | 0.83 | 0.22 | 8.25 | 11.76 | 64.38 | 1,475.5 | 1.00 | 1,475.5 | 2,730.7 | 54.0% | 3.21 | 3.15 | 1050 | 100.00 | 1.00% | 0.53 | YES |
| ST630 | CREEK 2 | 0.00 | 9.94 | 0.83 | 0.00 | 8.25 | 12.29 | 63.01 | 1,444.0 | 1.00 | 1,444.0 | 2,730.7 | 52.9% | 3.20 | 3.15 | 1050 | 83.30 | 1.00% | 0.44 | YES |
| ST706 | ST705 | 0.55 | 0.55 | 0.83 | 0.46 | 0.46 | 8.00 | 76.68 | 97.2 | 1.00 | 97.2 | 146.7 | 66.3% | 1.42 | 1.33 | 375 | 133.92 | 0.70% | 1.68 | NO |
| ST705 | ST704 | 0.29 | 0.84 | 0.83 | 0.24 | 0.70 | 9.68 | 70.57 | 136.7 | 1.00 | 136.7 | 220.8 | 61.9% | 1.46 | 1.39 | 450 | 148.96 | 0.60% | 1.79 | NO |
| ST704 | ST703 | 5.13 | 5.97 | 0.65 | 3.33 | 4.03 | 11.47 | 65.18 | 730.0 | 1.00 | 730.0 | 862.3 | 84.7% | 2.19 | 1.95 | 750 | 120.00 | 0.60% | 1.02 | NO |
| ST710 | ST703 | 4.90 | 4.90 | 0.65 | 3.19 | 3.19 | 8.00 | 76.68 | 678.4 | 1.00 | 678.4 | 840.6 | 80.7% | 2.61 | 2.35 | 675 | 150.00 | 1.00% | 1.06 | YES |
| ST721 | ST720 | 10.50 | 10.50 | 0.65 | 6.83 | 6.83 | 8.00 | 76.68 | 1,453.7 | 1.00 | 1,453.7 | 1,717.4 | 84.6% | 3.03 | 2.70 | 900 | 118.03 | 0.90% | 0.73 | YES |
| ST720 | ST703 | 0.28 | 10.78 | 0.83 | 0.23 | 7.06 | 8.73 | 73.88 | 1,448.4 | 1.00 | 1,448.4 | 1,717.4 | 84.3% | 3.03 | 2.70 | 900 | 118.03 | 0.90% | 0.73 | YES |
| ST703 | ST702 | 0.91 | 22.56 | 0.83 | 0.76 | 15.03 | 12.49 | 62.50 | 2,609.4 | 1.00 | 2,609.4 | 3,019.9 | 86.4% | 3.01 | 2.67 | 1200 | 95.88 | 0.60% | 0.60 | YES |
| ST702 | ST701 | 0.00 | 22.56 | 0.65 | 0.00 | 15.03 | 13.09 | 61.05 | 2,548.8 | 1.00 | 2,548.8 | 3,019.9 | 84.4% | 2.99 | 2.67 | 1200 | 95.88 | 0.60% | 0.60 | YES |
| ST730 | ST701 | 0.00 | 0.00 | 0.65 | 0.00 | 0.00 | 8.00 | 76.68 | 0.0 | 1.00 | 0.0 | 285.1 | 0.0% | 0.00 | 1.79 | 450 | 150.00 | 1.00% | 1.39 | NO |
| ST701 | ST700 | 24.44 | 47.00 | 0.65 | 15.89 | 30.92 | 13.69 | 59.68 | 5,124.7 | 1.00 | 5,124.7 | 5,914.2 | 86.6% | 3.77 | 3.35 | 1500 | 120.00 | 0.70% | 0.60 | YES |
| ST700 | SWMF NE | 0.00 | 47.00 | 0.65 | 0.00 | 30.92 | 14.29 | 58.37 | 5,012.6 | 1.00 | 5,012.6 | 14,278.4 | 35.1% | 6.80 | 8.08 | 1500 | 44.12 | 4.08% | 0.09 | YES |
| SWMF NE | ST740 | 0.00 | 47.00 | 0.75 | 0.00 | 30.92 | 8.00 | 76.68 | 6,584.8 | 1.00 | 6,584.8 | 9,549.9 | 69.0% | 9.11 | 8.44 | 1200 | 18.80 | 6.00% | 0.04 | YES |
| ST740 | CREEK 3 | 0.00 | 47.00 | 0.75 | 0.00 | 30.92 | 8.04 | 76.53 | 6,572.1 | 1.00 | 6,572.1 | 9,549.9 | 68.8% | 9.10 | 8.44 | 1200 | 107.85 | 6.00% | 0.21 | YES |
| ST804 | ST803 | 8.06 | 8.06 | 0.65 | 5.24 | 5.24 | 8.00 | 76.68 | 1,115.9 | 1.00 | 1,115.9 | 1,402.3 | 79.6% | 2.45 | 2.20 | 900 | 138.27 | 0.60% | 1.05 | YES |
| ST803 | ST802 | 0.00 | 8.06 | 0.65 | 0.00 | 5.24 | 9.05 | 72.74 | 1,058.6 | 1.00 | 1,058.6 | 1,402.3 | 75.5% | 2.42 | 2.20 | 900 | 138.27 | 0.60% | 1.05 | YES |
| ST812 | ST811 | 1.21 | 1.21 | 0.65 | 0.79 | 0.79 | 8.00 | 76.68 | 167.5 | 1.00 | 167.5 | 180.3 | 92.9% | 1.29 | 1.13 | 450 | 120.00 | 0.40% | 1.76 | NO |
| ST811 | ST810 | 0.36 | 1.57 | 0.83 | 0.30 | 1.09 | 9.76 | 70.30 | 211.9 | 1.00 | 211.9 | 235.6 | 90.0% | 1.23 | 1.09 | 525 | 150.00 | 0.30% | 2.30 | NO |
| ST810 | ST802 | 5.43 | 7.00 | 0.83 | 4.51 | 5.59 | 12.06 | 63.60 | 988.0 | 1.00 | 988.0 | 1,280.1 | 77.2% | 2.22 | 2.01 | 900 | 89.35 | 0.50% | 0.74 | NO |
| ST820 | ST802 | 2.75 | 2.75 | 0.83 | 2.28 | 2.28 | 8.00 | 76.68 | 486.2 | 1.00 | 486.2 | 623.4 | 78.0% | 1.93 | 1.74 | 675 | 119.07 | 0.55% | 1.14 | NO |
| ST802 | ST801 | 0.81 | 18.62 | 0.83 | 0.67 | 13.79 | 12.80 | 61.74 | 2,364.5 | 1.00 | 2,364.5 | 2,756.8 | 85.8% | 2.74 | 2.44 | 1200 | 123.51 | 0.50% | 0.84 | NO |
| ST801 | ST800 | 7.54 | 26.16 | 0.83 | 6.26 | 20.04 | 13.65 | 59.77 | 3,328.1 | 1.00 | 3,328.1 | 3,871.8 | 86.0% | 2.46 | 2.19 | 1500 | 115.24 | 0.30% | 0.88 | NO |
| ST800 | SWMF NW 1 | 0.00 | 26.16 | 0.83 | 0.00 | 20.04 | 14.52 | 57.87 | 3,222.4 | 1.00 | 3,222.4 | 15,567.6 | 20.7% | 5.78 | 8.81 | 1500 | 36.49 | 4.85% | 0.07 | YES |
| ST830 | SWMF NW 1 | 3.21 | 3.21 | 0.65 | 2.09 | 2.09 | 8.00 | 76.68 | 444.4 | 1.00 | 444.4 | 882.4 | 50.4% | 4.08 | 4.08 | 525 | 42.71 | 4.21% | 0.17 | YES |
| SWMF NW 1 | ST840 | 0.00 | 29.37 | 0.75 | 0.00 | 22.13 | 8.00 | 76.68 | 4,713.7 | 1.00 | 4,713.7 | 4,434.3 | 106.3% | 7.90 | 6.97 | 900 | 10.27 | 6.00% | 0.02 | YES |
| ST840 | CREEK 4 | 0.00 | 29.37 | 0.75 | 0.00 | 22.13 | 8.02 | 76.58 | 4,707.7 | 1.00 | 4,707.7 | 4,434.3 | 106.2% | 7.90 | 6.97 | 900 | 57.97 | 6.00% | 0.14 | YES |
| ST904 | ST903 | 4.07 | 4.07 | 0.83 | 3.38 | 3.38 | 8.00 | 76.68 | 719.5 | 1.00 | 719.5 | 787.2 | 91.4% | 2.02 | 1.78 | 750 | 150.00 | 0.50% | 1.40 | NO |
| ST903 | ST902 | 0.00 | 4.07 | 0.83 | 0.00 | 3.38 | 9.40 | 71.50 | 670.9 | 1.00 | 670.9 | 787.2 | 85.2% | 2.00 | 1.78 | 750 | 120.00 | 0.50% | 1.12 | NO |
| ST902 | ST901 | 0.00 | 4.07 | 0.83 | 0.00 | 3.38 | 10.53 | 67.90 | 637.2 | 1.00 | 637.2 | 787.2 | 80.9% | 1.98 | 1.78 | 750 | 120.00 | 0.50% | 1.12 | NO |
| ST901 | ST900 | 11.26 | 15.33 | 0.83 | 9.35 | 12.72 | 11.65 | 64.70 | 2,286.6 | 1.00 | 2,286.6 | 2,756.8 | 82.9% | 2.73 | 2.44 | 1200 | 84.72 | 0.50% | 0.58 | NO |
| ST900 | SWMF NW 2 | 1.94 | 17.27 | 0.83 | 1.61 | 14.33 | 12.23 | 63.17 | 2,515.4 | 1.00 | 2,515.4 | 6,730.3 | 37.4% | 5.16 | 5.95 | 1200 | 21.84 | 2.98% | 0.06 | YES |
| SWMF NW 2 | ST910 | 0.00 | 17.27 | 0.75 | 0.00 | 14.33 | 8.00 | 76.68 | 3,053.1 | 1.00 | 3,053.1 | 2,727.0 | 112.0% | 6.87 | 6.17 | 750 | 5.93 | 6.00% | 0.02 | YES |
| ST910 | CREEK 5 | 0.00 | 17.27 | 0.75 | 0.00 | 14.33 | 8.02 | 76.61 | 3,050.5 | 1.00 | 3,050.5 | 2,727.0 | 111.9% | 6.87 | 6.17 | 750 | 56.75 | 6.00% | 0.15 | YES |

| U/S RIM ELEV. | D/S RIM ELEV. | U/S INV. | D/S INV. | U/S COVER | D/S COVER | U/S INV. DEPTH | D/S INV. DEPTH | AVG INV. DEPTH |
|---|---|---|---|---|---|---|---|---|
| m | m | m | m | m | m | m | m | m |
| 700.28 | 700.66 | 697.20 | 696.02 | 2.40 | 4.52 | 3.08 | 4.64 | 3.86 |
| 700.66 | 700.76 | 695.96 | 695.28 | 3.95 | 5.37 | 4.70 | 5.48 | 5.09 |
| 701.32 | 700.76 | 698.32 | 697.72 | 2.63 | 2.94 | 3.00 | 3.04 | 3.02 |
| 700.55 | 700.76 | 697.55 | 696.68 | 2.40 | 3.93 | 3.00 | 4.08 | 3.54 |
| 700.76 | 700.16 | 696.62 | 696.43 | 3.09 | 3.64 | 4.14 | 3.73 | 3.94 |
| 700.16 | 699.49 | 696.37 | 696.15 | 2.74 | 3.23 | 3.79 | 3.34 | 3.57 |
| 699.49 | 698.52 | 696.09 | 695.33 | 2.35 | 3.05 | 3.40 | 3.19 | 3.29 |
| 700.43 | 699.74 | 697.43 | 697.06 | 2.40 | 2.54 | 3.00 | 2.69 | 2.84 |
| 699.74 | 699.10 | 696.59 | 696.22 | 2.40 | 2.74 | 3.15 | 2.88 | 3.02 |
| 699.10 | 698.52 | 695.65 | 694.75 | 2.40 | 3.62 | 3.45 | 3.77 | 3.61 |
| 698.52 | 693.20 | 694.00 | 693.20 | 3.47 | -0.02 | 4.52 | 0.00 | 2.26 |
| 698.38 | 698.85 | 695.38 | 694.78 | 2.40 | 3.97 | 3.00 | 4.07 | 3.54 |
| 698.85 | 698.89 | 694.72 | 693.82 | 3.53 | 4.92 | 4.13 | 5.07 | 4.60 |
| 698.89 | 699.15 | 693.76 | 692.56 | 4.23 | 6.44 | 5.13 | 6.59 | 5.86 |
| 700.28 | 699.15 | 697.28 | 696.08 | 2.40 | 2.92 | 3.00 | 3.07 | 3.04 |
| 699.15 | 699.73 | 692.50 | 691.50 | 5.60 | 8.13 | 6.65 | 8.23 | 7.44 |
| 699.73 | 698.52 | 691.44 | 690.61 | 7.24 | 7.83 | 8.29 | 7.91 | 8.10 |
| 694.42 | 693.61 | 691.64 | 690.70 | 2.40 | 2.77 | 2.78 | 2.91 | 2.84 |
| 693.61 | 693.93 | 690.64 | 689.75 | 2.52 | 4.03 | 2.97 | 4.18 | 3.57 |
| 693.93 | 693.89 | 689.69 | 688.97 | 3.49 | 4.80 | 4.24 | 4.92 | 4.58 |
| 694.97 | 693.89 | 691.90 | 690.40 | 2.40 | 3.34 | 3.07 | 3.49 | 3.28 |
| 697.26 | 695.39 | 693.15 | 692.09 | 3.21 | 3.18 | 4.11 | 3.30 | 3.71 |
| 695.39 | 693.89 | 692.09 | 691.03 | 2.40 | 2.75 | 3.30 | 2.86 | 3.08 |
| 693.89 | 692.63 | 688.91 | 688.33 | 3.78 | 4.20 | 4.98 | 4.30 | 4.64 |
| 692.63 | 691.40 | 688.27 | 687.70 | 3.16 | 3.61 | 4.36 | 3.70 | 4.03 |
| 692.55 | 691.40 | 689.70 | 688.20 | 2.40 | 3.05 | 2.85 | 3.20 | 3.02 |
| 691.40 | 690.10 | 687.50 | 686.66 | 2.40 | 3.32 | 3.90 | 3.44 | 3.67 |
| 690.10 | 689.20 | 686.20 | 684.40 | 2.40 | 4.76 | 3.90 | 4.80 | 4.35 |
| 689.20 | 688.85 | | | 688.00 | 688.83 | 689.20 | 688.85 | 689.03 |
| 688.85 | 684.00 | | | 687.65 | 683.89 | 688.85 | 684.00 | 686.43 |
| 700.60 | 698.63 | 696.68 | 695.85 | 3.02 | 2.64 | 3.92 | 2.78 | 3.35 |
| 698.63 | 696.66 | 695.85 | 695.02 | 1.88 | 1.50 | 2.78 | 1.64 | 2.21 |
| 696.98 | 698.16 | 694.13 | 693.65 | 2.40 | 4.39 | 2.85 | 4.51 | 3.68 |
| 698.16 | 697.19 | 693.59 | 693.14 | 4.04 | 3.90 | 4.57 | 4.05 | 4.31 |
| 697.19 | 696.66 | 693.08 | 692.63 | 3.21 | 3.94 | 4.11 | 4.03 | 4.07 |
| 697.37 | 696.66 | 694.30 | 693.65 | 2.40 | 2.90 | 3.07 | 3.01 | 3.04 |
| 696.66 | 696.27 | 692.57 | 691.96 | 2.89 | 4.19 | 4.09 | 4.31 | 4.20 |
| 696.27 | 695.56 | 691.90 | 691.55 | 2.87 | 3.89 | 4.37 | 4.01 | 4.19 |
| 695.56 | 695.20 | 691.49 | 690.40 | 2.57 | 4.76 | 4.07 | 4.80 | 4.44 |
| 695.60 | 695.20 | 692.20 | 690.40 | 2.88 | 4.76 | 3.40 | 4.80 | 4.10 |
| 695.20 | 695.79 | | | 694.30 | 695.78 | 695.20 | 695.79 | 695.50 |
| 695.79 | 690.00 | | | 694.89 | 689.94 | 695.79 | 690.00 | 692.90 |
| 698.06 | 697.36 | 694.91 | 694.16 | 2.40 | 3.05 | 3.15 | 3.20 | 3.18 |
| 697.36 | 696.87 | 694.10 | 693.50 | 2.51 | 3.25 | 3.26 | 3.37 | 3.32 |
| 696.87 | 696.31 | 693.44 | 692.84 | 2.68 | 3.35 | 3.43 | 3.47 | 3.45 |
| 696.31 | 696.68 | 692.78 | 692.36 | 2.33 | 4.24 | 3.53 | 4.32 | 3.93 |
| 696.68 | 695.20 | 692.30 | 690.40 | 3.18 | 4.78 | 4.38 | 4.80 | 4.59 |
| 695.20 | 693.59 | | | 694.45 | 693.58 | 695.20 | 693.59 | 694.40 |
| 693.59 | 690.00 | | | 692.84 | 689.94 | 693.59 | 690.00 | 691.80 |

## 4.4 Stormwater Management Facilities

Each quarter section within the study area will be served by its own minor storm system, discharging into a dedicated stormwater management facility (SWMF). Outflow from each SWMF will be regulated through an outlet control structure before release to the receiving watercourses:

- **Southeast Quarter:** Minor system follows the unnamed roadway alignment to the Central Basin SWMF, then outlets east to Atim Creek.
- **Southeast Quarter East of Atim Creek:** The long narrow strip of development will be managed and outlet to Atim Creek for the minor and major storm systems.
- **Northeast Quarter:** Minor system connects to the Northeast Basin SWMF, with controlled discharge east to Atim Creek.
- **Northwest Quarter:** Two SWMFs (Northwest Basin and Northwest Basin 2) receive flows from divided minor systems, with controlled discharge to Whispering Waters Creek.

The study area is divided into four basins for SWMF development: Southeast (Central) Basin, Northeast Basin, Northwest Basin, and Northwest Basin 2. Each basin is serviced by its own SWMF. Outflow from each facility is controlled by an orifice designed to limit discharge to the pre-development rate of **2.5 L/s/ha**. The design accommodates the **100-year rainfall event**, based on the **City of Edmonton Huff Distribution** as outlined in **EPCOR Stormwater Guideline V-3.02**.

Table 4.2: Southeast (Central) Stormwater Management Facility

| Parameter | Value |
|---|---|
| Facility Type | Wet |
| Surface Area | 3.61 ha |
| Required Storage | 31,988 $m^3$ |
| Freeboard Level | 698.00 m |
| High Water Level | 697.27 m |
| Normal Water Level / Invert | 696.50 m |
| Peak Outflow | 0.085 $m^3/s$ |
| Receiving Watercourse | Atim Creek |

Table 4.3: Northeast Stormwater Management Facility

| Parameter | Value |
|---|---|
| Facility Type | Wet |
| Surface Area | 3.71 ha |
| Required Storage | 35,092 $m^3$ |
| Freeboard Level | 689.45 m |
| High Water Level | 688.56 m |
| Normal Water Level / Invert | 687.70 m |
| Peak Outflow | 0.072 $m^3/s$ |
| Receiving Watercourse | Atim Creek |

Table 4.4: Northwest Stormwater Management Facility #1

| Parameter | Value |
|---|---|
| Facility Type | Wet |
| Surface Area | 2.99 ha |
| Required Storage | 21,975 $m^3$ |
| Freeboard Level | 695.20 m |
| High Water Level | 694.35 m |
| Normal Water Level / Invert | 693.70 m |
| Peak Outflow | 0.062 $m^3/s$ |
| Receiving Watercourse | Whispering Waters Creek |

Table 4.5: Northwest Stormwater Management Facility #2

| Parameter | Value |
|---|---|
| Facility Type | Wet |
| Surface Area | 1.97 ha |
| Required Storage | 10,868 $m^3$ |
| Freeboard Level | 695.20 m |
| High Water Level | 694.25 m |
| Normal Water Level / Invert | 693.70 m |
| Peak Outflow | 0.0219 $m^3/s$ |
| Receiving Watercourse | Whispering Waters Creek |

## 5.0 Closure

As outlined in the previous sections, the servicing scheme will ensure that the development is fully serviced, without adversely impacting the downstream systems. Subsequent detailed design submissions for future phases of Stony Plain will be submitted to the Town of Stony Plain for review and approval once the subdivision approvals are granted. Following engineering approvals, the developer will enter into development agreements for the related municipal improvements.

# APPENDIX A

## Hydraulic Network Analysis Memorandum

7909 51 Avenue NW, Edmonton AB T6E 5L9, T: 780.438.9000 F: 780.438.3700

| | | | |
|---|---|---|---|
| To: | **Town of Stony Plain** | Date: | **February 26, 2026** |
| Attention: | **Khalid Aziz, Manager of Engineering** | Project No.: | **17060** |
| Cc: | | | |
| Reference: | **Stony Plain ASP Design Brief - Hydraulic Network Analysis** | | |
| From: | **Darin Hicks, P.Eng., Sarah Barbosa, P.Eng., ENV SP, Christopher Tang, E.I.T.** | | |

# 1.0 Introduction

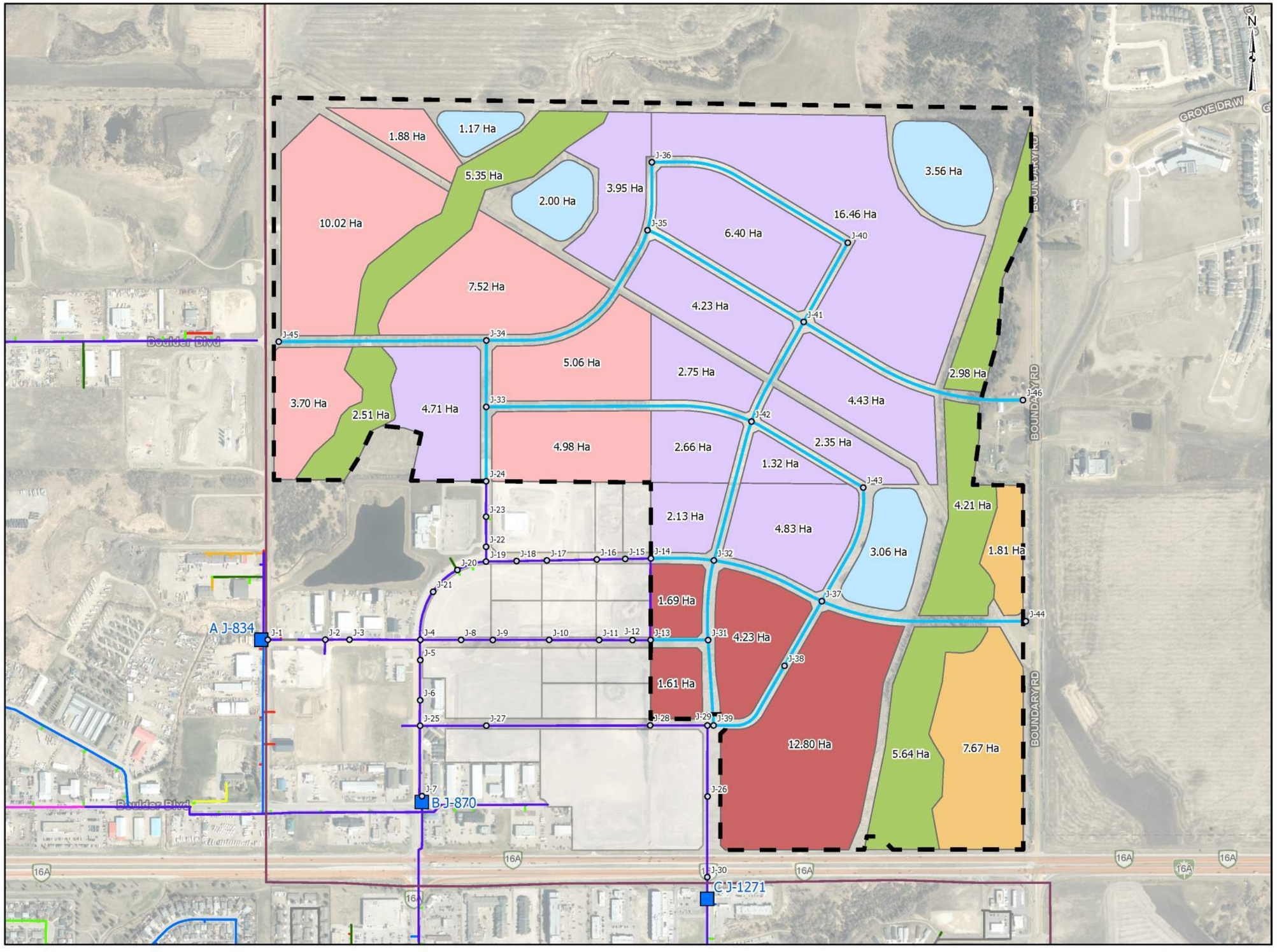
## 1.1 Study Area and Background

This memorandum outlines the water servicing concept plan developed to support the preparation of the Stony Plain Area Structure Plan (ASP) for lands located within Section 6-53-27-W4M, encompassing the NW, NE, and SE quarter sections. ISL was engaged by Scheffer Andrew Ltd. to provide technical support on the ASP, including the preparation of an Engineering Design Brief.

The water servicing concept plan was built upon the North Industrial ASP and Stony Plain North Industrial Stage 4 Development Hydraulic Network Analysis (ISL, 2025). The future land use is proposed to be industrial, commercial, and mixed use and will be serviced by the existing watermain connections located at the intersections of:

- **Boundary Condition 'A':** Slate Avenue and Golf Course Road (Node J-834)
- **Boundary Condition 'B':** Boulder Boulevard and North Park Drive (Node J-870)
- **Boundary Condition 'C':** Highway 16A and 28 Street (Node J-1271)

The study area, watermain diameters, and topography are shown in **Figures 1.1** and **1.2.** It is noted that the elevations used for the model were provided by the Town based on existing topography and may be subject to change depending on the finalized design grading.




LEGEND

- Study Area
- Modelled Junction
- Boundary Condition Location
- Proposed Watermain (300 mm)

**Existing Watermain Diameter**

- 50 mm
- 75 mm
- 100 mm
- 150 mm
- 200 mm
- 250 mm
- 300 mm
- 400 mm
- 600 mm
- Unknown

**Land Use**

- Business Commercial
- Commercial
- Light Industrial
- Mixed Use
- Stormwater Management Facility
- Open Space - Natural Area
- North Industrial Stage 4

TITLE

**STUDY AREA**

PROJECT

STONY PLAIN ASP DESIGN BRIEF

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor, Esri Canada

PROJECTION

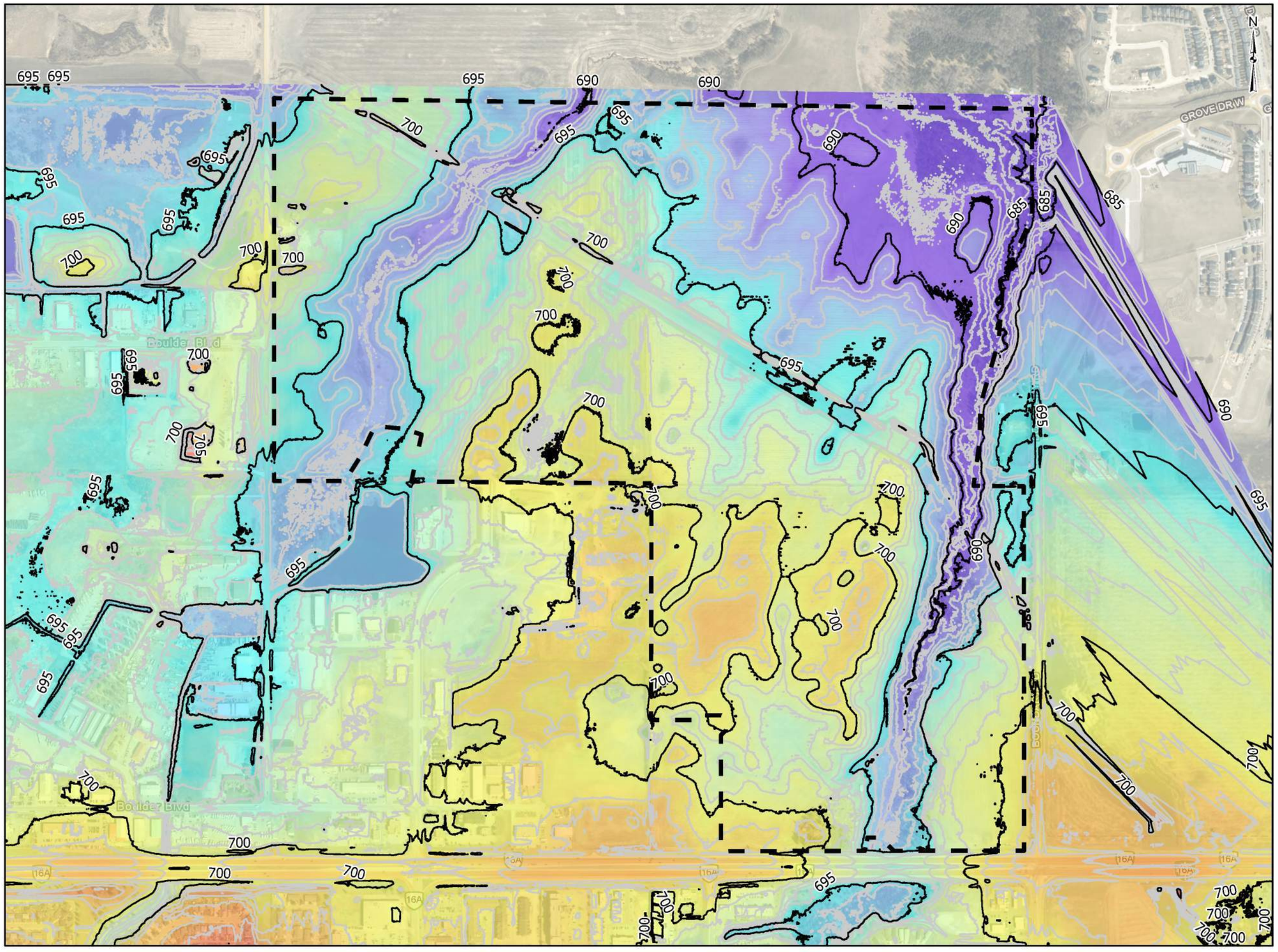
NAD 1983 3TM 114

0 100 200

1:8,000 Meters

| | |
|---|---|
| FIGURE | 1.1 |
| DATE | 2/13/2026 |
| PROJECT NO. | 17060 |
| AUTHOR | ctang |

Document: Z:\Shared\GIS\Projects\17060_Stony_Plain_ASP_Design_Brief\17060_Stony_Plain_ASP_Design_Brief.aprx - Figure 1.1 Study Area




LEGEND

- Study Area
- Contours (5 m interval)
- Contours (1 m interval)

**Elevation**

710 m

680 m

TITLE

**TOPOGRAPHY**

PROJECT

STONY PLAIN ASP DESIGN BRIEF

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor, Esri Canada

PROJECTION

NAD 1983 3TM 114

0 100 200

1:8,000 Meters

| | |
|---|---|
| FIGURE | 1.2 |
| DATE | 2/13/2026 |
| PROJECT NO. | 17060 |
| AUTHOR | ctang |

ISL

Document: Z:\Shared\GIS\Projects\17060_Stony_Plain_ASP_Design_Brief\17060_Stony_Plain_ASP_Design_Brief\17060_Stony_Plain_ASP_Design_Brief.aprx - Figure 1.2 Topography

## 1.2 Design Criteria

Relevant design criteria from the 2025 Design and Construction Standards in Section 7 – Water Distribution Systems are summarized below in **Table 1.1** to **1.4**:

Table 1.1 Equivalent Population by Land Use

| Land Use | Equivalent Population per Hectare |
|---|---|
| | ep/ha |
| Commercial | 37 |
| Industrial | 30 |
| Mixed Use | 25[1] |

[1] Population density assumes that 1/8 of a commercially mixed use area is residential, developed at a density of 125 units/ha at a density of 1.6 persons per unit. This means that the density for commercial mixed use areas is 15.625 units/ha or 25 persons/ha.

Table 1.2 Minimum per Capita Water Demands

| Demand | Value |
|---|---|
| | L/c/d |
| Average Daily Demand (ADD) | 300 |
| Peak Daily Demand (PDD) – 2.0 x ADD | 600 |
| Peak Hour Demand (PHD) – 3.0 x ADD | 900 |

Table 1.3 System Requirements

| Parameter | Value |
|---|---|
| Maximum allowable pressure during ADD | 550 kPa |
| Minimum pressure during PHD | 280 kPa |
| Minimum pressure during PDD+FF | 150 kPa |
| Hazen-Williams Roughness Coefficient – PVC | 130 |
| Minimum Diameter (Industrial/commercial/institutional/high density residential) | 300 mm |
| 300 mm Pipe Flush Velocity | 1.5 m/s |

Table 1.4 Fire Flow Requirements

| Land Use | Building Area | Exposure | Fire Flow | Fire Flow |
|---|---|---|---|---|
| | $m^2$ | | L/min | L/s |
| Commercial | Up to 2,900 | 50% | 11,000 | 183 |
| Commercial | Up to 4,200 | 50% | 14,000 | 233 |
| Light Industrial | Up to 2,900 | 25% | 9,000 | 150 |
| Light Industrial | Up to 2,900 | 50% | 11,000 | 183 |

Note: A conservative fire flow requirement of 233 L/s was assumed for areas designated as mixed use.

# 2.0 Proposed Hydraulic Network Analysis

## 2.1 Water Demand

The water demand was calculated based on the proposed land use within the study area shown in **Figure 1.1** and the Town's design criteria noted in **Section 1.2**. The demands for the North industrial Stage 4 Development were also incorporated in the model (ISL, 2025), considering the area's close proximity and similar proposed land uses to the study area. A summary of these demands is provided below in **Table 2.1.**

Table 2.1 Water Demand Summary

| Land Use | Area | Equivalent Population | Demand | | |
|---|---|---|---|---|---|
| | | | ADD | PDD | PHD |
| | ha | c | L/s | | |
| Commercial | 76.6 | 2,832 | 9.8 | 19.7 | 29.5 |
| Industrial | 33.2 | 995 | 3.5 | 6.9 | 10.4 |
| Mixed Use | 9.5 | 237 | 0.8 | 1.6 | 2.5 |
| **Total within Study Area** | **119.3** | **4,064** | **14.1** | **28.2** | **42.3** |
| North Industrial Stage 4 | 28.2 | 847 | 2.9 | 5.9 | 8.8 |
| **Total Modelled Demands** | **147.5** | **4,911** | **17.0** | **34.1** | **51.1** |

## 2.2 Modelled Boundary Conditions

The water servicing concept was assessed in WaterCAD by Bentley using boundary conditions provided by the Town. The results are based on the total modelled demands shown in **Table 2.1** and the Existing System Model developed for the Town of Stony Plain's Water and Sanitary Master Plan Update (Associated Engineering, 2019). Boundary locations and IDs are shown in **Figure 1.1** while the boundary conditions provided are summarized in **Table 2.2.**

Table 2.2 Boundary Conditions

| Scenario | Assessment Type | Result Type | A (Golf Course Road) Node J-834 | B (Boulder Boulevard) Node J-870 | C (Highway 16A and 28 St) Node J-1271 |
|---|---|---|---|---|---|
| Truckfill Operating | ADD | HGL (m) | 752.2 | 752.2 | 752.2 |
| | PDD | HGL (m) | 750.9 | 750.9 | 750.9 |
| | PHD | HGL (m) | 749.7 | 749.7 | 749.6 |
| | PDD+FF | Available FF (L/s) | 233 at 52.3 psi residual | 233 at 52.1 psi residual | 233 at 43.7 psi residual |
| | Elevation (model) | m | 695.0 | 699.4 | 701.0 |
| Truckfill Not Operating | ADD | HGL (m) | 752.7 | 752.7 | 752.7 |
| | PDD | HGL (m) | 751.7 | 751.7 | 751.6 |
| | PHD | HGL (m) | 750.6 | 750.6 | 750.4 |
| | PDD+FF | Available FF (L/s) | 233 at 54.6 psi residual | 233 at 54.3 psi residual | 233 at 45.8 psi residual |
| | Elevation (model) | m | 695.0 | 699.4 | 701.0 |

Based on the provided boundary conditions, the more critical condition is during the Truckfill Operating scenario; therefore, the water servicing concept for ADD, PDD, and PHD was assessed using the boundary conditions under this scenario. The fire flow boundary condition is based on a minimum zone pressure of 40 psi and capped at 233 L/s. It is recommended that Truckfill services be halted during firefighting operations to maintain system pressure and sufficient water volume within the reservoir storage to support firefighting. Therefore, the Truckfill Not Operating scenario was used for the PDD+FF concept assessment. The boundary conditions are represented in the model as a fixed reservoir at the set hydraulic grade line (HGL), varying based on the demand conditions being analyzed (i.e., ADD, PDD, PHD, PDD+FF).

## 2.3 System Analysis

The water servicing concept was assessed using the Truckfill Operating scenario boundary conditions for ADD, PDD, and PHD and meets the minimum pressure criteria outlined in the Town's 2025 Design and Construction Standards. The ADD, PDD, and PHD pressure results are shown in **Figures 2.1** to **2.3**, respectively, and summarized in **Table 2.3**.

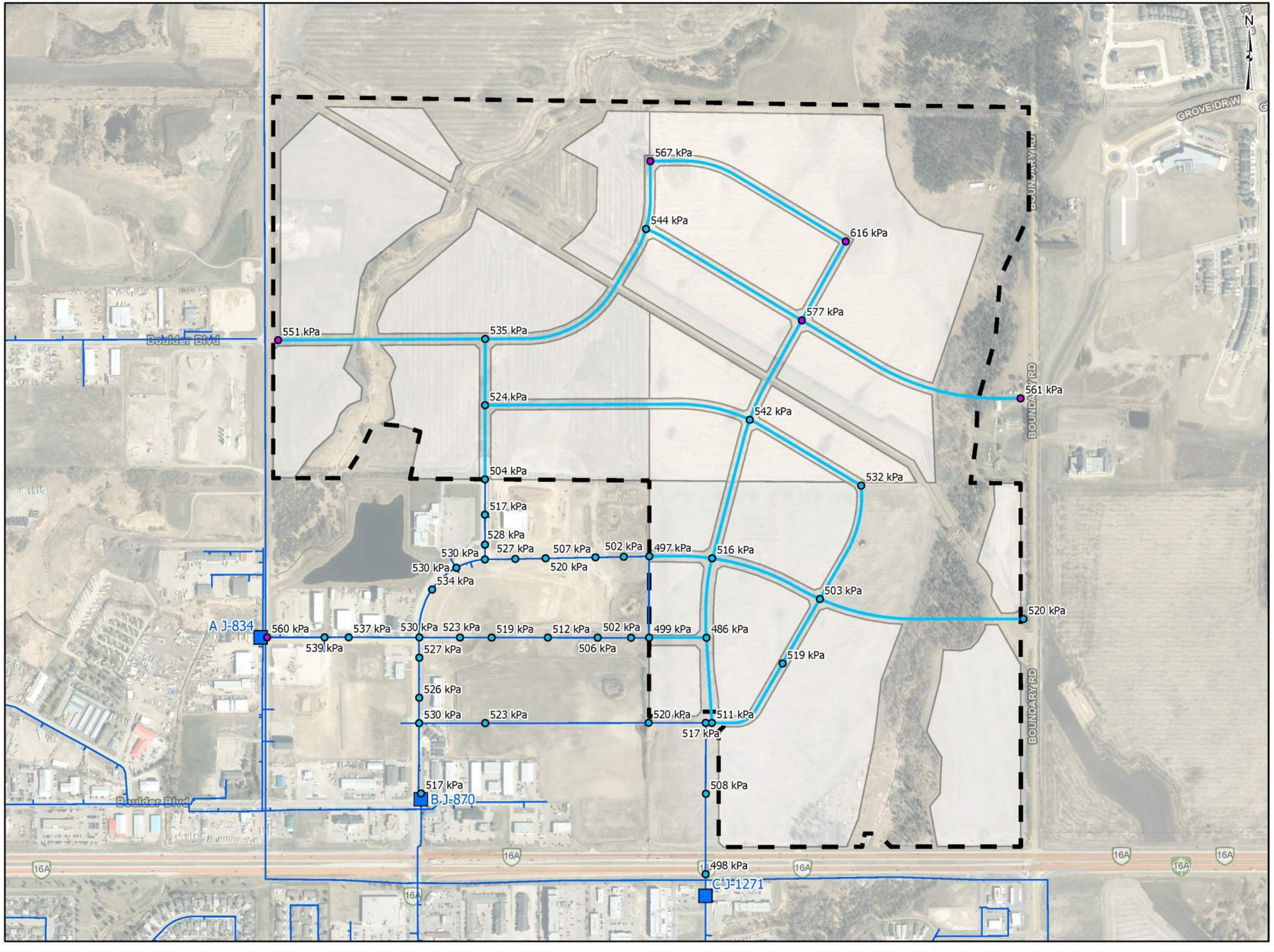
Table 2.3 Pressure Results Summary

| Scenario | Lowest Pressure | Location | Highest Pressure | Location |
|---|---|---|---|---|
| | kPa | | kPa | |
| ADD | 486 | J-31 | 616 | J-40 |
| PDD | 473 | J-31 | 602 | J-40 |
| PHD | 461 | J-31 | 589 | J-40 |

There is minimal concern with servicing the proposed development under ADD, PHD, and PHD conditions. Six nodes, primarily located in the northeast corner of the study area, do however exceed 550 kPa in the ADD scenario, with less exceedances in the PDD and PHD scenarios. This is not unexpected, given the topography naturally slopes towards the northeast corner of the study area. It is possible that these locations will experience higher stress and could potentially be of concern unless the pipes have an appropriate pressure rating, which could be confirmed at the design stage (i.e., pressure rating adequate for 89.3 psi). This is a localized assessment criteria exceedance and is not anticipated to negatively impact the study area. If these nominally higher pressures are ultimately a concern to the Town, an additional pressure zone within the northeast quarter section, localized PRVs on services, or additional site regrading could be considered.

The water servicing concept was assessed using the Truckfill Not Operating scenario boundary condition for PDD+FF. The PDD+FF results are shown in **Figure 2.4**. The fire flow requirement for the proposed development is capped at 233 L/s as per the boundary conditions provided by the Town. The system can meet the 233 L/s requirement for all proposed land use types at a minimum pressure of 150 kPa within the study area.

The demand within the study area in combination with the larger watermains based on the design criteria requirements will result in a low flow velocity within the proposed watermains. The minimum flushing velocity as outline in **Section 1.1** for watermains less than or equal to 300 mm is 1.5 m/s, therefore periodic flushing within the proposed development is recommended to maintain water quality.




LEGEND

- Boundary Condition Location
- Existing Watermain
- Proposed Watermain
- Study Area
- Parcel

**Pressure**

- Less than 280 kPa
- 280 kPa - 350 kPa
- 350 kPa - 550 kPa
- Greater than 550 kPa

TITLE
**ADD PRESSURE**

PROJECT
STONY PLAIN ASP DESIGN BRIEF

CLIENT
TOWN OF STONY PLAIN

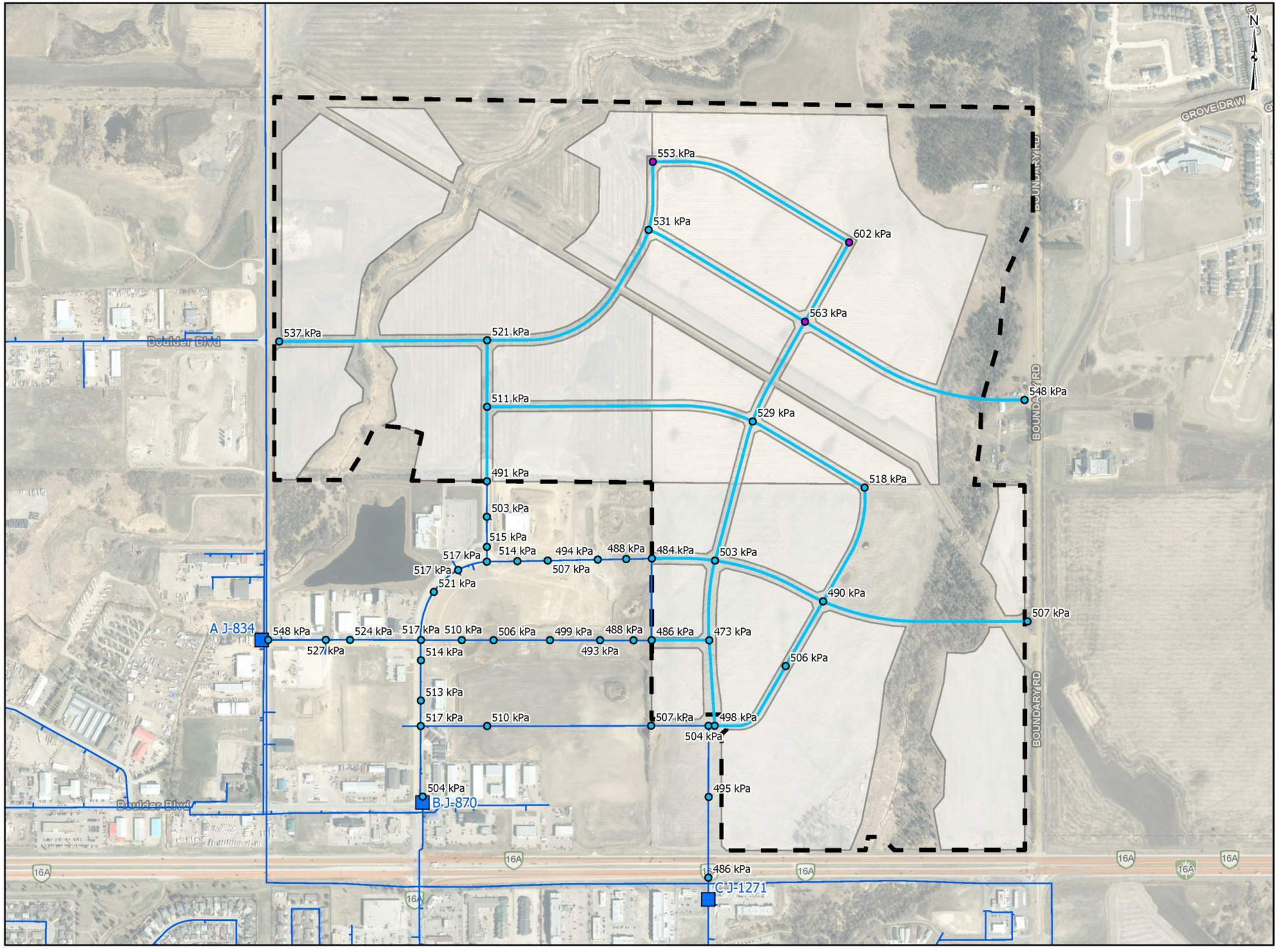
DATA SOURCES
- Topographic Map:Parkland County, Vantor, Esri Canada

PROJECTION
NAD 1983 3TM 114

0 100 200
1:8,000 Meters

| | |
|---|---|
| FIGURE | 2.1 |
| DATE | 2/13/2026 |
| PROJECT NO. | 17060 |
| AUTHOR | ctang |

Document: Z:\Shared\GIS\Projects\17060_Stony_Plain_ASP_Design_Brief\17060_Stony_Plain_ASP_Design_Brief.aprx - Figure 2.1 ADD Pressure




LEGEND

- Boundary Condition Location
- Existing Watermain
- Proposed Watermain
- Study Area
- Parcel

**Pressure**

- Less than 280 kPa
- 280 kPa - 350 kPa
- 350 kPa - 550 kPa
- Greater than 550 kPa

TITLE
**PDD PRESSURE**

PROJECT
STONY PLAIN ASP DESIGN BRIEF

CLIENT
TOWN OF STONY PLAIN

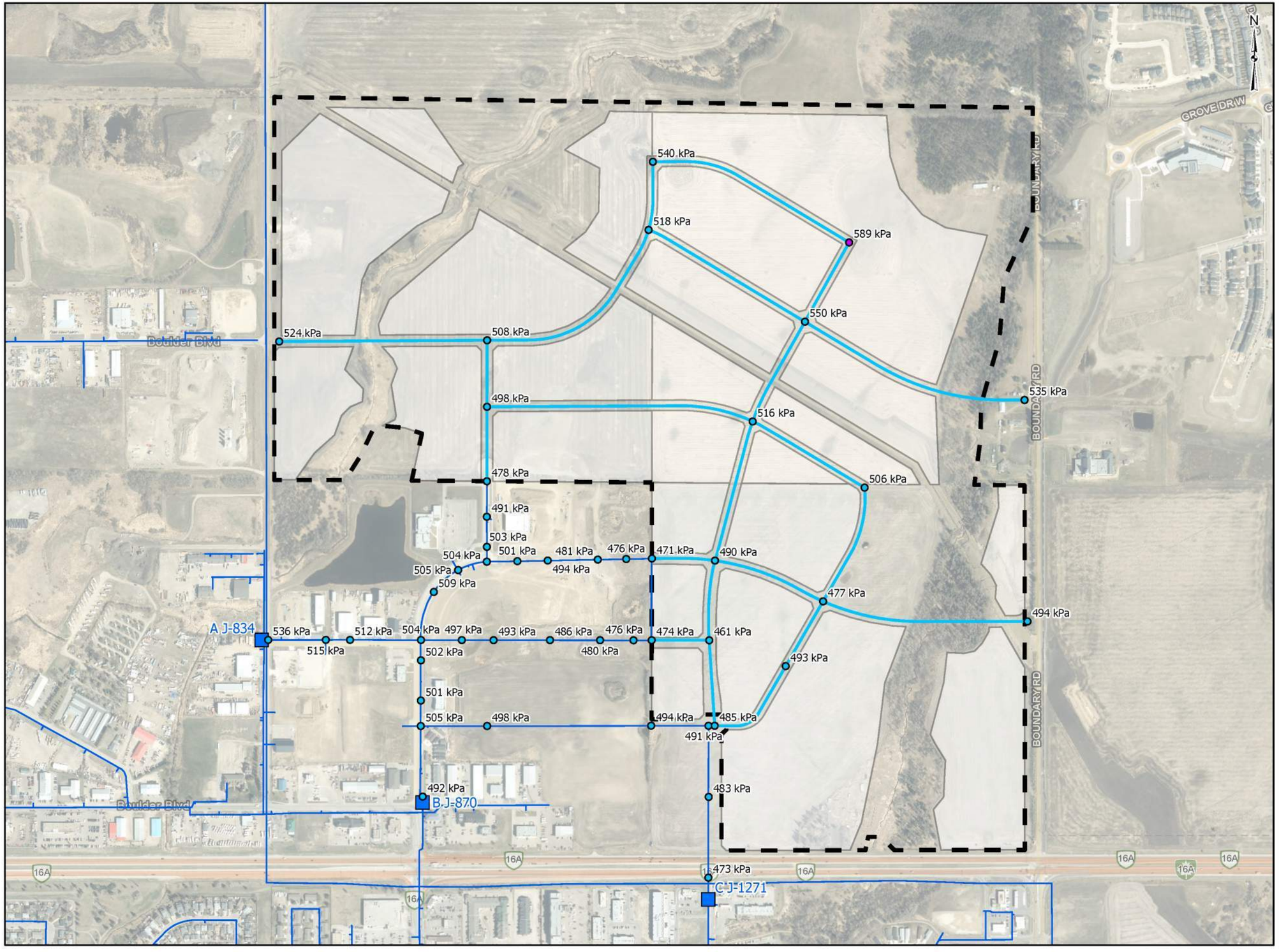
DATA SOURCES
- Topographic Map:Parkland County, Vantor, Esri Canada

PROJECTION
NAD 1983 3TM 114

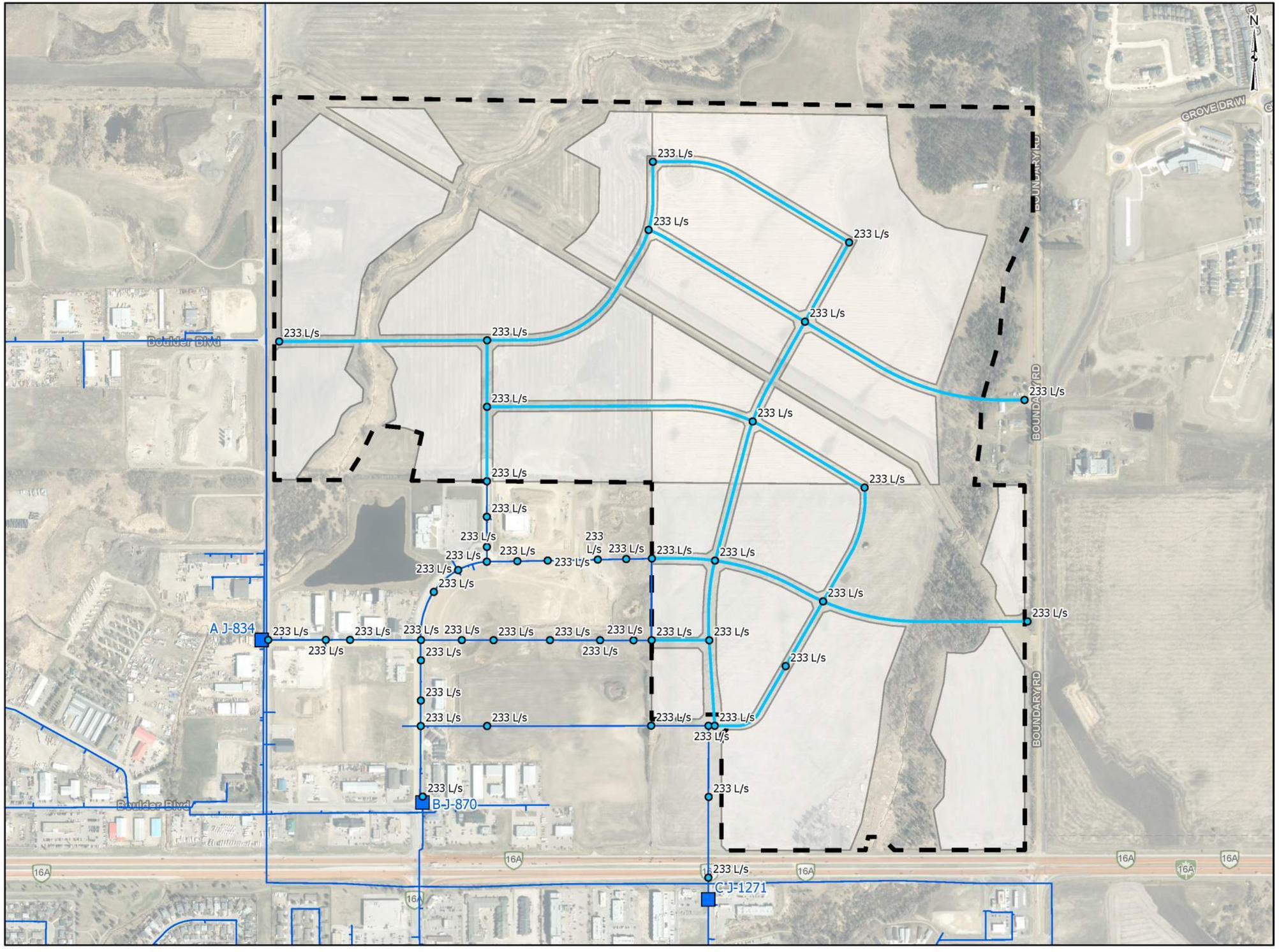
0 100 200
1:8,000 Meters

| | |
|---|---|
| FIGURE | 2.2 |
| DATE | 2/13/2026 |
| PROJECT NO. | 17060 |
| AUTHOR | ctang |

Document: Z:\Shared\GIS\Projects\17060_Stony_Plain_ASP_Design_Brief\17060_Stony_Plain_ASP_Design_Brief.aprx - Figure 2.2 PDD Pressure




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LEGEND

- Boundary Condition Location
- Existing Watermain
- Proposed Watermain
- Study Area
- Parcel

**Available Fire Flow**

- Less than 150 L/s
- 150 L/s - 183 L/s
- 183 L/s - 233 L/s
- Greater than 233 L/s

TITLE
**PDD+FF**

PROJECT
STONY PLAIN ASP DESIGN BRIEF

CLIENT
TOWN OF STONY PLAIN

DATA SOURCES
- Topographic Map:Parkland County, Vantor, Esri Canada

PROJECTION
NAD 1983 3TM 114

0 100 200
1:8,000 Meters

| | |
|---|---|
| FIGURE | 2.4 |
| DATE | 2/13/2026 |
| PROJECT NO. | 17060 |
| AUTHOR | ctang |

Document: Z:\Shared\GIS\Projects\17060_Stony_Plain_ASP_Design_Brief\17060_Stony_Plain_ASP_Design_Brief.aprx - Figure 2.4 PDD+FF

## 3.0 Conclusion and Recommendations

The proposed water system for the Stony Plain ASP can connect to the existing water distribution system and receive sufficient flows to service the study area during the more conservative Truckfill Operating scenario for ADD, PDD, and PHD conditions. There are also sufficient flows to service the study area during the Truckfill Not Operating scenario for the PDD+FF condition. The system can provide sufficient capacity to service the study area, meeting the Town's design criteria and minimum pressure requirements.

The following recommendations have been made to help maintain the existing and proposed water distribution system:

- **Pressure Management:** Ensure pipes located in the northeast portion of study area have an appropriate pressure rating to handle the higher pressures anticipated during ADD and PDD conditions.
- **Periodic Flushing:** Conduct periodic flushing to ensure the proposed developments have adequate water quality.
- **Halt Truckfill Operation during Fire Flow Events:** Halt truckfill operation during a firefighting event to help maintain system pressure and sufficient water volume in the reservoir storage.

If localized high pressures remain a concern to the Town, options such as creating an additional pressure zone, installing pressure reducing valves, or site regrading can be considered to mitigate exceedances.

## 4.0 References


- Associated Engineering. 2019. Town of Stony Plain Water and Sanitary Master Plan Update.
- ISL Engineering and Land Services Ltd. 2025. Stony Plain North Industrial Stage 4 Hydraulic Network Analysis.
- Town of Stony Plain. 2025. 2025 Design and Construction Standards.

## 5.0 Authorization

This document entitled “Stony Plain ASP Design Brief - Hydraulic Network Analysis” has been prepared by ISL Engineering and Land Services Ltd. (ISL) for the use of the Town of Stony Plain. The information and data provided herein represent ISL’s professional judgment at the time of preparation. ISL denies any liability whatsoever to any other parties who may obtain this report and use it, or any of its contents, without prior written consent from ISL.

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February 26 2026

Sarah Barbosa, P.Eng., ENV SP
Technical Reviewer

**PERMIT TO PRACTICE**

*ISL Engineering and Land Services Ltd.*

RM Signature:
RM APEGA ID: 81770
Date: 26 February 2026

PERMIT NUMBER: P 4741
The Association of Professional Engineers and Geoscientists of Alberta

Darin Hicks, P.Eng.
Project Manager

# APPENDIX B
## Stormwater Management Plan

# 2. Stormwater Management Plan

STONY PLAIN
AREA STRUCTURE PLAN
NW 1/4, SE 1/4 and NE 1/4
SECTION 6 – 53 – 27 –W4M

# STORMWATER MANAGEMENT PLAN

**Prepared For: Scheffer Andrew Ltd.**

**Prepared By: Bob Quazi, M.Sc., P.Eng., CPESC**

**River Engineering Consulting**

**Dated: 2026- 02- 19**

# EXECUTIVE SUMMARY

Scheffer Andrew Ltd. is preparing an Area Structure Plan (ASP) for Stony Plain Lands Inc. Lands owned by Stony Plain Lands Inc. are located in the north east part of the Town. River Engineering Consulting was retained to prepare a Stormwater Management Plan (SWMP) for the ASP lands. The objective of the SWMP is to prepare a design to control the 100-Year rainfall runoff in such a manner that the stormwater outflow from the site is limited to the Predevelopment Rate of 2.5 L /s /ha.

For analysis of the SWMF's, the ASP lands were subdivided into four basins. Each of the basin had a Stormwater Management Facility (SWMF). On each SWMF, outflow was controlled by an Orifice to the Pre-development rate. The 100-Year rainfall (City of Edmonton -24 Hour 100- Year Huff Distribution Storm) was simulated using HydroCAD Stormwater Modeling System (Version 10-20-6 -2024) to generate the stormwater outflow from the Basins. SWMF's design results were:

| SWMF* | Invert[1] (m) | Required[2] Storage ($m^3$) | Storage[3] Provided ($m^3$) | Peak Outflow $m^3/s$ | Allowed Peak Outflow $m^3/s$ (2.5 L/s/ha) |
|---|---|---|---|---|---|
| Central | 694.50 | 31,988 | 26,728 | 0.085 | 0.11 |
| North East | 684.70 | 35,092 | 30,498 | 0.072 | 0.12 |
| North West | 690.70 | 21,975 | 18,451 | 0.062 | 0.085 |
| North West 2 | 690.70 | 10,868 | 9,626 | 0.021 | 0.05 |

SWMF* - Wet Ponds, Invert[1]-Pond Bottom, Required Storage[2]- 100 - Year basin outflow volume.

Storage Provided[3]- Additional Outflow through Orifice.

The designed SWMF's meet the water quality requirement by Alberta Environment and Protected Areas (AEP). All the SWMF's discharge to the two creeks flowing through the site.

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**Figure 7 – Central SWMF HydroCAD Routing Summary**

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**Figure 9 – North East SWMF Inflow / Outflow**

**Figure 10 – North East SWMF Routing Summary**

**Figure 11 – North West 1 Outflow Hydrograph**

**Figure 12 – North West 1 SWMF Inflow / Outflow Hydrograph**

**Figure 13 – North West 1 Inflow /outflow Hydrograph**

**Figure 14 - NW Basin 2 - Inflow /Outflow Routing**

# 1.0 Background

Stony Plain Land Inc. is planning to file for a commercial / industrial subdivision approval application with the Town of Stony Plain. Scheffer Andrew Ltd. is preparing an Area Structure Plan (ASP) for the support of the planned subdivision application. The legal of the lands included in the ASP is NW 6, SE 6 and SW 6 - 53 – 27 - W4M. These lands are located (**Figure 1**) in the north east part of the Town, north of Hwy. #16 A and east of Golf Course Road. The area of the ASP covers three-quarter (1/4) Sections of land. There is an existing commercial / industrial subdivision in SW 6 – 53 – 27 – W4M.

River Engineering Consulting was retained by Scheffer Andrew Ltd. to prepare a Stormwater Management Plan Report for the ASP lands.

# 2.0 Reference Reports

The following Reports were consulted for the background material for this study:

1. 2025 Design and Construction Standards – Town of Stony Plain.
2. Stormwater Master Plan – Town of Stony Plain – SamEng Inc., 2019.
3. Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage System, Alberta Environment and Protected Areas (2013).
4. Stormwater Management Guidelines for the Province of Alberta – Alberta Environmental Protection – January 1999.
5. City of Edmonton Design & Construction Standards - Volume 3 – Drainage – City of Edmonton – March 2004.
6. Big Lake Basin Task Force – Big Lake Stormwater Management Plan – Associated Engineering – May 2004
7. Geotechnical investigation - J.R. Paine & Associates June 3, 2025.
8. U.S Soil Conservation Service (SCS) – NEH 4, 1985

## 3.0 Subsurface Soils

J.R. Paine and Associates (January 3, 2025) conducted drilling on the site to determine soils and groundwater levels. Soil investigations were carried out on the site on September 30 and October 1-3, 2024. Twenty-eight holes were drilled on the site with a truck mounted rig. All of these holes were carried to a depth between 8.8 m to of 11.9 m. As the drilling progressed a record was kept of the soil types and its variations in depth. Samples were also collected for the laboratory analysis. The general geology of the site is composed of undivided, ice contact lacustrine and fluvial deposits of Pleistocene age. These deposits consist of gravel, sand, silt and local till.

Top soil at all test holes ranged in thickness from 100 to 900 mm with average thickness of 485 mm. Subsurface deposits were of fluvial sandy silt encountered in most test holes. The silt layer ranged in thickness from 0.6 m to 1.5 m below ground surface. Lacustrine Clay was encountered below the silt layer in all test holes. The clay was generally described as silty, sandy moist and stiff. Lacustrine clay continued to termination depth of all holes.

Based on the J.R. Paine geotechnical drilling report, the subsurface material is classified as Silt Loam or Loam. In Soil Conservation Service (**SCS**) runoff analysis method (SCS- NEH 4, 1985) soils are classified into hydrologic soil groups (HSG's) to indicate the minimum rate of infiltration for the soil after prolonged wetting. The HSG's classes are A, B, C and D. This soil classification is one element used in determining runoff curve numbers for the runoff analysis in HydroCAD Stormwater modelling System. Based on the above soil analysis information, the subsurface soil is classified as Silt Loam (HSG B). These soils have moderate infiltration rate (0.15 to 0.30 in / hr.) when thoroughly wetted.

## 4.0 ASP Lands - Proposed Uses

The development concept for the ASP lands is shown on **Figure 2**. **Figure 3** shows Land Uses for the ASP lands. Lots around Whispering Waters Creek are Light Industrial. In the southern part of

the ASP the lots shown are Commercial. Lots in the central and eastern area are Business Commercial. Environmental Reserve Lines are drawn on the east and west side of the Atim Creek and Whispering Waters Creek. There are four Stormwater Management Facilities (**SWMF – Figure 3**) provided to receive the 100-Year runoff from the contributing basin, store and release it at the pre-development runoff rate of 2.5 L / S /ha (Big Lake SW Management Plan, 2004).

## 5.0 Whispering Waters Creek, Atim Creek – Existing Drainage

ASP lands (**Figure 1**) are traversed by two Creeks flowing from south through the Town of Stony Plain. Existing drainage from the lands west of Whispering Waters Creek inflows into this creek. Area east of Whispering Waters Creek and area west of Atim Creek flows into Atim Creek. The remainder of the area outflows to north east. There are small areas of wetland and local high areas of highland. There is no off-site drainage coming into the ASP Lands.

## 6.0 Stormwater Management System

Town of Stony Plain Municipal Standards (2020) require that the stormwater runoff generated from within the subdivision shall be routed through a SWMF (Stormwater Management Facility) to regulate the rate of outflow to the predevelopment level. Each drainage system has to be based on the following concepts:

- Minor System consisting of underground pipes to convey 1: 5 Year flood flows without surcharging.
- Major System consisting of surface flood paths, roadways, drainage parkways and water course to convey 1: 100 Year flood flow volume to the SWMF.

Stormwater Management Plan for the ASP lands was based on the above concepts.

## 7.0 SWMF's / Drainage Basins

The Stormwater Management Facilities (SWMF's) provided for the proposed ASP lands are shown on **Figure 3**. These SWMS's contributing basins are described as:

- Central Basin
- NE Basin
- NW Basin 1
- NW Basin 2

**Figure 3** shows the contributing areas for theses basins. The outfalls for the SWMF's are also shown (**Figure 3)**.

## 8.0 Stormwater Management – Criteria

Stormwater Management design for the proposed SWMF's for the ASP lands (**Figure 3)** was carried out to meet the following standards and guidelines:

1. Alberta Environment Stormwater Management Guidelines (Alberta Environmental Protection, 1999).
2. 2025 Design and Construction Standards – Town of Stony Plain.
3. City of Edmonton (EPCOR) Stormwater Management Guidelines (V-3.02).

2025 Design and Construction Standards – Town of Stony Plain recommends:

The Stormwater Pond to be designed to contain the most critical of the following storm events:

- 100-Year 24 Hour Synthetic design event for Edmonton based on Huff distribution.
- July 12-15, 1937 Edmonton Storm.
- July 10 -11, 1978 Edmonton Storm.

- July 12, 2012 Edmonton Storm.
- July 2-3, 2004 Edmonton Storm.

Edmonton (EPCOR Stormwater Guidelines V-3.02), recommends use of 24 hours 100 -Year Huff distribution storm for the design of SWMF along with the historical floods data as listed above for Edmonton Storms. 1978 Edmonton storm had total precipitation of 138 mm, the highest among all the other storms. The data used in calculation Huff distribution for Edmonton is based on 11 gauges for 37 years period, therefore it is more reliable. The total precipitation calculated for 100- Year Huff storm was 128 mm. As the SWMF will have min 0.3 m or higher freeboard it can contain 138 mm storm (1978) safely. Therefore, the SWMF's for the ASP area was based on the 24 Hour 100-Year Huff Distribution Storm based on City of Edmonton data.

Other factors that the SWMF has to meet are:

- Stormwater Pond outflow to be limited to the predevelopment rate of flow of 2.50 L/s /ha. This outflow rate is based on the Big Lake Drainage Study (2004) by Associated Engineers.
- AEP Water Quality Requirement: Storm detention facility to enhance water quality by settlement of 85% of the fraction coarser than 0.075 mm of the suspended sediment load.

# 9.0 HydroCAD Stormwater Model

**HydroCAD (Version 10-20-4b, 2024**) model was used in simulating the rainstorm runoff from the site. It is based largely on the hydrology techniques developed by the U.S Soil Conservation Service (SCS) combined with other hydrology and hydraulics methods. Basic input to the model is the contributing flow areas and their types (i.e. Lots, Grassed Areas, Roads, MR / ER etc.). Related to the inflow areas are the **CN** values and the time of concentration - Tc. **CN** value is a

function of the soil type, ground cover and vegetation. Planned land use also affects the **CN** curve number selection.

Curve Number (CN) is used to determine the portion of the precipitation depth that will appear as runoff. In developed areas CN value depends on the density of the development. A high CN value (98 for pavement) indicates low retention and high runoff, while a low CN (30 for wooded areas) indicates high retention capability and low runoff potential. HydroCAD has built in table for selecting CN values. Curve number was selected based on the soil type (**HSG B- Silt Loam**) and land use determined from the site development plans.

Tc (Time of concentration) is defined as the time required for a particle of water to travel from the farthest point in the watershed to the outflow point (i.e. Detention Pond, Channel). Tc introduces the time element into the runoff calculation equation used in the HydroCAD model. HydroCAD provides a number of methods to calculate Tc. Lag /CN method was used to calculate Tc value for the HydroCAD simulation.

# 10.0 Design - Central SWMF

## 10.1 Input Data HydroCAD Simulation

The summary (**Table 1**) shows the classification of different runoff surfaces of the Central Basin, their areas (ha) and CN values for input to the HydroCAD model. This data was taken from the Central Basin Land Use Plan (**Figure 2**).

Tc (Time of concentration) calculation is summarized at the bottom of the **Table 1**. Calculated weighted CN values and the split of pervious and impervious areas is also given in **Tables 1**. **Table 2** shows the setting for the rainfall event and AMC (Antecedent Moisture Level) for the analysis. **Table 3** gives the summary of the results for the event used in the rainfall analysis (100 -Year Huff storm from the City of Edmonton (EPCOR) Stormwater Management Guidelines (V- 3.02).

**Summary for Subcatchment CentralCatchment: CentralCatchment**

Runoff = 1.1227 m³/s @ 6.28 hrs, Volume= 31.988 M, Depth> 72 mm
Routed to Pond 1Central SWPondP : Central SWPond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-26.00 hrs, dt= 0.05 hrs
Edmonton Huff 2022 100-yr Rainfall=128 mm

| | Area (ha) | CN | Description |
|---|---|---|---|
| * | 12.8000 | 75 | Urban commercial, 75% imp, HSG B |
| | 2.8000 | 92 | Urban commercial, 85% imp, HSG B |
| * | 4.2400 | 75 | Urban commercial, 75% imp, HSG B |
| * | 1.6200 | 75 | Urban commercial, 75% imp, HSG B |
| * | 1.6900 | 75 | Urban commercial, 75% imp, HSG B |
| * | 2.1300 | 75 | Urban commercial, 75% imp, HSG B |
| * | 2.6500 | 75 | Urban commercial, 75% imp, HSG B |
| * | 1.3200 | 75 | Urban commercial,75% imp, HSG B |
| * | 4.9900 | 75 | Urban commercial, 75% imp, HSG B |
| | 1.0000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.7200 | 61 | >75% Grass cover, Good, HSG B |
| | 0.7300 | 61 | >75% Grass cover, Good, HSG B |
| | 3.0200 | 98 | Water Surface, HSG B |
| | 0.9300 | 98 | Paved roads w/curbs & sewers, HSG B |
| | 2.3300 | 98 | Paved roads w/curbs & sewers, HSG B |
| | 1.6600 | 98 | Paved roads w/curbs & sewers, HSG B |
| | 44.6300 | 79 | Weighted Average |
| | 10.7300 | | 24.04% Pervious Area |
| | 33.9000 | | 75.96% Impervious Area |

| Tc (min) | Length (meters) | Slope (m/m) | Velocity (m/sec) | Capacity (m³/s) | Description |
|---|---|---|---|---|---|
| 96.2 | 759.0 | 0.0050 | 0.13 | | **Lag/CN Method, Lag/CN** |

**Table 1 – Input Ground Data Central SWMF - HydroCAD Simulation**

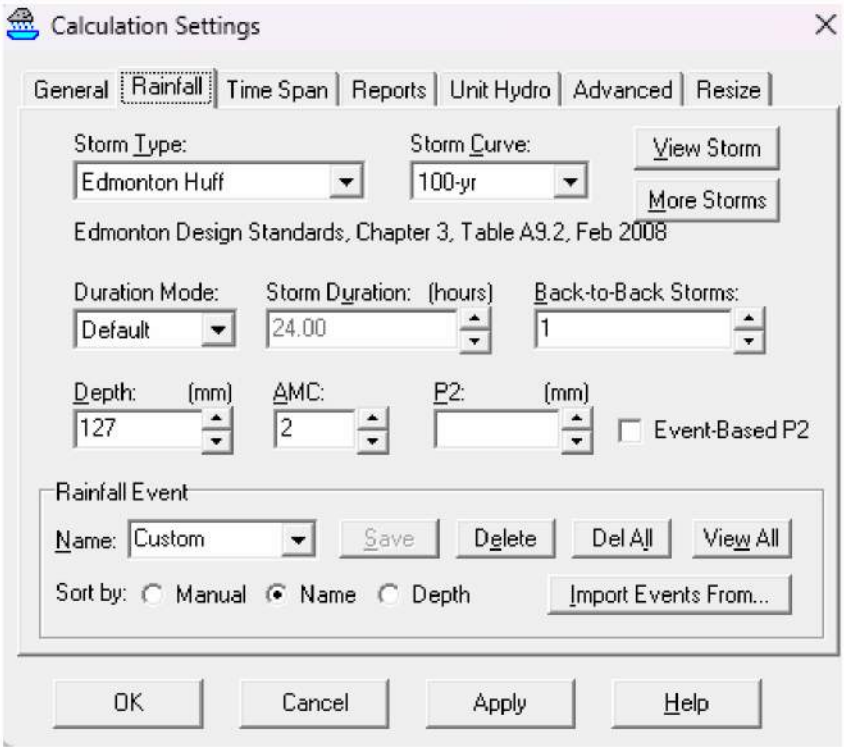



**Table 2 – Storm Event 100 -Year Edmonton Huff Settings**

**Events for Subcatchment CentralCatchment: Centr**

| Event | Rainfall (mm) | Runoff ($m^3/s$) | Volume (Mega-liters) | Depth (mm) |
|---|---|---|---|---|
| 100-yr | **128** | **1.3200** | **37.457** | **68** |

**Table 3 – Rainfall event simulation summary**

**Figure 5** gives the outflow hydrograph for the Central SWMF basin. The outflow peak is 1.122 $m^3/s$ and the volume of flow is 31,988 $m^3$. Depth of runoff is 72 mm.

## 10.2 Post-development Runoff - Central SWMF

Post-development runoff for the Central SWMF was generated by HydroCAD simulation. **Figure 6** shows the Inflow /Outflow hydrograph for this simulation. **Figure 7** gives the HydroCAD Routing summary for this SWMF. The outflow from the SWMF is controlled by a 225 mm Orifice. Peak outflow from the orifice is 0.085 $m^3/s$ (Allowable = 0.111 based on 2.5 L / s/ ha). Flood level (HWL) reached in the SWMF is 697.27 m. Top of SWMF (FOB level) is 698.00 m. The SWMF is a Wet facility with 2.0 m of dead water.

# 11.0 North East (NE) SWMF

Location of the North East SWMF is shown on **Figure 3**. A HydroCAD model was setup for modeling this SWMF. **Figure 8** shows the outflow Hydrograph for the 100- Year flood is given below. **Figure 9** shows the Inflow /Outflow Hydrograph for the SWMF. **Figure 10** gives the data routing summary for the SWMF analysis. The following table shows the input data to the HydroCAD model and the hydrograph results:

**Summary for Subcatchment NEModifiedBasin: NEBasin**

Runoff = 1.2445 m³/s @ 6.08 hrs, Volume= 35.092 M, Depth> 69 mm
Routed to Pond NESWPond : NESWPond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-26.00 hrs, dt= 0.05 hrs
Edmonton Huff 2022 100-yr Rainfall=128 mm

| | Area (ha) | CN | Description |
|---|---|---|---|
| * | 4.0600 | 75 | Urban commercial, 75% imp, HSG B |
| * | 17.1700 | 75 | Urban commercial, 75% imp, HSG B |
| * | 2.4500 | 75 | Urban commercial, 75% imp, HSG B |
| * | 3.0100 | 75 | Urban commercial, 75% imp, HSG B |
| * | 3.5400 | 75 | Urban commercial, 75% imp, HSG B |
| * | 2.4200 | 75 | Urban commercial, 75% imp, HSG B |
| * | 2.4400 | 75 | Urban commercial, 75% imp, HSG B |
| | 0.1900 | 61 | >75% Grass cover, Good, HSG B |
| | 0.7400 | 61 | >75% Grass cover, Good, HSG B |
| | 3.5600 | 98 | Water Surface, HSG B |
| | 4.1800 | 98 | Paved roads w/curbs & sewers, HSG B |
| | 2.2600 | 98 | Paved roads w/curbs & sewers, HSG B |
| | 4.5300 | 61 | >75% Grass cover, Good, HSG B |
| | 50.5500 | 78 | Weighted Average |
| | 14.2325 | | 28.16% Pervious Area |
| | 36.3175 | | 71.84% Impervious Area |

| Tc (min) | Length (meters) | Slope (m/m) | Velocity (m/sec) | Capacity (m³/s) | Description |
|---|---|---|---|---|---|
| 81.9 | 598.0 | 0.0050 | 0.12 | | **Lag/CN Method, LAg/CN** |

**Table 4: North East SWMF HydroCAD Routing Summary**

The results are:

Peak Flood (HW) Level = 688.558 m

Top of SWMF (FOB) = 689.45 m

200 mm Orifice Peak Outflow = 0.0722 $m^3$/ s, Allowable = 0.126 $m^3$/s (Based on 2.5 L /s /ha).

The depth of dead water in the facility is 3.0 m.

## 12. North West 1 SWMF

North West 1 SWMF is shown on **Figure 3**. Basin Outflow Hydrograph is shown on **Figure 11.**

**Table 5** gives the simulation results and the input data summary.

**Table 5- Input Data and Simulation Results**

**Summary for Subcatchment NWBasin: NWBasin**

Runoff = 0.7564 m³/s @ 6.51 hrs, Volume= 22.248 M, Depth> 65 mm
Routed to Pond NWSWPond : NWSWMF

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Edmonton Huff 2022 100-yr Rainfall=128 mm

| | Area (ha) | CN | Description |
|---|---|---|---|
| * | 4.7100 | 72 | Urban industrial, 72% imp, HSG B |
| * | 3.8800 | 72 | Urban industrial, 72% imp, HSG B |
| * | 4.9800 | 75 | Urban commercial, 75% imp, HSG B |
| * | 8.6300 | 72 | Urban industrial, 72% imp, HSG B |
| * | 4.8400 | 72 | Urban industrial, 72% imp, HSG B |
| | 2.6100 | 98 | Paved roads w/curbs & sewers, HSG B |
| | 0.7500 | 98 | Paved roads w/curbs & sewers, HSG B |
| | 2.0200 | 98 | Water Surface, HSG B |
| | 0.1700 | 61 | >75% Grass cover, Good, HSG B |
| | 1.6700 | 61 | >75% Grass cover, Good, HSG B |
| | 34.2600 | 76 | Weighted Average |
| | 9.2618 | | 27.03% Pervious Area |
| | 24.9982 | | 72.97% Impervious Area |

| Tc (min) | Length (meters) | Slope (m/m) | Velocity (m/sec) | Capacity ($m^3$/s) | Description |
|---|---|---|---|---|---|
| 105.6 | 763.0 | 0.0050 | 0.12 | | **Lag/CN Method, Lag/CN** |

The NW 1 SWMF was simulated in HydroCAD. Inflow / outflow hydrograph for the simulation is shown on **Figure 12**. HydroCAD Routing summary for the simulation is on **Figure 13**. The Peak outflow from 125 mm Orifice is 0.0621 $m^3/s$ (Allowable is 0.085 $m^3/s$). Peak flood (HW) level is 694.35 m. SWMF top (FOB) is 695.20. 3.0 m of dead water is provided to create a wet pond.

## 13. North West 2 SWMF

The location of North West SWMF (NW2) is shown on **Figure 3**. Basin Outflow Hydrograph is shown on **Figure 14**.

**Summary for Subcatchment NWBASIN2: NWSWMF01**

Runoff = 0.3741 $m^3/s$ @ 6.27 hrs, Volume= 10.952 M, Depth> 54 mm
Routed to Pond NWSWMF01 : NWSWMF01

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-27.00 hrs, dt= 0.05 hrs
Edmonton Huff 2022 100-yr Rainfall=128 mm

| | Area (ha) | CN | Description |
|---|---|---|---|
| * | 3.7000 | 72 | Urban industrial, 72% imp, HSG B |
| * | 10.2000 | 72 | Urban industrial, 72% imp, HSG B |
| * | 3.4200 | 75 | Urban commercial, 75% imp, HSG B |
| | 2.8600 | 61 | >75% Grass cover, Good, HSG B |
| | 20.1800 | 71 | Weighted Average |
| | 7.6070 | | 37.70% Pervious Area |
| | 12.5730 | | 62.30% Impervious Area |

| Tc (min) | Length (meters) | Slope (m/m) | Velocity (m/sec) | Capacity ($m^3/s$) | Description |
|---|---|---|---|---|---|
| 75.1 | 418.0 | 0.0050 | 0.09 | | **Lag/CN Method, Lag/CN** |

**Table 6 – North West Basin 2 Data Summary and Basin Outflow Results**

**Figure 15** gives the inflow / outflow Hydrographs for the SWMF. SWMF Routing results are given on Figure 16. Orifice Peak outflow is 0.0219 $m^3/s$ (Allowable is 0.050 based on 2.5L /s /ha). 100-Year flood Peak (HW) Elevation = 694.215 m. SWMF top (FOB) = 695.20m.

## 14. SWMF's Design Summary

| SWMF | Top - FOB (m)* | Flood Elevation - HW (m) | Invert Bottom Level(m) |
|---|---|---|---|
| Central | 698.0 | 697.269 | 694.5 |
| NE | 689.45 | 688.558 | 684.7 |
| NW 1 | 695.20 | 694.351 | 690.70 |
| NW 2 | 695.20 | 694.251 | 690.70 |

- Elevations from ISL Grading Plan Figure 4.

## 15. Stormwater Management - East of Atim Creek -Adequate Outlet

This area is a long narrow strip consisting of two lots of 7.87 ha and 1.88 ha. Atim Creek forms the west boundary of this area. Alberta Environment and Protected Areas under Water Act Code of Practice for Outfall Structures for Water Bodies allows construction of an outfall and discharge of stormwater without approval if conditions of an Adequate Outlet are met. For a storm drainage discharge outlet to be considered an Adequate Outlet, the outfall must Not measurably:

- Alter the natural peak flow or water level of the water body receiving the storm drainage.
- Change or capable of changing the location of the water or the direction of the flow of water in the water body receiving the storm drainage.
- Cause or capable of causing the siltation or erosion of the bed or shore of the receiving water body.
- Cause or capable of causing the siltation or erosion of the bed or shore of the receiving water body.
- Cause or be capable of causing an adverse effect on aquatic environment.

  A 14 days notice of start of construction of the outfall has to be given to the Director.

  Technical details as the Adequate Outlet have to be submitted with the notice.

  Minor drainage outfalls can be constructed for Stormwater Management in this area using Adequate Outlet provision.

## 16. Water Quality

Alberta Environment Stormwater Management Guidelines (1999) require settlement of 85 % of particles greater than 0.075mm in the designed ponds. The settling velocity of different sized suspended particles with smaller sized particles requiring longer time to settle.

The settling velocity of a particle can be calculated using Stokes' law. Stokes' law states that the settling velocity of a particle is proportional to the square of its radius and the difference in density between the particle and the fluid it is moving through. The formula for calculating the settling velocity of a particle using Stokes' law is:

v = (2 * r^2 * (p1 - p2) * g) / (9 * n)

where: v = settling velocity (m/s) r = radius of the particle (m) p1 = density of the particle (kg/m^3) p2 = density of the fluid (kg/m^3) g = acceleration due to gravity (m/s^2) n = viscosity of the fluid (Pa.s - Pascal-Viscosity)

For a 75 microns particle, its settling velocity using Stokes' law is calculated as follows:

v = (2 * 0.0000375^2 * (2650 - 1000) * 9.81) / (9 * 0.000001002)

v ≈ **0.0004 m/s**

Based on the above Stokes Law the calculated settling velocity required for particles 0.075mm is 0.04 cm / sec. With this fall rate, the 0.075 mm particle will fall 0.70 m in 5.23 Hours. The centre of mass detention times in various SWMF are:

Central SWMF = 334 min = 5.56 Hours

NE SWMF = 386 min = 6.43 Hours

NW 1 SWMF = 322 min = 5.38 Hours

NW 2 SWMF = 319 min = 5.3 Hours

The average flow depth of SWMF's is close to 0.7 m. With the above detention times 0.075 mm and coarser particles will be retained in the SWMF's.




2026-02- 19

Prepared By:

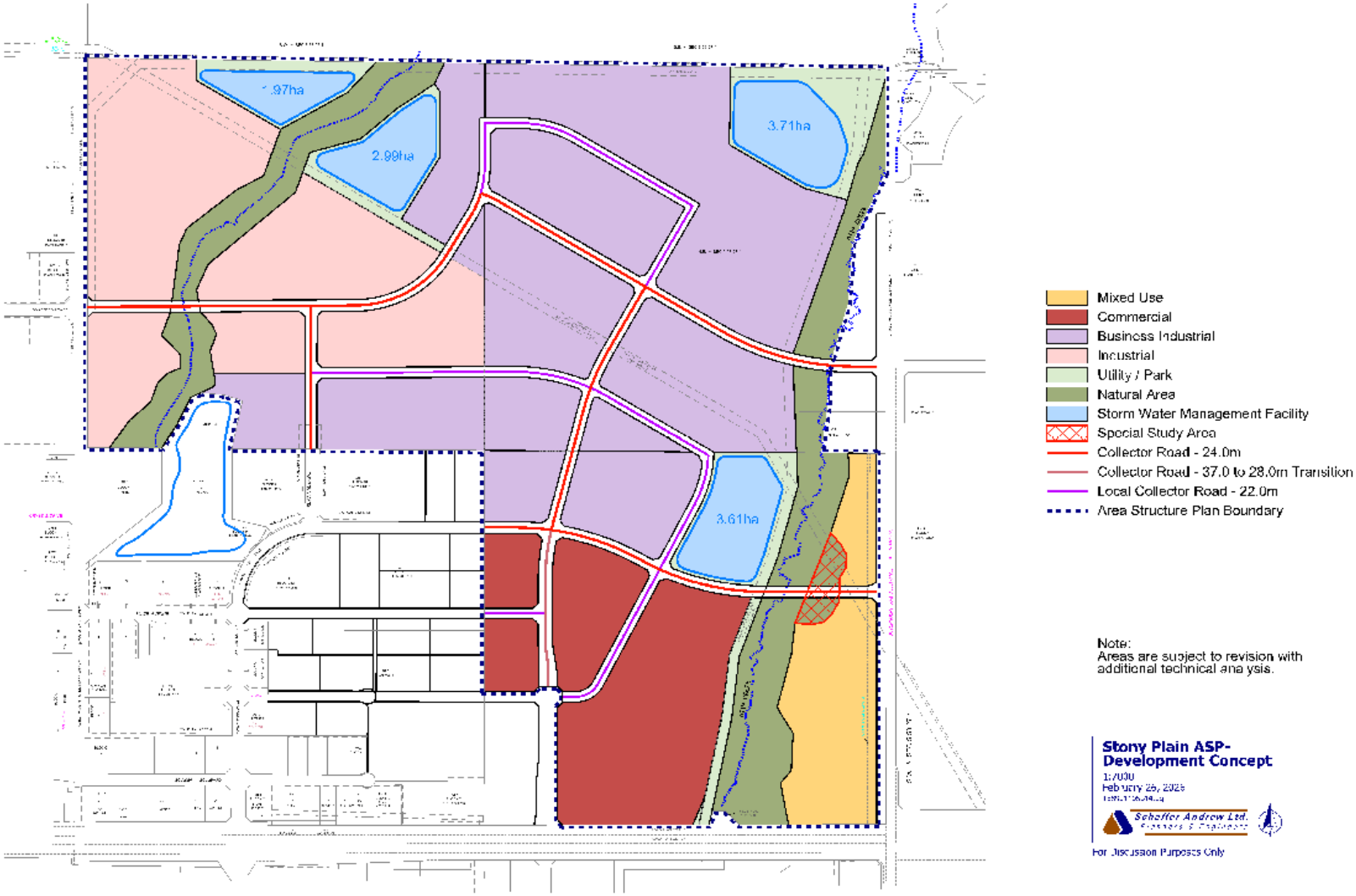
Bob Quazi, M.Sc., P.Eng., CPESC.

River Engineering Consulting

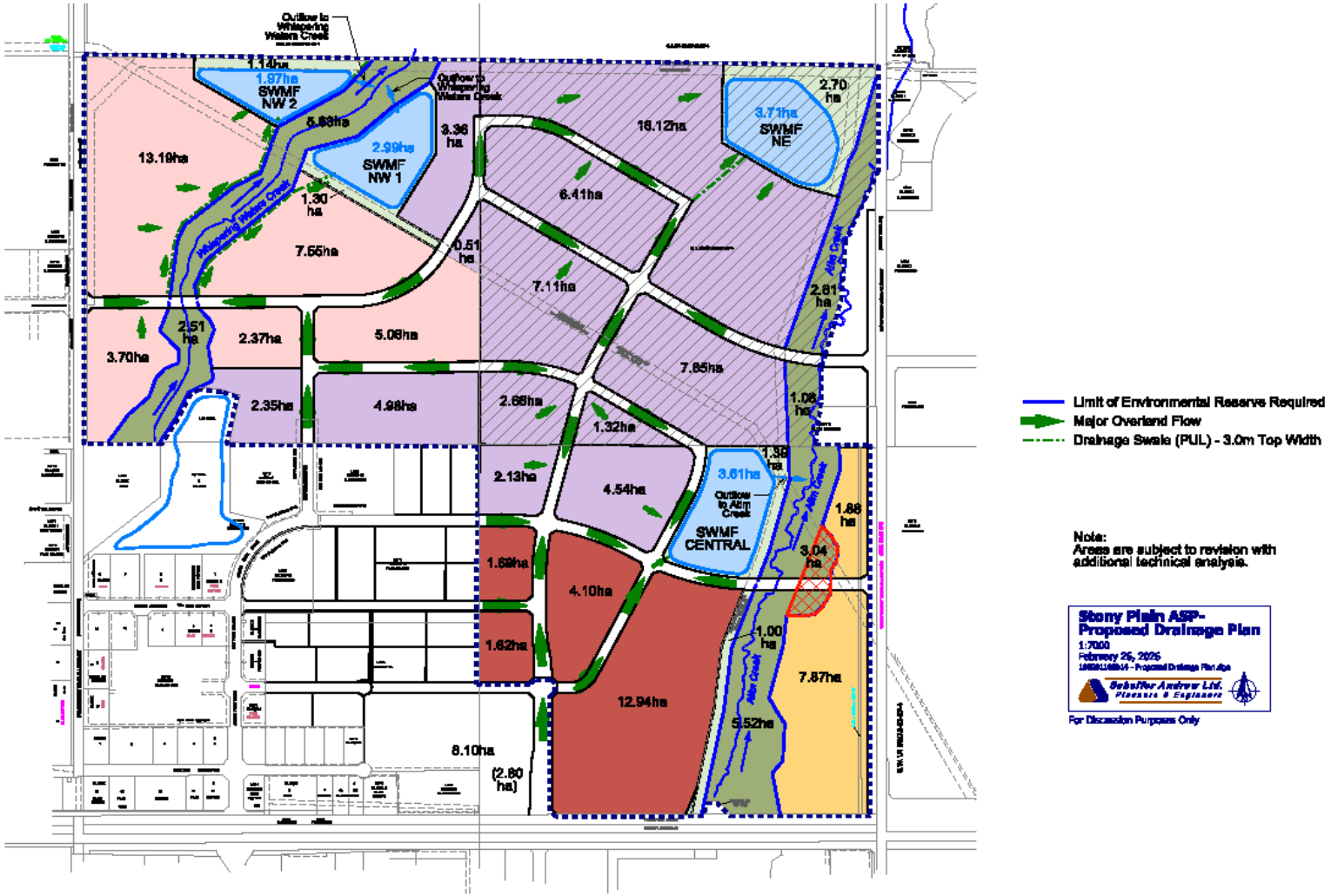


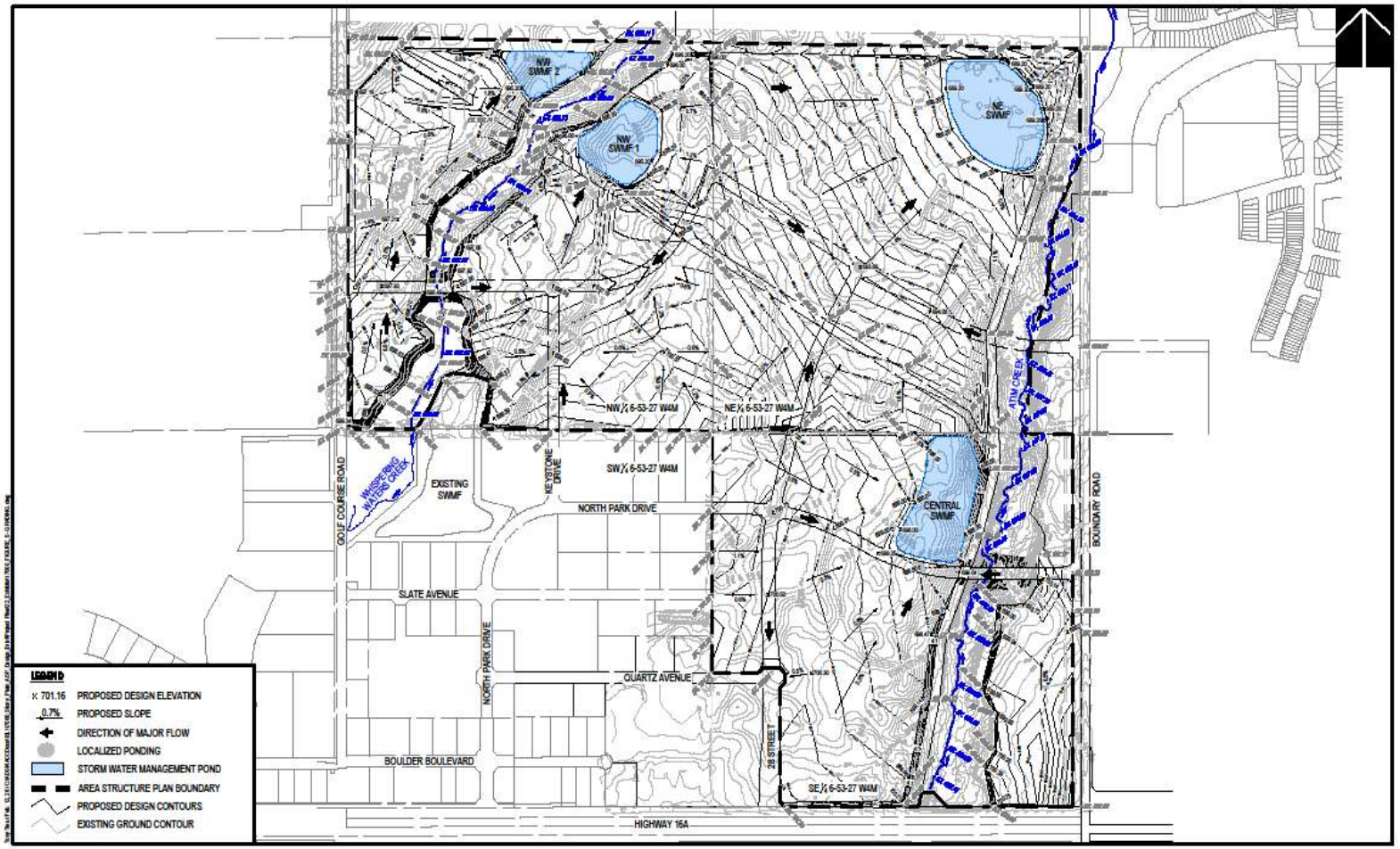

**Figure 1 – ASP Lands Location  Google Image 5 /1/2025**

## Figure 2 – ASP Development Concept



## FIGURE 3 – Drainage Plan






ISL

**STONY PLAIN NORTHEAST ASP**

PRELIMINARY GRADING PLAN

**FIGURE 4**

1:7500

FEBRUARY 2026

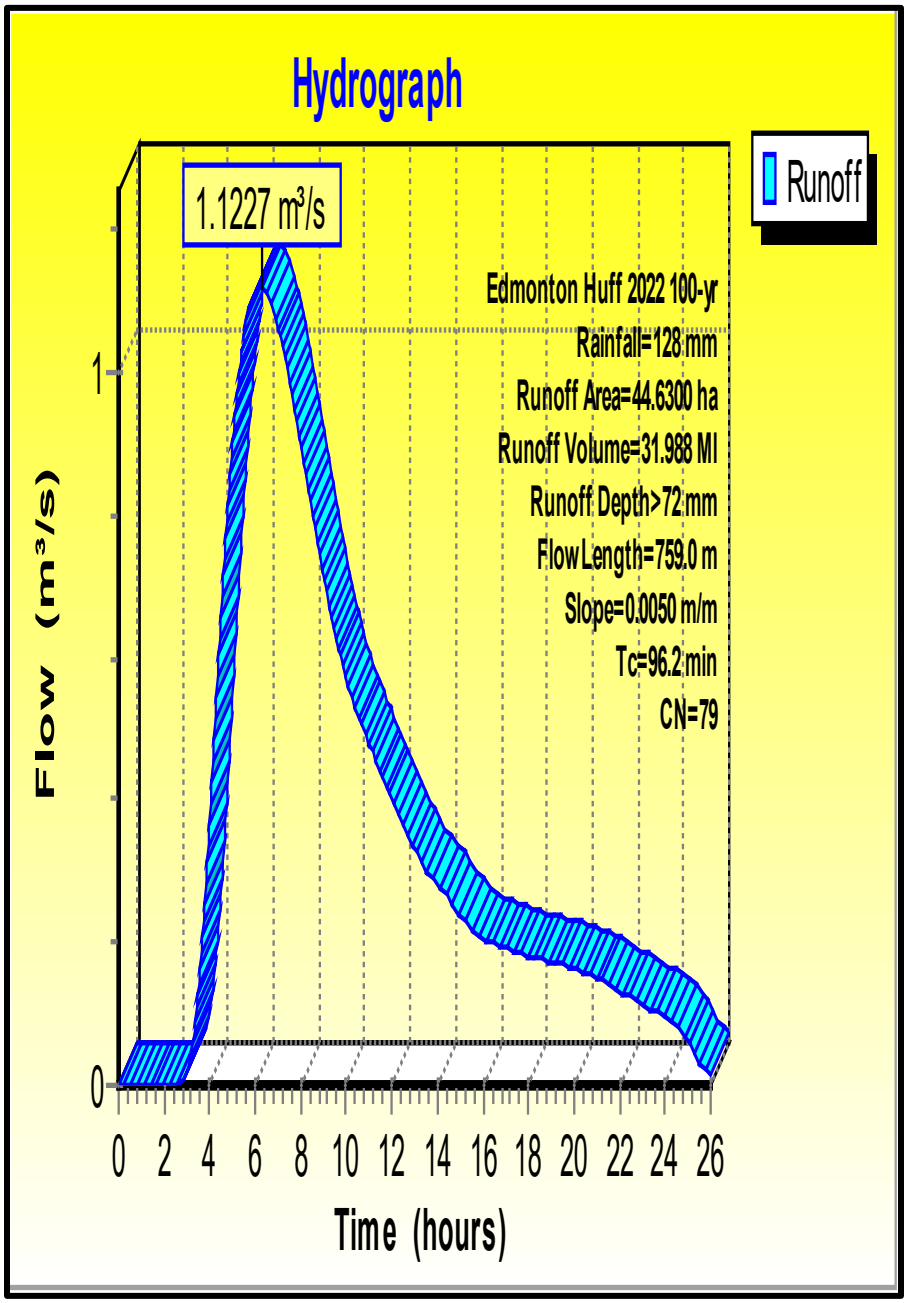



**Figure 5 – Central Basin - Outflow Hydrograph**

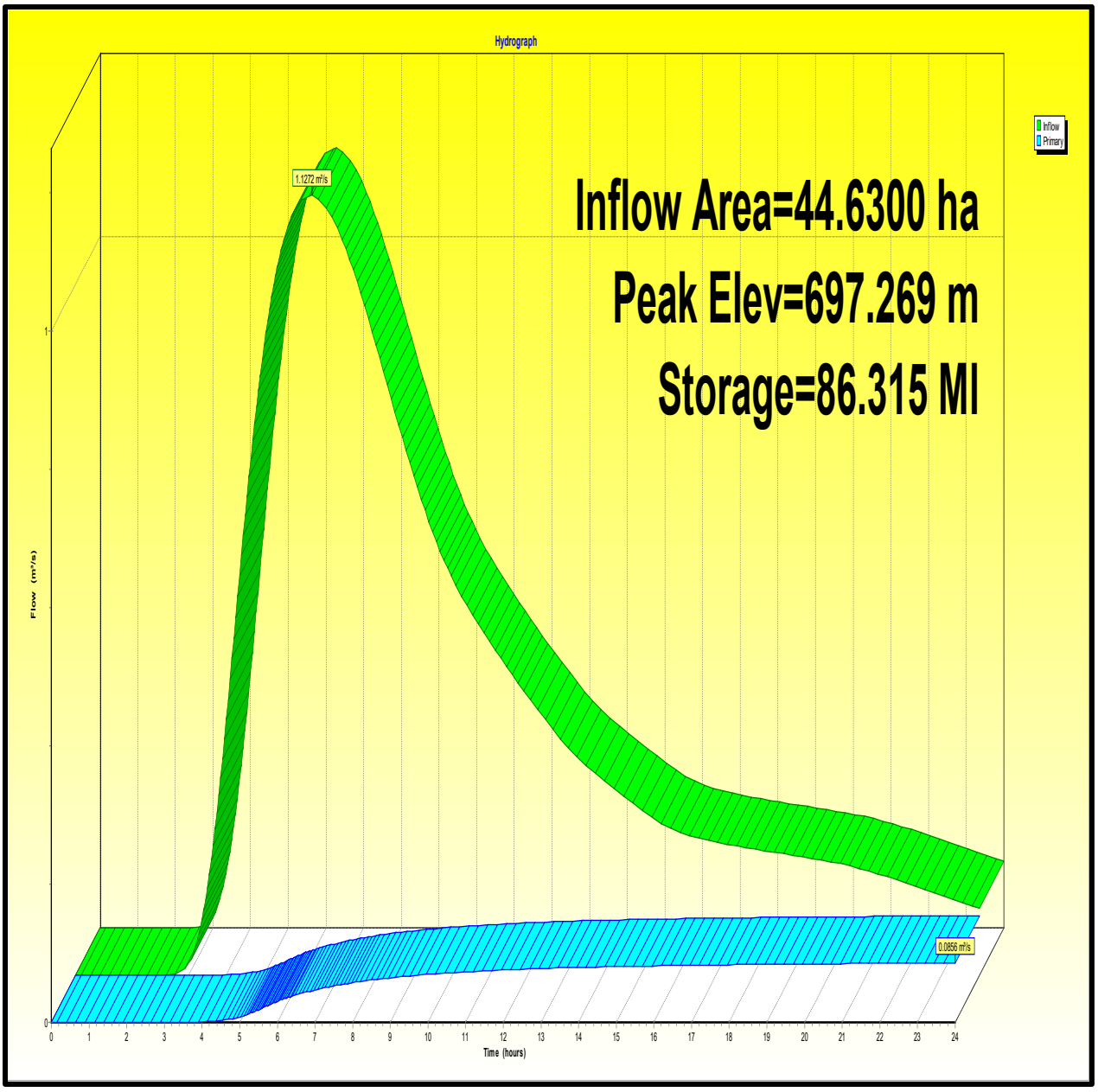



**Figure 6- Central SWMF Inflow / Outflow Hydrograph**

**Summary for Pond 1Central SW PondP: Central SW Pond**

Inflow Area = 44.6300 ha, 75.96% Impervious, Inflow Depth > 71 mm for Custom event
Inflow = 1.1272 m³/s @ 6.28 hrs, Volume= 31.692 M
Outflow = 0.0856 m³/s @ 24.00 hrs, Volume= 4.963 M, Atten= 92%, Lag= 1,063.0 min
Primary = 0.0856 m³/s @ 24.00 hrs, Volume= 4.963 M

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 696.500 m Surf.Area= 3.3320 ha Storage= 59.587 M
Peak Elev= 697.269 m @24.00 hrs Surf.Area= 3.6194 ha Storage= 86.315 M (26.728 M above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 334.0 min ( 935.9 - 601.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 694.500 m | 113.797 M | **150.00 mW x 176.00 mL x 3.50 mH Prismatoid Z=5.0** |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 696.500 m | **225 mm Vert. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.0856 m³/s @24.00 hrs HW=697.269 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0856 m³/s @2.15 m/s)

**Figure 7 – Central SWMF - HydroCAD Routing Summary**

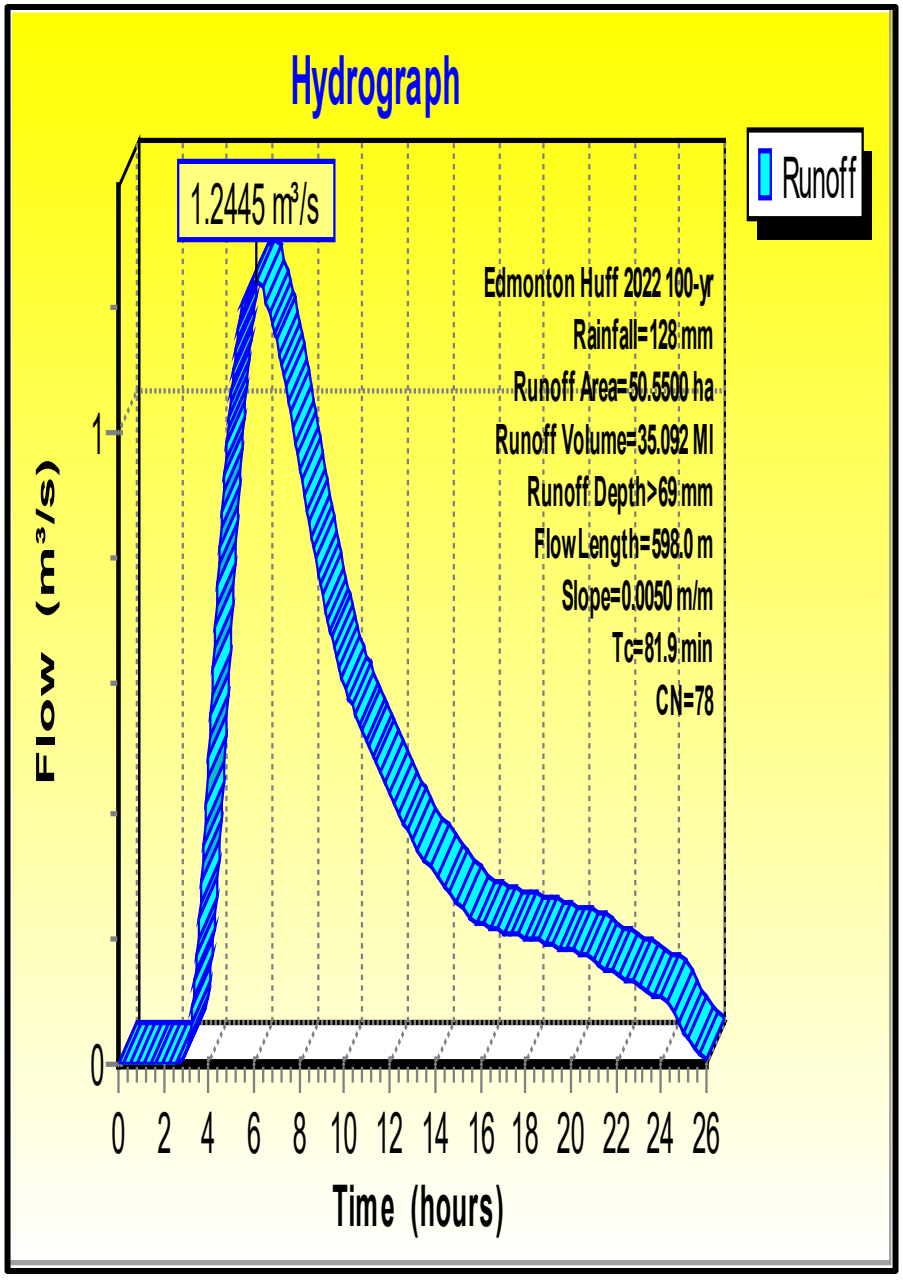



**Figure 8 – North East SWMF - Outflow Hydrograph**

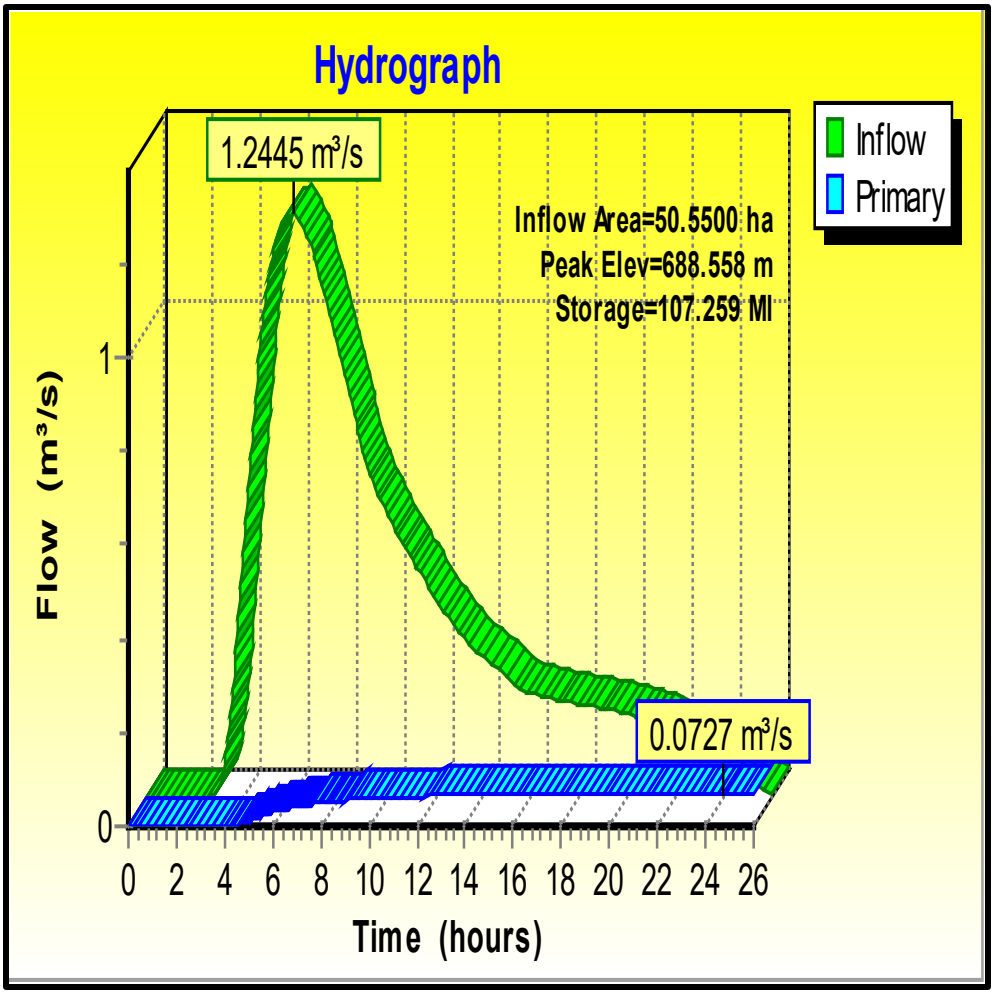



**Figure 9 – North East SWMF Inflow / Outflow Hydrographs**

**Summary for Pond NESWPond: NESWPond**

Inflow Area = 50.5500 ha, 71.84% Impervious, Inflow Depth > 69 mm for 100-yr event
Inflow = 1.2445 m³/s @ 6.08 hrs, Volume= 35.092 M
Outflow = 0.0727 m³/s @ 24.77 hrs, Volume= 4.769 M, Atten= 94%, Lag= 1,121.5 min
Primary = 0.0727 m³/s @ 24.77 hrs, Volume= 4.769 M

Routing by Stor-Ind method, Time Span= 0.00-26.00 hrs, dt= 0.05 hrs
Starting Elev= 687.700 m Surf.Area= 3.3147 ha Storage= 76.761 M
Peak Elev= 688.558 m @24.77 hrs Surf.Area= 3.7955 ha Storage= 107.259 M (30.498 M above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 386.3 min ( 991.8 - 605.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 684.700 m | 132.813 M | **85.00 mW x 219.00 mL x 4.50 mH Prismatoid Z=7.0** |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 687.700 m | **200 mm Vert. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.0727 m³/s @24.77 hrs HW=688.558 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0727 m³/s @2.31 m/s)

**Figure 10 – North East SWMF HydroCAD Routing Summary**

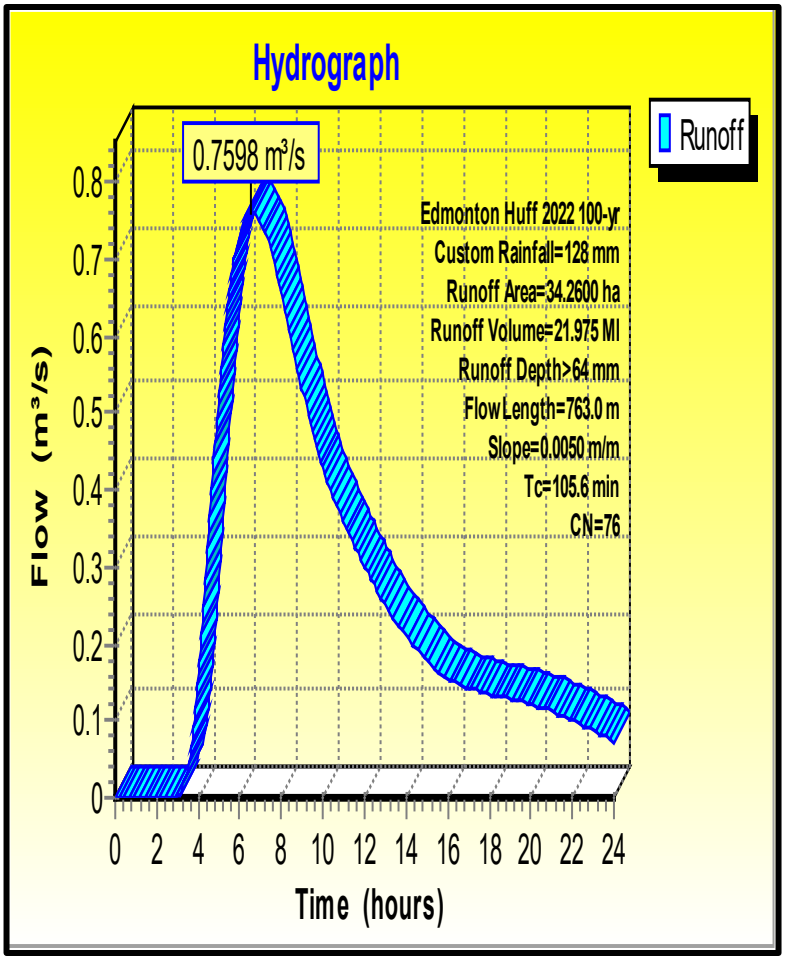



**Figure 11 – NW 1 SWMF Outflow Hydrograph**

**Summary for Pond SWMF1: SWMF1**

Inflow Area = 34.2600 ha, 15.70% Impervious, Inflow Depth > 64 mm for Custom event
Inflow = 0.7598 m³/s @ 6.50 hrs, Volume= 21.975 M
Outflow = 0.0620 m³/s @ 24.00 hrs, Volume= 3.514 M, Atten= 92%, Lag= 1,049.8 min
Primary = 0.0620 m³/s @ 24.00 hrs, Volume= 3.514 M

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 693.700 m Surf.Area= 2.6796 ha Storage= 61.047 M
Peak Elev= 694.351 m @24.00 hrs Surf.Area= 2.9933 ha Storage= 79.506 M (18.459 M above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 322.8 min ( 945.5 - 622.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 690.700 m | 106.738 M | **90.00 mW x 161.00 mL x 4.50 mH Prismatoid Z=7.0** |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 693.700 m | **200 mm Vert. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.0620 m³/s @24.00 hrs HW=694.351 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0620 m³/s @1.97 m/s)

**Figure 12 – NW 1 SWMF Inflow / Outflow**

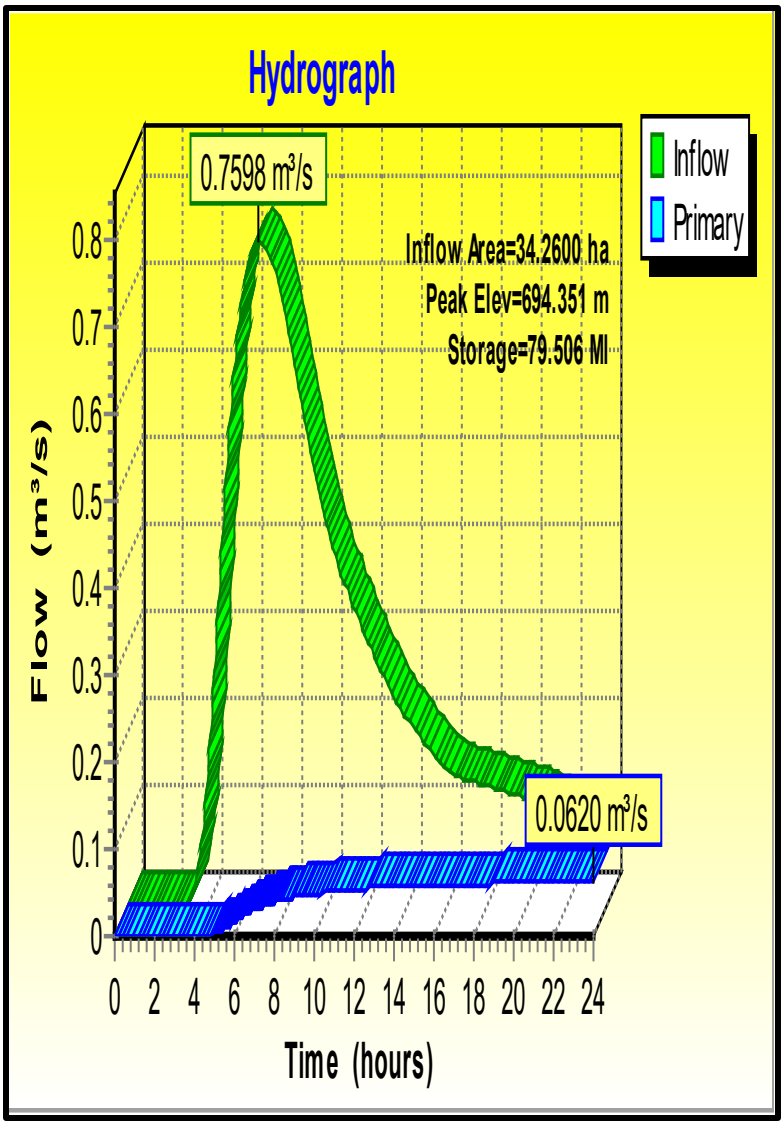



**Figure 13 – NW 1 SWMF Inflow / Outflow**

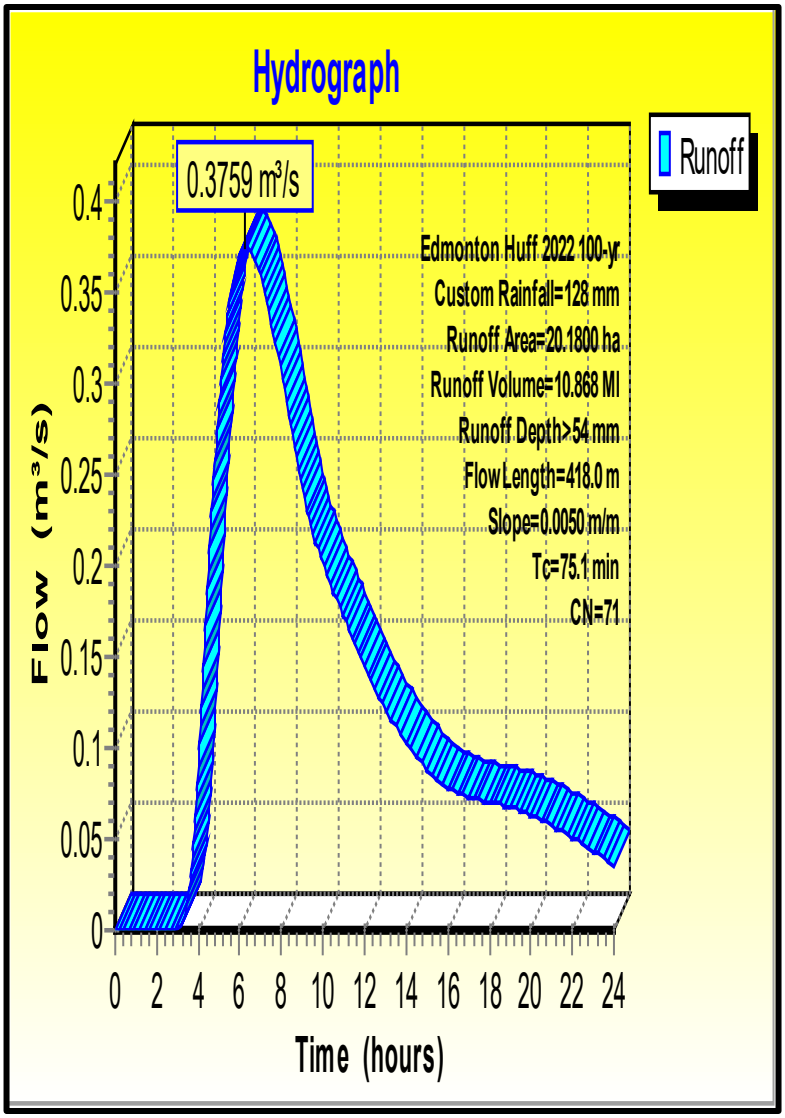



**Figure 14 – NW 2 – Basin Outflow**

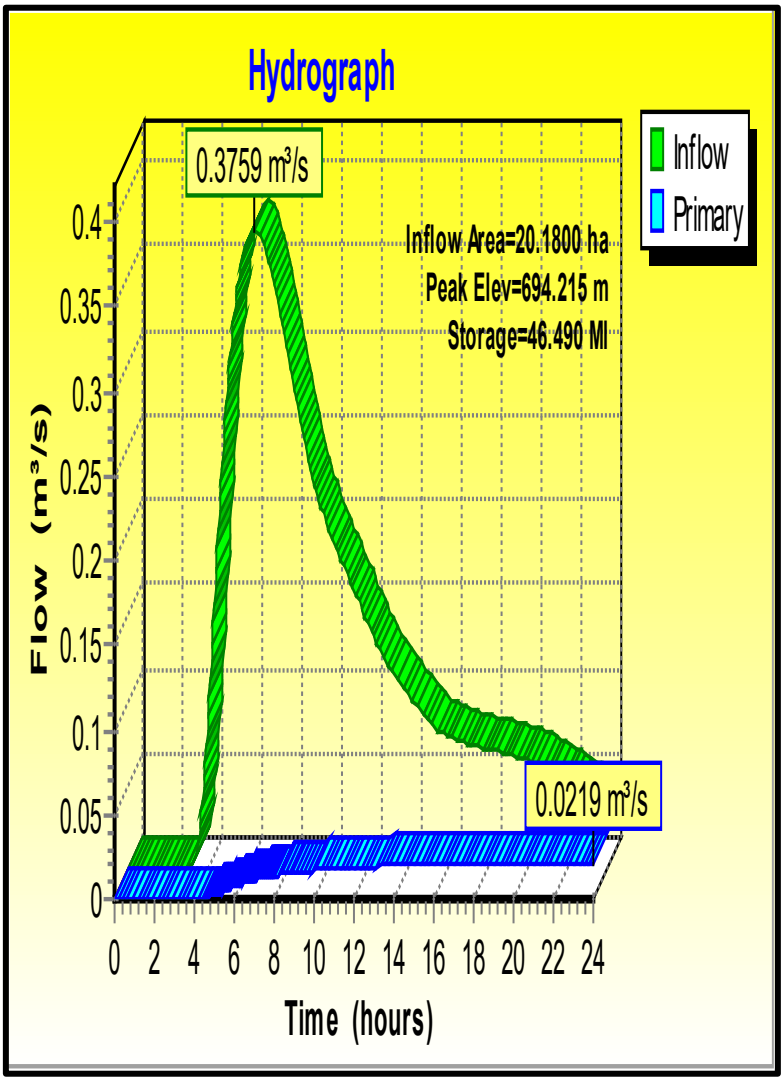



**Figure 15 – NW 2 SWMF Inflow / Outflow**

**Summary for Pond SWMF2: SWMF2**

Inflow Area = 20.1800 ha, 0.00% Impervious, Inflow Depth > 54 mm for Custom event
Inflow = 0.3759 m³/s @ 6.27 hrs, Volume= 10.868 M
Outflow = 0.0219 m³/s @ 24.00 hrs, Volume= 1.241 M, Atten= 94%, Lag= 1,063.8 min
Primary = 0.0219 m³/s @ 24.00 hrs, Volume= 1.241 M

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 693.700 m Surf.Area= 1.7664 ha Storage= 36.864 M
Peak Elev= 694.215 m @24.00 hrs Surf.Area= 1.9762 ha Storage= 46.490 M (9.626 M above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 318.7 min ( 941.3 - 622.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 690.700 m | 68.054 M | **50.00 mW x 150.00 mL x 4.50 mH Prismatoid Z=7.0** |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 693.700 m | **125 mm Vert. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.0219 m³/s @24.00 hrs HW=694.215 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0219 m³/s @1.79 m/s)

**Figure 16 – NW 2 SWMF Routing Results**

# APPENDIX C
## Earthworks Cut/Fill Plans

NW ¼ 6-53-27 W4M

NE ¼ 6-53-27 W4M

SW ¼ 6-53-27 W4M

SE ¼ 6-53-27 W4M

KEYSTONE DRIVE

NORTH PARK DRIVE

CENTRAL SWMF

ATIM CREEK

BOUNDARY ROAD

QUARTZ AVENUE

HIGHWAY 16A

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# STONY PLAIN ASP

CUT/FILL SE QUARTER

## APPENDIX C-1

1:4000 0 40 80 120 160m

FEBRUARY 2026

NW
SWMF 1

NE
SWMF

ATIM CREEK

BOUNDARY ROAD

NW¼ 6-53-27 W4M

SW¼ 6-53-27 W4M

NE¼ 6-53-27 W4M

SE¼ 6-53-27 W4M

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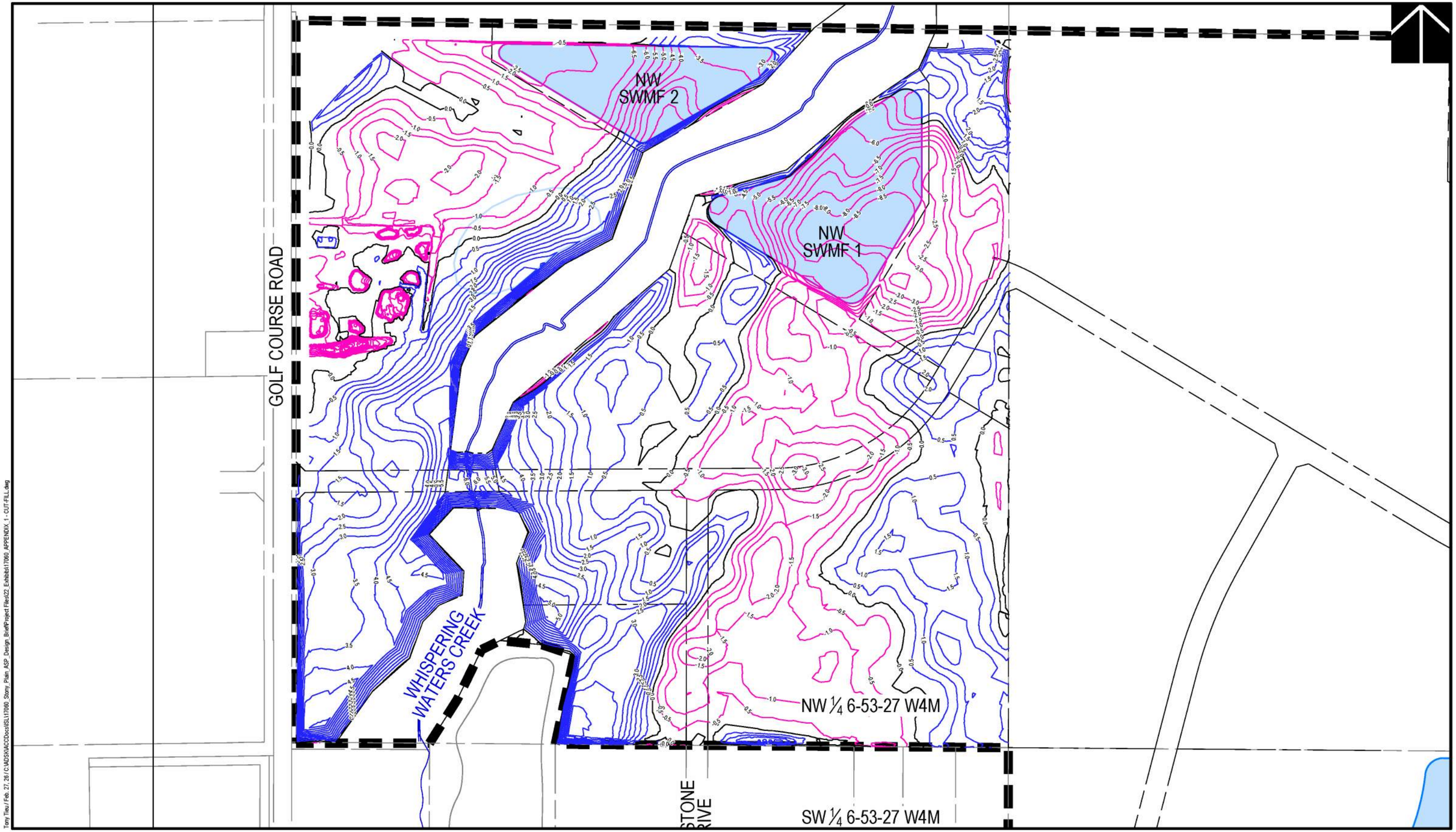
# STONY PLAIN ASP

CUT/FILL NE QUARTER

## APPENDIX C-2

1:4000 0 40 80 120 160m

FEBRUARY 2026




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# STONY PLAIN ASP

CUT/FILL NW QUARTER

## APPENDIX C-3

1:4000 0 40 80 120 160m

FEBRUARY 2026

# 3. Biophysical Impact Assessment

# Biophysical Impact Assessment for NW 06-053-27 W4M, SE 06-053-27 W4M and NE 06-053-27 W4M



Prepared for:
Stony Plain Land Inc.

Project Number: EP-1136
Report Date: November 2025

Prepared by:

SPENCER ENVIRONMENTAL
MANAGEMENT SERVICES LTD.

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# 1. Introduction

Spencer Environmental Management Services Ltd. (Spencer Environmental) is pleased to submit our Biophysical Impact Assessment (BIA) report to Stony Plain Land Inc. in support of the proposed Area Structure Plan for lands located within NW-06-053-27 W4M, SE-06-053-27 W4M, and NE-06-053-27 W4M (the Project; Appendix A and Appendix B – Figure 1). This BIA provides an evaluation of existing environmental conditions, identifies biophysical sensitivities, and outlines measures to protect and integrate natural features during the land use planning and development.

## Project Overview

The draft BIA was prepared concurrent with the development concept planning. This finalized BIA assesses impacts by referencing the concept shown in Appendix A. The Project is situated in the northeast portion of the Town of Stony Plain, adjacent to the municipal boundary (Appendix B - Figure 1). The three (3) quarter sections comprising the Project (aka subject lands) currently support agriculture. The subject lands form an L-shaped parcel, bounded on the south by Highway 16A; on the southwest by commercial development within the SW-06-053-27 W4M, and then to the west by Range Road 280; by agricultural lands on the north and by Veterans Boulevard on the east. Lands to the east of Veterans Boulevard are currently developing but some still support agricultural use (Appendix A and Appendix B – Figure 1). The subject lands include all of the NE-06-053-27 W4M (NE-06) and the majority of lands within NW-06-053-27 W4M (NW-06) and SE-06-053-27 W4M (SE-06), excepting a small area in each quarter that are part of the North Industrial ASP (Stage 5), situated to the south and west (Appendix B – Figure 1). A previous BIA was prepared for an amendment to Stage 5 of the North Industrial ASP (Spencer Environmental 2025) to include the small areas with NW-06 and SE-06.

## Regulatory Considerations

Collectively, the municipal, provincial, and federal instruments highlighted below provide the regulatory framework within which this BIA has been completed and will guide the environmental management of future development within the Project area.

Municipal

This report has been prepared to meet the requirements of a BIA established by the Town of Stony Plain. This report provides recommendations to align the ASP with Stony Plain's environmental policy framework:

- Environmental Master Plan (EMP; Stony Plain, 2021);
- Environmental Stewardship Strategy; and
- Uniquely Stony Plain Municipal Development Plan (Bylaw 2694/D&P/24)

Provincial

Recommendations within this report consider compliance with the following provincial legislation and policy:

- *Municipal Government Act* (Government of Alberta, 2000a);
- *Water Act* (Government of Alberta, 2000b);
- Wetland Policy (Government of Alberta, 2013);
- *Wildlife Act* (Government of Alberta, 2000c); and
- *Wildlife Regulations* (Government of Alberta, 1997).

Federal

Recommendations made within this report will address compliance with the following:

- *Species at Risk Act* (Government of Canada, 2002);
- *Fisheries Act* (Government of Canada, 1985); and

- *Migratory Birds Convention Act* (Government of Canada, 1994).

# 2. Regional Ecological Setting

## Landscape

The Project is located within the Central Parkland Natural Subregion of the Parkland Natural Region and within the Aspen Parkland Ecoregion of the Prairies Ecozone. This region is the transition between boreal forest and grassland regions. Undulating till plains and hummocky uplands are the dominant landforms. A majority of lands are cultivated, with a mosaic of aspen and prairie vegetation intermixed (Ecological Stratification Working Group, 1996; Natural Regions Committee, 2006).

Climate

High precipitation and a warm, relatively long growing season in the Central Parkland Subregion give a highly productive environment for annual crops. The mean annual precipitation for the Central Parkland Natural Subregion is 441 mm of which 75% falls during the growing season. The mean annual temperature is 2.3°C, with a mean daily maximum of 23.0°C of the warmest month and mean daily minimum of -20°C of the coldest month (Natural Regions Committee, 2006).

Soils

Grasslands and open woodlands in the Central Parkland Subregion are dominated by Orthic Black Chernozems with occurrences of Solonetzic soils. Forested areas commonly have Orthic Dark Gray Chernozemic and Dark Gray Luvisolic soils. Humic and Orthic Gleysols are the most common soil types associated with wetlands (Natural Regions Committee, 2006).

Vegetation

The subregion has been intensively cultivated for over a century with few remaining contiguous areas of native parkland vegetation. The reference site for the more northerly portions of Central Parkland Subregion includes aspen with understories of saskatoon, prickly rose, snowberry, beaked hazelnut and forbs developed on Dark Gray Chernozems (Natural Regions Committee, 2006).

Hydrology

Small water bodies account for approximately 2% of the area within the Central Parkland Subregion. Wetlands account for approximately 10% of the area within the subregion. Typical wetland types in this subregion include: marshes, swamps dominated by willow, seasonal open water, and treed fens with shallow organic soil in the northwest corner of the subregion (Natural Regions Committee, 2006). The Project is within the North Saskatchewan River HUC2 watershed and the Middle North Saskatchewan River HUC4 watershed.

## Environmentally Significant Areas

Environmentally Significant Area (ESA) mapping by Parkland County (O2 Planning and Design Inc. 2014) considers county features that cross municipal boundaries into the Town of Stony Plain. One such feature, Atim Creek ESA, mapped as regionally significant extends into the Project, within SE-06 and NE-06 (Appendix B – Figure 1).

In addition, an unnamed watercourse locally known as Whispering Waters Creek, a tributary to Atim Creek, crosses through the NW-06 (Appendix B - Figure 1). The Town of Stony Plain considers the creeks and floodplain to be an important natural feature as mapped in Town of Stony Plain - Environmental Master Plan (2021).

# 3. Assessment Methods

The BIA study area was coincident with the Project area shown in Appendix B - Figure 1. Field investigations were restricted to the portions of SE-06 and NW-06. For the NE-06 investigations were limited to desktop assessment, due to access restrictions. For context and to capture potential indirect effects of development on regulated

ecological features, such as watercourses and wetlands, consideration was also given to features adjacent to the Project limits. The location of features outside of the Project is made explicit in all figures.

## Soils

Desktop Assessment

Publicly available data sets were reviewed prior to field assessments including:

- Agricultural Regions of Alberta Soil Inventory Database (AGRASID)(Alberta Soil Information Viewer, 2025);
- Soil Correlation Area (SCA) Map (Government of Alberta, 2016); and
- Cumulative Clubroot Infestations in Alberta map (Government of Alberta, 2023).

Field Assessment - SE-06 and NW-06

Soil assessment in the field focused on wetland areas (and potential wetlands) identified during desktop assessment (see below). Upland soils were not formally assessed. As such, the soil assessment focused on identifying water altered soils as described in the following documents:

- Alberta Wetland Identification and Delineation Directive (Government of Alberta, 2015a);
- Alberta Wetland Classification System (Alberta ESRD, 2015);
- Alberta Wetland Rapid Evaluation Tool Actual (ABWRET-A) Guide (Government of Alberta, 2015b); and
- The Canadian System of Soil Classification (Soil Classification Working Group, 1998).

## Upland Vegetation

Desktop Assessment

Sources reviewed specific to the vegetation assessment included:

- Alberta Conservation Information Management System (Alberta Parks, 2024) for Section 06-053-27 W4M.
- Natural Regions and Subregions of Alberta (Natural Regions Committee, 2006).
- Aerial and satellite imagery.

Field Assessment - SE-06 and NW-06

The Project is located on cultivated lands; therefore, the upland vegetation assessment was limited to qualitative documenting of weeds and invasive species. Vegetation plots were established only at wetlands (see below).

Weed and invasive species, if present, were recorded at every vegetation survey plot as well as when traversing between sample plot locations. Weed species were identified and classified as per the *Weed Control Act: Weed Control Regulation* (Government of Alberta, 2010). Weeds were assessed for type, presence, percent cover, and phenology.

## Hydrological Investigation – Surface Water

Desktop Assessment

Publicly available datasets reviewed included:

- Fisheries and Wildlife Management Information System (FWMIS) (Government of Alberta, 2025) centered on Section 06-053-27 W4M with a 1 kilometer search area.
- Alberta Wild Species Status Search (Government of Alberta, 2024b).

- Aquatic Species at Risk Map (DFO, 2024).
- Management Area Map for Alberta's *Water Act* Codes of Practice (Government of Alberta, 2012a).

Field Assessment - SE-06 and NW-06
Watercourses in the Project area were assessed in conjunction with wetland assessments. Watercourses were classed in the field according to the Alberta Public Lands Glossary of Terms (Alberta Forestry and Parks, 2025).

## Hydrological Investigation – Groundwater

Desktop Assessment
Desktop review consisted of reviewing the Alberta Water Well Information Database (Government of Alberta, 2024a) for Section 06-053-27 W4M. Water wells for which static water depth was recorded were considered further to establish an estimate of groundwater depth in the vicinity of the Project.

Field Assessment
A field assessment of groundwater was not included in the BIA scope.

## Wetlands

Desktop Assessment
The following publicly available datasets were used during desktop wetland delineation:

- Alberta Biomonitoring Institutes' Wetland Inventory (ABMI; ABMI, 2021).
- Alberta Merged Wetland Inventory (AMWI; Government of Alberta, 2022).
- Parkland County Historic Wetland Inventory 1950 (Parkland County, 2021b).
- Current Wetland Inventory 2013 (Parkland County, 2021a).

Each of those inventories are presented at a scale that often needs refinement when assessing small parcels. Therefore, per the provincial wetland directives, historical wetland presence was further assessed for the subject lands by reviewing historical satellite and aerial imagery between 1950 and 2024, to produce desktop wetland delineations for the Project (Government of Alberta, 2000b). Wetlands in SE-06 and NW-06 were assessed following Pathway 5 – comprehensive desktop delineation with field verification as per the Alberta Wetland Identification and Delineation Directive (Government of Alberta, 2015a). Wetlands in NE-06 were assessed following Pathway 1 – purely desktop delineation as per the Alberta Wetland Identification and Delineation Directive (Government of Alberta, 2015a). Desktop wetland boundaries were derived from available aerial and satellite imagery.

Field Assessment – SE-06 and NW-06
For two quarter sections, field assessment was conducted to ground truth the desktop wetland delineations and gather information sufficient to supply Alberta Environment and Protected Areas (EPA) information to value of wetlands following the Alberta Wetland Rapid Evaluation Tool Actual (ABWRET-A) Guide (Government of Alberta, 2015b). At each wetland, boundaries were field verified at a representative number of points using a GPS handheld unit and desktop mapping adjusted as necessary. Soils were assessed for signs of water alteration (mottling and gleying) and vegetation was inventoried at each assessment location.

## Fish and Fish Habitat

Desktop Assessment
Given the location of Whispering Waters Creek and Atim Creek within the Project, Alberta FWMIS database was reviewed for existing aquatic habitat data and fish records (Government of Alberta, 2025). The federal Aquatic Species at Risk map was also reviewed (DFO, 2024).

Field Assessment - SE-06 and NW-06

Fish habitat was assessed only in conjunction with wetland assessments in the Project. Fish habitat was generally assessed incorporating descriptions of fish habitat as described in the Fisheries Habitat Enhancement and Sustainability Program Habitat Data Collection Manual (FISHES, 2019).

### Wildlife Assessment

Desktop Assessment

Desktop assessment comprised a review of aerial imagery to identify and characterize natural habitat patches and a 1 km radius search centered on Section 06-053-27 W4M of the Alberta FWMIS database (Government of Alberta, 2025).

Field Assessment - SE-06 and NW-06

Wildlife surveys were not undertaken. Incidental wildlife observations or wildlife signs were recorded during field assessments on September 19 and 20, 2024. The locations of any identified wildlife features (if any) were marked with a hand-held GPS unit and the areas photographed.

### Methodology Limitations

- No formal wildlife surveys were conducted on the Project.
- No formal vegetation inventory or rare plant surveys were conducted on the Project.
- The site reconnaissance took place during the fall season, when vegetation was senescing and outside of the bird breeding season.
- Soil assessment focused on potential wetland and wetland areas only. Upland soils were not formally assessed.
- The Town of Stony Plain does not have a published Environmentally Significant Areas (ESA) study identifying ESAs specific to Town of Stony Plain. However, Parkland County's ESA inventory includes areas within the Town of Stony Plain. Consideration of ESAs within and surrounding this Project depended largely on Parkland County's Environmental Conservation Master Plan (O2 Planning and Design Inc., 2014).
- The scope of the assessment summarized in this report does not meet criteria for a Phase I Environmental Site Assessment and additional information may be required by the Town of Stony Plain as part of the development permit as outlined in the Development Permit Checklist (Stony Plain, 2019).

## 4. Results - Existing Conditions

### Soils

Desktop Assessment

The Project is located within Soil Correlation Area (SCA) 10 Thick Black/Dark Gray-Gray Soil Zone of Dry and East-Dry Alberta (Alberta Soil Information Viewer, 2025; Government of Alberta, 2016). The dominant soil in the area is the Winterburn soil series which is an Orthic Dark Gray Chernozemic soil. The Cumulative Clubroot Infestations in Alberta map indicated that Parkland County has more than 500 cases of clubroot documented between 2005 and 2023 (Government of Alberta, 2023).

Field Assessment

Soils within desktop delineated wetlands were sampled near the centre of the feature, looking for hydric indicators. Features sampled are listed in Table 1 and shown in Appendix B - Figure 2. Hydric soils (where confirmed) along with vegetation and landscape position were used to verify wetland boundaries.

**Table 1. Soil Inspection and Sample Point Locations**

| Inspection Point ID | Coordinates (UTM NAD 83) |
|---|---|
| WT-01A* | 12U 303205 5936890 |
| WT-01B-1* | 12U 303900 5937216 |
| WT-01B-2* | 12U 303910 5937297 |
| WT-01B-3* | 12U 303206 5936890 |
| WT-03 | 12U 303656 5937231 |
| WT-03 | 12U 303663 5937234 |
| WT-04* | 12U 303606 5937317 |
| WT-05* | 12U 303589 5937252 |
| WT-06* | 12U 303546 5937182 |
| WT-07 | 12U 303487 5937249 |
| WT-08* | 12U 303496 5937081 |
| WT-09* | 12U 303410 5937118 |
| WT-10* | 12U 303330 5937183 |
| WT-11-1* | 12U 303188 5937162 |
| WT-11-2* | 12U 303251 5937227 |
| WT-12* | 12U 303159 5937224 |
| WT-13 | 12U 303147 5937092 |
| WT-14 | 12U 303151 5937001 |
| WT-15 | 12U 303168 5936963 |
| WT-16* | 12U 303166 5937381 |
| WT-18* | 12U 303026 5937637 |
| WT-19 | 12U 302724 5937499 |
| WT-20* | 12U 302585 5937464 |
| WT-21* | 12U 302814 5937638 |
| WT-22* | 12U 302750 5937661 |
| WT-23* | 12U 302778 5937730 |
| WT-24 | 12U 302765 5937824 |
| WT-25* | 12U 302832 5937803 |
| WT-26* | 12U 302878 5937933 |
| WT-27* | 12U 302977 5937958 |
| WT-28* | 12U 303127 5937848 |
| WT-29* | 12U 303156 5938093 |
| WT-30* | 12U 303077 5938116 |
| WT-31A* | 12U 302536 5937529 |
| WT-31B* | 12U 302516 5937810 |
| WT-32 | 12U 302380 5937735 |
| WT-32 | 12U 302379 5937736 |
| WT-33* | 12U 302531 5938141 |
| WT-51* | 12U 302661 5937460 |

*water-altered soils

Topsoil was found to be heavily admixed due to cultivation at all assessment locations except for WT-31A and WT-29, as shown in Table 1. These soils were classified as Gleyed Orthic Dark Gray Chernozems consistent with those of the Winterburn-GL soil series (Appendix E - Photos 7 and 8). Field observations are included below.

### *Winterburn - Gleyed (WTBgl)*

| | |
|---|---|
| **Extent:** | Occupies all lowland areas of the Project |
| **Soil Class:** | Gleyed Orthic Dark Gray Chernozem |
| **Parent Material:** | M2 – medium textured (L, VFSL) sediments deposited by wind and water |
| **Parent Material Type:** | GLFL - glaciofluvial |
| **Drainage:** | Imperfectly Drained |
| **Surface Stones:** | Non-stony (S0). |
| **Topography:** | Undulating with high relief (U1h) and Class 2-3 slopes. |
| **Inspection Point:** | WT-01B-3 |

| Horizon | Depth (cm) | Texture | Colour | Mottles | Notes |
|---|---|---|---|---|---|
| Ap | 0-24 | Loam (L) | 10YR1/1 | Faint | |
| Btjg | 24-30 | Loam | 10YR3/2 | Distinct | |

**Comments:**
Top 15cm - 20cm are admixed due to cultivation.
Found on lower slopes and depressions.
Gleyed soils are inundated with water throughout much of the year and are therefore more susceptible to rutting and compaction.
Colour contrast between topsoil and upper subsoil is generally good and can be used as a guide for stripping.
Loam textured topsoil has a medium risk of wind erosion. Water erosion risk is low due to medium textured soils and gentle slopes.

## Upland Vegetation

Desktop Assessment

Satellite and aerial imagery indicate that upland areas within and surrounding the Project have been cultivated in some capacity annually since at least 1950, leaving thin shelterbelts of vegetation along quarter section boundaries and narrow riparian communities along Whispering Waters and Atim Creeks. In addition, a small (~2.5 ha) stand of forest is present in the northeast corner of NE-06, mapped as part of the ESA. This stand currently presents as upland but has in past been mapped as a bog (AMWI; Government of Alberta, 2022). Additional field assessment is required for this stand of forest.

The Alberta Conservation Information Management System (ACIM) search identified no upland vegetation element occurrences within 06-053-27 W4M.

Field Assessment - SE-06 and NW-06

Two distinct upland communities were observed during the field assessment: disturbed–cropland and trembling aspen forest. The disturbed cropland covers most upland areas within the Project area. At the time of assessment, the crop was harvested, and vegetation cover consisted of stubble. Some weed species were identified, including creeping thistle and perennial sow thistle within the cropland. There are small discontinuous areas of trembling aspen forest following the quarter section boundary around SW-06-053-27 W4M and continuous deciduous-leading forest around Atim Creek, within the mapped ESA.

## Hydrological Investigation – Surface Water

Desktop Assessment

Atim Creek flows north within SE-06 and NE-06. Whispering Waters Creek, flows north within NW-06 (Appendix B – Figure 1). The confluence of Whispering Waters Creek and Atim Creek is approximately 1.5 km downstream of the Project. Prior to disturbance, the upstream reach of Whispering Waters Creek within SW-06, was

described as “a man-made drainage canal, (i.e., not a natural stream) that was dug sometime between 1994 and 2002” (Spencer Environmental, 2007).

Satellite imagery suggested an ephemeral drainage exists flowing east towards Atim Creek within SE-06. This corresponds with a feature mapped as a potential linear wetland (WT-01A) during the desktop delineation of wetlands (see below and Appendix B - Figure 4).

Field Assessment - SE-06 & NW-06

Field observations were completed on surface water features within the Project, specifically Whispering Waters and Atim creeks. Both creeks were flowing during the assessment period, indicating perennial flow conditions consistent with regional drainage mapping. Across the Project, surface runoff generally drains toward either Whispering Waters Creek or Atim Creek through a network of ephemeral channels and depressions. These localized drainage features provide short-duration surface flow following precipitation events and contribute to the hydrological connectivity of the area.

Slopes leading toward Whispering Waters Creek were gentle to moderate within the southern portion of NW-06 and steeper downstream toward the northern extent of the Project limits. Surface drainage across surrounding cultivated land was directed toward the creek, contributing to intermittent runoff during precipitation events.

Atim Creek flows north through SE-06 and NE-06 and serves as the primary drainage corridor in the area. The channel was single-threaded with a defined bed and bank with flowing water. Bank scour was observed along outside bends, likely related to seasonal high-flow conditions. Slopes adjacent to the channel were relatively steep, confining flow within the valley and limiting overbank flooding under typical flow conditions.

Floodplain Analysis

A 1:100 year floodplain delineation was prepared by River Engineering Consulting (2025) for each watercourse, in support of proposed development and has been included as part of Appendix B - Figure 5.

## Hydrological Investigation – Groundwater

Desktop Assessment

Available groundwater well data for Section 06-053-27 W4M (Table 2) indicated the shallowest water table in a portion of the SE-06. The description of the Atim Creek ESA in the Parkland County Environmental Conservation Master Plan indicated that there are many springs along Atim Creek which feed Atim Creek throughout the winter. It is possible that groundwater is shallow within the majority of the Project area based on its proximity to Atim Creek and Whispering Waters Creek. Future site-specific work may be required to refine the desktop values.

The Project is within the Beverly Buried Valley, a pre-glacial river valley usually no more than 60 m deep. Groundwater susceptibility immediately north of the Project, within Section 07-053-27 W4M is medium low (Aquality Environmental Consulting Ltd., 2015) and has a medium to high score within the ESA scoring models (O2 Planning and Design Inc., 2014).

**Table 2. Groundwater Well Search**

| Well ID | Location (ATS) | Year Drilled | Static Water Level (ft) |
|---|---|---|---|
| 85032 | SW-06-053-27 W4M | 1950 | 15 |
| 85030 | SE-06-053-27 W4M | 1911 | 20 |
| 1300027 | SE-06-053-27 W4M | 2004 | 9.81 |
| 227877 | SE-06-053-27 W4M | 1991 | 8 |
| 1166171 | NE-06-053-27 W4M | 2018 | 16 |
| 85037 | NE-06-053-27 W4M | 1987 | 10 |
| 85034 | NW-06-053-27 W4M | 1974 | 36 |
| | | **Average Static Water Depth** | **16.4** |

## Wetlands

Desktop Assessment

The four available datasets reviewed showed numerous wetlands within the Project (Appendix B - Figure 3). The refined results using the provincial wetland directives, are shown in Appendix B - Figure 6. The character of the forested area in the northeast corner of NE-06 remains indeterminate. It was once previously mapped as a bog and is therefore currently shown in Appendix B - Figure 7 as a potential wetland, pending field assessment.

The ACIMs search identified three non-sensitive water tolerant vegetation element occurrences (EOs) within Section 06-053-27 W4M and two sensitive species (Table 3; Appendix B). These species may or may not be present in the Project area. Neither of the two sensitive species are protected by legislation.

**Table 3. ACIMS Results**

| Species Observation | Species Scientific Name | EO ID | S Rank | Last Observation Date | Habitat Description |
|---|---|---|---|---|---|
| clammy hedge-hyssop | *Gratiola neglecta* | 18823, 18824 | S3 | 2007-09-19 | Muddy stream banks, lake margins and wet meadows |
| cat-tongue liverwort | *Conocephalum salebrosum* | 24169 | S2S4 | 2013-06-07 | Moist, shaded and calcareous habitats |

S2 = Known from twenty or fewer occurrences or vulnerable to extirpation because of other factors
S3= Known from 100 or fewer occurrences, or somewhat vulnerable due to other factors, such as restricted range, relatively small population sizes, or other factors
S4 = apparently secure, taxon is uncommon but not rare, potentially some cause for long term concern due to declines or other factors.
S2S4 = Range from S2 and S4

Field Assessment- SE-06 and NW-06

Desktop wetland boundaries, shown in Appendix B - Figure 4, were updated following field investigations and final wetland maps produced for the Project (Appendix B - Figure 7). Key changes between the desktop and field investigations were:

- Three wetlands (WT-01B-3, WT-01D, and WT-51) were added to the wetland inventory during the field assessment. Those wetlands are shown in Appendix B - Figure 7 but are not shown in Appendix B - Figure 4.
- Twelve wetlands (WT-01A, WT-02A, WT-03, WT-04, WT-07, WT-14, WT-15, WT-19, WT-23, WT-24, WT-32, and WT-47; Appendix B - Figure 4) were removed from the inventory based on field assessment results as they were found to be ephemeral water bodies that did not meet the definition of wetland.
- Two wetlands (WT-17 and portions of WT-18) were removed from the wetland inventory on the basis of evidence of removal of these wetland areas from the landscape on a date preceding the field assessment.

In total, the final wetland inventory comprised 36 wetlands: twelve (12) wetlands present within SE-06, fourteen (14) wetlands present within NW-06, and ten (10) wetlands present within NE-06 (Appendix B - Figure 7). The characteristics of each wetland in the final inventory are summarized in Table 4. Note that wetland characterizations for the NE-06 are based on desktop review only and require further field assessment. Wetland boundaries and typing may require adjusting.

None of the wetlands were classified as permanent; two were classified as seasonal and the remainder were classified as temporary; all but two were typed as graminoid marsh. The majority of mapped wetlands are small (well under 0.5 ha). Notable exceptions are WT-01C, which is a swamp riparian fringe wetland along Atim Creek; WT-31, which is the marsh riparian wetland fringing Whispering Waters Creek; and WT-41, located on the NE-06. WT-41 measures ~ 7.0 ha.

**Table 4. Final Wetland Inventory, Based on Field Results (2024)**

| Quarter Section | Wetland ID | Wetland Classification | Vegetation Characteristics | Soil Characteristics | Hydrology / Slope Characteristics |
|---|---|---|---|---|---|
| SE-06 | WT-01B-3 | Temporary Graminoid Marsh | 100% cultivated vegetation cover | Fine, faint – distinct mottles within 30 cm of surface. | Downslope of WT-01A and WT-15. Upslope of WT-01D. |
| | WT-01C* | Temporary Wooded Deciduous Swamp | Portions of riparian area wetlands dominated by forest layer.<br>Also portions of cultivated vegetation cover. | Fine, faint – distinct mottles within 30 cm of surface.<br>Coarse distinct mottles 30 - 35 cm | Easternmost extent is cultivated. Evidence of surface connection west towards riparian wetland area surrounding Atim Creek. |
| | WT-05 | Temporary Graminoid Marsh | Some non-agronomic species:<br>Nettle<br>Foxtail<br>Reed canary grass | Fine, faint – distinct mottles within 30 cm of surface. | Imagery sees surface water in spring.<br>No surface water at the time of assessment. |
| | WT-06 | Temporary Graminoid Marsh | 100% cultivated vegetation cover | Fine, distinct mottles within 30 cm of surface. | Depression in landscape. |
| | WT-08 | Temporary Graminoid Marsh | 100% cultivated vegetation cover | Fine, distinct mottles within 30 cm of surface. | Depression in landscape. |
| | WT-09 | Temporary Graminoid Marsh | 100% cultivated vegetation cover | Fine, distinct mottles within 30 cm of surface. | Depression in landscape. No surface water at time of field assessment. |
| | WT-10 | Temporary Graminoid Marsh | 100% cultivated vegetation cover | Fine faint mottles at surface. | Depression in landscape.<br>Surface water visible on imagery. |
| | WT-11-1 | Temporary Graminoid Marsh | 100% cultivated vegetation cover | Fine faint mottles at surface. | Depression in landscape. |
| | WT-11-2 | Temporary Graminoid Marsh | 100% cultivated vegetation cover | Fine faint mottles at surface. | Lower depression from WT-11-1. |
| | WT-12 | Temporary Graminoid Marsh | 100% cultivated vegetation cover | Fine, distinct mottles within 30 cm of surface. | Depression in landscape. |
| | WT-13 | Temporary Graminoid Marsh | 100% cultivated vegetation cover | Fine, faint – distinct mottles within 30 cm of surface. | Depression in landscape. |
| | WT-16 | Temporary Graminoid Marsh | 100% cultivated vegetation cover | Fine, distinct mottles within 30 cm of surface. | Depression in landscape. |

**WT-01C boundaries are preliminary only and require additional field assessment if disturbance is contemplated.*

**Table 5 (Continued). Final Wetland Inventory, Based on Field Results (2024)**

| Quarter Section | Wetland ID | Wetland Classification | Vegetation Characteristics | Soil Characteristics | Hydrology / Slope Characteristics |
|---|---|---|---|---|---|
| NW-06 | WT-18 | Temporary Graminoid Marsh | Scentless chamomile<br>Creeping thistle<br>Agronomic | Fine, distinct mottles within 30 cm of surface. | Depression in landscape. |
| | WT-21 | Temporary Graminoid Marsh | 100% cultivated vegetation cover with minor Creeping thistle. | Fine, distinct mottles within 30 cm of surface | Depression in landscape. |
| | WT-22 | Temporary Graminoid Marsh | 100% cultivated vegetation cover | Fine, distinct mottles within 30 cm of surface | Depression in landscape. |
| | WT-25 | Temporary Graminoid Marsh | 100% cultivated vegetation cover with minor Creeping thistle. | Fine, distinct mottles within 30 cm of surface | Depression in landscape. |
| | WT-26 | Temporary Graminoid Marsh | 100% cultivated vegetation cover with minor Creeping thistle and sow thistle | Fine, distinct mottles within 30 cm of surface | Depression in landscape. |
| | WT-27 | Temporary Graminoid Marsh | 100% cultivated vegetation cover with minor foxtail cover | Fine, distinct mottles within 30 cm of surface | Depression in landscape. |
| | WT-28 | Temporary Graminoid Marsh | 100% cultivated vegetation cover with minor Creeping thistle. | Fine, distinct mottles within 30 cm of surface | Depression in landscape. |
| | WT-29 | Graminoid Marsh, with wooded deciduous swamp margins | Balsam poplar<br>Willow sp.<br>Salix beb<br>Reed canary grass<br>Creeping thistle<br>Nettle<br>Bluejoint | Fine, distinct mottles within 30 cm of surface | Depression in landscape. |
| | WT-30 | Temporary Graminoid Marsh | 100% cultivated vegetation cover. | Fine, distinct mottles within 30 cm of surface | Depression in landscape. |
| | WT-31 | Temporary Graminoid Marsh | Relatively native vegetation cover including:<br>Beb's willow<br>Reed canary grass<br>Nettle<br>Bluejoint<br>Also includes invasive species such as creeping thistle and common tansy | Deep topsoil horizon.<br>Fine, distinct mottling within 30 cm of surface. | Fringe wetland surrounding Whispering Waters Creek. |
| | WT-33 | Temporary Graminoid Marsh | 100% cultivated vegetation cover. | Fine faint mottles within 30 cm of surface. | Depression in landscape – bowl shaped. |
| | WT-34 | Temporary Graminoid Marsh | 100% cultivated vegetation cover. | Fine, distinct mottles within 30 cm of surface | Depression in landscape. |
| | WT-35 | Temporary Graminoid Marsh | 100% cultivated vegetation cover. | Fine, distinct mottles within 30 cm of surface | Depression in landscape. |
| | WT-51 | Temporary Graminoid Marsh | 100% cultivated vegetation cover | Fine distinct mottling within 30 cm of surface. | Mid slope plateau, sloping towards WT-31 and Whispering Waters Creek. |

**Table 6 (Continued). Final Wetland Inventory, Based on Field Results (2024)**

| Quarter Section | Wetland ID | Wetland Classification | Vegetation Characteristics | Soil Characteristics | Hydrology / Slope Characteristics |
|---|---|---|---|---|---|
| NE-06 | WT-01B | Temporary Wooded Deciduous Swamp | Desktop Delineation Only | Desktop Delineation Only | Wetter areas shown on most historical images reviewed. |
| | WT-36 | Temporary Graminoid Marsh | Desktop Delineation Only | Desktop Delineation Only | Wetter areas shown on most historical images reviewed. |
| | WT-37 | Temporary Graminoid Marsh | Desktop Delineation Only | Desktop Delineation Only | Wetter areas shown on most historical images reviewed. |
| | WT-38 | Seasonal Graminoid Marsh | Desktop Delineation Only | Desktop Delineation Only | Wetter areas shown on most historical images reviewed. |
| | WT-39 | Temporary Graminoid Marsh | Desktop Delineation Only | Desktop Delineation Only | Wetter areas shown on most historical images reviewed. |
| | WT-40 | Temporary Graminoid Marsh | Desktop Delineation Only | Desktop Delineation Only | Wetter areas shown on most historical images reviewed. |
| | WT-41 | Temporary Graminoid Marsh | Desktop Delineation Only | Desktop Delineation Only | Wetter areas shown on most historical images reviewed. |
| | WT-42 | Temporary Graminoid Marsh | Desktop Delineation Only | Desktop Delineation Only | Wetter areas shown on most historical images reviewed. |
| | WT-43 | Temporary Graminoid Marsh | Desktop Delineation Only | Desktop Delineation Only | Wetter areas shown on most historical images reviewed. |
| | WT-44 | Temporary Graminoid Marsh | Desktop Delineation Only | Desktop Delineation Only | Wetter areas shown on most historical images reviewed. |
| | WT-45 | Seasonal Graminoid Marsh | Desktop Delineation Only | Desktop Delineation Only | Wetter areas shown on most historical images reviewed. |

## Fish and Fish Habitat

Desktop Assessment

A query of the FWMIS database identified fish habitat survey data and fish species inventories collected in 2012 and 2013 (Government of Alberta, 2025). A summary of relevant fish and fish habitat records are provided in Table 5. Whispering Waters Creek and Atim Creek are not located within mapped aquatic species at risk habitat or potential habitat (DFO, 2024).

The Project is located within a watershed designated as Yellow Zone for Whirling Disease (Government of Alberta, 2025b). Yellow zones represent areas with high to moderate risk for the introduction and spread of whirling disease.

**Table 7. Desktop Assessment Summary of Watercourse**

| Watercourse Name | Location | Fish Species Within Watercourse Segment | Temp (°C) | Conductivity (µS/cm) | Average DO (%) | Average pH | Wetted Width (Average) | Rooted Width (Average) | Substrate Average Percent (F/SMG/LGG/C/BE/B)* |
|---|---|---|---|---|---|---|---|---|---|
| Atim Creek | within SE-06 | Brook Stickleback, Fathead Minnow, Lake Chub, White Sucker | 8.9 | 666.6 | 7.26 | 7.55 | 1.51 | 2.26 | 80/17/2.5/2.5/0/2.5 |
| Whispering Waters Creek | within NW-06 | Brook Stickleback, Fathead Minnow, Lake Chub, Pearl Dace, White Sucker | 7.25 | 538.9 | 10.32 | 7.93 | 1.13 | 0.96 | 72/0/5/42/0/0 |

*F = Fines, SMG = Small Gravel, LGG = Large Gravel, C = Cobble, B= Boulder, BE= Bedrock

The portions of Whispering Waters Creek and Atim Creek within the Project are unmapped Class C watercourses with a restricted activity period of April 16 – June 30 according to the Stony Plain Code of Practice Map (Government of Alberta, 2012a).

Field Assessment- SE-06 and NW-06

Both Atim and Whispering Waters Creeks showed characteristics of a small permanent watercourse with clear pool/riffle/run patterns and habitat cover suitable for fish. No fish were observed during the field assessment and no efforts were made to inventory fish communities as part of the field assessment.

## Wildlife and Wildlife Habitat

Desktop Assessment

Results of the FMWIS search are included in Appendix D. There were no recorded occurrences of species of concern in the search area. FWMIS sensitive species range records indicate that the study area falls within the province's sharptailed grouse (*Tympanuchus phasianellus*) survey area and the bald eagle (*Haliaeetus leucocephalus*) range (Government of Alberta, 2025c). Sharp-tailed grouse are not, however, expected to occur within the Project area because suitable grassland/shrubland habitat is not present. Atim Creek riparian trees may occasionally be used for bald eagle staging or foraging along Atim Creek, however, the area is not suitable for bald eagle nesting.

Field Assessment

Wildlife habitat on the subject lands are considered to generally be of low quality, with the better habitat found at the few seasonal wetlands, including along Whispering Waters Creek, in shelterbelt trees on some quarter section boundaries and, more notably, the forested areas around Atim Creek and in the northeast corner of the NE-06, both part of a mapped ESA. Lands associated with Atim Creek and the forested corner of the NE-06 comprise relatively high-quality habitat, particularly for bird and small mammal species. Based on character and location, the woody riparian zone, including the upland forest patch in the northeast corner of NE-06, likely provide important local migratory bird staging habitat and good, high quality, peri-urban landbird nesting habitat. Aspen trees of suitable size (30cm diameter at breast height) for pileated woodpecker nesting are

present near Atim Creek and are possibly present elsewhere in the NE-06. Whispering Water Creek riparian zone is suitable waterbird nesting habitat. Incidental wildlife observations made during the field assessment on September 19 and 20, 2024 were limited to Canada goose (Table 7). This short list is very likely a product of the time of year and lack of formal avian surveys. The subject lands are expected to support a rich landbird community during spring/fall migration, a variety of rural-adapted bird species during the breeding season, and a year-round suite of the region's commonly occurring mammals such as deer, coyote, fox, skunk, weasel, porcupine, and several small mammal species. Herptiles are likely restricted to the commonly occurring, non-licensed, wood frog, boreal chorus frog and garter snakes. Field assessment revealed no evidence suggesting high potential for snake hibernacula.

**Table 8. Incidental Wildlife Observations**

| Species Common Name | Species Scientific Name | Alberta Species Status[1] | Canada General Species Status[2] | SARA Schedule 1[3] | Notes |
|---|---|---|---|---|---|
| Canada goose | *Branta Canadensis* | Secure | Secure | Not Listed | Flyover, staging in wetlands/fields |

Wildlife Movement/ Ecological Connectivity

The subject lands are currently very permeable to wildlife, owing to their agricultural/wetland character and the presence of two riparian corridors. The resident terrestrial and avian wildlife likely move freely throughout the parcel foraging/hunting and seasonally dispersing. The seasonally wetter, isolated temporary and seasonal wetlands within the parcel likely at times also serve as stopovers for a variety of migrating waterbirds, particularly in the spring.

More broadly speaking, at present, the subject lands form part of a narrow band of developing or soon to be developed agricultural lands situated between the east margins of developed Stony Plain and the west limit of Spruce Grove. This band of agricultural land is assumed to be currently important for dispersing and large-territory wildlife attempting to navigate around the two urban areas. As these agricultural lands develop, they will become less permeable and regional movement corridors available to wildlife will be reduced. Within this existing agricultural area, the Whispering Waters Creek and Atim Creek reaches are key to wildlife movement and they will be the features that persist in a more or less natural state into the future. For each watercourse, the corridor function extends further upstream of the subject lands into the developed town (and south of the town for Atim Creek) and further downstream of the subject lands. Overall, Atim Creek corridor, being the more substantial, longer, better-connected and woody riparian feature is the more important of the two corridors. With the development of the remaining agricultural lands, the wildlife movement function of these corridors will become more critical. Atim Creek is already considered by Parkland County to be a regionally significant wildlife movement corridor (O2 Planning and Design Inc. 2014).

## 5. Proposed Development Impacts

Based on the development concept (Appendix A) it is anticipated that most lands within the Project area will be subject to regrading and clearing of existing vegetation, resulting in the loss of the majority of natural features within the Project boundaries. Table 8 summarizes the anticipated impacts to the environmental components described in this BIA and provides some potential mitigation measures including environmental reserve lands along Whispering Waters Creek and Atim Creek, which are discussed in more detail below.

In addition to the mitigation measures noted in Table 8, all best management construction practices are expected to be implemented during construction. For example, weed control as required by provincial legislation, soil management, and no fuel storage or refuelling within 100 m of a waterbody.

**Table 9. Key Environmental Impacts and Proposed Mitigation for the Project**

| Ecosystem Component | Potential Project Interaction and Adverse Effects | Mitigation Measures and Monitoring Plans |
|---|---|---|
| Soils | Loss of soil from improper salvage and conservation.<br><br>Soil erosion in disturbed areas.<br><br>Spread of clubroot. | Follow soil salvage and storage BMPs to prevent soil loss and degradation.<br><br>An Erosion and Sediment Control (ESC) plan will be required for work near Whispering Water Creek and Atim Creek. An ESC plan should outline the necessary measures to manage potential erosion and sediment transport via surficial or aeolian mechanism during clearing, grading, construction, and site stabilization.<br><br>To mitigate potential spread of clubroot it is recommended to follow the Alberta Clubroot Management Plan (Government of Alberta, 2014). |
| Vegetation | Removal of existing vegetation and shelterbelts during grading.<br><br>Removal of a ~2.5 ha patch of forest.<br><br>Spread of noxious and prohibited weed species | Limit disturbance to those areas requiring construction.<br><br>Further investigate forest area in the NE-06 and consider retention.<br><br>Manage weeds in accordance with the Town of Stony Plan Environmental Master Plan.<br><br>Re-establish disturbed areas with appropriate seed mixes to suppress weeds. |
| Surface Water | Change of upslope land use, sediments and other potential contaminants of concern transported into permanent watercourses. | Development should avoid Whispering Waters Creek and Atim Creek.<br><br>Environmental Reserve (ER) lands are proposed based on 1 in 100-year flood modeling, surveyed top of bank and Stepping Back from the Water guidelines (Government of Alberta, 2012b).<br><br>Ensure post-development stormwater does not directly enter the creek. |
| Groundwater | Potential alteration of shallow groundwater movement from grading.<br><br>Possible risk of surface contaminants entering shallow aquifers. | Maintain existing drainage patterns where practicable to preserve shallow groundwater recharge zones (this assessment assumes that engineering will account for water table conditions.)<br><br>Adhere to BMPs for equipment fueling, storage, and spill prevention. |
| Wetlands | Loss of up to 36 wetlands within the Project.<br><br>Notable losses are the potential wetland (bog) in the northeast corner of NE-06 and the adjacent WT-41 in the same quarter. | Attempt to retain the potential wetland/upland forest in the northeast corner of NE-06 as a wooded area. This area requires field investigations.<br><br>Undertake field investigations to better characterize and valuate WT-41 and consider potential for retention into the future development concept.<br><br>For each/all wetland impacts, submit to EPA a *Water Act* application for wetland disturbance, supported by a wetland assessment impact report (WAIR). |

| Ecosystem Component | Potential Project Interaction and Adverse Effects | Mitigation Measures and Monitoring Plans |
|---|---|---|
| Fish and Fish Habitat | Potential increase in sediment and runoff entering Atim Creek and Whispering Waters Creek during construction, particularly during installation of road crossings and outfalls.<br><br>Loss of riparian stability and potential indirect effects on fish habitat.<br><br>Potential to block fish passage with inappropriate culvert design. | Minimize instream works, properly size culverts and maximize maintenance of vegetated buffers adjacent to creeks.<br><br>Implement ESC BMPs during construction to prevent sediment release.<br><br>Adhere to restricted activity period (April 16 – June 30) under the Water Act Codes of Practice Management Area Map (Government of Alberta 2012a).<br><br>During near-water and in-water works, implement DFO Measures to Protect Fish and Fish Habitat (Government of Canada, 2025c) and use all relevant DFO BMPs, standards etc.<br><br>Have Contractor prepare an ECO Plan, with fisheries and water quality related ECO Plan content to be prepared by a QAES.<br><br>Contractor will be required to comply with Yellow Zone GoA whirling disease protocols (Government of Alberta, 2020b).<br><br>Report any accidental release or fish mortality to Alberta Environment and Protected Areas (EPA). |
| Wildlife and Wildlife Habitat | Much of the existing wildlife habitat will be removed.<br><br>Notable losses include the forest stand in the northeast corner of NE-06, larger deciduous trees along the boundary of SW-06 will be removed, and fragmentation of the Atim Creek riparian corridor by two road crossings.<br><br>The two collector roads proposed to cross Atim Creek and the one crossing Whispering Waters Creek have potential to act as barriers to wildlife movement.<br><br>Incidental damage/mortality of wildlife | The proposed ER along Atim and Whispering Waters creeks will protect the wildlife habitat values of those areas, although some reduction is expected related to conversion of the adjacent agricultural matrix to an urban matrix.<br><br>The proposed storm water management ponds, to be located adjacent to the watercourses, will provide some new aquatic habitat and will augment the wildlife habitat value of the riparian corridors.<br><br>Minimize clearing of Atim Creek trees and shrubs riparian habitat. Augment riparian habitat wherever feasible.<br><br>Limit road crossings and locate roads to cross as close as perpendicular to the creek as possible.<br><br>Design creek/ER crossings to provide for and funnel wildlife movement under the road. Maximum clearance should be sought. Engage a qualified wildlife professional for assistance with crossing design. Establish an animal design group for crossing designs.<br><br>Undertake a pileated woodpecker nest cavity search prior to any tree clearing and preferably during the NSP phase to allow for avoidance of protected nest cavities.<br><br>To reduce impacts to wildlife, vegetation clearing of all kinds should be completed outside of the breeding bird season (April 20 - August 20) and February 15 to April 30 for larger trees capable of supporting nesting owls.<br><br>If work cannot be completed outside of the above dates, pre-disturbance wildlife sweeps and nest searches should be completed by a qualified environmental professional. |

# 6. Recommendations and Environmental Approvals

While the subject lands currently support many wetlands, most are not of a type or size that would integrate well into urban development. Natural features that merit retention and integration in the proposed development are limited to the two watercourses and associated riparian corridors. The development concept retains these as ER corridors. In addition, two features in the northeast corner of NE-06, the forested patch/potential bog and the adjacent WT-41, warrant consideration for retention. Both are sizeable features and are components of an ESA identified by Parkland County that connects the two watercourses.

### Proposed Environmental Reserve

ER boundaries for Atim Creek and Whispering Waters Creek were developed to maintain creek riparian and hydrological functions, and to satisfy the Town of Stony Plain's policies regarding undevelopable lands and conservation of natural features. Proposed ER delineation considered:

- Guidance provided in Stepping Back from the Water: A Beneficial Management Practices Guide for New Development Near Water Bodies in Alberta's Settled Region (Government of Alberta, 2012b);
- Surveyed top of bank; and
- 1 in 100-year flood boundaries modelled by River Engineering Consulting (2025).

This approach meets the intent of the *Municipal Government Act* for dedicating lands subject to flooding, instability, or watercourse protection as ER.

Based on the above, Appendix B - Figure 5 presents the recommended ERs for Whispering Waters Creek and Atim Creek. The suggested ERs are compliant with policies described in the Town of Stony Plain's highest level planning documents and would achieve the following:

- protect lands undevelopable because they are flood prone or are sloped;
- protect regulated watercourses and riparian vegetation that is in limited supply in the Town of Stony Plain;
- provide for ecological and recreational connectivity;
- provide pollution protection for groundwater and surface water;
- protect existing treed riparian communities and the ecosystem services they provide;
- provide lands for future initiatives to enhance riparian communities to improve ecological connectivity and enhance the provision of ecosystem services.

The ER recommendations and associated mitigation measures are supported by the following Town of Stony Plain policy statements:

<u>From the Municipal Development Plan:</u>
*6.2.c* The Town of Stony Plain will require the protection, enhancement and conservation of hazardous or environmentally significant areas—including wetlands, watercourses, water bodies and their associated riparian areas—through appropriate techniques, such as environmental reserve dedication and conservation easements, donations and bequests.

*6.2.f* The Town of Stony Plain will require that new area structure plans and subdivision applications connect municipal and environmental reserves throughout the ASP area and adjacent developments or municipalities.

*6.2.d* The Town of Stony Plain will require that new area structure plans and subdivision applications be designed to incorporate and enhance environmentally significant lands, by keeping pre-existing woodlots and vegetation intact, planting complementary native and non-invasive plant species and increasing tree plantings, while still providing for recreational opportunities, parks and open spaces.

From the EMP:

The *Municipal Government Act* (MGA) requires that every municipality in Alberta have a Land Use Bylaw to establish rules and regulations for land development. The Town of Stony Plain has chosen to include Natural Conservation Areas as part of the Land Use Bylaw. Natural Conservation Areas are intended to preserve natural landscape and drainage patterns that support ecological landscape services. The EMP promotes the consideration of the existing environment when planning subdivision development, while also providing new guidelines for future land use planning decisions intended for environmental and conservation reserves. The EMP also promotes avoidance of development in flood prone areas.

From the LUB:

Natural Conservation Area: a Park set aside for conservation of natural features or areas of cultural or scenic value, which are intended to be kept in a natural state with limited development of pathway and similar Landscape elements that would not impact natural landscaping and drainage patterns.

3.1.0 Natural Conservation Areas

1. A natural conservation area is an area of park space intended to be kept in a state that preserves natural landscaping and drainage patterns, creates and supports habitats and encourages ecological sustainability.
2. Development within a natural conservation area will be limited to educational signage, enhanced stormwater drainage and maintenance, pathways, sitting areas and similar landscaping elements.

The development concept shown in Appendix A adopts the ER recommendations provide in this BIA.

## Environmental Regulatory Triggers

Disturbance of the identified sensitive aquatic features (wetlands and watercourses) will require environmental approvals, as follows:

- Permanent disturbance to any of the delineated wetlands in the Project lands will require *Water Act* Approval to remove wetlands.
- Any new or modified stormwater outfall on either creek would likely require a Code of Practice Notice pursuant to the *Water Act, Code of Practice for Outfalls*.
- Any road crossings of either creek would likely require a Code of Practice Notice pursuant to the *Water Act Code of Practice for Watercourse Crossings.*
- Disturbance to either fish-bearing watercourse, related to stormwater infrastructure or road crossings (e.g., culvert installation), will require a QAES assessment of potential impacts to fish and fish habitat and compliance with the federal *Fisheries Act.* Such work may require submission of a Request for Review to DFO. Timing restrictions may apply to in-stream works.

# 7. Disclaimer

Spencer Environmental has prepared this report in accordance with generally accepted environmental consulting practices and the professional obligations of the authors under the Professional Biologists Regulation and Agrology Profession Regulation (Alberta).

The findings, interpretations, and conclusions contained in this report are based on the conditions observed and information available to Spencer Environmental at the time of the assessment. No warranty is made as to the accuracy of information provided by third parties or obtained from public datasets. Where third-party or historical data are referenced, such information has been assumed to be correct.

The conclusions presented herein are based on the scope of work outlined in this report and are not intended to apply to any areas of the Project not investigated. Any use that a third party makes of this report, or any decisions made based on it, are the responsibility of such third parties. Spencer Environmental accepts no responsibility for damages, if any, suffered by others as a result of actions taken or decisions made based on this report.

This document has been prepared solely for the use of Stony Plain Land Inc., and submission to the Town of Stony Plain for regulatory review. It may not be reproduced or distributed for other purposes without the written consent of Spencer Environmental.

# 8. Closure

Spencer Environmental appreciated the opportunity to work on this project. If we can provide clarification, please call the undersigned at 780-429-2108.

Yours truly,

**Spencer Environmental Management Services Ltd.**

Prepared by:




Emily Harrison B.Sc., P.Biol.
Environmental Scientist

Reviewed by:




Jeremy Paul B.Sc., P.Ag, P.Biol.
Senior Environmental Scientist

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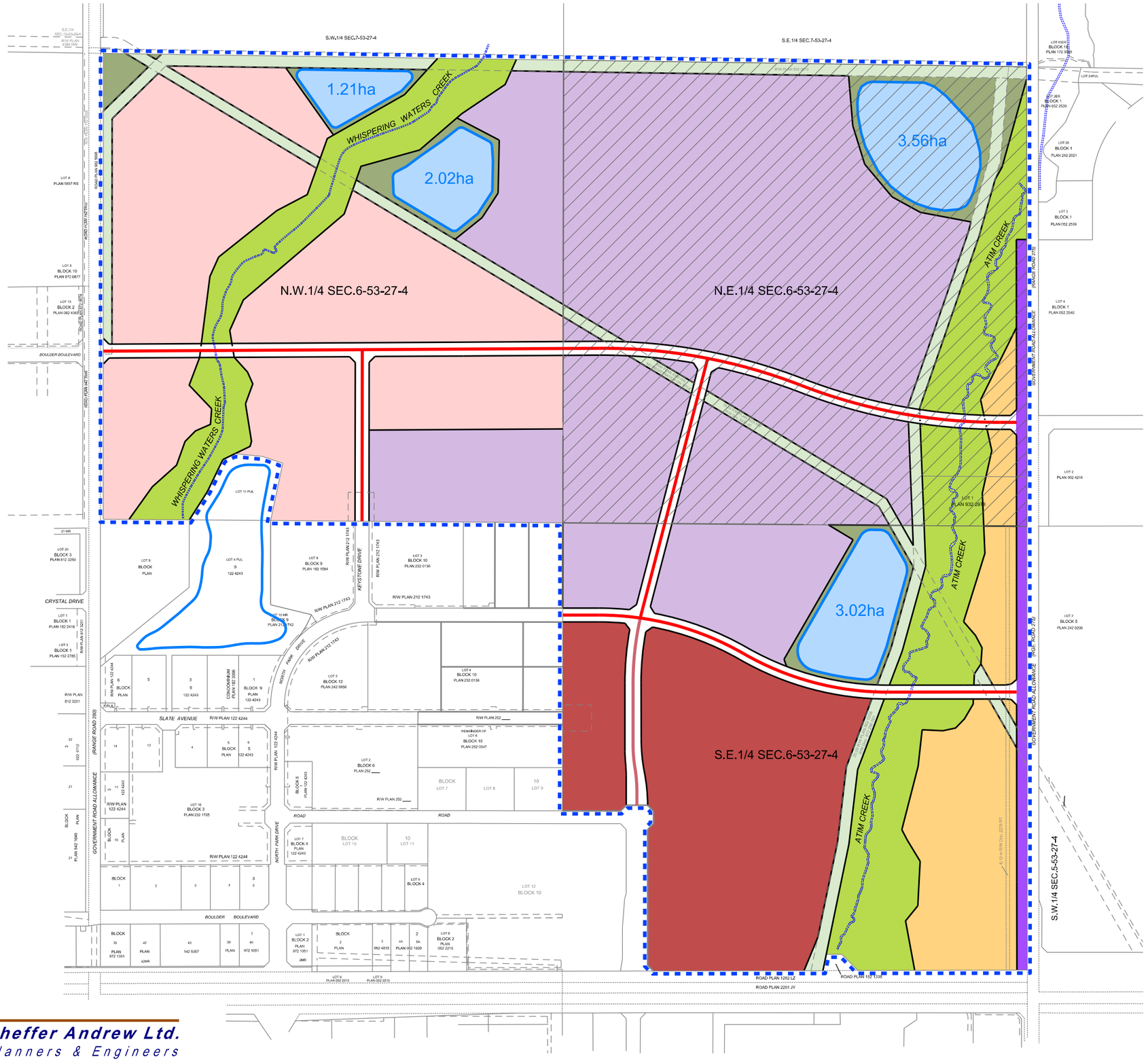
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# APPENDIX A
Development Concept



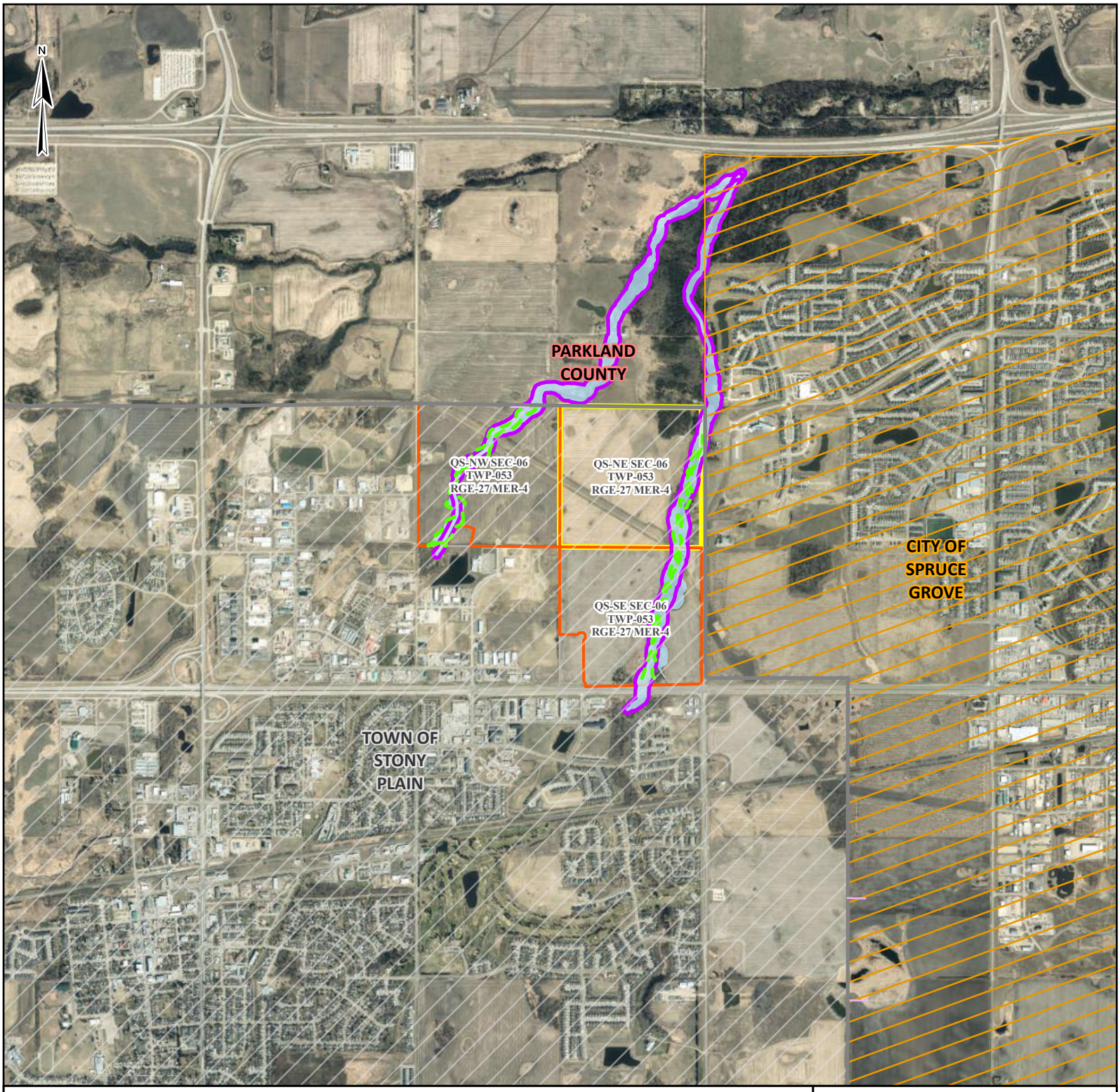

- Mixed Use
- Commercial
- Business Commercial
- Light Industrial
- Open Space - Municipal Reserve (Parks)
- Open Space - Utility R/W
- Open Space - Environmental Reserve
- Storm Water Management Pond
- Arterial Road Widening
- Shadow Plan Area
- Collector Road - 24.0m
- Collector Road - 37.0 to 28.0m Transition
- Area Structure Plan Boundary

# NORTHEAST AREA STRUCTURE PLAN
# DEVELOPMENT CONCEPT
## TOWN OF STONY PLAIN

Scheffer Andrew Ltd.
Planners & Engineers

1:7000
October 17, 2025
168901105b9 - ASP.dgn

# APPENDIX B
Site Figures




## Legend

- Desktop Assessment
- Field Assessment
- Proposed ER
- Stepping Back Setbacks
- Flood Plain 1 in 100yr

Scheffer Andrew Ltd.

# Stony Plain EP-1136

Location and ESA

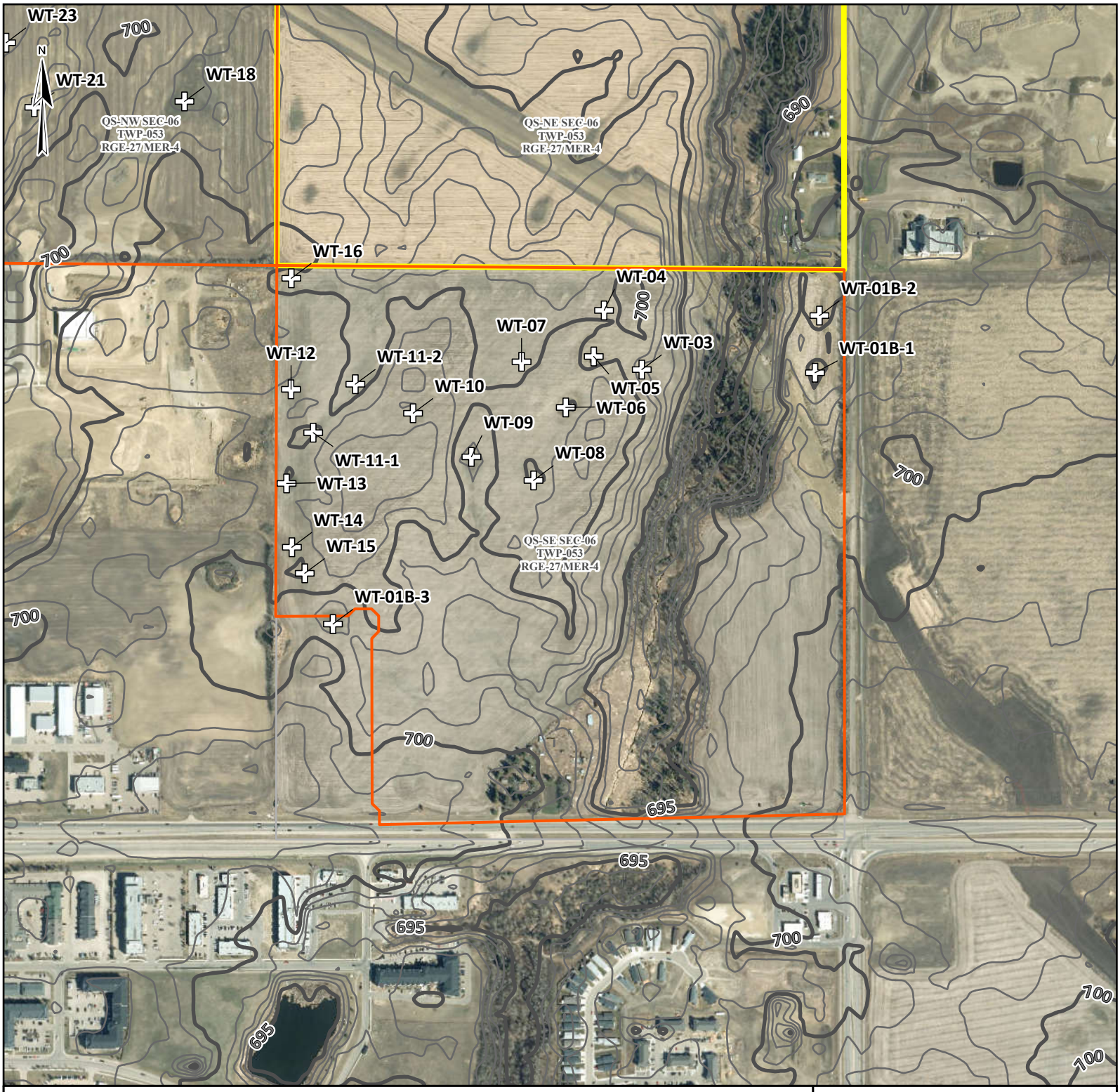
Figure 1 | September 2025

Scale: 1:30,000

SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

Spatial Reference
Name: NAD 1983 3TM 114

0 500 Meters




## Legend

- Desktop Assessment
- Field Assessment
- Assessment Locations
- Contours Index
- Contours Intermittent

Scheffer Andrew Ltd.

# Stony Plain EP-1136

Assessment Locations

Figure 2
Page 1 of 3

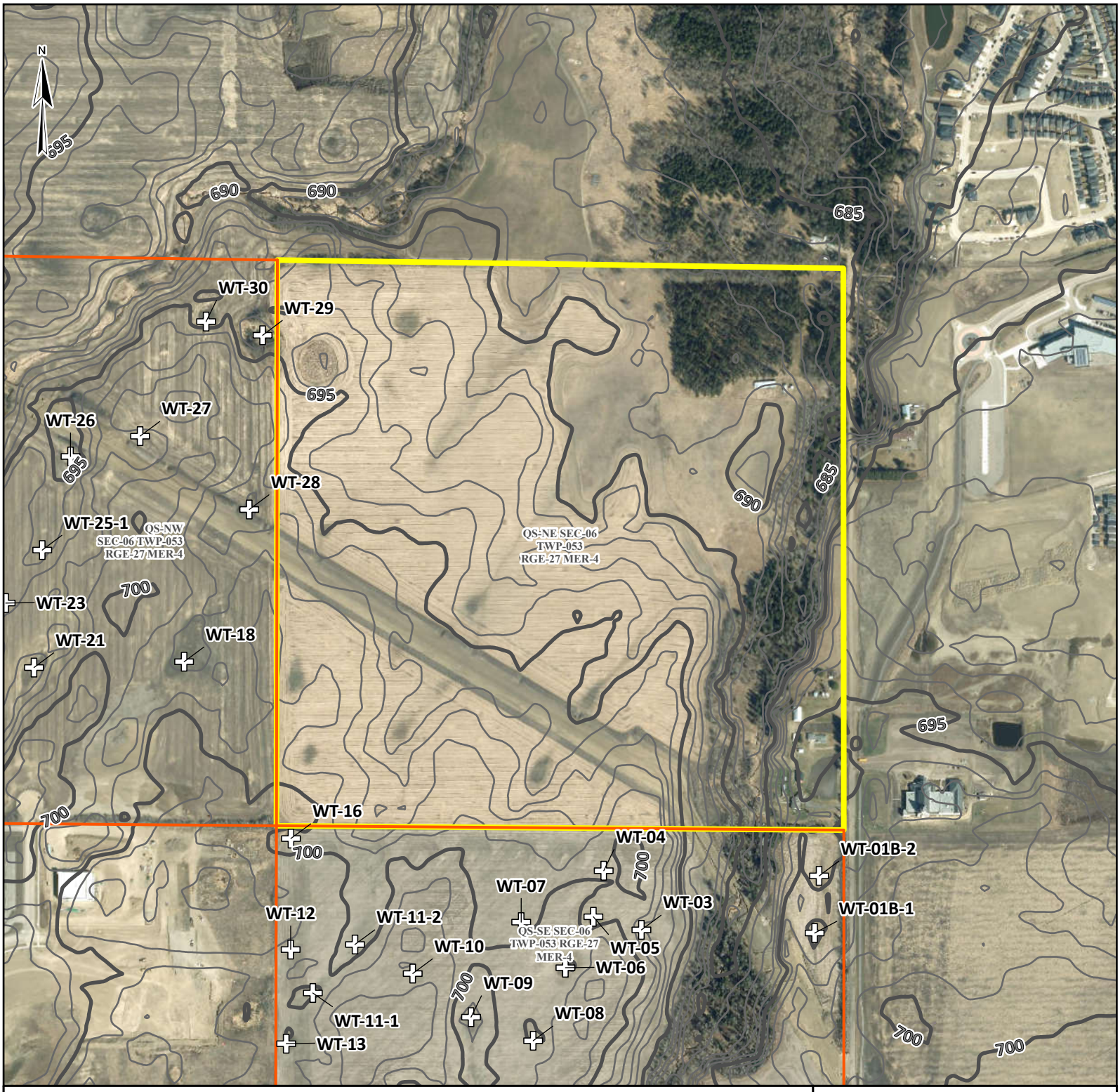
September 2025

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Spatial Reference
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0 200 Meters




## Legend

- Desktop Assessment
- Field Assessment
- Assessment Locations
- Contours Index
- Contours Intermittent

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# Stony Plain EP-1136

Assessment Locations

Figure 2
Page 2 of 3

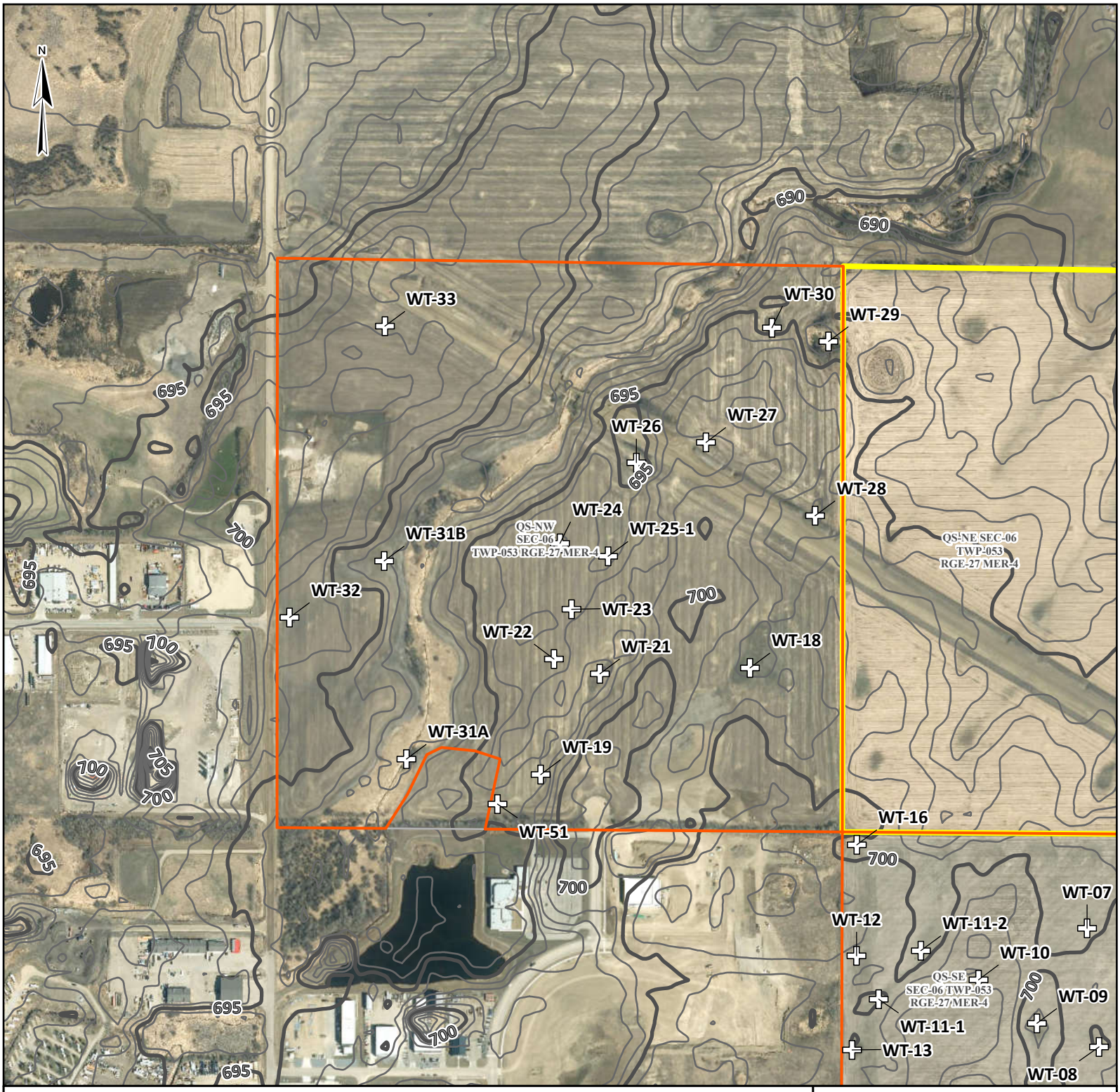
September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL
MANAGEMENT SERVICES LTD.

Spatial Reference
Name: NAD 1983 3TM 114

0 200 Meters




## Legend

- Desktop Assessment
- Field Assessment
- Assessment Locations
- Contours Index
- Contours Intermittent

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# Stony Plain EP-1136

Assessment Locations

Figure 2
Page 3 of 3

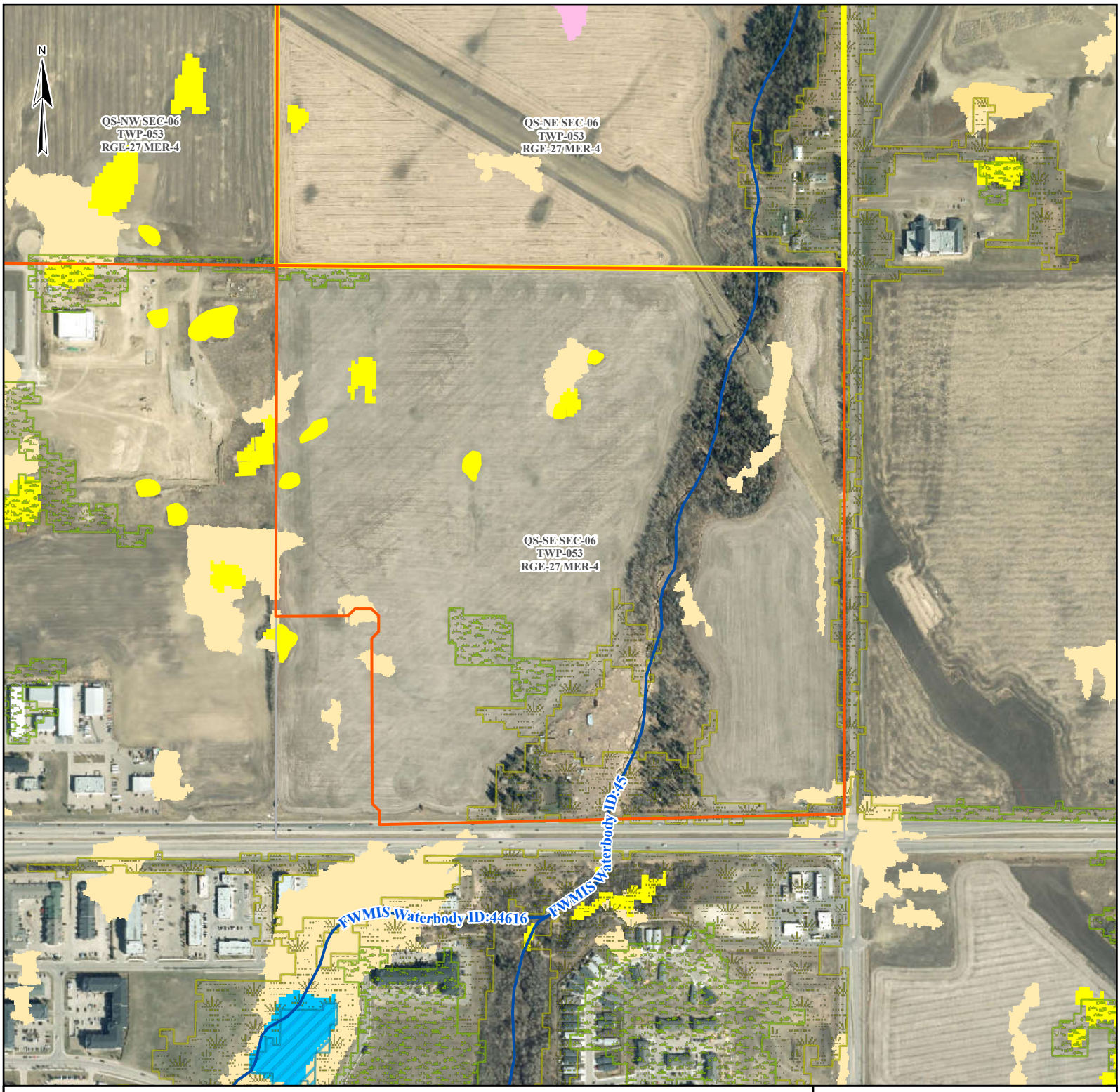
September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

Spatial Reference
Name: NAD 1983 3TM 114

0 200 Meters




## Legend

- Desktop Assessment
- Field Assessment
- FWMIS Hydroarcs
- FWMIS Hydro Polygons

ABMI Wetland Inventory
- Marsh

Parkland County Current Wetland Inventory (1950)
- Bog/Fen
- Marsh/Open Water

Parkland County Current Wetland Inventory (2013)
- Marsh
- Open Water

Alberta Merged Wetland Inventory Class
- Fen
- Marsh
- Open Water

Scheffer Andrew Ltd.

# Stony Plain EP-1136

Desktop Review

Figure 3
Page 1 of 3

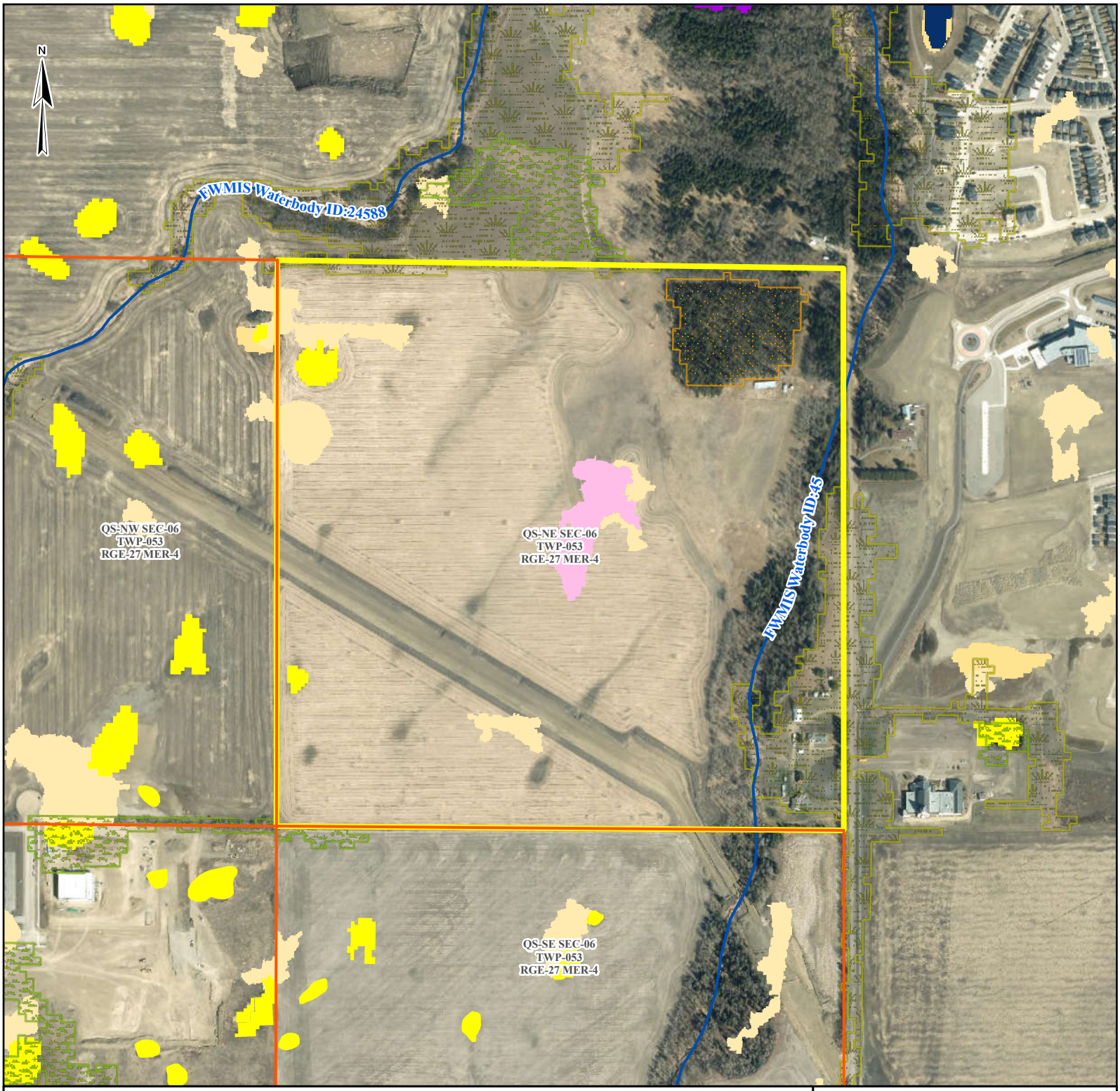
September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

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0 200 Meters




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- Bog
- Marsh

Alberta Merged Wetland Inventory Class
- Bog
- Fen
- Marsh

Scheffer Andrew Ltd.

# Stony Plain EP-1136

Desktop Review

Figure 3
Page 2 of 3

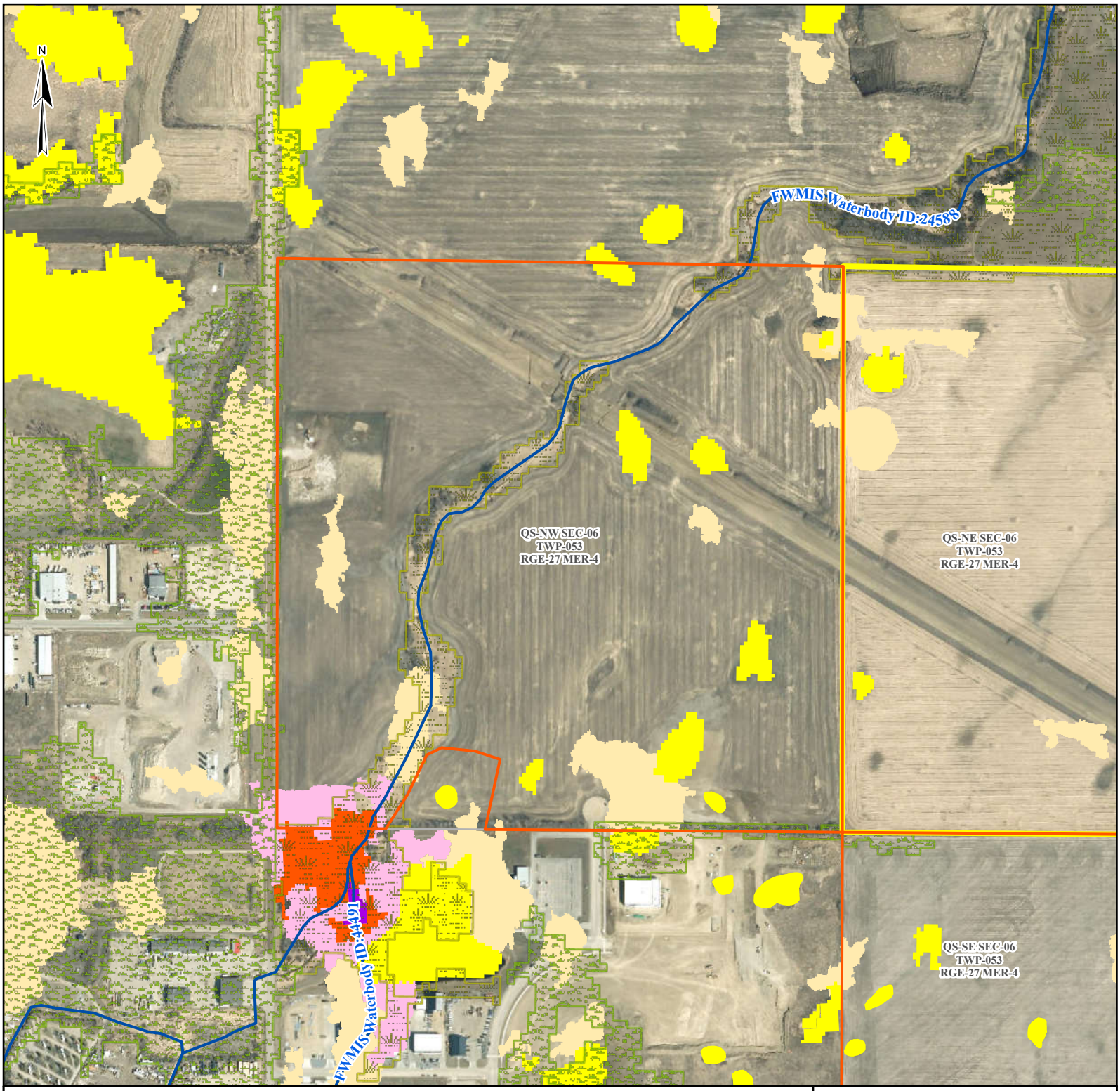
September 2025

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Alberta Merged Wetland Inventory Class
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- Marsh

Scheffer Andrew Ltd.

# Stony Plain EP-1136

Desktop Review

Figure 3
Page 3 of 3

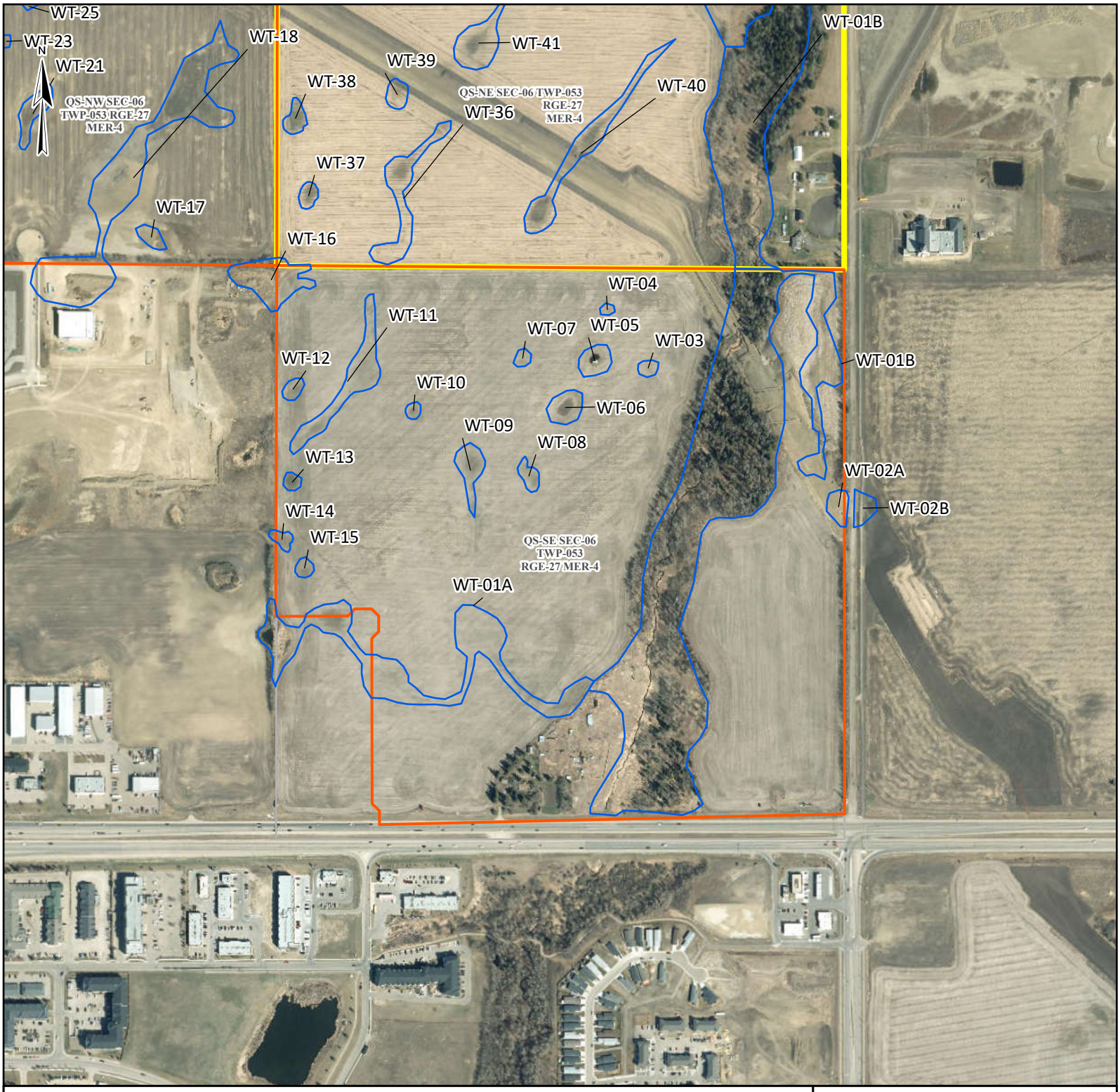
September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

Spatial Reference
Name: NAD 1983 3TM 114

0 200 Meters




## Legend

- Desktop Assessment
- DesktopDelineation
- Field Assessment

Scheffer Andrew Ltd.

# Stony Plain EP-1136

Desktop Wetland Delineation

Figure 4
Page 1 of 3

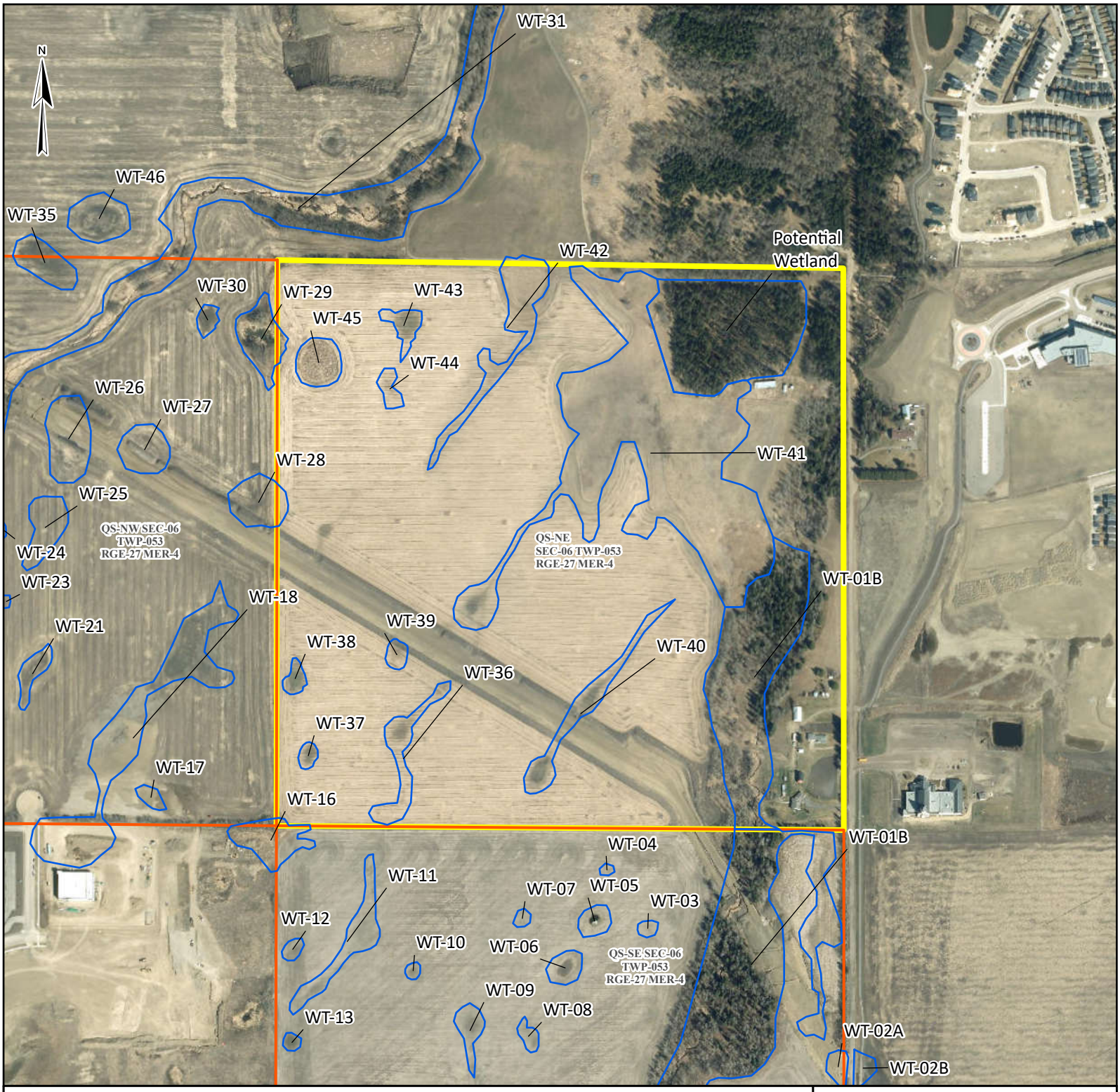
September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

Spatial Reference
Name: NAD 1983 3TM 114

0 200 Meters




## Legend

- Desktop Assessment
- Field Assessment
- DesktopDelineation

Scheffer Andrew Ltd.

# Stony Plain EP-1136

Desktop Wetland Delineation

Figure 4
Page 2 of 3

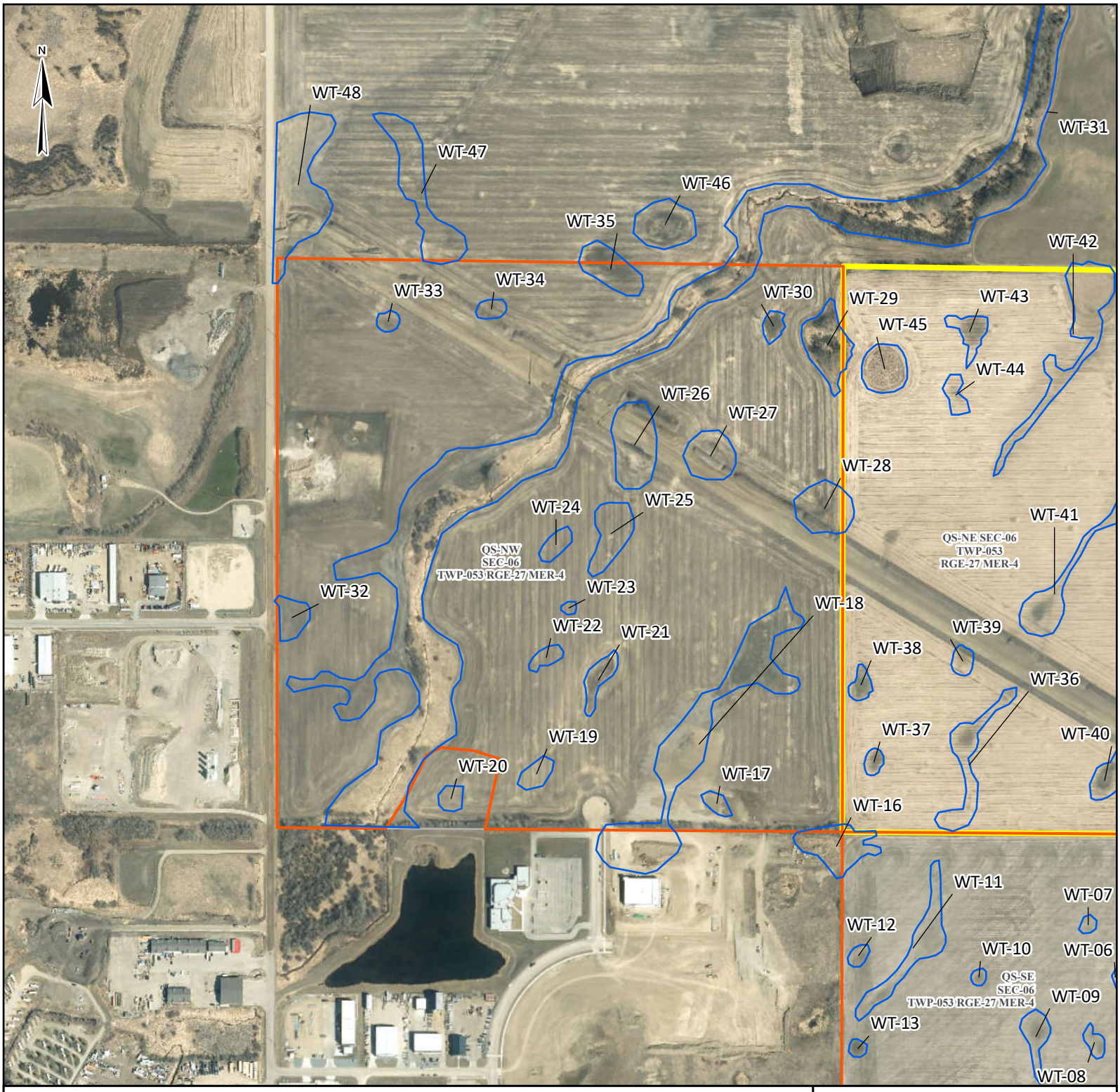
September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

Spatial Reference
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## Legend

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Scheffer Andrew Ltd.

# Stony Plain EP-1136

Desktop Wetland Delineation

Figure 4
Page 3 of 3

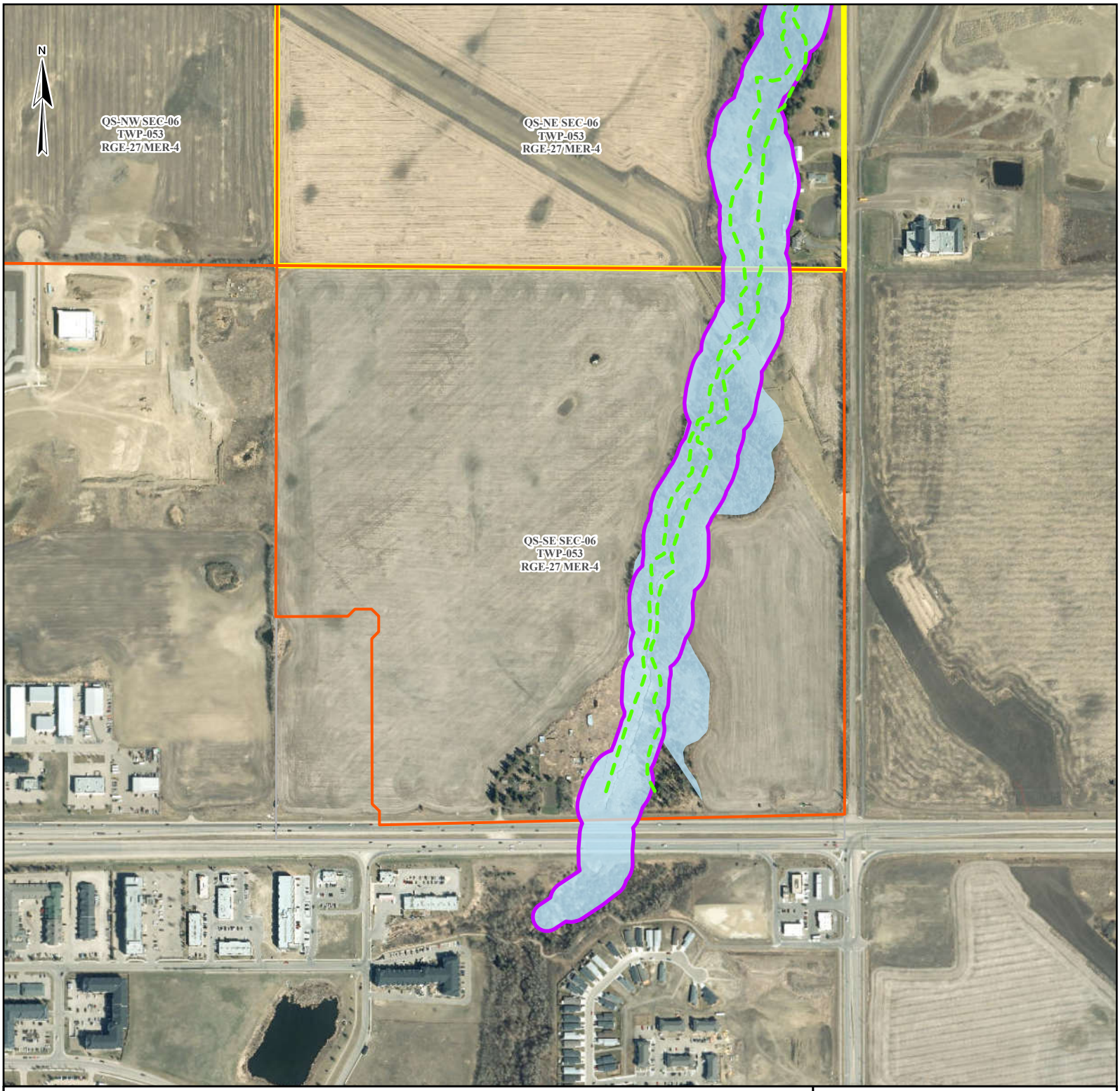
September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

Spatial Reference
Name: NAD 1983 3TM 114

0 200 Meters




## Legend

- Desktop Assessment
- Field Assessment
- Proposed ER
- Stepping Back Setbacks
- Flood Plain 1 in 100yr

Scheffer Andrew Ltd.

# Stony Plain EP-1136

Proposed ER

Figure 5
Page 1 of 3

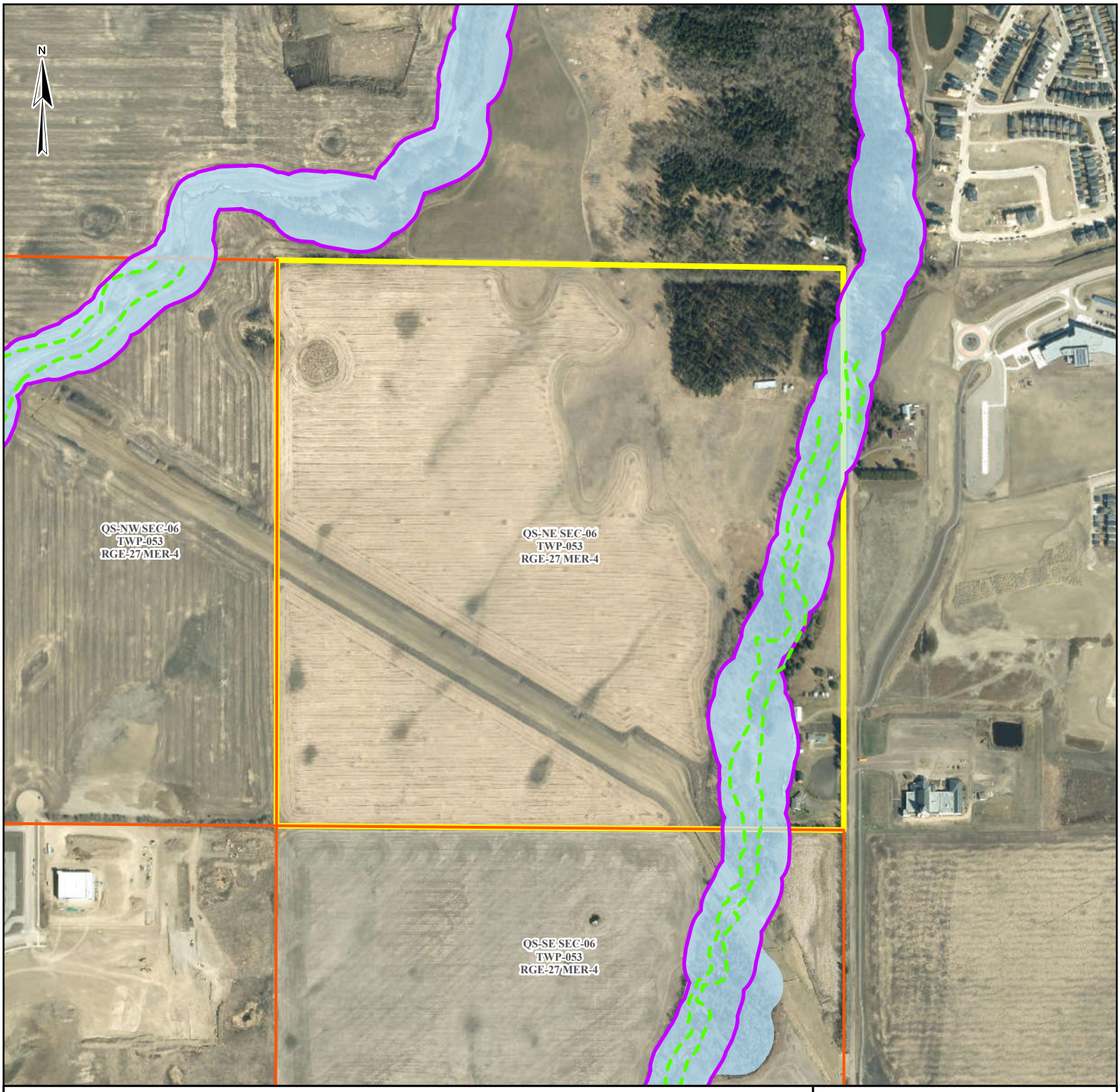
September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

Spatial Reference
Name: NAD 1983 3TM 114

0 200 Meters




## Legend

- Desktop Assessment
- Field Assessment
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Scheffer Andrew Ltd.

# Stony Plain EP-1136

Proposed ER

Figure 5
Page 2 of 3

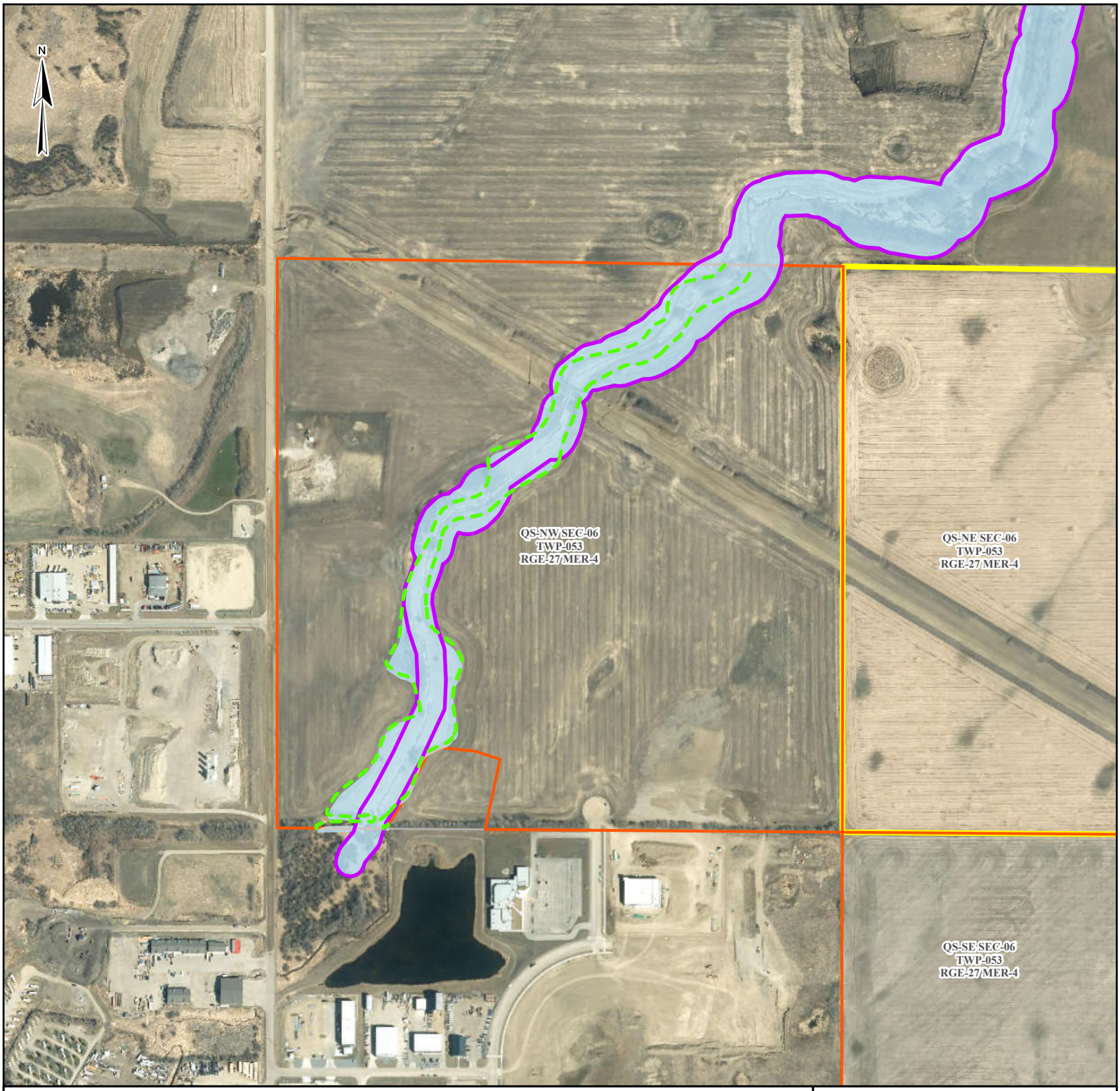
September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL
MANAGEMENT SERVICES LTD.

Spatial Reference
Name: NAD 1983 3TM 114

0 200 Meters




## Legend

- Desktop Assessment
- Field Assessment
- Proposed ER
- Stepping Back Setbacks
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Scheffer Andrew Ltd.

# Stony Plain EP-1136

Proposed ER

Figure 5
Page 3 of 3

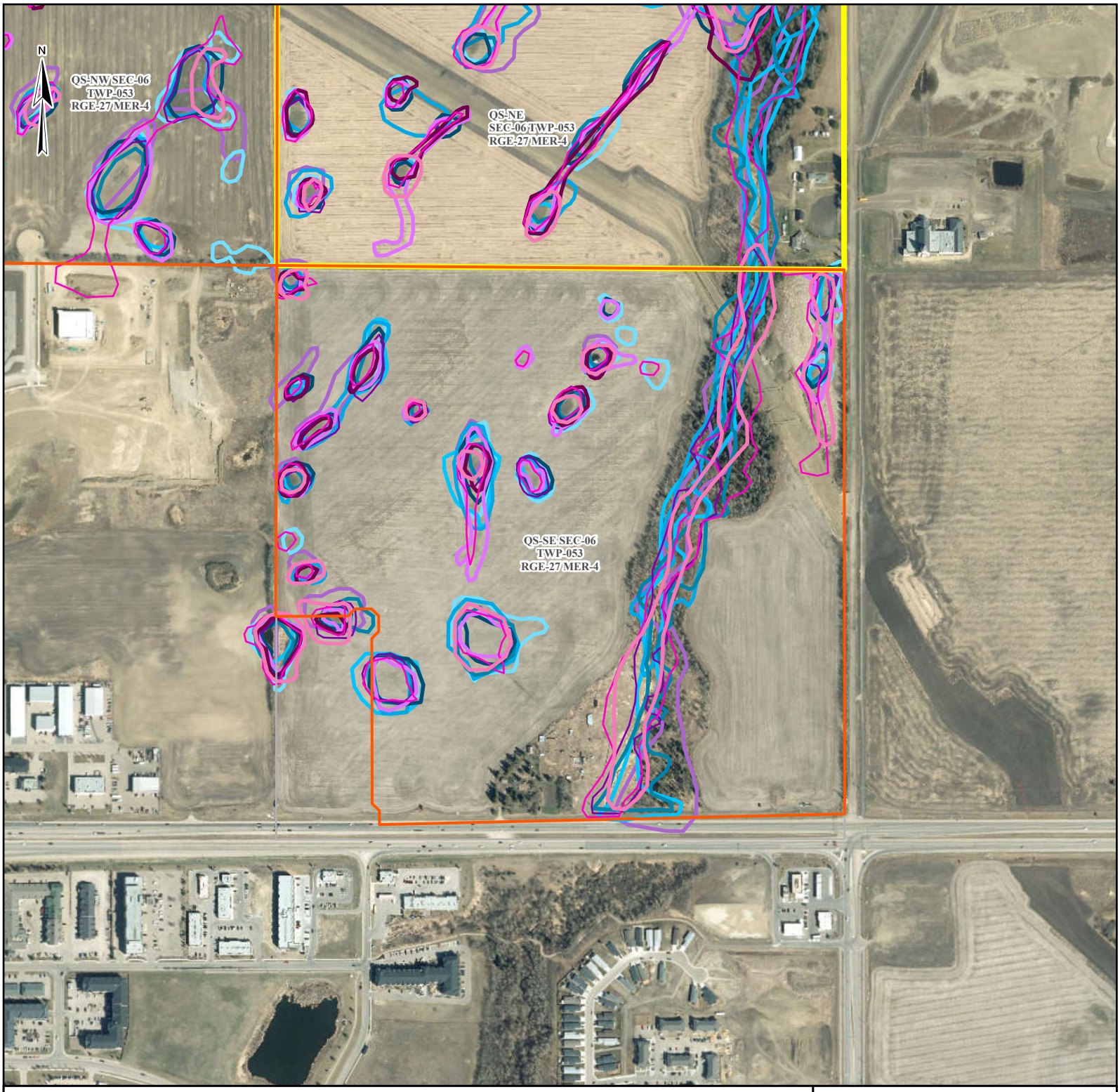
September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

Spatial Reference
Name: NAD 1983 3TM 114

0 200 Meters




## Legend

- Desktop Assessment
- Field Assessment
- DesktopDelineation 2024
- DesktopDelineation 2020
- DesktopDelineation 2019
- DesktopDelineation 2013April
- DesktopDelineation 2013Sept
- DesktopDelineation 2002
- DesktopDelineation 1994
- DesktopDelineation 1986
- DesktopDelineation 1976
- DesktopDelineation 1962
- DesktopDelineation 1950

Scheffer Andrew Ltd.

# Stony Plain EP-1136

Historical Wetland Delineations

Figure 6
Page 1 of 3

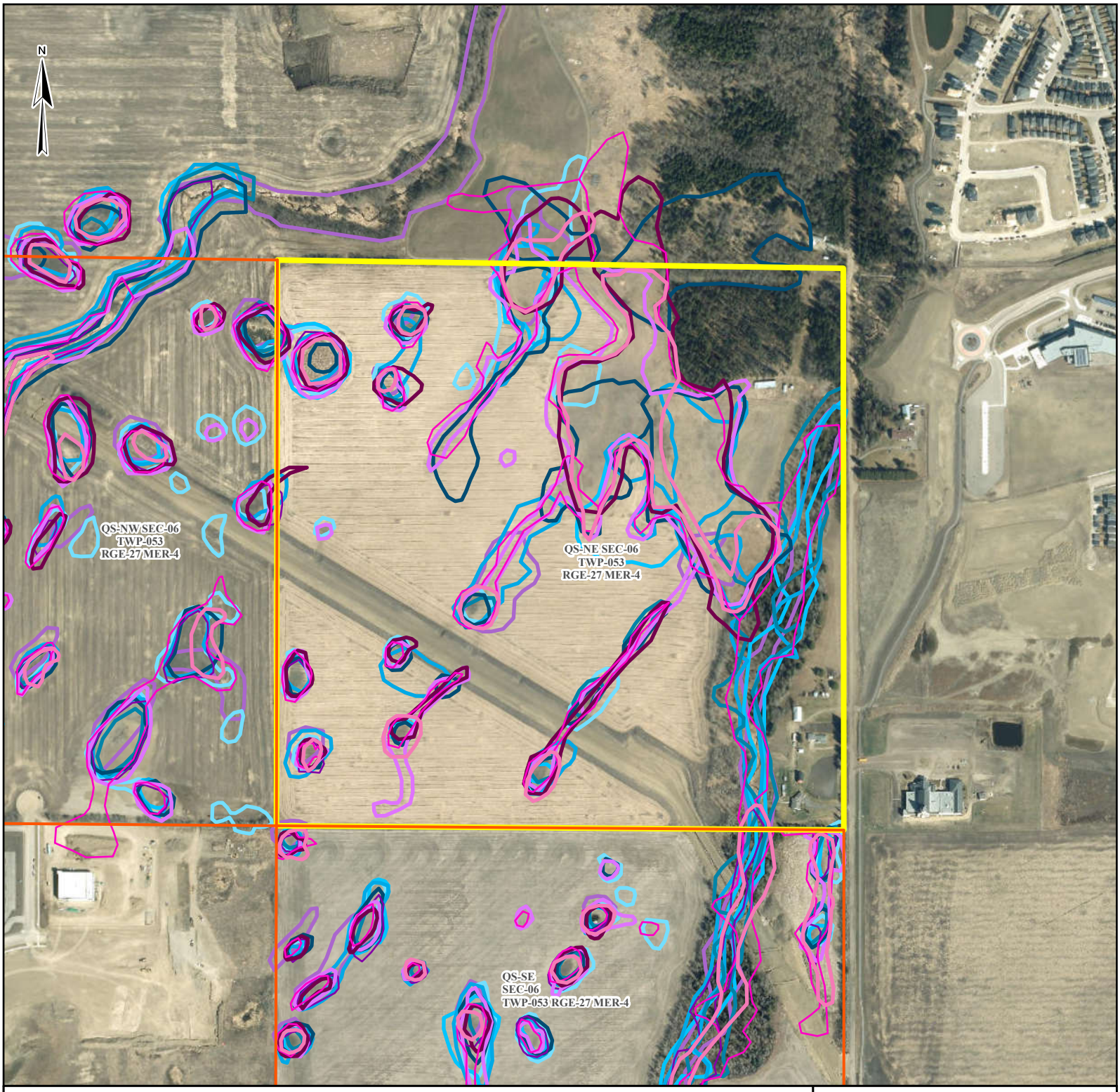
September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

Spatial Reference
Name: NAD 1983 3TM 114

0 200 Meters




## Legend

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- DesktopDelineation 2024
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Scheffer Andrew Ltd.

# Stony Plain EP-1136

Historical Wetland Delineations

Figure 6
Page 2 of 3

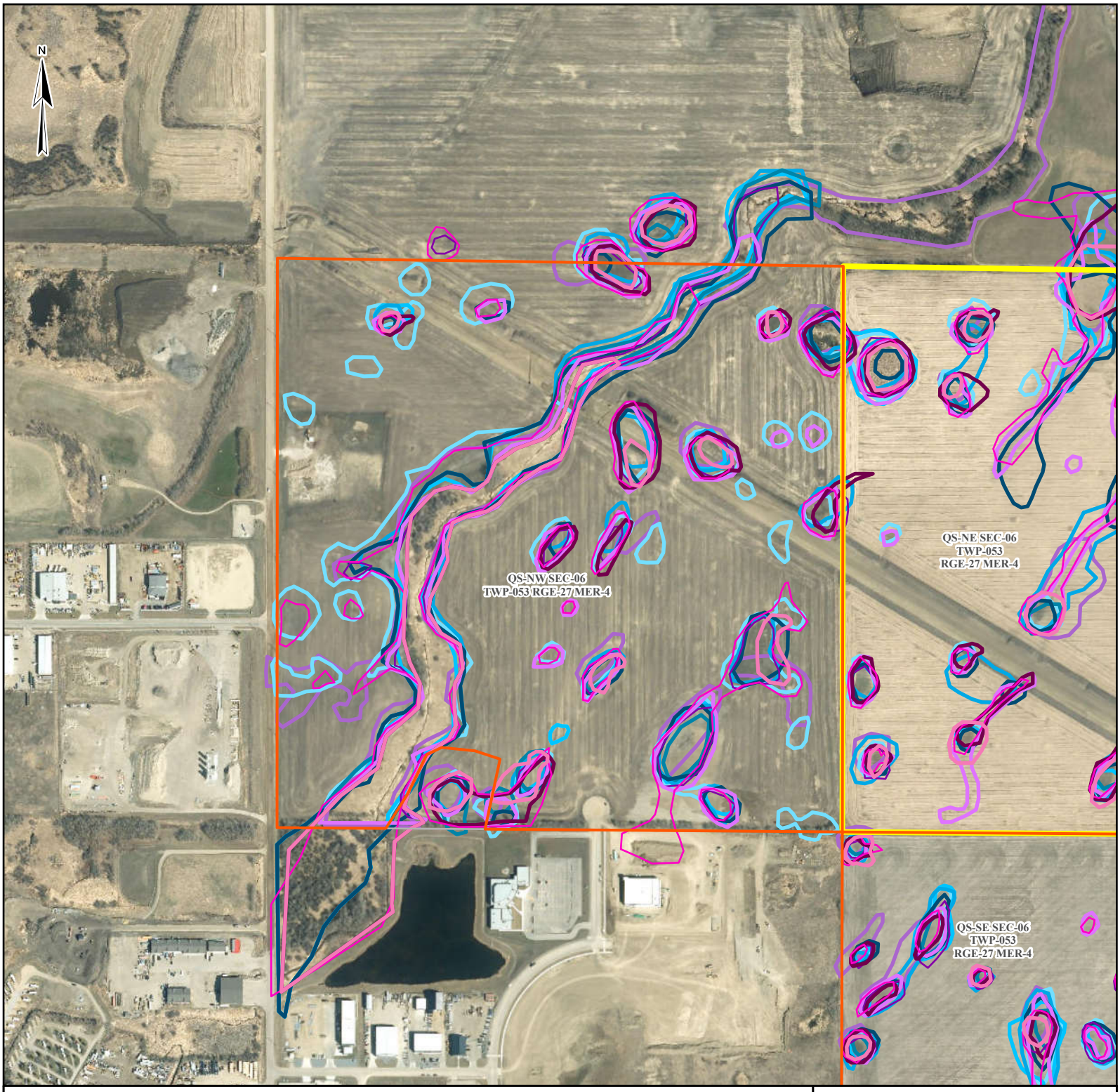
September 2025

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SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

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Scheffer Andrew Ltd.

# Stony Plain EP-1136

Historical Wetland Delineations

Figure 6
Page 3 of 3

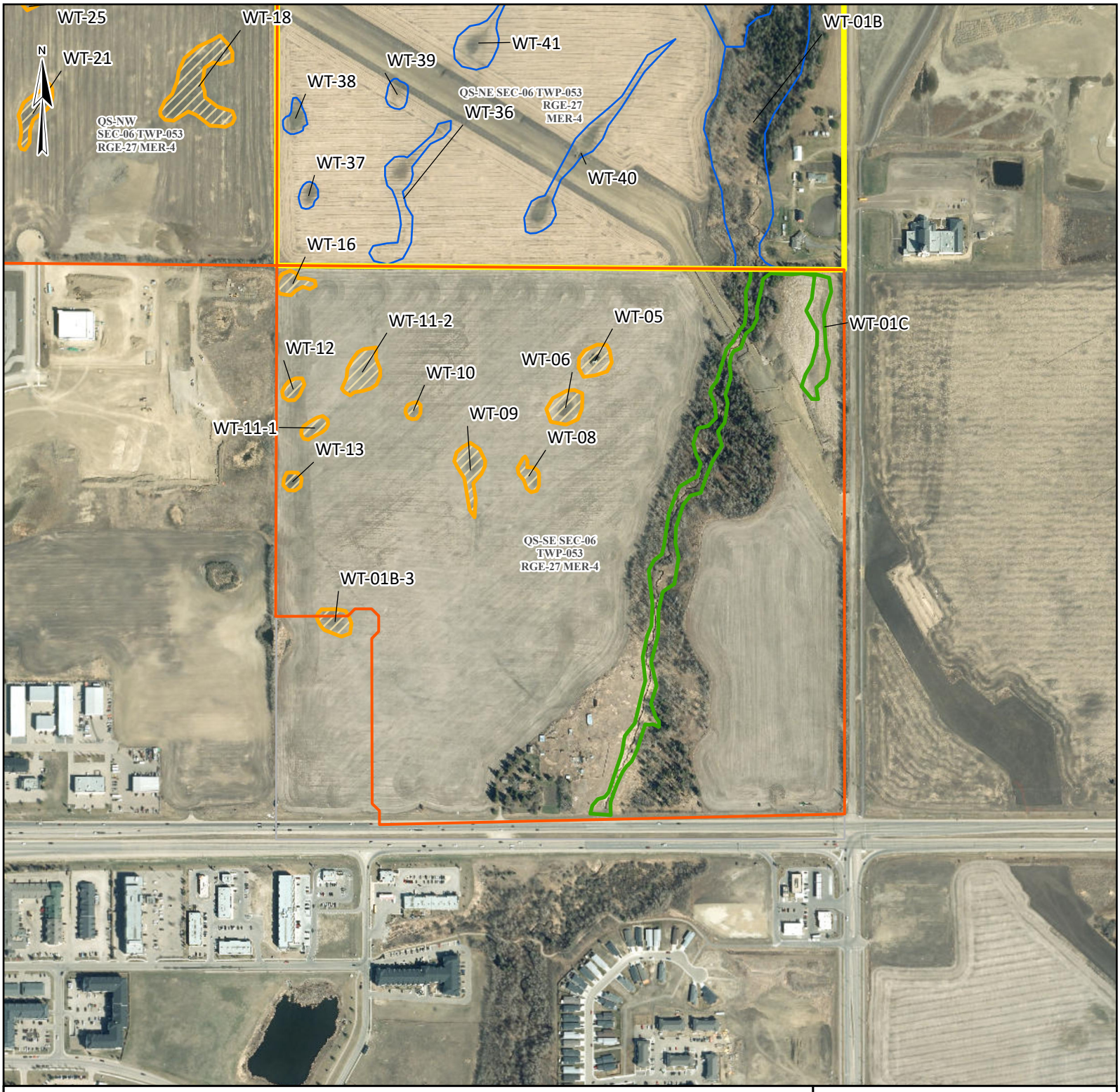
September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

Spatial Reference
Name: NAD 1983 3TM 114

0 200 Meters




## Legend

- Desktop Assessment
- Field Assessment

Wetland Classification

- Temporary Graminoid Marsh
- Temporary Wooded Deciduous Swamp
- Desktop Delineation

Scheffer Andrew Ltd.

# Stony Plain EP-1136

Location

Figure 7
Page 1 of 3

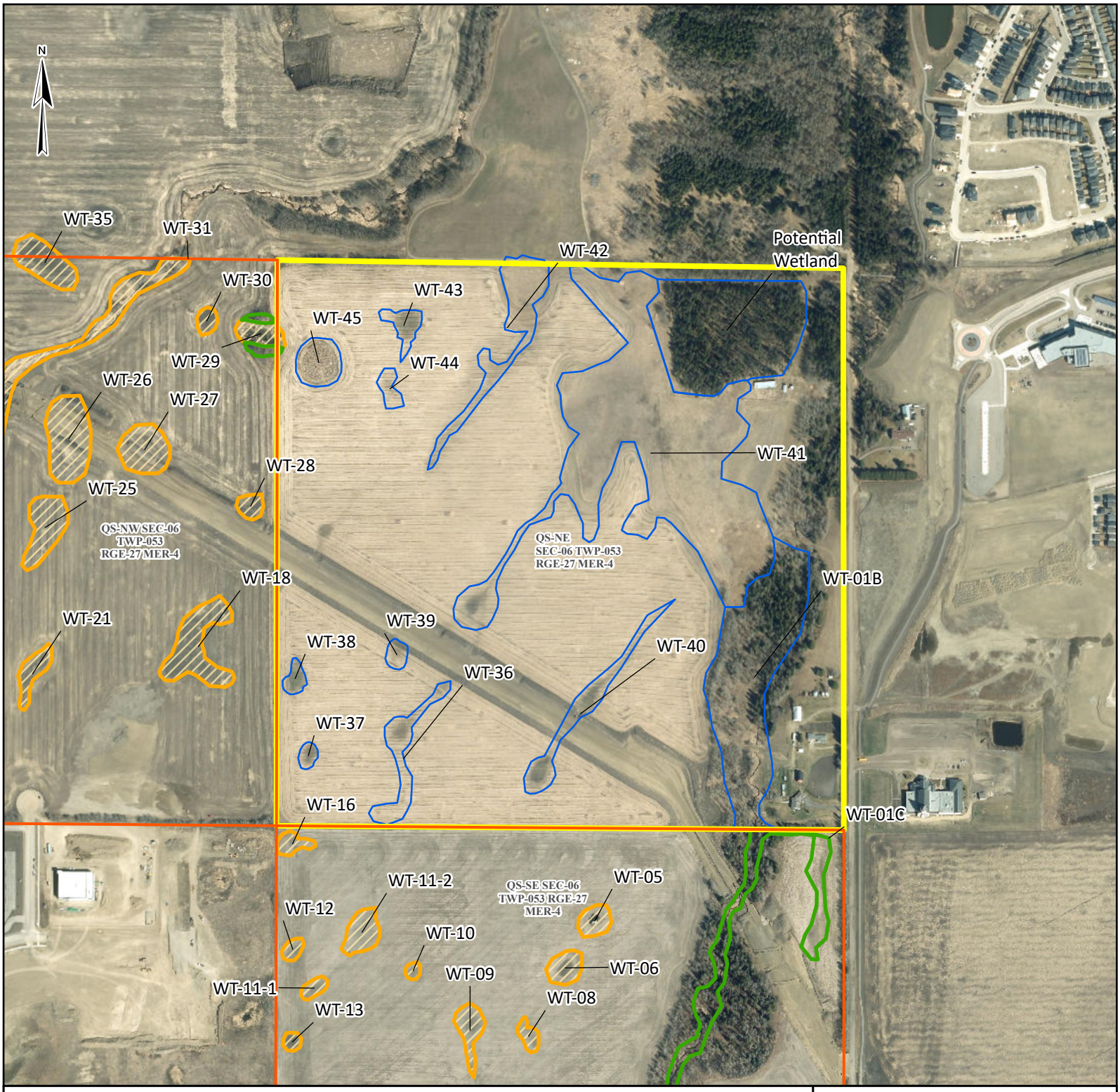
September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

Spatial Reference
Name: NAD 1983 3TM 114

0 200 Meters




## Legend

- Desktop Assessment
- Field Assessment

Wetland Classification

- Temporary Graminoid Marsh
- Temporary Wooded Deciduous Swamp
- Desktop Delineation

Scheffer Andrew Ltd.

# Stony Plain EP-1136

Location

Figure 7
Page 2 of 3

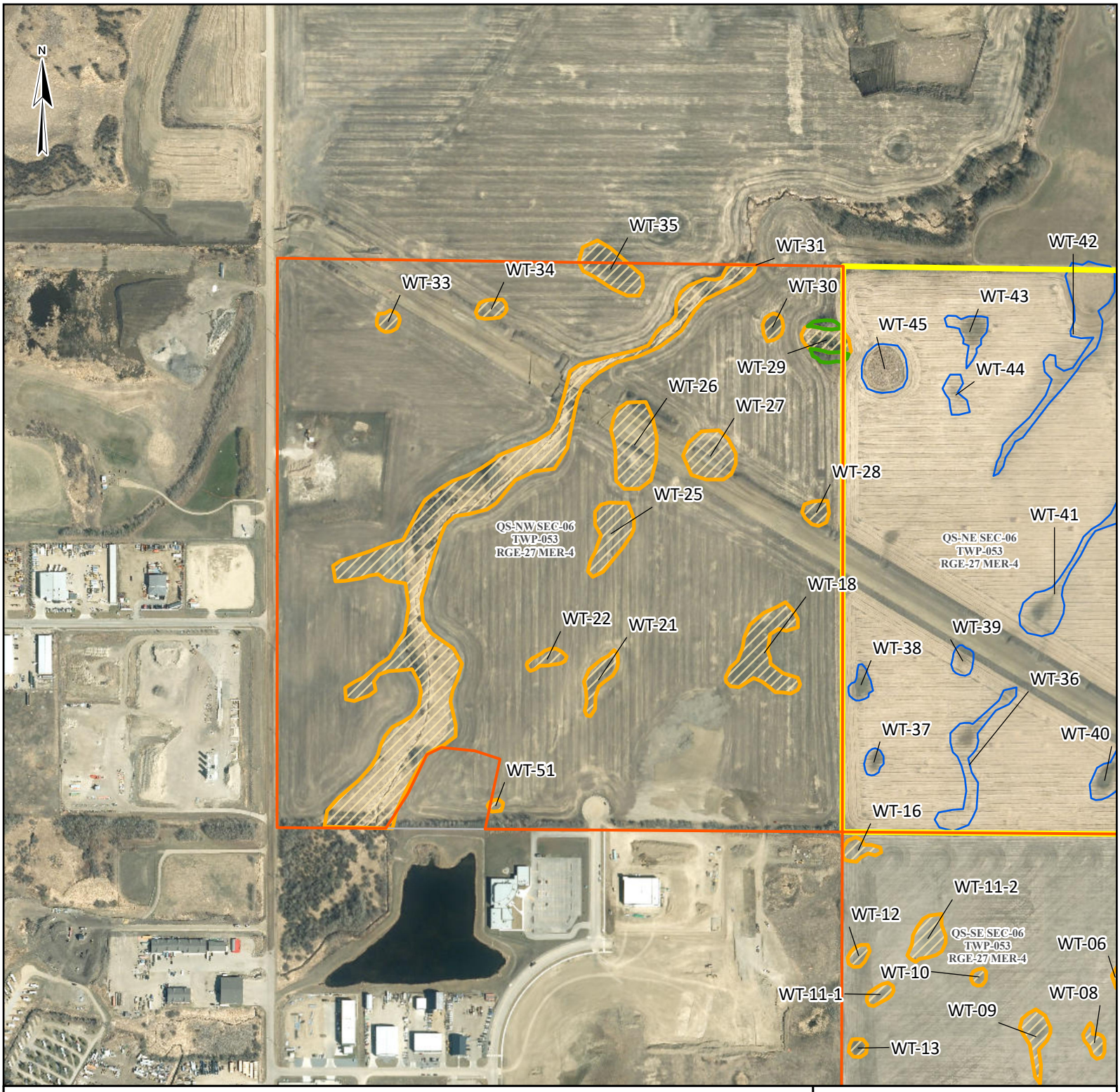
September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

Spatial Reference
Name: NAD 1983 3TM 114

0 200 Meters




## Legend

- Desktop Assessment
- Field Assessment

Wetland Classification

- Temporary Graminoid Marsh
- Temporary Wooded Deciduous Swamp
- Desktop Delineation

Scheffer Andrew Ltd.

# Stony Plain EP-1136

Location

Figure 7
Page 3 of 3

September 2025

Scale: 1:7,500

SPENCER ENVIRONMENTAL MANAGEMENT SERVICES LTD.

Spatial Reference
Name: NAD 1983 3TM 114

0 200 Meters

**APPENDIX C**
ACIMS Search Result

**Date**: 15/12/2024
**Requestor**: Consultant
**Reason for Request**: Element Occurrence Search
**SEC:** 06 **TWP:** 053 **RGE:** 27 **MER:** 4

Alberta Parks

## Non-sensitive EOs (updated: June 2022)

| M_RR_TTT_SS | EO_ID | ECODE | S_RANK | SNAME | SCOMNAME | LAST_OBS_D |
|---|---|---|---|---|---|---|
| 4-27-053-06 | 18823 | PDSCR0R070 | S3 | Gratiola neglecta | clammy hedge-hyssop | 2007-09-19 |
| 4-27-053-06 | 18824 | PDSCR0R070 | S3 | Gratiola neglecta | clammy hedge-hyssop | 2007-09-19 |
| 4-27-053-06 | 24169 | NBHEP0Y020 | S2S4 | Conocephalum salebrosum | cat-tongue liverwort | 2013-06-07 |

**Next Steps:** **See FAQ (https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/faqs.aspx#2 - Process)**

## Sensitive EOs (updated: June 2022)

| M-RR-TTT | EO_ID | ECODE | S_RANK | SNAME | SCOMNAME | LAST_OBS_D |
|---|---|---|---|---|---|---|

**No Sensitive EOs Found: Next Steps -** **See FAQ (https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/faqs.aspx#2 - Process)**

Updated: Aug 31, 2022

**APPENDIX D**
FWMIS Search Results

# Fish and Wildlife Internet Mapping Tool (FWIMT)

(source database: Fish and Wildlife Management Information System (FWMIS))

## Species Summary Report

**Report Date:** 26-Aug-2025 07:40

### Species present within the current extent

| Fish Inventory | Wildlife Inventory | Stocked Inventory |
|---|---|---|
| BROOK STICKLEBACK | No Species Found in Search Extent | No Species Found in Search Extent |
| FATHEAD MINNOW | | |
| LAKE CHUB | | |
| PEARL DACE | | |
| WHITE SUCKER | | |

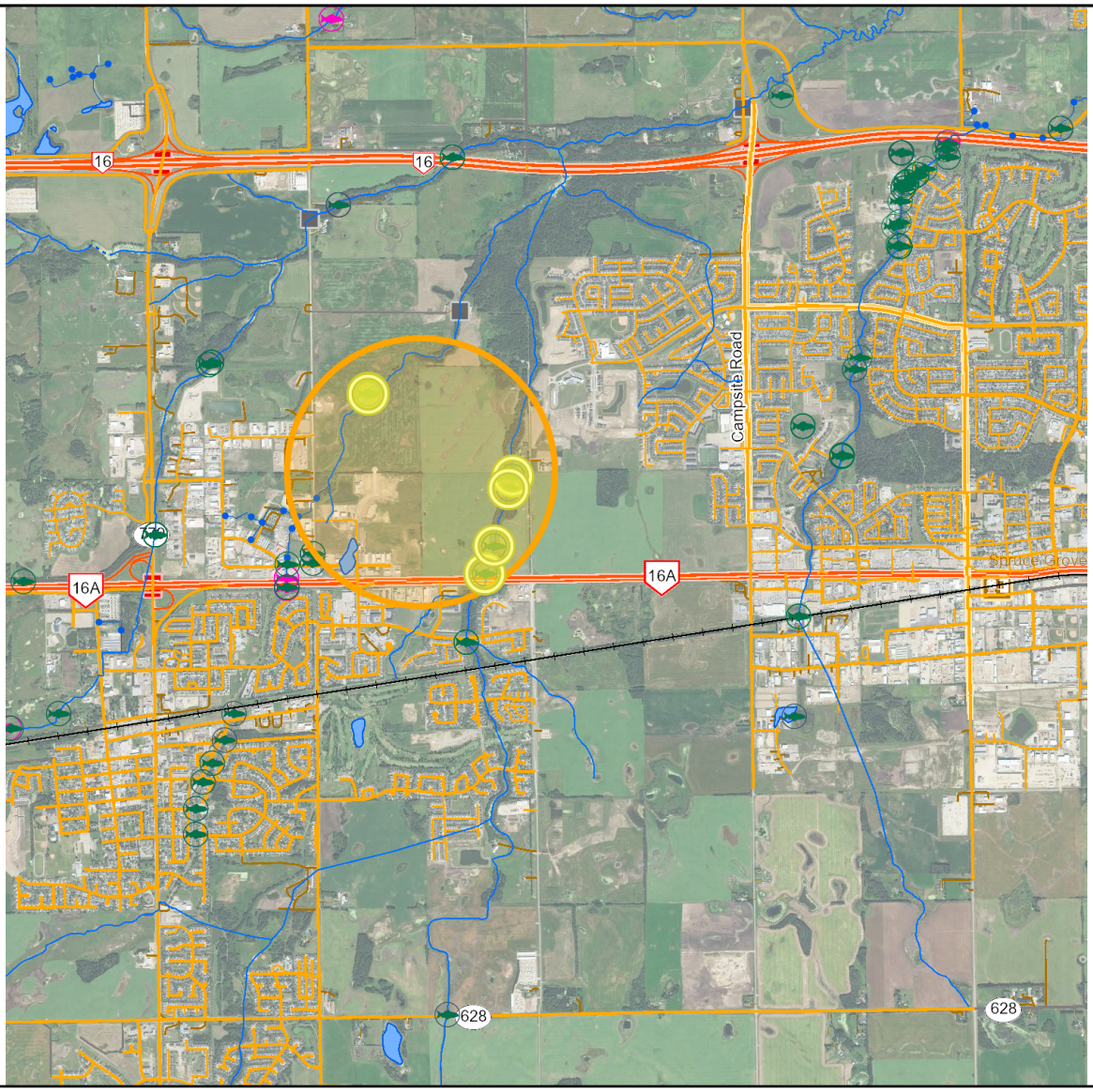
### Buffer Extent

| Centroid (X,Y) | Projection | Centroid (Qtr Sec Twp Rng Mer) | Radius or Dimensions |
|---|---|---|---|
| 568115, 5931420 | 10-TM AEP Forest | NW 6 53 27 4 | 1 kilometers |

### Contact Information

For contact information, please visit:
https://www.alberta.ca/fisheries-and-wildlife-management-contacts.aspx

26-Aug-2025 07:40 **Map Results**




Display may contain: Base Map Data provided by the Government of Alberta under the Alberta Open Government Licence. Cadastral and Dispositions Data provided by Alberta Data Partnerships. (c)GeoEye, all rights reserved. Information as depicted is subject to change, therefore the Government of Alberta assumes no responsibility for discrepancies at time of use

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**APPENDIX E**
Field Photos




*Photograph 1 viewing west within WT-01A*




*Photograph 2 viewing west within WT-01A*




*Photograph 3 viewing north within WT-01B-3*




*Photograph 4 viewing east within WT-01B-3*




*Photograph 5 viewing south within WT-01B-3*




*Photograph 6 viewing west within WT-01B-3*




*Photograph 7 viewing soils at WT-01B-3. Typical wetland soils within the Project area.*




*Photograph 8 viewing evidence of water altered soils at WT-01B-3*




*Photograph 9 viewing north within WT-15*




*Photograph 10 viewing east within WT-15*




*Photograph 11 viewing south within WT-15*




*Photograph 12 viewing west within WT-15*




*Photograph 13 viewing north within WT-20*




*Photograph 14 viewing east within WT-15*




*Photograph 15 viewing south within WT-20*




*Photograph 16 viewing west within WT-20*




*Photograph 17 viewing vegetation within WT-20*




*Photograph 18 viewing soil pit within WT-20*



*Photograph 19 overview of WT-31 at upland-wetland boundary*




*Photograph 20 viewing WT-31 native vegetation*




*Photograph 21 viewing soil within WT-31 cultivated portions*




*Photograph 22 viewing east within cultivated portion of WT-31 towards native portion of WT-31*




*Photograph 23 viewing Whispering Waters Creek*




*Photograph 24 viewing soil within WT-31 native vegetation portion*



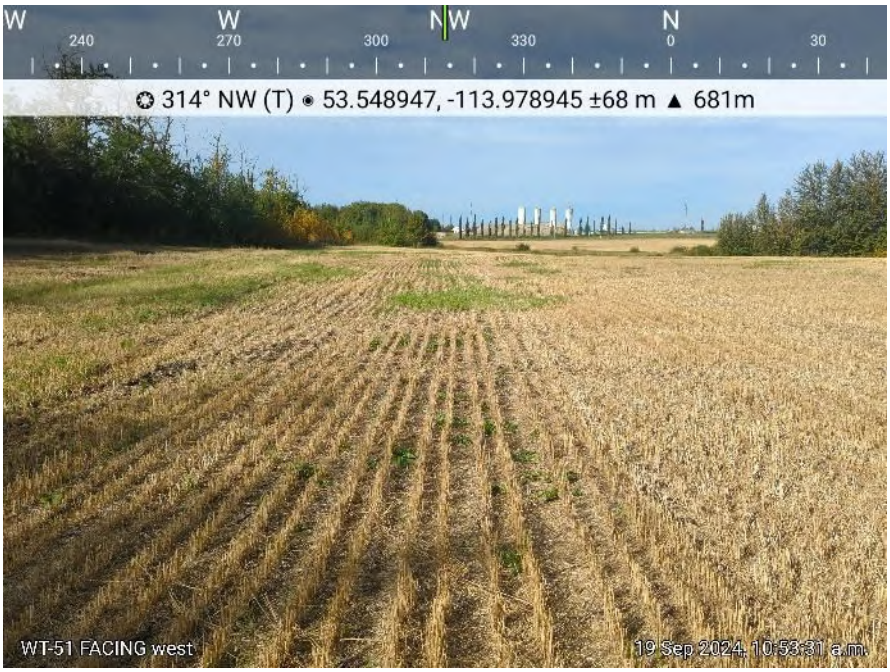

*Photograph 25 viewing north within WT-51*




*Photograph 26 viewing east within WT-51*




*Photograph 27 viewing south within WT-51*




*Photograph 28 viewing west within WT-51*




*Photograph 29 viewing soil pit within WT-51*




*Photograph 30 viewing evidence of water altered soils within WT-51*



*Photograph 31 viewing upland riparian boundary surrounding Atim Creek*



*Photograph 32 viewing characteristic fish habitat at Atim Creek*

# 4. 100 – Year Flood Plain Delineation

Atim CREEK
SE / NE ¼ -6 - 53 - 27 - W4
WHISPERING WATERS CREEK
NW ¼ - 6 - 53 - 27 - W4
TOWN OF STONY PLAIN

# 100 – YEAR FLOOD PLAIN DELINEATION

**Prepared For: Scheffer Andrew Ltd.**

**Prepared By: Bob Quazi, M.Sc., PEng., CPESC**
**River Engineering Consulting**

**02/11/2025**

# Executive Summary

Scheffer Andrew Ltd. is preparing an Area Structure Plan (ASP) for Stony Plain Land Inc. The objective of the ASP is to provide a framework for applying to the Town of Stony Plain for a subdivision approval. The lands covered in the ASP are located in SW 1/4, NW1/4 and SE 1/4 - 6 – 53 – 37 – W4M. These lands are traversed by the waters of Whispering Waters Creek and Atim Creek (**Figure 1**). Mapping of the 100-Year Flood Plain and Floodway / Flood Fringe was required as a part of the ASP preparation.

100-Year peak flow for the study area was determined by the analysis of regional data from 33 Water Survey of Canada (WSC) Metering Stations. The calculated 100-Year flood peaks were plotted against the effective drainage area for these stations. A relationship was derived relating effective drainage area to the 100-Year flood peak. Using this relationship 100-Year flood peaks were determined for the Whispering Waters Creek (4.47 $m^3$/ s) and Atim Creek (9.62 $m^3$/ s) for the study area.

HEC-RAS Computer Program was used for modelling the 100-Year flood profile for the study area. Geometric data (River Cross Section Data) required for HEC-RAS modelling was surveyed by Pals Geomatics of Edmonton. The survey data was collected by a drone-based Lidar. As Lidar cannot penetrate water, Creek centerline depths were measured by survey crew in the field. Calibration of HEC -RAS flow profile with observed flood levels was not possible as no historical flood observation existed for the two Creeks in the Study area. The model was initiated in normal depth mode with a slope of 0.001. HEC-RAS calculated 100-Year flood levels were plotted on the contour plans for the area to generate the 100-Year Flood Plain for the Whispering Waters Creek and the Atim Creek. Flood Plains (100-Year) for both of the Creeks are confined within a wider valley. Due to the confinement of the valley no Floodway /Flood Fringe can be delineated for the two creeks.

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**Figure 2 ASP – Land Use Plan**

**Figure 3 Drainage Basin Whispering Waters Creek / Atim Creek**

**Figure 4 Data Summary**

**Figure 5 Effective Drainage Area VS 100-Year flood Peak**

**Figure 6 100-Year Water Surface Profile – Whispering Waters Creek**

**Figure 7 100-Year Flood Profile Atim Creek**

**Figure 8 Whispering Waters Creek – 100-Year Flood Plain**

**Figure 9 Atim Creek – 100-Year Flood Plain Part 1**

**Figure 10 Atim Creek – 100-Year Flood Plain Part 2**

**APPENDIX – A**

**Pal Geomatics Cross Sections Survey Data**

**Cross Section Plots With 100-Year Flood Elevation**

# 1.0 Background

Scheffer Andrew Ltd. is preparing an Area Structure Plan (ASP) for the lands located in the Northeast (**Figure 1**) part of the Town of Stony Plain. This ASP focuses on the lands in NW 6, NE 6 and SE 6 – 53 – 27 -W4 M. These lands are traversed by two Creeks:

- Whispering Waters Creek (NW 6 -53 – 27 – W4).
- Atim Creek (SE 6, NE 6- 53 – 27 – W 4).

Details of the ASP lands are shown **Figure 2**. ASP requires the 100-Year Flood plain and Floodway / Flood Fringe delineation for the above two Creeks.

Scheffer Andrew Ltd. retained River Engineering Consulting to prepare the 100-Year Flood Plain and Floodway /Flood Fringe delineation for the two Creeks.

# 2.0 Whispering Waters Creek – Drainage Basin

Whispering Waters Creek (**Figure 1**) flows through the ASP lands in a north east direction. The upstream reach from where the Creek enters the Town lands is fairly flat. Whispering Creek enters Stony Plain through culvert at HWY. # 779 and exiting in St. John Paul School grounds. The Creek crosses Hwy. # 16 near St. Andrew Community Centre. Whispering Waters Creek exits the Town lands north of Quance Industrial Park Stormwater Pond. The total drainage area of the Whispering Waters Creek at exit from the Town Boundary is 945 ha.

# 3.0 Atim Creek – Drainage Basin

Atim Creek enters the Town from the south east and flows through east part of the Town in a north easterly direction. In this area the Creek flows through undeveloped lands and crosses Hwy. #628. Further D/S the Creek crosses Hwy. # 16A. There are 8 culverts on the Creek in its flow through Stony Plain including two major culverts at CN Rail crossing and Hwy. #16A. In the last part the Creek flows through industrial land before exiting the Town Boundary. The drainage area of the Atim Creek at exit from the Town is 3044 ha.

# 4.0 Flood Risk Map Preparation – Process

Preparation of a flood risk map for an area requires the following elements:

- Background search for historical flood data for the study area. Review of existing Report / Studies related to flooding on the two Creeks through Stony Plain area.
- Hydrological Analysis: 100 – Year return instantaneous flood peak is used as the criteria for Flood Risk Mapping in Alberta Flood Risk Mapping Program (Alberta Environment and Protected Areas). This flood peak is determined by hydrological analysis of available yearly flood instantaneous peak data for the creek under study. However, if no data is available, data is transposed from river basins with similar hydrological regions.
- River / Creek Channel Survey – Channel cross sections are required at appropriate intervals for modeling the flood profile through the study reach.
- Hydraulic Modeling of Flood Profile using a computer flood profile calculation model.
- Plotting of calculated flood levels at each cross section on a contour map of the study area to produce a flood risk map boundary.
- Floodway / Flood Fringe analysis to produce two zone flood risk maps.

## 4.1 Hydrology

Whispering Waters Creek has no flow metering gauge. Therefore, no data is available to estimate the 100-Year flood peak.

The only streamflow measuring station on Atim Creek was located near Spruce Grove From 1979 to 1996. This station was discontinued in 1996. The gross drainage at this site was 315 $Km^2$. Appendix A has the data record for this station. 1974 was a known high flow event on Atim Creek and the data from the Station has no record of it. Associated Engineers (Big Lake Basin Study, 2004) used a regional analysis approach to estimate flows for the ungauged sites. A correlation was developed between the effective drainage area versus the 100-Year Flood

Peak. **Figure 3** provides a summary of all the data used in the analysis. The resulting relationship was determined as:

$Y = 1.0478\ X^{0.6491}$

Where: Y = 1: 100 Year Flood ($m^3/s$), X = Effective Drainage Area ($Km^2$).

Using the above relationship, the 100-Year flows for the two Creeks were determined as:

Atim Creek Effective Drainage Area = 30.4 $Km^2$, **100-Year Flood = 9.62 $m^3/s$.**

Whispering Waters Creek Effective Drainage Area = 9.45 $Km^2$, **100- Year Flood = 4.47 $m^3/s$.**

## 4.2 Channel Surveys

Channel surveys for the Whispering Waters Creek and the Atim Creek were conducted by Pals Geomatics using drone based lidar. Lidar surveys were conducted for Whispering Waters Creek (NW ¼ - 6 – 53 – 7 -W4) and Atim Creek (SE and NE ¼ -6 – 53 -7 -W4). As Lidar does not penetrate water, the cross-section center depths were ground surveyed by crews. Surveys in NE ¼ for Atim Creek were conducted using Lidar as no ground access was available.
In tall grass and trees, Lidar shots are typically seeing elevations within10cm of GPS verification shots. In areas with little grass or bare earth, elevations are even closer, within 3 cm.

For the cross sections in the NE ¼ (where no ground Access was available) no ground survey could be done, there is a possibility of introducing an error in the center of creek elevation. In most situation crews noted that the water depth (Estimated) was not significant and was usually not more than 15-30 cm deep.

Lidar would not necessarily produce an observation more accurate than conventional methods but similar accuracy. However, it does give a significantly higher point density so in a conventional survey you might take observations every 15 m and you could miss any variations in between data points and that is where lidar excels because it is producing points on a 0.10m spacing so it is able to pick up every bump and dip in the ground surface.

Channel surveys for the Whispering Waters Creek and the Atim Creek were conducted by Pals Geomatics. Ground surveys were conducted for Whispering Waters Creek (NW ¼ - 6 – 53 – 7 -W4) and Atim Creek (SE ¼ -6 – 53 -7 -W4). Surveys in NE ¼ for Atim Creek were conducted using Lidar as no ground access was available.
Appendix A has the PDF files containing the layout of the cross-section location and the surveyed cross section plots. Details of these files are:

PDF NW Cross section Layout Plan, Plot of 10 Cross sections surveyed.

PDF NE Cross section Layout Plan, Plot of Cross sections 1-20.

PDF SE Cross section Layout Plan, Plot of cross sections 21 – 36.

# 5.0 100- Year Flood Profile

## 5.1 HEC –RAS Program

The 100-year flood profile was calculated using the HEC-RAS program (Version 6.5, Feb 2024). HEC – RAS was developed by U.S Army Corps of Engineers Hydrological Engineering Centre (Davis, California) for simulation of Steady and Unsteady water surface profiles. HEC - RAS is a Microsoft Window based program with a graphic interface for file management, data entry and editing, program execution and output display. This program calculates water levels from cross section to cross section based on solution of one-dimensional energy equation (Bernoulli's Equation). Manning's equation is used to determine the energy losses due to friction. The energy equation solution is derived by an iterative procedure to obtain an energy balance between successive sections. The basic assumptions in HEC –RAS model are;

- Flow is gradually varied so friction losses between cross sections can be estimated by Manning's equation.
- Flow is one dimensional so only velocity component considered is in the direction of flow.
- The channel bed ad banks are considered rigid so any changes (Erosion, deposition) during the flood event are ignored.
- Channels have small slope less than 1:10.

The steps involved in setting of a river model in HEC – RAS model are:

1. River schematics to lay out the river reach and cross section locations. Any junctions and hydraulic structures (Bridges, Culverts, Weirs, and Ponds etc.) are laid out in the model schematics.

2. Geometric model of the river reaches with required hydraulic parameters (cross sections, reach lengths and n-values).

3. Calibration of the model with known water levels of known flooding events if possible or using other starting conditions as provided in HEC-RAS.

4. Calculation of the water surface profiles for the design flood.

## 5.2 Geometric Data

The cross-sectional data for the HEC – RAS analysis was extracted from Pals Geomatics supplied survey data for Atim Creek and Whispering Waters Creek. The ground contours generated by the Lidar Data have a contour interval of 0.25 m. Appendix A has all the cross-sectional Data and Creek Plans in PDF format.

The distances between cross sections (**LOB, CH** and **ROB** – Left overbank, Channel and Right Overbank) were measured from the centerline plot of the profile for each Creek in the study reach. There were no structures (Bridges, Culverts, Weirs etc.) to be modeled for the reaches on the two Creeks.

For calculating losses due to channel contraction and expansion coefficients are specified. For normal condition where the changes in cross sectional area are not that large these were input as 0.10 and 0.30.

## 5.3 Manning's Roughness Coefficients (n –values)

The best approach for selecting n-values would have been to calibrate the HEC – RAS model with the recorded highwater marks for known flood events and determine n – values for the channel and the overbank through the calibration process. No recoded flood events are available for Whispering Waters Creek and Atim Creek through the Study area. Therefore, model calibration approach could not be used for the present study.

Examination of aerial photographs and a field data (Photos) by the Survey crews provided guidance to selection of n-values. The following general recommendations were used for the selection of n- values:

- ***Overbank Roughness Coefficient***

The roughness coefficients for the overbank portion of the cross sections were chosen from Chow [1] and previous experience with other flood plain studies. Chow provides the following guideline for these as:

| **Overbank Type** | **Roughness 'n' value** |
|---|---|
| Pasture, short to long grass | 0.030-0.035 |
| Brush light | 0.035-0.070 |
| Brush, medium to dense | 0.070-0.160 |
| Trees, heavy stand of timber | 0.080-0.120 |

- ***Channel Roughness Coefficient***

Chow provides the following range of values for different channel conditions:

| **Stream Type** | **Range of 'n' values** |
|---|---|
| Clean no riffles or pools | 0.025-.033 |
| Same as 1 with more stone /sand | 0.030-0.040 |
| Clean winding, same | 0.033-0.045 |
| Same as above but some weed and | 0.035-0.050 |

- **Roughness Values for HEC–RAS Model**

[1] "Open Channel Hydraulics", Chow, V.T., McGraw Hill Book Company, New York, 1959.

Based on the above guidelines and field observations, the roughness values selected were:
Channel 'n' value =0.026 (Bed Silty / clay with occasional Gravel / Boulder paving)

Right / Left Overbank n values:

'n' = 0.05 (Tall grass with some brush)

## 5.4 Model Boundary Conditions HEC- RAS Model

Boundary conditions are necessary to establish a starting water surface for the model. Starting water surface is necessary for the program to start calculations. For subcritical flow (Whispering Waters Creek and Atim Creek) the boundary conditions are provided at the lower end of the reach as the calculations proceeds upstream. In HEC –RAS the following options are for boundary conditions:

1. **Known Water Surface Elevations** – The user enters known water surface elevation for each of the profiles to be calculated.
2. **Critical Depth** – No other information is required. The program will calculate critical depth for each of the profile and use that as the starting condition.
3. **Normal Depth** –Energy slope has to be provided and the program will calculate the normal depth (Manning's Equation) using the energy slope provided.
4. **Rating Curve** – A stage discharge curve is provided at the end of the reach. The program will interpolate the water surface elevation for the profile to be calculated.

For the Whispering Waters Creek and Atim Creek study reaches, the only option available was to go with Normal Depth option as no other data was available. Channel slope of 0.001 was estimated from the bed profile of the Creek channel and was used in starting calculations in HEC – RAS.

## 5.5 Whispering Waters Creek – 100-Year Calculated Flood Levels

HEC-RAS model developed for the Whispering Waters Creek was run for the 100- Year discharge of 4.49 $m^3$/sec. The calculated water surface elevation at each cross section is listed in **Table 1.** The condition for the model starting was Normal Depth with slope of 0.001 at the downstream end of the reach. The 100 –Year Calculated Water Surface Profile is plotted in **Figure 6**.

Profile Output Table - Standard Table 1

File Options Std. Tables Locations Help

HEC-RAS Plan: plan1 River: WhisperingCRK4 Reach: NW6 Profile: PF 1

| Reach | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (m3/s) | (m) | (m) | (m) | (m) | (m/m) | (m/s) | (m2) | (m) | |
| NW6 | 10 | PF 1 | 4.47 | 692.06 | 693.15 | | 693.23 | 0.003435 | 1.31 | 5.01 | 19.12 | 0.50 |
| NW6 | 9 | PF 1 | 4.47 | 691.43 | 692.65 | | 692.68 | 0.003898 | 1.07 | 8.73 | 46.65 | 0.40 |
| NW6 | 8 | PF 1 | 4.47 | 691.46 | 692.50 | | 692.52 | 0.001234 | 0.74 | 12.77 | 58.99 | 0.29 |
| NW6 | 7 | PF 1 | 4.47 | 690.90 | 692.42 | | 692.43 | 0.000809 | 0.57 | 12.50 | 31.85 | 0.18 |
| NW6 | 6 | PF 1 | 4.47 | 690.52 | 691.84 | 691.84 | 692.19 | 0.021760 | 2.63 | 1.70 | 2.41 | 1.00 |
| NW6 | 5 | PF 1 | 4.47 | 690.24 | 691.69 | | 691.73 | 0.001431 | 0.90 | 5.80 | 18.69 | 0.33 |
| NW6 | 4 | PF 1 | 4.47 | 689.79 | 691.42 | 691.36 | 691.45 | 0.004687 | 1.04 | 8.16 | 39.49 | 0.43 |
| NW6 | 3 | PF 1 | 4.47 | 689.78 | 691.19 | | 691.20 | 0.001392 | 0.74 | 11.47 | 38.09 | 0.28 |
| NW6 | 2 | PF 1 | 4.47 | 689.60 | 690.99 | | 691.00 | 0.001720 | 0.81 | 9.83 | 30.44 | 0.31 |
| NW6 | 1 | PF 1 | 4.47 | 689.50 | 690.88 | 690.63 | 690.89 | 0.001000 | 0.78 | 10.77 | 28.32 | 0.26 |

**Table 1 -100- Year Profile Data - Whispering Waters Creek**

## 5.6 Atim Creek – 100-Year Calculated Flood Levels

HEC-RAS model developed for the Atim Creek was run for the 100- Year discharge of 9.62 $m^3$/sec. The calculated water surface elevation at each cross section is listed in **Table 1.** The condition for the model starting was Normal Depth with slope of 0.001 at the downstream end of the reach. The 100 –Year Calculated Water Surface Profile is plotted in **Figure 7**.

Table 2 – Atim Creek 100-Year Flood Output Data Summary

Profile Output Table - Standard Table 1

File Options Std. Tables Locations Help

HEC-RAS Plan: 01 River: Atim Creek Reach: HWY16DS Profile: PF 1

| Reach | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (m3/s) | (m) | (m) | (m) | (m) | (m/m) | (m/s) | (m2) | (m) | |
| HWY16DS | 36 | PF 1 | 9.62 | 691.07 | 693.18 | 693.18 | 693.44 | 0.007566 | 2.39 | 5.46 | 13.25 | 0.69 |
| HWY16DS | 35 | PF 1 | 9.62 | 690.57 | 692.43 | | 692.49 | 0.002549 | 1.45 | 13.40 | 39.41 | 0.45 |
| HWY16DS | 34 | PF 1 | 9.62 | 690.18 | 692.06 | 691.96 | 692.25 | 0.006178 | 2.27 | 6.95 | 16.78 | 0.65 |
| HWY16DS | 33 | PF 1 | 9.62 | 690.01 | 691.50 | 691.50 | 691.89 | 0.010962 | 2.78 | 3.65 | 6.13 | 0.92 |
| HWY16DS | 32 | PF 1 | 9.62 | 689.68 | 691.21 | | 691.34 | 0.003024 | 1.63 | 7.01 | 12.99 | 0.53 |
| HWY16DS | 31 | PF 1 | 9.62 | 689.19 | 690.98 | | 691.07 | 0.002304 | 1.33 | 7.25 | 8.42 | 0.46 |
| HWY16DS | 30 | PF 1 | 9.62 | 689.16 | 690.81 | | 690.92 | 0.002937 | 1.46 | 6.69 | 10.25 | 0.52 |
| HWY16DS | 29 | PF 1 | 9.62 | 688.79 | 690.24 | 690.20 | 690.49 | 0.010346 | 2.25 | 4.28 | 7.24 | 0.93 |
| HWY16DS | 28 | PF 1 | 9.62 | 688.49 | 689.87 | | 690.00 | 0.003313 | 1.57 | 6.19 | 8.20 | 0.56 |
| HWY16DS | 27 | PF 1 | 9.62 | 688.24 | 689.71 | 689.51 | 689.82 | 0.003737 | 1.55 | 7.77 | 25.19 | 0.59 |
| HWY16DS | 26 | PF 1 | 9.62 | 687.74 | 689.44 | | 689.60 | 0.003853 | 1.88 | 6.43 | 10.89 | 0.60 |
| HWY16DS | 25 | PF 1 | 9.62 | 687.50 | 689.18 | 689.04 | 689.36 | 0.004182 | 2.02 | 6.92 | 16.49 | 0.60 |
| HWY16DS | 24 | PF 1 | 9.62 | 687.20 | 689.02 | | 689.16 | 0.004272 | 1.65 | 5.82 | 7.87 | 0.61 |
| HWY16DS | 23 | PF 1 | 9.62 | 687.42 | 689.01 | | 689.06 | 0.001789 | 1.26 | 12.11 | 24.98 | 0.41 |
| HWY16DS | 22 | PF 1 | 9.62 | 687.14 | 688.94 | | 689.02 | 0.002084 | 1.54 | 11.23 | 21.28 | 0.40 |
| HWY16DS | 21 | PF 1 | 9.62 | 687.08 | 688.67 | 688.61 | 688.87 | 0.004772 | 2.16 | 6.93 | 17.78 | 0.62 |
| HWY16DS | 20 | PF 1 | 9.62 | 686.96 | 688.74 | | 688.78 | 0.000892 | 1.07 | 14.11 | 25.38 | 0.31 |
| HWY16DS | 19 | PF 1 | 9.62 | 686.98 | 688.72 | | 688.75 | 0.000851 | 1.00 | 19.36 | 33.92 | 0.27 |
| HWY16DS | 18 | PF 1 | 9.62 | 687.15 | 688.29 | 688.29 | 688.59 | 0.010363 | 2.44 | 16.50 | 39.48 | 0.97 |
| HWY16DS | 17 | PF 1 | 9.62 | 686.16 | 687.55 | 687.55 | 687.81 | 0.012371 | 2.25 | 4.41 | 11.15 | 0.98 |
| HWY16DS | 16 | PF 1 | 9.62 | 686.01 | 687.24 | 687.24 | 687.43 | 0.006682 | 2.20 | 7.12 | 19.64 | 0.77 |
| HWY16DS | 15 | PF 1 | 9.62 | 685.71 | 686.94 | | 687.08 | 0.005057 | 1.65 | 6.30 | 15.85 | 0.67 |
| HWY16DS | 14 | PF 1 | 9.62 | 685.19 | 686.46 | 686.46 | 686.65 | 0.007695 | 2.06 | 6.61 | 23.10 | 0.80 |
| HWY16DS | 13 | PF 1 | 9.62 | 684.85 | 686.20 | | 686.31 | 0.002709 | 1.50 | 7.57 | 16.09 | 0.52 |
| HWY16DS | 12 | PF 1 | 9.62 | 684.97 | 686.17 | | 686.22 | 0.001602 | 1.06 | 9.97 | 19.90 | 0.40 |
| HWY16DS | 11 | PF 1 | 9.62 | 684.53 | 686.02 | | 686.14 | 0.004107 | 1.50 | 6.66 | 19.29 | 0.61 |
| HWY16DS | 10 | PF 1 | 9.62 | 684.42 | 685.66 | 685.65 | 685.96 | 0.008669 | 2.50 | 4.41 | 10.03 | 0.89 |
| HWY16DS | 9 | PF 1 | 9.62 | 684.23 | 685.37 | 685.24 | 685.60 | 0.006128 | 2.18 | 4.98 | 12.37 | 0.76 |
| HWY16DS | 8 | PF 1 | 9.62 | 684.23 | 685.39 | | 685.46 | 0.002262 | 1.37 | 11.13 | 22.08 | 0.47 |
| HWY16DS | 7 | PF 1 | 9.62 | 684.12 | 685.20 | | 685.28 | 0.002192 | 1.28 | 9.63 | 24.22 | 0.47 |
| HWY16DS | 6 | PF 1 | 9.62 | 683.83 | 684.96 | 684.96 | 685.15 | 0.006506 | 2.18 | 7.04 | 20.60 | 0.78 |
| HWY16DS | 5 | PF 1 | 9.62 | 683.88 | 685.03 | | 685.05 | 0.000654 | 0.77 | 23.99 | 44.18 | 0.26 |
| HWY16DS | 4 | PF 1 | 9.62 | 683.87 | 684.77 | 684.77 | 684.94 | 0.008173 | 2.29 | 7.84 | 23.98 | 0.87 |
| HWY16DS | 3 | PF 1 | 9.62 | 682.79 | 684.02 | 683.93 | 684.27 | 0.006592 | 2.26 | 4.79 | 9.52 | 0.79 |

**Table 2 - 1 -100- Year Profile Data – Atim Creek**

## 5.7 100-Year Flood Plain

The 100-Year Flood Plains for the two Creeks are plotted on **Figure 8**, **Figure 9** and **Figure 10**. **Figure 8 –** Shows the 100-Year Flood Plain for the Whispering Waters Creek. The drawn Flood Plain is bound by the Environmental Boundary Line and higher Creek valley walls shown on the 100-Flood level plots of the Creek in **Appendix A**.

**Figure 9** and **Figure 10** shows the Atim Creek 100-Year Flood Plain bound by the Environmental Boundary line and the higher Creek Valley walls shown on 100-Year Creek Cross section plots in **Appendix A.**

# 6.0 Floodway/ Flood Fringe

## 6.1 Definition and Guidelines

Alberta signed an agreement with Canada to participate in the Flood Damage Reduction Program in 1979. Before 1979 Alberta flood mapping program was a single zone (100 –Year Flood Plain) program. Canada Flood Damage Reduction Program (FDRP) was a two zone (Floodway and Flood Fringe) program as shown on **Figure 11**. The definitions for Floodway and Flood Fringe as used in the Flood Damage Reduction Program (FDRP) are:

(1) Floodway- The stream channel and that portion of the flood plain required to convey the design flood under constricted condition.
(2) Flood Fringe- Is that portion of the flood plain between the floodway and the outer boundary of the design flood.

The FDRP has adopted the following criteria for determining the Floodway and Flood Fringe limits:

(1) The constricted profile cannot be higher than 0.3 m above the natural profile for the design flood.

(2) All areas where the depth exceeds 1 m or the flow velocities are greater than 1 m/sec must become part of the floodway.

## 6.2 ASP Lands - Mapping of Floodway / Flood Fringe

The objective of two zone mapping is to allow development in the Flood Fringe area with flood proofing. In the case of Whispering Waters Creek and Atim Creek 100-Year flood Plain mapping, the 100-Year flood plain is confined between the valley walls and is within the Environmental Reserve limits (Appendix A – Whispering Waters Creek and Atim Creek Cross Sections with 100-Year flood Level and the Valley limits shown as surveyed). Therefore, no Floodway / Flood Fringe can be delineated for the Whispering Waters Creek or Atim Creek reaches for the present study.




2025 10-06

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River Engineering Consulting




**Figure 1 – Northeast Industrial Lands Stony Plain- Google Image 5/1/2025**

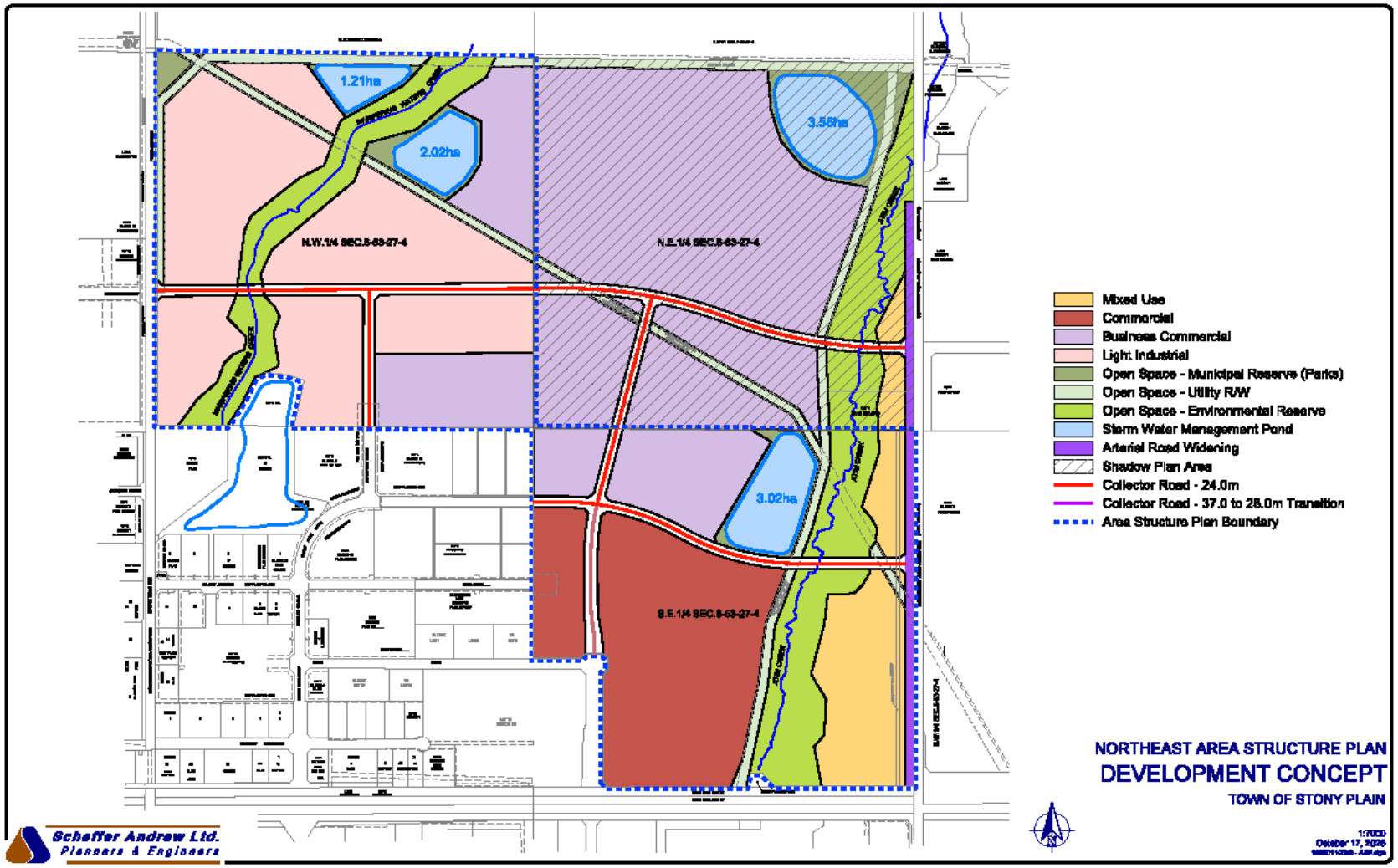



**Figure 2 - ASP Draft Land Uses**

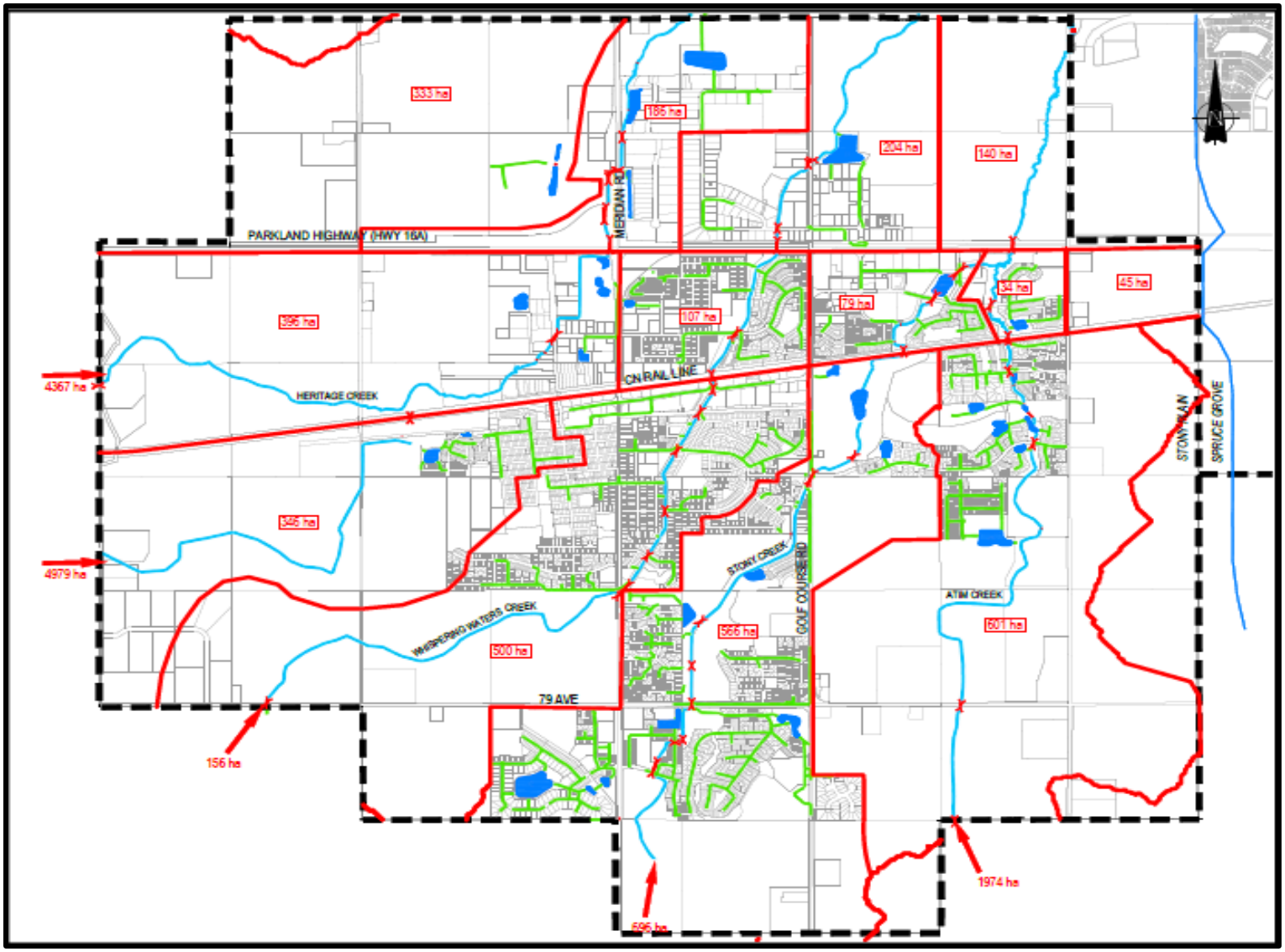



**Figure 3 – Drainage Basin Whispering Waters Creek, Atim Creek through Town of Stony Plain**

| Gauge # | Name of Station | Years of Data | Gross Drainage Area ($km^2$) | Effective Area ($km^2$) | Mean Annual Flood, QMAF ($m^3/s$) | 1:100 year Discharge, Q100 ($m^3/s$) | Zone | Class of Lake Storage |
|---|---|---|---|---|---|---|---|---|
| 05EC002 | WASKATENAU CREEK NEAR WASKATENAU | 32 | 312 | 205 | 8.1 | 68.7 | 1 | L |
| 05EC004 | NAMEPI CREEK NEAR THE MOUTH | 21 | 720 | 586 | 10.7 | 67.7 | 1 | L |
| 05EC005 | REDWATER RIVER NEAR THE MOUTH | 22 | 1550 | 1110 | 13.7 | 83.8 | 1 | L |
| 05EB911 | POINTE-AUX-PINS TRIBUTARY NO. 3 NEAR ARDROSSAN | 11 | 3.55 | 3.55 | 0.3 | 1.9 | 1 | L |
| 05EB909 | POINTE-AUX-PINS TRIBUTARY NO. 1 NEAR ARDROSSAN | 14 | 17.8 | 17.8 | 0.8 | 5.1 | 1 | L |
| 05EB910 | POINTE-AUX-PINS TRIBUTARY NO. 2 NEAR ARDROSSAN | 17 | 8.34 | 8.34 | 1.0 | 6.8 | 1 | L |
| 05EB902 | POINTE-AUX-PINS CREEK NEAR ARDROSSAN | 20 | 106 | 106 | 4.3 | 16.1 | 1 | L |
| 07BE004 | STONY CREEK NEAR TAWATINAW | 14 | 128 | 113 | 4.2 | 18.9 | 1 | L |
| 07BC007 | WABASH CREEK NEAR PIBROCH | 20 | 339 | 339 | 10.1 | 79.7 | 1 | L |
| 07BC003 | WABASH CREEK NEAR WESTLOCK | 13 | 321 | 321 | 19.7 | 94.3 | 1 | L |
| 05DF006 | WHITEMUD CREEK NEAR ELLERSLIE | 29 | 395 | 395 | 19.6 | 133.7 | 2 | L |
| 05DF007 | WEST WHITEMUD CREEK NEAR IRETON | 23 | 63.7 | 63.7 | 3.2 | 7.2 | 2 | L |
| 05DF003 | BLACKMUD CREEK NEAR ELLERSLIE | 24 | 643 | 494 | 9.0 | 27.5 | 2 | M |
| 05FA022 | PIPESTONE CREEK BELOW BIGSTONE CREEK | 11 | 1020 | 843 | 17.5 | 99.4 | 2 | M |
| 05FA012 | PIPESTONE CREEK NEAR WETASKIWIN | 16 | 1030 | 852 | 22.8 | 137.1 | 2 | M |
| 05EA002 | STURGEON RIVER AT ST. ALBERT | 23 | 2950 | 2120 | 18.2 | 53.8 | 3 | H |
| 05EA005 | STURGEON RIVER NEAR VILLENEUVE | 35 | 1910 | 1660 | 33.2 | 148.1 | 3 | H |
| 05EA009 | ATIM CREEK NEAR SPRUCE GROVE | 18 | 315 | 91.7 | 2.9 | 15.2 | 3 | H |
| 05DE003 | WABAMUN CREEK NEAR DUFFIELD | 20 | 513 | 484 | 7.1 | 26.3 | 3 | H |
| 07BB014 | COYOTE CREEK NEAR CHERHILL | 18 | 57.8 | 53.9 | 3.3 | 11.5 | 3 | L |
| 07BB903 | ROMEO CREEK ABOVE ROMEO LAKE | 17 | 115 | 115 | 5.3 | 24.3 | 3 | L |
| 07BB009 | CONNOR CREEK NEAR SANGUDO | 10 | 165 | 162 | 5.2 | 22.6 | 3 | L |
| 05EA001 | STURGEON RIVER NEAR FORT SASKATCHEWAN | 77 | 3950 | 2490 | 28.7 | 118.5 | 3 | M |
| 07BC004 | SHOAL CREEK NEAR LINARIA | 9 | 442 | 413 | 9.1 | 33.3 | 3 | M |
| 05EA916 | RIVIERE QUI BARRE NEAR RIVIERE QUI BARRE | 33 | 184.3 | 184.3 | 15.7 | 85.1 | 3 | M |
| 07BB003 | LOBSTICK RIVER NEAR STYAL | 32 | 1570 | 1560 | 30.2 | 155.4 | 4 | H |
| 05DF004 | STRAWBERRY CREEK NEAR THE MOUTH | 33 | 584 | 582 | 58.7 | 353.8 | 4 | L |
| 05DE009 | TOMAHAWK CREEK NEAR TOMAHAWK | 14 | 105 | 105 | 10.8 | 27.6 | 4 | L |
| 05EA010 | STURGEON RIVER NEAR MAGNOLIA BRIDGE | 18 | 121 | 121 | 19.0 | 102.9 | 4 | L |
| 07AH001 | FREEMAN RIVER NEAR FORT ASSINIBOINE | 35 | 1660 | 1660 | 151.2 | 557.4 | 4 | L |
| 07BB004 | PADDLE RIVER NEAR ROCHFORT BRIDGE | 37 | 625 | 625 | 37.8 | 165.9 | 4 | L |
| 07BB005 | LITTLE PADDLE RIVER NEAR MAYERTHORPE | 37 | 298 | 298 | 32.9 | 147.8 | 4 | L |
| 07AH002 | CHRISTMAS CREEK NEAR BLUE RIDGE | 27 | 424 | 424 | 18.3 | 45.7 | 4 | L |

Classes: Low (L); Medium (M); High (H)

**Figure 4 – Data Summary Basin Area VS 100-Year Flood Peak Analysis**

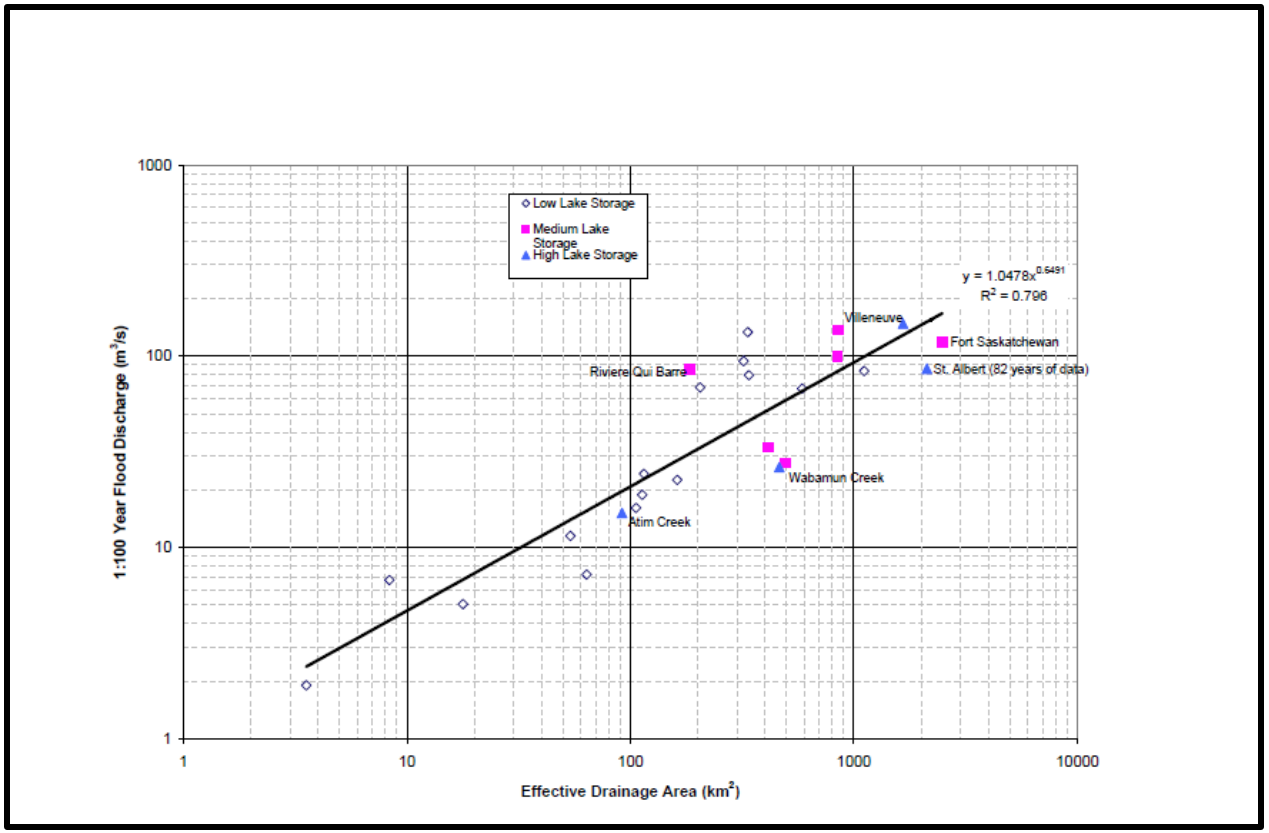



**Figure 5 – Effective Drainage Area VS 100-Year Peak Discharge**

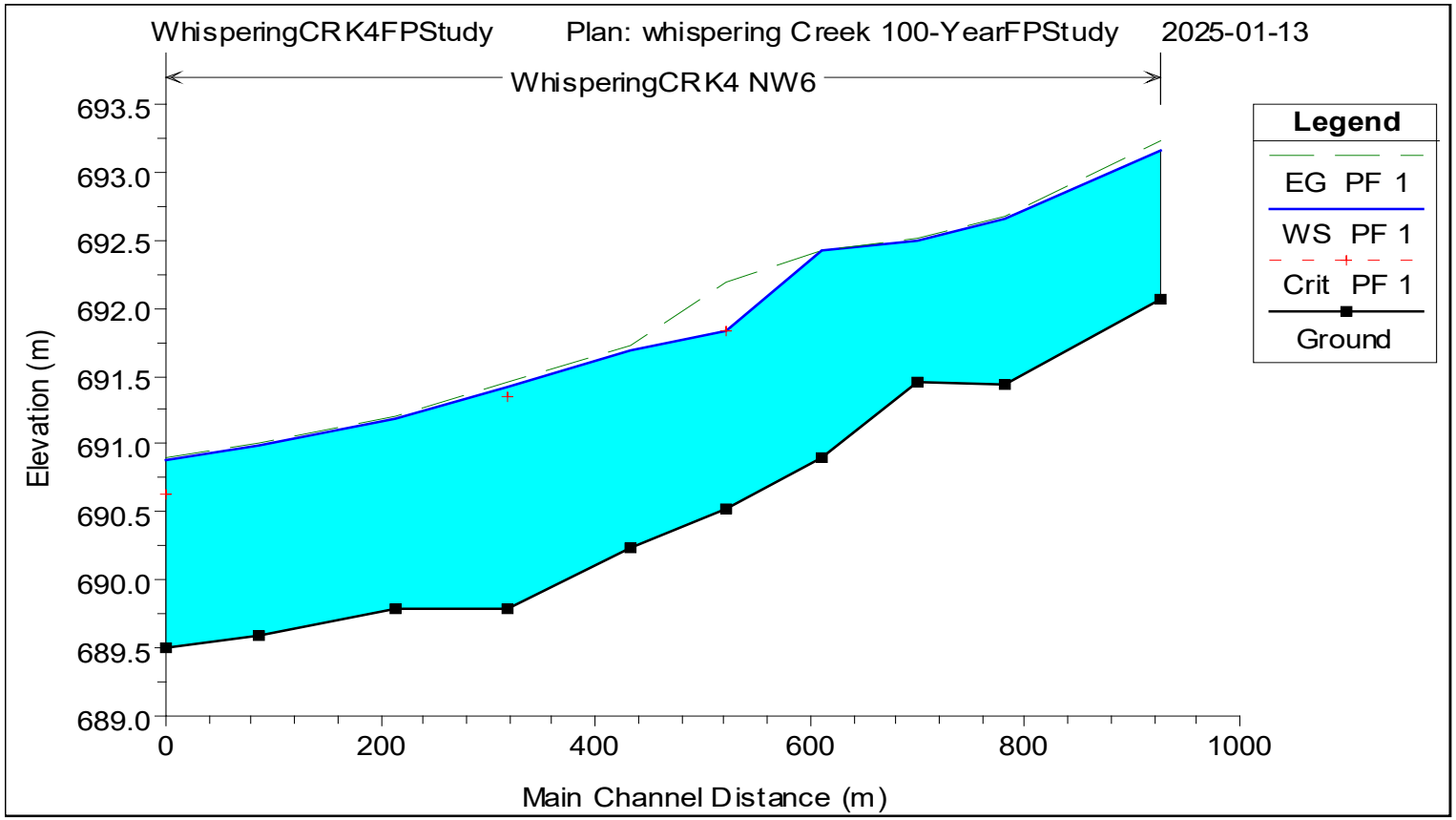



**Figure 6 – 100- Year Flood Profile Whispering Waters Creek**

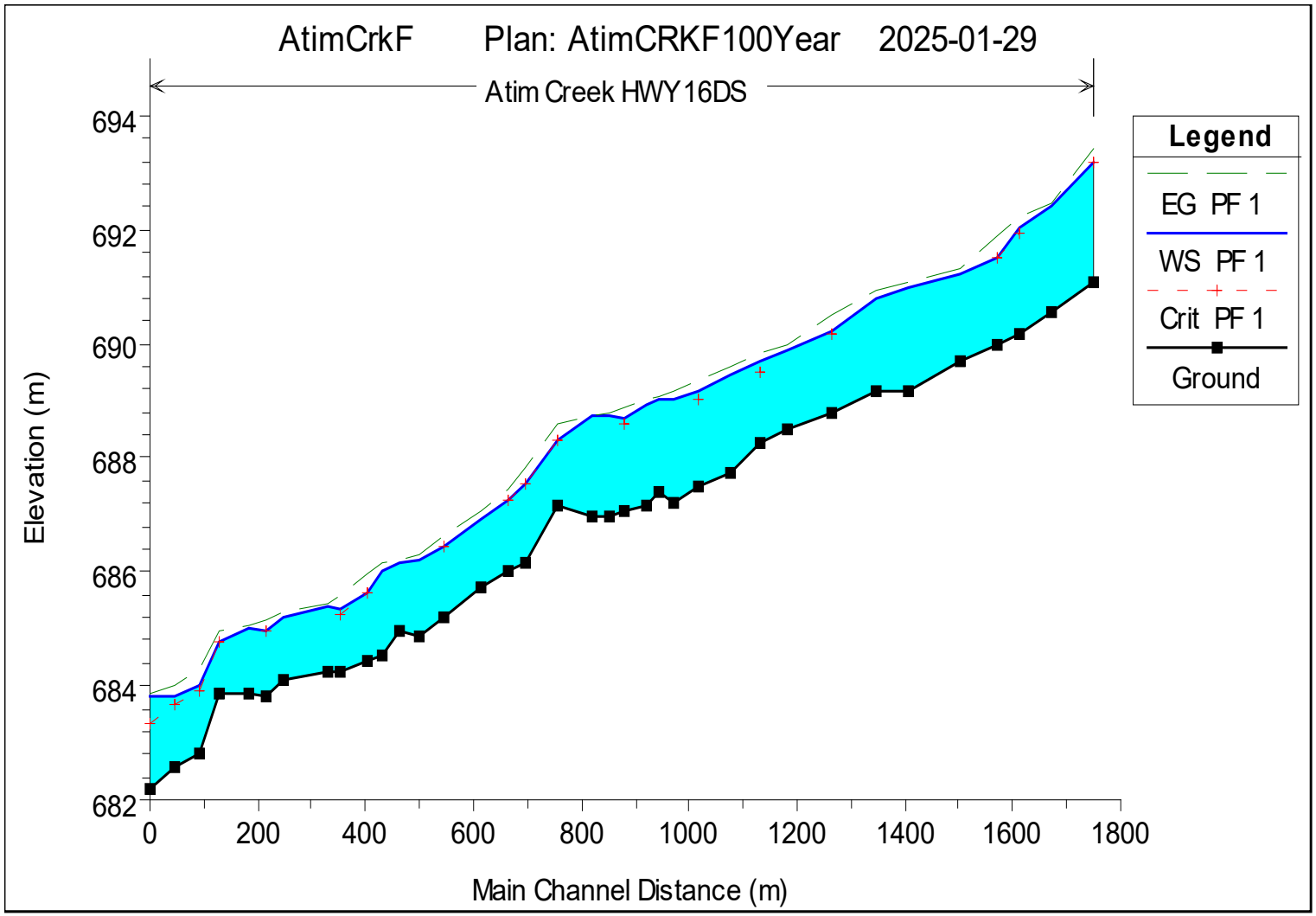
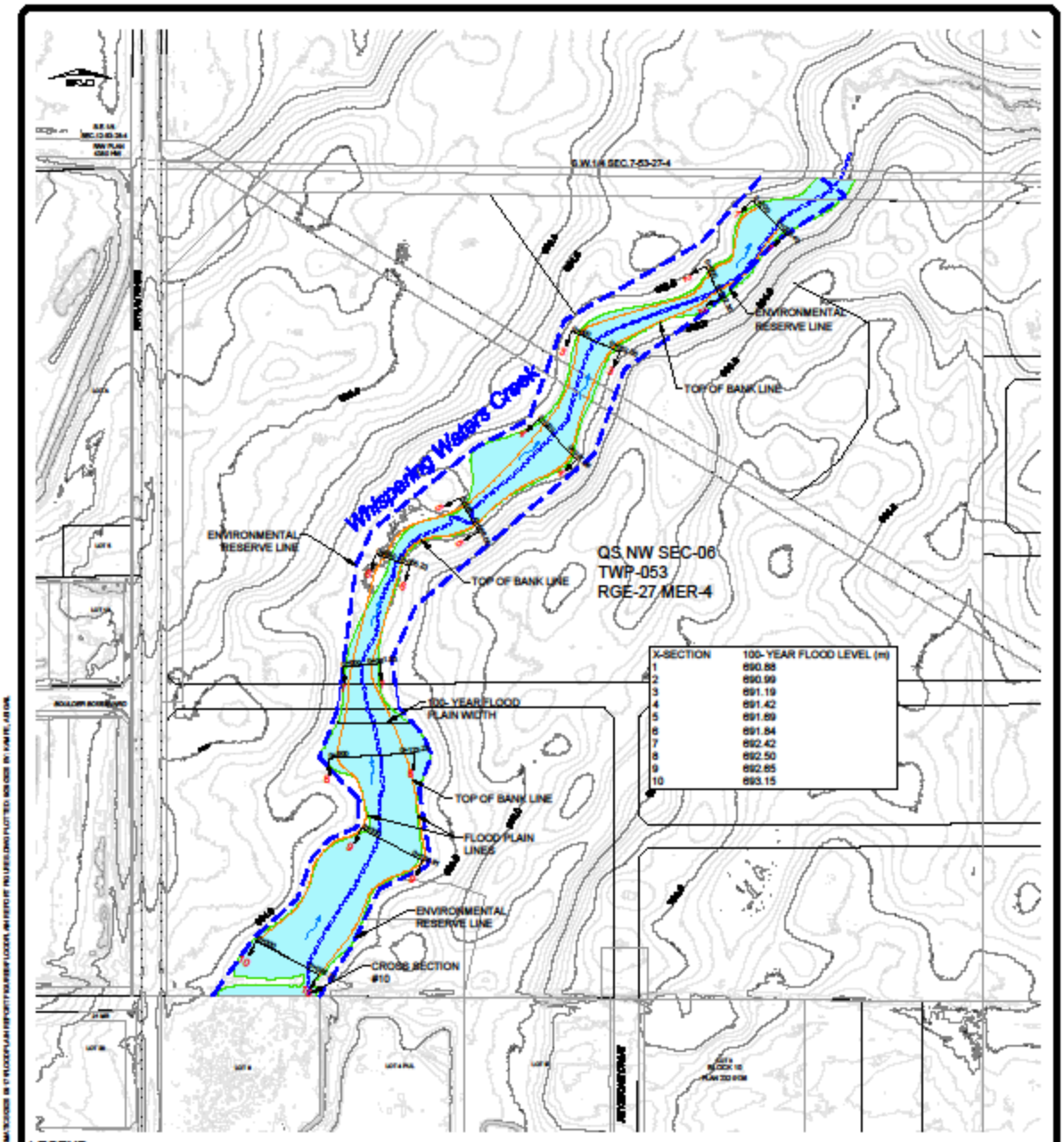
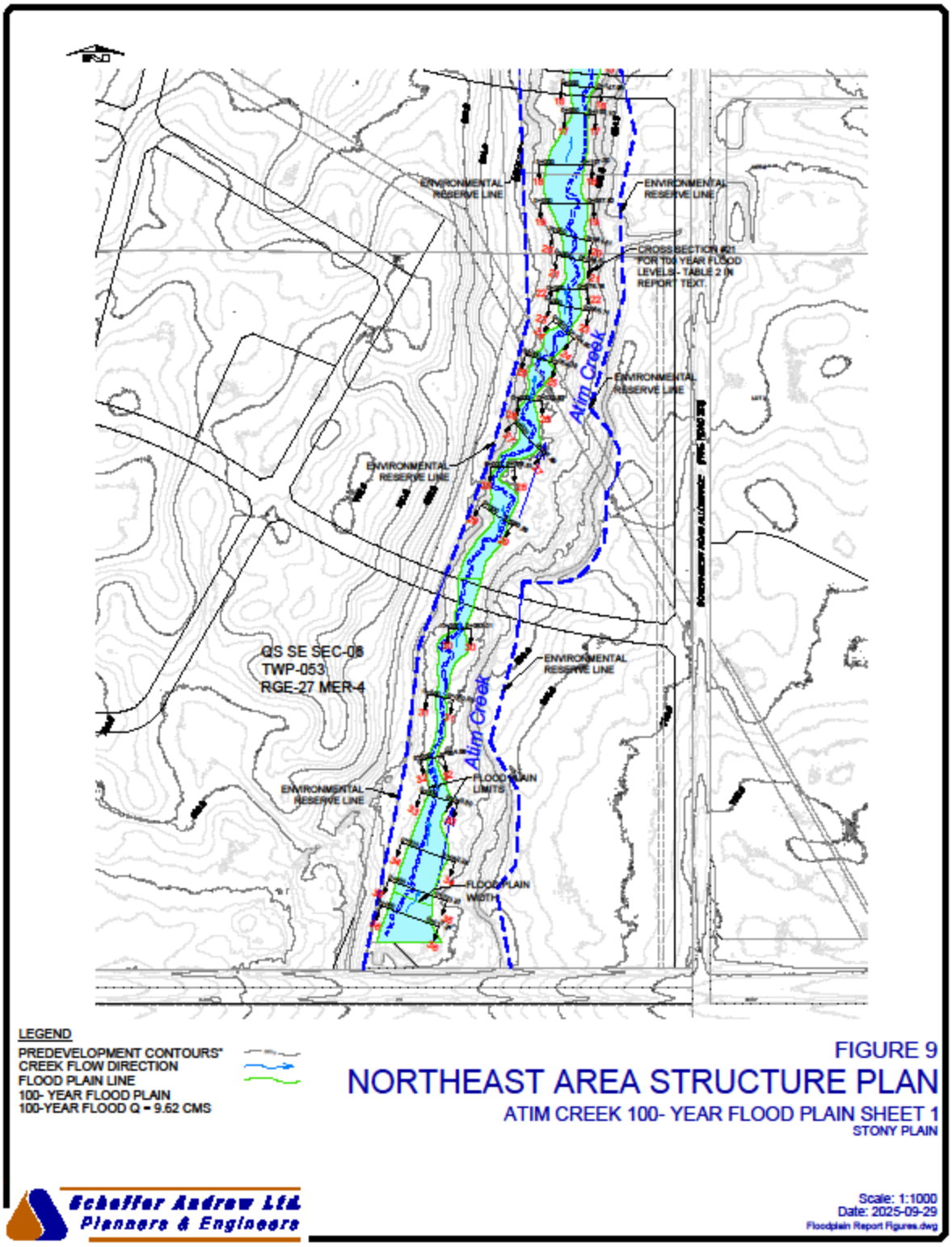
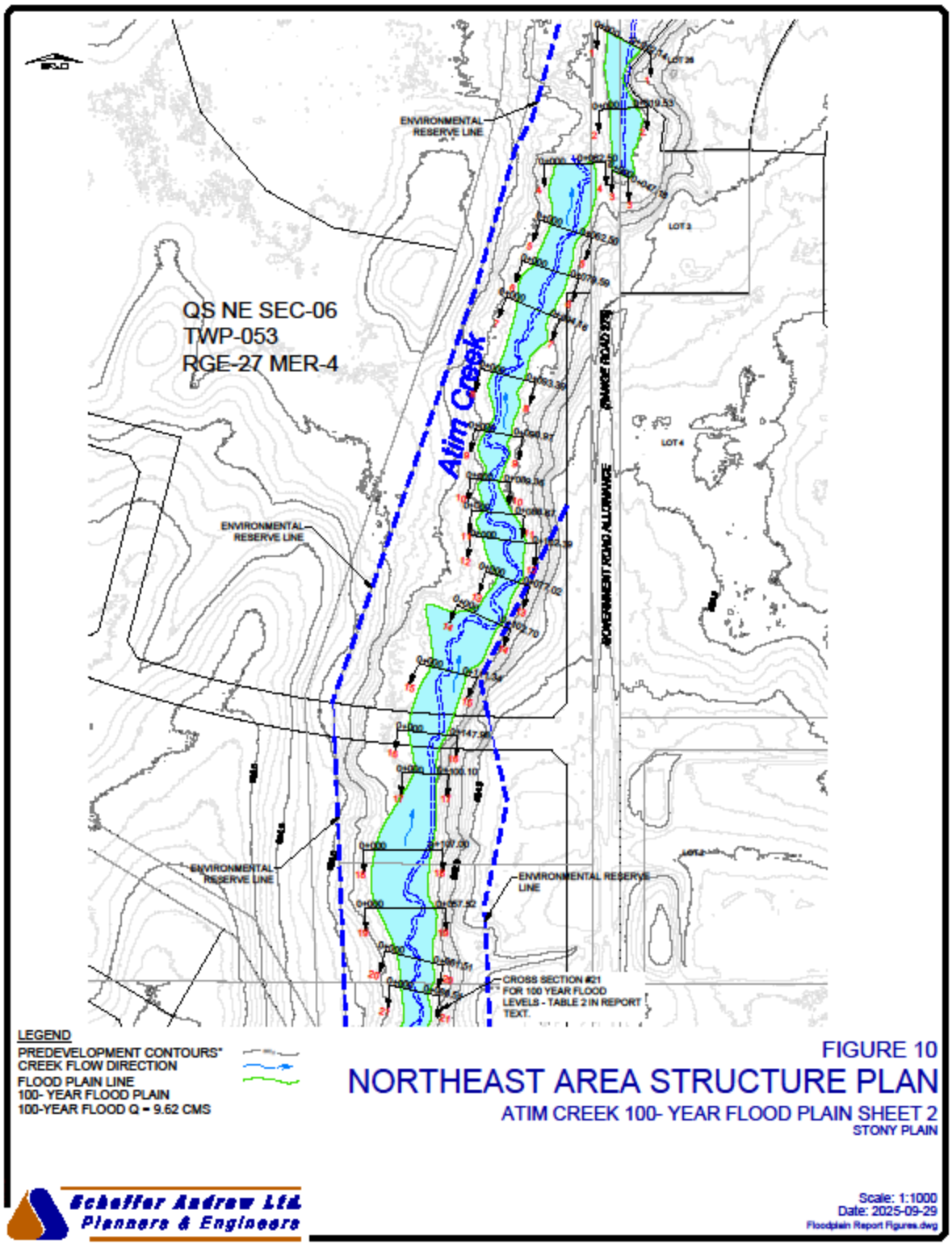



**Figure 7 – Atim Creek 100-Year Flood Profile**


Whispering Waters Creek
ENVIRONMENTAL RESERVE LINE
TOP OF BANK LINE
ENVIRONMENTAL RESERVE LINE
TOP OF BANK LINE
QS NW SEC-06
TWP-053
RGE-27 MER-4
100- YEAR FLOOD PLAIN WIDTH
TOP OF BANK LINE
FLOOD PLAIN LINES
ENVIRONMENTAL RESERVE LINE
CROSS SECTION #10
X-SECTION | 100- YEAR FLOOD LEVEL (m)
1 | 690.88
2 | 690.99
3 | 691.19
4 | 691.42
5 | 691.89
6 | 691.84
7 | 692.42
8 | 692.50
9 | 692.85
10 | 693.15
LEGEND
PREDEVELOPMENT CONTOURS*
CREEK FLOW DIRECTION
SURVEYED TOP OF BANK
FLOOD PLAIN LINE
100- YEAR FLOOD PLAIN DELINEATION
100-YEAR FLOOD Q = 4.47 CMS
FIGURE 8
NORTHEAST AREA STRUCTURE PLAN
WHISPERING WATERS CREEK 100-YEAR FLOOD PLAIN
STONY PLAIN
Scheffer Andrew Ltd.
Planners & Engineers
Scale: 1:1500
Date: 2025-09-29
Floodplain Report Figures.dwg


ENVIRONMENTAL RESERVE LINE
ENVIRONMENTAL RESERVE LINE
CROSS SECTION #21 FOR 100 YEAR FLOOD LEVELS - TABLE 2 IN REPORT TEXT.
Atim Creek
ENVIRONMENTAL RESERVE LINE
ENVIRONMENTAL RESERVE LINE
QS SE SEC-08
TWP-053
RGE-27 MER-4
ENVIRONMENTAL RESERVE LINE
Atim Creek
FLOOD PLAIN LIMITS
ENVIRONMENTAL RESERVE LINE
FLOOD PLAIN WIDTH
LEGEND
PREDEVELOPMENT CONTOURS*
CREEK FLOW DIRECTION
FLOOD PLAIN LINE
100- YEAR FLOOD PLAIN
100-YEAR FLOOD Q = 9.62 CMS
FIGURE 9
NORTHEAST AREA STRUCTURE PLAN
ATIM CREEK 100- YEAR FLOOD PLAIN SHEET 1
STONY PLAIN
Schaffer Andrew Ltd.
Planners & Engineers
Scale: 1:1000
Date: 2025-09-29
Floodplain Report Figures.dwg


QS NE SEC-06
TWP-053
RGE-27 MER-4
Atim Creek
ENVIRONMENTAL RESERVE LINE
ENVIRONMENTAL RESERVE LINE
ENVIRONMENTAL RESERVE LINE
ENVIRONMENTAL RESERVE LINE
RANGE ROAD 278
GOVERNMENT ROAD ALLOWANCE
LOT 3
LOT 4
CROSS SECTION #21 FOR 100 YEAR FLOOD LEVELS - TABLE 2 IN REPORT TEXT.
LEGEND
PREDEVELOPMENT CONTOURS*
CREEK FLOW DIRECTION
FLOOD PLAIN LINE
100- YEAR FLOOD PLAIN
100-YEAR FLOOD Q = 9.62 CMS
FIGURE 10
NORTHEAST AREA STRUCTURE PLAN
ATIM CREEK 100- YEAR FLOOD PLAIN SHEET 2
STONY PLAIN
Schaffer Andrew Ltd.
Planners & Engineers
Scale: 1:1000
Date: 2025-09-29
Floodplain Report Figures.dwg

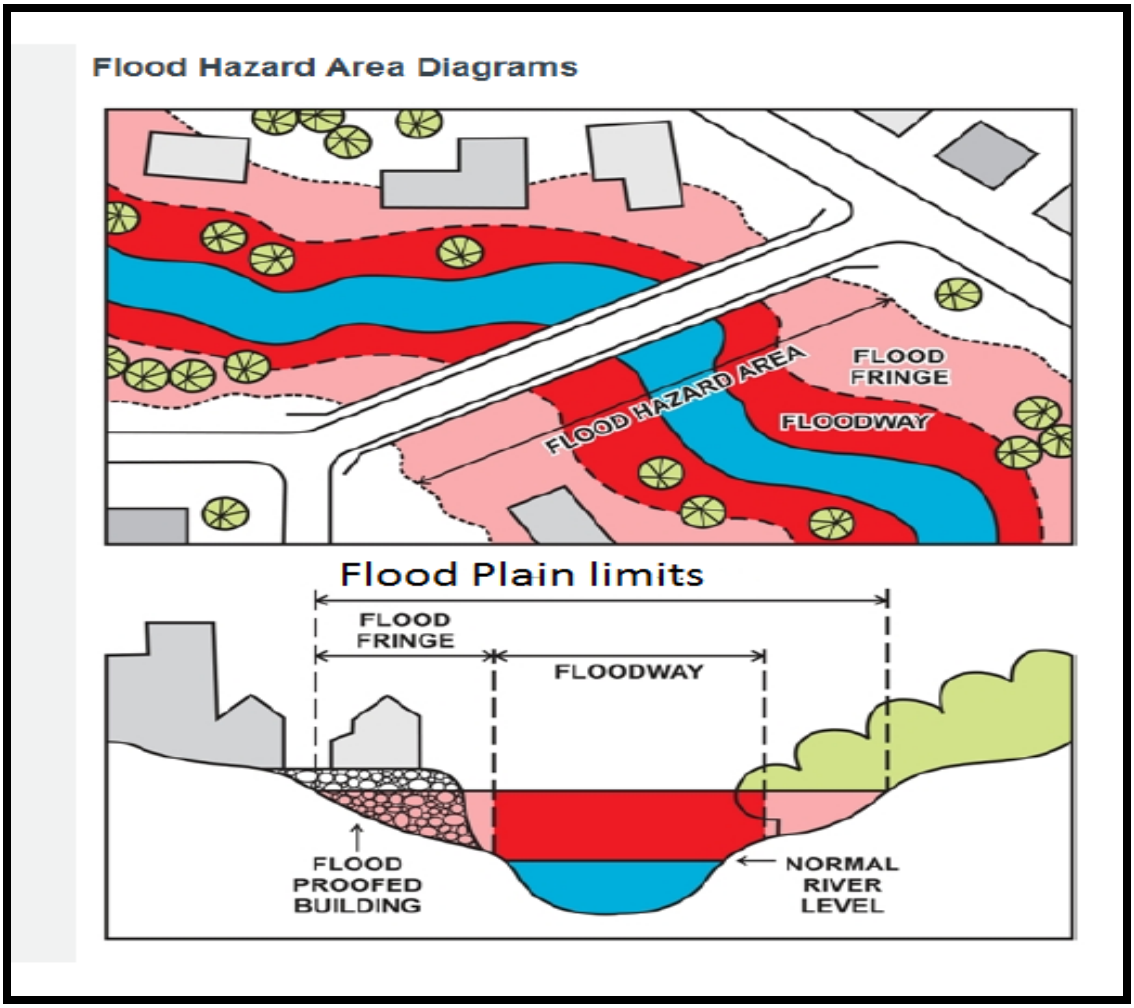



**Figure 11 - Two Zone Flood Mapping – Defining Floodway / Flood Fringe**

# APPENDIX A

## Whispering Waters Creek / Atim Creek Survey data

## By Pals Geomatics

## Whispering Waters Creek Cross Sections With 100-Year Flood Level

## Atim Creek Cross Sections With 100-Year Flood Level




Adobe Acrobat Document

SE




Adobe Acrobat Document

NE



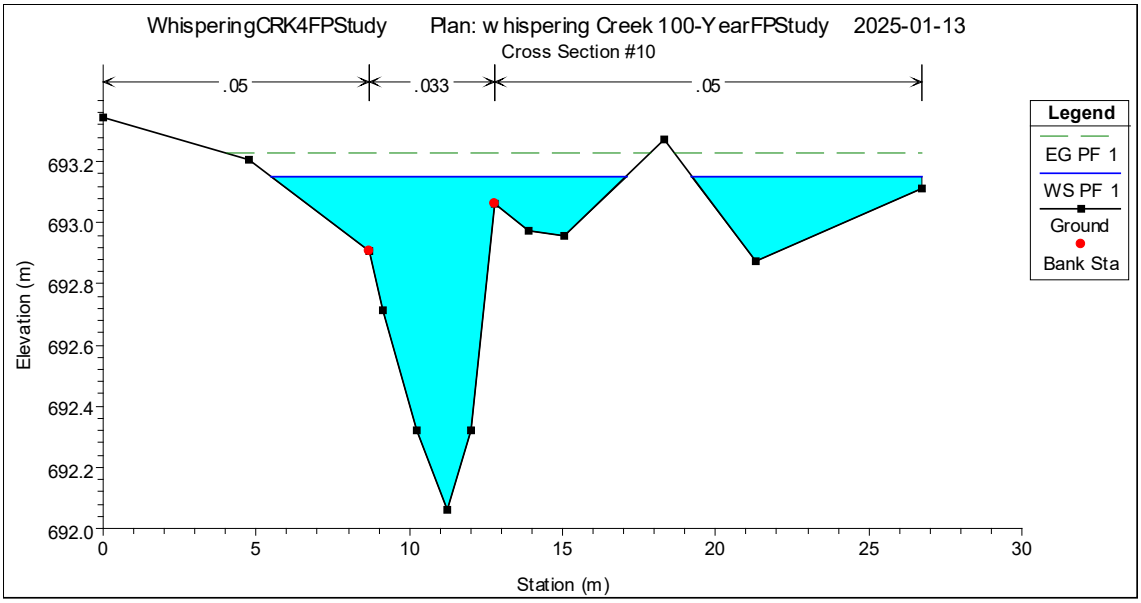

Adobe Acrobat Document

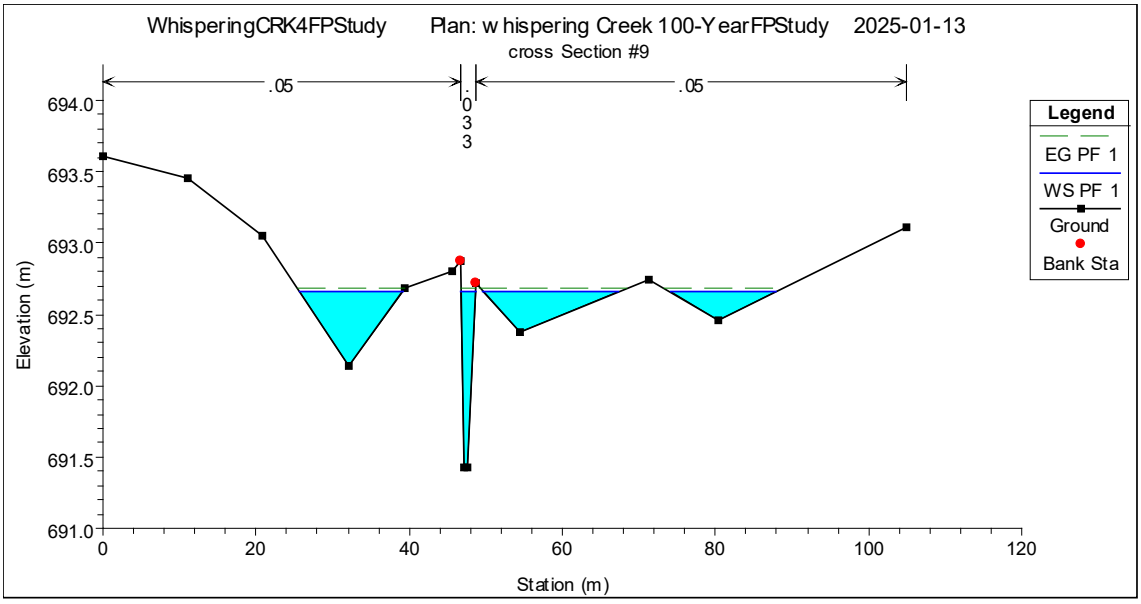
NW

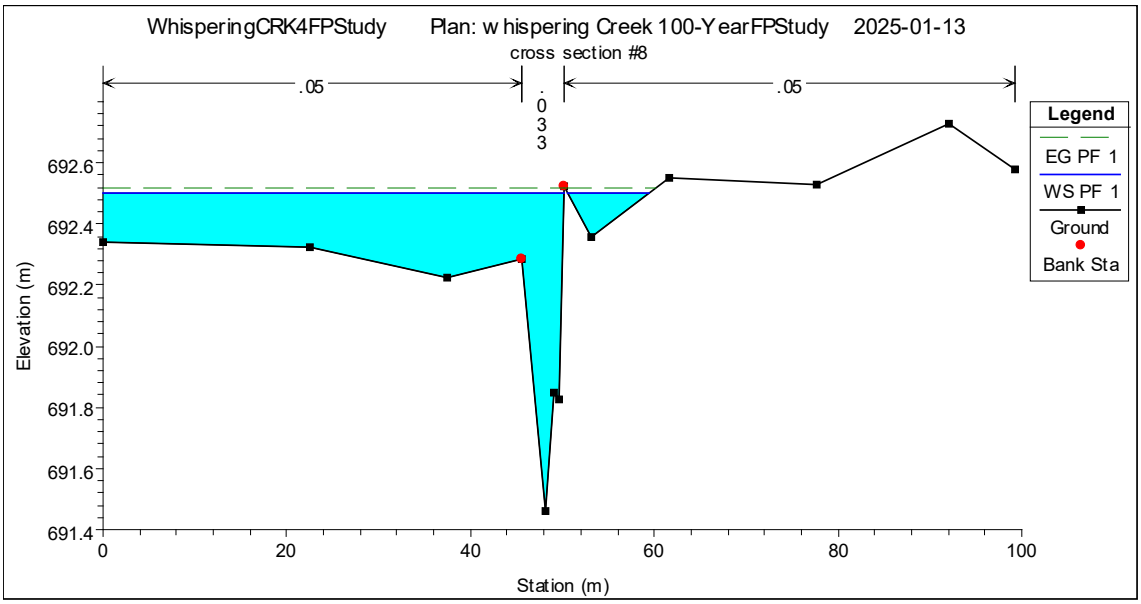
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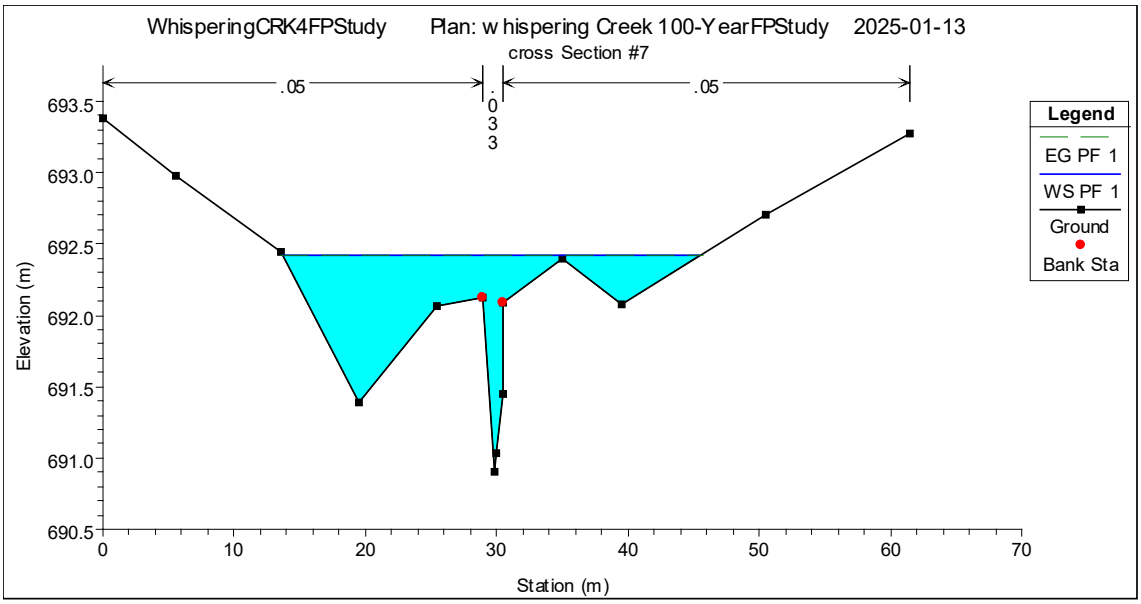
1. PDF NW: Whispering Waters Creek Data NW 1/4- Cross Section location on a Plan. Plotted cross Sections #1 to #10.
2. PDF NE: Atim Creek Data NE 1/4. Cross Section locations on a Plan. Plotted Cross Sections from #1 to #21.
3. PDF NW: Atim Creek Data SE1/4. Cross sections 20 to #36 on a Plan. Plotted Cross section #21 to #36.

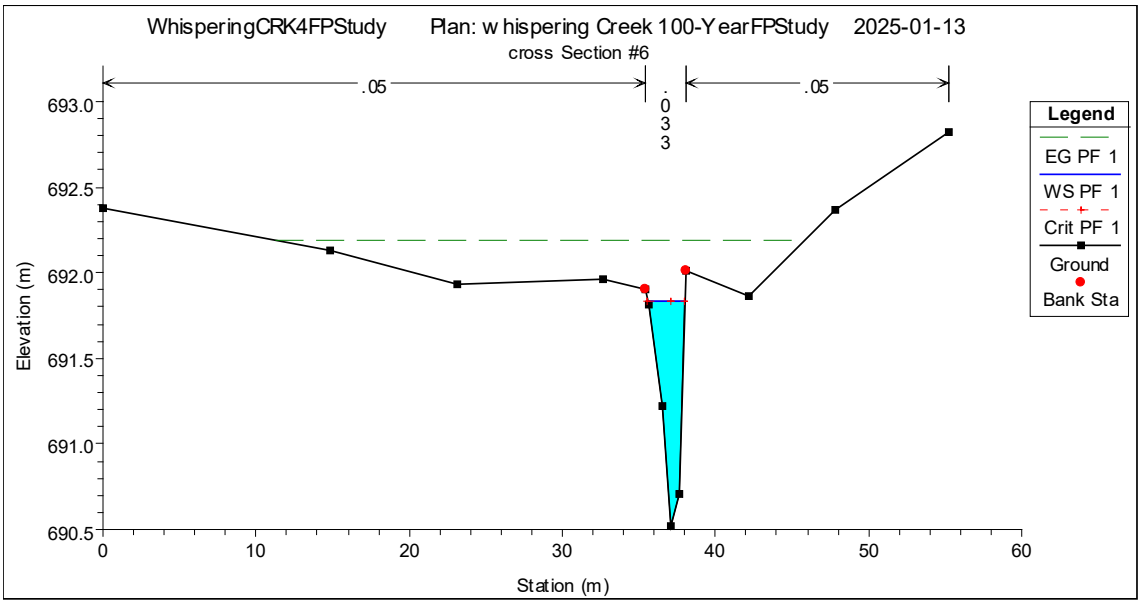
## Whispering Waters Creek – Cross sections with 100-Year Flood Levels Plotted

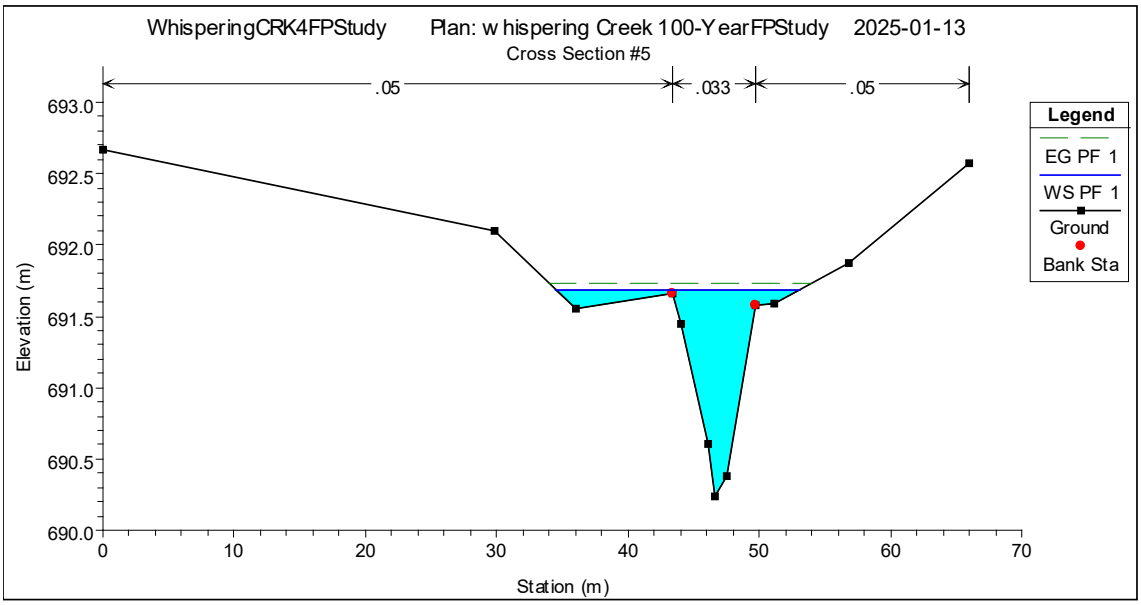


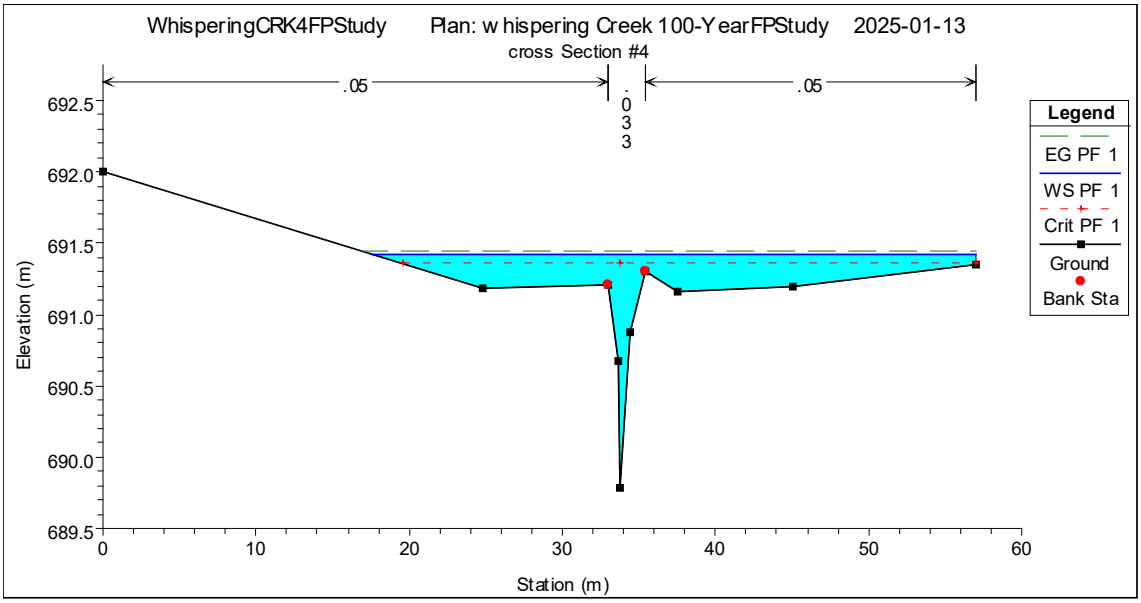



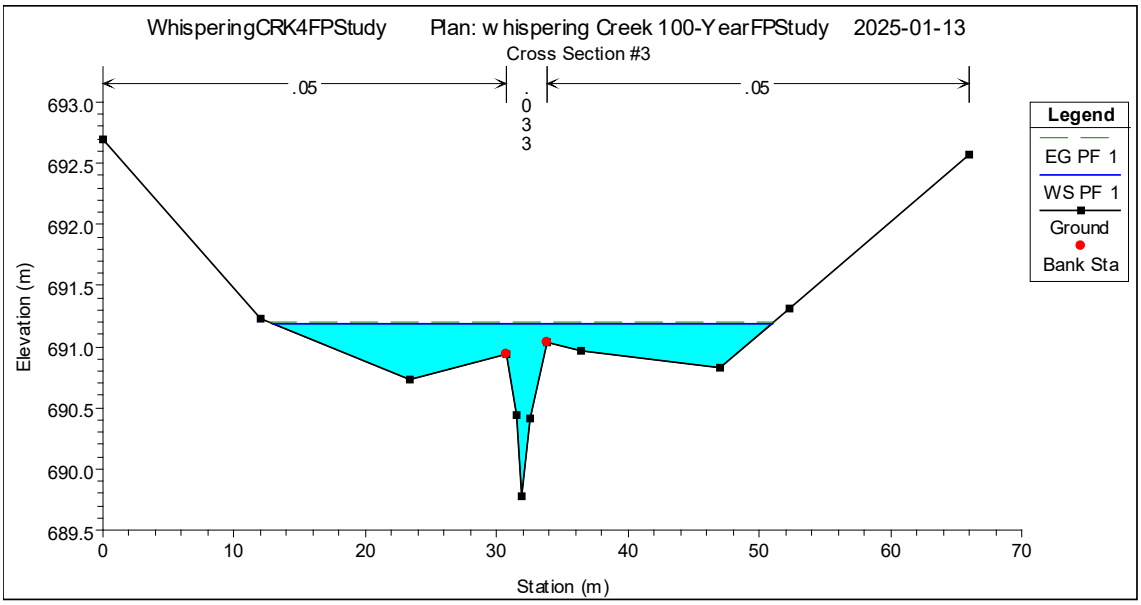

WhisperingCRK4FPStudy Plan: whispering Creek 100-YearFPStudy 2025-01-13
cross section #8
.05
.033
.05
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
692.6
692.4
692.2
692.0
691.8
691.6
691.4
0
20
40
60
80
100
Station (m)

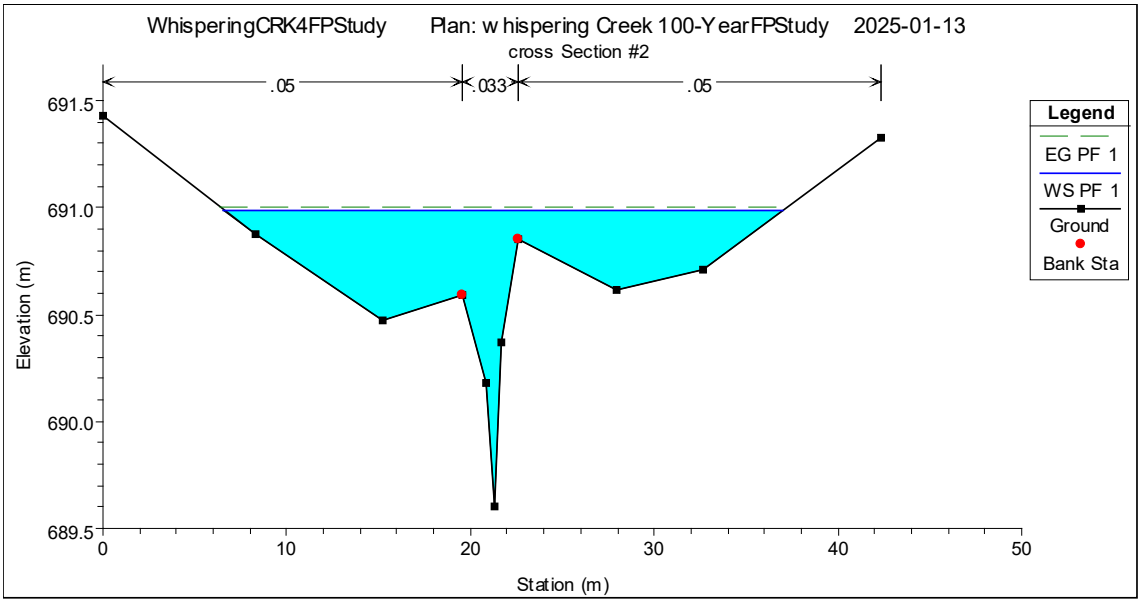

WhisperingCRK4FPStudy Plan: whispering Creek 100-YearFPStudy 2025-01-13
cross Section #7
.05
.033
.05
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
693.5
693.0
692.5
692.0
691.5
691.0
690.5
0
10
20
30
40
50
60
70
Station (m)

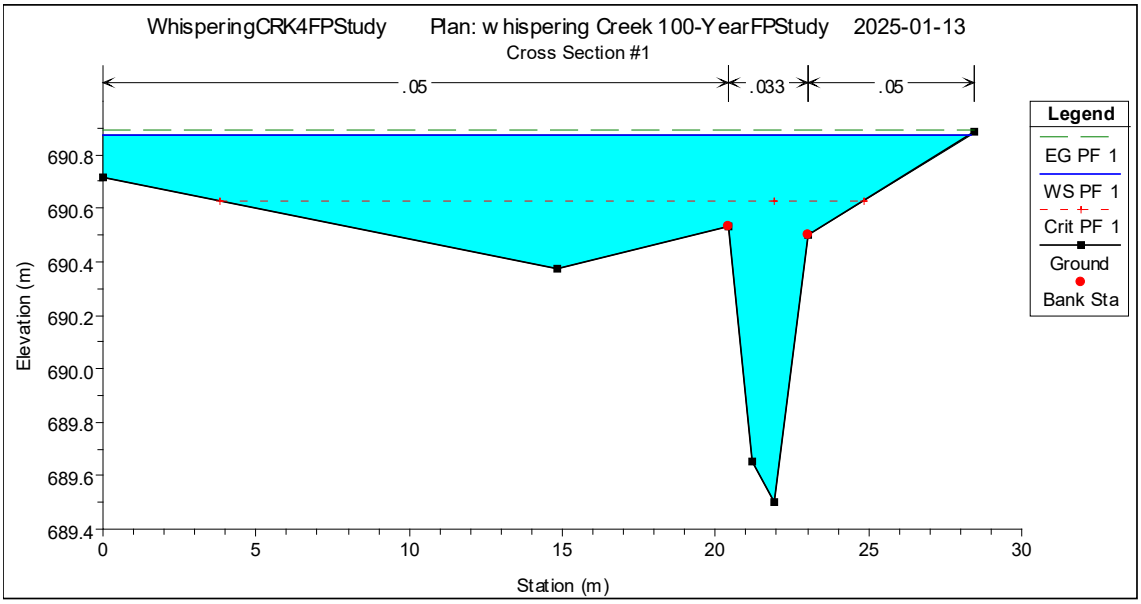

WhisperingCRK4FPStudy Plan: whispering Creek 100-YearFPStudy 2025-01-13
cross Section #6
.05
.033
.05
693.0
692.5
692.0
691.5
691.0
690.5
Elevation (m)
0
10
20
30
40
50
60
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


WhisperingCRK4FPStudy Plan: whispering Creek 100-YearFPStudy 2025-01-13
Cross Section #5
.05
.033
.05
693.0
692.5
692.0
691.5
691.0
690.5
690.0
Elevation (m)
0
10
20
30
40
50
60
70
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

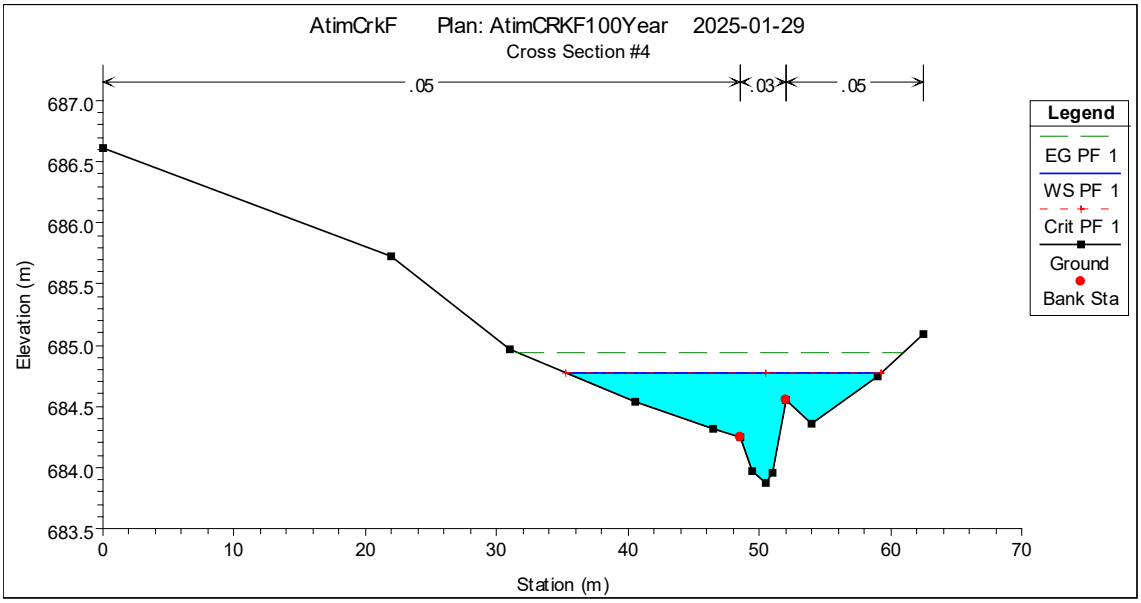

WhisperingCRK4FPStudy Plan: whispering Creek 100-YearFPStudy 2025-01-13
cross Section #4
.05
.033
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
692.5
692.0
691.5
691.0
690.5
690.0
689.5
0
10
20
30
40
50
60
Station (m)

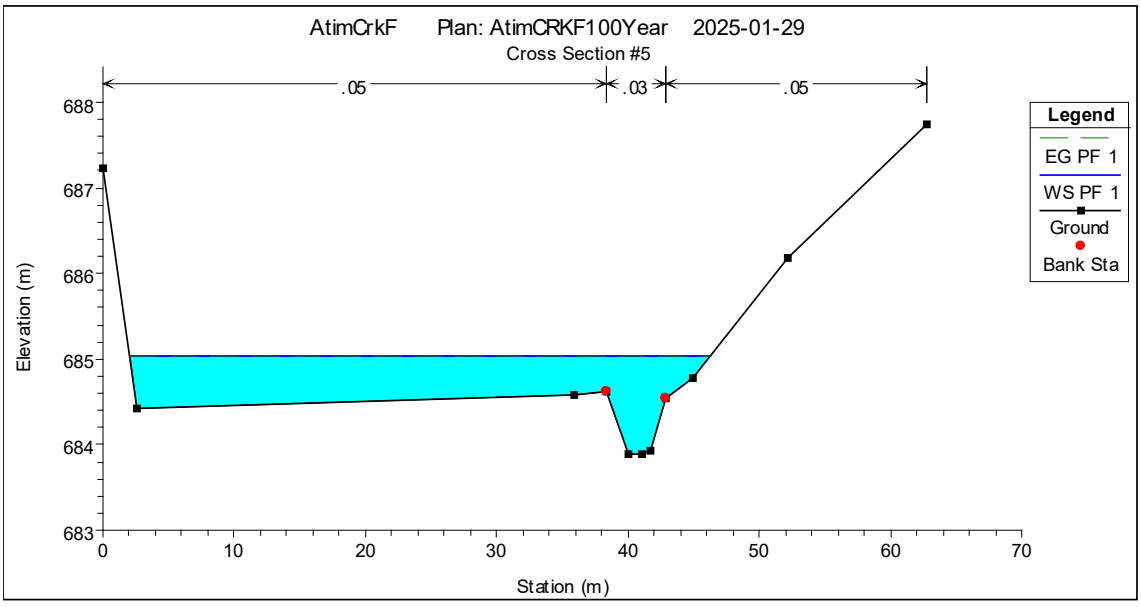

WhisperingCRK4FPStudy Plan: whispering Creek 100-YearFPStudy 2025-01-13
Cross Section #3
.05
.033
.05
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
693.0
692.5
692.0
691.5
691.0
690.5
690.0
689.5
0
10
20
30
40
50
60
70
Station (m)

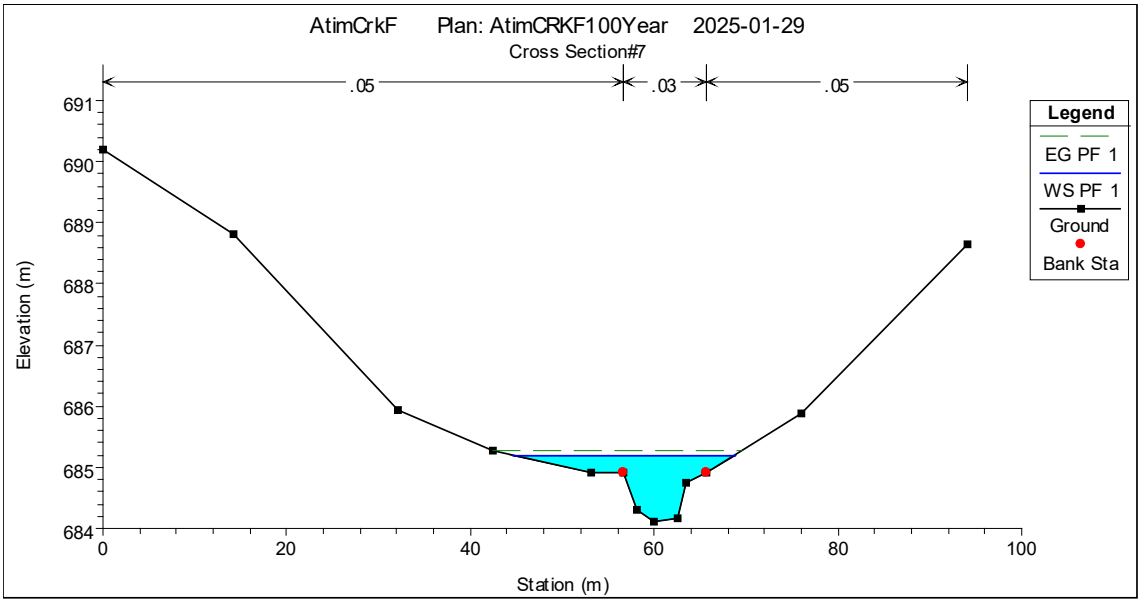

WhisperingCRK4FPStudy Plan: whispering Creek 100-YearFPStudy 2025-01-13
cross Section #2
.05
.033
.05
691.5
691.0
690.5
690.0
689.5
Elevation (m)
0
10
20
30
40
50
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

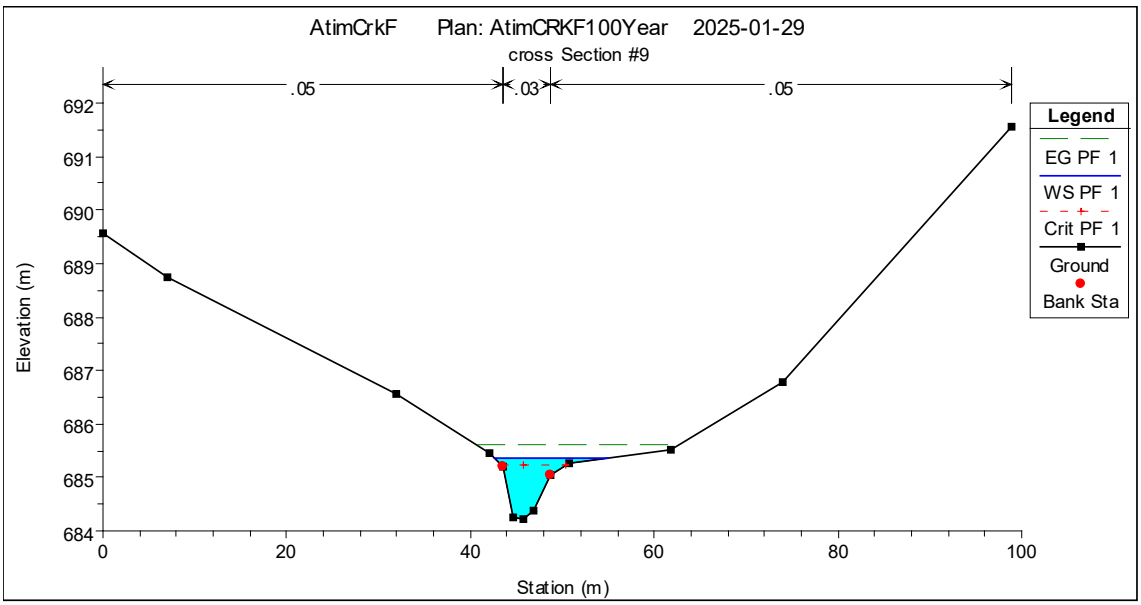

WhisperingCRK4FPStudy Plan: whispering Creek 100-YearFPStudy 2025-01-13
Cross Section #1
.05
.033
.05
690.8
690.6
690.4
690.2
690.0
689.8
689.6
689.4
Elevation (m)
0
5
10
15
20
25
30
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

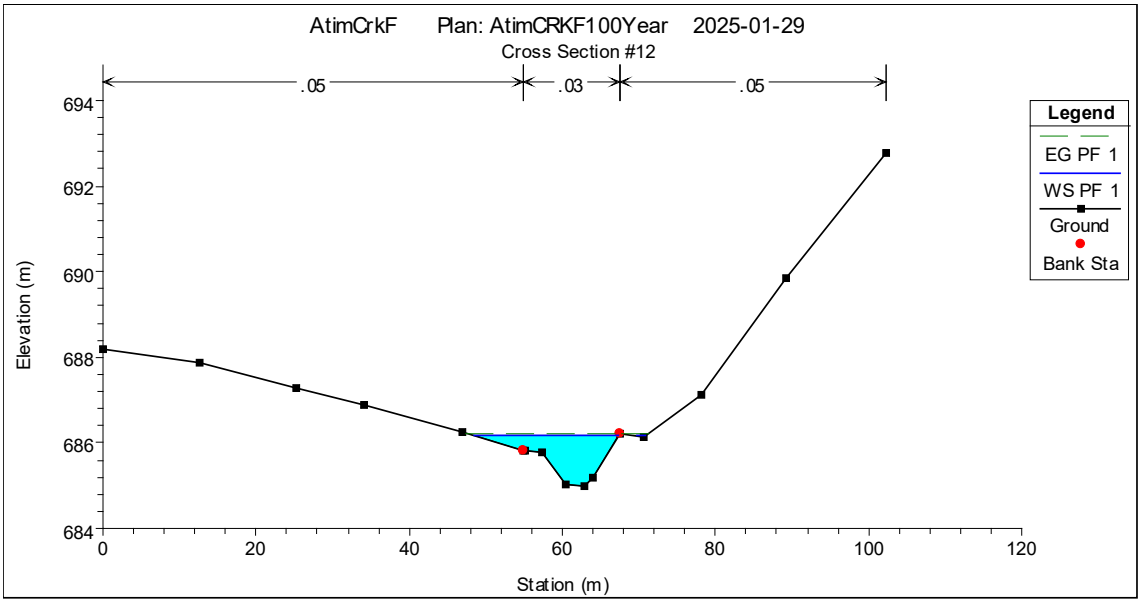
## Atim Creek – Cross sections with 100-Year Flood Level Plotted

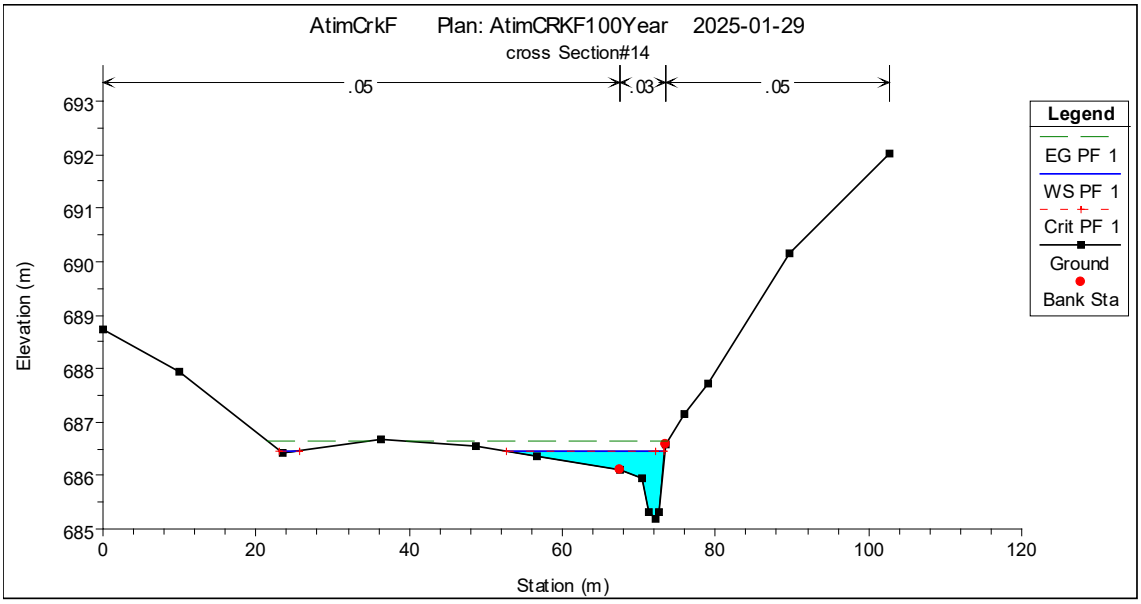


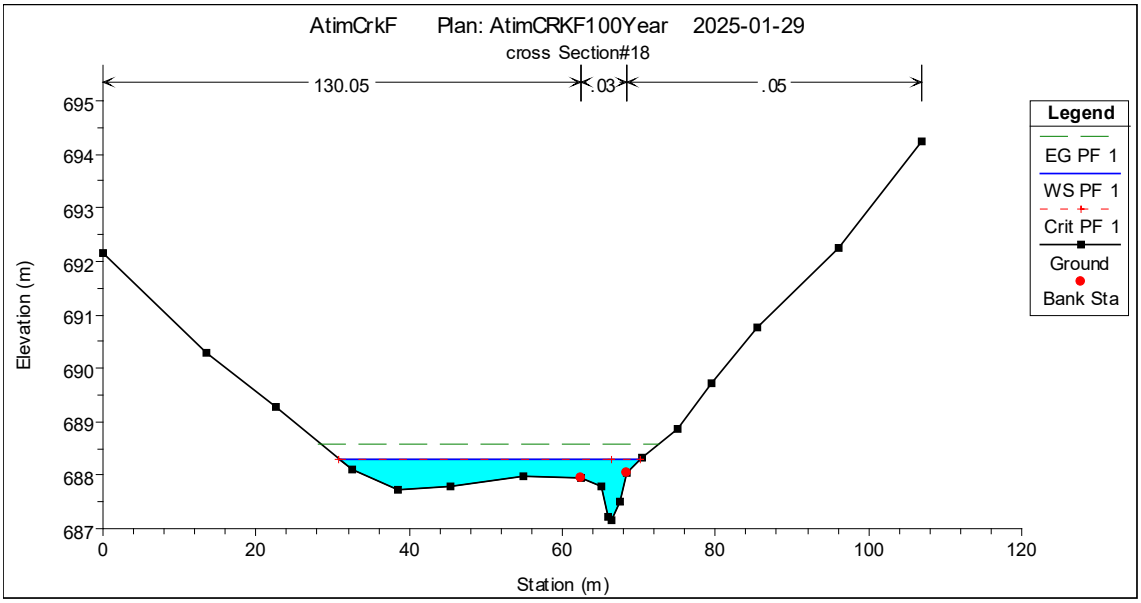



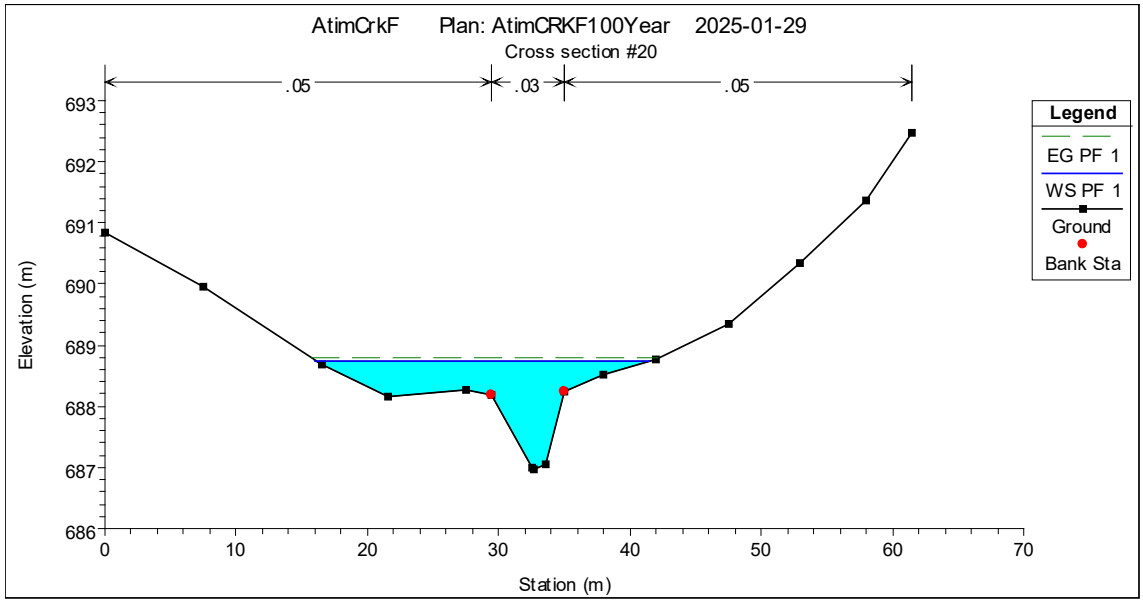

AtimCrkF Plan: AtimCRKF100Year 2025-01-29
Cross Section#7
.05
.03
.05
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
691
690
689
688
687
686
685
684
0
20
40
60
80
100
Station (m)

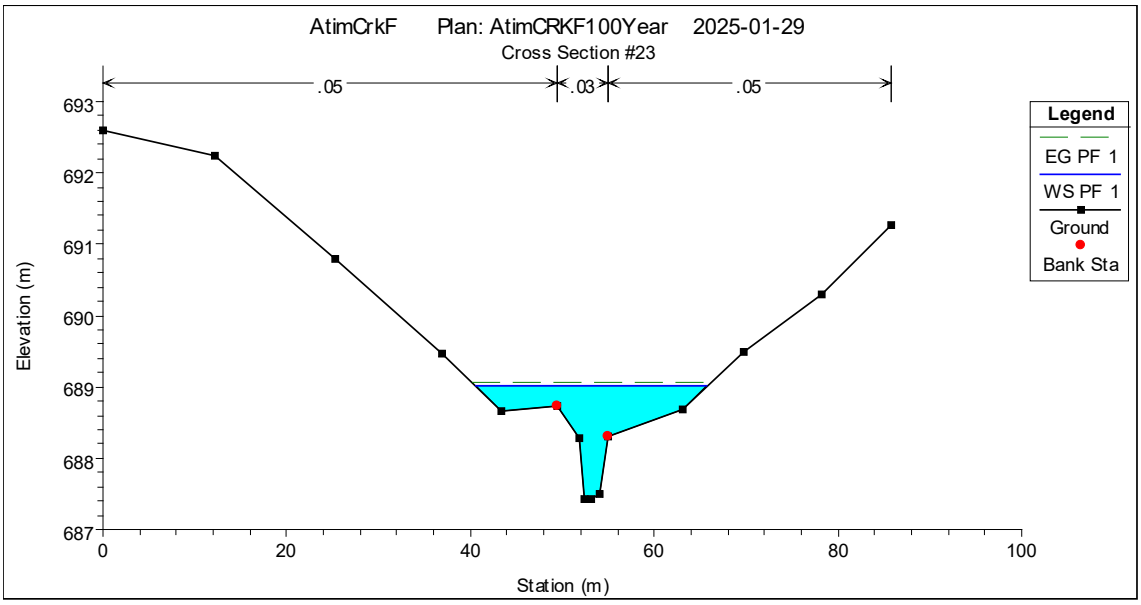

AtimCrkF Plan: AtimCRKF100Year 2025-01-29
cross Section #9
.05
.03
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
692
691
690
689
688
687
686
685
684
0
20
40
60
80
100
Station (m)

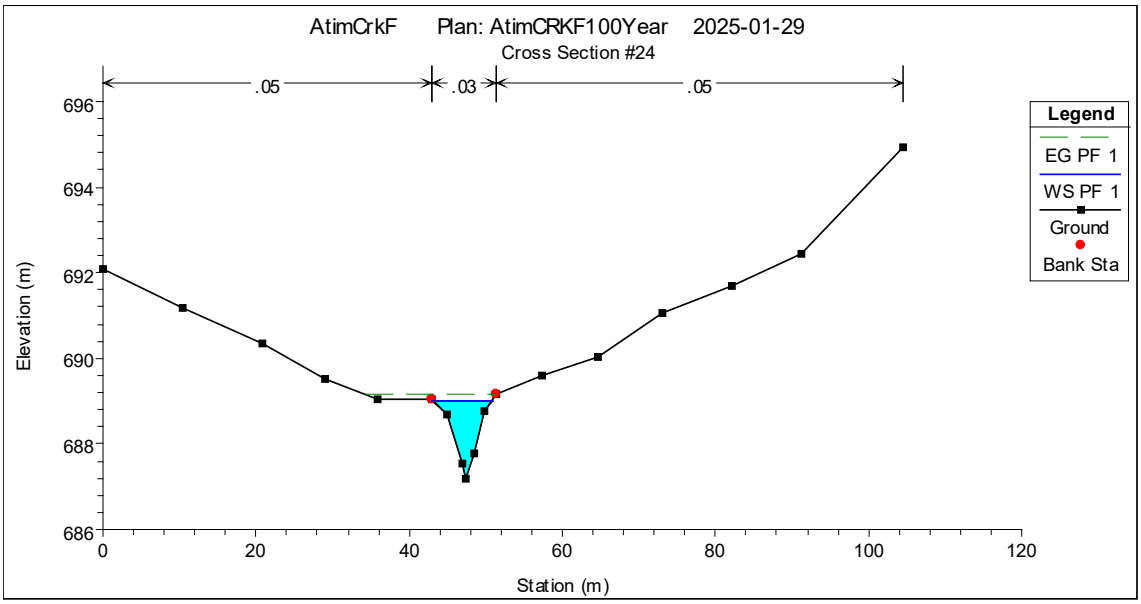

AtimCrkF Plan: AtimCRKF100Year 2025-01-29
Cross Section #12
.05
.03
.05
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
694
692
690
688
686
684
0
20
40
60
80
100
120
Station (m)

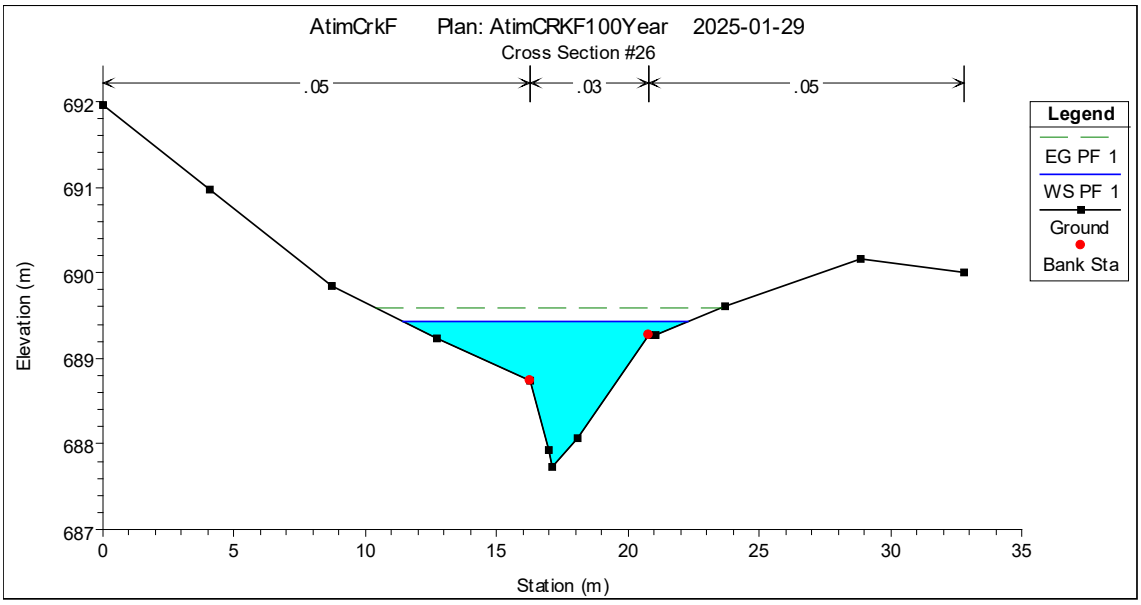

AtimCrkF Plan: AtimCRKF100Year 2025-01-29
cross Section#14
.05
.03
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
693
692
691
690
689
688
687
686
685
0
20
40
60
80
100
120
Station (m)

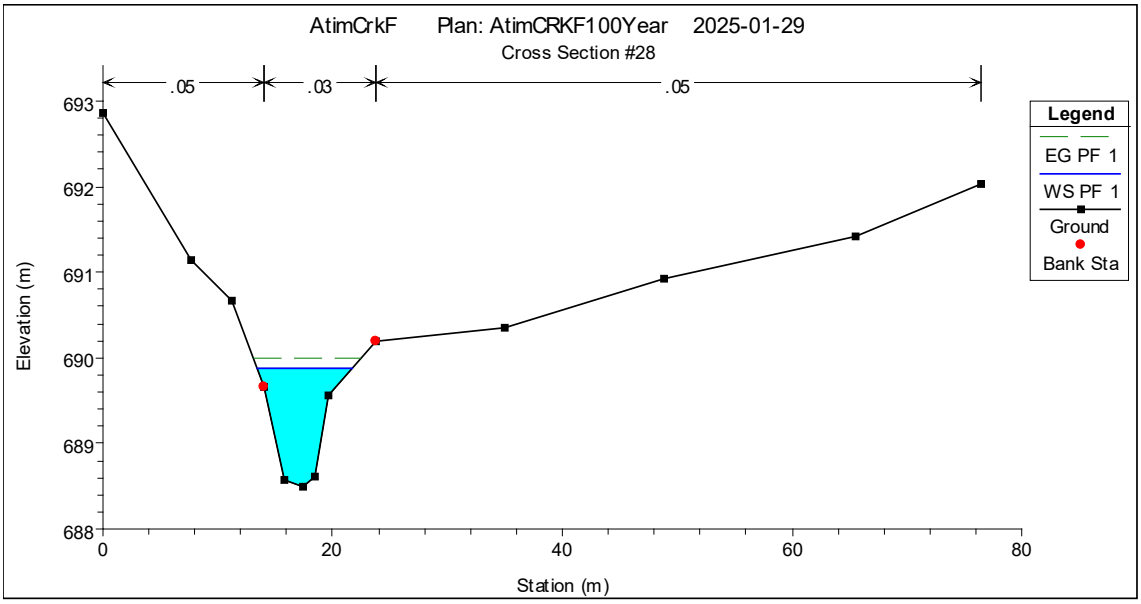

AtimCrkF Plan: AtimCRKF100Year 2025-01-29
cross Section#18
130.05
.03
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
695
694
693
692
691
690
689
688
687
0
20
40
60
80
100
120

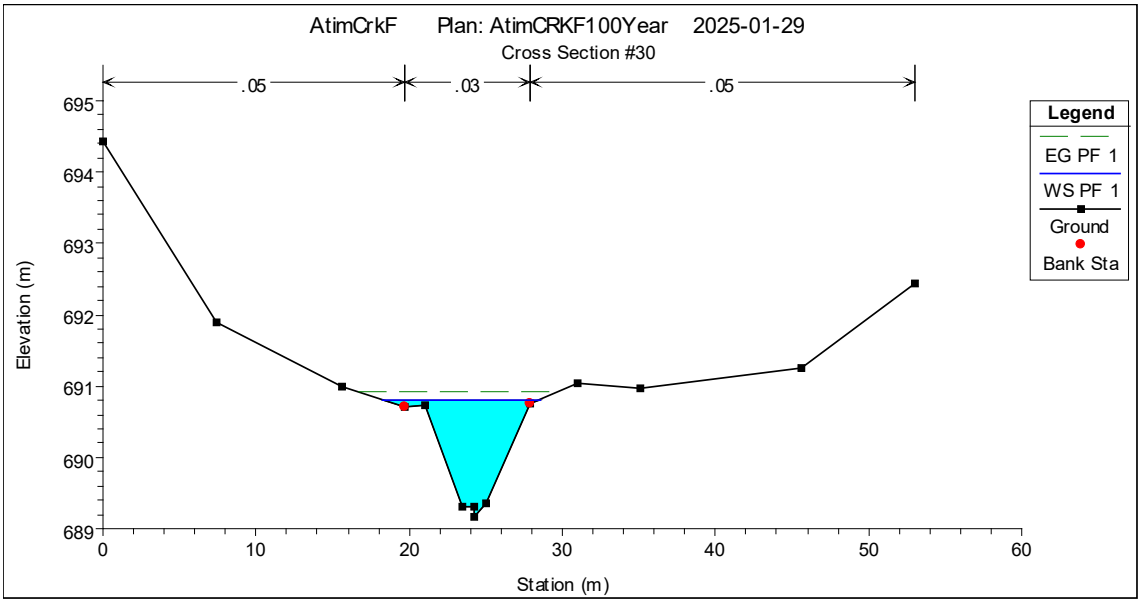

AtimCrkF Plan: AtimCRKF100Year 2025-01-29
Cross section #20
.05
.03
.05
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
693
692
691
690
689
688
687
686
0
10
20
30
40
50
60
70

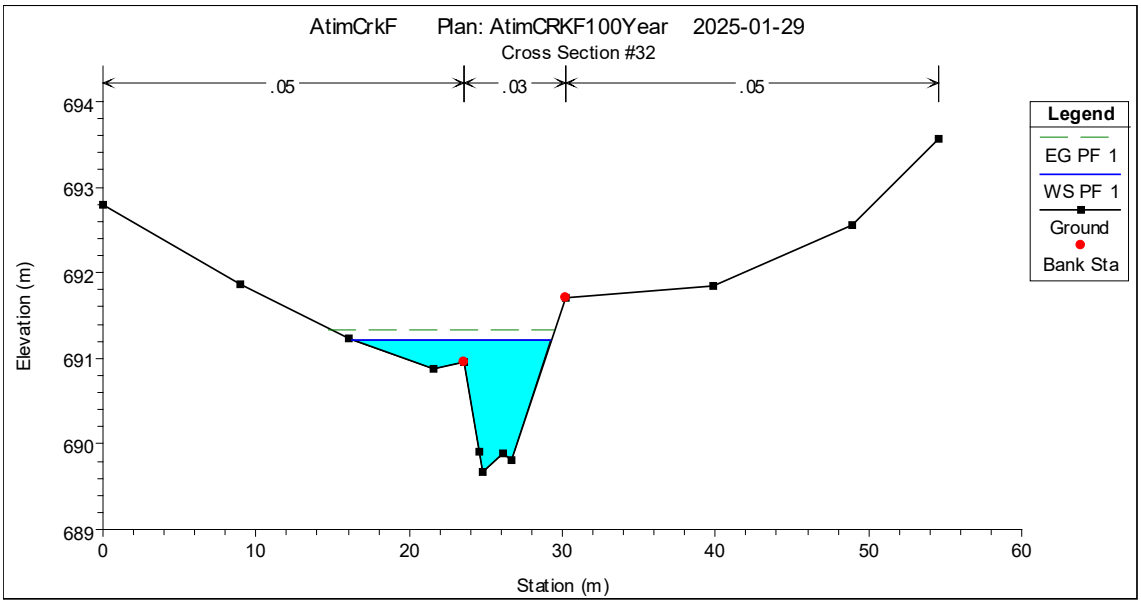

AtimCrkF Plan: AtimCRKF100Year 2025-01-29
Cross Section #23
.05
.03
.05
693
692
691
690
689
688
687
Elevation (m)
0
20
40
60
80
100
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

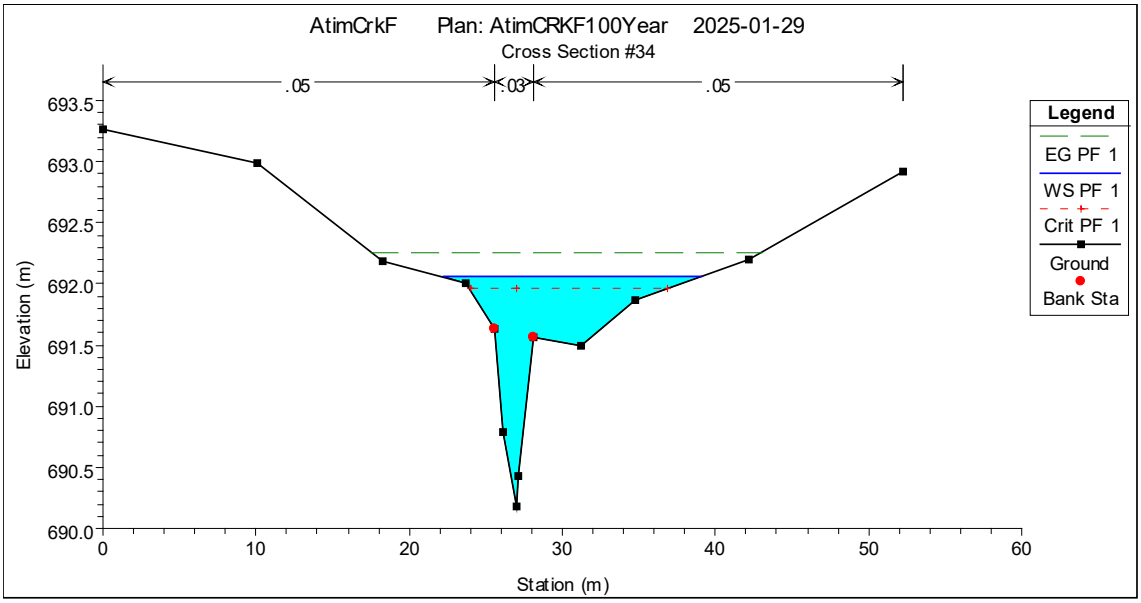

AtimCrkF Plan: AtimCRKF100Year 2025-01-29
Cross Section #24
.05
.03
.05
696
694
692
690
688
686
Elevation (m)
0
20
40
60
80
100
120
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

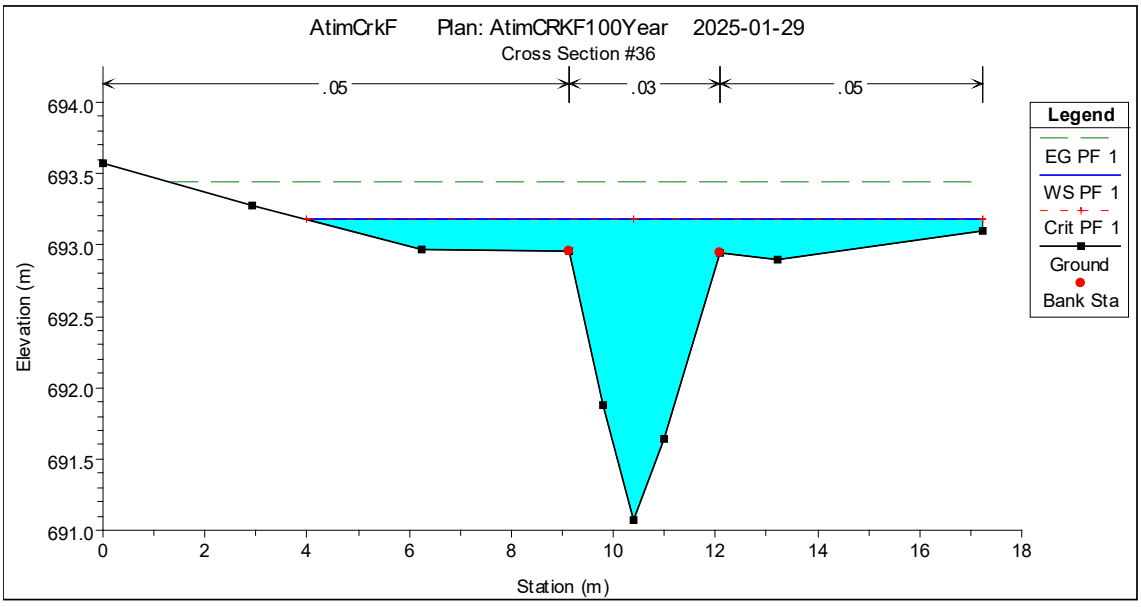

AtimCrkF Plan: AtimCRKF100Year 2025-01-29
Cross Section #26
.05
.03
.05
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
692
691
690
689
688
687
0
5
10
15
20
25
30
35
Station (m)


AtimCrkF Plan: AtimCRKF100Year 2025-01-29
Cross Section #28
.05
.03
.05
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
693
692
691
690
689
688
0
20
40
60
80
Station (m)


AtimCrkF Plan: AtimCRKF100Year 2025-01-29
Cross Section #30
.05
.03
.05
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
689
690
691
692
693
694
695
0
10
20
30
40
50
60


AtimCrkF Plan: AtimCRKF100Year 2025-01-29
Cross Section #32
.05
.03
.05
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
689
690
691
692
693
694
0
10
20
30
40
50
60


AtimCrkF Plan: AtimCRKF100Year 2025-01-29
Cross Section #34
.05
.03
.05
693.5
693.0
692.5
692.0
691.5
691.0
690.5
690.0
Elevation (m)
0
10
20
30
40
50
60
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


AtimCrkF Plan: AtimCRKF100Year 2025-01-29
Cross Section #36
.05
.03
.05
694.0
693.5
693.0
692.5
692.0
691.5
691.0
Elevation (m)
0
2
4
6
8
10
12
14
16
18
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

# 5. Agricultural Impact Assessment

# Agricultural Impact Assessment

## Stony Plain Industrial Lands
## Area Structure Plan

Prepared For

Stony Plain Lands Inc.

Prepared By

Serecon Inc.

August 2025

August 29th, 2025

Stony Plain Lands Inc.
C/O: Scheffer Andrew Ltd.
Kyle Miller, Project Planner
#310, 4803-87th Street
Edmonton, AB
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**RE: AGRICULTURAL IMPACT ASSESSMENT: STONY PLAIN INDUSTRIAL LANDS**

Please find attached our Final Report reviewing the agricultural impact of development of the Stony Plain Industrial Lands Area Structure Plan. We have reviewed the potential for conflict of new development with agricultural uses, outlined the anticipated impact on the agricultural community, and included recommendations for impact mitigation.

Yours truly,
SERECON INC.



Robert Burden, CVA, P.Ag., MBA
Edmonton Office

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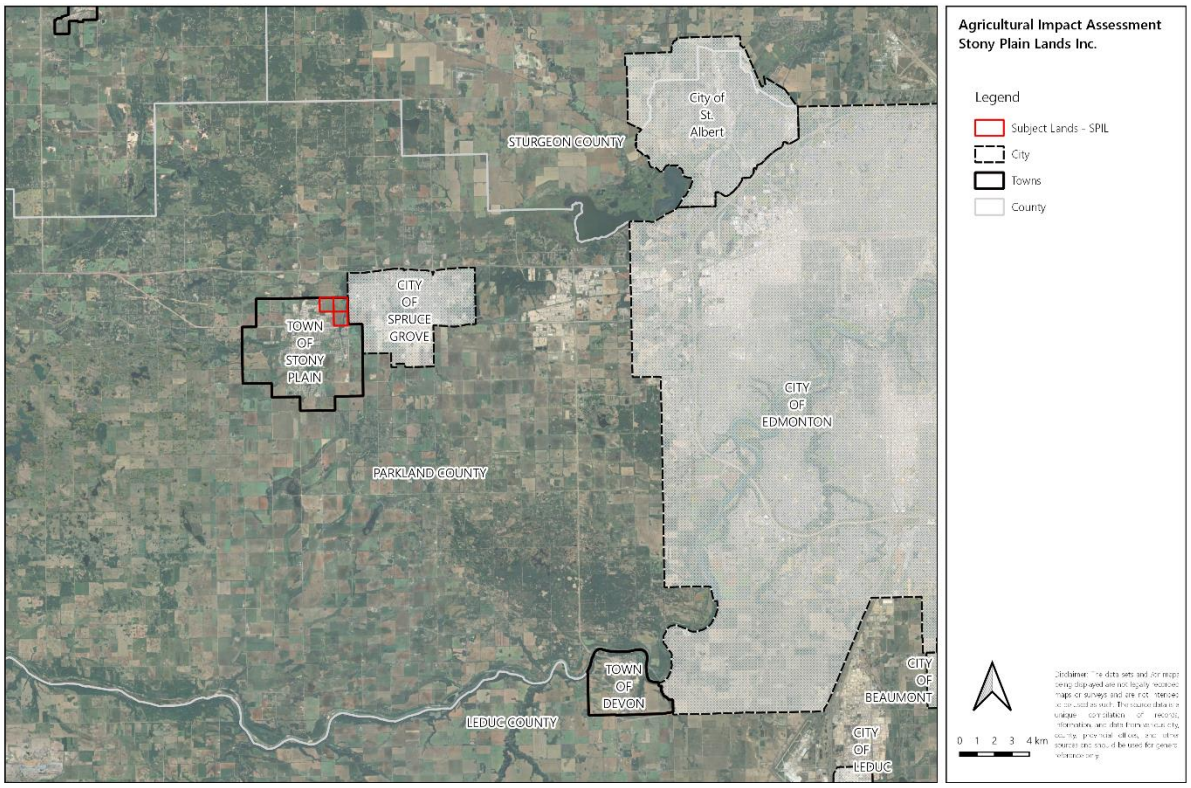
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# 1.0 Introduction

## 1.1 Location

This agricultural impact assessment ("AIA") has been prepared for the area currently being described as "Stony Plain Industrial Lands" and outlined below. The area encompasses the northeast portion of the Town of Stony Plain, in Central Alberta, Canada. This area is referred to simply as the subject area, subject lands, the ASP, or as SPIL (Stony Plain Industrial Lands) throughout this report.

Figure 1: General Location of SPIL - Area Structure Plan




The subject area is located north of Highway 16A and south of Highway 16. The area is bordered to the west by Range Road 280 (Golf Course Road) and bordered to the east by Range Road 275 (Veterans Boulevard).

The area includes only lands designated as Future Development (FD). The Town Planning documents, and the designation applied within the subject area will be further discussed in Section 2.0 of this report.

## 1.2 Scope of AIA

We were retained to produce this Agricultural Impact Assessment (AIA) to assess the impact of development in the study area on agricultural production in the region. The Town of Stony Plain specifies in its 2020 Municipal Development Plan that: *"The Town will require the completion of an agricultural impact assessment for Areas of Future Urban Development, which must identify the potential adverse impacts of*

*proposed development on agricultural lands and existing agricultural operations, both on-site and on the surrounding area; and include recommended mitigation measures to incorporate into the planning, design and staging of development to minimize impacts and conflicts with surrounding land uses"*[1].

We supplemented, and adhered to these guidelines using the analysis components that Leduc County developed and employs. We have therefore assumed that the minimum requirements for an AIA include the following:

1. Review of land use planning documents
2. Size, configuration, and accessibility of parcels
3. Soil analysis, drainage
4. Soil maps
5. Suitability of proposed concept
6. Inventory of current property
7. Impacts on current and neighbouring lands:
    i. Fragmentation and conversion
    ii. Impact on agricultural lands
    iii. Loss of agricultural services
8. Final summary, including recommendations on mitigation or qualifications

An Agricultural Impact Assessment may on some occasions also require other professionally prepared reports upon request by certain parties, including biophysical, geotechnical, hydrogeological, environmental, floodplain, or servicing studies. However, under the circumstances of the current stage of development and consideration of the overall area structure plan, none of these additional reports should be required in the context of an AIA for the SPIL. The assessment was conducted without accessing the said lands directly, but rather based on existing knowledge and available information.

1 Bylaw 2631/D&P/20 Uniquely Stony Plain Municipal Development Plan 2020. Policy 6.8.d.

# 2.0 Existing Planning Documents

## 2.1 Town of Stony Plain

The following section will outline the implications of current planning documents and bylaws on the subject area. Table 1 shows current designations from various Town of Stony Plain land use policies. Note that relevant inter-municipal policies are discussed in Section 2.2. These planning documents and policies are each a part of establishing and realizing the overall vision and strategy for the region.

Table 1: Town of Stony Plain Land Use Policy Documents

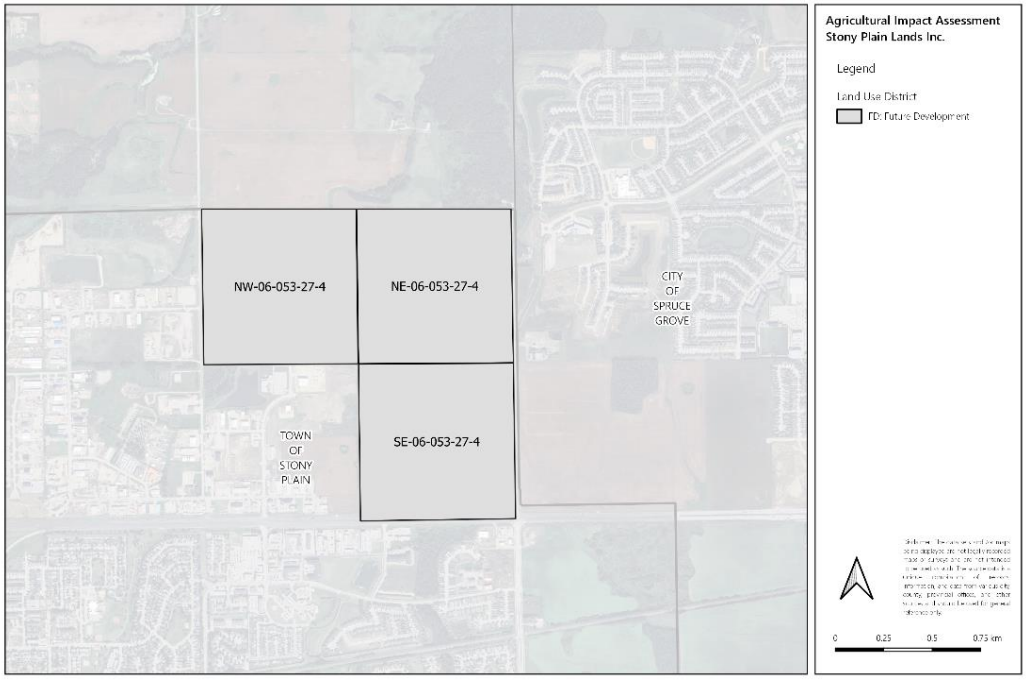
| Policy | Subject Designation(s) |
|---|---|
| Land Use Bylaw | Future Development (FD) |
| Municipal Development Plan | Employment Lands, Areas for Future Urban Development |
| Strategic Plan | Town-wide strategy document, no designations |

### Land Use Bylaw

The Land Use Bylaw (LUB) is the most specific of the land use planning documents and is used to implement the vision of broader planning documents through specific land districts or zones with certain regulations for appropriate land uses.

All the land within the subject area is zoned as FD (Future Development) to accommodate future urban growth. "*This district reserves those areas within the municipality which are rural in character until such time that the land is required for urban purposes. Development must be consistent with the future development concepts within the Municipal Development Plan. The redistricting of land to other land use districts will normally occur subsequent to the approval of an area structure plan and prior to the endorsement of a proposed subdivision*".

Figure 2: Land Use Bylaw (2886/LUO/24) Land Use Districts for SPIL ASP



Within the NW-06-53-27-4 quarter section of the Subject Lands there is an area specified to allow for *Limited and Temporary Medium Industrial Uses.* This allowance specifies:
*"A development permit under Section 2.17.5.6.a. may only be issued and valid: until December 31, 2026, unless an area structure plan is approved for the subject area that supports a Medium Industrial use; and when the use does not require servicing"*[2].
This un-serviced use, appearing to be a landscaping materials processing and storage site, will either be included in the SPIL ASP or if not, will have its Development Permit revoked at the end of 2026.

### Strategic Plan: 2024-2027

The Town Council last adopted a Strategic Plan for 2024 to 2027, which is based on the Town's existing vision: "A Connected Community…Embracing the Future". The strategic commitments and key actions identified in the Strategic Plan provide a framework by which the Town's Corporate Plan, with a higher resolution of actions and resource allocation detail, is designed and operationalized. The five Strategic Pillars, presented in no order of importance, are as follows:

- Governance & Partners;
- Community Development;
- Supportive Infrastructure;
- Economic Opportunity;
- Environmental Responsibility.

### Municipal Development Plan 2020 – *Uniquely Stony Plain*

The Municipal Development Plan (MDP) is a comprehensive, town-wide plan used to strategize development and plan for the coordinated future needs and vision for the Town. The five themes align with the Strategic Pillars of the Strategic Plan and include a set of twenty-one directions, each with multiple specific policies included.

Lands with the following designations are situated within the subject area:

1. **Employment Areas** – are dedicated locations for a variety of industrial and office-based businesses that benefit from convenient access to the regional transportation network;

## 2.2 Edmonton Metropolitan Region

The Town of Stony Plain is a prominent member of the Edmonton Metropolitan Region Board (EMRB) and there are several EMRB strategy documents whose scope covers the subject area. These documents will be discussed and considered in connection with the City documents outlined previously.

### Regional Growth Plan

The Edmonton Metropolitan Region Board Growth Plan (Growth Plan) is a multifaceted policy framework document with several guiding principals to be used to steer local governing bodies towards making development policies which are coherent within the region and enhance the effectiveness of individual municipalities' efforts.

2 Town of Stony Plain Land Use Bylaw 2686/LUO/24. Section 2.17.5.6.b.

The Growth Plan is an important strategy document, but it is recognized that it is broader in scope than local municipality documents and it may not fully reflect the nuance of a particular local area or specifically address individual areas the way a land use bylaw would. For this reason, we have listed all of the policy areas within the Growth Plan and the specific objectives on the policy areas deemed more relevant to the subject area for the purposes of this Agricultural Impact Assessment.

Key Growth Plan policies and principles are outlined to contextualize the intention of the growth plan with respect to the subject area.

**Policy Group 1:** Economic Competitiveness and Employment

**Guiding Principle**: Promote global economic competitiveness and regional prosperity

**Policy Group 2:** Natural Living Systems

**Guiding Principle:** Protect natural living systems and environmental assets

**Policy Group 3:** Communities and Housing

**Guiding Principle**: Recognize and celebrate the diversity of communities and promote an excellent quality of life across the Region

**Policy Group 4:** Integration of Land Use and Infrastructure

**Guiding Principle**: Achieve compact growth that optimizes infrastructure investment

**Objectives:**

1. Establish a compact and contiguous development pattern to accommodate employment and population growth
2. Enable growth within built-up urban areas to optimize existing infrastructure and minimize the expansion of the development footprint
3. Plan and develop greenfield areas in an orderly and phased manner to contribute to complete communities
4. Plan for and accommodate rural growth in appropriate locations with sustainable levels of local servicing
5. Plan for and develop mixed use and higher density centres as areas to accommodate population and job growth
6. Prioritize investment and funding of regional infrastructure to support planned growth
7. Ensure compatible land use patterns to minimize risks to public safety and health

**Policy Group 5:** Transportation Systems

**Guiding Principle**: Ensure effective regional mobility

**Policy Group 6**: Agriculture

**Guiding principle:** Ensure the wise management of prime agricultural resources

**Objectives:**

1. Identify and conserve an adequate supply of prime agricultural lands to provide a secure local food source for future generations
2. Minimize the fragmentation and conversion of prime agricultural lands for non-agricultural uses
3. Promote diversification and value-added agriculture production and plan infrastructure to support the agricultural sector and regional food system

The policies, principles, and objectives of the Growth Plan generally indicate that agricultural lands and uses should be managed wisely to ensure an adequate supply of productive land remains into the future. Soil quality and productivity tend to be the emphases for priority of preservation with secondary considerations for socioeconomic and cultural values.

### Regional Agriculture Master Plan

Work on the Edmonton Metropolitan Region Board's Regional Agriculture Master Plan (RAMP) was initiated in 2018. This master plan and the accompanying land evaluation and site assessment (LESA) tool were completed in 2021, adopted by the Edmonton Metropolitan Region Board in August of 2021 and endorsed by the Province of Alberta in late 2022. RAMP is now formally included as an amendment to the EMRB's Growth Plan and policies are in the process of being applied to achieve the agricultural policy objectives.

The subject area falls within RAMP's Policy Area 3 which has the explicit intention of *Agriculture in Future Transition Lands*. This policy area has the goal that the agricultural lands in the vicinity of built-up urban area be kept in production and managed under principles of good land and environmental stewardship until required for future growth.

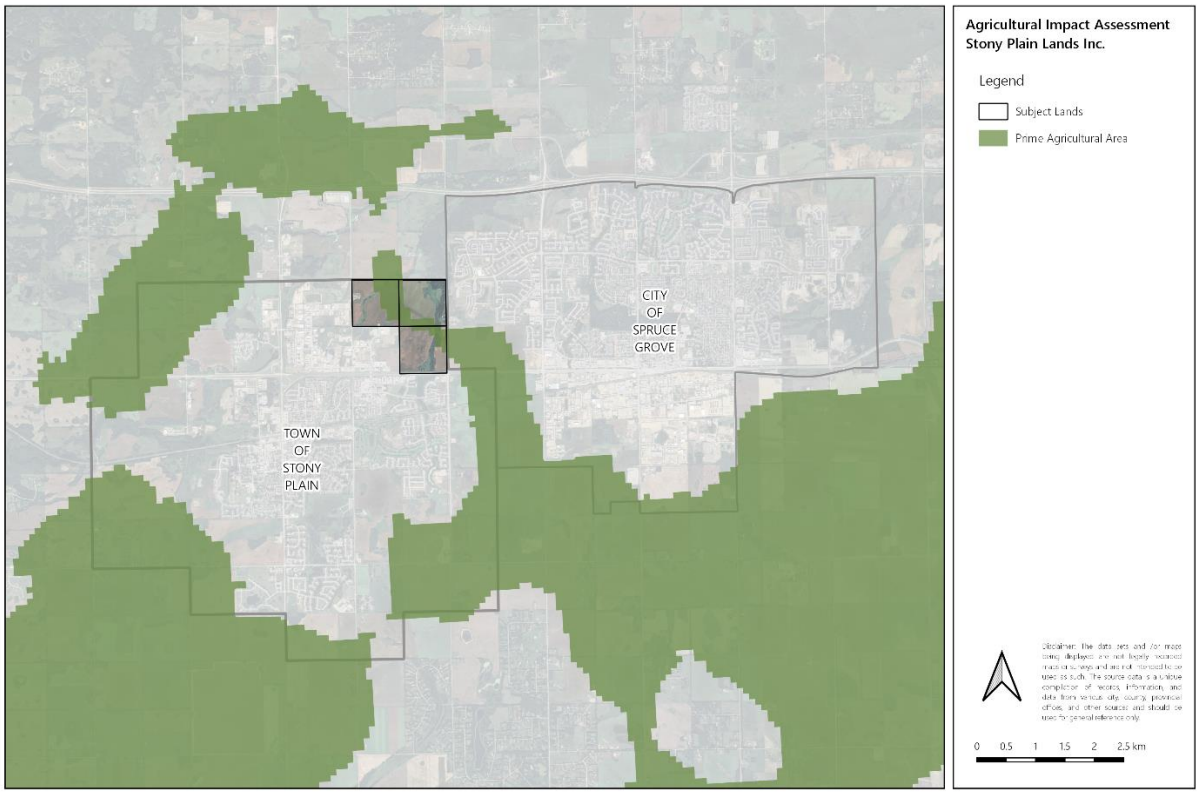
The following 5 policies are specified for lands within RAMP's Policy Area 3:

1. Agricultural lands in Policy Area 3 will remain in agriculture use until the lands are needed for population and/or employment growth.
2. Subdivision and development should be limited to maintain large parcel sizes to support ongoing agricultural uses until the lands are needed for population and/ or employment growth.
3. Until the lands are needed for population and/or growth, agricultural producers must have access to their agricultural lands to farm their lands. This includes but is not limited to maintaining field approaches and local roads sufficient to accommodate agricultural machinery.
4. Consideration must be given to public education about the daily and seasonal operational needs of agriculture and agricultural operators, to increase awareness and understanding and reduce conflict.
5. Existing agricultural uses shall be given consideration to be kept as an existing land use supported by an urban agriculture plan.

RAMP also identified prime agricultural areas in the first three Policy Areas using a Land Evaluation Site Assessment (LESA) model which considered soil quality, agricultural land density, and parcel fragmentation. A corridor through the Subject

Lands was identified as part of the prime agricultural area (Figure 3). Despite these areas overlapping with the Subject Lands, the lands are not formally included as Prime Agricultural Lands. This is due to the RAMP application of LESA, which only applies Prime Agricultural Land policy to those parcels with a majority (>50%) of area within the Prime Agricultural Area. The undeveloped other three corners within the Town of Stony Plain include parcels determined to be Prime Agricultural Lands.

Figure 3. LESA-Identified Prime Agricultural Area and the SPIL ASP Lands




Source: Edmonton Metropolitan Region Board. EMRGIS. Prime Agricultural Areas. June 2021.

# 3.0 Area Description

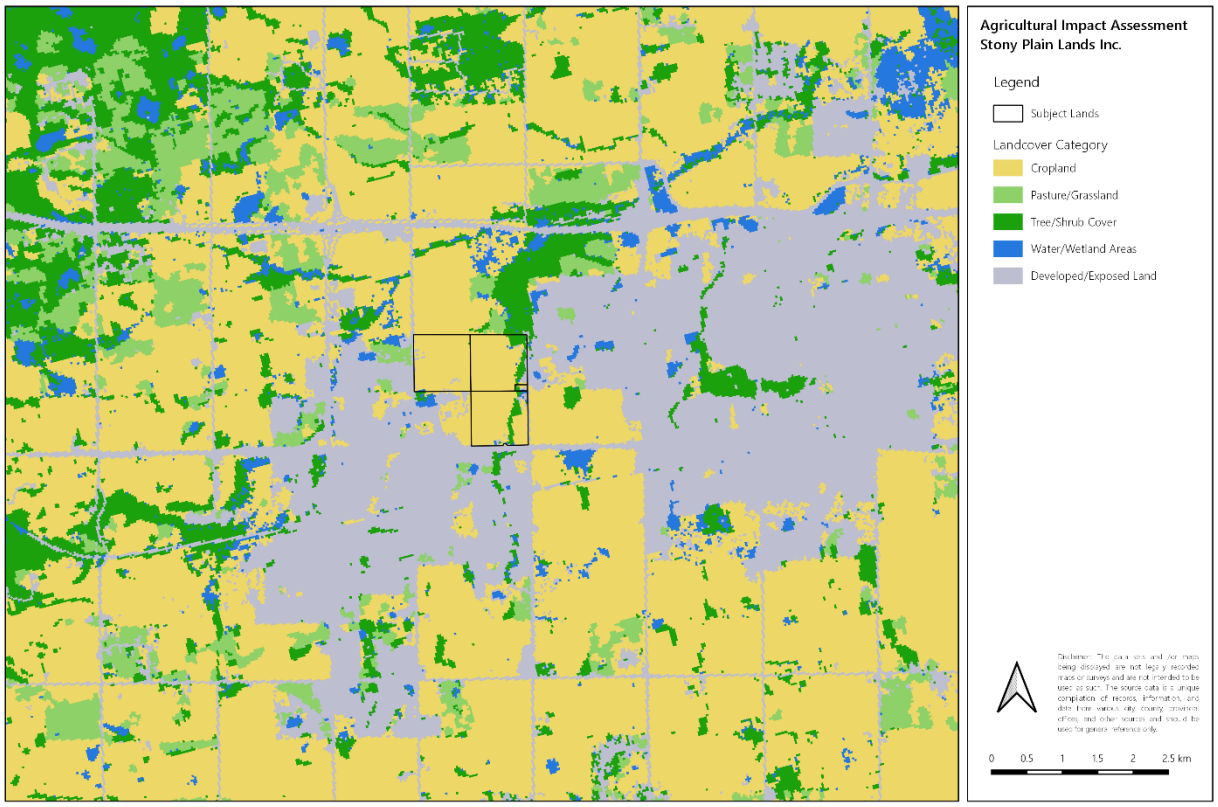
## 3.1 Regional Influences

The land in the SPIL, is almost entirely actively being used for annual crop production. This section will examine the various features and current uses of the land in the subject area.

### Current Land Use

Figure 4 below shows land use estimates derived from remote sensing and modelling, sourced from Agriculture and Agri-Food Canada's Annual Crop Inventory for the year 2020. The black parcel boundaries indicate all parcels within the study area as of October 25, 2024.

Figure 4: Remote Sensing-based Agricultural Crop Inventory (2023)




Source: Agriculture and Agri-food Canada. Annual Crop Inventory 2023.

Annual crop production is the dominant land use within the subject area, with a bisecting tributary of Atim Creek encompassing the treed north to south corridor on the eastern edge of the SPIL. The subject area is bounded to the east, south and west with developed land within the Town of Stony Plain and the City of Spruce Grove. To the north is a mixed area of cropland, pasture and trees. To the south, beyond the Town, is a large area of cropland.

The aerial imagery in Figure 5 below displays a visual of the land use pattern noted above. Imagery indicates there is an existing drainage path in the NW quarter

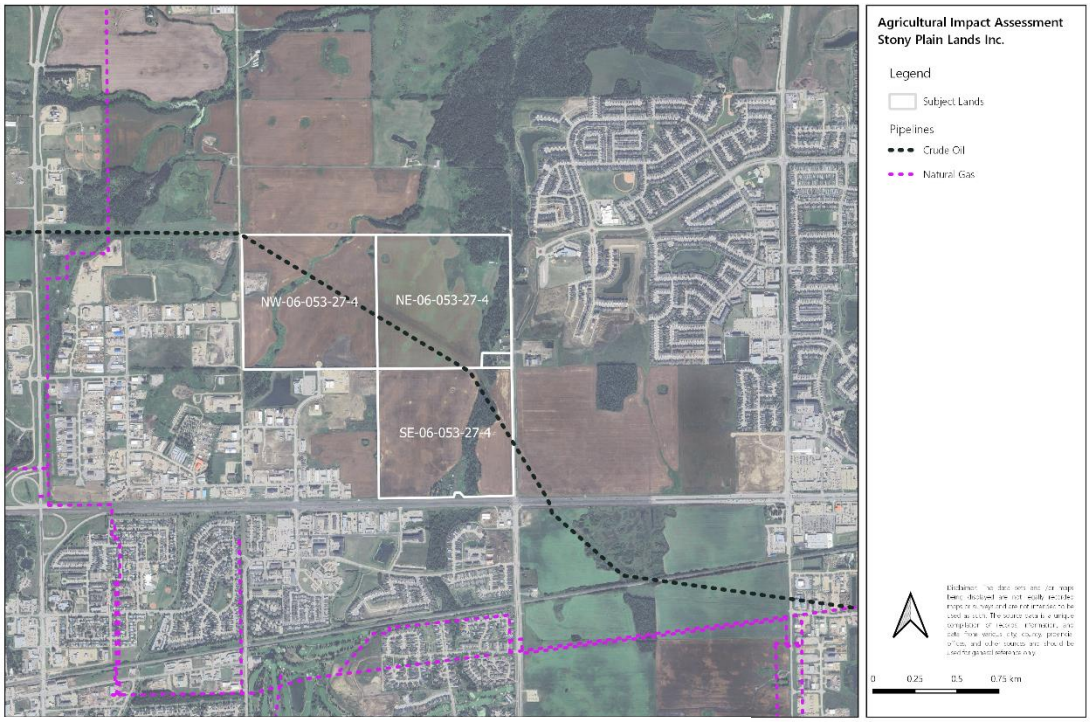
section and confirms the medium industrial use noted in the LUB (section 2.1). The dark path crossing the subject lands was confirmed as lands recently disturbed for the construction of the transmountain pipeline expansion (Figure 6). This line transports crude oil to the west coast terminal in Burnaby BC.

Figure 5: Aerial Imagery and 2024 Parcel Boundaries




Source: Google Imagery. 2024.

Figure 6: Pipeline Crossing the SPIL




Source: Alberta Energy Regulator. Pipeline Spatial File. Accessed: October 28, 2024

## Access and Transportation

The primary access to the subject area is from Highway 16A via several local access roads (Veterans Boulevard, Golf Course Road and Keystone Drive). Of the three access roads, only Golf Course Road is gravel. The approximate driving distances and times to nearby communities are shown in the table below.

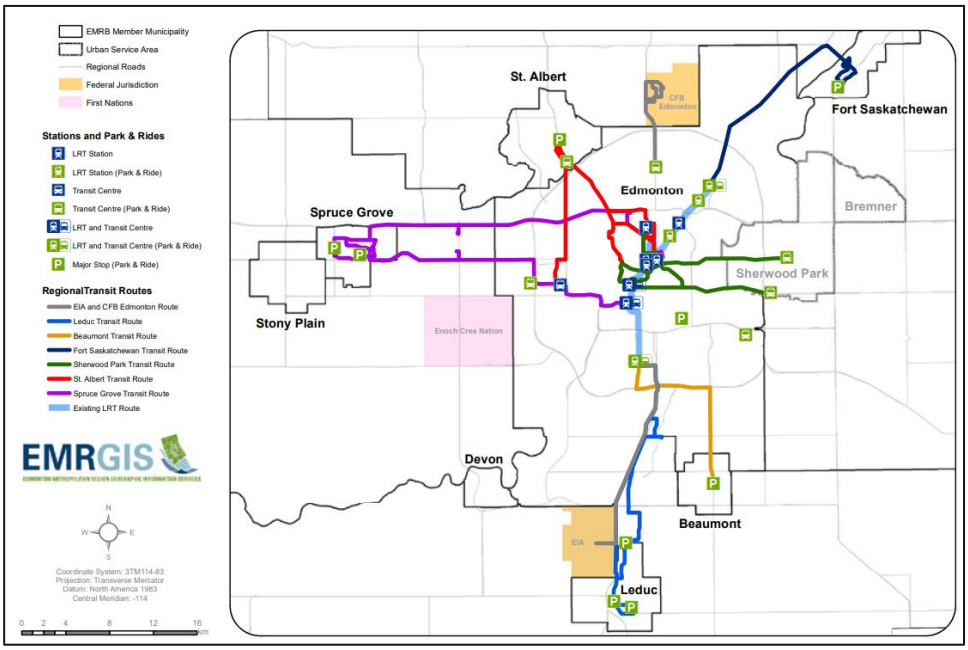
Table 2: Estimated Driving Distances within Region

| Community | Approximate Distance | Approximate Time |
|---|---|---|
| Stony Plain | 0-2 km | 1 min |
| Spruce Grove | 2-5 km | 5 min |
| Acheson | 12 km | 15 min |
| Northwest Edmonton (Hwy216) | 20 km | 20 min |
| Downtown Edmonton | 30 km | 30 mins |

While the above table is approximate in times and distances, it shows the accessibility of the subject area to nearby communities and indicates a high potential for businesses within the subject area to attract workers residing in regional communities and the cost-effective procurement of services from regional businesses.

Public transportation within the region (Figure 7) indicates no direct current public transportation access to the subject area.

Figure 7. Regional Transit Routes




Source: Edmonton Metropolitan Region Board. 2019. *Metropolitan Region Servicing Plan Report.* Page 84.

## Business and Economic Influences

There are no apparent agri-businesses based within the subject area, but many small to medium-sized local businesses within the broader surrounding area. Businesses within 25km of the subject who are within the agricultural sector or who serve the agriculture sector include:

- Apiary
- Butcher and custom meat packing/wrapping
- Cattle Breeder
- Cow-calf Cattle Operations
- Commercial/custom transport services
- Dairy production
- Electrical services
- Equine boarding and training facilities
- Equipment and automotive repair services
- Excavation services
- Farm Equipment Sales
- Fertilizer Distributors
- General contracting and construction
- Grain farming
- Grain Elevator (Viterra – Acheson)
- Greenhouse Facility
- Horticultural Operations (market gardens and berry u-picks)
- Poultry Farms (commercial and small flock)
- Seed and Table Potato Farms
- Seed Cleaning Facility (Stony Plain Seed Cleaning Co-op Ltd)
- Sheep and Goat Farms (commercial and small herd)
- Sod Farms

The businesses listed above are not based directly out of the subject area, and therefore, the following discussion on the potential impact will focus on indirect impacts as opposed to direct impacts of development.

Many of the businesses listed above would draw clientele from multiple sectors and not only from the agricultural industry. In addition, the specialized nature of these businesses would require them to draw from a relatively large geographic area (including areas well beyond Stony Plain and Parkland County's boundaries).

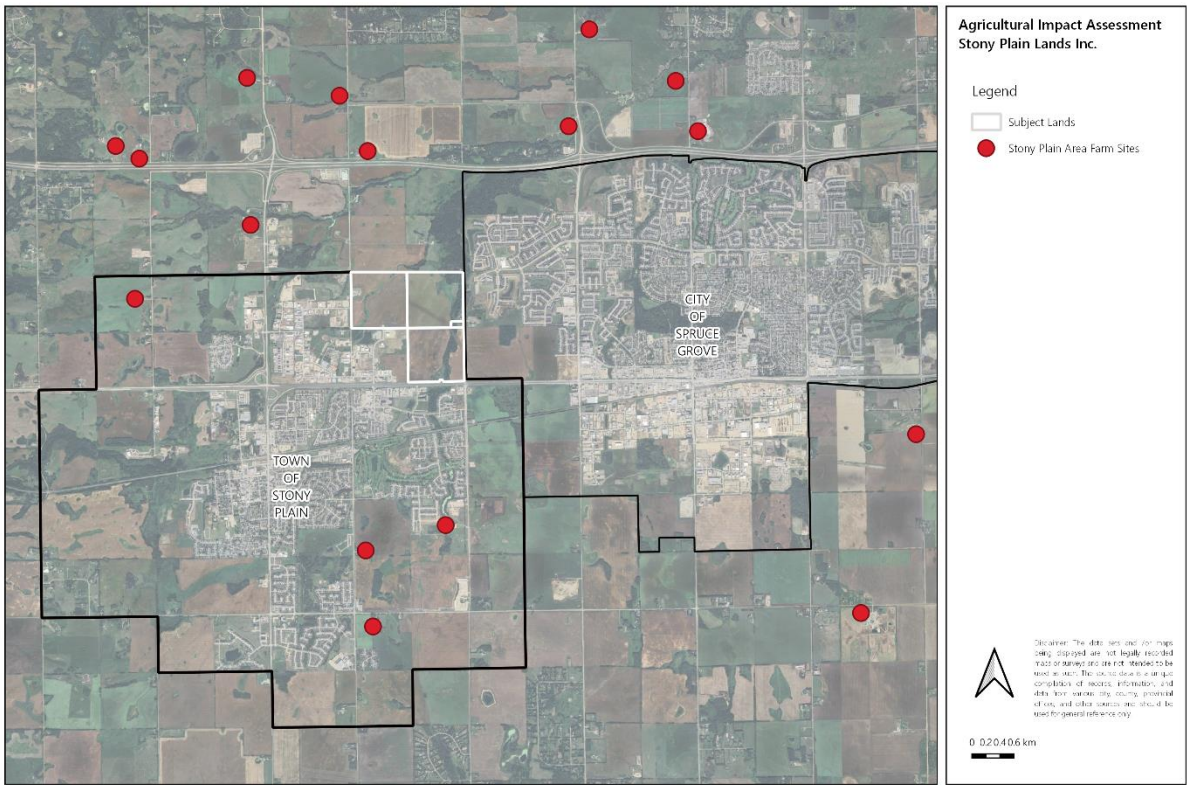
Considering these factors, it is unlikely that a conversion of subject lands from agriculture to commercial, industrial, and residential development would have a noticeable impact on these businesses.

When the entire subject area is converted out of agricultural use, agri-businesses that supply inputs would face a very small decrease in business volume. Input providers typically supply large regions and so the loss of the subject area would not have any significant negative impact on these regional agribusinesses.

### Regional Farm Sites

With no active farm sites within the subject area, all agricultural land is managed by farm enterprises with primary farm sites located outside the subject area. There are many farm sites representing different sized operations within 10km, one or multiple of which may be the current tenant farmer(s) of the subject area lands. These farm sites include operations with a combination of grain, seed potato, dairy and beef cattle enterprises.

Figure 8. Regional Farmsites within 10km of the SPIL



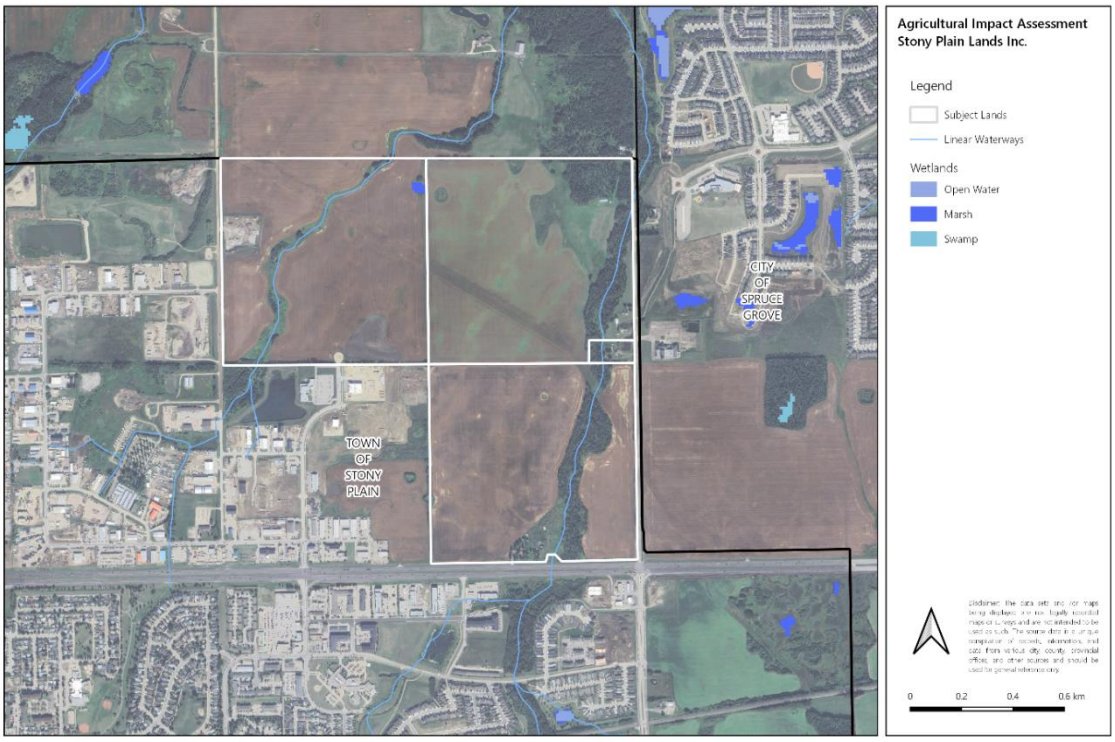

## 3.2 Physical Features

The aim of this section is to provide an overview of the predominant physical features of the subject area. As physical features inherently influence a region there is some overlap in concepts of this section and the previous section Regional Influences (3.1). These sections are meant to be taken into consideration together in providing an overall summary of the subject and surrounding area.

### Topography and Drainage

The land within the subject area is gently undulating with limited pockets of riparian, wetland, and natural treed areas. Atim Creek bisects the two eastern quarter sections and flows north and eventually into the Sturgeon River. One small ephemeral stream bisects the northeast quester section and joins Atim Creek to the north of the subject area. A single marsh wetland is found within the northwest quarter section, though depressions with ephemeral wetlands are also evident within imagery for the northeast quarter section.

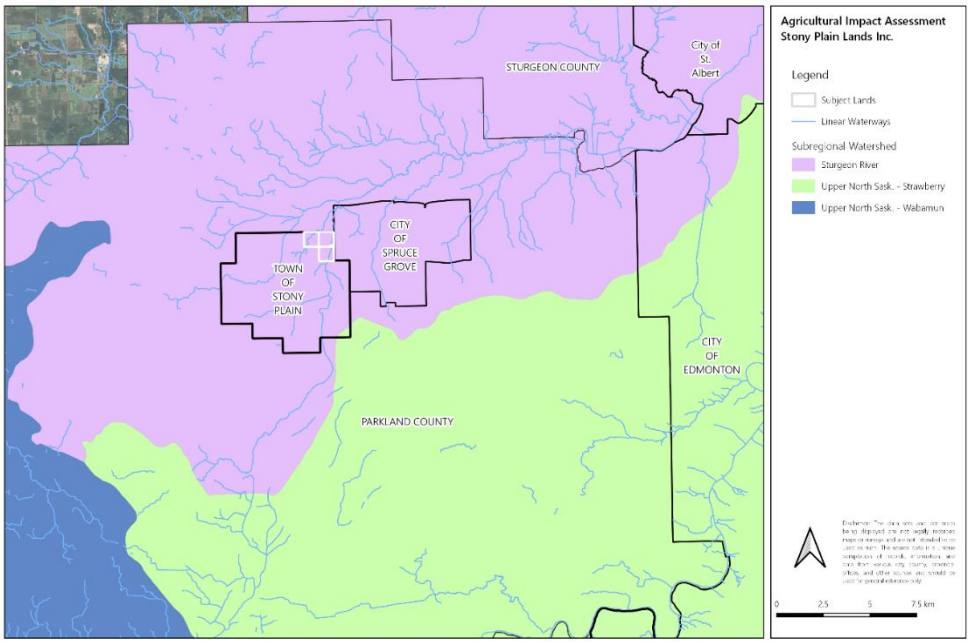
Figure 9. Waterways and Wetland Areas




Source: Alberta Biodiversity Monitoring Institute. 2021 Wetland Inventory.

CSSC classifies the area's dominant drainage as ranging from well to moderately well. This classification applies to 100% of the surface area within the particular classification region. The subject area is within the Sturgeon River sub-watershed of the North Saskatchewan River Watershed. A regional watershed map from EMRGIS is shown in the map below.

Figure 10. Regional Sub-Watersheds



## Soil Productivity Ratings

Soil can be classified and rated using multiple metrics. The Canadian System of Soil Classification (CSSC) and the Land Suitability Rating System (LSRS) classifications for the subject area will be discussed in this section.

### 1. Canadian System of Soil Classifications

The following description of the Canadian System of Soil Classification was retrieved from the Canadian Society of Soil Science.

In each area over the period of soil formation, environmental conditions cause a certain set of soil processes to occur, which leads to a distinctive set of soil horizons at the time the soil is observed. These soil horizons are the basis for classifying the soil in the Canadian System of Soil Classification. The Canadian System is a rigorous taxonomic system (taxonomy is the science of classification). The System is a comprehensive method for assigning pedons to the soil classes; if the system is correctly used, a pedon can only be assigned to one specific class. The System is also a hierarchical system: each group occupies a distinct position within the overall system. The major levels used in the classification include: Order, Great Group, and Subgroup.

The first level of categorization within the system is the Order. Which Order a given pedon is assigned to is based on properties of the pedon that reflect the nature of the overall soil environment and the effects of the dominant soil-forming process. There are ten Orders in the Canadian System of Soil Classification (shown in Table 4). The system has changed through time, and the last major addition to the system occurred in 1996, when the Vertisolic Order was added to the system.

Table 3: Soil Orders of Canada Descriptions[7]

| Order | Diagnostic Horizon | Comments |
|---|---|---|
| Chernozemic | Ah, Ap, Ahe | A grassland soil whose diagnostic horizon is formed by high levels of organic matter additions from the roots of grasses. |
| Solonetzic | Bn or Bnt | A grassland soil with high sodium levels in the B horizon; usually associated with a clay-rich B horizon and often with saline C horizon material. |
| Podzolic | Bf or Bh | A forest soil normally associated with coniferous vegetation on igneous-rock derived parent materials. High acidity in the A horizon results in formation of a bleached Ae horizon and deposition of iron and aluminum in the B horizon. |
| Luvisolic | Bt | A forest soil found in areas with parent materials derived from sedimentary rocks. Dominant process is eluviation of clay from the Ae horizon and its deposition in the Bt horizon. |
| Brunisolic | Bm | A forest soil whose properties are not strongly enough developed to meet the criteria for the Luvisolic or Podzolic Orders. |

| | | |
|---|---|---|
| Gleysolic | Bg, Cg | Found throughout Canada wherever temporary or permanent water saturation cause formation of gleyed features in the profile. |
| Regosolic | No B horizon | Found throughout Canada wherever pedogenic conditions prevent the formation of B horizons (unstable slopes, sand dunes, floodplains etc.). |
| Vertisolic | Bss, or Css and Bv | Associated with high clay glacio-lacustrine landscapes; characterized by shrinking and swelling of clays. |
| Cryosolic | By, Cy, Cz | A soil of arctic and tundra regions; characterized by presence of permafrost. |
| Organic | O horizon | Organic soils are associated with the accumulation of organic materials (peat) in water-saturated conditions. They are most commonly associated with Boreal Forest soils. |

Great Groups are sub-divisions of each Order. The Great Groups reflect differences in the strengths of the major processes or a major contribution of a process in addition to the major one. For example, if someone describes a Prairie soil as a Dark Brown Chernozem, the Order is Chernozemic (i.e., soils with rich topsoil that developed under grassland vegetation) and the Great Group is Dark Brown, which refers to the surface colour of the soil and reflects an intermediate level of soil organic matter (SOM) additions relative to the lower SOM levels to the south and the higher SOM levels to the north.

Subgroups are subdivisions of Great Groups. They are differentiated on: how closely they correspond to the central concept of the Great Group; intergrading towards soils of another Order; or additional special features within the profile. For example, an Orthic Dark Brown Chernozem reflects the central concept of the Dark Brown Great Group within the Chernozemic Order. In contrast, an Eluviated Dark Brown Chernozem has evidence of translocation of materials between horizons via eluviation and illuviation but does not meet the classification criteria of the Luvisolic Order. [3]

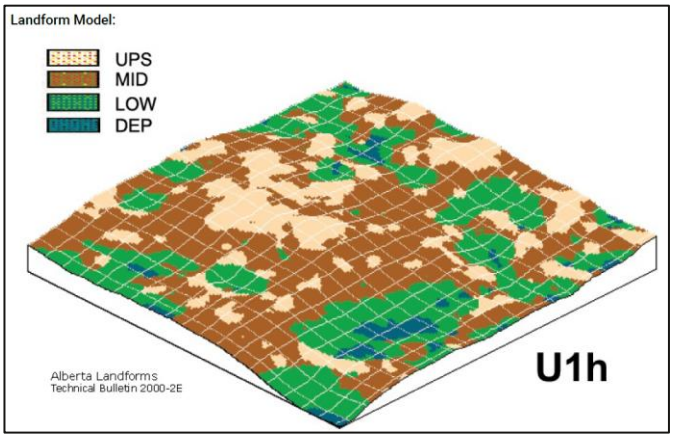
The subject lands are within the Chernozemic soil order, in the Black Chernozem Great Group. The subject area is entirely within the landform model classification: **U1h – Undulating – High relief**, which is described as an "eluviated black chernozem on fine textured materials water-laid sediments. Undulating, high relief landform with a limiting slope of 4%".

[3] Canadian Society of Soil Science, Soils of Canada. soilsofcanada.ca

Figure 11. Example Image of U1h Landform




Figure 12. Landform Model U1h Lands




## 2. Land Suitability Rating System – Suitability for Small Grains

Land Suitability Rating System maps detail the soil types in different regions and rate them based on their suitability for agricultural use, using the following classes and subclasses (Figure 13).[4]

- Class 1 land has no significant limitation for production. (Few lands in Alberta due to heat unit limitations)
- Class 2 land has slight limitations that may restrict the growth of the specified crops or require modified management practices.
- Class 3 land has moderate limitations that restrict growth of the specified crops or require special management practices.
- Class 4 land has severe limitations that restrict the growth of the specified crops or require special management practices or both. This class is marginal for sustained production of the specified crops.
- Class 5 land has very severe limitations for sustained production of the specified crops. Annual cultivation using common cropping practices is not recommended.
- Class 6 land has extremely severe limitations for sustained production of the specified crops. Annual cultivation is not recommended even on an occasional basis.
- Class 7 land is not suitable for production of the specified crops.

[4] Government of Canada, Land Suitability Rating System for Agricultural Crops 1. Spring-seeded small grains. 1995. https://sis.agr.gc.ca/cansis/publications/manuals/1995-lsrs/lsrs.pdf

Figure 13. LSRS Sub-Class Limitation Descriptions

| Land Suitability Rating System Restrictions and Limitations | | | |
|---|---|---|---|
| **General Restriction** | **Subclass** | **Code** | **Limitation** |
| **C – CLIMATE** | Temperature | H | Inadequate heat units for the optimal growth. |
| | Moisture | A | Inadequate moisture for the optimal growth. |
| **S – SOIL** | Water holding capacity/texture | M | Crops are adversely affected by lack of water due to inherent soil characteristics. |
| | Soil structure | D | Crops are adversely affected either by soil structure that limits the depth of rooting, or by surface crusting that limts the emergence of shoots. |
| | Organic matter | F | Mineral soil with a low organic matter content in the Ap or Ah horizon. |
| | Depth of topsoil | E | Mineral soil with a thin Ap or Ah horizon. |
| | Soil reaction | V | Soils with a pH value either too high or too low for optimal growth. |
| | Salinity | N | Soils with amounts of soluble salts sufficient to have an adverse effect on growth. |
| | Sodicity | Y | Soils having amounts of exchangeable sodium suffcient to have an adverse effect on soil structure and/or growth. |
| | Organic surface | O | Mineral soils having a peaty surface layer up to 40 cm thick. |
| | Drainage | W | Soils in which excess water (not due to inundation) limits the production. |
| | Organic soil temperature | Z | Additional temperature limitation associated with organic soils. |
| | Rock | R | Soils having bedrock sufficiently close to the surface to have an adverse effect on production. |
| | Degree of decomposition or fibre content | B | Organic soils in which the degree of decomposition of the organic material is not optimum for production. |
| | Depth and substrate | G | Shallow organic soils with underlying material that is not optimum for production. |
| **L – LANDSCAPE** | Slope | T | Landscapes with slopes steep enough to incur a risk of water erosion or to limit production. |
| | Landscape pattern | K | Land areas with strongly contrasting soils and/or non-arable onstacles that limit production or substantially impact management practices. |
| | Stoniness and coarse fragments | P | Land that is sufficiently stony or gravelly so as to hinder tillage or limit production. |
| | Wood content | J | Organic soils with a content of wood or of Eriophorum *sp.* sufficient to limit production. |
| | Inundation | I | Land areas subject to inundation or flooding that limits production. |

The location of the subject area is outlined on the Land Suitability Rating System map in Figure 14. The LSRS soil capability ratings within the subject area are generally equally or more productive than those in other areas of the County. The ratings and proportions for the SPIL lands are noted in Table 4.

Figure 14. Land Suitability Rating System (LSRS) Ratings for SPIL Area and Region

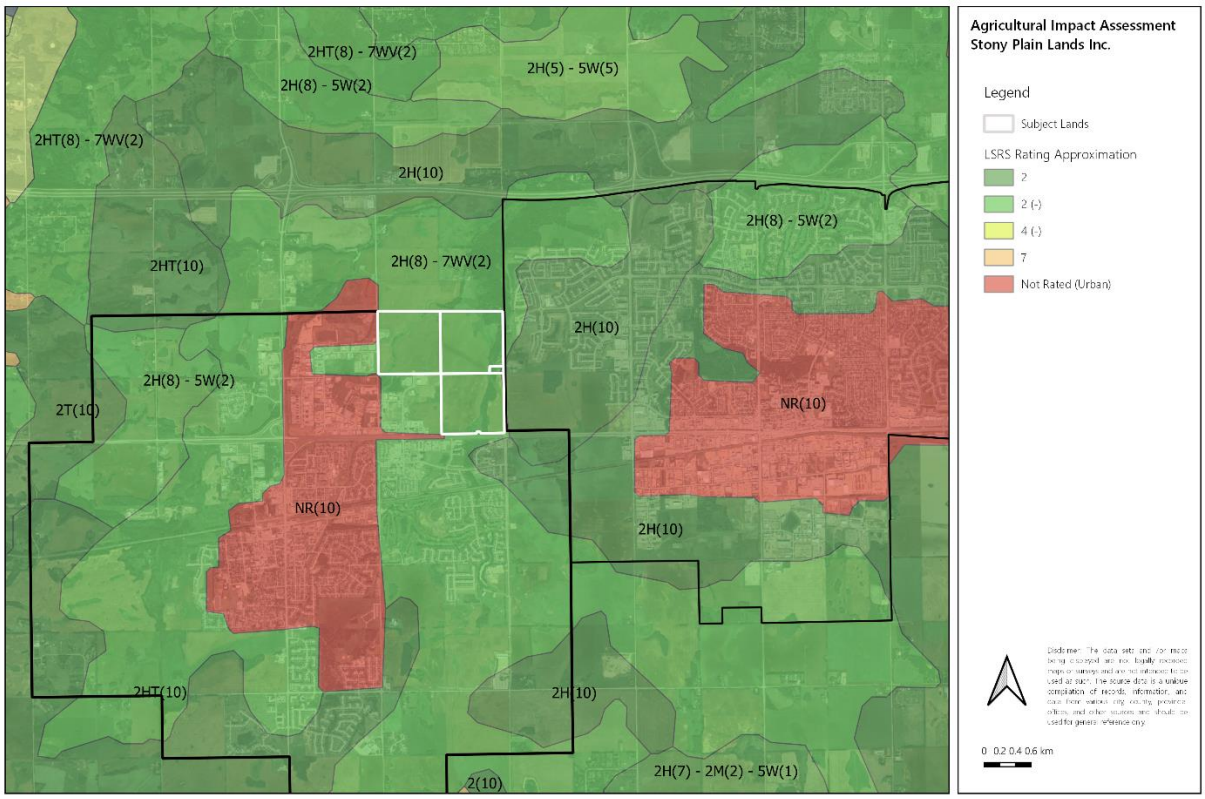



Table 4: LSRS Ratings for SPIL Area

| Acres | Percentage of Subject Area | LSRS Soil Class |
|---|---|---|
| 468 | 100% | 80% Class 2H, 20% Class 7WV |

## 3.3 Land Uses

Annual cropland is currently the dominant agricultural land use with 88% coverage of the subject area. Developed/Exposed land covers 4% of the subject area and consists of several residential properties and one light industrial project as previously noted. The remaining 8% of the subject area consists of treed areas and minor wetland within the Atim Creek corridor.

This following section examines existing agricultural uses, trends and development in greater detail.

### Landcover and Land Use Trends

The subject area is characterized by extensive agricultural land uses, but it is bordered on the east by significant urban development.

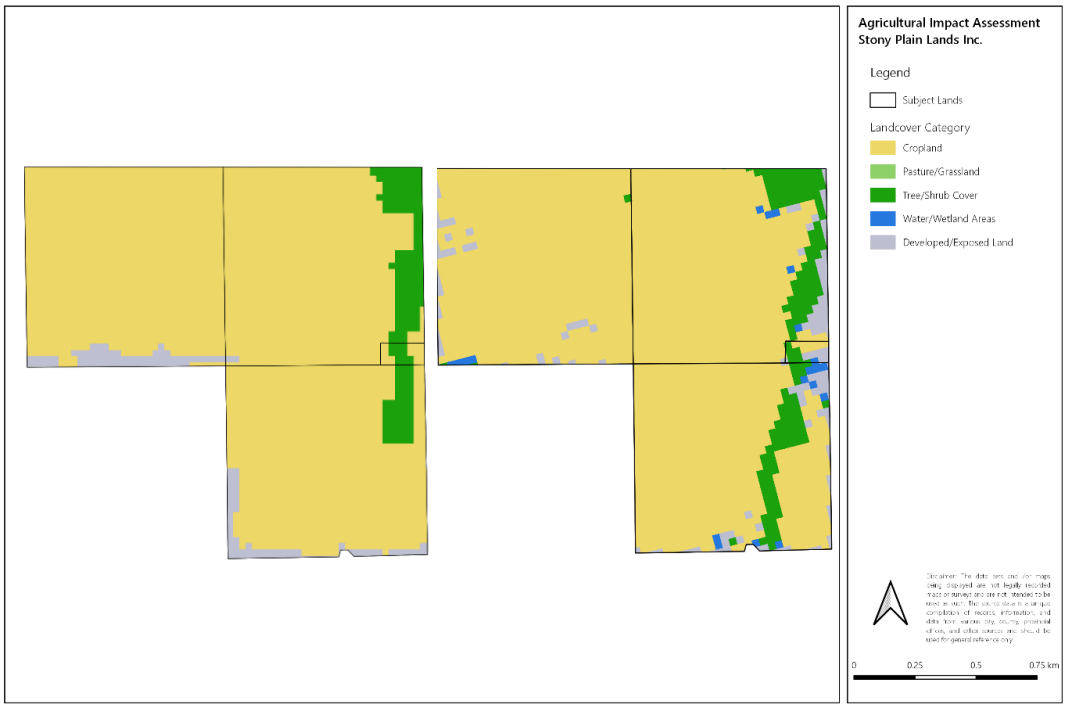
Figures 4 and 5 provide land use information for a single point in time, providing a view of the current agricultural land uses. Land use decisions are however inherently intertemporal and so it is important to also review the trends in land use for an accurate assessment of the state of agricultural use.

Land use trends are assessed by comparing remote sensing landcover data from the year 2000 (Figure 15) to the 2023 landcover data illustrated in Figure 4. Land use did not significantly change within the subject area from 2000 to 2023 (Table 5). The landcover data indicates that there were small shifts in developed area, however these may be a result of improved satellite imagery available for translating data to landcover categories.

Table 5: Land Use Trends within Subject Area

| Landcover | 2000 Acres | 2023 Acres | 2000-20 Change |
|---|---|---|---|
| Developed/Exposed | 18 | 20 | +2 acres (11% increase) |
| Water/Wetlands | - | 4 | +4 acres (NA) |
| Tree/Shrub cover | 29 | 34 | +5 acres (17% increase) |
| Pasture/Grassland | - | - | (NA) |
| Annual Crops | 421 | 409 | -12 acres (3% decrease) |

Figure 15. Remote Sensing Landcover Data 2000 (left) and 2023 (right)

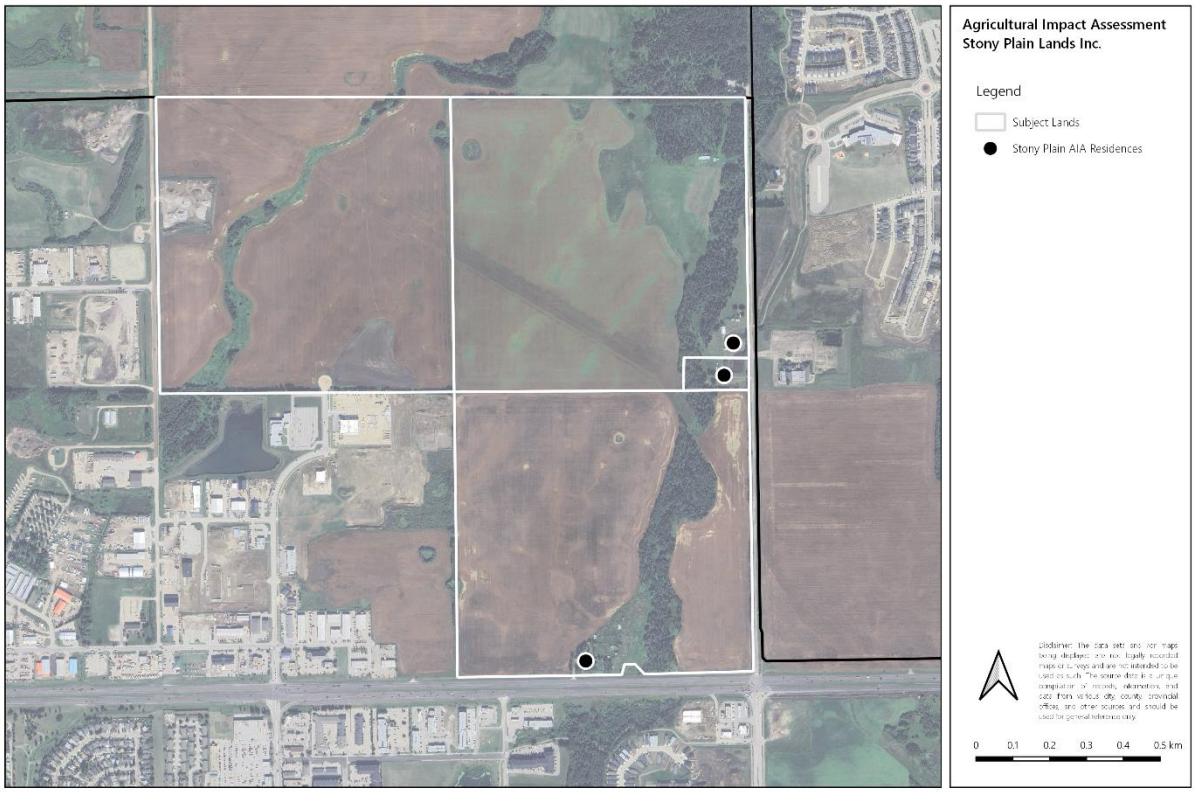



Source: Agriculture and Agri-food Canada. Annual Crop Inventory.

## Existing Development and Permanent Structures

There is notably little residential development in the subject area, with only three residences, which were manually observed for this assessment. All are on aging farm sites that appear minimally active, each with one or two small grain storage bins or aging barns and sheds. These farm sites do not appear to be currently used as a primary or secondary farm location for grain and equipment storage or other active farming activities.

Figure 16. Existing Residences within the SPIL




## Current Agricultural Uses

The current agricultural use of the SPIL area is very similar to the regional agricultural uses. It is dominantly annually cropped, with some low-lying areas that are cropped when dry enough and left to grass in wet years. The map below shows the crops grown within the subject area in 2020, 2021, 2022 and 2023. These maps are derived from data obtained from Agriculture and Agri-food Canada's Annual Crop Inventory, which relies on a combination of satellite imagery and calibrated algorithms to estimate the crop grown across the agricultural regions of the country.

The annual crop rotation in the subject area appears like areas right across central Alberta, dominated by the oilseed crop canola and the cereal crop wheat. It also appears from remote sensing data that barley and peas are part of rotations but are grown less frequently than canola and wheat. This pattern is consistent with the dominant regional crop patterns.

Figure 18. Crop Inventory in the Subject Area, 2020-2023

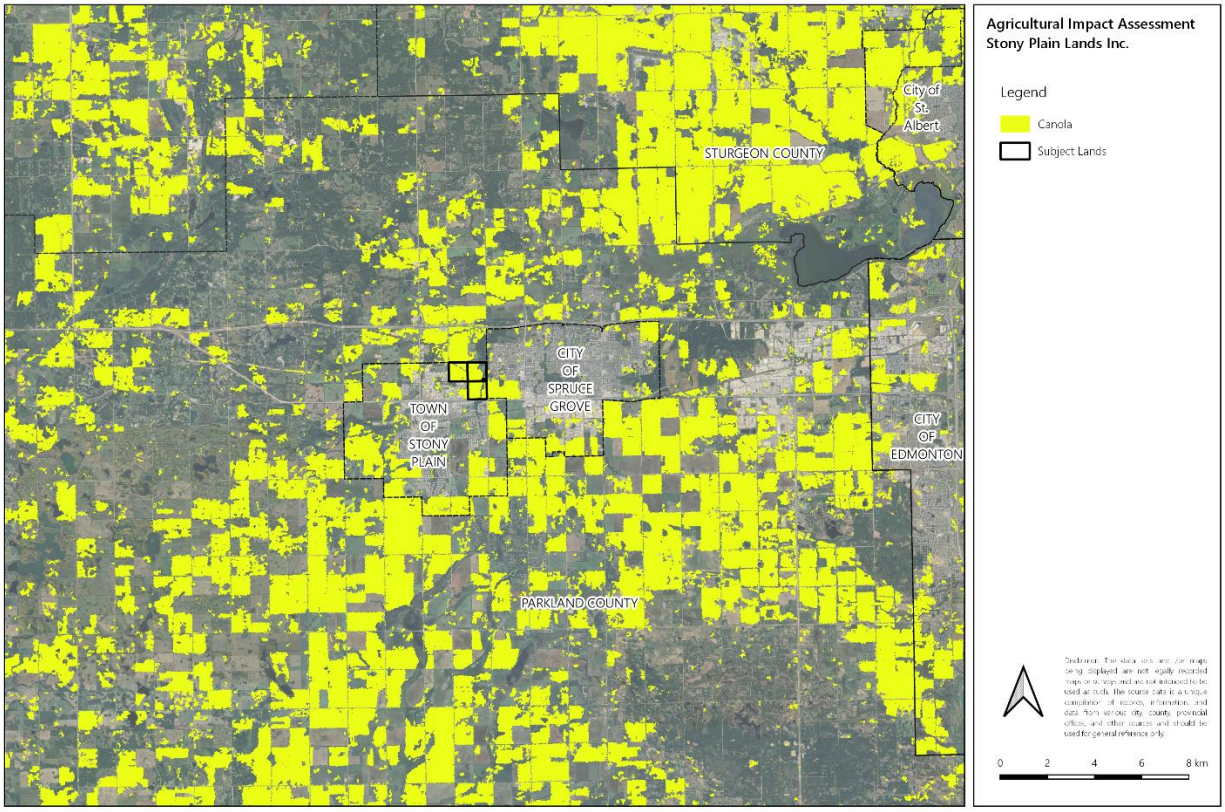



Source: Agriculture and Agri-food Canada. Annual Crop Inventory.

Of the crops grown in the area, canola is, on average the most profitable major annual crop. For this reason and because of canola's agronomic strengths, its presence in a rotation can be used as an indicator of land's crop growth potential. In other words, the absence of canola from the rotation on a field is often used to indicate considerable limitations to production.

Canola is grown across the entire subject area, which further substantiates the high agricultural production potential of the subject lands. The regional map of land which has grown canola between 2020 and 2023 also indicates that the subject lands are part of a scattered regional pattern of high-quality agricultural lands. These lands mostly surround the western, south, and eastern borders of the Town of Stony Plain and City of Spruce Grove.

Figure 19. Canola Fields 2020-2023, within Region Surrounding SPIL

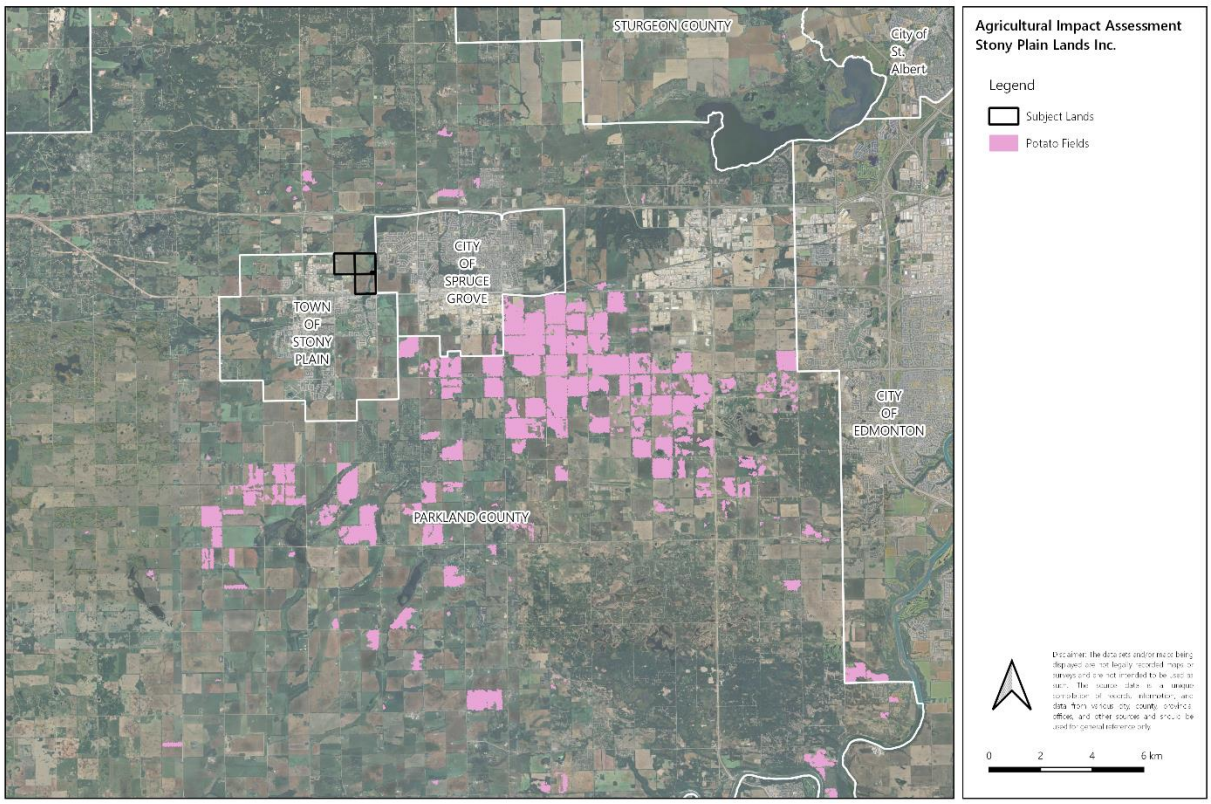



Source: Agriculture and Agri-food Canada. Annual Crop Inventory.

The region surrounding the SPIL is also one of two portions of the EMR where seed and table potatoes are grown. This major specialty crop is produced within annual crop rotations on land suitable for the intensive cultivation required for potatoes production activities. Seed and table potatoes therefore have a suitable land base that is more constrained than major annual crops such as canola, wheat or barley. When considering the regional economic impacts to the agricultural industry, it is therefore important to consider the impacts of converting land suitable for potato production out of agricultural use.

Figure 20 illustrates the high concentration of potato fields south and southeast of the City of Spruce Grove. This current distribution of land used for potatoes shows that the SPIL lands are not part of the potato production land base.

Figure 20. Potato Fields 2019-2023 in the Region Surrounding the SPIL




## Agricultural Equipment Movement

To be used actively for annual crop production, each field will typically need to be accessed at least 3-5 times per year for crop management activities. The primary activities include seeding, crop protection (spraying), and harvest. Each activity is typically undertaken by large equipment that requires access with adequate height and width accessibility. Therefore, to continue to be effectively farmed, suitable access to such large equipment for each portion of the agricultural land base will need to be maintained.

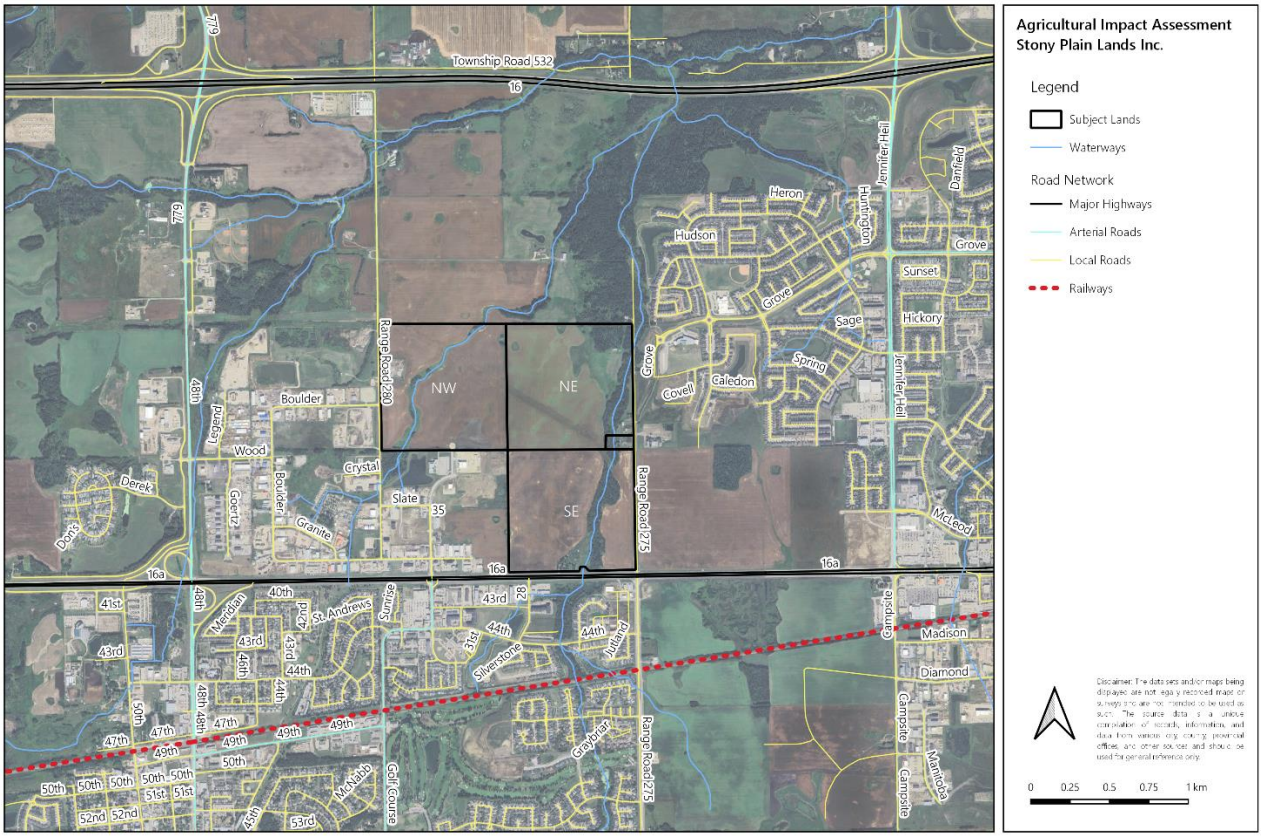
The study area has somewhat restricted access to agricultural parcels, due to the two bisecting waterways with no suitable equipment crossings. There is no impact from the rail line to the south.

The northwest quarter section has multiple access options which are all dependent on Range Road 280. The field on the northwest side of the waterway is cropped with the parcel north of the subject lands and has multiple suitable access points. The field across the waterway is cropped separately and is reliant on access either through the residential property to the north of the subject area, through the existing commercial development via Keystone Drive, or through the northeast quarter section.

Similarly, access to the northeast quarter section is constrained to either through the southeast portion of the northwest quarter section, or through the southeast quarter section. There is possible access through the northeast corner of the subject area, however the access appears to be insufficient for large agricultural equipment.

Access to the southeast quarter section is via a single approach off Range Road 275 (Veterans Boulevard) for the eastern portion, and via the residential approach off of Highway 16A for the western portion. The western portion has the additional option of access through the northeast quarter section, however the eastern portion does not.

Figure 21. Roadways and Railways within and surrounding the SPIL




Considerations should be given during development to ensuring that access is maintained to parcels that remain in agricultural use. Agricultural producers in this region will need to access their fields with very large implements that require access primarily from the months of May to October.

Development activity during this time of year will need to consider that access to some fields can only be had from a single side or even a single approach, either from gravel or paved roads. Farm implements can also be very tall in transport modes, so the location of temporary detours and temporary powerlines should consider this impact on agricultural producers accessing the subject area.

Given the landscape position there should be no agricultural producers transiting through the subject area to access agricultural parcels outside of the subject area and so the focus need only be on maintaining access to the interior agricultural parcels intended for later development.

# 4.0 Impact and Suitability of Development

## 4.1 Impacts to Agriculture

This section outlines the potential impact to agriculture in view of the current strategy and land use planning documents, and the physical and socioeconomic characteristics of the study area and surrounding region.

The study area currently still has 410 acres of quality agricultural land being used for grain and oilseed production. The land is of high productive capacity as demonstrated by the high LSRS rating and prevalence of canola production. All the fields appear to be cultivated by farms that have their home yard, storage facilities, supporting buildings, and equipment storage outside of the SPIL.

While any loss of agricultural land should be considered carefully, we cannot see any feature of the subject area that makes these lands more favourable to any specialty agricultural production than the areas around it. There appears to be no agricultural infrastructure present within the subject area.

Staged development of the subject area would likely create some accessibility constraints for the remaining land base portion still in agricultural use. Construction traffic, roadway barriers and removal of critical access approaches may all challenge the access to the remaining agricultural fields.

As discussed above, nearly all the business activity in, or supporting the agriculture industry is located in nearby communities outside the SPIL boundaries. The overall impact to these businesses following the transition of the subject lands use away from agriculture is deemed to be negligible. In fact, some of the service businesses currently serving agricultural enterprises may be expected to become more economically sustainable due to commercial property development in the subject area.

## 4.2 Mitigation and Qualification

The direct loss of the developed lands from agricultural production will remove high-quality farmland from production. However, the development of these lands is not expected to impact the agricultural operations in the area beyond this direct loss of the developed lands. Nonetheless, it is important to ensure that SPIL lands are developed in a manner that minimizes impacts to agricultural operations.

Agricultural productivity of the soil is reasonably uniform and high across the subject lands, and so there is no obvious direction that can be given to direct development first to lands with lower productivity. Impacts to agricultural productivity would be best mitigated by phasing development to avoid isolating portions of the land base by limiting or constraining equipment access options.

Drainage issues will need to be considered as development proceeds. If any of the surface drainage ways that flow into the two bisecting waterways are blocked the

agricultural land could become saturated during spring melt or high precipitation events and restrict field equipment operations and productivity. This would have potentially severe negative impacts to agricultural operations within the subject area though it would likely not have impacts to agricultural land outside the subject area.

To mitigate the impact to agriculture, it is recommended that development occur in phases consistent with efficient servicing. Phasing aligned with the agricultural parcels would most effectively reduce impacts to agriculture by avoiding further fragmentation of fields which are already fragmented by existing waterways.

## 4.3 Suitability

Considering all the points within this report, the conclusion of this Agriculture Impact Assessment is that the subject area is deemed to be suitable for development. While nearly all the land within the subject area is also highly suitable for annual crop production, it is not unique in quality or current agricultural use. Therefore, its conversion to non-agricultural use, when solely considered, would not present a significant loss of agricultural potential to the surrounding Parkland County area or the greater Edmonton Region.

Development of the SPIL lands will incrementally reduce the agricultural use but if equipment access is accommodated, is unlikely to restrict the use of undeveloped subject area lands or surrounding agricultural lands. In summary, the planned development would not unduly impact the overall viability of either the local agricultural community or crop production in surrounding areas. Further, the agricultural area adjacent to the south of the City of Spruce Grove is shown to be the centre of an important specialty crop, and so development of the SPIL land as an alternative location reduces the risk of developing this agricultural land with a unique use.

HRA Number: 4835-24-0126-002
January 13, 2026

# *Historical Resources Act* Approval

Proponent: Stony Plain Land Inc.
25 Commerce Road S, Spruce Grove, AB T7X 0G6
Contact: Ms. Stephanie Seguin

Agent: Western Heritage
Contact: Peter Stewart

**Project Name:** **Stony Plain Land Inc. NE Area Structure Plan**

Project Components: Urban Residential Subdivision

Application Purpose: Requesting HRA Approval / Requirements

*Historical Resources Act* approval is granted for the activities described in this application and its attached plan(s)/sketch(es) subject to Section 31, "a person who discovers an historic resource in the course of making an excavation for a purpose other than for the purpose of seeking historic resources shall forthwith notify the Minister of the discovery." The chance discovery of historical resources is to be reported to the contacts identified within Standard Requirements under the *Historical Resources Act*: Reporting the Discovery of Historic Resources.

David Link
Assistant Deputy Minister
Heritage Division
Alberta Arts, Culture and Status of Women

## HISTORIC STRUCTURES

There are no *Historical Resources Act* requirements associated with historic structures; however, the proponent must comply with Standard Requirements under the *Historical Resources Act*: Reporting the Discovery of Historic Resources, which are applicable to all land surface disturbance activities in the Province.

1. The following *Historical Resources Act* approval is based on the documentation submission from Western Heritage and reported to Alberta Arts, Culture and Status of Women in a submission dated October 2025.

| SITE | HRV | SITE DESCRIPTION | CONDITIONS/APPROVAL |
|---|---|---|---|
| HS 53863 | N/A | 0502 - Farming and Ranching: Barn | The documentation completed for this site is considered to be acceptable, and there are no further requirements for this site. |

# 6. Historical Resources Act Approval

**(continued)**

| | | | |
|---|---|---|---|
| HS 53866 | N/A | 0502 - Farming and Ranching: Barn | The documentation completed for this site is considered to be acceptable, and there are no further requirements for this site. |
| HS 53867 | N/A | 0502 - Farming and Ranching: Barn | The documentation completed for this site is considered to be acceptable, and there are no further requirements for this site. |
| HS 53864 | N/A | 0506 - Farming and Ranching: Food Storage Shed or Building | The documentation completed for this site is considered to be acceptable, and there are no further requirements for this site. |

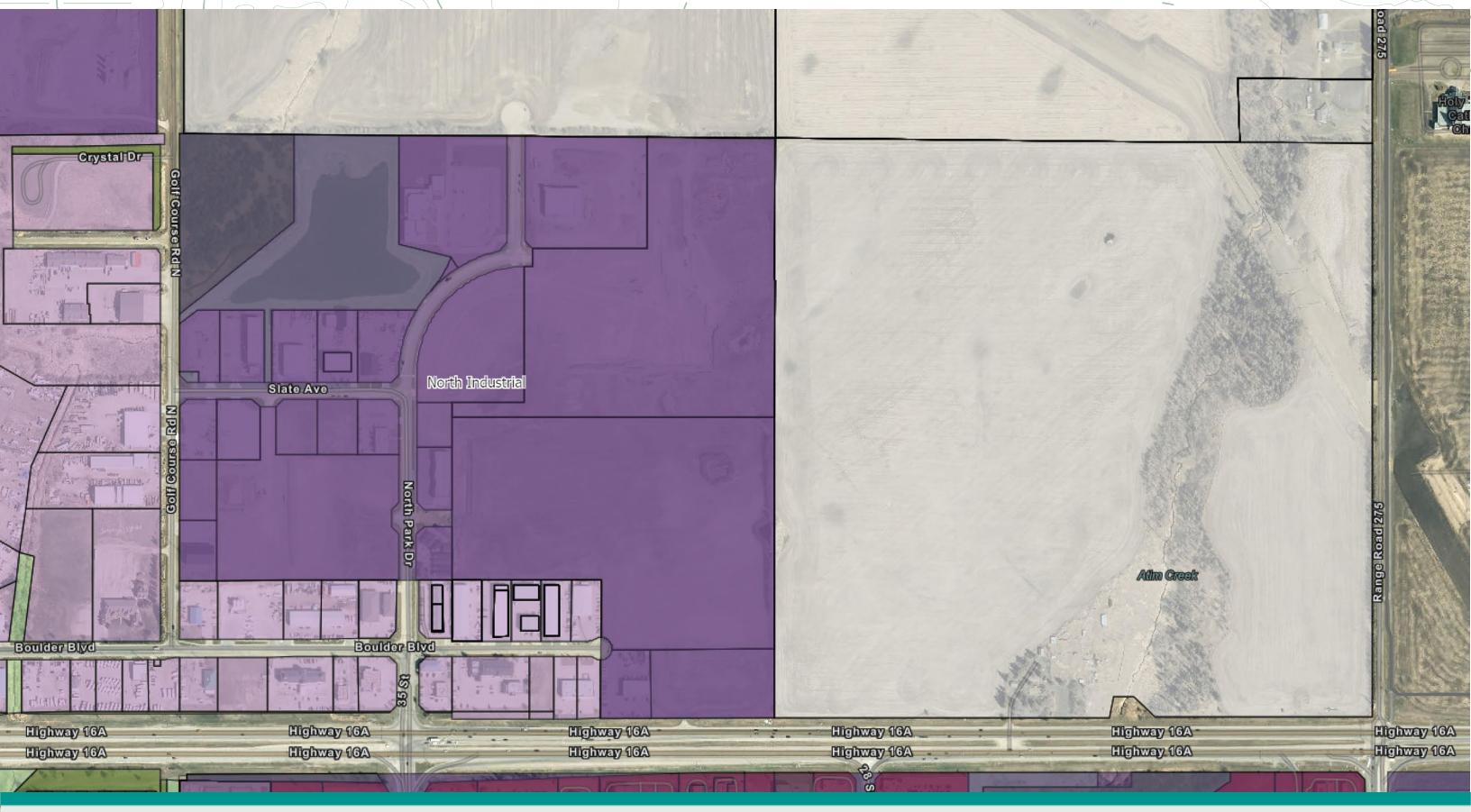
Proposed Development Location:

| MER | RGE | TWP | SEC | LSD List |
|---|---|---|---|---|
| 4 | 27 | 53 | 6 | 1-2,7-16 |

Documents Attached:

| Document Name | Document Type |
|---|---|
| Draft survey plans | Illustrative Material |
| Project Area (No Site Data) | Miscellaneous |

# 7. Traffic Impact Assessment




# Stony Plain North Industrial Area Structure Plan – Traffic Impact Assessment

November 26, 2025 | Final Report

Submitted to: Town of Stony Plain
Prepared by: McElhanney Ltd.

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Our file: 2131-00831-00

# Your Challenge.
# Our Passion.

# Authorization and Signatory Page

This “Stony Plain North Industrial Area Structure Plan Traffic Impact Assessment – Final Report” has been prepared by McElhanney Ltd. for the benefit of the Town of Stony Plain. The information and data contained herein represent our best professional judgement based on knowledge and information available at the time of preparation. Any use of this information in a manner not intended, or with knowledge that situations have changed, shall not be the responsibility of McElhanney Ltd. or the undersigned.

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**Prepared by:**

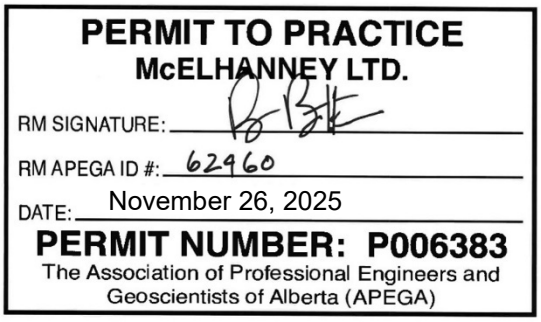

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# 1 Introduction

## 1.1 PROJECT BACKGROUND

The North Industrial area, located near Highway 16A and east of North Park Drive in Stony Plain, Alberta, is designated for future light industrial and commercial development. A big-box grocery store with a standalone liquor store and gas station (proposed development) is being proposed on a parcel of land just east of North Park Drive and approximately 150 m north of Highway 16A.

To support the request for additional access to Highway 16A and Alberta Transportation and Economic Corridors' (TEC) roadside permitting process, a Traffic Impact Assessment (TIA) is required. An earlier study, the *North Industrial Traffic Impact Assessment (McElhanney, March 2025)*, provided an initial review of transportation needs in this area, with particular focus on the operational impacts along Highway 16A and the feasibility of a proposed full-movement intersection at Highway 16A and 28 Street.

The previous TIA also considered, at a high level, an Area Structure Plan (ASP) that was being developed for three-quarter sections of land located to the north and east of the big-box grocery store site. Since then, the ASP has been refined to include a mix of light industrial, commercial, and mixed-use development. As a result, the Town has requested an update to the TIA to incorporate the latest ASP information and an expanded study area, including the internal network of the ASP.

This updated analysis intends to confirm access requirements, identify necessary network improvements, and ensure that future development is accommodated safely, efficiently, and in alignment with the Town's planning priorities.

## 1.2 STUDY SCOPE

McElhanney worked with the Town at the outset of the study to confirm the scope of the project, which included the following:

- Prepare a TIA for the study area impacted by the proposed development for Opening Day (2026) and the 20-year horizon (2046). The 20-year horizon assumes the full build-out of the ASP, incorporating the proposed uses and land areas as provided by Andrew Scheffer Ltd.
- Utilize the Town's Travel Demand Model (Visum) to assess the network impacts due to the full build-out of the ASP.
- Confirm access locations and intersection configuration for the proposed development, including staging of improvements (as applicable).
- Identify traffic constraints on the network and recommend roadway and intersection improvements, as well as other network improvements to facilitate safe and efficient movements.

- Identify potential network impacts to 28 Street and 44 Avenue.

The traffic and travel demand models completed as part of the Town's Transportation Master Plan (TMP) in 2020 were updated and utilized for this TIA.

# 2 Site Context

## 2.1 SITE LOCATION AND STUDY AREA

As illustrated in *Figure 1*, the proposed development is situated within the North Industrial area and is bounded by Highway 16A to the south and Boulder Boulevard to the west. Two new roadways – 28 Street and Quartz Avenue – are proposed to facilitate access to and from the site via Highway 16A and North Park Drive, respectively.

For this TIA, the following intersections were included in the detailed traffic operational analysis:

- Highway 16A / North Park Drive/South Park Drive
- Highway 16A / 28 Street (New Intersection)
- Highway 16A / Boundary Road
- Boulder Boulevard / North Park Drive
- North Park Drive / Quartz Avenue (New Intersection)
- Quartz Avenue / 28 Street (New Intersection)
- Site Access #1 on 28 Street
- Site Access #2 on Quartz Avenue

Due to the potential inability to secure a secondary access on Highway 16A and the designation of some accesses for delivery vehicles, only two of the five proposed accesses were evaluated in the TIA to ensure a more conservative review, providing flexibility for improved traffic operations with additional accesses. The accesses considered in the traffic analysis include the Highway 16A access west of the Highway 16A / 28 Street intersection, as well as the west access on Quartz Avenue, and the access at the end of Boulder Boulevard, which are both intended for service access.

The section of 28 Street south of Highway 16A, and 44 Avenue was also reviewed to identify the anticipated impacts of the proposed Highway 16A / 28 Street intersection.

The future ASP also proposes several other new roads for internal connectivity and connections to Boundary Road, Quartz Avenue, and Boulder Boulevard, including the extension of 28 Street, north of Quartz Avenue, and the extension of Slate Avenue and North Park Drive to the east. Operational analyses were also conducted for these roadways to identify the required signal control, general intersection configuration, and roadway cross-section. The internal road network was also considered in the trip distribution and assignment of the site-generated trips.

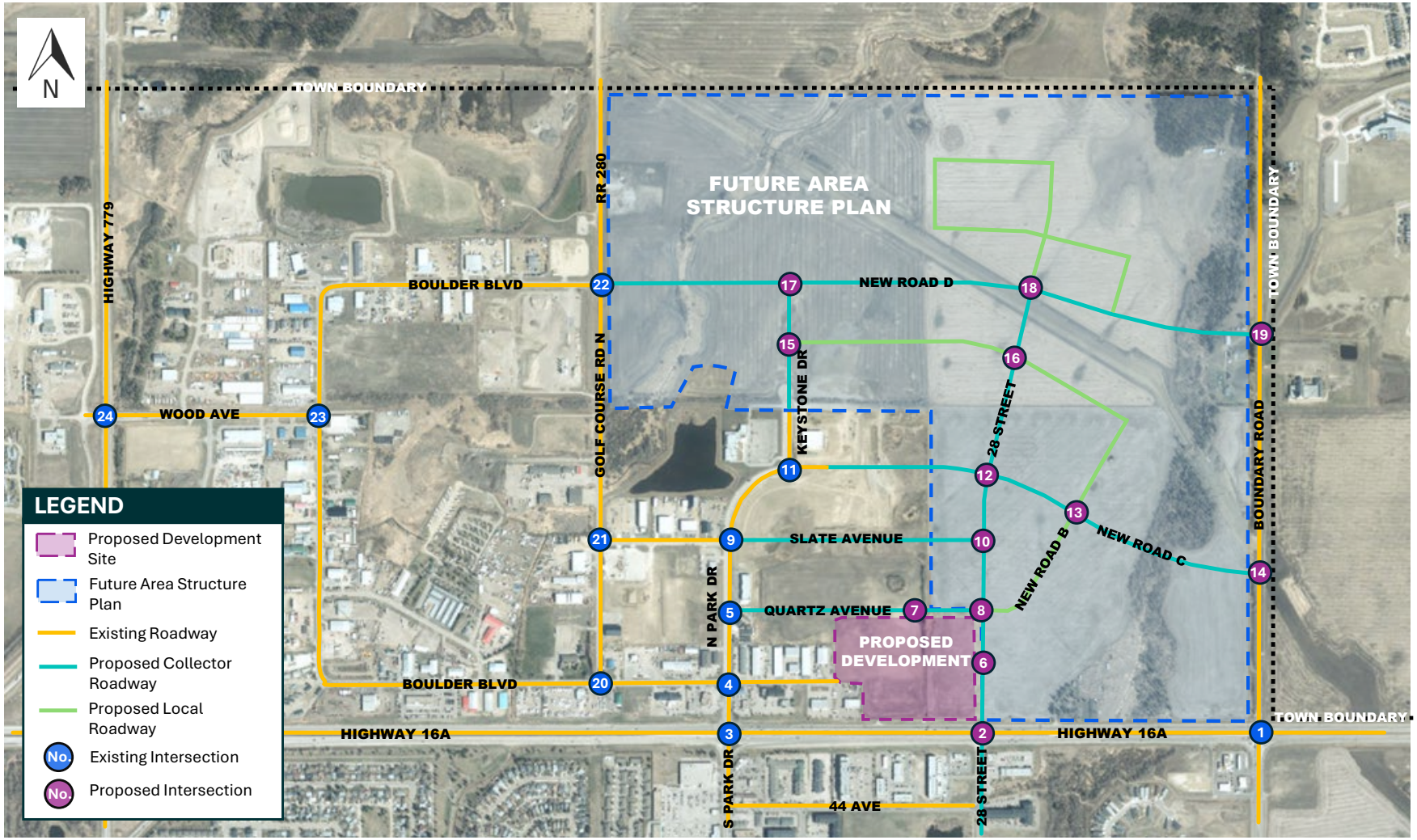



*Figure 1: Proposed Site Location and Study Area*

## 2.2 PROPOSED DEVELOPMENT OVERVIEW

The proposed development encompasses an area of approximately 7.32 hectares, consisting of a 160,000 square-foot big box store, a 16,000 square-foot liquor store, and a 24-pump gas station. The development is anticipated to be completed and fully operational by 2026. The site will accommodate up to 1,146 parking spaces, with 1,014 spaces (998 regular stalls and 16 accessible stalls) provided on Opening Day. The site can accommodate an additional 132 stalls if required in the future.

### 2.2.1 Site Accesses

As illustrated in *Figure 2*, several site access points are identified, with the main access (Access #1) situated on the new 28 Street, which is intended to form a full movement intersection at Highway 16A. Additional accesses (Access #2 and Access #3) are provided along a new east-west road (Quartz Avenue) that borders the northern site boundary, connecting North Park Drive to 28 Street. Access #3 and Access #4 are intended as the primary access for truck deliveries, with Access #4 having limited access. A right-in/right-out (RI/RO) access on Highway 16A, approximately 280m west of 28 Street, is also being considered.




*Figure 2: Proposed Site Plan*

## 2.3 AREA STRUCTURE PLAN (ASP)

The ASP, which encompasses the area north and east of the site, will serve as a critical hub for commercial activity and employment through a mix of industrial, commercial, and mixed uses. The draft land uses, as illustrated in *Figure 3*, were used to develop high-level estimates of trip generation. Commercial development is planned for the southern portion of the ASP, while light industrial and business commercial development is planned for the northern portion of the ASP. Mixed-use developments are planned along Boundary Road on the east side of the ASP, potentially including a mix of commercial, multifamily standalone component and/or hotel uses .

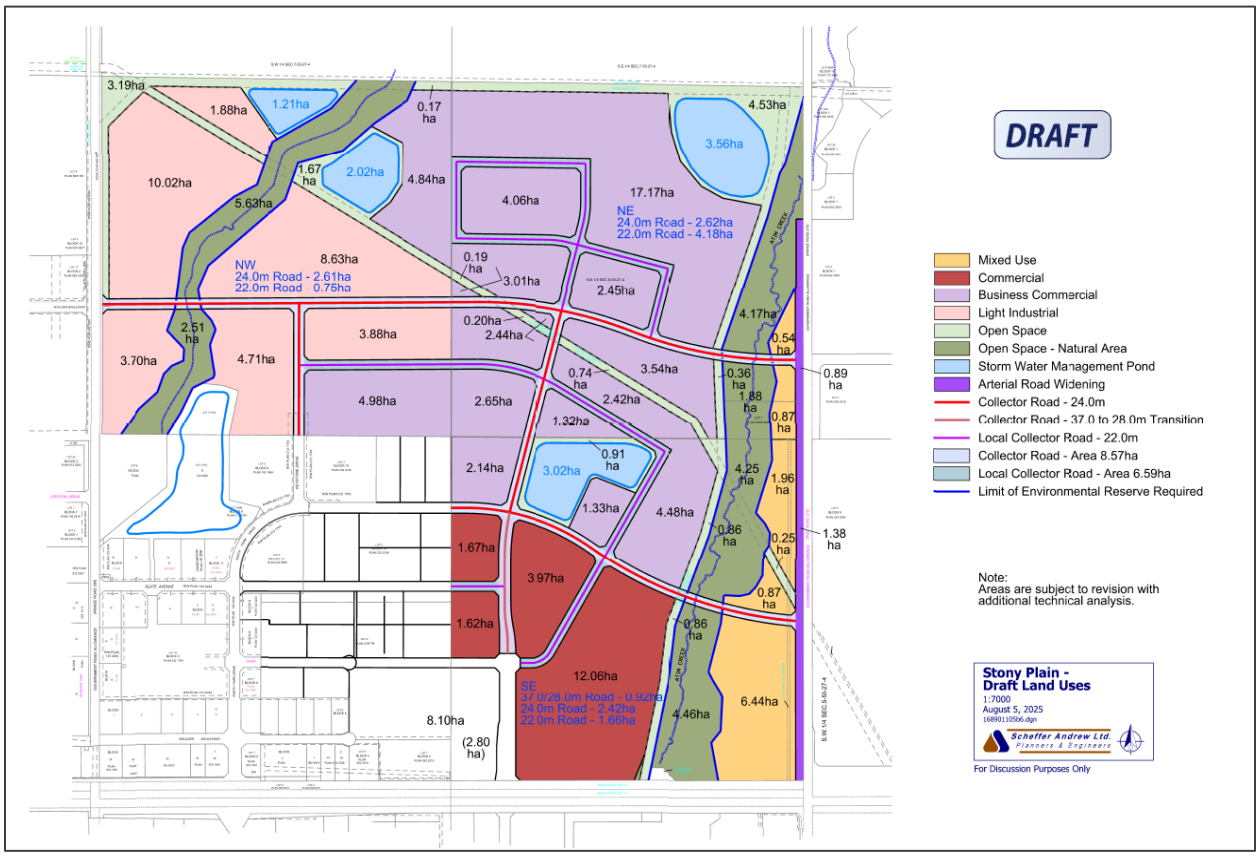



*Figure 3: Proposed Area Structure Plan*

The estimated land area for development by land use is summarized in *Table 1*.

*Table 1: ASP Land Uses by Area*

| LAND USE | GROSS DEVELOPABLE AREA (HECTARES) |
|---|---|
| Commercial | 19.32 ha |
| Business Commercial | 56.83 ha |
| Mixed Use | 10.68 ha |
| Light Industrial | 32.82 ha |

## 2.4 EXISTING & ADJACENT LAND USES

The site area is zoned as a Business Industrial District, and the existing land uses surrounding the development site currently comprise of light industrial and commercial uses, including repair shops, automobile dealerships, an RV park, a dog park, and hotels. A large portion of land in the study area is currently undeveloped, including the development site.

## 2.5 EXISTING ROADWAY NETWORK

The following roadways and intersections currently exist within the study area and are anticipated to be impacted by the proposed development and ASP.

### Highway 16A

Highway 16A serves as a major east-west arterial roadway through Stony Plain, extending to the City of Edmonton and connecting urban centers such as Acheson, Spruce Grove, and Stony Plain. Within Stony Plain, it is a six-lane divided highway with a 10m wide median. The speed limit between Boundary Road and North Park Drive is 80 km/h, and illumination is provided along the corridor. Highway 16A also serves as an alternative route to Highway 16.

### Boundary Road (Veterans Boulevard)

Boundary Road, also referred to as Veterans Boulevard south of Highway 16A, runs north-south, linking Highway 628 to Highway 16A. It provides access to residential neighborhoods, commercial services, and a church. North of Highway 16A, Boundary Road is a rural paved roadway with a 50 km/h speed limit. It is anticipated that future upgrades to this corridor will ultimately include four-laning to an arterial standard. South of Highway 16A, Veterans Boulevard is a four-lane divided arterial with a posted speed of 60 km/h.

### North Park Drive

North Park Drive runs north from Highway 16A to Keystone Drive, providing access to businesses in the North Industrial area. The majority of the corridor is a two-lane collector except for the section between Highway 16A and Boulder Boulevard, where it is a four-lane roadway. North Park Drive has a speed limit of 50 km/h.

### Boulder Boulevard

Boulder Boulevard extends east from North Park Drive through the North Industrial area and loops around to connect to Golf Course Road North (Range Road 280). The corridor functions as a two-lane collector roadway with a posted speed limit of 50 km/h, providing access to industrial lots.

### Slate Avenue

Slate Avenue is an east-west road connecting Golf Course Road North to North Park Drive. The corridor functions as a two-lane collector roadway with a posted speed limit of 50 km/h, providing direct business accesses.

### Golf Course Road North (Range Road 280)

Golf Course Road North (designated Range Road 280 north of Boulder Boulevard), extends from Highway 16A to the Town's northern boundary. The corridor functions currently as a two-lane collector roadway with a posted speed limit of 50 km/h, providing access to adjacent businesses and connecting the North Industrial area with the rural road network to the north.

### Wood Avenue

Wood Avenue extends east–west between Highway 779 and Boulder Boulevard, providing local access and connecting traffic to the North Industrial area. The roadway is a two-lane local road with a posted speed limit of 50 km/h.

*Table 2* outlines the characteristics of the key existing intersections within the study area.

*Table 2: Study Intersection Characteristics*

| INTERSECTION | CONTROL TYPE | INTERSECTION LANING | | | |
|---|---|---|---|---|---|
| | | EASTBOUND | WESTBOUND | NORTHBOUND | SOUTHBOUND |
| Highway 16A / North Park Drive | Signalized | 3 thru, 2 left, 1 channelized right; | 3 thru, 2 left, 1 right; | 2 thru, 1 left, 1 channelized right | SB: 1 left, 1 thru, 1 shared thru/right; |
| Highway 16A / 28 Street | Yield (RI/RO) – Eastbound Only | 3 thru + acceleration lane; | N/A | 1 right lane (RI/RO) | N/A |
| Highway 16A / Boundary Rd / Veterans Blvd | Signalized | 3 thru, 2 left, 1 channelized right | 3 thru, 2 left, 1 right | 1 thru, 1 left, 1 channelized right; | 1 lane, no dedicated turn lanes |
| Highway 779 / Wood Avenue | Signalized | 1 shared left/thru, 1 right | 1 shared left/thru, 1 right | 1 left, 1 shared thru/right | 1 left, 1 shared thru/right |
| North Park Drive / Boulder Boulevard | Signalized | 1 lane all movements | 1 lane all movements | 1 left, 1 thru, 1 right | 1 shared thru, 1 left |
| North Park Drive / Slate Avenue | Stop-Controlled | N/A | 1 lane all movements | 1 lane all movements | 1 lane all movements |
| Golf Course Road N / Boulder Boulevard | Stop-Controlled | 1 lane all movements | 1 lane all movements | N/A | 1 lane all movements |
| Golf Course Road N/ Slate Avenue | Stop-Controlled | N/A | 1 lane all movements | 1 lane all movements | 1 lane all movements |
| Range Road 280 / Boulder Boulevard | Stop-Controlled | 1 lane all movements | N/A | 1 lane all movements | 1 lane all movements |
| Wood Avenue / Boulder Boulevard | Stop-Controlled | 1 lane all movements | N/A | 1 lane all movements | 1 lane all movements |

## 2.6 FUTURE ROADWAY NETWORK

The evaluation of the TIA captures the proposed network and intersection to support the development on Opening Day, as well as the network proposed for the ASP. *Figure 4* illustrates the future road network recommended in the Town's current Transportation Master Plan (TMP). Within the study area, the following road segments are recommended for future road classification upgrades:

- Boulder Boulevard between North Park Drive and Golf Course Road North (Range Road 280) – Upgrade from a collector road to an arterial road.
- Golf Course Road North – Upgrade from a collector road to an arterial road.
- Complete the remaining section of North Park Drive as a collector road.

Highway 16A through the study area is intended to remain a six-lane undivided roadway. The TMP also identified intersection improvements at Highway 16A / North Park Drive/South Park Drive in the medium-term, which include providing a second left-turn lane in the northbound and southbound directions.

While the arterial and collector road network within the ASP generally aligns with the TMP recommendations, additional local and collector road connections are being proposed to support the development and the ASP. Specifically, the extension of Slate Avenue from North Park Drive to the new 28 Street connection, and a new east-west road (Quartz Avenue) that runs south, and parallel to the Slate Avenue extension. Additionally, a new link connecting 28 Street to the future North Park Drive extension to Boundary Road.

The ASP's network includes 24m wide collector roadways designed to connect various land uses. The collector roadways will link to Boundary Road, Highway 16A, and Range Road 280, while the local roads will facilitate access between diverse land uses while minimizing conflict points and ensuring efficient traffic flow.

Depending on the Annexation approvals between the Town and the City of Spruce Grove, Boundary Road will also be upgraded to a four-lane arterial. As identified in the *City of Spruce Grove Integrated Transportation Master Plan*, the first phase of four-lane upgrade between Highway 16A and McLeod Avenue, is anticipated to be within the next five years (near-term). The second phase of the widening, between McLeod Avenue and Grove Drive, is anticipated to occur within the next 20 years (long-term), depending on the rate of development.

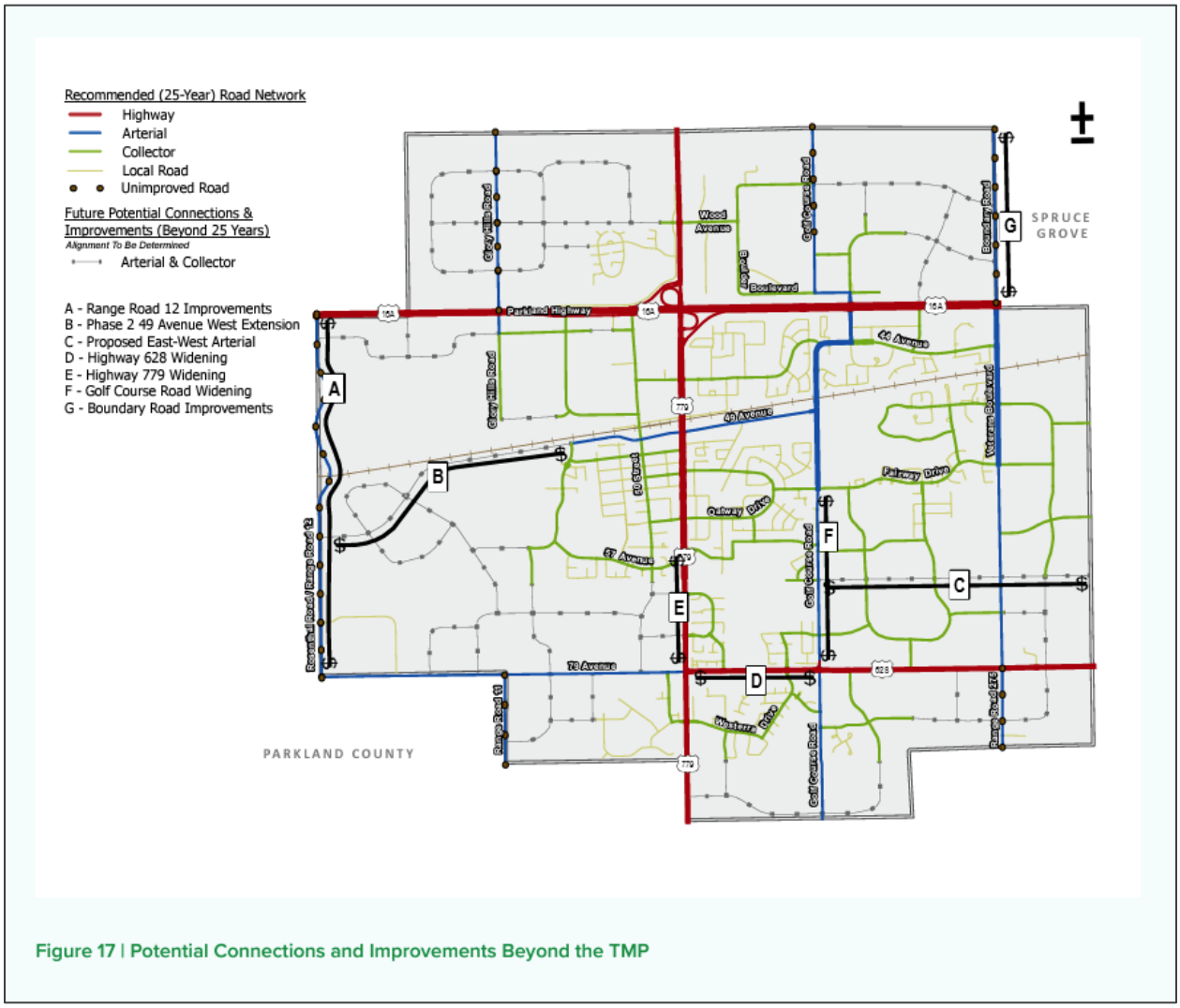



**Figure 17 | Potential Connections and Improvements Beyond the TMP**

*Image Source: Stony Plain Transportation Master Plan 2021*

*Figure 4: Stony Plain Transportation Master Plan – Recommended Future Network*

## 2.7 ANALYSIS HORIZON

This TIA is based on two planning horizons to ensure the roadway network can support the site-generated trips along with future development growth. The horizons include:

- Opening Day (2026) – The Opening Day horizon reflects the completion and full operation of the proposed development, anticipated to be in 2026. No other new adjacent development is occurring. The two new collector roads (28 Street and Quartz Avenue) are included to support site access, including a full movement intersection at Highway 16A / 28 Street.

- Full Build-out (2046) – The Full Build-out horizon reflects a 20-year horizon post Opening Day and assumes the development in the ASP to be fully completed, including the proposed road network. Boundary Road is assumed to be a four-lane arterial.

# 3 Traffic Projections

## 3.1 BACKGROUND TRAFFIC

Existing (2024) background PM peak hour traffic projections were developed using a combination of traffic counts from TEC traffic website, McElhanney's traffic count database, and historical data sources relevant to the study area. This approach ensured that the background traffic estimates were established through data reflective of the Town's transportation trends and tailored to the local context.

Saturday peak hour volumes were estimated by applying a 20% reduction to the PM peak hour volumes. The reduction factor was established based on data extracted from the permanent count stations along Highway 16A.

A linear growth rate of 3.0% was applied to 2024 traffic volumes to forecast the Opening Day traffic volumes. A linear growth rate of 2.5% was then applied to forecast future traffic volumes from Opening Day to 2046 (20-year horizon). These rates are consistent with the historic growth in the study area as well as traffic projections identified in the Town's TMP. The historic growth rates already reflect contributions from surrounding areas, while the traffic projections from the TMP reflect growth in Spruce Grove and surrounding areas by incorporating anticipated increases in traffic demands influenced by population and employment growth.

The peak background volume estimates (excluding site-generated traffic) for Opening Day (2026) and the 20-year horizon (2046) are provided in **Appendix B**.

## 3.2 DEVELOPMENT TRAFFIC

### 3.2.1 Trip Generation Rates

The trip generation rates used in the assessment (see *Table 3*) are based on a combination of trip generation rates published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 11th Edition*, and trip generation rates with adjustments informed by local context and/or established data sources.

The ITE *Land Use Code 850 Supermarket* was used as a basis to develop the trip generation for the proposed development. Upon literature review of multiple TIA's for similar developments, the trip rate for the development was adjusted to reflect the unique features of the big-box grocery store with a standalone liquor store and a large gas station. In addition, the proposed development is expected to not only serve the Town, but also the surrounding area, including Spruce Grove and Parkland County, resulting in higher trip generation.

The big-box grocery store is assumed to be closed during the weekday morning peak hour, therefore, trip generation rates were established only for the weekday PM peak hour and Saturday (weekend) peak

hour. These periods are typically the busiest in commercial-retail areas as many patrons run errands, shop, and dine after work or during the weekends.

For the uses in the ASP, the land use (LU) codes used for each land use type are as follows:

- Commercial: *LU Code 820 - Shopping Center (> 150K) and LU Code 821 - Shopping Plaza (40-150K)*
- Business Commercial: *LU Code 130 – Industrial Park*
- Light Industrial: *LU Code 130 – Industrial Park*
- Mixed Use: *LU Code 821 – Shopping Plaza (40-150K), LU Code 221 – Multifamily House (Mid-Rise) and LU Code 310 – Hotel*

*Land Use Code 130 (Industrial Park)* is applied to both Business Commercial and Light Industrial because their traffic patterns align more closely with service/light industrial parks than traditional retail. This approach is particularly suitable in smaller municipalities like Stony Plain, where business commercial areas often blend with light industrial and service-oriented uses. For Mixed Use, a combination of *Land Use Codes 821 (Shopping Plaza), 221 (Multifamily Mid-Rise),* and *310 (Hotel)* is applied to capture the potential mix of commercial-retail, residential, and hospitality components. This allows for more accurate representation of trip-making characteristics and supports proper accounting of internal capture and pass-by effects.

*Table 3: Trip Generation Rates*

| LAND USE | SOURCE | WEEKDAY PM PEAK HOUR | SATURDAY PEAK HOUR |
|---|---|---|---|
| **PROPOSED DEVELOPMENT** | | | |
| Big-Box Grocery Store & Liquor Store | 850 – Supermarket, adjusted with data from other Transportation Impact Assessments | 9.22 trips/1,000 ft$^2$<br>50% in/50% out | 11.35 trips/1,000 ft$^2$<br>50% in/50% out |
| Gas Station | | 29.86 trips/Fueling Station<br>50% in/50% out | 30.41 trips/Fueling Station<br>50% in/50% out |
| **ASP** | | | |
| Commercial | 820 – Shopping Centre (>150K) | 3.40 trips/1,000 ft$^2$<br>48% in/52% out | 4.40 trips/1,000 ft$^2$<br>52% in/48% out |
| | 821 – Shopping Plaza (40-150K) | 9.03 trips/1,000 ft$^2$<br>48% in/52% out | 9.26 trips/1,000 ft$^2$<br>51% in/49% out |
| Business Commercial | 130 – Industrial Park | 0.34 trips/1,000 ft$^2$<br>22% in/78% out | 0.44 trips/1,000 ft$^2$<br>32% in/68% out |
| Light Industrial | 130 – Industrial Park | 0.34 trips/1,000 ft$^2$<br>22% in/78% out | 0.44 trips/1,000 ft$^2$<br>32% in/68% out |
| Mixed Use | 821 – Shopping Plaza (40-150K) | 9.03 trips/1,000 ft$^2$<br>48% in/52% out | 9.26 trips/1,000 ft$^2$<br>51% in/49% out |
| | 221 – Multifamily Housing (Mid-Rise) | 0.39 trips/Dwelling Unit<br>61% in/39% out | 0.39 trips/Dwelling Unit*<br>51% in/49% out |
| | 310 - Hotel | 0.59 trips/Room<br>51% in/49% out | 0.72 trips/Room<br>56% in/44% out |

* Trip generation rates for the Saturday peak hour were estimated due to limited data or unavailable rates.

### 3.2.2 Gross Trip Generation Estimates

*Table 4* summarizes the anticipated trips generated by the development and the ASP. The standalone liquor store was included as part of the main store. For the ASP estimates, the site gross floor area (GFA) or gross land area (GLA) was initially estimated assuming a 30%-50% site coverage, staying within the maximum lot coverages set out in the Town's Land Use Bylaw 2686/LUO/24. These coverage assumptions were then refined using an inventory of comparable land uses in Stony Plain and the broader Edmonton region.

The number of residential dwelling units within the mixed-use development was estimated using the Town's ASP density assumption of 45 units per hectare for medium-density areas. For the hotel component, the land area requirement was estimated based on comparable hotels in the Tri-Region.

Overall, the proposed development is estimated to generate approximately 1,980 two-way trips during the weekday PM peak hour and approximately 2,360 two-way trips during the Saturday peak hour. Full build-out of the ASP is estimated to add another 4,700 two-way trips to the area during the weekday PM peak hour, and 5,590 two-way trips during the Saturday peak hour. The more detailed calculations of the trip generation are provided in **Appendix C**.

*Table 4: Total Trip Generation Estimates*

| LAND USE | UNITS | WEEKDAY PM PEAK HOUR | | SATURDAY PEAK HOUR | |
|---|---|---|---|---|---|
| | | IN | OUT | IN | OUT |
| **PROPOSED DEVELOPMENT (BIG-BOX STORE & GAS STATION)** | | | | | |
| Big-Box Store & Liquor Store | 176,000 ft² | 795 | 828 | 979 | 1019 |
| Gas Station | 24 Fuelling Pumps | 179 | 179 | 182 | 182 |
| **Total Trips – Proposed Development** | | **974** | **1,007** | **1,161** | **1,201** |
| **ASP** | | | | | |
| Commercial | 623,650 ft² | 1,305 | 1,414 | 1,685 | 1,575 |
| Business Commercial | 1,834,472 ft² | 137 | 487 | 258 | 549 |
| Light Industrial | 1,059,430 ft² | 79 | 281 | 149 | 317 |
| Mixed Use | | | | | |
| Commercial | 82,960 ft² | 360 | 390 | 392 | 376 |
| Medium-Density Residential | 169 units | 52 | 34 | 34 | 34 |
| Hotel | 450 Rooms | 90 | 88 | 122 | 96 |
| **Total Trips - ASP** | | **2,024** | **2,691** | **2,641** | **2,946** |
| **Total Trips – Proposed Development + ASP** | | **2,998** | **3,698** | **3,803** | **4,147** |

### 3.2.3 Net Trip Generation Estimates

The gross trip generation estimates were adjusted to determine the net new trips on the roadway network. The adjustments account for the following:

- **Big-Box Grocery Store Internal Trips:** These include trips that visit multiple destinations within the site (i.e. patrons who visit the main store, liquor store and/or gas station in one trip). These trips do not contribute to the traffic volumes on the surrounding road network or site accesses. Following the same methodology as previous TIA's, an internal trip reduction of 50% was applied to the Gas Station trips for both weekday PM peak hour and Saturday peak hour.
- **Commercial Internal Area Trips**: In order to estimate the internal trips between the commercial developments surrounding the big-box store, a 10% internal capture in the PM peak and a 15% internal capture in the Saturday peak were applied. As the ITE methods do not provide a way of estimating internal capture between different retail land uses, the above estimates were determined by comparing the combined unreduced volumes of the retail land uses and the *LU code 820 – Shopping Center (>150*k). The shopping center land use rate was scaled up by 1.5 standard deviations in the PM peak and 1.0 standard deviations in the Saturday peak to account for the presence of the big-box grocery store and gas station. It was assumed that the internal

trips would be distributed between the individual commercial accesses as vehicle trips (assuming no one is walking between stores).

- **Mixed Used Internal Capture:** These include potential trips between commercial and residential land uses within the ASP. An internal capture rate of 15% was applied to the residential and commercial uses in the PM peak hour and Saturday peak hour. This rate was estimated using the *NCHRP 684 Internal Trip Estimation Tool*.
- **Pass-By Trips:** These include trips stopping at the site on route to other destinations. ITE guidelines indicate that typical pass-by trip rates for comparable development types generally fall within the 25% to 40% range. For this TIA, pass-by trips were capped at 10% of the total of the adjacent highway trips, as well as the trips from the northern industrial developments in the ASP. Trips from the northern industrial and business park developments were considered as volumes that can feed pass-by trips at the southern commercial developments, given that the combined trips generated from the north are comparable to the highway volumes. A 10% cap was chosen, as otherwise, unrealistic portions of the highway traffic are shown to make pass-by trips. 10% is a common rule used by multiple jurisdictions to cap pass-by trips.

*Table 5* outlines the net trip estimates for the proposed development and the ASP. The development is estimated to generate approximately 1,500 to 1,800 new trips to the area during the peak hours, while the ASP is estimated to generate approximately 4,000 to 4,600 new peak hour trips.

*Table 5: Net Trip Generation Estimates*

| LAND USE | WEEKDAY PM PEAK HOUR | | SATURDAY PEAK HOUR | |
|---|---|---|---|---|
| | IN | OUT | IN | OUT |
| **Big-Box Grocery Store Development (including Liquor Store and Gas Station)** | | | | |
| Total Trips | 974 | 1,007 | 1,161 | 1,201 |
| Internal Trips | 97 | 101 | 174 | 180 |
| Pass-by Trips | 134 | 139 | 120 | 124 |
| **Net Total Trips** | **743** | **768** | **868** | **897** |
| **ASP** | | | | |
| Total Trips | 2,024 | 2,691 | 2,641 | 2,946 |
| Internal Trips | 206 | 218 | 335 | 312 |
| Pass-by Trips | 180 | 195 | 173 | 162 |
| **Net Trips** | 1,639 | 2,279 | 2,133 | 2,472 |
| **Total Net Trips** | **2,382** | **3,047** | **3,000** | **3,370** |

### 3.2.4 Trip Distribution

Recognizing that travel patterns will change with future growth and new network connections, trip distribution assumptions for the development site and ASP were established for the Opening Day and Full Build-out horizon, which are summarized in *Table 6*. The distributions in and out of the site are assumed to be the same. The distribution assumptions were guided by existing distributions at the intersections, results of the Visum model, and local and regional knowledge.

*Table 6: Trip Distribution*

| ROADWAY | OPENING DAY (2026) | | FULL BUILD-OUT (2046) | |
|---|---|---|---|---|
| | PM PEAK HOUR | SATURDAY PEAK HOUR | PM PEAK HOUR | SATURDAY PEAK HOUR |
| Highway 16A Eastbound | 30% | 30% | 25% | 25% |
| Highway 16A Westbound | 20% | 20% | 15% | 15% |
| Boundary Road | 0% | 0% | 5% | 5% |
| Veterans Boulevard | 15% | 15% | 15% | 15% |
| 28 Street, South of Highway 16A | 5% | 5% | 5% | 5% |
| South Park Drive | 5% | 5% | 10% | 10% |
| Highway 779 South (48 Street) | 20% | 20% | 20% | 20% |
| Highway 779 North | 5% | 5% | 5% | 5% |

## 3.3 TOTAL (BACKGROUND + DEVELOPMENT) TRAFFIC

The net trip estimates were assigned to the roadway network based on the above noted distributions, the location of land uses, and accesses. The site-generated traffic was then combined with the background traffic volumes to determine the total traffic volumes used in the analysis.

**Appendix B** provides the corresponding peak total intersection volumes, including overall net site-generated volumes, for Opening Day (2026) and the 20-year horizon (2046)

# 4 Traffic Analysis

Traffic operations analysis for the study intersections was completed utilizing Vistro for the Opening Day (2026) and Full Build-out (2046) horizons. Existing signal timings provided by the Town were used in the analysis and optimized.

The Level of Service (LOS) is a performance metric used to assess operating conditions of intersections and their respective approaches. LOS reported in the analysis scenarios are based on the methodology outlined in the 2010 Highway Capacity Manual. LOS 'A' represents minimal delays for minor street traffic movements, and LOS 'F' represents a scenario with an insufficient number of gaps on the major street for minor street motorists to complete their movements without significant delays.

For unsignalized intersections, the LOS is based on the computed delays on each of the critical movements. For signalized intersections, the methodology considers the intersection geometry, traffic volumes, the traffic signal phasing/timing plan, as well as pedestrian and cyclist volumes. The average delay for each lane group is calculated, as well as the delay for the overall intersection. The operating conditions can also be expressed in terms of volume-to-capacity (v/c) ratio. The signalized and unsignalized LOS criteria as summarized in HCM are also shown in *Table 6*.

In the context of Stony Plain, a LOS D or better is considered acceptable operational standards for a major intersection, with individual movements operating at a LOS E or better and a volume-to-capacity (v/c) ratio of 0.85 or less.

*Table 7: 2010 Highway Capacity Manual Level of Service Criteria*

| Level of Service | Description | Signalized Intersection Delay (s) | Unsignalized Intersection Delay(s) |
|---|---|---|---|
| A | Represents free flow. Individual users are virtually unaffected by others in the traffic stream. | < 10 | < 10 |
| B | Stable flow, but the presence of others begins to be noticeable. Occasionally minor delay due to conflicting traffic. | > 10 to 20 | > 10 to 15 |
| C | Stable flow, but occasionally some delay due to conflicting traffic. Delay is noticeable but not inconveniencing. | > 20 to 35 | > 15 to 25 |
| D | Represents high-density, but stable flow. Delay is noticeable and irritating. | > 35 to 55 | > 25 to 35 |
| E | Represents operating conditions at or near the capacity level. Delay approaching tolerance levels. | > 55 to 80 | > 35 to 50 |
| F | Traffic demand exceeds capacity of intersection, very long queues, and delays. Represents forced or breakdown flow. Delay exceeds tolerance level. | > 80 | > 50 |

The detailed results of the traffic analysis are further discussed in the next subsections and reflect the following assumptions:

- Optimized signal timing plans for the Opening Day (2026) and Full Build-out (2046) scenarios with coordinated signals along Highway 16A.
- Where applicable, additional turn bays or channelization were included to manage future traffic delays and queues.
- Total site trips include primary trips and pass-by trips and were assigned based on current and projected travel patterns and then adjusted based on available network capacity.

## 4.1 OPENING DAY (2026)

*Table 8* and *Table 9* summarizes the traffic analysis results for the Opening Day (2026) horizon, comparing background volumes and total volumes (background + development) at the intersections most directly impacted. Detailed Vistro reports for all study intersections are included in **Appendix D**. The results indicate the following trends under the 2026 horizon:

**2026 Background Traffic**

- With background growth only (no development), all study intersections are expected to operate at LOS D or better during the PM and Saturday peak hours, with most individual movements also maintaining LOS D or better. The exception is the westbound left turn at Highway 16A / North Park Drive / South Park Drive, which is projected to operate over capacity at LOS F during the PM peak hour.

**2026 Total (Background + Development) Traffic**

- With the addition of site-generated traffic from the big-box store, moderate increases in delays are expected across the study intersections during the peak hours. However, the overall intersection levels of service, particularly at the intersections along Highway 16, are maintained at LOS D or better.
- The performance of the westbound left turn at **Highway 16A / North Park Dive/South Park Drive** improves to a LOS D under optimized signal timings and coordination along Highway 16A.
- With the proposed development, the **Highway 16A / 28 Street** intersection will require upgrading to a full-movement, signalized intersection. Under site-generated traffic conditions, the intersection is expected to operate at LOS C during the PM and Saturday peak hour, reflecting coordinated signal timings along Highway 16A at Boundary Road and North Park Drive / South Park Drive. While the southbound left and eastbound left movements are anticipated to operate at LOS E and approach capacity on Opening Day, providing dual left-turn lanes in the southbound and westbound directions should be considered to accommodate the heavy turning volumes and maintain acceptable operating conditions.

- **Site Access #1 on 28 Street** – This intersection will operate at a LOS B as a T-intersection with stop-control on the eastbound during the PM peak hour with development. Traffic exiting the site during the peak hours is expected to operate at a LOS B/C with some delays and queuing due to the heavy right-turn. Overall, minimal queuing is also expected for the northbound direction, reducing the risk of vehicles spilling back onto Highway 16A.

- **Site Access #2 on Quartz Avenue** – This intersection will operate at a LOS D or better as a T-intersection with stop-control on the northbound during the PM and Saturday peak hour with development. Traffic exiting the site is expected to operate at a LOS C/D during the peak hours with minimal delays and queuing. The main delays are attributed to the delays of the northbound left movement, where a heavier volume is projected. However, these delays are acceptable as drivers entering and exiting a busy commercial area typically expect some delay. There are also alternate exit points, which allow drivers to choose a different route to minimize waiting times.

- The remaining study intersections will operate at a LOS D or better during the peak hours, with no significant delays or queuing impacts anticipated.

The proposed development is expected to generate a significant volume of traffic during the peak hours. To maintain acceptable levels of service at the Highway 16A / North Park Drive/South Park Drive intersection, a full-movement intersection should be provided at Highway 16A and 28 Street on Opening Day to support site access. In addition, at least one access must be provided along Quartz Avenue to facilitate connections to the west. This will ensure efficient flows are maintained along Highway 16A while providing effective connections to the development. It will also provide a better distribution of site traffic across the road network.

A summary of the proposed improvements to address operational constraints and network connectivity is provided in **Section 6**.

*Table 8: Intersection Performance Measures Summary – Opening Day (2026) PM Peak Hour*

| Intersection | Intersection Control | Direction | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Intersection LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Movement | L | T | R | L | T | R | L | T | R | L | T | R | |
| Highway 16A / North Park Drive/South Park Drive | Signalized | Geometry | | L/T/TR | | | L/T/TR | | | L/L/T/T/T/R | | | L/L/T/T/T/R | | D |
| | | Volume | 230 | 108 | 235 | 367 | 142 | 62 | 80 | 769 | 213 | 383 | 747 | 201 | |
| | | v/c | 0.35 | 0.17 | 0.43 | 0.7 | 0.17 | 0.17 | 0.39 | 0.73 | - | 0.65 | 0.46 | 0.4 | |
| | | Delay (s) | 21 | 29 | 43 | 62 | 29 | 29 | 58 | 45 | - | 125 | 31 | 32 | |
| | | LOS | C | C | D | E | C | C | E | D | - | F | C | C | |
| | | 95th Queue (m) | 55 | 35 | 85 | 132 | 35 | 33 | 17 | 83 | - | 129 | 67 | 58 | |
| | **2026 PM PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | | L/T/TR | | | L/T/TR | | | L/L/T/T/T/R | | | L/L/T/T/T/R | | C |
| | | Volume | 230 | 142 | 243 | 367 | 176 | 254 | 265 | 951 | 213 | 392 | 935 | 201 | |
| | | v/c | 0.5 | 0.42 | 0.86 | 0.7 | 0.32 | 0.55 | 0.82 | 0.61 | - | 0.87 | 0.54 | 0.38 | |
| | | Delay (s) | 27 | 41 | 52 | 30 | 31 | 34 | 54 | 35 | - | 52 | 31 | 30 | |
| | | LOS | C | D | D | C | C | C | D | C | - | D | C | C | |
| | | 95th Queue (m) | 61 | 48 | 86 | 92 | 51 | 75 | 50 | 87 | - | 70 | 81 | 56 | |
| Highway 16A / 28 Street | **2026 PM PEAK HOUR - BACKGROUND VOLUMES** | | | | | | | | | | | | | | |
| | Uncontrolled, Right-in/Right-out Eastbound | Geometry | | R | | | | | | T/T/T/R | | | T/T/T | | C |
| | | Volume | | | 176 | | | | | 1318 | 52 | | 1264 | | |
| | | v/c | | | 0.51 | | | | | 0 | 0 | | 0 | | |
| | | Delay (s) | | | 23 | | | | | 0 | 0 | | 0 | | |
| | | LOS | | | C | | | | | A | A | | A | | |
| | | 95th Queue (m) | | | 21 | | | | | 0 | 0 | | 0 | | |
| | **2026 PM PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | | L/TR | | | L/T/R | | | L/T/T/T/R | | | L/T/T/T/R | | C |
| | | Volume | 20 | 42 | 176 | 390 | 43 | 243 | 190 | 1318 | 52 | 50 | 1264 | 424 | |
| | | v/c | 0.08 | 0.86 | 0.86 | 0.98 | 0.07 | - | 0.90 | 0.59 | - | 0.33 | 0.62 | - | |
| | | Delay (s) | 43 | 54 | 54 | 64 | 27 | - | 61 | 25 | - | 49 | 27 | - | |
| | | LOS | D | D | D | E | C | - | E | C | - | D | C | - | |
| | | 95th Queue (m) | 7 | 80 | 80 | 127 | 11 | - | 73 | 98 | - | 18 | 100 | - | |

| Intersection | Intersection Control | Direction | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Intersection LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Movement | L | T | R | L | T | R | L | T | R | L | T | R | |
| Highway 16A / Veterans Way/Boundary Road | **2026 PM PEAK HOUR - BACKGROUND VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/R | | | LTR | | | L/T/T/T/R | | | L/L/T/T/TR | | | B |
| | | Volume | 70 | 4 | 285 | 0 | 0 | 12 | 4 | 1407 | 86 | 584 | 1278 | 8 | |
| | | v/c | 0.23 | 0.02 | - | 0.18 | 0.18 | 0.18 | 0.27 | 0.55 | - | 0.86 | 0.35 | 0.35 | |
| | | Delay (s) | 43 | 41.28 | - | 54 | 54 | 54 | 64 | 20 | - | 46 | 7 | 8 | |
| | | LOS | D | D | - | D | D | D | E | B | - | D | A | A | |
| | | 95th Queue (m) | 24 | 1 | - | 5 | 5 | 5 | 2 | 93 | - | 92 | 46 | 49 | |
| | **2026 PM PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/R | | | LTR | | | L/T/T/T/R | | | L/L/T/T/TR | | | C |
| | | Volume | 196 | 4 | 285 | 0 | 0 | 12 | 4 | 1667 | 216 | 584 | 1530 | 8 | |
| | | v/c | 0.48 | 0.01 | - | 0.18 | 0.18 | 0.18 | 0.19 | 0.7 | - | 0.97 | 0.45 | 0.45 | |
| | | Delay (s) | 42 | 36 | - | 54 | 54 | 54 | 58 | 25 | - | 56 | 11 | 12 | |
| | | LOS | D | D | - | D | D | D | E | C | - | E | B | B | |
| | | 95th Queue (m) | 66 | 1 | - | 5 | 5 | 5 | 2 | 123 | - | 101 | 72 | 77 | |
| Boulder Boulevard / North Park Drive | **2026 PM PEAK HOUR - BACKGROUND VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/R | | | L/TR | | | LT/R | | | LTR | | | B |
| | | Volume | 276 | 27 | 41 | 5 | 106 | 5 | 3 | 74 | 318 | 100 | 21 | 2 | |
| | | v/c | 0.33 | 0.03 | 0.05 | 0.01 | 0.12 | 0.12 | 0.15 | 0.15 | 0.85 | 0.39 | 0.39 | 0.39 | |
| | | Delay (s) | 8 | 5 | 5 | 8 | 7 | 7 | 17 | 17 | 27 | 22 | 22 | 22 | |
| | | LOS | A | A | A | A | A | A | B | B | C | C | C | C | |
| | | 95th Queue (m) | 20 | 2 | 2 | 0 | 9 | 9 | 11 | 11 | 60 | 21 | 21 | 21 | |
| | **2026 PM PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/R | | | L/TR | | | LT/R | | | LTR | | | B |
| | | Volume | 276 | 246 | 41 | 5 | 332 | 13 | 10 | 74 | 318 | 100 | 21 | 2 | |
| | | v/c | 0.44 | 0.24 | 0.05 | 0.01 | 0.38 | 0.38 | 0.17 | 0.17 | 0.85 | 0.39 | 0.39 | 0.39 | |
| | | Delay (s) | 11.56 | 6.01 | 4.9 | 10 | 9 | 9 | 17 | 17 | 27 | 22 | 22 | 22 | |
| | | LOS | B | A | A | B | A | A | B | B | C | C | C | C | |
| | | 95th Queue (m) | 21.82 | 16.51 | 2.44 | 1 | 33 | 33 | 12 | 12 | 60 | 21 | 21 | 21 | |
| North Park Drive / Quartz Avenue (New Intersection) | **2026 PM PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | | T/R | | LT | | | | | | L/R | | | B |
| | | Volume | | 33 | 288 | 14 | 50 | | | | | 296 | | 15 | |
| | | v/c | | 0 | 0 | 0.01 | 0.01 | | | | | 0.34 | | 0.01 | |
| | | Delay (s) | | 0 | 0 | 8 | 8 | | | | | 11 | | 9 | |
| | | LOS | | A | A | A | A | | | | | B | | A | |
| | | 95th Queue (m) | | 0 | 0 | 0 | 0 | | | | | 11 | | 0 | |

| Intersection | Intersection Control | Direction | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Intersection LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Movement | L | T | R | L | T | R | L | T | R | L | T | R | |
| Quartz Avenue / 28 Street (New Intersection) | | 2026 PM PEAK HOUR - TOTAL VOLUMES | | | | | | | | | | | | | |
| | T-Intersection, Yield-Controlled | Geometry | L | | | TR | | | R | | | | | | A |
| | | Volume | 109 | | | | | | | | 87 | | | | |
| | | v/c | 0.07 | | | | | | | | 0.08 | | | | |
| | | Delay (s) | 3 | | | | | | | | 4 | | | | |
| | | LOS | A | | | | | | | | A | | | | |
| | | 95th Queue (m) | 2 | | | | | | | | 2 | | | | |
| Site Access #1 on 28 Street | | 2026 PM PEAK HOUR - TOTAL VOLUMES | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | L/T | | | TR | | | L/R | | | | | | B |
| | | Volume | 563 | 109 | | | 87 | 0 | 0 | | 605 | | | | |
| | | v/c | 0.37 | 0 | | | 0 | 0 | 0 | | 0.62 | | | | |
| | | Delay (s) | 9 | 0 | | | 0 | 0 | 0 | | 15 | | | | |
| | | LOS | A | A | | | A | A | A | | B | | | | |
| | | 95th Queue (m) | 13 | 0 | | | 0 | 0 | 0 | | 34 | | | | |
| Site Access #2 on Quartz Avenue | | 2026 PM PEAK HOUR - TOTAL VOLUMES | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | L/R | | | | | | TR | | | LT | | | C |
| | | Volume | 300 | | 87 | | | | | 0 | 292 | 109 | 0 | | |
| | | v/c | 0.52 | | 0.1 | | | | | 0 | 0 | 0.09 | 0.09 | | |
| | | Delay (s) | 18 | | 9 | | | | | 0 | 0 | 8 | 8 | | |
| | | LOS | C | | A | | | | | A | A | A | A | | |
| | | 95th Queue (m) | 23 | | 2 | | | | | 0 | 0 | 2 | 2 | | |

*Table 9: Intersection Performance Measures – Opening Day (2026) Saturday Peak Hour*

| Intersection | Intersection Control | Direction | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Intersection LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Movement | L | T | R | L | T | R | L | T | R | L | T | R | |
| Highway 16A / North Park Drive/South Park Drive | **2026 SAT PEAK HOUR - BACKGROUND VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/TR | | | L/L/T/TR | | | L/L/T/T/T/R | | | L/L/T/T/T/R | | | C |
| | | Volume | 184 | 87 | 188 | 293 | 111 | 50 | 64 | 616 | 170 | 306 | 598 | 160 | |
| | | v/c | 0.39 | 0.32 | 0.8 | 0.45 | 0.31 | 0.32 | 0.31 | 0.3 | - | 0.63 | 0.24 | 0.21 | |
| | | Delay (s) | 32 | 39 | 48 | 30 | 39 | 39 | 46 | 21 | - | 42 | 16 | 16 | |
| | | LOS | C | D | D | C | D | D | D | C | - | D | B | B | |
| | | 95th Queue (m) | 53 | 27 | 64 | 38 | 26 | 24 | 10 | 42 | - | 48 | 34 | 28 | |
| | **2026 SAT PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/TR | | | L/T/TR | | | L/L/T/T/T/R | | | L/L/T/T/T/R | | | C |
| | | Volume | 184 | 129 | 198 | 293 | 156 | 288 | 293 | 841 | 170 | 317 | 831 | 160 | |
| | | v/c | 0.5 | 0.46 | 0.82 | 0.61 | 0.36 | 0.77 | 0.82 | 0.46 | - | 0.72 | 0.42 | 0.27 | |
| | | Delay (s) | 32 | 44 | 52 | 30 | 36 | 43 | 53 | 28 | - | 48 | 26 | 25 | |
| | | LOS | C | D | D | C | D | D | D | C | - | D | C | C | |
| | | 95th Queue (m) | 54 | 45 | 73 | 78 | 49 | 92 | 55 | 71 | - | 57 | 67 | 40 | |
| Highway 16A / 28 Street | **2026 SAT PEAK HOUR - BACKGROUND VOLUMES** | | | | | | | | | | | | | | |
| | Yield Controlled, Right-in/Right-out Eastbound | Geometry | R | | | | | | T/T/T/R | | | T/T/T | | | B |
| | | Volume | | | 141 | | | | | 1033 | 42 | | 1027 | | |
| | | v/c | | | 0.33 | | | | | 0 | 0 | | 0 | | |
| | | Delay (s) | | | 14 | | | | | 0 | 0 | | 0 | | |
| | | LOS | | | B | | | | | A | A | | A | | |
| | | 95th Queue (m) | | | 11 | | | | | 0 | 0 | | 0 | | |
| | **2026 SAT PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/TR | | | L/T/R | | | L/T/T/T/R | | | L/T/T/T/R | | | C |
| | | Volume | 16 | 52 | 141 | 484 | 54 | 280 | 235 | 1054 | 42 | 40 | 1012 | 505 | |
| | | v/c | 0.08 | 0.85 | 0.85 | 0.94 | 0.08 | - | 0.88 | 0.52 | - | 0.29 | 0.61 | - | |
| | | Delay (s) | 45 | 55 | 55 | 48 | 24 | - | 60 | 26 | - | 49 | 33 | - | |
| | | LOS | D | D | D | D | C | | E | C | - | D | C | - | |
| | | 95th Queue (m) | 6 | 73 | 73 | 144 | 13 | | 87 | 83 | - | 14 | 90 | - | |

| Intersection | Intersection Control | Direction | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Intersection LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Movement | L | T | R | L | T | R | L | T | R | L | T | R | |
| Highway 16A / Veterans Way/Boundary Road | **2026 SAT PEAK HOUR - BACKGROUND VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | **Geometry** | L/T/R | | | LTR | | | L/T/T/T/R | | | L/L/T/T/TR | | | B |
| | | **Volume** | 56 | 3 | 227 | 0 | 0 | 10 | 3 | 1125 | 68 | 467 | 1023 | 7 | |
| | | **v/c** | 0.19 | 0.01 | - | 0.18 | 0.18 | 0.18 | 0.13 | 0.42 | - | 0.87 | 0.28 | 0.28 | |
| | | **Delay (s)** | 40 | 38 | - | 50 | 50 | 50 | 52 | 15 | - | 46 | 7 | 7 | |
| | | **LOS** | D | D | - | D | D | D | D | B | - | D | A | A | |
| | | **95th Queue (m)** | 17 | 1 | - | 4 | 4 | 4 | 1 | 62 | - | 73 | 32 | 35 | |
| | **2026 SAT PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/R | | | LTR | | | L/T/T/T/R | | | L/L/T/T/TR | | | B |
| | | Volume | 212 | 3 | 227 | 0 | 0 | 10 | 3 | 1447 | 230 | 467 | 1336 | 7 | |
| | | v/c | 0.63 | 0.01 | - | 0.18 | 0.18 | 0.18 | 0.27 | 0.55 | - | 0.84 | 0.37 | 0.37 | |
| | | Delay (s) | 52 | 40 | - | 54 | 54 | 54 | 67 | 19 | - | 48 | 8 | 9 | |
| | | LOS | D | D | - | D | D | D | E | B | - | D | A | A | |
| | | 95th Queue (m) | 77 | 1 | 0 | 4 | 4 | 4 | 2 | 92 | - | 78 | 52 | 56 | |
| Boulder Boulevard / North Park Drive | **2026 SAT PEAK HOUR - BACKGROUND VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/R | | | L/TR | | | LT/R | | | LTR | | | B |
| | | Volume | 221 | 22 | 33 | 5 | 97 | 4 | 2 | 72 | 254 | 80 | 17 | 2 | |
| | | v/c | 0.25 | 0.02 | 0.04 | 0.01 | 0.1 | 0.1 | 0.17 | 0.17 | 0.82 | 0.35 | 0.35 | 0.35 | |
| | | Delay (s) | 5 | 4 | 4 | 7 | 6 | 6 | 19 | 19 | 28 | 23 | 23 | 23 | |
| | | LOS | A | A | A | A | A | A | B | B | C | C | C | C | |
| | | 95th Queue (m) | 12 | 1 | 2 | 0 | 7 | 7 | 11 | 11 | 49 | 17 | 17 | 17 | |
| | **2026 SAT PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/R | | | L/TR | | | LT/R | | | LTR | | | B |
| | | Volume | 221 | 293 | 33 | 5 | 378 | 14 | 11 | 72 | 254 | 80 | 17 | 2 | |
| | | v/c | 0.34 | 0.27 | 0.04 | 0.01 | 0.4 | 0.4 | 0.19 | 0.19 | 0.82 | 0.36 | 0.36 | 0.36 | |
| | | Delay (s) | 8 | 5 | 4 | 9 | 8 | 8 | 20 | 20 | 28 | 23 | 23 | 23 | |
| | | LOS | A | A | A | A | A | A | B | B | C | C | C | C | |
| | | 95th Queue (m) | 14 | 17 | 2 | 0 | 33 | 33 | 13 | 13 | 49 | 17 | 17 | 17 | |
| North Park Drive / Quartz Avenue (New Intersection) | **2026 SAT PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | | T/R | | LT | | | | | | L/R | | | B |
| | | Volume | | 33 | 342 | 15 | 50 | | | | | 353 | | 16 | |
| | | v/c | | 0 | 0 | 0.01 | 0.01 | | | | | 0.4 | | 0.02 | |
| | | Delay (s) | | 0 | 0 | 8 | 8 | | | | | 12 | | 9 | |
| | | LOS | | A | A | A | A | | | | | B | | A | |
| | | 95th Queue (m) | | 0 | 0 | 0 | 0 | | | | | 15 | | 0 | |

| Intersection | Intersection Control | Direction | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Intersection LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Movement | L | T | R | L | T | R | L | T | R | L | T | R | |
| Quartz Avenue / 28 Street (New Intersection) | | 2026 SAT PEAK HOUR - TOTAL VOLUMES | | | | | | | | | | | | | |
| | T-Intersection, Yield-Controlled | Geometry | L | | | TR | | | R | | | | | | A |
| | | Volume | 135 | | | | | | | | 108 | | | | |
| | | v/c | 0.08 | | | | | | | | 0.1 | | | | |
| | | Delay (s) | 3 | | | | | | | | 4 | | | | |
| | | LOS | A | | | | | | | | A | | | | |
| | | 95th Queue (m) | 2 | | | | | | | | 3 | | | | |
| Site Access #1 on 28 Street | | 2026 SAT PEAK HOUR - TOTAL VOLUMES | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | L/T | | | TR | | | T/R | | | | | | C |
| | | Volume | 683 | 135 | | | 108 | 0 | 0 | | 736 | | | | |
| | | v/c | 0.46 | 0 | | | 0 | 0 | 0 | | 0.78 | | | | |
| | | Delay (s) | 9 | 0 | | | 0 | 0 | 0 | | 21 | | | | |
| | | LOS | A | A | | | A | A | A | | C | | | | |
| | | 95th Queue (m) | 19 | 0 | | | 0 | 0 | 0 | | 61 | | | | |
| Site Access #2 on Quartz Avenue | | 2026 SAT PEAK HOUR - TOTAL VOLUMES | | | | | | | | | | | | | |
| | T-Intersection, Yield-Controlled | Geometry | L/R | | | | | | TR | | | LT | | | D |
| | | Volume | 358 | | 108 | | | | | 0 | 347 | 135 | 0 | | |
| | | v/c | 0.7 | | 0.12 | | | | | 0 | 0 | 0.11 | 0.11 | | |
| | | Delay (s) | 27 | | 10 | | | | | 0 | 0 | 8 | 8 | | |
| | | LOS | D | | A | | | | | A | A | A | A | | |
| | | 95th Queue (m) | 42 | | 3 | | | | | 0 | 0 | 3 | 3 | | |

## 4.2 FULL BUILD-OUT (2046)

At Full Build-out in 2046, it is assumed that the ASP will be completed. The addition of the ASP is expected to generate significantly more trips than the proposed development. As a result, the road network and intersections within the study area will be further constrained. *Table 10* and *Table 9* summarizes the traffic analysis results for the Opening Day (2026) horizon, comparing background volumes and total volumes (background + development) at the intersections most directly impacted. Detailed Vistro reports for all study intersections are included in **Appendix D**.

Anticipated local and regional growth is expected to increase delays along the Highway 16A corridor. As a result, several key movements will operate near or at capacity, with longer delays and queuing occurring even without the full build-out of the ASP. Based on the analysis, the traffic operations for the 2046 horizon with development show the following notable results:

- **Highway 16A / North Park Drive / South Park Drive** – Under the 2046 horizon with background growth (including the big-box store development), all left-turn movements are projected to operate at LOS E during the PM peak hour. However, these conditions are further deteriorated with the addition of the ASP traffic demands, resulting in most movements operating at a LOS F. Conditions are slightly improved during the Saturday peak hour due to lower commuter traffic; however, key movements will still experience longer delays. While some movements are projected to operate at LOS F, the majority of delays are under three minutes. This level of delay is generally typical for semi-urban arterial corridors of this nature, especially where a highway functions as the primary access to adjacent industrial and commercial development and protected left-turn phasing is provided.

- **Highway 16A / 28 Street** – The intersection will operate at a LOS C and LOS D under the 2046 horizon with background growth and the proposed development during the PM and Saturday peak hour, respectively. The eastbound and westbound thru movements will experience in longer queues in the range of 200m to 250m.

  The performance of the key movements is significantly reduced with the addition of the ASP traffic demands, resulting in LOS E operations. In particular, southbound left is projected to have a queue length of approximately 140 m with dual left-turn lanes, which is approaching towards the proposed Site Access #2 on 28 Street. The eastbound and westbound thru movement will also experience queues in the range of approximately 250 m. Despite some of these constraints, the overall intersection is anticipated to operate at a LOS D during the peak hours with the full build-out of the ASP.

- **Highway 16A / Boundary Road** – The intersection will operate at a LOS E or better under the 2046 horizon with background growth and the proposed development during the PM and Saturday peak hour, with some individual movements operating at a LOS F. These results account for traffic growth on Boundary Road as a result of the four-lane upgrade, also noting that there will be the requirement for a creek crossing and consultation with the City of Spruce Grove. Similar to the other intersections along Highway 16A, the addition of the ASP will place increased

pressure along Boundary Road and the intersection with Highway 16A. All turn movements will experience longer delays and queues, resulting in the eastbound and westbound movements operating at a LOS F. The intersection performance is slightly better during the Saturday peak hour due to the reduction of commuter traffic, however, some of the left-turn movements will experience longer delays and queues with the ASP traffic.

- **North Park Drive / Quartz Avenue (New Intersection)** – This intersection operate at a LOS B during the PM peak hour and Saturday peak hour with background growth and the proposed development. The addition of the ASP will increase the delays of the westbound left-turns, particularly during the Saturday peak hour, resulting in a LOS F and delays nearing one minute. This is primarily due to reduced gaps and a high volume of left-turns. These delays can be mitigated through the implementation of an all-way stop control or a potential signal.

- **Site Access #1 on 28 Street** – Under the 2046 horizon, and without completion of the ASP, this intersection will continue to operate at a LOS B and a LOS C during the PM peak hour and Saturday peak hour, respectively. The addition of the ASP will require this intersection to be upgraded to a four-legged, signalized intersection with dedicated turn lanes. This would allow the intersection to maintain a LOS C while minimizing the queues for the northbound left. It is assumed that the fourth leg of the intersection will also serve as the main access into the ASP's commercial area (east of 28 Street).

  The northbound left is projected to have a queue length of just over 100m during the Saturday peak hour. The proposed location of the site may need to be shifted further north to provide sufficient spacing to accommodate the required storage length for the northbound left, as well as the storage for the southbound left turn at the Highway 16/28 Street intersection.

- **Site Access #2 on Quartz Avenue** – Under the 2046 horizon, and without completion of the ASP, this intersection will continue to operate at a LOS B and a LOS C during the PM peak hour and Saturday peak hour, respectively. The addition of the ASP will further increase the delays of the northbound left movement, resulting in a LOS E during the Saturday peak hour (almost 40 seconds of delay). However, this level of delay may be tolerable in a busy commercial area during peak shopping hours. Alternate exit points are also provided to allow drivers to choose a different route to minimize wait times. Therefore, this anticipated delay is considered acceptable.

While the addition of the ASP will further increase the delays and place increased pressures across the network, the remaining study intersections, including the intersections west of the site and the internal ASP intersections, will operate at a LOS D or better during the peak hours, with no significant delays or queuing impacts anticipated.

The planned ASP is expected to generate significantly more traffic than the proposed development (big-box store), resulting in increased delays and congestion on the main arterials (i.e. Highway 16A, Boundary Road/Veterans Boulevard) and the primary north-south collector (28 Street). Under full ASP build-out, projected delays result in capacity constraints and longer queues at key intersections despite

the inclusion of dedicated turn lanes (including dual left-turns) and optimized signal timing plans. These impacts are most notable at the following Highway 16A intersections:

- **Highway 16A / North Park Drive/South Park Drive**: Eastbound and Westbound Thru and Left, Northbound Left and Right
- **Highway 16A / 28 Street**: Westbound Thru and left, Eastbound Left and Southbound Left
- **Highway 16A / Boundary Road**: Eastbound and Westbound Thru and Left, Southbound Left

For the big-box store development alone, the existing and proposed network connections provide sufficient capacity, and operations remain acceptable. The more pronounced capacity constraints are associated with the full build-out of the ASP, which emphasizes the need for additional connections beyond those currently proposed. In particular, an east-west link along the northern boundary of the ASP, providing a direct connection to Highway 779, would help alleviate pressure on Highway 16A, 28 Street, and Boundary Road. It would also offer an alternate route into the ASP for the industrial and business commercial traffic, as well as regional travel. Additional analysis of this east-west link is further discussed in **Section 5.3**.

A summary of the proposed improvements to address operational constraints and network connectivity is provided in **Section 6**.

*Table 10: Intersection Performance Measures – Full Build-out (2046) PM Peak Hour*

| Intersection | Intersection Control | Direction | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Intersection LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Movement | L | T | R | L | T | R | L | T | R | L | T | R | |
| Highway 16A / North Park Drive/South Park Drive | **2046 PM PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/L/T/TR | | | L/L/T/TR | | | L/L/T/T/T/R | | | L/L/T/T/T/R | | | D |
| | | Volume | 338 | 140 | 353 | 361 | 169 | 235 | 261 | 1492 | 314 | 476 | 1388 | 197 | |
| | | v/c | 0.87 | 0.31 | 0.93 | 0.87 | 0.36 | 0.59 | 0.83 | 0.78 | - | **0.91** | 0.62 | - | |
| | | Delay (s) | 63 | 41 | 60 | 62 | 41 | 45 | 64 | 40 | - | 61 | 30 | - | |
| | | LOS | E | D | E | E | D | D | E | D | - | E | C | - | |
| | | 95th Queue (m) | 74 | 52 | 138 | 78 | 62 | 85 | 59 | 152 | - | 95 | 124 | - | |
| | **2046 PM PEAK HOUR – TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/L/T/TR | | | L/L/T/TR | | | L/L/T/T/T/R | | | L/L/T/T/T/R | | | F |
| | | Volume | 338 | 194 | 419 | 402 | 278 | 491 | 488 | 1828 | 314 | 549 | 1876 | 200 | |
| | | v/c | 1.08 | 0.4 | 1.01 | 0.93 | 0.26 | 0.26 | 1.12 | 1.14 | - | 1.14 | 1.12 | - | |
| | | Delay (s) | 113 | 44 | 94 | 70 | 38 | 38 | 121 | 120 | - | 129 | 110 | - | |
| | | LOS | **F** | D | **F** | E | D | D | **F** | **F** | - | **F** | **F** | - | |
| | | 95th Queue (m) | 96 | 73 | 203 | 93 | 51 | 51 | 133 | 308 | - | 152 | 304 | - | |
| Highway 16A / 28 Street | **2046 PM PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/R | | | L/T/R | | | L/T/T/T/R | | | L/T/T/T/R | | | C |
| | | Volume | 30 | 42 | 264 | 347 | 43 | 250 | 190 | 1938 | 78 | 175 | 1780 | 424 | |
| | | v/c | 0.08 | 0.37 | 0.92 | 0.91 | 0.18 | - | 0.87 | 0.65 | - | 0.85 | 0.61 | - | |
| | | Delay (s) | 42 | 61 | 61 | 51 | 39 | - | 66 | 20 | - | 66 | 19 | - | |
| | | LOS | D | E | E | E | D | - | E | B | - | E | B | - | |
| | | 95th Queue (m) | 11 | 19 | 19 | 136 | 18 | - | 84 | 144 | - | 78 | 131 | - | |
| | **2046 PM PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/R | | | L/L/T/R | | | L/L/T/T/T/R | | | L/T/T/T/R | | | D |
| | | Volume | 31 | 106 | 285 | 629 | 133 | 559 | 440 | 2123 | 85 | 201 | 1934 | 497 | |
| | | v/c | 0.08 | 0.79 | 0.79 | 1 | 0.32 | - | 0.94 | 0.94 | - | 0.89 | 0.87 | - | |
| | | Delay (s) | 36 | 74 | 74 | 74 | 46 | - | 69 | 46 | - | 72 | 41 | - | |
| | | LOS | D | E | E | D | C | - | E | D | - | E | D | - | |
| | | 95th Queue (m) | 11 | 57 | 57 | 140 | 54 | - | 98 | 240 | - | 92 | 207 | - | |

| Intersection | Intersection Control | Direction | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Intersection LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Movement | L | T | R | L | T | R | L | T | R | L | T | R | |
| Highway 16A / Boundary Road | **2046 PM PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | **Geometry** | L/T/T/R | | | L/T/T/R | | | L/L/T/T/T/R | | | L/L/T/T/TR | | | D |
| | | **Volume** | 229 | 6 | 418 | 20 | 200 | 139 | 156 | 2136 | 256 | 660 | 1970 | 50 | |
| | | **v/c** | 0.81 | 0.02 | - | 0.06 | 0.72 | - | 0.81 | 0.79 | - | 1.29 | 0.62 | - | |
| | | **Delay (s)** | 74 | 52 | - | 45 | 62 | - | 69 | 27 | - | 192 | 16 | - | |
| | | **LOS** | E | D | - | D | E | - | E | C | - | **F** | B | - | |
| | | **95th Queue (m)** | 104 | 1 | - | 8 | 46 | - | 38 | 189 | - | 212 | 133 | - | |
| | **2046 PM PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/T/R | | | L/T/T/R | | | L/L/T/T/T/R | | | L/L/T/T/T/R | | | E |
| | | Volume | 303 | 199 | 418 | 382 | 446 | 380 | 390 | 2273 | 373 | 660 | 2051 | 313 | |
| | | v/c | 0.77 | 0.36 | - | 0.78 | 0.81 | - | 0.97 | 1.12 | - | 1.2 | 0.92 | - | |
| | | Delay (s) | 54 | 53 | - | 51 | 60 | - | 77 | 105 | - | 155 | 44 | - | |
| | | LOS | D | D | - | D | E | - | E | **F** | - | F | D | - | |
| | | 95th Queue (m) | 116 | 43 | - | 51 | 60 | - | 92 | 358 | - | 194 | 227 | - | |
| Boulder Boulevard / North Park Drive | **2046 PM PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/R | | | L/TR | | | LT/R | | | LTR | | | B |
| | | Volume | 276 | 288 | 41 | 10 | 294 | 27 | 14 | 12 | 318 | 100 | 21 | 2 | |
| | | v/c | 0.4 | 0.26 | 0.04 | 0.02 | 0.34 | 0.34 | 0.06 | 0.06 | 0.89 | 0.4 | 0.4 | 0.4 | |
| | | Delay (s) | 9 | 7 | 5 | 13 | 12 | 12 | 26 | 26 | 41 | 31 | 31 | 31 | |
| | | LOS | A | A | A | B | B | B | C | C | D | C | C | C | |
| | | 95th Queue (m) | 30 | 29 | 3 | 2 | 47 | 47 | 6 | 6 | 89 | 32 | 32 | 32 | |
| | **2046 PM PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/R | | | L/TR | | | LT/R | | | LTR | | | C |
| | | Volume | 280 | 569 | 41 | 10 | 674 | 20 | 14 | 12 | 344 | 100 | 21 | 2 | |
| | | v/c | 0.72 | 0.53 | 0.04 | 0.03 | 0.76 | 0.76 | 0.06 | 0.06 | 0.9 | 0.38 | 0.38 | 0.38 | |
| | | Delay (s) | 27 | 10 | 6 | 22 | 22 | 22 | 25 | 25 | 40 | 29 | 29 | 29 | |
| | | LOS | C | B | A | C | C | C | C | C | D | C | C | C | |
| | | 95th Queue (m) | 44 | 73 | 4 | 2 | 130 | 130 | 6 | 6 | 94 | 31 | 31 | 31 | |

| Intersection | Intersection Control | Direction | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Intersection LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Movement | L | T | R | L | T | R | L | T | R | L | T | R | |
| North Park Drive / Quartz Avenue (New Intersection) | **2046 PM PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | | TR | | | LT | | | | | | L/R | | B |
| | | Volume | | 12 | 293 | 14 | 50 | | | | | 272 | | 36 | |
| | | v/c | | 0 | 0 | 0.01 | 0.01 | | | | | 0.37 | | 0.04 | |
| | | Delay (s) | | 0 | 0 | 8 | 8 | | | | | 13 | | 9 | |
| | | LOS | | A | A | A | A | | | | | B | | A | |
| | | 95th Queue (m) | | 0 | 0 | 0 | 0 | | | | | 13 | | 1 | |
| | **2046 PM PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | | T/R | | | L/T | | | | | | L/R | | D |
| | | Volume | | 251 | 335 | 14 | 421 | | | | | 274 | | 36 | |
| | | v/c | | 0 | 0 | 0.01 | 0 | | | | | 0.69 | | 0.05 | |
| | | Delay (s) | | 0 | 0 | 9 | 0 | | | | | 31 | | 10 | |
| | | LOS | | A | A | A | A | | | | | D | | A | |
| | | 95th Queue (m) | | 0 | 0 | 0 | 0 | | | | | 38 | | 1 | |
| Quartz Avenue / 28 Street (New Intersection) | **2046 PM PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | T-Intersection, Yield-Controlled | Geometry | L | | | | | | R | | | | | | A |
| | | Volume | 76 | | | | | | | | 78 | | | | |
| | | v/c | 0 | | | | | | | | 0 | | | | |
| | | Delay (s) | 0 | | | | | | | | 0 | | | | |
| | | LOS | A | | | | | | | | A | | | | |
| | | 95th Queue (m) | 0 | | | | | | | | 0 | | | | |
| | **2046 PM PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Four Legged, Signalized | Geometry | L/T/TR | | | L/T/TR | | | L/TR | | | L/TR | | | B |
| | | Volume | 101 | 211 | 155 | 9 | 419 | 88 | 93 | 45 | 104 | 218 | 47 | 18 | |
| | | v/c | 0.23 | 0.21 | 0.22 | 0.02 | 0.29 | 0.29 | 0.2 | 0.3 | 0.3 | 0.57 | 0.12 | 0.12 | |
| | | Delay (s) | 13 | 8 | 8 | 10 | 9 | 9 | 17 | 15 | 15 | 23 | 14 | 14 | |
| | | LOS | B | A | A | A | A | A | B | B | B | C | B | B | |
| | | 95th Queue (m) | 13 | 17 | 15 | 1 | 23 | 22 | 13 | 19 | 19 | 39 | 8 | 8 | |

| Intersection | Intersection Control | Direction | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Intersection LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Movement | L | T | R | L | T | R | L | T | R | L | T | R | |
| Site Access #1 on 28 Street | **2046 PM PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | L/T | | | TR | | | L/R | | | | | | B |
| | | Volume | 538 | 76 | | | 78 | 46 | 0 | | 562 | | | | |
| | | v/c | 0.37 | 0 | | | 0 | 0 | 0 | | 0.59 | | | | |
| | | Delay (s) | 9 | 0 | | | 0 | 0 | 0 | | 14 | | | | |
| | | LOS | A | A | | | A | A | A | | B | | | | |
| | | 95th Queue (m) | 13 | 0 | | | 0 | 0 | 0 | | 30 | | | | |
| | **2046 PM PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Four Legged, Signalized | Geometry | L/T/TR | | | L/T/TR | | | L/T/R | | | L/TR | | | C |
| | | Volume | 438 | 402 | 303 | 12 | 719 | 10 | 40 | 24 | 482 | 219 | 38 | 25 | |
| | | v/c | 0.82 | 0.46 | 0.46 | 0.03 | 0.56 | 0.56 | 0.08 | 0.06 | 0.24 | 0.4 | 0.16 | 0.16 | |
| | | Delay (s) | 29 | 19 | 19 | 10 | 27 | 27 | 23 | 30 | 0 | 28 | 30 | 30 | |
| | | LOS | C | B | B | B | C | C | C | C | A | C | C | C | |
| | | 95th Queue (m) | 89 | 76 | 68 | 2 | 88 | 88 | 9 | 7 | 2 | 58 | 17 | 17 | |
| Site Access #2 on Quartz Avenue | **2046 PM PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | L/R | | | | | | T/R | | | L/T | | | B |
| | | Volume | 277 | | 78 | | | | | 0 | 276 | 76 | 0 | | |
| | | v/c | 0.42 | | 0.09 | | | | | 0 | 0 | 0.06 | 0 | | |
| | | Delay (s) | 14 | | 9 | | | | | 0 | 0 | 8 | 0 | | |
| | | LOS | B | | A | | | | | A | A | A | A | | |
| | | 95th Queue (m) | 16 | | 2 | | | | | 0 | 0 | 1.43 | 0 | | |
| | **2046 PM PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | L/R | | | | | | T/R | | | L/T | | | D |
| | | Volume | 254 | | 202 | | | | | 41 | 298 | 190 | 46 | | |
| | | v/c | 0.67 | | 0.24 | | | | | 0 | 0 | 0.16 | 0 | | |
| | | Delay (s) | 31 | | 11 | | | | | 0 | 0 | 8 | 0 | | |
| | | LOS | D | | B | | | | | A | A | A | A | | |
| | | 95th Queue (m) | 35 | | 7 | | | | | 0 | 0 | 3 | 3 | | |

*Table 11: Intersection Performance Measures – Full Build-out (2046) Saturday Peak Hour*

| Intersection | Intersection Control | Direction | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Intersection LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Movement | L | T | R | L | T | R | L | T | R | L | T | R | |
| Highway 16A / North Park Drive/South Park Drive | **2046 SAT PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/L/T/TR | | | L/L/T/TR | | | L/L/T/T/T/R | | | L/L/T/T/T/R | | | D |
| | | Volume | 276 | 129 | 292 | 293 | 156 | 288 | 293 | 1295 | 256 | 368 | 1209 | 160 | |
| | | v/c | 0.50 | 0.34 | 0.89 | 0.54 | 0.39 | 0.86 | 0.85 | 0.59 | - | 0.87 | 0.52 | - | |
| | | Delay (s) | 38 | 48 | 64 | 38 | 48 | 60 | 68 | 32 | - | 66 | 29 | - | |
| | | LOS | D | D | E | D | D | E | E | C | - | E | C | - | |
| | | 95th Queue (m) | 49 | 54 | 124 | 52 | 64 | 119 | 69 | 125 | - | 82 | 111 | - | |
| | **2046 SAT PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/L/T/TR | | | L/L/T/TR | | | L/L/T/T/T/R | | | L/L/T/T/T/R | | | E |
| | | Volume | 271 | 211 | 365 | 344 | 272 | 499 | 550 | 1676 | 251 | 545 | 1691 | 290 | |
| | | v/c | 0.87 | 0.46 | 0.93 | 0.96 | 0.29 | 0.29 | 1.00 | 1.03 | - | 0.96 | 1.01 | - | |
| | | Delay (s) | 70 | 46 | 73 | 77 | 42 | 42 | 77 | 77 | - | 68 | 72 | - | |
| | | LOS | E | D | E | E | D | D | E | **F** | - | E | **F** | **-** | |
| | | 95th Queue (m) | 67 | 80 | 161 | 85 | 53 | 53 | 124 | 235 | - | 117 | 232 | - | |
| Highway 16A / 28 Street | **2046 SAT PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/R | | | L/T/R | | | L/T/T/T/R | | | L/T/T/T/R | | | C |
| | | Volume | 24 | 52 | 211 | 484 | 54 | 280 | 235 | 1581 | 62 | 160 | 1434 | 505 | |
| | | v/c | 0.05 | 0.44 | - | 0.89 | 0.13 | - | 0.90 | 0.66 | - | 0.9 | 0.67 | - | |
| | | Delay (s) | 35 | 66 | - | 58 | 43 | - | 70 | 30 | - | 77 | 34 | - | |
| | | LOS | D | E | - | E | D | - | E | C | - | E | C | - | |
| | | 95th Queue (m) | 8 | 26 | - | 187 | 21 | - | 106 | 153 | - | 80 | 148 | - | |
| | **2046 SAT PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/TR | | | L/L/T/R | | | L/L/T/T/T/R | | | L/T/T/T/R | | | D |
| | | Volume | 27 | 146 | 235 | 650 | 157 | 594 | 548 | 1767 | 70 | 86 | 1907 | 641 | |
| | | v/c | 0.06 | 0.83 | - | 0.99 | 0.34 | - | 0.96 | 0.75 | - | 0.58 | 0.99 | - | |
| | | Delay (s) | 33 | 72 | - | 71 | 43 | - | 69 | 33 | - | 66 | 60 | - | |
| | | LOS | C | E | - | E | D | - | E | C | - | E | E | - | |
| | | 95th Queue (m) | 9 | 72 | - | 142 | 61 | - | 118 | 172 | - | 42 | 242 | - | |

| Intersection | Intersection Control | Direction | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Intersection LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Movement | L | T | R | L | T | R | L | T | R | L | T | R | |
| Highway 16A / Boundary Road | **2046 SAT PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | **Geometry** | L/T/T/R | | | L/T/T/R | | | L/L/T/T/T/R | | | L/L/T/T/T/R | | | C |
| | | **Volume** | 238 | 3 | 334 | 20 | 160 | 110 | 125 | 1857 | 263 | 528 | 1722 | 40 | |
| | | **v/c** | 0.76 | 0.01 | - | 0.06 | 0.62 | - | 0.51 | 0.7 | - | 0.96 | 0.56 | - | |
| | | **Delay (s)** | 71 | 54 | - | 47 | 65 | - | 64 | 27 | - | 70 | 17 | - | |
| | | **LOS** | E | D | - | D | E | - | E | C | - | E | B | - | |
| | | **95th Queue (m)** | 109 | 1 | - | 8 | 39 | - | 30 | 169 | - | 117 | 124 | - | |
| | **2046 SAT PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/T/R | | | L/T/T/R | | | L/L/T/T/T/R | | | L/L/T/T/TR | | | D |
| | | Volume | 381 | 219 | 334 | 426 | 460 | 459 | 380 | 1902 | 370 | 528 | 1793 | 353 | |
| | | v/c | 0.81 | 0.35 | - | 0.77 | 0.83 | - | 0.95 | 1.04 | - | 1.06 | 0.91 | - | |
| | | Delay (s) | 51.62 | 50.84 | - | 48.43 | 60.52 | - | 73.46 | 76.09 | - | 96.24 | 48.03 | - | |
| | | LOS | D | D | - | D | E | - | E | F | - | F | D | - | |
| | | 95th Queue (m) | 137 | 47 | - | 151 | 98 | - | 88 | 264 | - | 130 | 207 | - | |
| Boulder Boulevard / North Park Drive | **2046 SAT PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/R | | | L/TR | | | LT/R | | | LTR | | | B |
| | | Volume | 221 | 293 | 33 | 5 | 378 | 14 | 11 | 72 | 254 | 80 | 17 | 2 | |
| | | v/c | 0.34 | 0.27 | 0.04 | 0.01 | 0.4 | 0.4 | 0.19 | 0.19 | 0.82 | 0.36 | 0.36 | 0.36 | |
| | | Delay (s) | 8 | 5 | 4 | 9 | 8 | 8 | 20 | 20 | 28 | 23 | 23 | 23 | |
| | | LOS | A | A | A | A | A | A | B | B | C | C | C | C | |
| | | 95th Queue (m) | 14 | 17 | 2 | 0 | 33 | 33 | 13 | 13 | 49 | 17 | 17 | 17 | |
| | **2046 SAT PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Signalized | Geometry | L/T/R | | | L/TR | | | LT/R | | | LTR | | | B |
| | | Volume | 251 | 764 | 33 | 5 | 699 | 31 | 15 | 10 | 283 | 80 | 17 | 2 | |
| | | v/c | 0.60 | 0.66 | 0.03 | 0.02 | 0.74 | 0.74 | 0.06 | 0.06 | 0.88 | 0.34 | 0.34 | 0.34 | |
| | | Delay (s) | 20 | 11 | 5 | 24 | 19 | 19 | 28 | 28 | 42 | 32 | 32 | 32 | |
| | | LOS | C | B | A | C | B | B | C | C | D | C | C | C | |
| | | 95th Queue (m) | 30 | 94 | 3 | 1 | 125 | 125 | 6 | 6 | 82 | 26 | 26 | 26 | |

| Intersection | Intersection Control | Direction | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Intersection LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Movement | L | T | R | L | T | R | L | T | R | L | T | R | |
| North Park Drive / Quartz Avenue (New Intersection) | **2046 SAT PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | | T/R | | | LT | | | | | | L/R | | B |
| | | Volume | | 33 | 342 | 15 | 50 | | | | | 353 | | 16 | |
| | | v/c | | 0 | 0 | 0.01 | 0.01 | | | | | 0.40 | | 0.02 | |
| | | Delay (s) | | 0 | 0 | 8 | 8 | | | | | 12 | | 9 | |
| | | LOS | | A | A | A | A | | | | | B | | A | |
| | | 95th Queue (m) | | 0 | 0 | 0 | 0 | | | | | 15 | | 0 | |
| | **2046 SAT PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | | T/R | | | L/T | | | | | | L/R | | F |
| | | Volume | | 315 | 473 | 15 | 446 | | | | | 296 | | 40 | |
| | | v/c | | 0 | 0 | 0.02 | 0 | | | | | 0.84 | | 0.06 | |
| | | Delay (s) | | 0 | 0 | 9 | 0 | | | | | 51 | | 10 | |
| | | LOS | | A | A | A | A | | | | | F | | B | |
| | | 95th Queue (m) | | 0 | 0 | 0 | 0 | | | | | 58 | | 1 | |
| Quartz Avenue / 28 Street (New Intersection) | **2046 SAT PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | T-Intersection, Yield-Controlled | Geometry | | L | | | | | | R | | | | | A |
| | | Volume | 104 | | | | | | | | 108 | | | | |
| | | v/c | 0 | | | | | | | | 0 | | | | |
| | | Delay (s) | 0 | | | | | | | | 0 | | | | |
| | | LOS | A | | | | | | | | A | | | | |
| | | 95th Queue (m) | 0 | | | | | | | | 0 | | | | |
| | **2046 SAT PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Four Legged, Signalized | Geometry | | L/T/TR | | | L/T/TR | | | L/TR | | | L/TR | | B |
| | | Volume | 16 | 300 | 196 | 6 | 403 | 116 | 104 | 99 | 129 | 95 | 75 | 25 | |
| | | v/c | 0.03 | 0.26 | 0.27 | 0.01 | 0.27 | 0.27 | 0.3 | 0.53 | 0.53 | 0.4 | 0.22 | 0.22 | |
| | | Delay (s) | 8 | 7 | 7 | 8 | 7 | 7 | 22 | 19 | 19 | 27 | 17 | 17 | |
| | | LOS | A | A | A | A | A | A | C | B | B | C | B | B | |
| | | 95th Queue (m) | 2 | 20 | 18 | 1 | 20 | 19 | 17 | 35 | 35 | 18 | 14 | 14 | |

| Intersection | Intersection Control | Direction | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Intersection LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Movement | L | T | R | L | T | R | L | T | R | L | T | R | |
| Site Access #1 on 28 Street | **2046 SAT PEAK HOUR - BACKGROUND + BIG BOX STORE VOLUMES** | | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | L/T | | | TR | | | L/R | | | | | | C |
| | | Volume | 714 | 104 | | | 108 | 0 | 0 | | 736 | | | | |
| | | v/c | 0.48 | 0 | | | 0 | 0 | 0 | | 0.78 | | | | |
| | | Delay (s) | 10 | 0 | | | 0 | 0 | 0 | | 21 | | | | |
| | | LOS | A | A | | | A | A | A | | C | | | | |
| | | 95th Queue (m) | 21 | 0 | | | 0 | 0 | 0 | | 61 | | | | |
| | **2046 SAT PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | Four Legged, Signalized | Geometry | L/T/TR | | | L/T/TR | | | L/T/R | | | L/TR | | | C |
| | | Volume | 488 | 427 | 420 | 8 | 591 | 28 | 34 | 57 | 553 | 256 | 63 | 51 | |
| | | v/c | 0.84 | 0.53 | 0.61 | 0.02 | 0.51 | 0.52 | 0.07 | 0.14 | 0.27 | 0.48 | 0.28 | 0.28 | |
| | | Delay (s) | 30 | 21 | 23 | 12 | 28 | 28 | 22 | 31 | 0 | 29 | 31 | 31 | |
| | | LOS | C | C | C | B | C | C | C | C | A | C | C | C | |
| | | 95th Queue (m) | 102 | 88 | 93 | 1 | 79 | 78 | 8 | 16 | 3 | 67 | 32 | 32 | |
| Site Access #2 on Quartz Avenue | | | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | L/R | | | | | | TR | | | LT | | | C |
| | | Volume | 358 | | 108 | | | | | 0 | 347 | 135 | 0 | | |
| | | v/c | 0.63 | | 0.12 | | | | | 0 | 0 | 0.09 | 0.09 | | |
| | | Delay (s) | 22 | | 10 | | | | | 0 | 0 | 8 | 8 | | |
| | | LOS | C | | A | | | | | A | A | A | A | | |
| | | 95th Queue (m) | 33 | | 3 | | | | | 0 | 0 | 2 | 2 | | |
| | **2046 SAT PEAK HOUR - TOTAL VOLUMES** | | | | | | | | | | | | | | |
| | T-Intersection, Stop-Controlled | Geometry | L/R | | | | | | TR | | | LT | | | A |
| | | Volume | 276 | | 279 | | | | | 53 | 425 | 158 | 49 | | |
| | | v/c | 0.73 | | 0.36 | | | | | 0 | 0 | 0.15 | 0.15 | | |
| | | Delay (s) | 36 | | 12 | | | | | 0 | 0 | 9 | 9 | | |
| | | LOS | E | | B | | | | | A | A | A | A | | |
| | | 95th Queue (m) | 43 | | 13 | | | | | 0 | 0 | 3 | 3 | | |

# 5 Other Network Considerations

The following subsections outline potential new connections and other road network measures that could help mitigate the anticipated operational constraints associated with the ASP.

## 5.1 ALTERNATIVE NETWORK

*Figure 5* illustrates an alternative network the Town is exploring within the North Industrial area. This alternative concept proposes a new north-south connection west of 28 Street, removing the full extension of Slate Avenue and Quartz Avenue from North Park Drive to 28 Street.

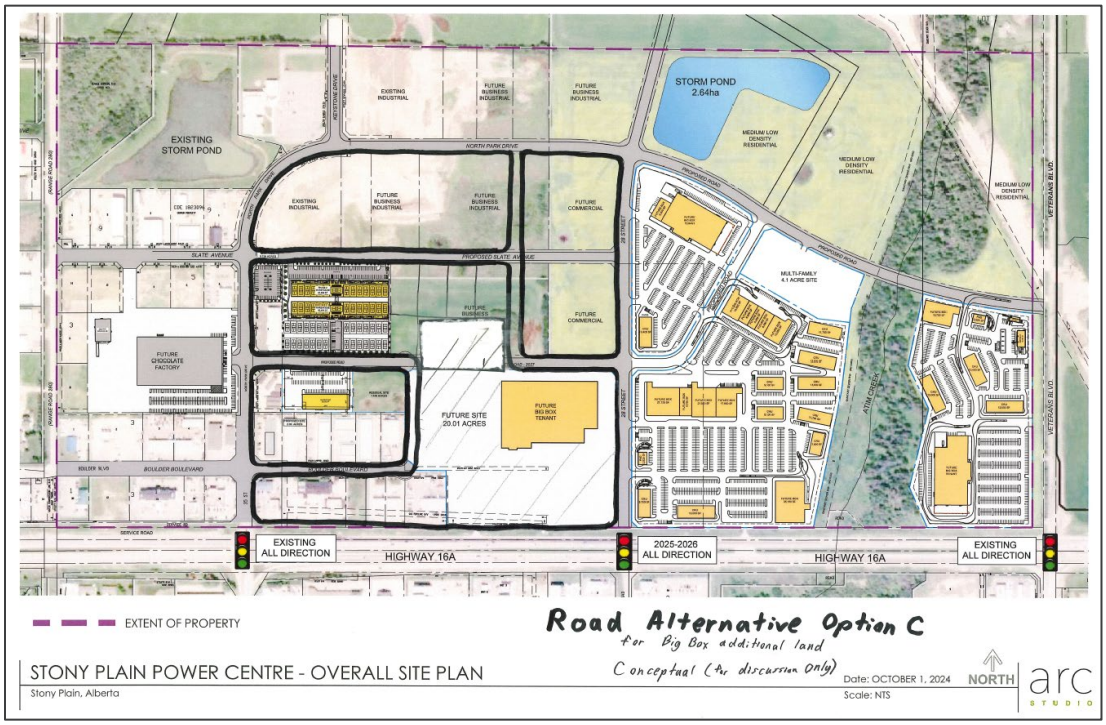



*Figure 5: North Industrial Area Road Alternative Concept*

The impacts of the alternative road concept to site access will depend on several factors, including the site layout and availability of the access points on the west side of the development. The location of the store and the gas station will influence how patrons access the site. If an access is provided on the north-south road, a higher proportion of site traffic may turn right onto Boulder Boulevard, which could lead to queuing onto Highway 16A due to its proximity to the highway. However, if an access is not provided, more site-generated traffic would utilize 28 Street, resulting in further congestion and capacity issues. This could also increase the delays on Highway 16A.

A second alternative network was considered by the Town which include a zigzagging north-south connection that links Boulder Boulevard to Slate Avenue, deviating from a direct alignment. The connection starts at Boulder Boulevard, heading north and immediately jogs eastward on Quartz Avenue, and then turns north to Slate Avenue or south back to Quartz Avenue. This second alternative was found to be not ideal with the staggered intersections in close proximity to the sharp turn.

Among the road networks being considered, the original proposed road network appears to facilitate better site circulation and distribution of site-traffic due to the direct alignment on Quartz Avenue and Slate Avenue. It also reduces the risk of traffic queuing onto Highway 16A, particularly at North Park Drive/Boulder Boulevard, as site-traffic is encouraged to travel further north on North Park Drive to access the site. The exclusion of an alternative north-south connection is acceptable subject to site access being maintained along Quartz Avenue.

## 5.2 LOCAL ROAD NETWORK

The VISUM model indicates that a full-movement intersection at Highway 16A / 28 Street will have minimal impacts on the local network south of Highway 16A. Despite the through connection on 28 Street, the majority of traffic is anticipated to utilize South Park Drive or Veterans Boulevard via Highway 16A.

Depending on the annexation approval, Boundary Road is ultimately planned as a four-lane arterial. The anticipated traffic demands from the full build-out of the ASP will place increased pressure on 28 Street and Boundary Road, resulting in significant delays and queues at the intersections along Highway 16A. To address these pressures, the ASP can benefit from an additional east-west connection providing direct access to Highway 779 and Highway 16. However, the effectiveness of this new connection is contingent on Boundary Road being widened, as the two improvements work best in tandem. Together, the widened Boundary Road and the new east-west corridor would help redistribute regional traffic, reduce dependency on Highway 16A, and improve overall network performance.

## 5.3 EAST-WEST CONNECTOR

Additional analysis was undertaken to evaluate the network impacts of a potential east–west link along the northern boundary of the ASP. The corridor was tested as a four-lane arterial link between Boundary Road and Highway 779, with an intermediate access connection to Golf Course Road North.

The VISUM model suggests that the additional east-west link would reduce PM peak hour volumes on Highway 16A by approximately 15% in the eastbound direction (~350 trips) and 5% (~110 trips) in the westbound direction, with up to 200 trips expected to divert within the ASP. Since the Town's model does not incorporate local travel behaviour from the adjacent municipality of Spruce Grove, the diversion estimates may be conservative. It is reasonable to expect that some additional trips could be diverted from Highway 16A, particularly if the east-west link connects at Boundary Road with Grove Drive. To capture this in sensitivity testing, an additional 10% of Highway 16A trips are assumed to use the east-west link.

Based on these assumptions, traffic operations at the Highway 16A intersections are significantly improved. Delays and queues for through movements on Highway 16A are reduced to more acceptable

and manageable levels. Overall, the intersections at North Park Drive / South Park Drive, 28 Street, and Boundary Road along Highway 16A are expected to operate at LOS E or better with the addition of the east-west link. A comparison of intersection levels of service with and without the east-west link under full build-out conditions is presented in *Table 12*, with detailed analysis results provided in **Appendix E**.

*Table 12: Comparison of Intersection Levels of Service on Highway 16A*

| INTERSECTION | 2046 PM PEAK HOUR | | 2046 SATURDAY PEAK HOUR | |
|---|---|---|---|---|
| | NO EAST-WEST LINK | WITH EAST-WEST LINK | NO EAST-WEST LINK | WITH EAST-WEST LINK |
| Highway 16A / North Park Drive | F | E | E | D\ |
| Highway 16A / 28 Street | D | C | D | D |
| Highway 16A / Boundary Rd / Veterans Blvd | E | D | D | D |

The results above reflect a high-level assessment based on generalized network assumptions and is intended to provide a broad indication of potential network performance. Detailed evaluation of the alignment, lane configuration, geometric feasibility, and right-of-way requirements for an additional east–west connection is beyond the scope of this TIA. Such review should be undertaken through a separate study to confirm the feasibility of potential configurations or upgrades.

## 5.4 RIGHT-IN/RIGHT-OUT ACCESS

A RI/RO access on Highway 16A, approximately 280m west of 28 Street, is also being considered for the big-box store development. This additional access would help redistribute some of the site-traffic from 28 Street and Quartz Avenue. To understand the implications, a sensitivity analysis was undertaken to review potential operational impacts at the Highway 16A / 28 Street intersection with the RI/RO access in place. For this analysis, it is assumed that both entering and exiting volumes at the RI/RO would be less than 150 vehicles per hour each during the peak hour, representing approximately 20% of total entering or exiting site traffic.

The result of the analysis shows that the overall intersection delays remain largely unchanged, indicating minimal operational impact. However, the RI/RO access does provide other benefits, including improved site circulation and additional routing options for inbound and outbound traffic. A more detailed review should be undertaken to assess the safety implications of the right-in movement relative to Highway 16A / 28 Street intersection, particularly with the merging and weaving maneuvers.

The detailed analysis results are provided in **Appendix F**.

## 5.5 SPEED LIMIT REDUCTION

The current posted speed on Highway 16A through Stony Plain and Spruce Grove varies between 60 km/h and 100 km/h. The speed limit is 100 km/h at the Town's east limits and reduces down to 80 km/h approaching the intersection at Highway 16A / North Park Drive/South Park Drive. The speed is further reduced to 60 km/h approaching the Highway 16A / Jennifer Heil Way/Campsite Road intersection in Spruce Grove.

The Town should advocate reducing the speed limit from 80 km/h to 60 km/h as the area starts to develop and transitions to an urban environment. Maintaining consistent speed limits along Highway 16A, especially through areas with similar land uses and access types, would better manage traffic flows and driver expectations, as well as reduce safety risks. Particularly, when there is an increase in traffic merging and turning to and from Highway 16A. The speed limit between east of the Highway 16A / Highway 779 interchange to Boundary Road can be reduced to 60 km/h as the area becomes more urbanized. This would align with the speed limit along other urban sections of Highway 16A that facilitate multiple commercial access (i.e. section of Highway 16A within Spruce Grove boundaries).

Since a speed reduction requires approval from TEC, it is recommended that the Town work proactively with TEC to advance a request for this change.

# 6 Summary of Findings and Recommendations

A 160,000 square-foot big-box grocery store, 16,000 square-foot liquor store, and a gas station are being proposed on a parcel of land east of North Park Drive and approximately 150m north of Highway 16A in Stony Plain. A full-movement intersection at Highway 16A / 28 Street is proposed to facilitate site access from Highway 16A. It is situated almost midway between the Highway 16A / North Park Drive / South Park Drive and Highway 16A / Boundary Road intersection.

An ASP is being developed for the lands immediately north and east of the proposed development site. The planned road network within the ASP will integrate with the proposed site accesses and is expected to influence traffic distribution and operations within the study area.

This TIA reviewed traffic operations impacts associated with this proposed development, as well as anticipated development within the ASP. Measures to mitigate potential impacts have also been identified. The following summarizes the findings and recommendations from this review.

- **A full movement access is required at Highway 16A / 28 Street on Opening Day** to maintain acceptable levels of service along Highway 16A, and to facilitate efficient and safe access. Current operational and geometric constraints at the Highway 16A / North Park Drive / South Park Drive intersection indicate that the Highway 16A / 28 Street will serve as the main access point from Highway 16A to the site. At the same time, it is critical that multiple connections to Highway 16A are provided so that the site-generated traffic is better distributed throughout the network.
- While the proposed development is anticipated to be a high-volume generator during the PM peak hour and Saturday peak hour, **the proposed development is expected to have low to moderate impacts on the study intersections along Highway 16A.** This is the case under the 2026 and 2046 horizon.
- The ASP is expected to generate substantially more traffic than the proposed development, leading to significant delays and congestion on Highway 16A, Boundary Road, and 28 Street. Despite improvements such as additional turn lanes and optimized signal coordination, **key movements at the Highway 16A intersections are projected to experience near or at failing conditions at full build-out**. While these results represent a worst-case scenario, and some constraints may be considered typical of semi-urban highway operations, **an additional east-west link along the northern boundary of the site, connecting Highway 779 to Boundary Road, would mitigate these impacts. With this connection in place, the intersections are expected to operate at conditions similar to those observed today**, while also providing additional roadway capacity to accommodate future growth.
- Aside from the study intersections on Highway 16A, the remaining study intersections are expected to continue operating under acceptable levels of service, with low to moderate levels of delays and congestion. This is the case under the Opening Day and Full Build-out horizons.

*Table 13* summarizes the overall intersection of level of service for the more critical study intersections under each analysis scenario.

*Table 13: Summary of Intersection Level of Service*

| INTERSECTION | BACKGROUND TRAFFIC | WITH BIG BOX STORE DEVELOPMENT | | WITH ASP FULL BUILD-OUT | WITH EAST-WEST LINK |
|---|---|---|---|---|---|
| | 2026 | 2026 | 2046 | 2046 | 2046 |
| **PM PEAK HOUR** | | | | | |
| Highway 16A / North Park Drive / South Park Drive | LOS D | LOS C | LOS D | LOS F | LOS E |
| Highway 16A / 28 Street | LOS C | LOS C | LOS C | LOS D | LOS C |
| Highway 16A / Boundary Road | LOS B | LOS C | LOS D | LOS E | LOS D |
| Boulder Boulevard / North Park Drive | LOS B | LOS B | LOS B | LOS C | LOS B |
| North Park Drive / Quartz Avenue | n/a | LOS B | LOS B | LOS D | LOS B |
| Quartz Avenue / 28 Street | n/a | LOS A | LOS A | LOS B | LOS A |
| Site Access #1 ( on 28 Street) | n/a | LOS B | LOS B | LOS C | LOS C |
| Site Access #2 (on Quartz Avenue) | n/a | LOS C | LOS B | LOS D | LOS D |
| **SATURDAY PEAK HOUR** | | | | | |
| Highway 16A / North Park Drive / South Park Drive | LOS C | LOS C | LOS D | LOS E | LOS D |
| Highway 16A / 28 Street | LOS B | LOS C | LOS C | LOS D | LOS D |
| Highway 16A / Boundary Road | LOS B | LOS B | LOS C | LOS D | LOS D |
| Boulder Boulevard / North Park Drive | LOS B | LOS B | LOS B | LOS B | LOS B |
| North Park Drive / Quartz Avenue | n/a | LOS B | LOS B | LOS F | LOS C |
| Quartz Avenue / 28 Street | n/a | LOS A | LOS A | LOS B | LOS A |
| Site Access #1 (on 28 Street) | n/a | LOS C | LOS C | LOS C | LOS C |
| Site Access #2 (on Quartz Avenue) | n/a | LOS D | LOS D | LOS E | LOS D |

## 6.1 DEVELOPMENT SITE ACCESS RECOMMENDATIONS:

- **Site Access #1 on 28 Street** - The site access on 28 Street (Site Access #1) should be constructed at least 200m north of Highway 16A / 28 Street to accommodate sufficient left turn bays (northbound at Site Access #1 and southbound at Highway 16A / 28 Street). This would reduce the risk of vehicles queuing past the left-turn bay and potentially spilling back. On Opening Day, Site Access #1 can function as a stop-controlled T-intersection with a northbound turn-lane. Assuming full build-out of the ASP in the 20-year horizon, the intersection will need to be upgraded to a four-legged, signalized intersection with dedicated turn bays. It is recommended that the future commercial access to the east form the fourth leg of the intersection to enhance traffic flows and safety along 28 Street.
- **Site Access #2 on Quartz Avenue** – Site Access #2 can be maintained as a stop-control T-intersection on Opening Day and Full Build-out.
- **Other Site Accesses** – The proposed site plan indicates several other site accesses, which were not included in the evaluations. Two of the access locations appear to be utilized and better suited for service and delivery access. It is recognized that a low percentage of patrons may shortcut through the site's parking lot to use these accesses, and the impacts to the connecting roadways are likely minimal.
- **Restrict Site Access from Boulder Boulevard** – The Boulder Boulevard / North Park Drive intersection is in close proximity to Highway 16A. To minimize the risk of site-generated traffic increasing congestion at the intersection and disrupting traffic flow on Highway 16A, the developer indicated that general access on Boulder Boulevard would be restricted through the use of barricades. Site traffic coming from the west can travel further north on North Park Drive and utilize the access on Quartz Avenue. The Town also considered an alternative north-south connection along the west side of the development that would connect Boulder Boulevard and Quartz Avenue. However, this alternative would likely encourage more traffic utilizing Boulder Boulevard and the road layout is not ideal for circulation due to staggered intersections located too close to the turns. The exclusion of this alternative north-south connection is acceptable subject to site access being maintained along Quartz Avenue.

  Maintaining the cul-de-sac on Boulder Boulevard east of North Park Drive may limit maneuverability for large vehicles and reduce network connectivity. However, the volume of heavy trucks utilizing this section of Boulder Boulevard would be limited due to the nature of the existing land uses. The proposed Quartz Avenue and the extension of Slate Avenue also provide alternative east-west connections and access for emergency services.
- **East Access on 28 Street** –The eastern access of the proposed development located along 28 Street is planned to be situated between two commercial accesses located across 28 Street. This creates increased conflict points, which can lead to higher collision risk and driver decision error. The staggered access points along 28 Street can also reduce capacity and interrupt traffic flow due to traffic turning, weaving or changing lanes. To mitigate these risks, the eastern access should be planned and aligned with the commercial access across 28 Street. This alignment will

necessitate adjustments to the 28 Street cross-section to accommodate turning movements and future signalization. The intersection is expected to evolve into a four-legged signalized configuration as traffic volumes increase with the ASP's completion.

- **North Park Drive / Quartz Avenue** – This intersection can operate as a stop-controlled T-intersection with a northbound right turn lane on Opening Day and Full Build-out. An all-way stop or a signal may be warranted in the future to address projected delays.
- **28 Street / Quartz Avenue** – This intersection can operate as a stop-controlled T-intersection on Opening Day. The full build-out of the ASP will require intersection upgrades, which include adding a fourth leg and a signal. Dedicated turn lanes are also required to maintain acceptable levels of service. A roundabout can also be considered to address future delays and safety.

## 6.2 INTERSECTION UPGRADE RECOMMENDATIONS:

The following recommendations aim to maintain acceptable operational conditions at the most critical study intersections during the peak hours and facilitate safe and efficient movements across the road network.

- **Highway 16A / North Park Drive / South Park Drive** - The addition of a second southbound left-turn bay would help reduce the projected southbound delays and queues on Opening Day and in the 20-year horizon. Additional improvements, such as a second northbound left-turn lane, channelizing the southbound and westbound right-turns can also help reduce delays at the intersection in the future. However, the implementation of these improvements is met with several challenges such as the limited right-of-way on Boulder Boulevard and proximity to the North Park Drive / Boulder Boulevard. Aligning with TMP recommendations, the addition of the second southbound and northbound left-turn lane should be implemented within the next five years, especially as development continues in the North Industrial area.
- **Highway 16A / 28 Street** – On Opening Day, the Highway 16A / 28 Street will require dedicated left-turn lanes in all directions and dedicated right-turn lanes in the eastbound and westbound directions. The full build-out of the ASP will require dual left-turn lanes in the eastbound and southbound directions, as well as a dedicated right-turn lane in the southbound direction. The proposed intersection configuration is shown in *Figure 6* and *Figure 7*.
- **Highway 16A / Boundary Road** – The current configuration at Highway 16A / Boundary Road can be maintained on Opening Day. However, additional upgrades are required to accommodate the anticipated ASP demands. This includes dual left-turn lanes in the eastbound and southbound directions and dedicated right-turn lanes in all directions.
- **North Park Drive / Boulder Road** – The current configuration at North Park Drive / Boulder Road can be maintained on Opening Day and in the 20-year horizon. The signal timings should be optimized to accommodate future traffic growth.

Although some movements are projected to operate at LOS F with the ASP, these movements are already operating at LOS E and nearing LOS F under background (no-development) conditions due to regional traffic growth on Highway 16A. This is a typical and acceptable condition for a built-up urban

highway corridor, where high regional volumes and physical constraints naturally limit the ability to achieve LOS D for all movements.

It is also important to note that the analysis reflects a conservative assumption where all nearby developments are modeled to reach their peak traffic levels at the exact same time. In practice, different land uses experience offset peak periods and staggered demand, meaning vehicle arrivals vary throughout the peak period rather than occurring simultaneously. Consequently, the modelled delays represent an upper-bound condition, and actual operating conditions on Highway 16A are expected to be less constrained than the results suggest.

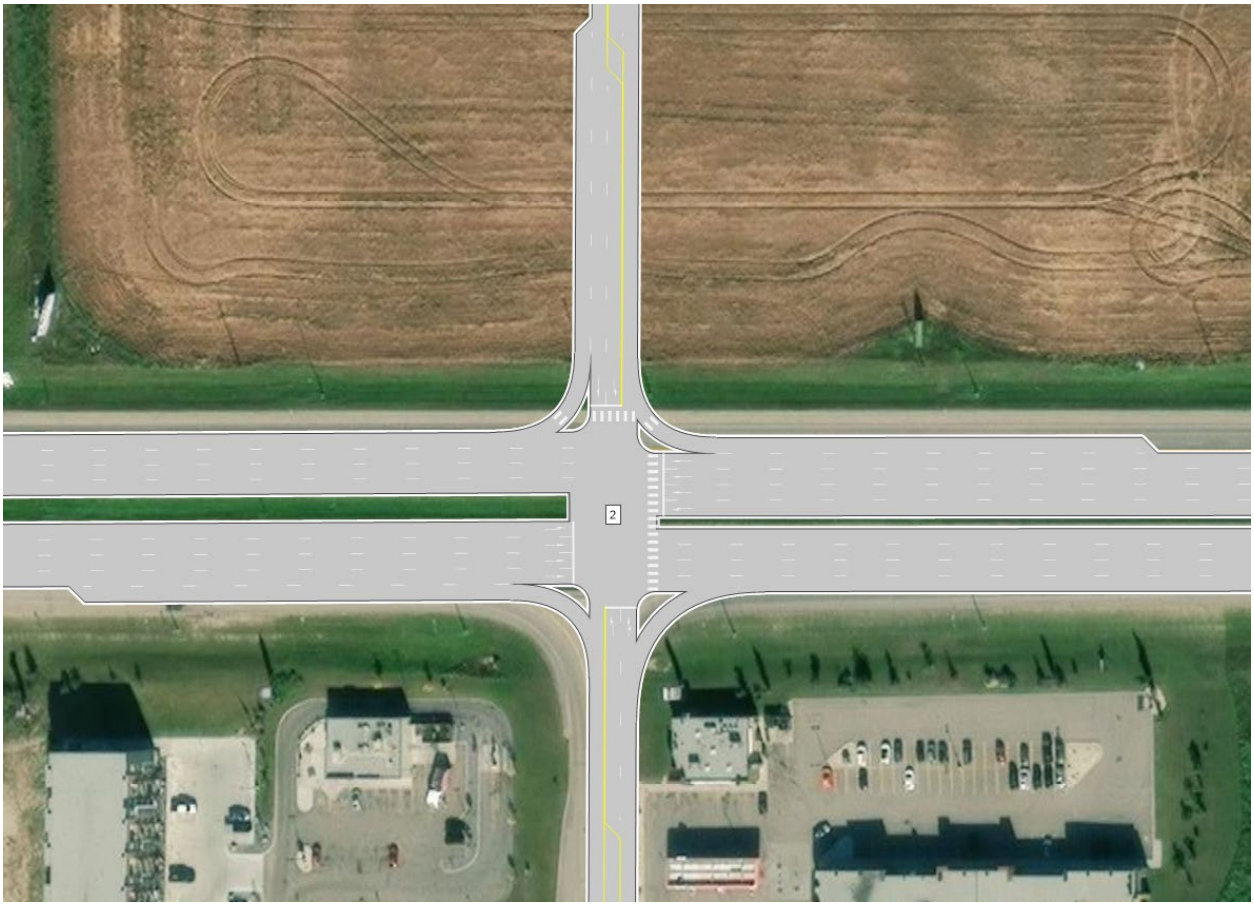



*Figure 6: Highway 16A / 28 Street Proposed Opening Day Configuration*

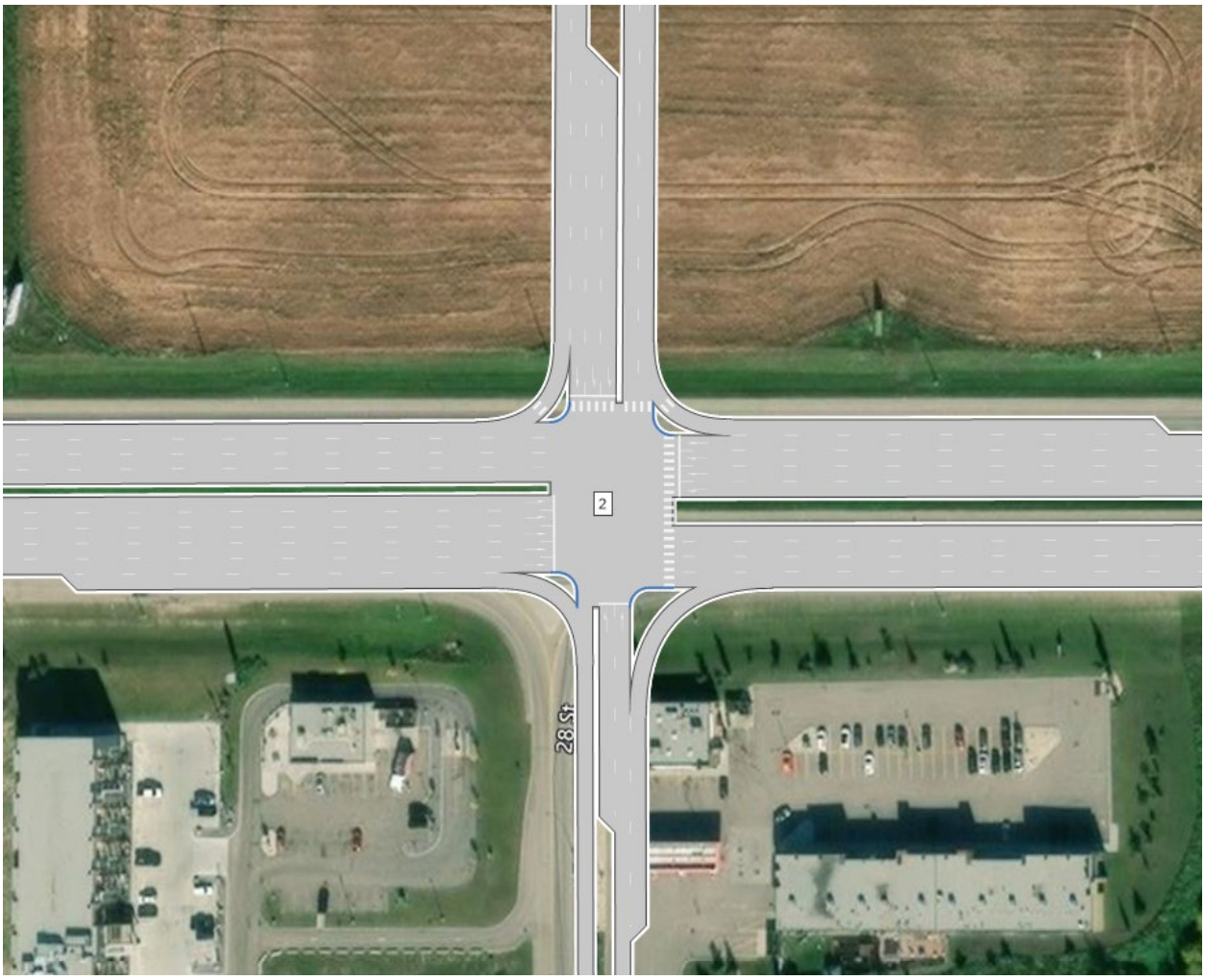



*Figure 7: Highway 16A / 28 Street Proposed Full Build-out Configuration*

*Table 14* outlines the recommended signal control and intersection type for each of the study intersections. **Should the Highway 16A / 28 Street intersection proceed as a full movement intersection, signal coordination with the North Park Drive / South Park Drive and Boundary Road / Veterans Boulevard intersections is recommended to optimize Highway 16A operations**.

Details of the proposed intersection configuration and control for the study intersections and site accesses under Opening Day (2026) and Full Build-out (2046) are provided in **Appendix G**. The staging of improvements will highly depend on the rate of future development on the adjacent lands. Therefore, the recommendations outlined in this TIA should be reviewed and updated as needed if development plans change within the ASP.

*Table 14: Summary of Recommended Intersection Upgrades*

| NO. | INTERSECTION | OPENING DAY (2026) | | FULL BUILD-OUT (2046) | |
|---|---|---|---|---|---|
| | | CONTROL TYPE | INTERSECTION CONFIGURATION | CONTROL TYPE | INTERSECTION CONFIGURATION |
| 1 | Hwy 16A / Boundary Rd | Signalized | No Change | Signalized | Additional Southbound and Northbound Lanes, Eastbound Left-Turn Lane |
| 2 | Hwy 16A / 28 St | Signalized | Full Movement Intersection | Signalized | Additional Southbound Lanes, Northbound Right Turn Lane, Eastbound Left Turn and Right Turn Lane |
| 3 | Hwy 16A / S Park Dr / N Park Dr | Signalized | No Change | Signalized | Additional Northbound and Southbound Left Turn Lane |
| 4 | Boulder Blvd / N Park Dr | Signalized | No Change | Signalized | No Change |
| 5 | N Park Dr / Quartz Avenue | Stop-Control | T-Intersection | Stop-Control | T-Intersection |
| 6 | 28 St / Site Access #1 | Stop-Control | T-Intersection | Signalized | Full Movement Intersection - With Turn Bays |
| 7 | Quartz Avenue / Site Access #2 | Stop-Control | T-Intersection | Stop-Control | T-Intersection |
| 8 | Quartz Avenue / 28 St | Yield | T-Intersection | Signalized | Full Movement Intersection - With Turn Bays |
| 9 | Slate Ave / N Park Dr | N/A | N/A | Stop-Control | Full Movement Intersection – No Turn Bays |
| 10 | Slate Ave / 28 St | N/A | N/A | Signalized | Full Movement Intersection - With Northbound Turn Bay |
| 11 | N Park Dr / Keystone Dr | N/A | N/A | Stop-Control | T-Intersection |
| 12 | N Park Dr / 28 St | N/A | N/A | Stop-Control | Full Movement Intersection – No Turn Bays |

| NO. | INTERSECTION | OPENING DAY (2026) | | FULL BUILD-OUT (2046) | |
|---|---|---|---|---|---|
| | | CONTROL TYPE | INTERSECTION CONFIGURATION | CONTROL TYPE | INTERSECTION CONFIGURATION |
| 13 | N Park Dr / Road B | N/A | N/A | Stop-Control | Full Movement Intersection – No Turn Bays |
| 14 | N Park Dr / Boundary Rd | N/A | N/A | Signalized | T-Intersection |
| 15 | New Road B / Keystone Dr | N/A | N/A | Stop-Control | T-Intersection |
| 16 | New Road B / 28 St | N/A | N/A | Stop-Control | Full Movement Intersection – No Turn Bays |
| 17 | Boulder Blvd / Keystone Dr | N/A | N/A | Stop-Control | Full Movement Intersection – No Turn Bays |
| 18 | Boulder Blvd / 28 St | N/A | N/A | Stop-Control | Full Movement Intersection – No Turn Bays |
| 19 | Boulder Blvd / Boundary Rd | N/A | N/A | Signalized | T-Intersection |
| 20 | Boulder Blvd / Range Road 280 | Stop-Control | No Change | Stop-Control | No Change |
| 21 | Slate Ave / Golf Course Rd | Stop-Control | No Change | Stop-Control | No Change |
| 22 | Boulder Blvd / Golf Course Rd N | Stop-Control | No Change | Stop-Control | No Change |
| 23 | Boulder Blvd / Wood Ave | Stop-Control | No Change | Stop-Control | No Change |
| 24 | Hwy 779 / Wood Ave | Signalized | No Change | Signalized | No Change |

**Note: No Change = No Change from existing configuration or signal control**

## 6.3 ROADWAY CLASSIFICATION AND CROSS-SECTION RECOMMENDATIONS:

The two internal roadways supporting the big-box store development, Quartz Avenue and 28 Street, are planned to be a collector and local road, respectively. However, the anticipated growth within the ASP will require the reclassification of these roadways to manage the anticipated traffic demands and the overall circulation and accessibility within the study area.

As per the ASP, Quartz Avenue is designated as a local roadway with a ROW width of 22.0m. To accommodate turn lanes at the development's accesses, additional ROW on Quartz Avenue will be required. Therefore, it is recommended that the ROW on Quartz Avenue be protected for 24.0m.

28 Street is designated as a collector with a ROW width of 24.0m. However, 28 Street is anticipated to function similarly to an arterial road based on the anticipated traffic demands and the important role the corridor will play within the ASP. At a minimum, 28 Street should be constructed as an undivided arterial with a cross-section width of 28.0m (based on the Town's design standards) to accommodate future growth. The section north of Highway 16A up to Quartz Avenue will require additional ROW to accommodate additional turn lanes for access and a minimum width of 37.0m is recommended. *Table 15* summarizes the recommended roadway classification and cross-sections for 28 Street and Quartz Avenue. The recommendation is for the overall corridor and based on future traffic volumes and in consideration of the future overall transportation network. Cross-sections at the intersections should be treated individually based on the required design.

*Table 15: Roadway Classification and Cross-Section*

| DEVELOPMENT ROADWAY | PROPOSED ASP | | RECOMMENDED | |
|---|---|---|---|---|
| | CLASSIFICATION | ROW WIDTH (m) | CLASSIFICATION | ROW WIDTH (m) |
| Quartz Avenue | Local | 22.0 | Collector | 24.0 |
| 28 Street – Highway 16A to Quartz Avenue | Collector | 24.0 | Arterial | 37.0 (minimum)* |

*Similar to the City of Edmonton standards for a four-lane arterial.

*Table 16* summarizes the recommended lane widths and cross-sections for the study intersections on 28 Street and Quartz Avenue.

**The recommended cross-sections and lane widths outlined in this TIA serve as a guideline for the Town's planning and should be confirmed during the design phase to ensure compliance with road design standards and guidelines**.

*Table 16: Recommended Lane Widths*

| INTERSECTION | PROPOSED LANING & WIDTHS | |
|---|---|---|
| | OPENING DAY (2026) | FULL BUILD-OUT (2046) |
| 28 Street / Site Access #1 | 2 Thru Lanes @ 4.0m = 8.0m<br>1 Right Turn Lane @ 4.0m = 4.0m<br>1 Left Turn Lane @ 3.7m = 3.7m<br>1 Sidewalk/Shoulder/Sideslope @ 6.0m = 6.0m<br><br>Total Cross-Section Width = 21.7m | 3 Thru Lanes @ 4.0m = 12.0m<br>1 Right Turn Lane @ 3.7m = 4.0m<br>2 Left Turn Lane @ 3.7m = 7.4m<br>2 Sidewalk/Shoulder/Sideslope @ 6.0m = 12.0m<br><br>Total Cross-Section Width = 35.4m |
| Quartz Avenue / Site Access #2 | 2 Thru Lanes @ 4.0m = 8.0m<br>1 Right Turn Lane @ 3.7m = 4.0m<br>1 Left Turn Lane @ 3.7m = 3.7m<br>2 Shoulder/Sideslope @ 5.0m = 10m<br><br>Total Cross-Section Width = 25.7m | 2 Thru Lanes @ 4.0m = 8.0m<br>1 Right Turn Lane @ = 4.0m<br>1 Left Turn Lane @ 3.7m<br>2 Shoulder/Sideslope @ 5.0m = 10m<br><br>Total Cross-Section Width = 25.7m |
| Quartz Avenue / 28 Streett | **28 Street:**<br>2 Shared Thru/Turn Lane @ 4.0m = 8.0m<br>1 Sidewalk/Shoulder/Sideslope @ 6.0m = 6.0m<br><br>Total Cross-Section Width = 14.0m<br><br>**Quartz Avenue**<br>2 Lanes @ 4.0m = 8.0m<br>2 Sidewalk/Shoulder/Sideslope @ 6.0m = 12.0m<br><br>Total Cross-Section Width = 20.0m | **28 Street:**<br>2 Lanes @ 4.0m = 8.0m<br>2 Left-Turn Lane @ 3.7m = 7.4m<br>2 Sidewalk/Shoulder/Sideslope @ 6.0m = 12.0m<br><br>Total Cross-Section Width = 27.4m<br><br>**Quartz Avenue:**<br>2 Lanes @ 4.0m = 8.0m<br>2 Left-Turn Lane @ 3.7m = 7.4m<br>2 Sidewalk/Shoulder/Sideslope @ 6.0m = 12.0m<br><br>Total Cross-Section Width = 27.4m |

# APPENDIX A

STATEMENT OF LIMITATIONS

# Statement of Limitations

***Use of this Report.*** This report was prepared by McElhanney Ltd. (**"McElhanney"**) for the particular site, design objective, development and purpose (the "**Project**") described in this report and for the exclusive use of the client identified in this report (the "**Client**"). The data, interpretations and recommendations pertain to the Project and are not applicable to any other project or site location and this report may not be reproduced, used or relied upon, in whole or in part, by a party other than the Client, without the prior written consent of McElhanney. The Client may provide copies of this report to its affiliates, contractors, subcontractors and regulatory authorities for use in relation to and in connection with the Project provided that any reliance, unauthorized use, and/or decisions made based on the information contained within this report are at the sole risk of such parties. McElhanney will not be responsible for the use of this report on projects other than the Project, where this report or the contents hereof have been modified without McElhanney's consent, to the extent that the content is in the nature of an opinion, and if the report is preliminary or draft. This is a technical report and is not a legal representation or interpretation of laws, rules, regulations, or policies of governmental agencies.

***Standard of Care and Disclaimer of Warranties.*** This report was prepared with the degree of care, skill, and diligence as would reasonably be expected from a qualified member of the same profession, providing a similar report for similar projects, and under similar circumstances, and in accordance with generally accepted engineering and scientific judgments, principles and practices. McElhanney expressly disclaims any and all warranties in connection with this report.

***Information from Client and Third Parties.*** McElhanney has relied in good faith on information provided by the Client and third parties noted in this report and has assumed such information to be accurate, complete, reliable, non-fringing, and fit for the intended purpose without independent verification. McElhanney accepts no responsibility for any deficiency, misstatements or inaccuracy contained in this report as a result of omissions or errors in information provided by third parties or for omissions, misstatements or fraudulent acts of persons interviewed.

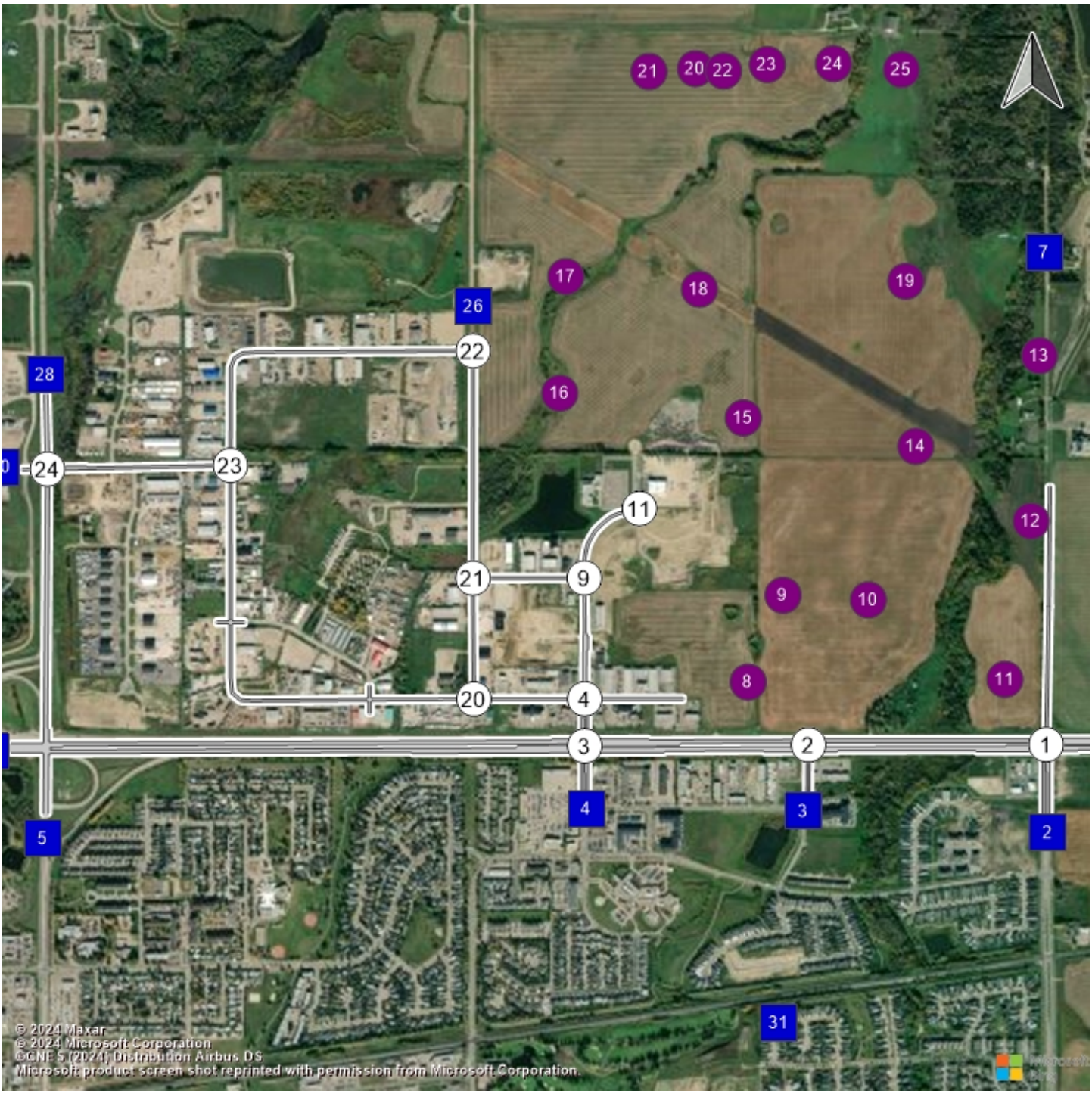
***Effect of Changes.*** All evaluations and conclusions stated in this report are based on facts, observations, site-specific details, legislation and regulations as they existed at the time of the report preparation. Some conditions are subject to change over time and the Client recognizes that the passage of time, natural occurrences, and direct or indirect human intervention at or near the site may substantially alter such evaluations and conclusions. McElhanney should be requested to re-evaluate the conclusions of this report and to provide amendments as required prior to any reliance upon the information presented herein upon any of the following events: a) any changes (or possible changes) as to the site, purpose, or development plans upon which this report was based, b) any changes to applicable laws subsequent to the issuance of the report, or c) new information is discovered in the future.

***Independent Judgments.*** McElhanney will not be responsible for the independent conclusions, interpretations, interpolations and/or decisions of the Client, or others, who may come into possession of this report, or any part thereof. This restriction of liability includes decisions made to purchase, finance or sell land or with respect to public offerings for the sale of securities.

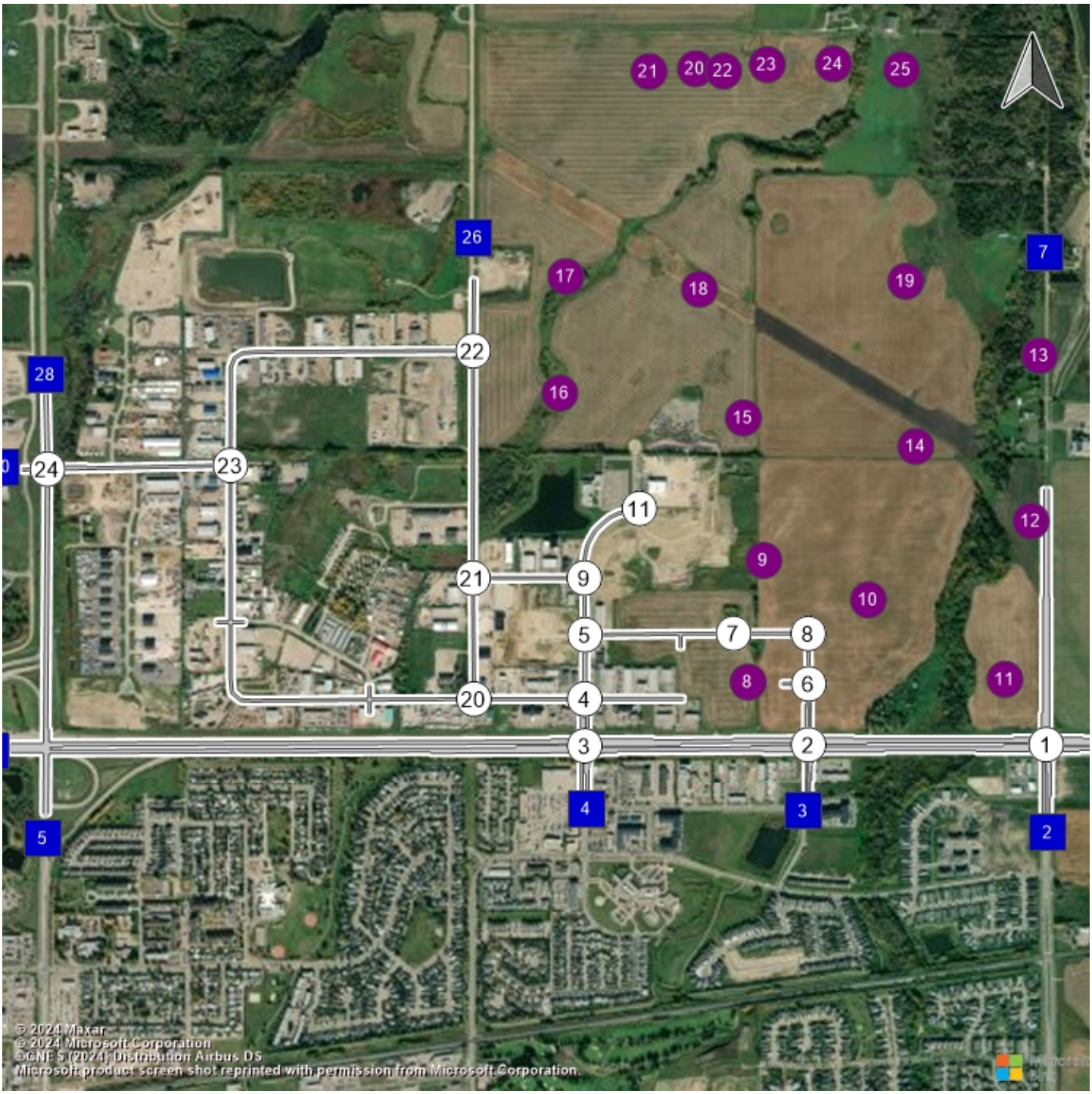
# APPENDIX B

BACKGROUND AND SITE-GENERATED TRAFFIC VOLUMES

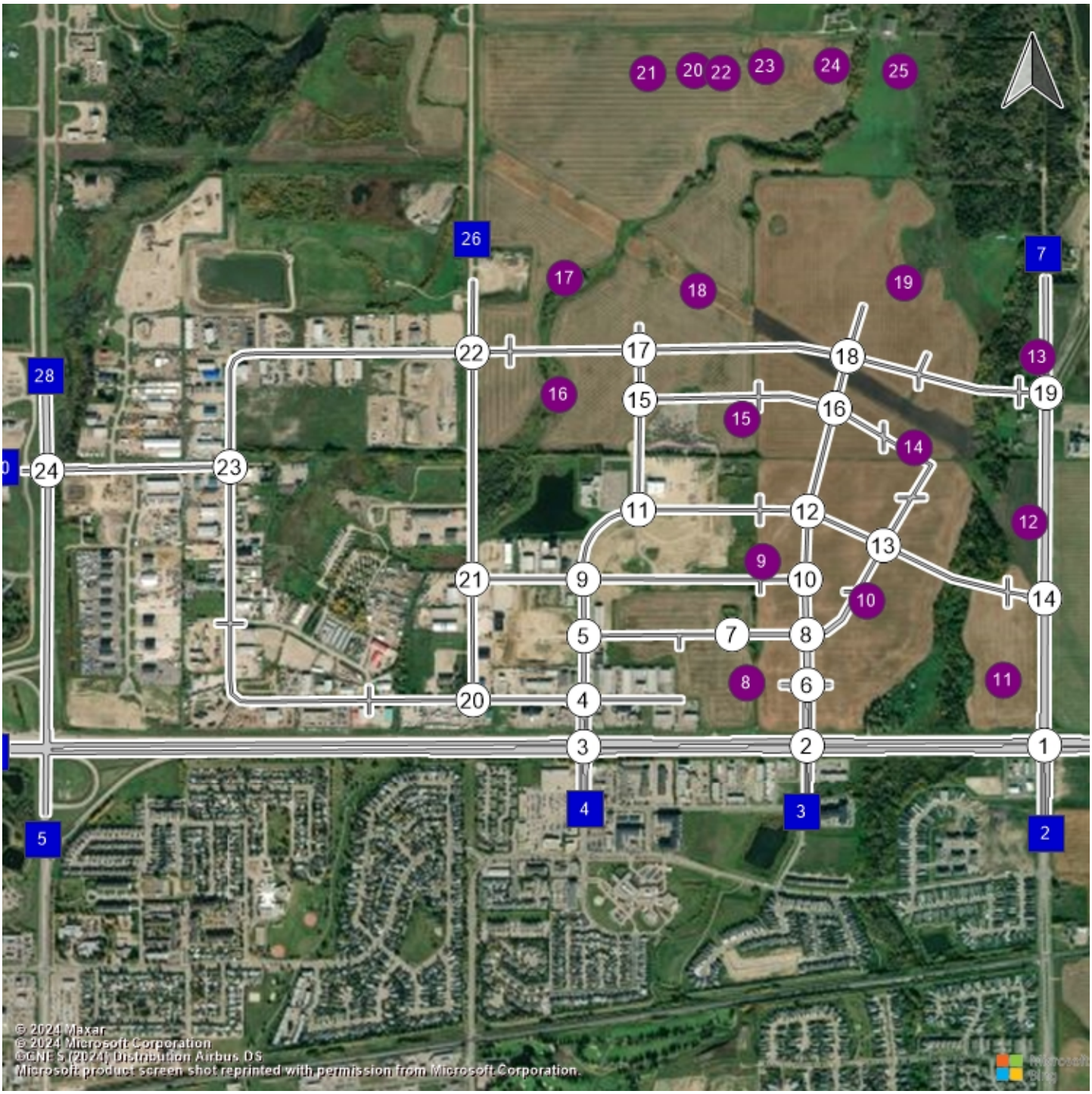
## Study Intersections



## Study Intersections



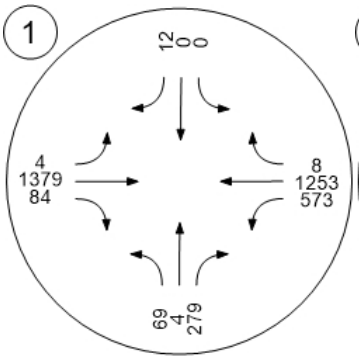
## Study Intersections



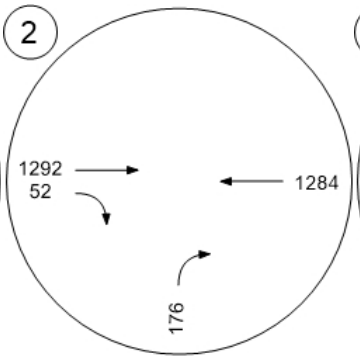
## Traffic Volume - Base Volume



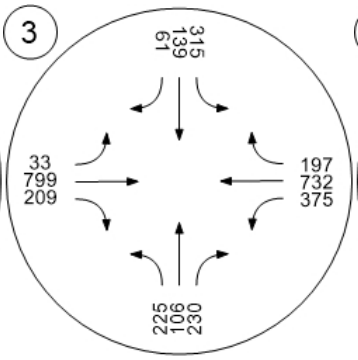

### Hwy 16 A & Boundary Rd



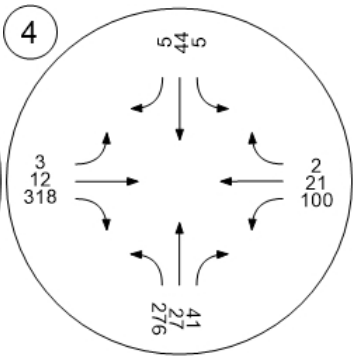

### Hwy 16A & 28 St



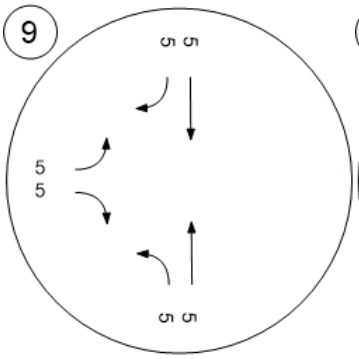

### Hwy 16A & S Park Dr/N Park



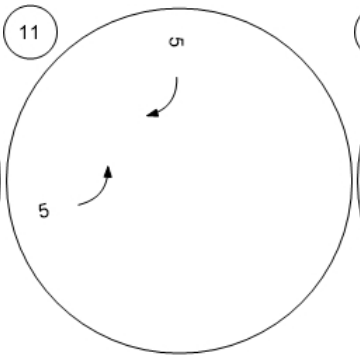

### Boulder Blvd & N Park Dr



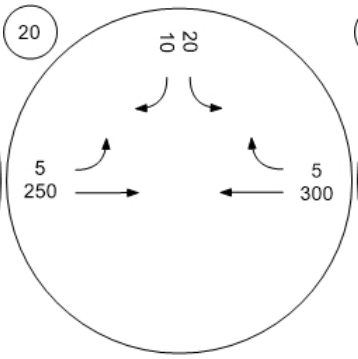

### Slate Ave & N Park Dr



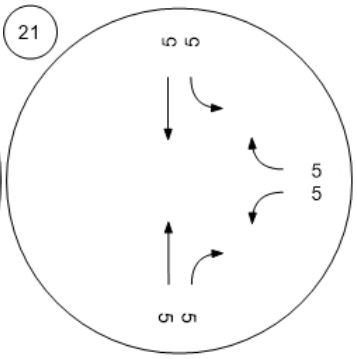

### N Park Dr & Keystone Dr




### Boulder Blvd & Golf Course



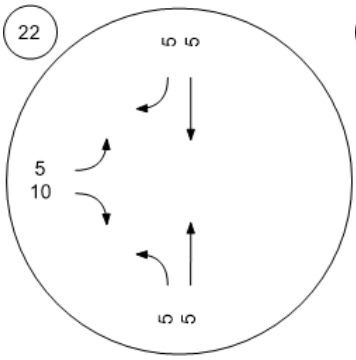

### Slate Ave & Golf Course Rd



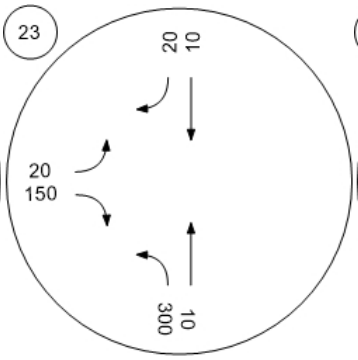
## Traffic Volume - Base Volume



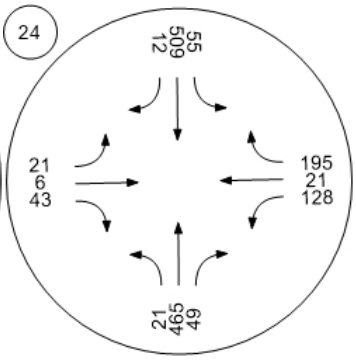

### Boulder Blvd & Golf Course




### Boulder Blvd & Wood Ave



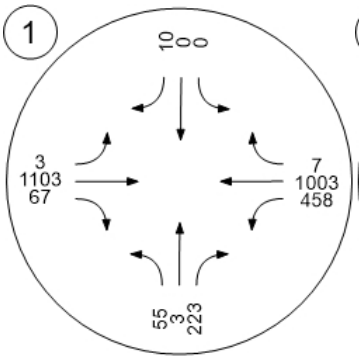

### Hwy 779 & Wood Ave



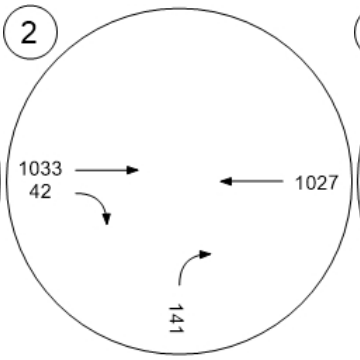
## Traffic Volume - Base Volume



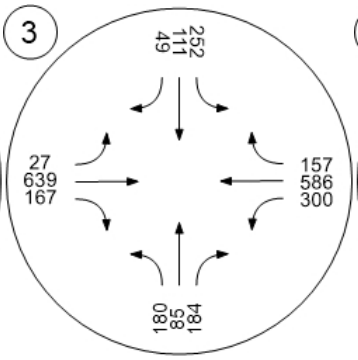

### Hwy 16 A & Boundary Rd



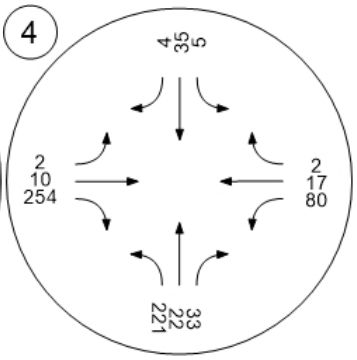

### Hwy 16A & 28 St



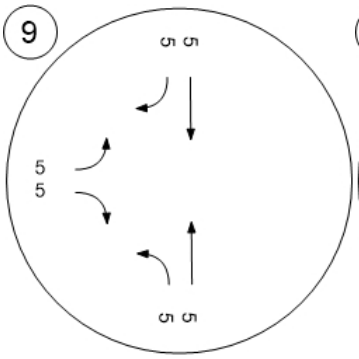

### Hwy 16A & S Park Dr/N Park



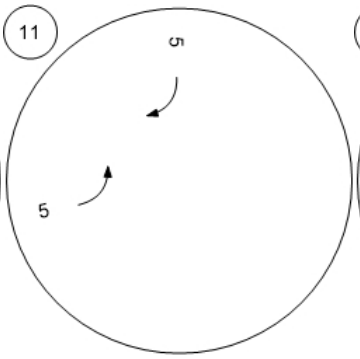

### Boulder Blvd & N Park Dr



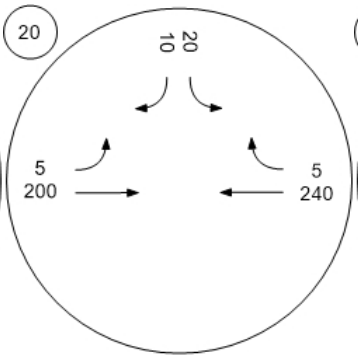

### Slate Ave & N Park Dr



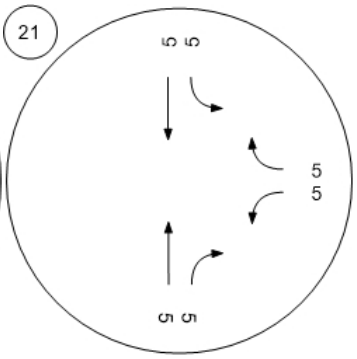

### N Park Dr & Keystone Dr




### Boulder Blvd & Golf Course



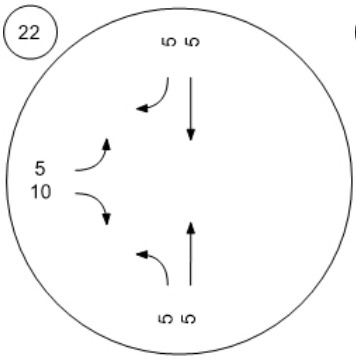

### Slate Ave & Golf Course Rd



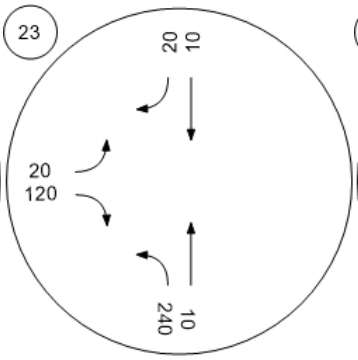
## Traffic Volume - Base Volume



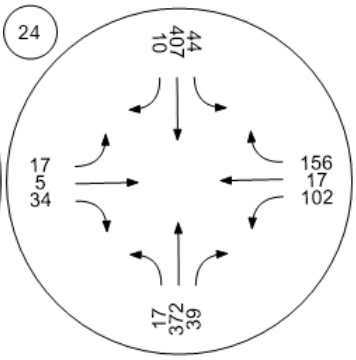

### Boulder Blvd & Golf Course



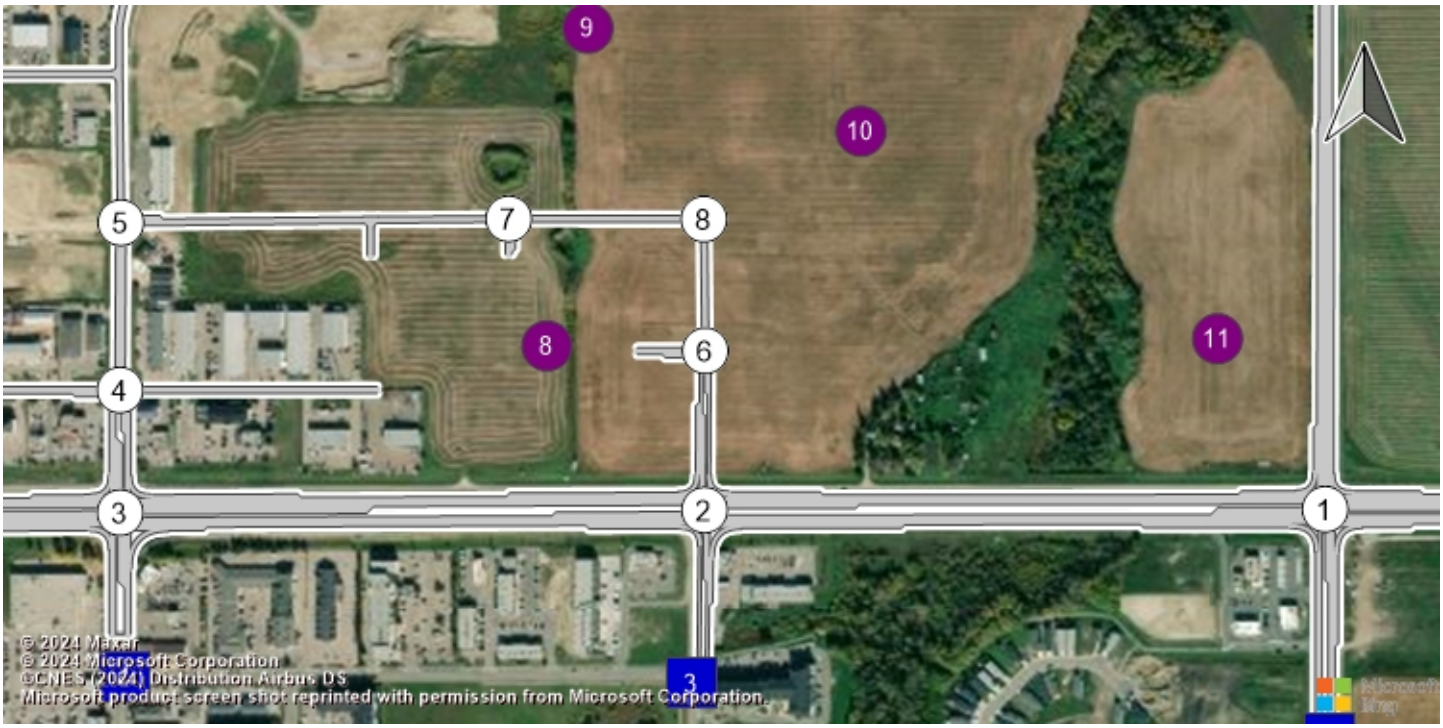

### Boulder Blvd & Wood Ave



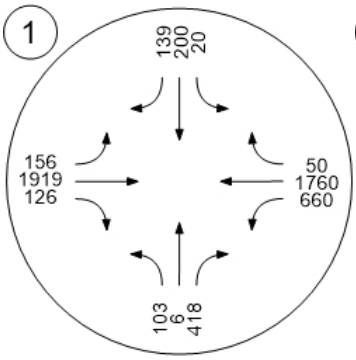

### Hwy 779 & Wood Ave



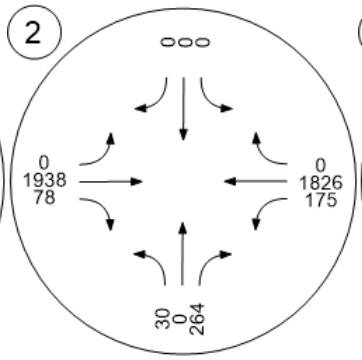
## Traffic Volume - Future Background Volume



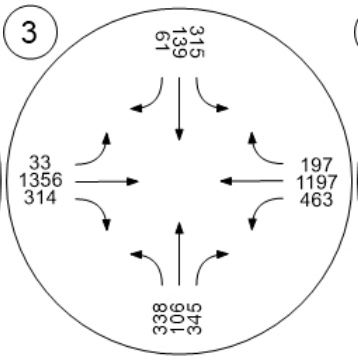

### Hwy 16 A & Boundary Rd



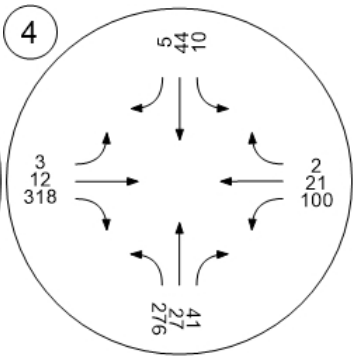

### Hwy 16A & 28 St



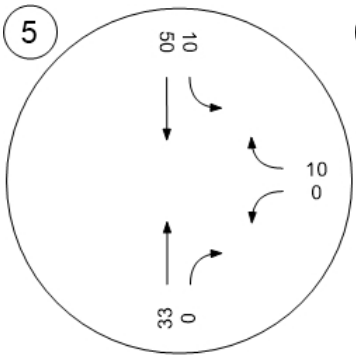

### Hwy 16A & S Park Dr/N Park



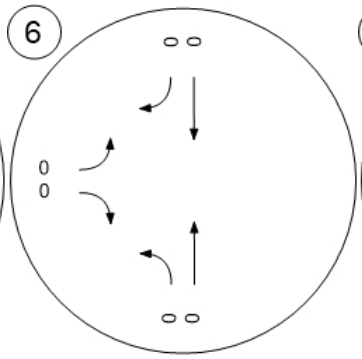

### Boulder Blvd & N Park Dr



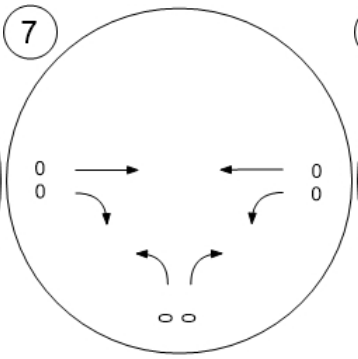

### N Park Dr & Quartz Ave



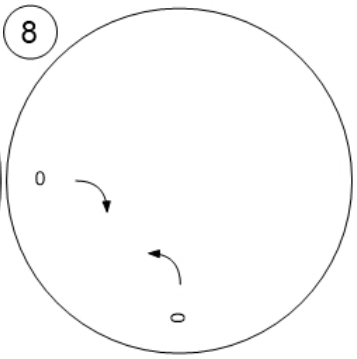

### 28 St & Site Access #1




### Quartz Ave & Site Access #2



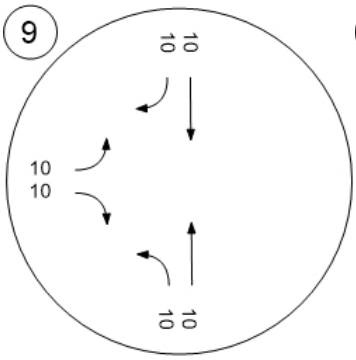

### Quartz Ave & 28 St



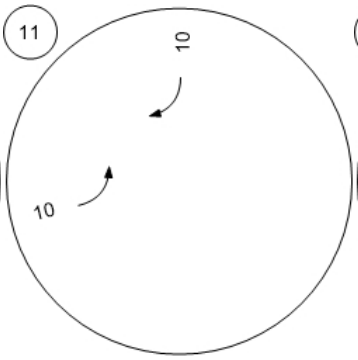
## Traffic Volume - Future Background Volume



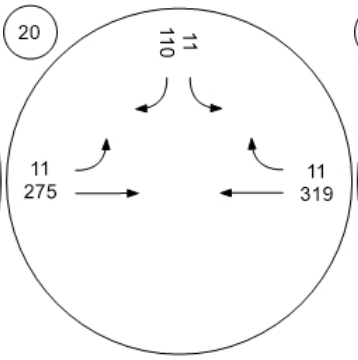

### Slate Ave & N Park Dr



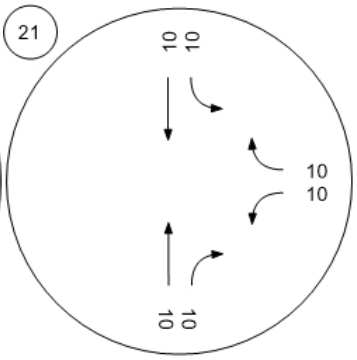

### N Park Dr & Keystone Dr



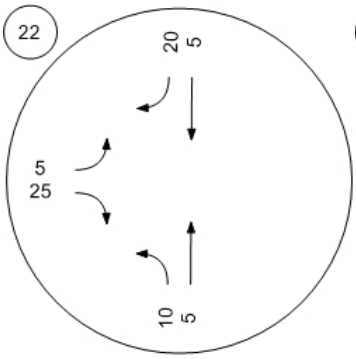

### Boulder Blvd & Golf Course



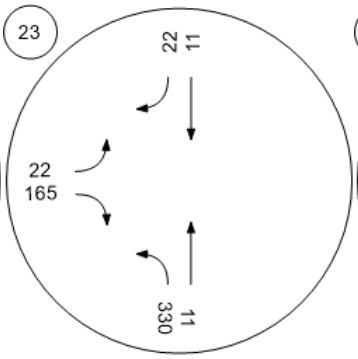

### Slate Ave & Golf Course Rd



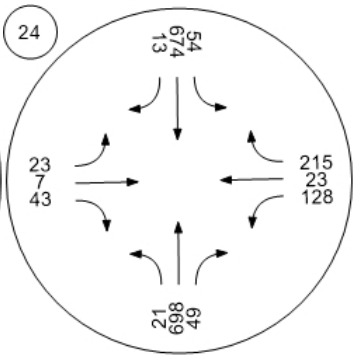

### Boulder Blvd & Golf Course




### Boulder Blvd & Wood Ave



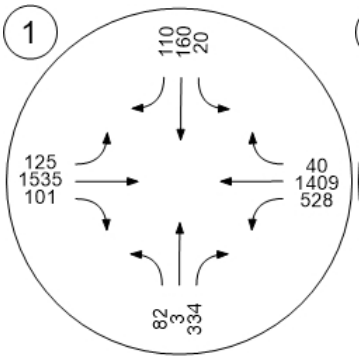

### Hwy 779 & Wood Ave



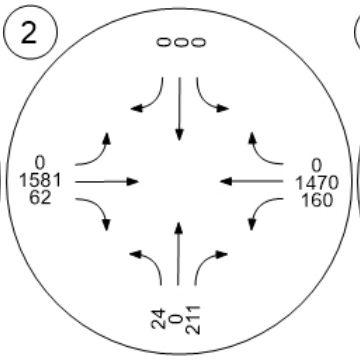
## Traffic Volume - Future Background Volume



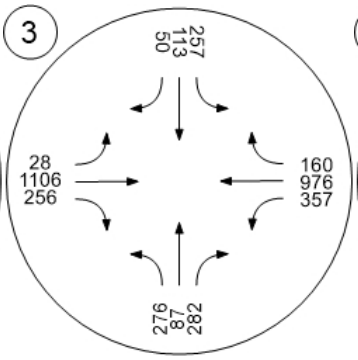

### Hwy 16 A & Boundary Rd



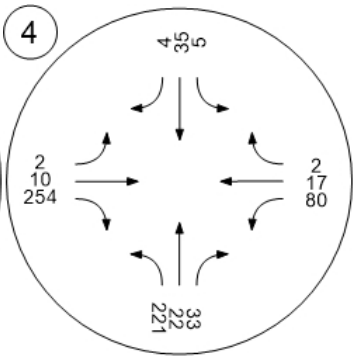

### Hwy 16A & 28 St



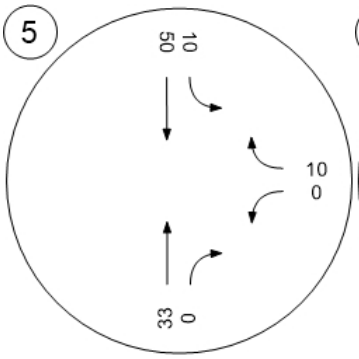

### Hwy 16A & S Park Dr/N Park



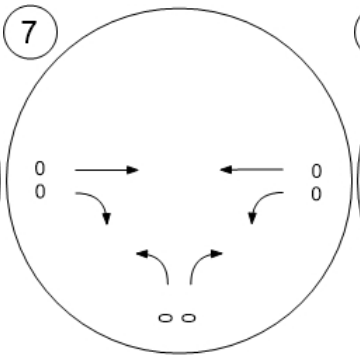

### Boulder Blvd & N Park Dr



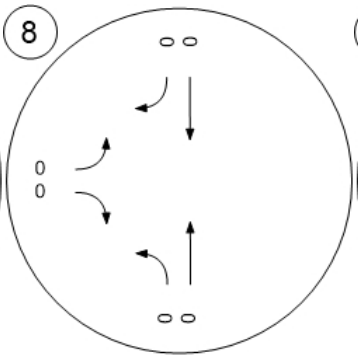

### N Park Dr & Quartz Ave



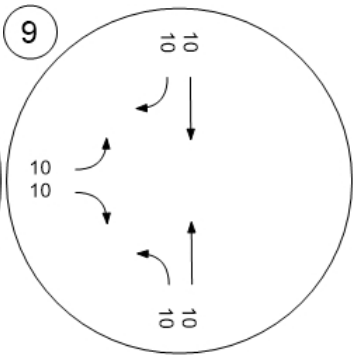

### Quartz Ave & Site Access #2




### 28 St & Site Access #1



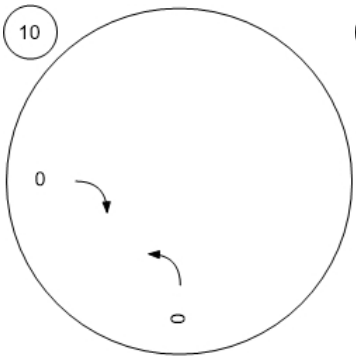

### Slate Ave & N Park Dr



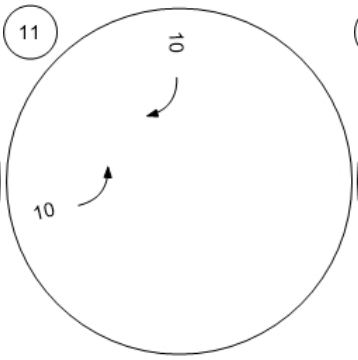
## Traffic Volume - Future Background Volume



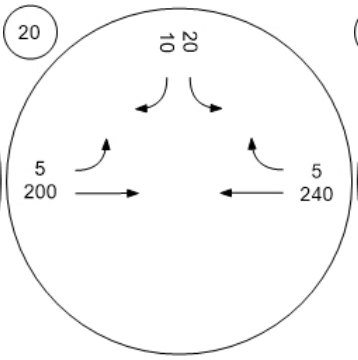

### Quartz Ave & 28 St



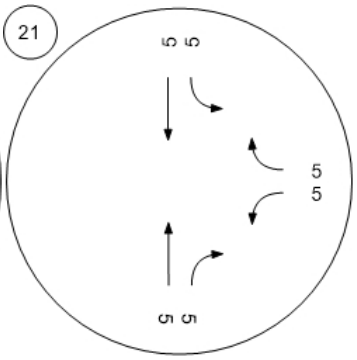

### N Park Dr & Keystone Dr



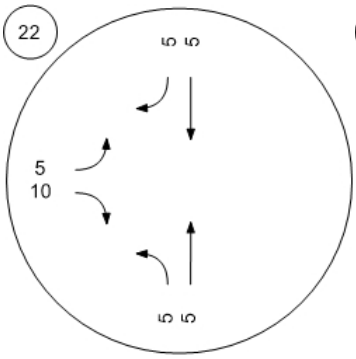

### Boulder Blvd & Golf Course



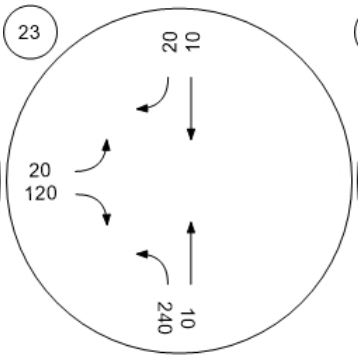

### Slate Ave & Golf Course Rd



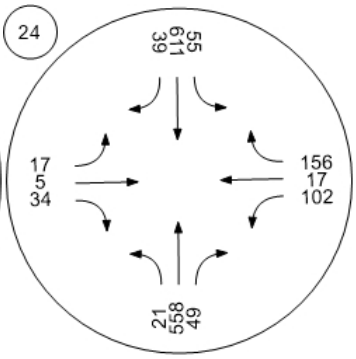

### Boulder Blvd & Golf Course



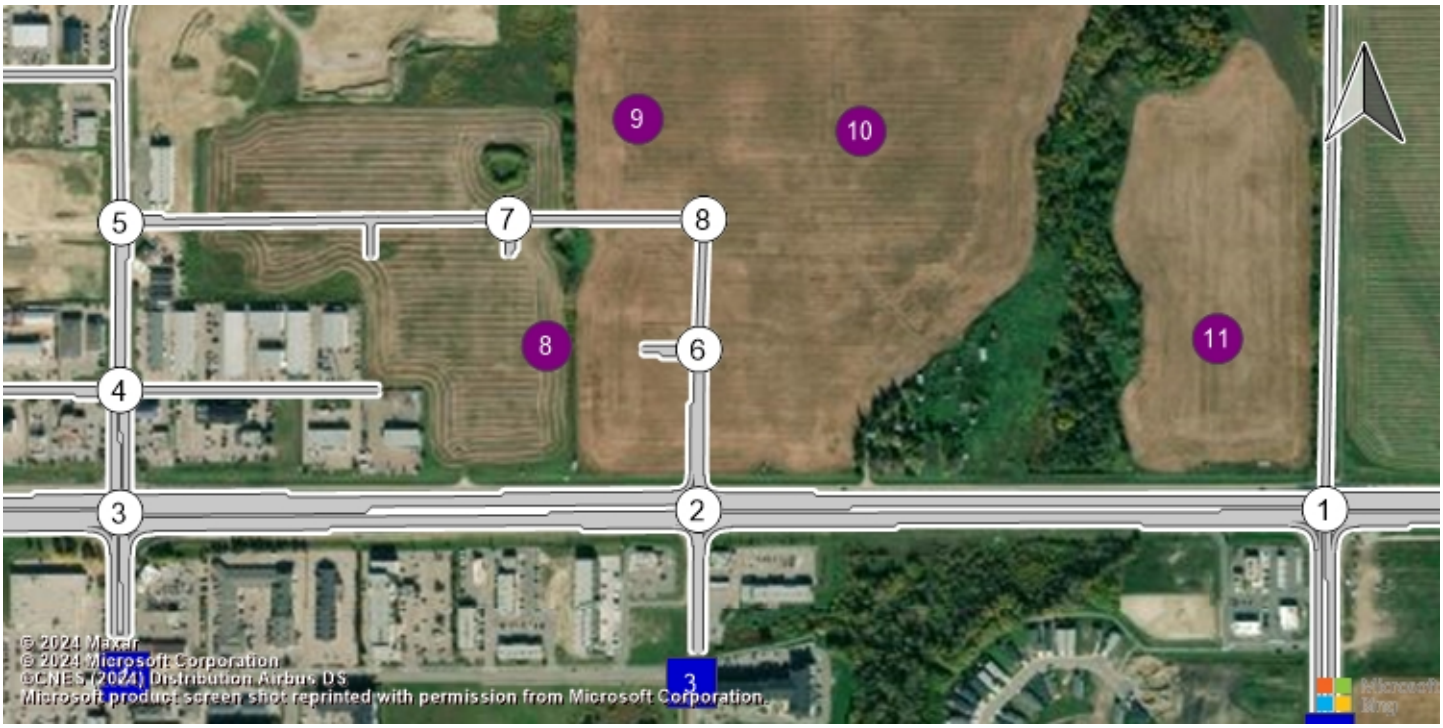

### Boulder Blvd & Wood Ave



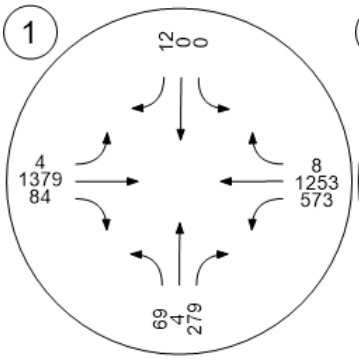

### Hwy 779 & Wood Ave



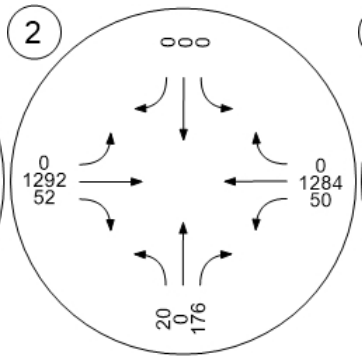
## Traffic Volume - Base Volume



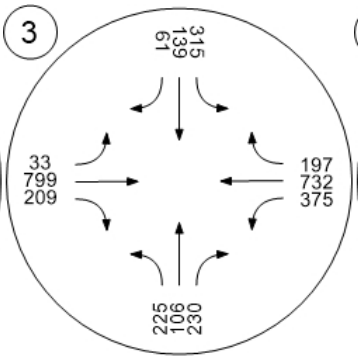

### Hwy 16 A & Boundary Rd



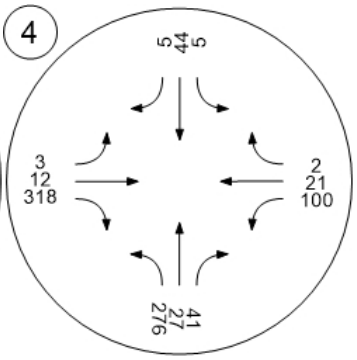

### Hwy 16A & 28 St



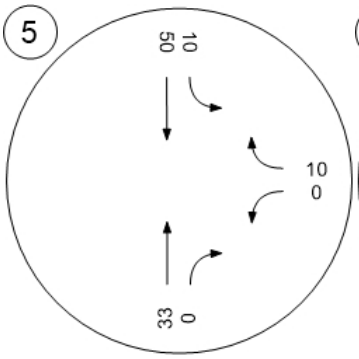

### Hwy 16A & S Park Dr/N Park



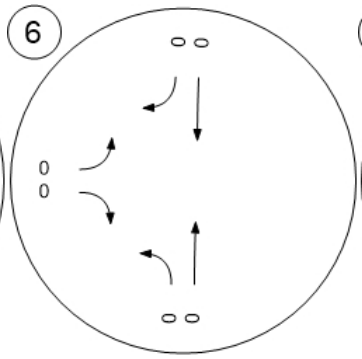

### Boulder Blvd & N Park Dr



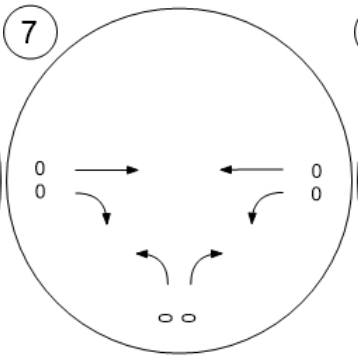

### N Park Dr & Quartz Ave



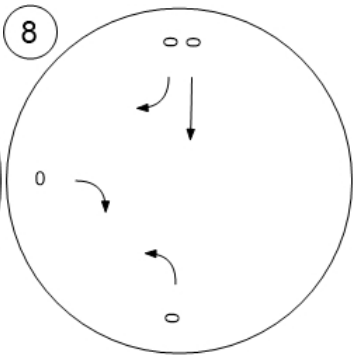

### 28 St & Site Access #1




### Quartz Ave & Site Access #2



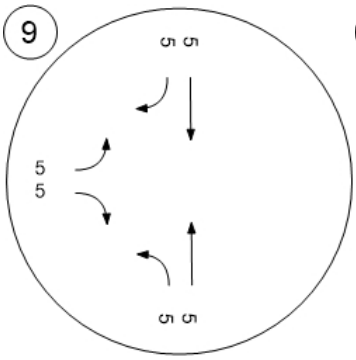

### Quartz Ave & 28 St



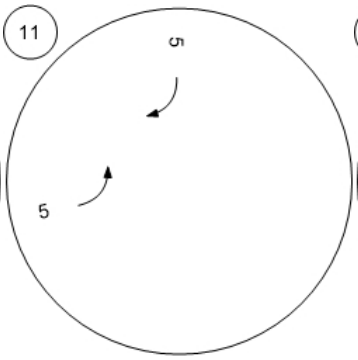
## Traffic Volume - Base Volume



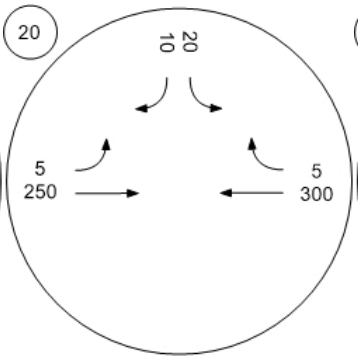

### Slate Ave & N Park Dr



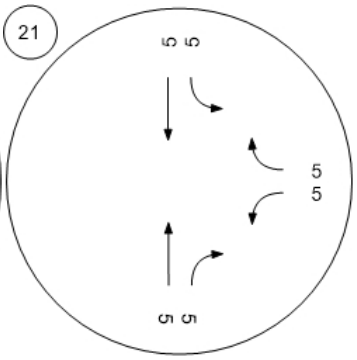

### N Park Dr & Keystone Dr



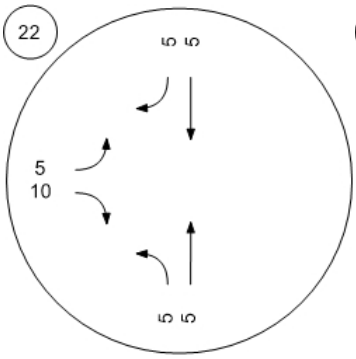

### Boulder Blvd & Golf Course



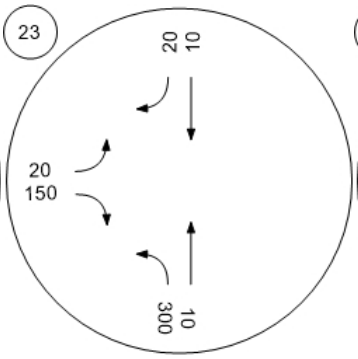

### Slate Ave & Golf Course Rd



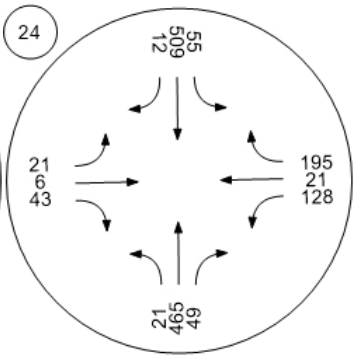

### Boulder Blvd & Golf Course




### Boulder Blvd & Wood Ave



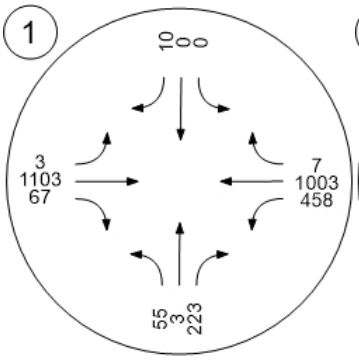

### Hwy 779 & Wood Ave



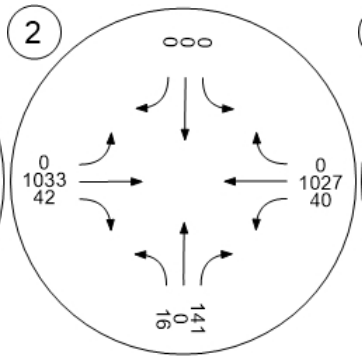
## Traffic Volume - Base Volume



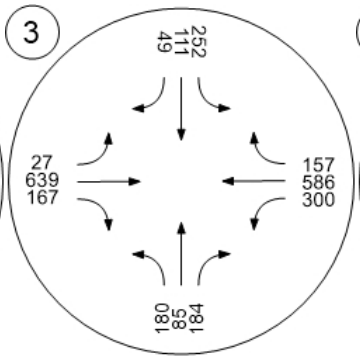

### Hwy 16 A & Boundary Rd



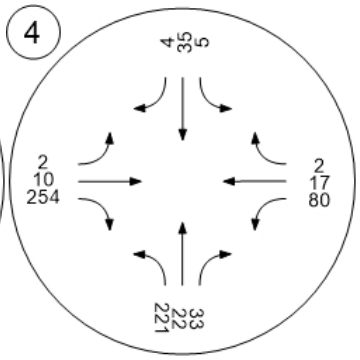

### Hwy 16A & 28 St



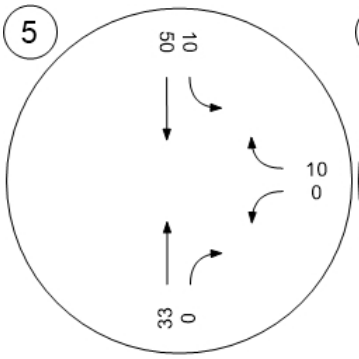

### Hwy 16A & S Park Dr/N Park



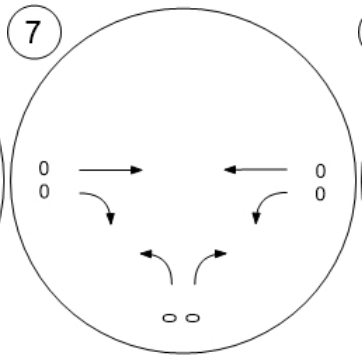

### Boulder Blvd & N Park Dr



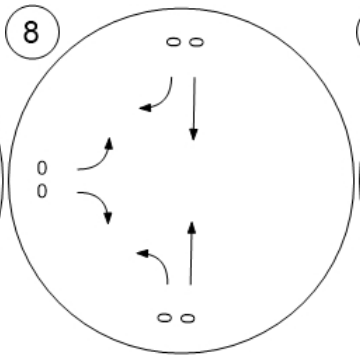

### N Park Dr & Quartz Ave



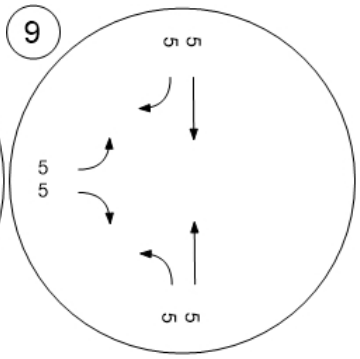

### Quartz Ave & Site Access #2




### 28 St & Site Access #1



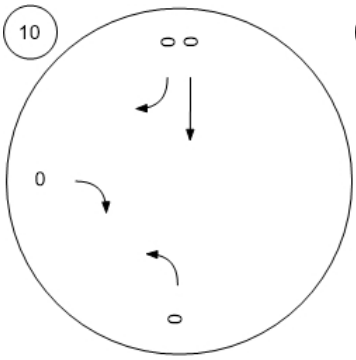

### Slate Ave & N Park Dr



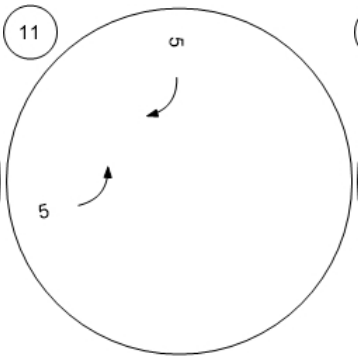
## Traffic Volume - Base Volume



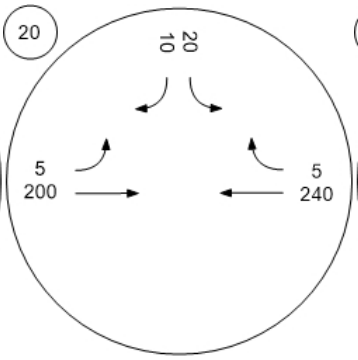

### Quartz Ave & 28 St



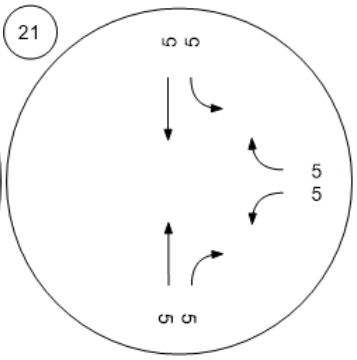

### N Park Dr & Keystone Dr



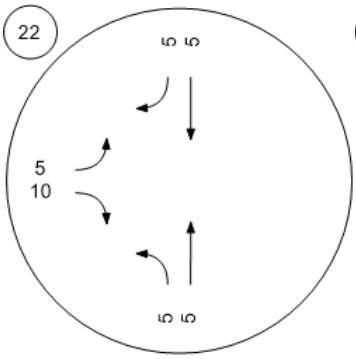

### Boulder Blvd & Golf Course



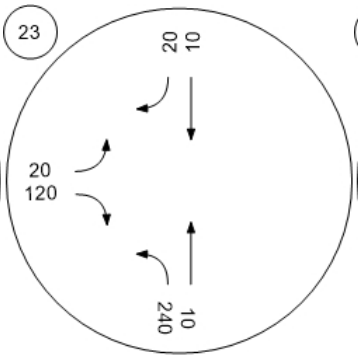

### Slate Ave & Golf Course Rd



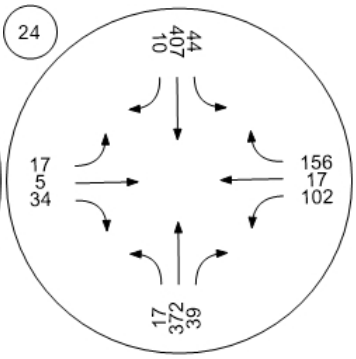

### Boulder Blvd & Golf Course




### Boulder Blvd & Wood Ave



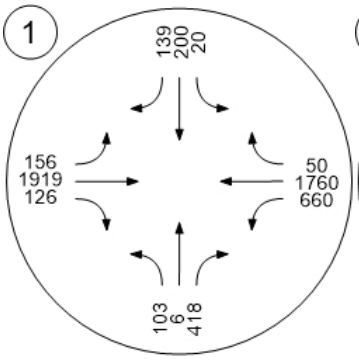

### Hwy 779 & Wood Ave



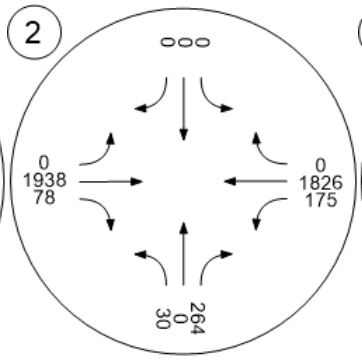
## Traffic Volume - Future Background Volume



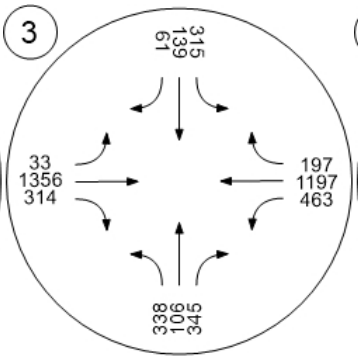

### Hwy 16 A & Boundary Rd



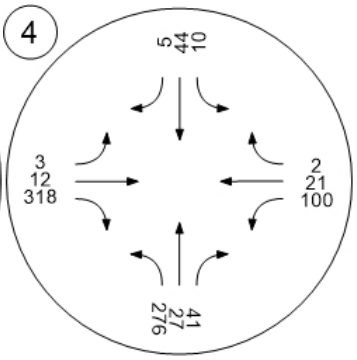

### Hwy 16A & 28 St



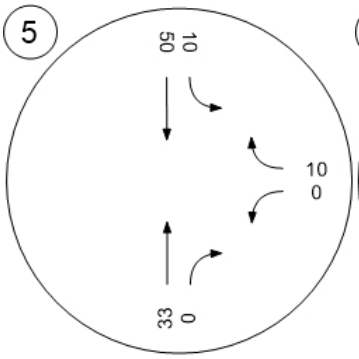

### Hwy 16A & S Park Dr/N Park



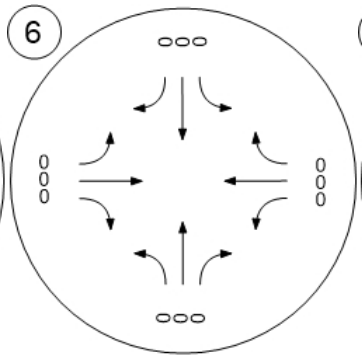

### Boulder Blvd & N Park Dr



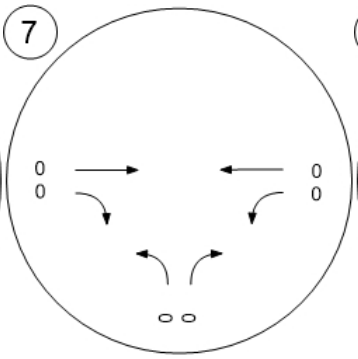

### N Park Dr & Quartz Ave



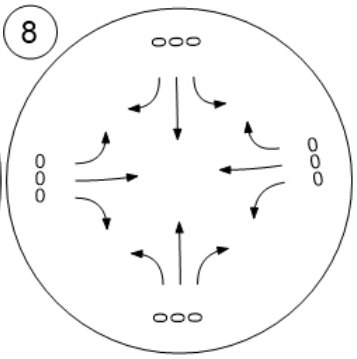

### 28 St & Site Access #1




### Quartz Ave & Site Access #2



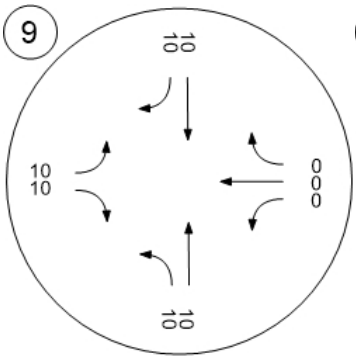

### Quartz Ave & 28 St



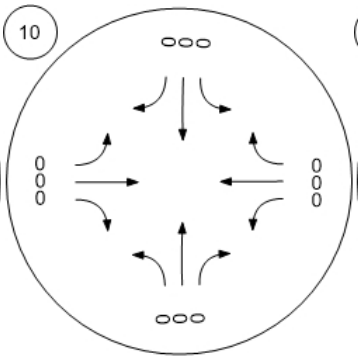
## Traffic Volume - Future Background Volume



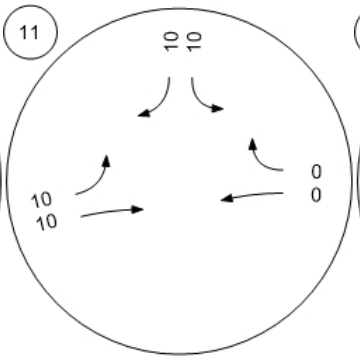

Slate Ave & N Park Dr



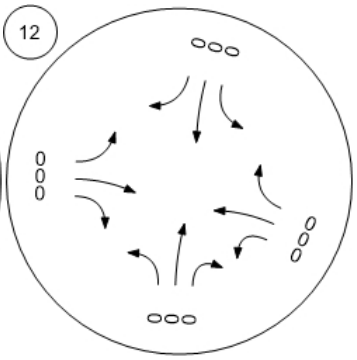

Slate Ave & 28 St



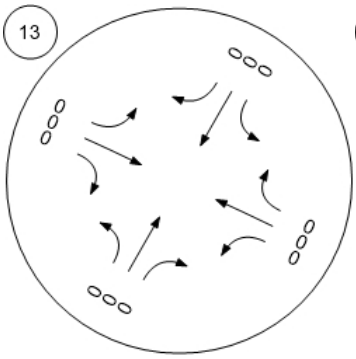

N Park Dr & Keystone Dr



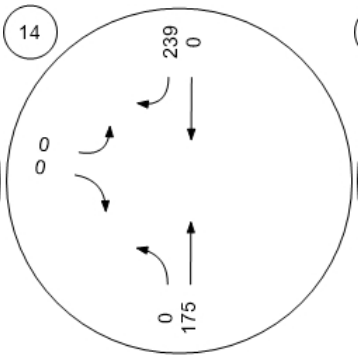

N Park Dr & 28 St



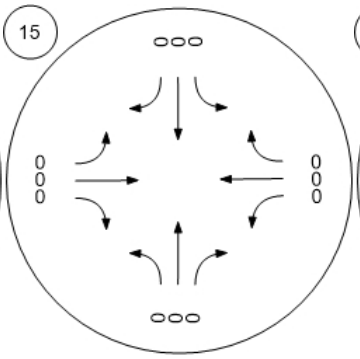

N Park Dr & New Road B



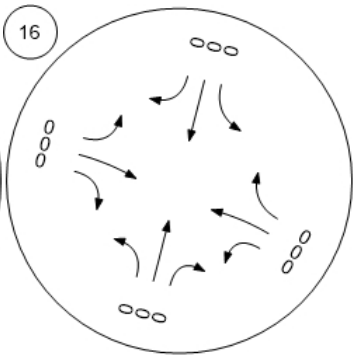

N Park Dr & Boundary Rd



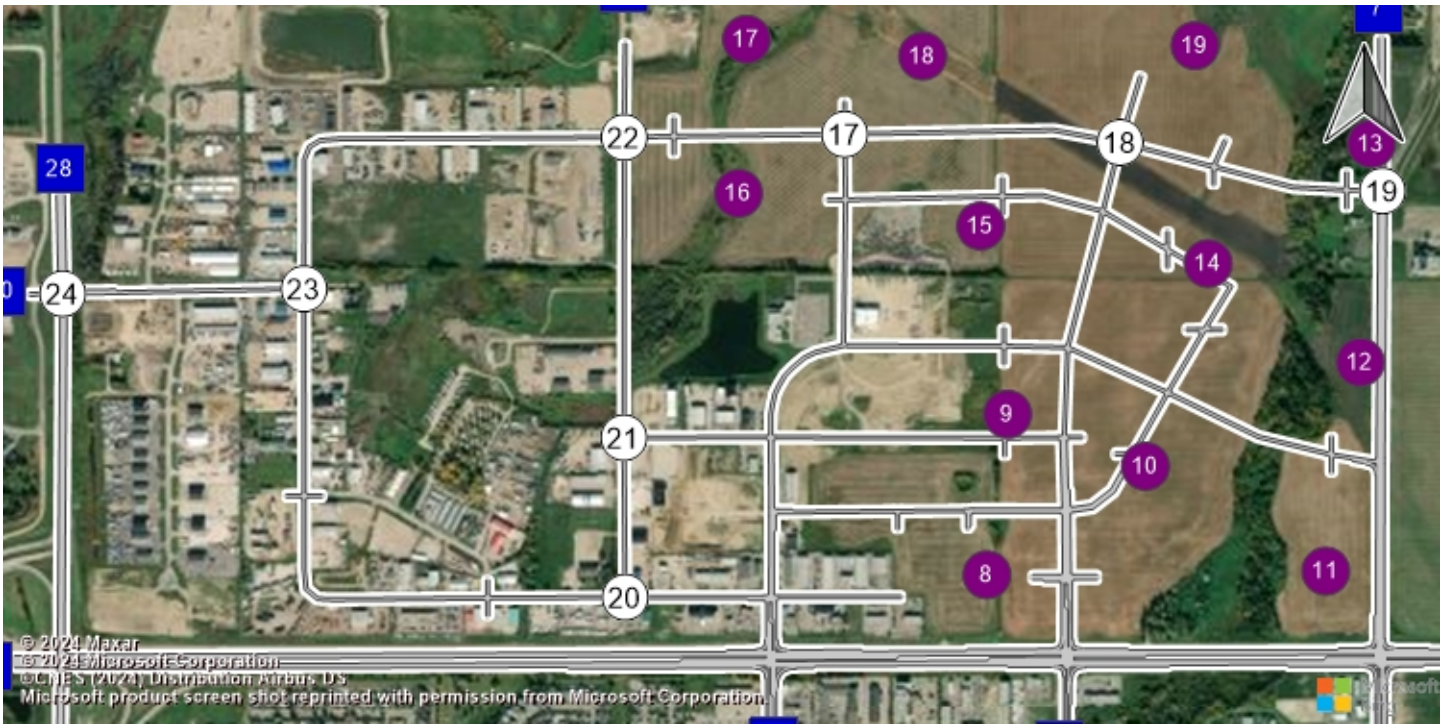

New Road B & Keystone Dr



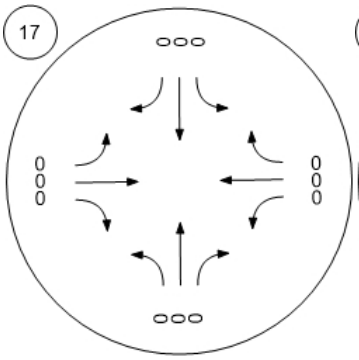

New Road B & 28 St



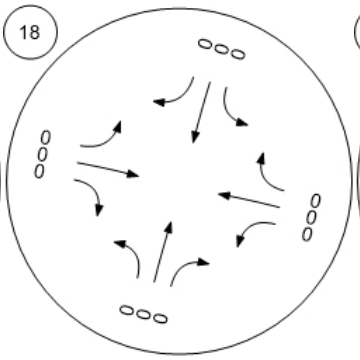
## Traffic Volume - Future Background Volume



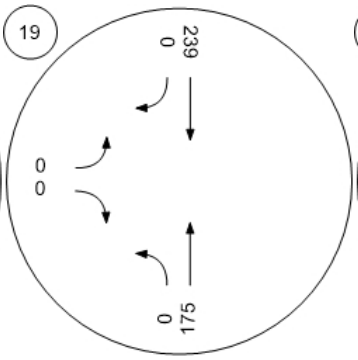

### Boulder Blvd & Keystone Dr



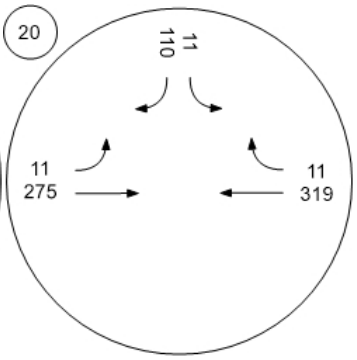

### Boulder Blvd & 28 St



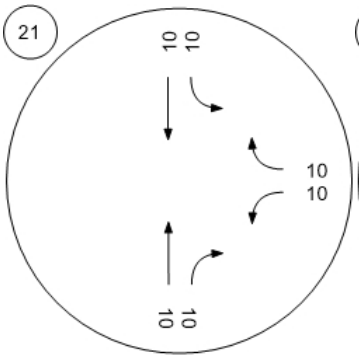

### Boulder Blvd & Boundary Rd



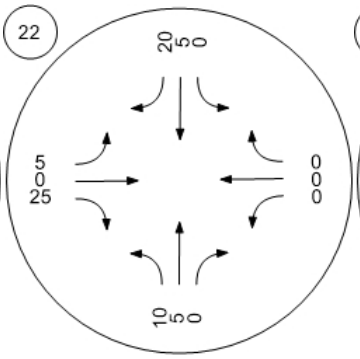

### Boulder Blvd & Golf Course



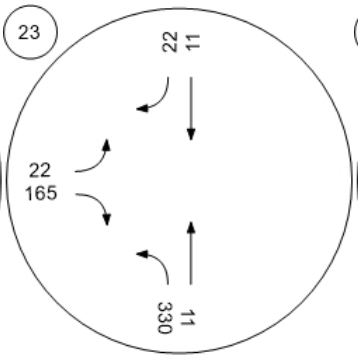

### Slate Ave & Golf Course Rd



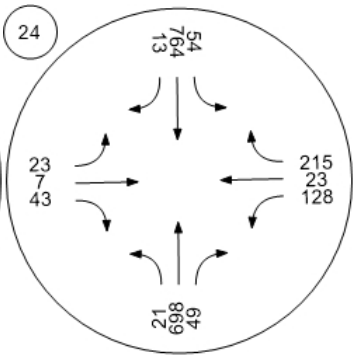

### Boulder Blvd & Golf Course




### Boulder Blvd & Wood Ave



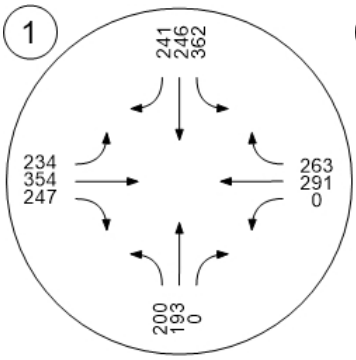

### Hwy 779 & Wood Ave



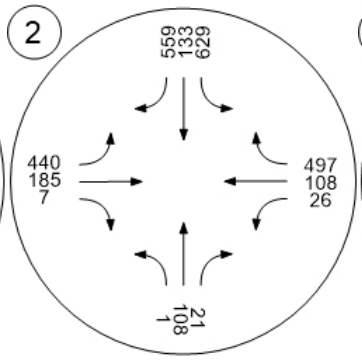
## Traffic Volume - Net New Site Trips



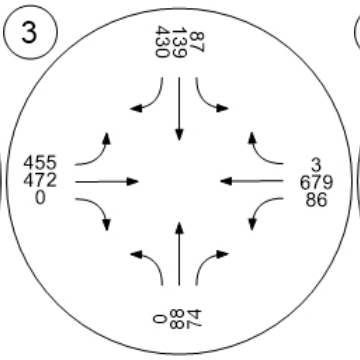

### Hwy 16 A & Boundary Rd



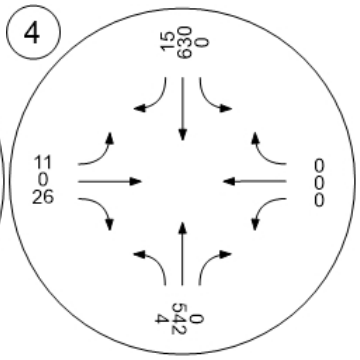

### Hwy 16A & 28 St



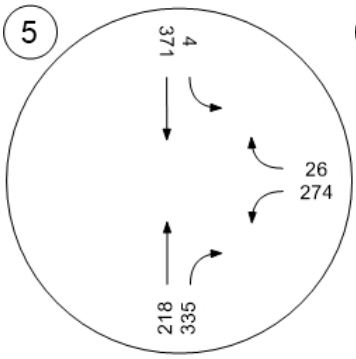

### Hwy 16A & S Park Dr/N Park



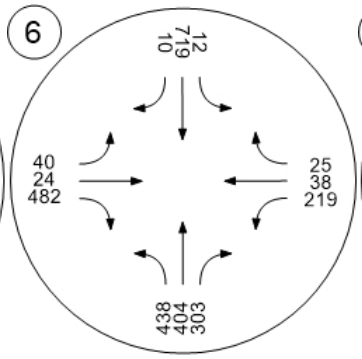

### Boulder Blvd & N Park Dr



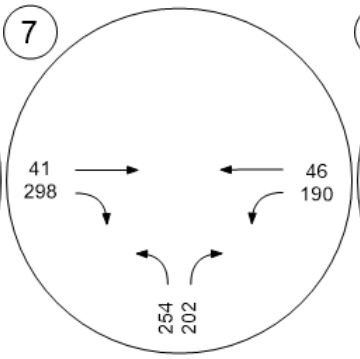

### N Park Dr & Quartz Ave



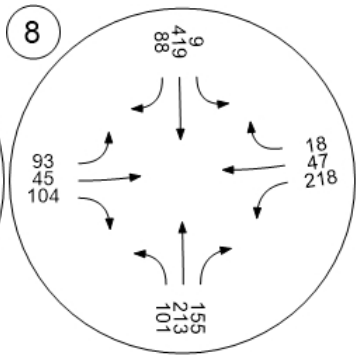

### 28 St & Site Access #1




### Quartz Ave & Site Access #2



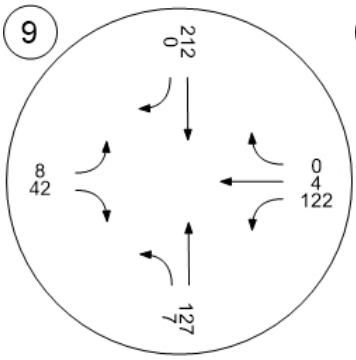

### Quartz Ave & 28 St



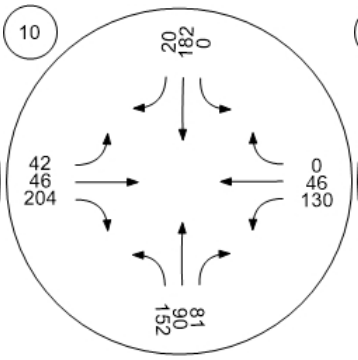
## Traffic Volume - Net New Site Trips



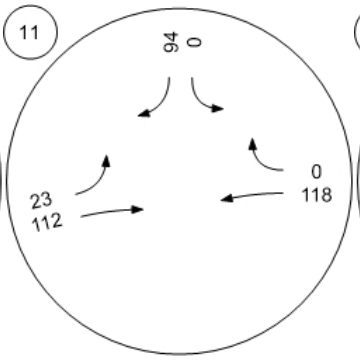

### Slate Ave & N Park Dr



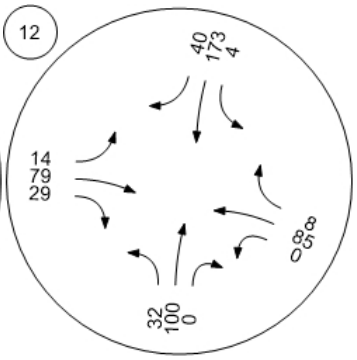

### Slate Ave & 28 St



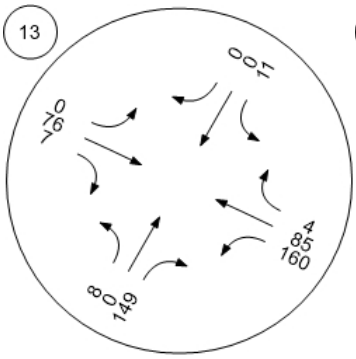

### N Park Dr & Keystone Dr



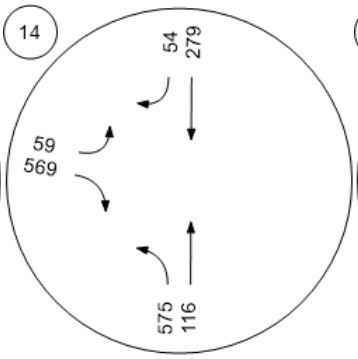

### N Park Dr & 28 St



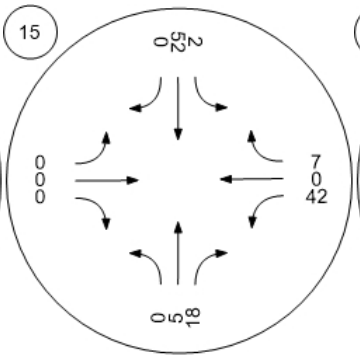

### N Park Dr & New Road B



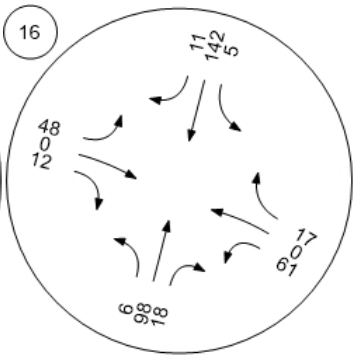

### N Park Dr & Boundary Rd



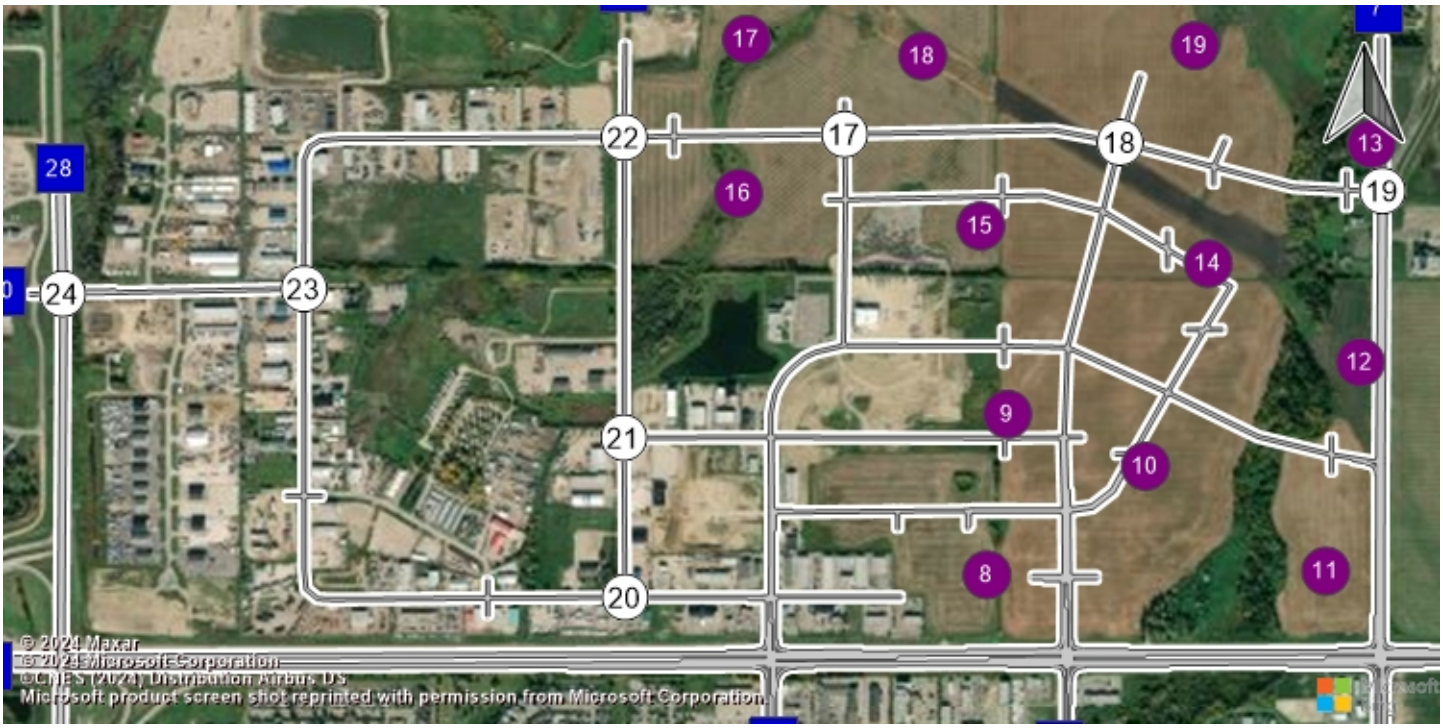

### New Road B & Keystone Dr



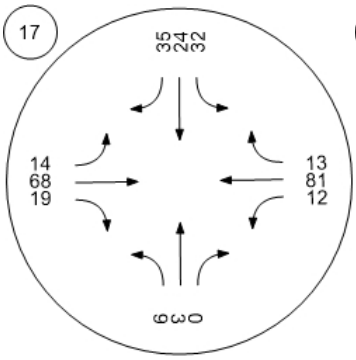

### New Road B & 28 St



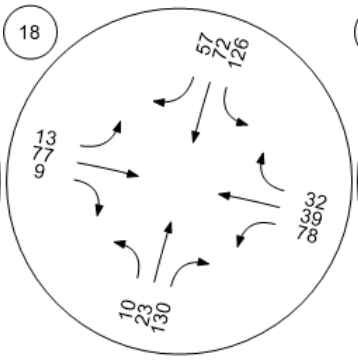
## Traffic Volume - Net New Site Trips



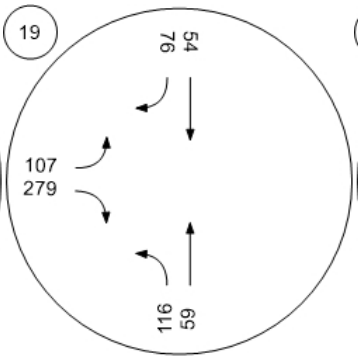

### Boulder Blvd & Keystone Dr



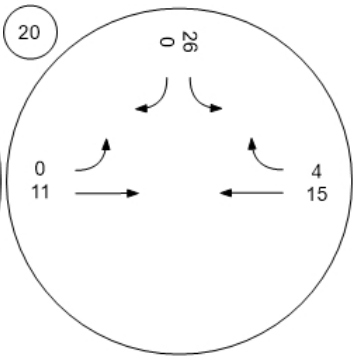

### Boulder Blvd & 28 St



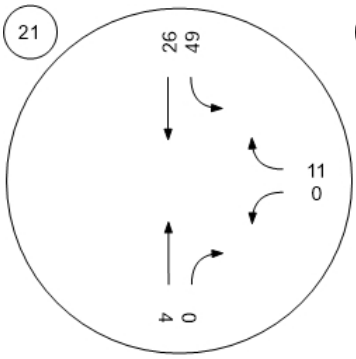

### Boulder Blvd & Boundary Rd



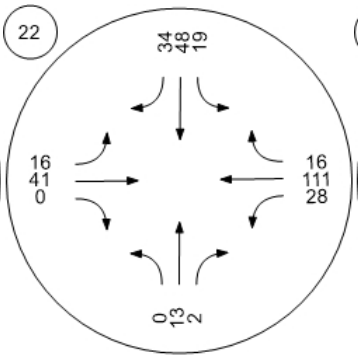

### Boulder Blvd & Golf Course



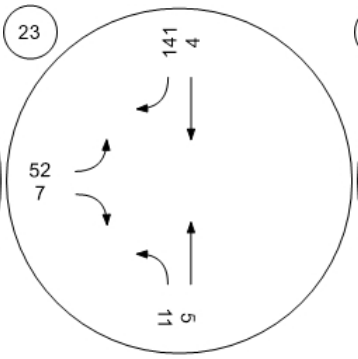

### Slate Ave & Golf Course Rd



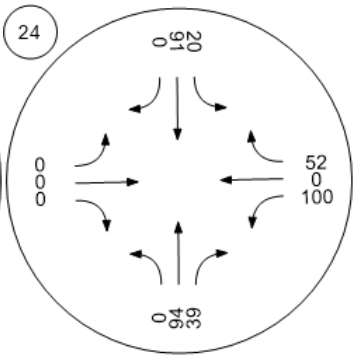

### Boulder Blvd & Golf Course




### Boulder Blvd & Wood Ave



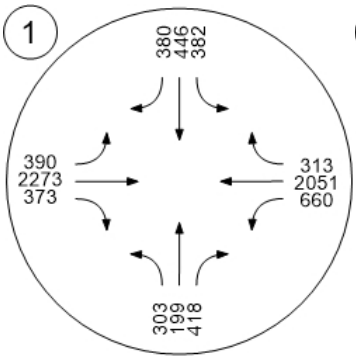

### Hwy 779 & Wood Ave



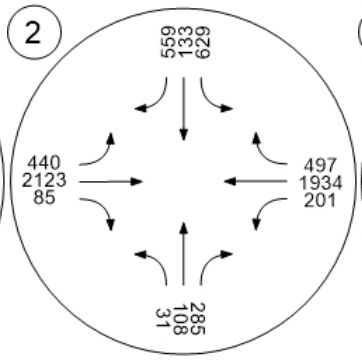
## Traffic Volume - Future Total Volume



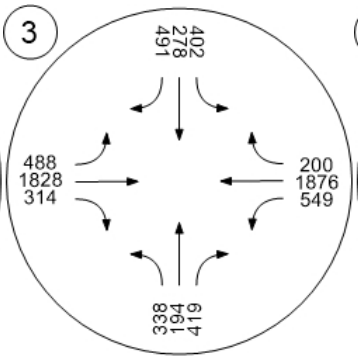

### Hwy 16 A & Boundary Rd



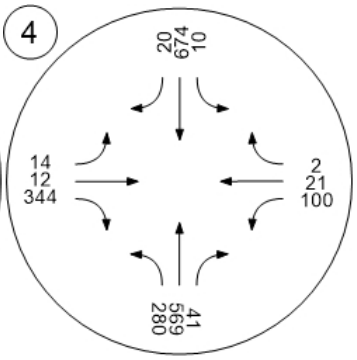

### Hwy 16A & 28 St



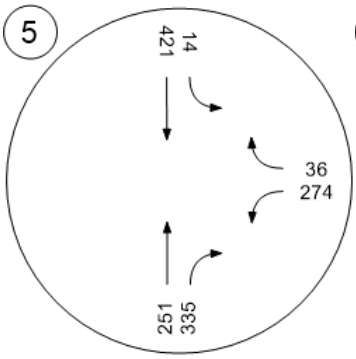

### Hwy 16A & S Park Dr/N Park



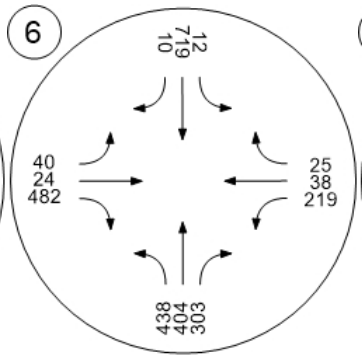

### Boulder Blvd & N Park Dr



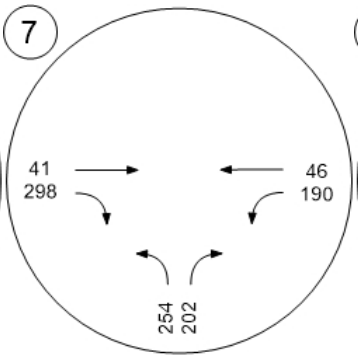

### N Park Dr & Quartz Ave



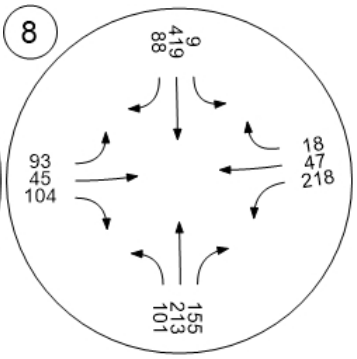

### 28 St & Site Access #1




### Quartz Ave & Site Access #2



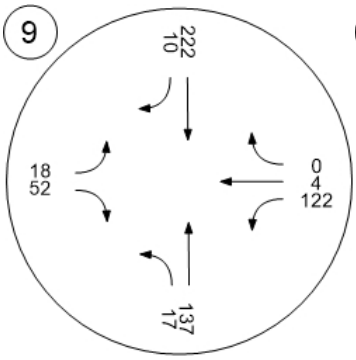

### Quartz Ave & 28 St



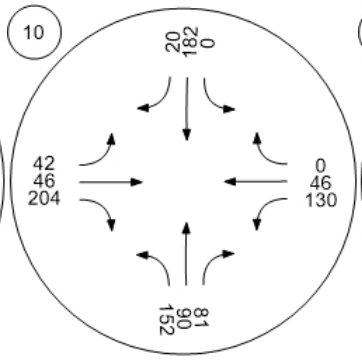
## Traffic Volume - Future Total Volume



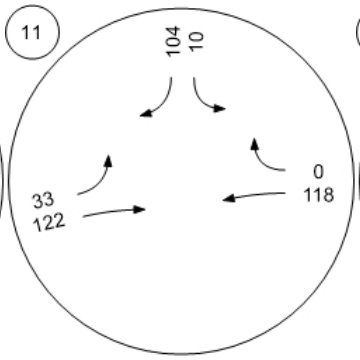

### Slate Ave & N Park Dr



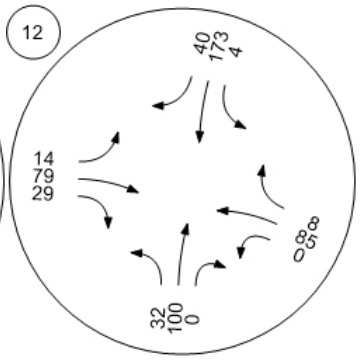

### Slate Ave & 28 St



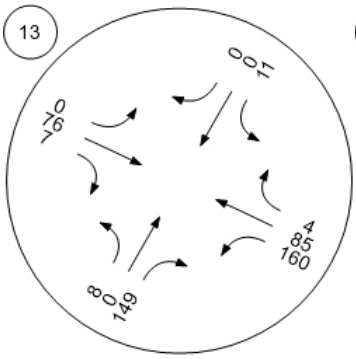

### N Park Dr & Keystone Dr



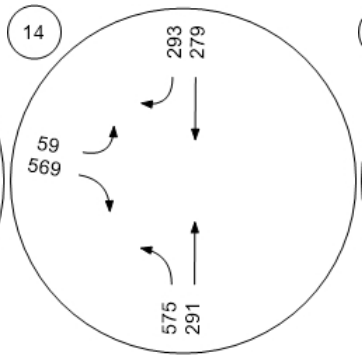

### N Park Dr & 28 St



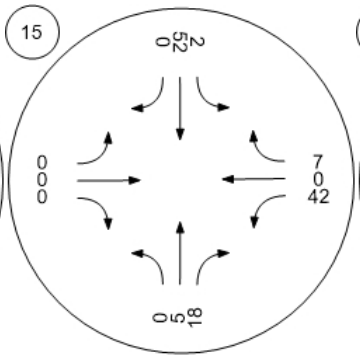

### N Park Dr & New Road B



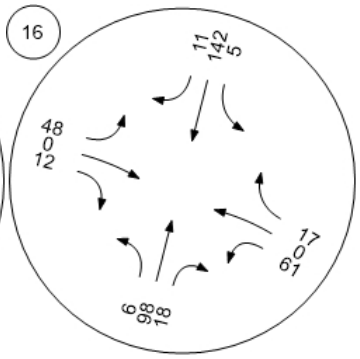

### N Park Dr & Boundary Rd



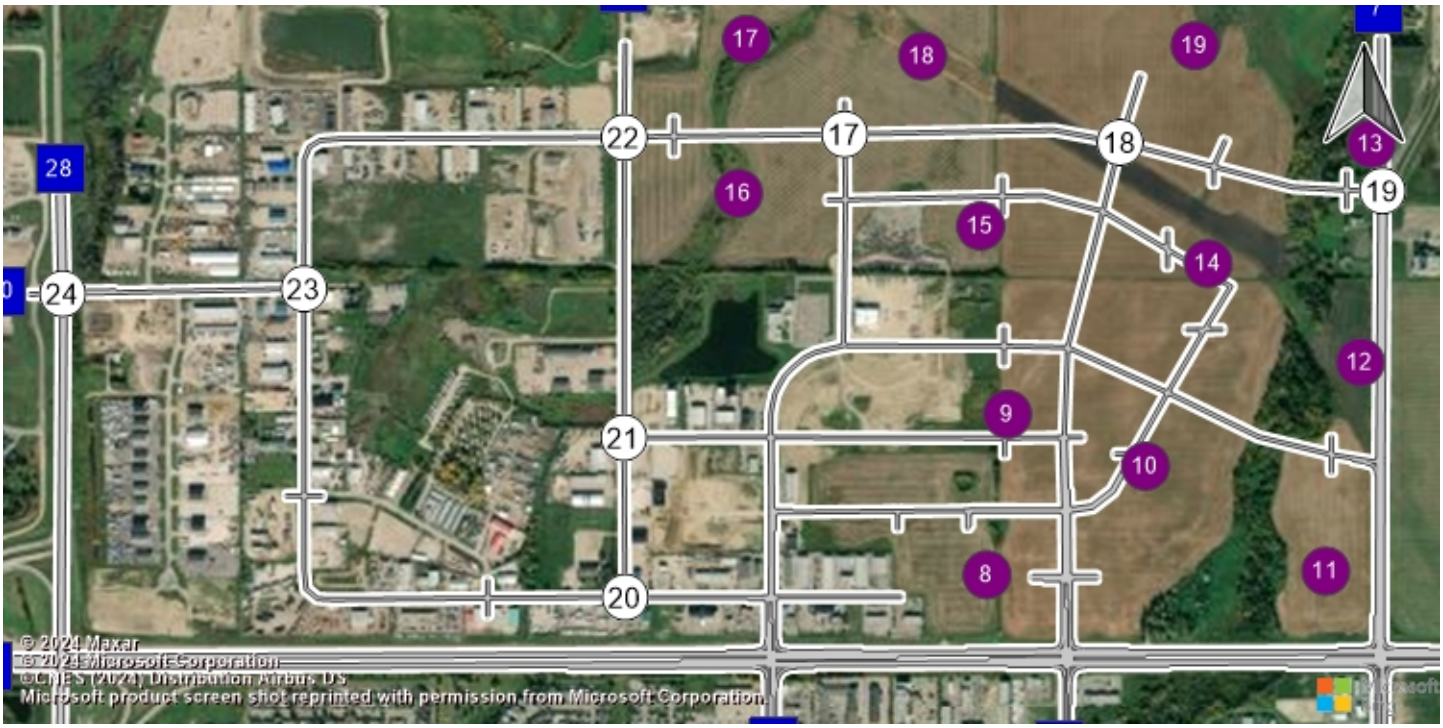

### New Road B & Keystone Dr



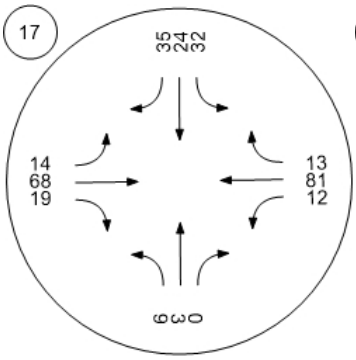

### New Road B & 28 St



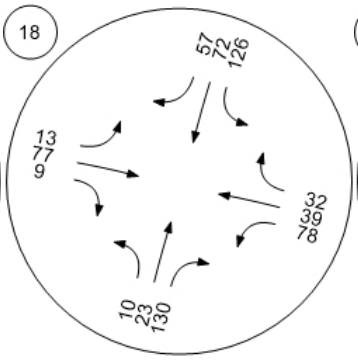
## Traffic Volume - Future Total Volume



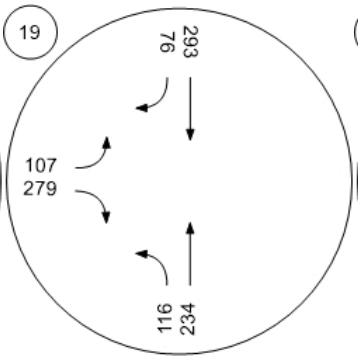

### Boulder Blvd & Keystone Dr



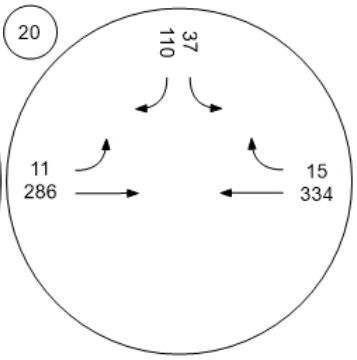

### Boulder Blvd & 28 St



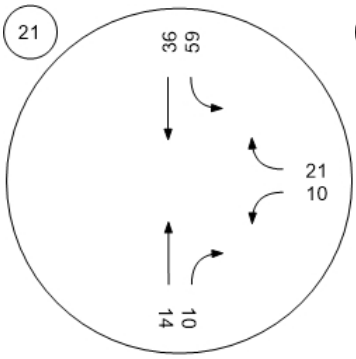

### Boulder Blvd & Boundary Rd



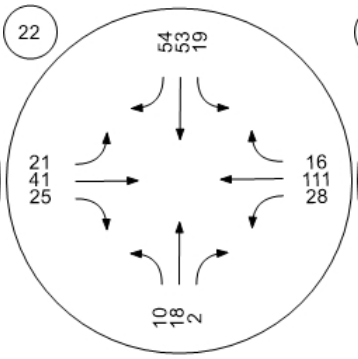

### Boulder Blvd & Golf Course



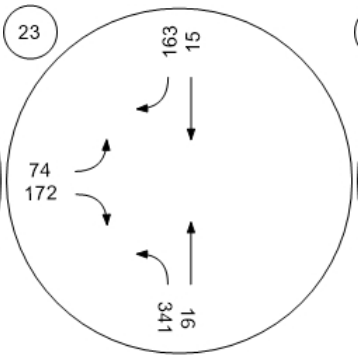

### Slate Ave & Golf Course Rd



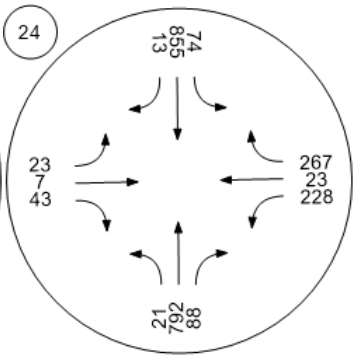

### Boulder Blvd & Golf Course




### Boulder Blvd & Wood Ave



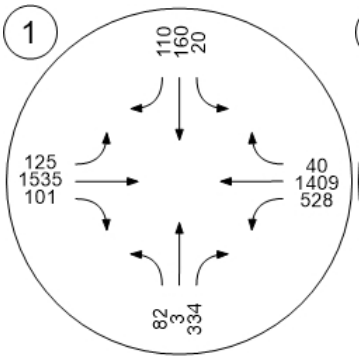

### Hwy 779 & Wood Ave



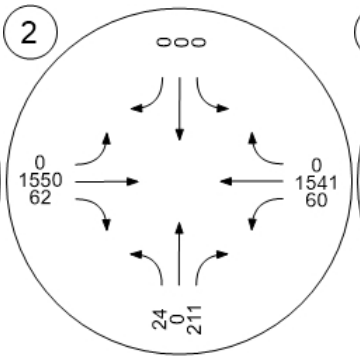
## Traffic Volume - Future Background Volume



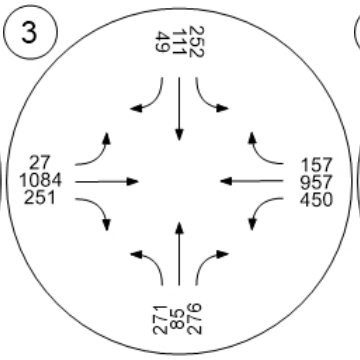

### Hwy 16 A & Boundary Rd



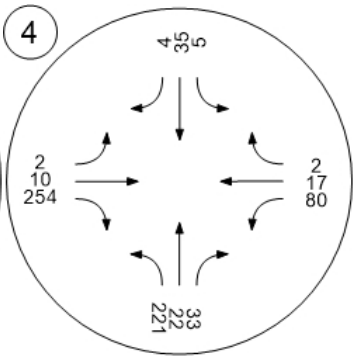

### Hwy 16A & 28 St



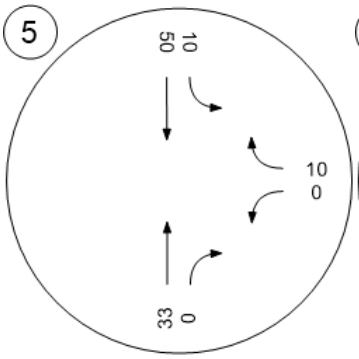

### Hwy 16A & S Park Dr/N Park



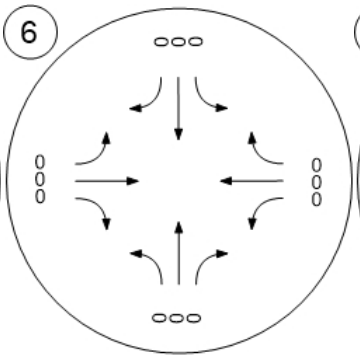

### Boulder Blvd & N Park Dr



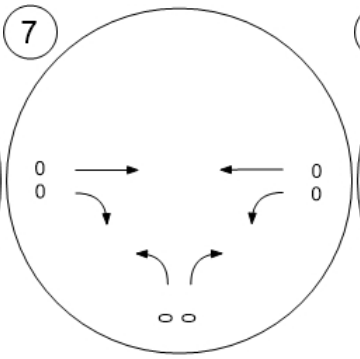

### N Park Dr & Quartz Ave



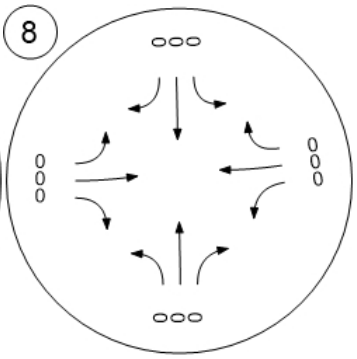

### 28 St & Site Access #1




### Quartz Ave & Site Access #2



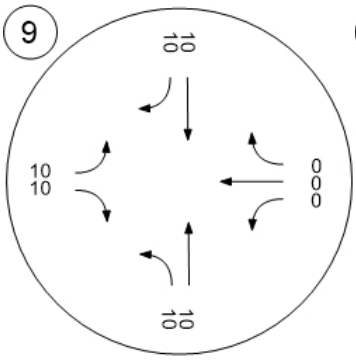

### Quartz Ave & 28 St



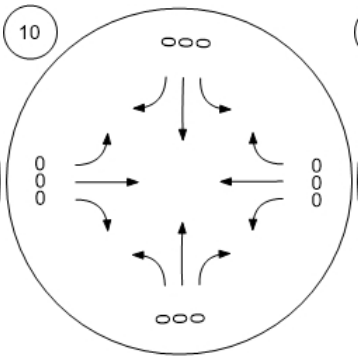
## Traffic Volume - Future Background Volume



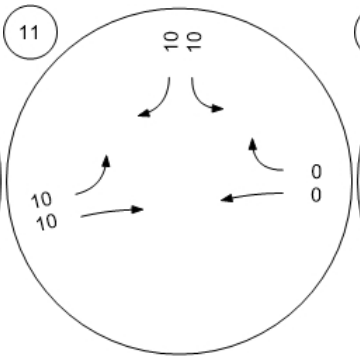

Slate Ave & N Park Dr



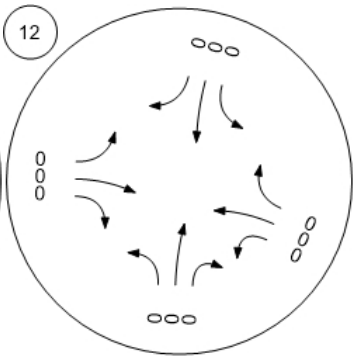

Slate Ave & 28 St



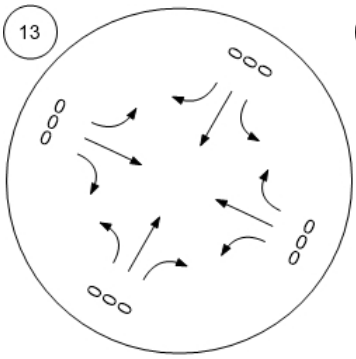

N Park Dr & Keystone Dr



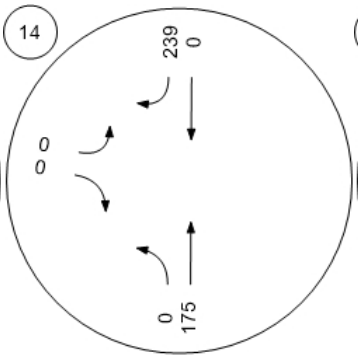

N Park Dr & 28 St



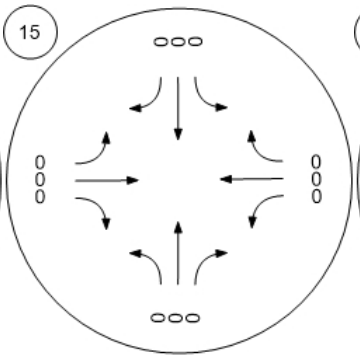

N Park Dr & New Road B



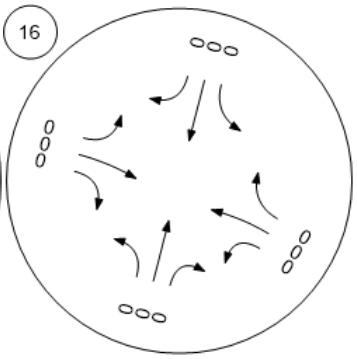

N Park Dr & Boundary Rd



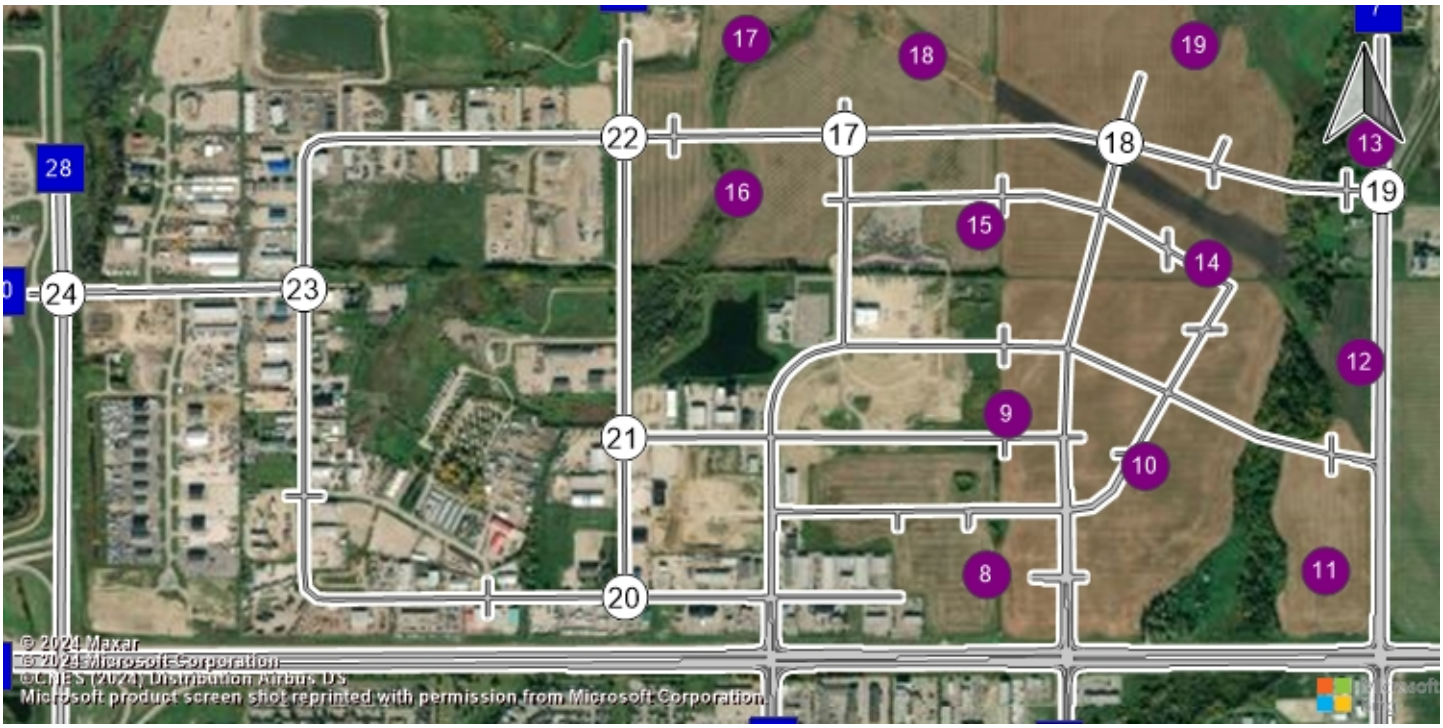

New Road B & Keystone Dr



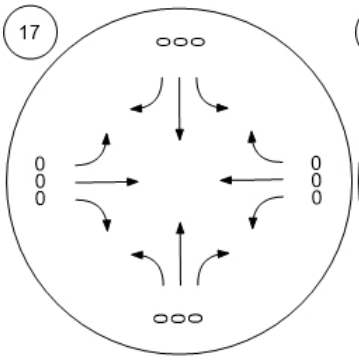

New Road B & 28 St



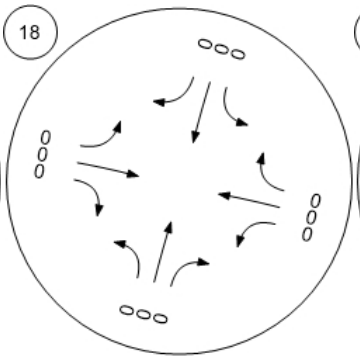
## Traffic Volume - Future Background Volume



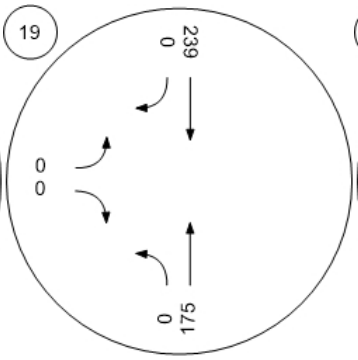

### Boulder Blvd & Keystone Dr



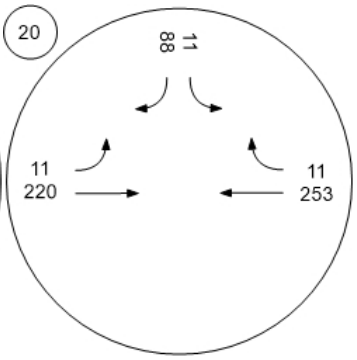

### Boulder Blvd & 28 St



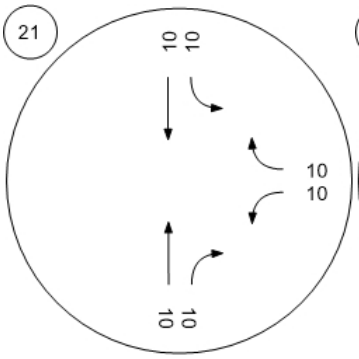

### Boulder Blvd & Boundary Rd



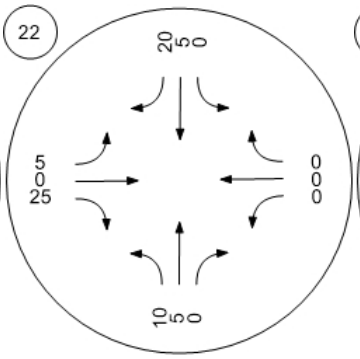

### Boulder Blvd & Golf Course



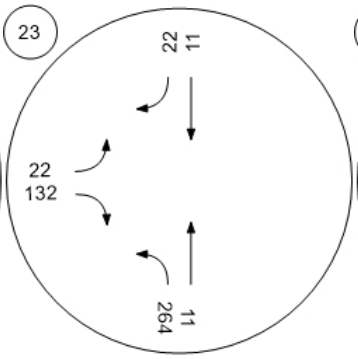

### Slate Ave & Golf Course Rd



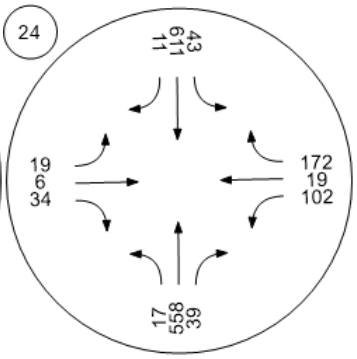

### Boulder Blvd & Golf Course




### Boulder Blvd & Wood Ave



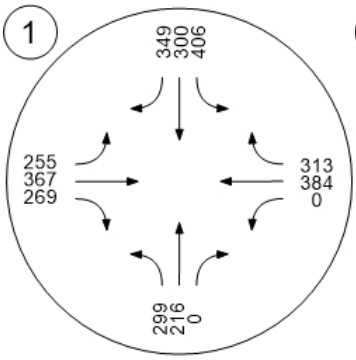

### Hwy 779 & Wood Ave



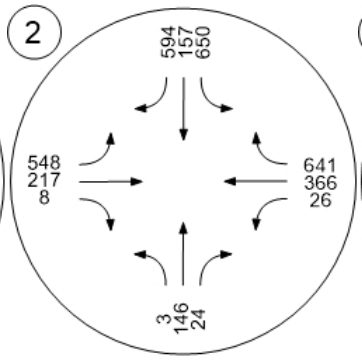
## Traffic Volume - Net New Site Trips



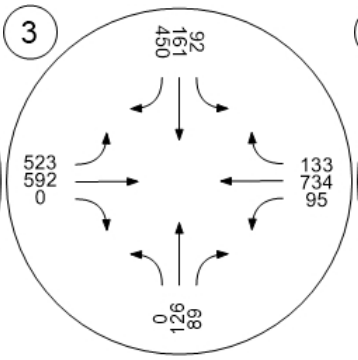

### Hwy 16 A & Boundary Rd



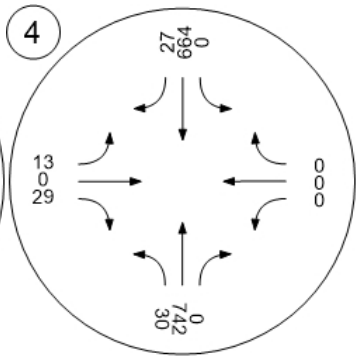

### Hwy 16A & 28 St



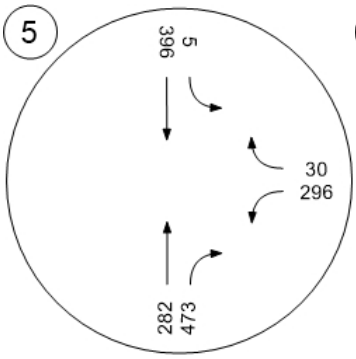

### Hwy 16A & S Park Dr/N Park



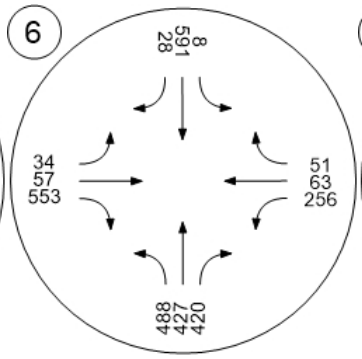

### Boulder Blvd & N Park Dr



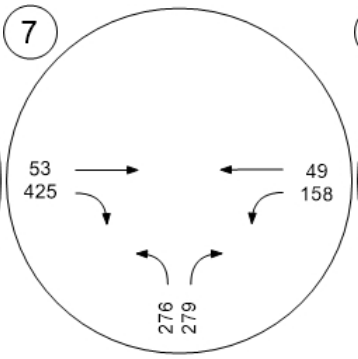

### N Park Dr & Quartz Ave



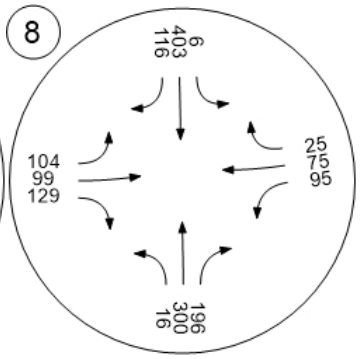

### 28 St & Site Access #1




### Quartz Ave & Site Access #2



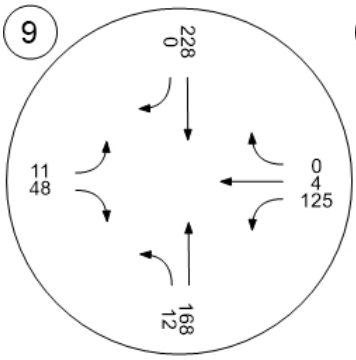

### Quartz Ave & 28 St



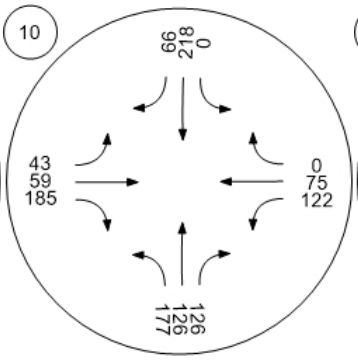
## Traffic Volume - Net New Site Trips



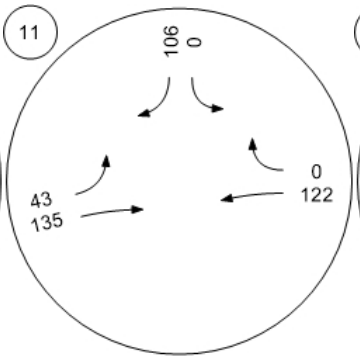

### Slate Ave & N Park Dr



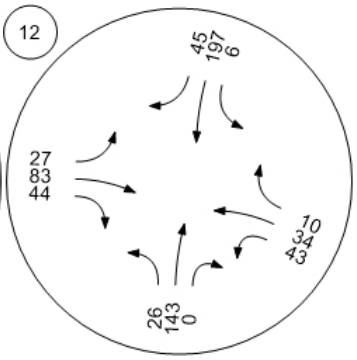

### Slate Ave & 28 St



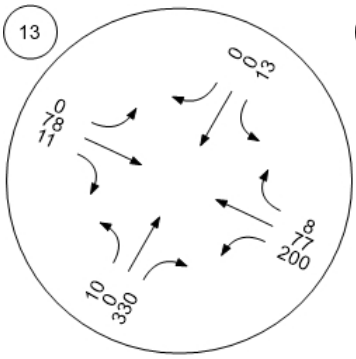

### N Park Dr & Keystone Dr



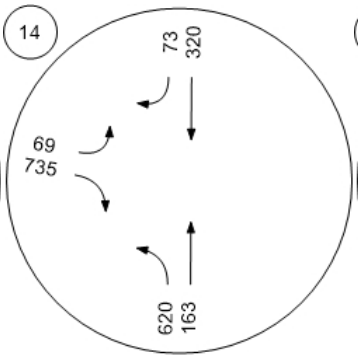

### N Park Dr & 28 St



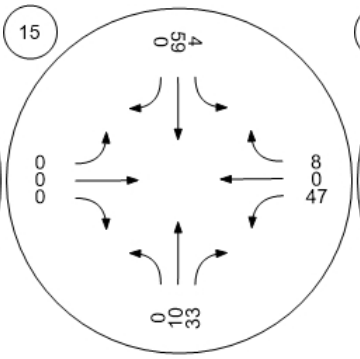

### N Park Dr & New Road B



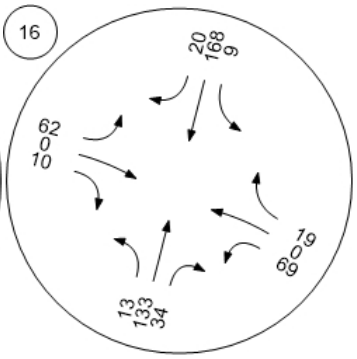

### N Park Dr & Boundary Rd



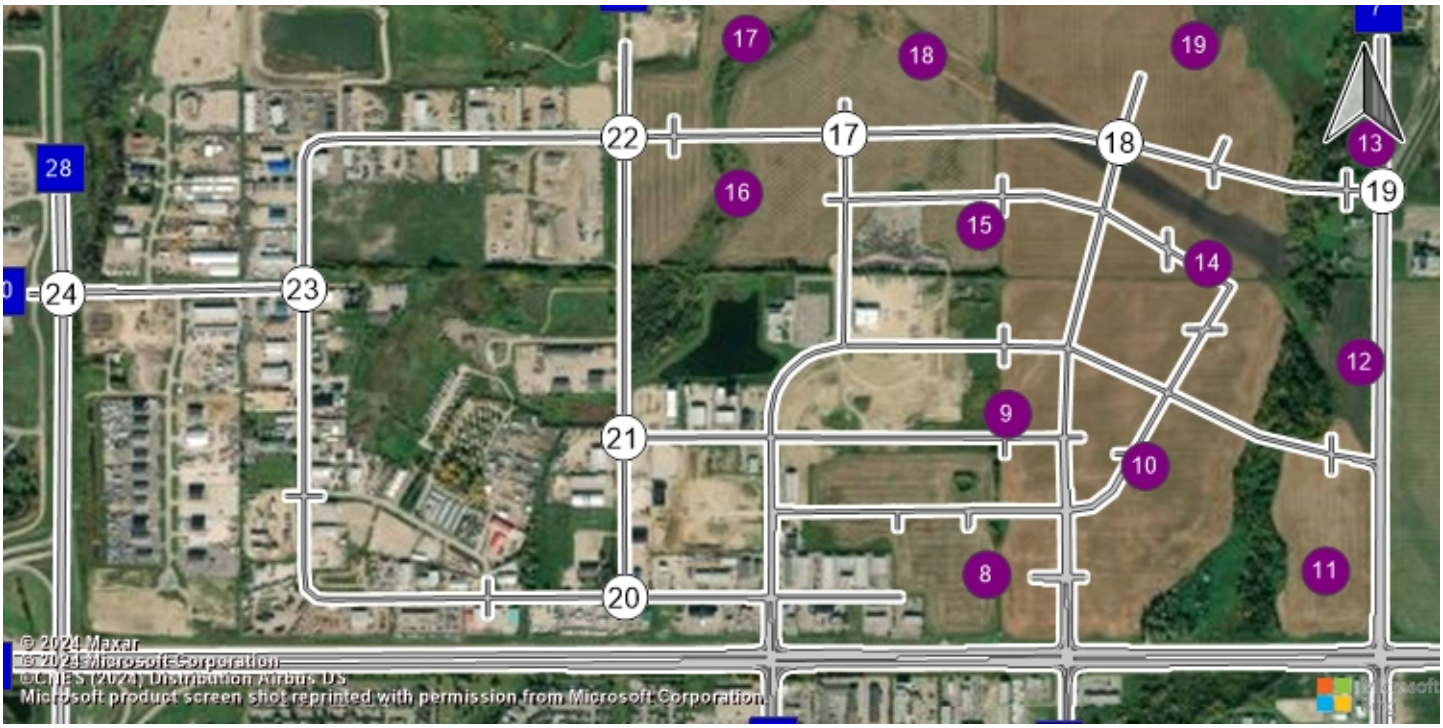

### New Road B & Keystone Dr



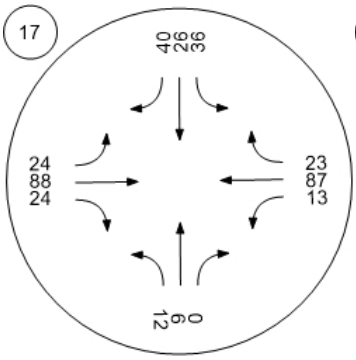

### New Road B & 28 St



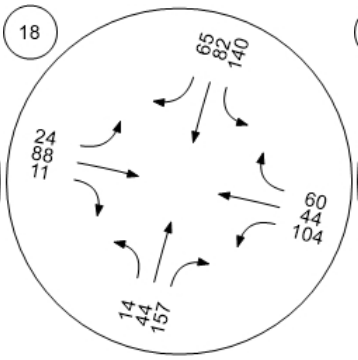
## Traffic Volume - Net New Site Trips



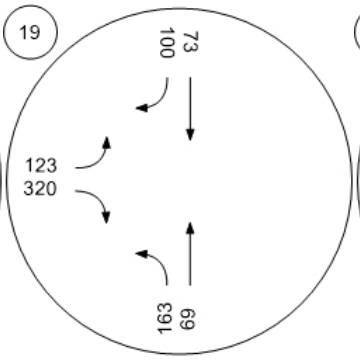

### Boulder Blvd & Keystone Dr



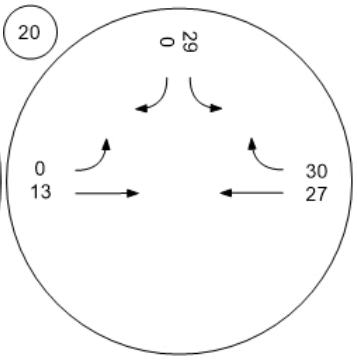

### Boulder Blvd & 28 St



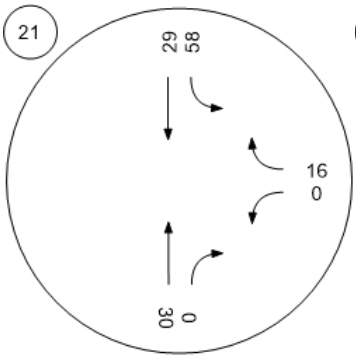

### Boulder Blvd & Boundary Rd



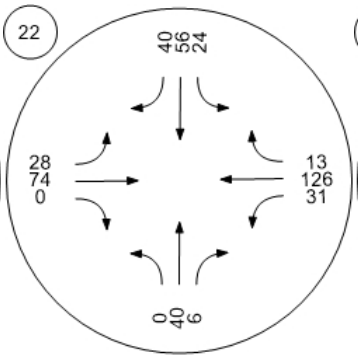

### Boulder Blvd & Golf Course



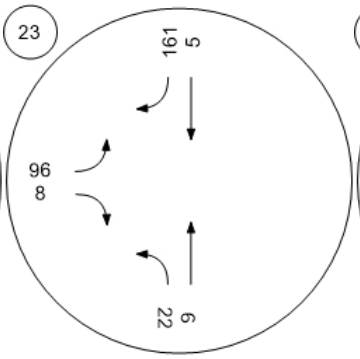

### Slate Ave & Golf Course Rd



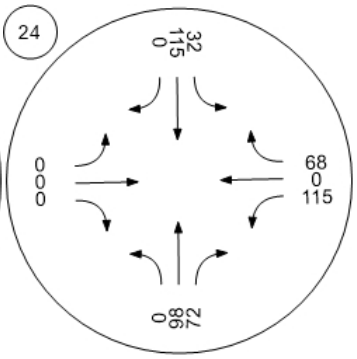

### Boulder Blvd & Golf Course




### Boulder Blvd & Wood Ave



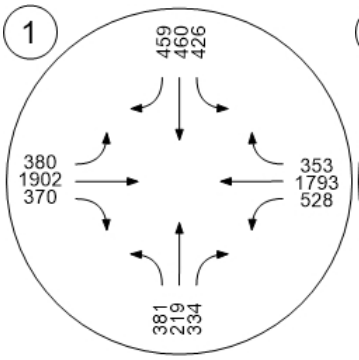

### Hwy 779 & Wood Ave



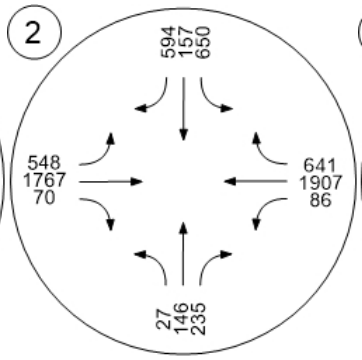
## Traffic Volume - Future Total Volume



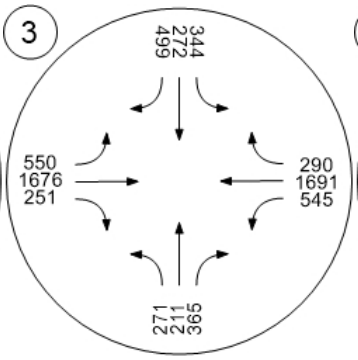

### Hwy 16 A & Boundary Rd



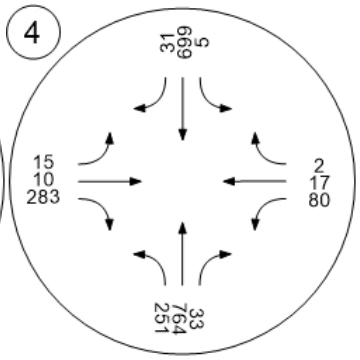

### Hwy 16A & 28 St



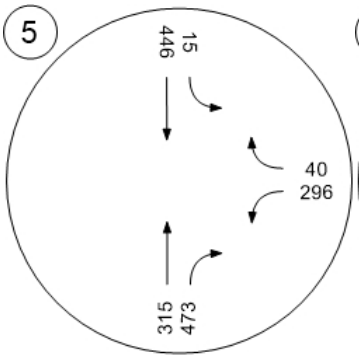

### Hwy 16A & S Park Dr/N Park



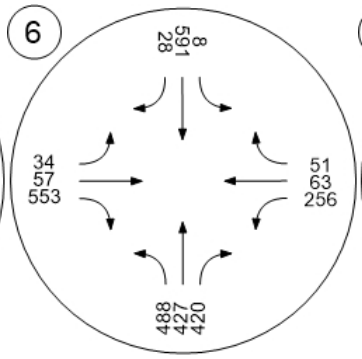

### Boulder Blvd & N Park Dr



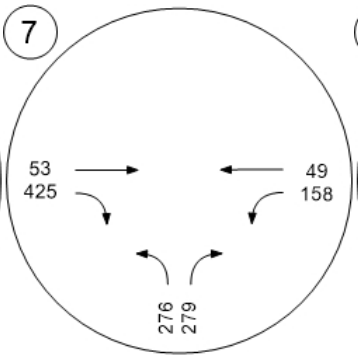

### N Park Dr & Quartz Ave



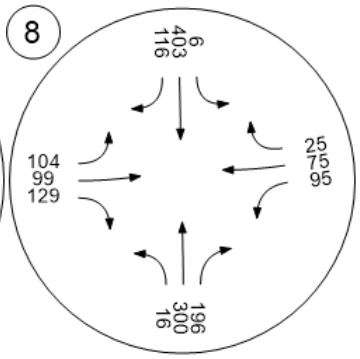

### 28 St & Site Access #1




### Quartz Ave & Site Access #2



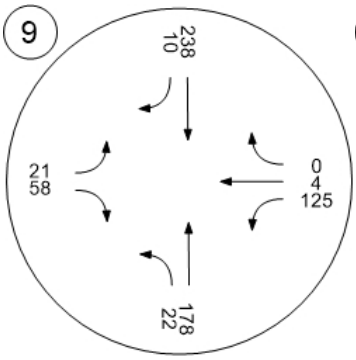

### Quartz Ave & 28 St



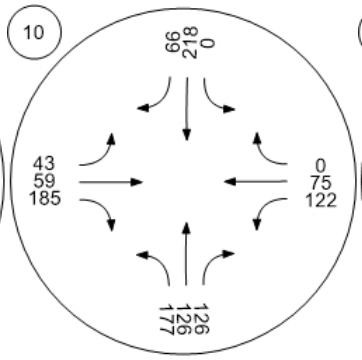
## Traffic Volume - Future Total Volume



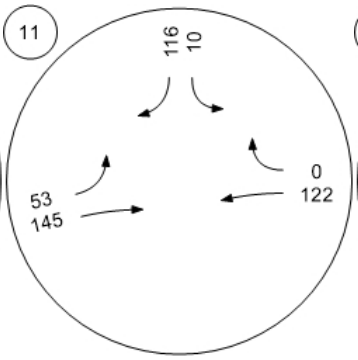

### Slate Ave & N Park Dr



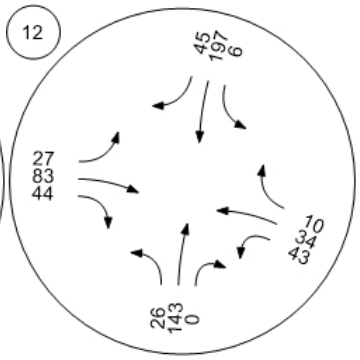

### Slate Ave & 28 St



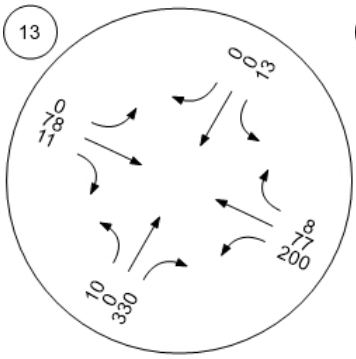

### N Park Dr & Keystone Dr



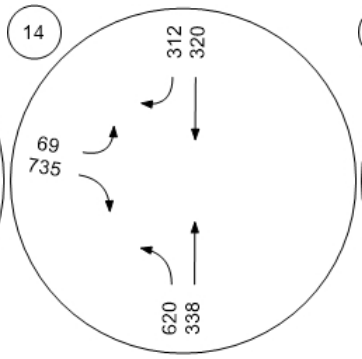

### N Park Dr & 28 St



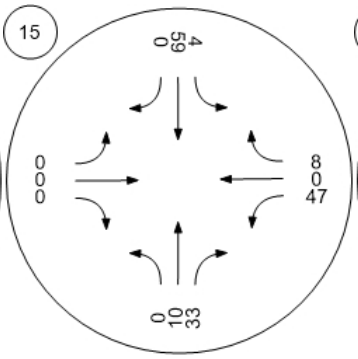

### N Park Dr & New Road B



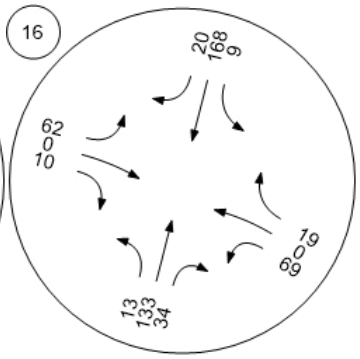

### N Park Dr & Boundary Rd



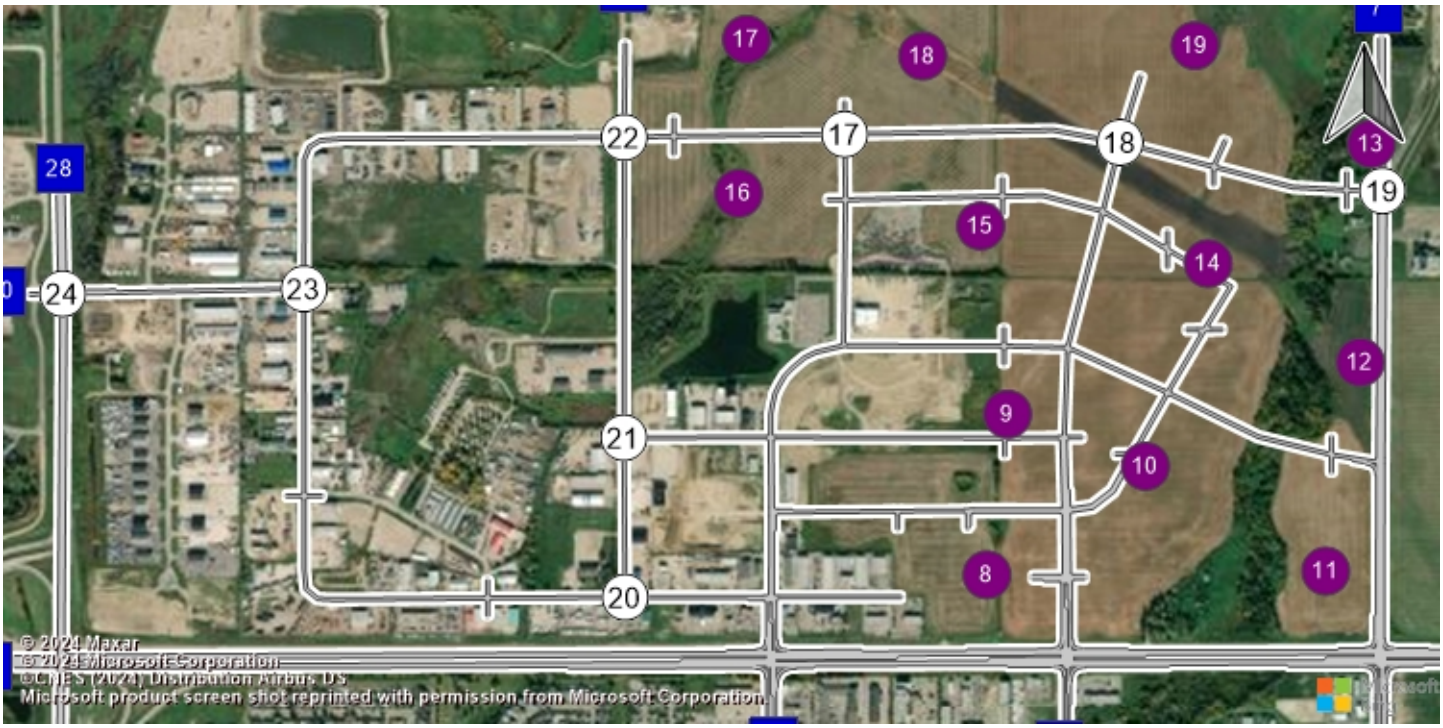

### New Road B & Keystone Dr



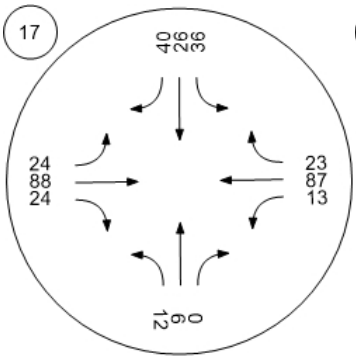

### New Road B & 28 St



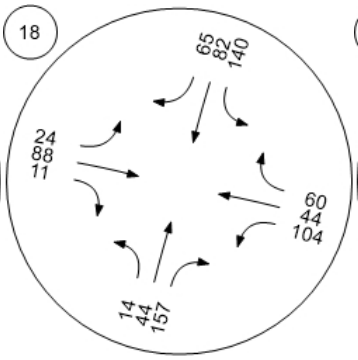
## Traffic Volume - Future Total Volume



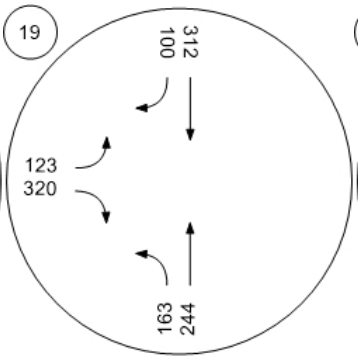

### Boulder Blvd & Keystone Dr



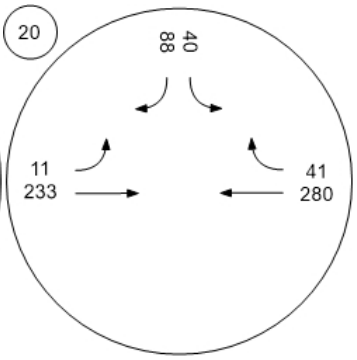

### Boulder Blvd & 28 St



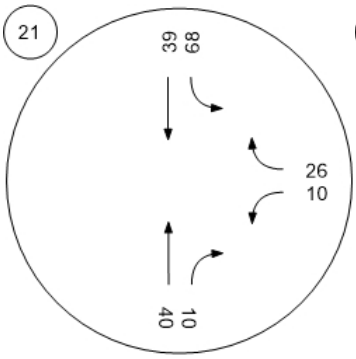

### Boulder Blvd & Boundary Rd



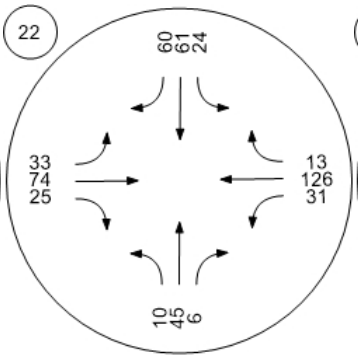

### Boulder Blvd & Golf Course



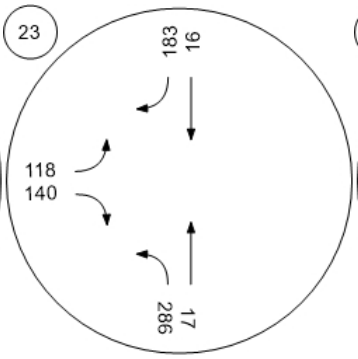

### Slate Ave & Golf Course Rd



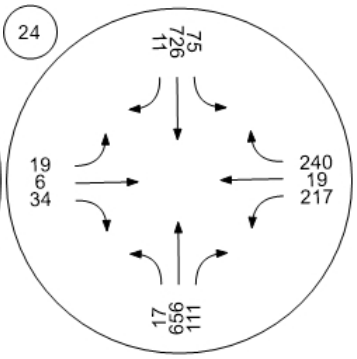

### Boulder Blvd & Golf Course




### Boulder Blvd & Wood Ave




### Hwy 779 & Wood Ave



# APPENDIX C

TRIP GENERATION SUMMARY

## North Industrial Development Lots and Land Use Assumptions

### Trip Generation

| | | | | | | | PM Peak Hour of Generator | | | | | | Saturday Peak Hour of Generator | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Land Use Block** | **Proposed Use** | **Net Developable Area (Ha)** | **Lot Coverage** | **Gross Floor Area (sq.ft.)** | **Per 1,000 sq. ft.** | **ITE Trip Gen Code (Transportation)** | **Avg rates** | **Total Trips Generated** | **in%** | **out%** | **Trips in** | **Trips out** | **Avg rates** | **Total Trips Generated** | **in%** | **out%** | **Trips in** | **Trips out** |
| 1 | Big Box Grocery | Proposed development – 160,000 sq ft store – 16,000 sq ft liquor store | n/a | 176,000 | 176 | 850 - Supermarket | 9.22 | 1623 | 49% | 51% | 795 | 828 | 11.35 | 1998 | 49% | 51% | 979 | 1019 |
| | Gas Pump | 24 Fueling Station | n/a | n/a | 24 | 944 - Gasoline / Service station | 14.93 | 358 | 50% | 50% | 179 | 179 | 15.205 | 365 | 50% | 50% | 182 | 182 |
| 2 | Commercial | 3.29 | 30% | 106,201 | 106 | 821 - Shopping Plaza (40-150k) | 9.03 | 959 | 48% | 52% | 460 | 499 | 9.26 | 983 | 51% | 49% | 502 | 482 |
| 3 | Commercial | 16.03 | 30% | 517,448 | 517 | 820 - Shopping Center (>150K) | 3.4 | 1759 | 48% | 52% | 844 | 915 | 4.4 | 2277 | 52% | 48% | 1184 | 1093 |
| 4 | Mixed Use | 6.44 | | | | | | | | | | | | | | | | |
| | Commercial | 2.57 | 30% | 82,960 | 83 | 821 - Shopping Plaza (40-150k) | 9.03 | 749 | 48% | 52% | 360 | 390 | 9.26 | 768 | 51% | 49% | 392 | 376 |
| | Medium Density Residential | 2.57 | 60% | 69 | | 221 - Multifamily Housing (Mid-Rise) | | 38 | 61% | 39% | 23 | 15 | | 28 | 51% | 49% | 14 | 14 |
| | Hotel - 150 rooms x 2 | 1.3 | - | | | 310 - Hotel | | 89 | 51% | 49% | 45 | 44 | | 109 | 56% | 44% | 61 | 48 |
| 5 | Mixed Use (Medium Density Residential) | 3.7 | 60% | 100 | - | 221 - Multifamily Housing (Mid-Rise) | | 48 | 61% | 39% | 29 | 19 | | 40 | 51% | 49% | 20 | 20 |
| 6 | Mixed Use (Hotel - 150 rooms) | 0.54 | - | | | 310 - Hotel | | 89 | 51% | 49% | 45 | 44 | | 109 | 56% | 44% | 61 | 48 |
| 7 | Business Commercial | 13.09 | 30% | 422,545 | 423 | 130 - Industrial Park | 0.34 | 144 | 22% | 78% | 32 | 112 | 0.44 | 186 | 32% | 68% | 59 | 126 |
| 8 | Business Commercial | 12.21 | 30% | 394,139 | 394 | 130 - Industrial Park | 0.34 | 134 | 22% | 78% | 29 | 105 | 0.44 | 173 | 32% | 68% | 55 | 118 |
| | Light Industrial | 3.88 | 30% | 125,246 | 125 | 130 - Industrial Park | 0.34 | 43 | 22% | 78% | 9 | 33 | 0.44 | 55 | 32% | 68% | 18 | 37 |
| 9 | Light Industrial | 8.41 | 30% | 271,475 | 271 | 130 - Industrial Park | 0.34 | 92 | 22% | 78% | 20 | 72 | 0.44 | 119 | 32% | 68% | 38 | 81 |
| 10 | Light Industrial | 11.9 | 30% | 384,132 | 384 | 130 - Industrial Park | 0.34 | 131 | 22% | 78% | 29 | 102 | 0.44 | 169 | 32% | 68% | 54 | 115 |
| 11 | Light Industrial | 8.63 | 30% | 278,576 | 279 | 130 - Industrial Park | 0.34 | 95 | 22% | 78% | 21 | 74 | 0.44 | 123 | 32% | 68% | 39 | 83 |
| | Business Commercial | 4.84 | 30% | 156,235 | 156 | 130 - Industrial Park | 0.34 | 53 | 22% | 78% | 12 | 41 | 0.44 | 69 | 32% | 68% | 22 | 47 |
| 12 | Business Commercial | 26.69 | 30% | 861,553 | 862 | 130 - Industrial Park | 0.34 | 293 | 22% | 78% | 64 | 228 | 0.44 | 379 | 32% | 68% | 121 | 258 |
| | | 126.09 | | | | **Total Site-Generated Trips** | | **6,696** | | | **2,998** | **3,698** | | **7,950** | **Site-Generated Trips** | | **3,803** | **4,147** |

**Total Trips (Prior to Reductions)**

| Block | PM | | | Sat | | |
|---|---|---|---|---|---|---|
| | Total Trips | Trips In | Trips Out | Total Trips | Trips In | Trips Out |
| 1 | 1981 | 974 | 1007 | 2363 | 1161 | 1201 |
| 2 | 959 | 460 | 499 | 983 | 502 | 482 |
| 3 | 1759 | 844 | 915 | 2277 | 1184 | 1093 |
| 4 | 876 | 428 | 448 | 905 | 467 | 438 |
| 5 | 48 | 29 | 19 | 40 | 20 | 20 |
| 6 | 89 | 45 | 44 | 109 | 61 | 48 |
| 7 | 144 | 32 | 112 | 186 | 59 | 126 |
| 8 | 177 | 39 | 138 | 229 | 73 | 155 |
| 9 | 92 | 20 | 72 | 119 | 38 | 81 |
| 10 | 131 | 29 | 102 | 169 | 54 | 115 |
| 11 | 148 | 33 | 115 | 191 | 61 | 130 |
| 12 | 293 | 64 | 228 | 379 | 121 | 258 |
| **Total** | 6696 | 2998 | 3698 | 7950 | 3803 | 4147 |
| | 4715 | 2024 | 2691 | 5588 | 2641 | 2946 |

**Total External Trips (Excluding Pass-By and Internal Trips)**

| Block | PM | | | Sat | | |
|---|---|---|---|---|---|---|
| | Total Trips | Trips In | Trips Out | Total Trips | Trips In | Trips Out |
| 1 | 1510 | 743 | 768 | 1765 | 868 | 897 |
| 2 | 731 | 351 | 380 | 735 | 375 | 360 |
| 3 | 1341 | 644 | 698 | 1701 | 884 | 816 |
| 4 | 745 | 364 | 381 | 769 | 397 | 372 |
| 5 | 41 | 25 | 16 | 34 | 17 | 17 |
| 6 | 76 | 39 | 37 | 93 | 52 | 41 |
| 7 | 144 | 32 | 112 | 186 | 59 | 126 |
| 8 | 177 | 39 | 138 | 229 | 73 | 155 |
| 9 | 92 | 20 | 72 | 119 | 38 | 81 |
| 10 | 131 | 29 | 102 | 169 | 54 | 115 |
| 11 | 148 | 33 | 115 | 191 | 61 | 130 |
| 12 | 293 | 64 | 228 | 379 | 121 | 258 |
| **Total** | 5428 | 2382 | 3047 | 6370 | 3000 | 3370 |

**External + Internal Trips (Excluding Pass-By)** **(For Vistro)**

| Block | PM | | | Sat | | |
|---|---|---|---|---|---|---|
| | Total Trips | Trips In | Trips Out | Total Trips | Trips In | Trips Out |
| 1 | 1708 | 840 | 868 | 2119 | 1042 | 1078 |
| 2 | 827 | 397 | 430 | 882 | 450 | 432 |
| 3 | 1517 | 728 | 789 | 2042 | 1062 | 980 |
| 4 | 876 | 428 | 448 | 905 | 467 | 438 |
| 5 | 48 | 29 | 19 | 40 | 20 | 20 |
| 6 | 89 | 45 | 44 | 109 | 61 | 48 |
| 7 | 144 | 32 | 112 | 186 | 59 | 126 |
| 8 | 177 | 39 | 138 | 229 | 73 | 155 |
| 9 | 92 | 20 | 72 | 119 | 38 | 81 |
| 10 | 131 | 29 | 102 | 169 | 54 | 115 |
| 11 | 148 | 33 | 115 | 191 | 61 | 130 |
| 12 | 293 | 64 | 228 | 379 | 121 | 258 |
| **Total** | 6049 | 2684 | 3365 | 7371 | 3510 | 3862 |

**Internal Trips**

| Block | PM | | | Sat | | |
|---|---|---|---|---|---|---|
| | Total Trips | Trips In | Trips Out | Total Trips | Trips In | Trips Out |
| 1 | 198 | 97 | 101 | 354 | 174 | 180 |
| 2 | 96 | 46 | 50 | 148 | 75 | 72 |
| 3 | 176 | 84 | 91 | 342 | 178 | 164 |
| 4 | 131 | 64 | 67 | 136 | 70 | 66 |
| 5 | 7 | 4 | 3 | 6 | 3 | 3 |
| 6 | 13 | 7 | 7 | 16 | 9 | 7 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | 621 | 303 | 318 | 1002 | 509 | 492 |

**Pass-By Trips (Total)**

| Block | PM | | | Sat | | |
|---|---|---|---|---|---|---|
| | Total Trips | Trips In | Trips Out | Total Trips | Trips In | Trips Out |
| 1 | 273 | 134 | 139 | 243 | 120 | 124 |
| 2 | 132 | 63 | 69 | 101 | 52 | 50 |
| 3 | 242 | 116 | 126 | 234 | 122 | 112 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | 647 | 314 | 333 | 579 | 293 | 286 |

**Pass-By Trips (From Highway)**

| Block | PM | | | Sat | | |
|---|---|---|---|---|---|---|
| | Total Trips | Trips In | Trips Out | Total Trips | Trips In | Trips Out |
| 1 | 189 | 93 | 96 | 145 | 71 | 74 |
| 2 | 91 | 44 | 47 | 61 | 31 | 30 |
| 3 | 168 | 80 | 87 | 140 | 73 | 67 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | 448 | 217 | 230 | 346 | 175 | 171 |

**Pass-By Trips (From North Developments Zone 4 - 12)**

| Block | PM | | | Sat | | |
|---|---|---|---|---|---|---|
| | Total Trips | Trips In | Trips Out | Total Trips | Trips In | Trips Out |
| 1 | 84 | 41 | 43 | 98 | 48 | 50 |
| 2 | 41 | 20 | 21 | 41 | 21 | 20 |
| 3 | 75 | 36 | 39 | 94 | 49 | 45 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | 200 | 97 | 103 | 233 | 118 | 115 |

# APPENDIX D

TRAFFIC ANALYSIS (VISTRO) REPORTS

Vistro File: C:\...\2025-11-24_North Industrial Development_Updated ASP_FINAL.vistro
Report File: C:\...\Opening Day (2026)_PM_Background.pdf

Scenario 11 2026_PM_Background Traffic
11/25/2025

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Hwy 16 A & Boundary Rd | Signalized | HCM 7th Edition | EB Left | 0.493 | 19.2 | B |
| 2 | Hwy 16A & 28 St | Two-way yield | HCM 7th Edition | NB Right | 0.505 | 23.0 | C |
| 3 | Hwy 16A & S Park Dr/N Park Dr | Signalized | HCM 7th Edition | WB Left | 0.532 | 45.1 | D |
| 4 | Boulder Blvd & N Park Dr | Signalized | HCM 7th Edition | EB Right | 0.290 | 16.4 | B |
| 9 | Slate Ave & N Park Dr | Two-way stop | HCM 7th Edition | EB Left | 0.005 | 8.7 | A |
| 11 | N Park Dr & Keystone Dr | Two-way stop | HCM 7th Edition | SB Right | 0.000 | 0.0 | A |
| 20 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | SB Left | 0.041 | 12.8 | B |
| 21 | Slate Ave & Golf Course Rd | Two-way stop | HCM 7th Edition | WB Left | 0.005 | 8.7 | A |
| 22 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | EB Left | 0.005 | 8.7 | A |
| 23 | Boulder Blvd & Wood Ave | Two-way stop | HCM 7th Edition | EB Left | 0.055 | 16.0 | C |
| 24 | Hwy 779 & Wood Ave | Signalized | HCM 7th Edition | WB Right | 0.450 | 13.0 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Hwy 16 A & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 19.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.493 |

**Intersection Setup**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 100.00 | 30.48 | 160.00 | 150.00 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 60.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | No | | | Yes | | |

**Volumes**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 69 | 4 | 279 | 0 | 0 | 12 | 4 | 1379 | 84 | 573 | 1253 | 8 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 70 | 4 | 285 | 0 | 0 | 12 | 4 | 1407 | 86 | 584 | 1278 | 8 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 18 | 1 | 71 | 0 | 0 | 3 | 1 | 352 | 22 | 146 | 320 | 2 |
| Total Analysis Volume [veh/h] | 70 | 4 | 285 | 0 | 0 | 12 | 4 | 1407 | 86 | 584 | 1278 | 8 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 110 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 41.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | Permiss | Permiss | Permiss | Protecte | Permiss | Unsigna | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 0 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 3 | 7 | 0 | 0 | 7 | 0 | 4 | 7 | 0 | 4 | 6 | 0 |
| Amber [s] | 4.0 | 4.7 | 0.0 | 0.0 | 4.7 | 0.0 | 3.0 | 5.2 | 0.0 | 3.0 | 5.3 | 0.0 |
| All red [s] | 1.5 | 2.1 | 0.0 | 0.0 | 2.1 | 0.0 | 1.8 | 1.8 | 0.0 | 1.8 | 1.8 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.8 | 0.0 | 0.0 | 4.8 | 0.0 | 2.8 | 5.0 | 0.0 | 2.8 | 5.1 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 13 | 44 | 0 | 0 | 31 | 0 | 34 | 22 | 0 | 44 | 32 | 0 |
| Lead / Lag | Lead | - | - | - | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 0 | 10 | 0 | 7 | 15 | 0 | 7 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| L, Total Lost Time per Cycle [s] | 6.80 | 6.80 | 6.80 | 4.80 | 7.00 | 4.80 | 7.10 | 7.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.80 | 4.80 | 2.80 | 5.00 | 2.80 | 5.10 | 5.10 |
| g_i, Effective Green Time [s] | 15 | 15 | 3 | 1 | 55 | 22 | 76 | 76 |
| g / C, Green / Cycle | 0.13 | 0.13 | 0.03 | 0.01 | 0.50 | 0.20 | 0.69 | 0.69 |
| (v / s)_i Volume / Saturation Flow Rate | 0.04 | 0.00 | 0.01 | 0.00 | 0.28 | 0.17 | 0.24 | 0.24 |
| s, saturation flow rate [veh/h] | 1644 | 1870 | 1198 | 1781 | 5094 | 3459 | 3560 | 1864 |
| c, Capacity [veh/h] | 304 | 252 | 67 | 15 | 2545 | 679 | 2445 | 1280 |
| d1, Uniform Delay [s] | 42.85 | 41.26 | 52.29 | 54.21 | 19.03 | 42.73 | 7.07 | 7.07 |
| k, delay calibration | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.38 | 0.02 | 1.26 | 9.41 | 0.87 | 3.33 | 0.39 | 0.74 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.23 | 0.02 | 0.18 | 0.27 | 0.55 | 0.86 | 0.35 | 0.35 |
| d, Delay for Lane Group [s/veh] | 43.23 | 41.28 | 53.55 | 63.62 | 19.90 | 46.06 | 7.46 | 7.81 |
| Lane Group LOS | D | D | D | E | B | D | A | A |
| Critical Lane Group | Yes | No | Yes | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 1.73 | 0.09 | 0.35 | 0.15 | 7.65 | 7.61 | 3.32 | 3.60 |
| 50th-Percentile Queue Length [m/ln] | 13.15 | 0.72 | 2.64 | 1.11 | 58.33 | 58.01 | 25.29 | 27.44 |
| 95th-Percentile Queue Length [veh/ln] | 3.11 | 0.17 | 0.62 | 0.26 | 12.19 | 12.14 | 5.97 | 6.48 |
| 95th-Percentile Queue Length [m/ln] | 23.66 | 1.30 | 4.76 | 1.99 | 92.90 | 92.49 | 45.52 | 49.39 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 43.23 | 41.28 | 0.00 | 53.55 | 53.55 | 53.55 | 63.62 | 19.90 | 0.00 | 46.06 | 7.58 | 7.81 |
| Movement LOS | D | D | | D | D | D | E | B | | D | A | A |
| d_A, Approach Delay [s/veh] | 8.89 | | | 53.55 | | | 18.87 | | | 19.60 | | |
| Approach LOS | A | | | D | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 19.18 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.493 | | | | | | | | | | | |

**Emissions**

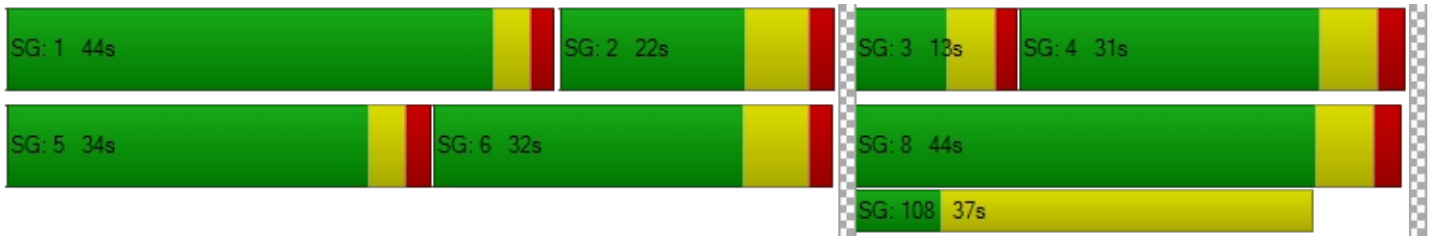
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 16.10 | 0.92 | 4.67 | 2.68 | 944.13 | 130.54 | 188.66 | 98.80 |
| Stops [stops/h] | 56.46 | 3.10 | 11.36 | 4.75 | 751.51 | 498.30 | 217.23 | 117.86 |
| Fuel consumption [L/h] | 5.56 | 0.31 | 1.19 | 0.68 | 139.15 | 59.63 | 32.20 | 17.22 |
| CO [g/h] | 102.58 | 5.68 | 22.05 | 12.56 | 2569.54 | 1101.07 | 594.55 | 317.92 |
| NOx [g/h] | 19.96 | 1.10 | 4.29 | 2.44 | 499.94 | 214.23 | 115.68 | 61.86 |
| VOC [g/h] | 23.77 | 1.32 | 5.11 | 2.91 | 595.52 | 255.18 | 137.79 | 73.68 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 15.0 | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 41.02 | 0.00 | 0.00 | 44.55 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.466 | 0.000 | 0.000 | 3.447 |
| Crosswalk LOS | B | F | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 676 | 440 | 273 | 453 |
| d_b, Bicycle Delay [s] | 24.09 | 33.46 | 41.02 | 32.92 |
| l_b,int, Bicycle LOS Score for Intersection | 1.682 | 1.579 | 2.336 | 2.588 |
| Bicycle LOS | A | A | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 2: Hwy 16A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way yield | Delay (sec / veh): | 23.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.505 |

**Intersection Setup**

| Name | 28 St | | Hwy 16A | | Hwy 16A | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 100.00 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 50.00 | | 80.00 | | 80.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | 28 St | | Hwy 16A | | Hwy 16A | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 176 | 1292 | 52 | 50 | 1284 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0200 | 1.0000 | 1.0000 | 1.0200 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 20 | 176 | 1318 | 52 | 50 | 1310 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 44 | 330 | 13 | 13 | 328 |
| Total Analysis Volume [veh/h] | 20 | 176 | 1318 | 52 | 50 | 1310 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | | | | |
|---|---|---|---|---|---|---|
| Priority Scheme | Stop | | Free | | Free | |
| Flared Lane | | | | | | |
| Storage Area [veh] | 0 | | 0 | | 0 | |
| Two-Stage Gap Acceptance | No | | | | | |
| Number of Storage Spaces in Median | 0 | | 0 | | 0 | |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.51 | 0.01 | 0.00 | 0.00 | 0.01 |
| d_M, Delay for Movement [s/veh] | 0.00 | 22.96 | 0.00 | 0.00 | 0.00 | 0.00 |
| Movement LOS | | C | A | A | | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 2.72 | 0.00 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 20.73 | 0.00 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 22.96 | | 0.00 | | 0.00 | |
| Approach LOS | C | | A | | A | |
| d_I, Intersection Delay [s/veh] | 1.42 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**

**Intersection 3: Hwy 16A & S Park Dr/N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 45.1 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.532 |

**Intersection Setup**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.50 | 3.66 | 3.66 | 3.50 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 170.00 | 30.48 | 450.00 | 250.00 | 30.48 | 165.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 210.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 225 | 106 | 230 | 315 | 139 | 61 | 33 | 799 | 209 | 375 | 732 | 197 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.50 | 0.50 | 2.00 | 2.00 | 0.50 | 0.50 | 0.50 | 0.00 | 0.50 | 2.00 | 0.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 230 | 108 | 235 | 321 | 142 | 62 | 34 | 815 | 213 | 383 | 747 | 201 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 58 | 27 | 59 | 80 | 36 | 16 | 9 | 204 | 53 | 96 | 187 | 50 |
| Total Analysis Volume [veh/h] | 230 | 108 | 235 | 321 | 142 | 62 | 34 | 815 | 213 | 383 | 747 | 201 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 110 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Protecte | Permiss | Unsigna | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 7 | 35 | 0 | 22 | 50 | 0 | 31 | 7 | 0 | 31 | 7 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 32 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 13 | 47 | 0 | 13 | 47 | 0 | 13 | 22 | 0 | 28 | 37 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 7 | 15 | 0 | 14 | 15 | 0 |
| Vehicle Extension [s] | 7.0 | 10.0 | 0.0 | 7.0 | 10.0 | 0.0 | 7.0 | 15.0 | 0.0 | 14.0 | 15.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 | 4.70 |
| g_i, Effective Green Time [s] | 47 | 34 | 34 | 47 | 34 | 34 | 5 | 25 | 19 | 39 | 39 |
| g / C, Green / Cycle | 0.43 | 0.31 | 0.31 | 0.43 | 0.31 | 0.31 | 0.04 | 0.23 | 0.17 | 0.36 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.17 | 0.06 | 0.15 | 0.27 | 0.06 | 0.06 | 0.01 | 0.16 | 0.11 | 0.14 | 0.13 |
| s, saturation flow rate [veh/h] | 1334 | 1892 | 1609 | 1210 | 1892 | 1702 | 3500 | 5176 | 3459 | 5176 | 1589 |
| c, Capacity [veh/h] | 620 | 592 | 503 | 494 | 592 | 532 | 144 | 1183 | 590 | 1853 | 569 |
| d1, Uniform Delay [s] | 20.56 | 27.56 | 30.44 | 25.26 | 27.54 | 27.57 | 51.06 | 38.84 | 42.55 | 26.49 | 25.95 |
| k, delay calibration | 0.69 | 2.96 | 2.96 | 2.96 | 2.96 | 2.96 | 0.69 | 0.50 | 11.14 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.36 | 3.97 | 17.31 | 33.05 | 3.90 | 4.44 | 5.26 | 3.29 | 82.60 | 0.65 | 1.72 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.37 | 0.18 | 0.47 | 0.65 | 0.18 | 0.18 | 0.24 | 0.69 | 0.65 | 0.40 | 0.35 |
| d, Delay for Lane Group [s/veh] | 22.92 | 31.53 | 47.75 | 58.32 | 31.43 | 32.02 | 56.31 | 42.13 | 125.15 | 27.15 | 27.67 |
| Lane Group LOS | C | C | D | E | C | C | E | D | F | C | C |
| Critical Lane Group | No | No | Yes | Yes | No | No | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 4.22 | 2.72 | 7.40 | 10.20 | 2.68 | 2.53 | 0.54 | 6.74 | 11.41 | 4.72 | 3.91 |
| 50th-Percentile Queue Length [m/ln] | 32.17 | 20.76 | 56.35 | 77.74 | 20.40 | 19.29 | 4.14 | 51.33 | 86.96 | 35.94 | 29.81 |
| 95th-Percentile Queue Length [veh/ln] | 7.59 | 4.90 | 11.85 | 15.44 | 4.82 | 4.56 | 0.98 | 10.99 | 16.95 | 8.28 | 7.04 |
| 95th-Percentile Queue Length [m/ln] | 57.85 | 37.37 | 90.33 | 117.66 | 36.73 | 34.72 | 7.45 | 83.76 | 129.17 | 63.08 | 53.66 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 22.92 | 31.53 | 47.75 | 58.32 | 31.58 | 32.02 | 56.31 | 42.13 | 0.00 | 125.15 | 27.15 | 27.67 |
| Movement LOS | C | C | D | E | C | C | E | D | | F | C | C |
| d_A, Approach Delay [s/veh] | 34.72 | | | 47.98 | | | 34.13 | | | 55.43 | | |
| Approach LOS | C | | | D | | | C | | | E | | |
| d_I, Intersection Delay [s/veh] | 45.10 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.532 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 30.11 | 14.14 | 30.76 | 42.43 | 14.05 | 12.91 | 51.76 | 1240.63 | 242.04 | 472.07 | 127.02 |
| Stops [stops/h] | 138.16 | 89.16 | 242.02 | 333.90 | 87.63 | 82.83 | 35.57 | 661.38 | 746.96 | 463.06 | 128.03 |
| Fuel consumption [L/h] | 10.02 | 5.97 | 17.00 | 25.95 | 5.88 | 5.50 | 7.60 | 162.23 | 98.90 | 79.43 | 21.65 |
| CO [g/h] | 185.11 | 110.22 | 313.89 | 479.10 | 108.52 | 101.48 | 140.29 | 2995.65 | 1826.28 | 1466.70 | 399.78 |
| NOx [g/h] | 36.02 | 21.44 | 61.07 | 93.21 | 21.11 | 19.74 | 27.30 | 582.84 | 355.33 | 285.37 | 77.78 |
| VOC [g/h] | 42.90 | 25.54 | 72.75 | 111.04 | 25.15 | 23.52 | 32.51 | 694.27 | 423.26 | 339.92 | 92.65 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 44.55 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 3.389 | 0.000 |
| Crosswalk LOS | F | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 745 | 745 | 278 | 551 |
| d_b, Bicycle Delay [s] | 21.64 | 21.64 | 40.76 | 28.87 |
| l_b,int, Bicycle LOS Score for Intersection | 2.143 | 2.104 | 2.137 | 2.403 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Boulder Blvd & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 16.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.290 |

**Intersection Setup**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 276 | 27 | 41 | 5 | 44 | 5 | 3 | 12 | 318 | 100 | 21 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 276 | 27 | 41 | 5 | 44 | 5 | 3 | 12 | 318 | 100 | 21 | 2 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 69 | 7 | 10 | 1 | 11 | 1 | 1 | 3 | 80 | 25 | 5 | 1 |
| Total Analysis Volume [veh/h] | 276 | 27 | 41 | 5 | 44 | 5 | 3 | 12 | 318 | 100 | 21 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 60 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 23 | 0 | 0 | 14 | 0 | 0 | 29 | 0 | 0 | 29 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 6 | 0 | 0 | 9 | 0 | 0 | 15 | 0 | 0 | 12 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 27 | 0 | 0 | 18 | 0 | 0 | 33 | 0 | 0 | 33 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | C | R | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 37 | 37 | 37 | 32 | 32 | 15 | 15 | 15 |
| g / C, Green / Cycle | 0.61 | 0.61 | 0.61 | 0.54 | 0.54 | 0.26 | 0.26 | 0.26 |
| (v / s)_i Volume / Saturation Flow Rate | 0.22 | 0.02 | 0.03 | 0.00 | 0.03 | 0.01 | 0.22 | 0.13 |
| s, saturation flow rate [veh/h] | 1242 | 1683 | 1431 | 1199 | 1653 | 1630 | 1431 | 940 |
| c, Capacity [veh/h] | 898 | 1024 | 870 | 707 | 894 | 493 | 369 | 352 |
| d1, Uniform Delay [s] | 6.15 | 4.67 | 4.73 | 7.84 | 6.53 | 16.66 | 21.23 | 19.73 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.89 | 0.05 | 0.10 | 0.02 | 0.12 | 0.02 | 5.96 | 0.59 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.31 | 0.03 | 0.05 | 0.01 | 0.05 | 0.03 | 0.86 | 0.35 |
| d, Delay for Lane Group [s/veh] | 7.04 | 4.72 | 4.84 | 7.86 | 6.64 | 16.68 | 27.19 | 20.32 |
| Lane Group LOS | A | A | A | A | A | B | C | C |
| Critical Lane Group | Yes | No | No | No | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.42 | 0.11 | 0.18 | 0.03 | 0.27 | 0.15 | 4.47 | 1.43 |
| 50th-Percentile Queue Length [m/ln] | 10.80 | 0.85 | 1.34 | 0.24 | 2.03 | 1.11 | 34.06 | 10.88 |
| 95th-Percentile Queue Length [veh/ln] | 2.55 | 0.20 | 0.32 | 0.06 | 0.48 | 0.26 | 7.94 | 2.57 |
| 95th-Percentile Queue Length [m/ln] | 19.44 | 1.54 | 2.42 | 0.43 | 3.66 | 2.01 | 60.48 | 19.58 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.04 | 4.72 | 4.84 | 7.86 | 6.64 | 6.64 | 16.68 | 16.68 | 27.19 | 20.32 | 20.32 | 20.32 |
| Movement LOS | A | A | A | A | A | A | B | B | C | C | C | C |
| d_A, Approach Delay [s/veh] | 6.59 | | | 6.76 | | | 26.72 | | | 20.32 | | |
| Approach LOS | A | | | A | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 16.43 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.290 | | | | | | | | | | | |

**Emissions**

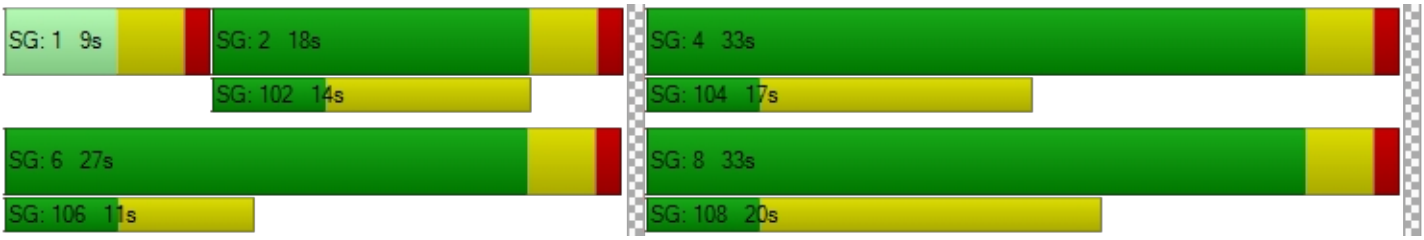
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 36.48 | 3.57 | 5.42 | 0.90 | 8.84 | 4.69 | 99.43 | 34.18 |
| Stops [stops/h] | 85.03 | 6.72 | 10.57 | 1.89 | 16.01 | 8.77 | 268.20 | 85.65 |
| Fuel consumption [L/h] | 6.88 | 0.59 | 0.91 | 0.16 | 1.45 | 0.84 | 22.14 | 7.10 |
| CO [g/h] | 126.95 | 10.87 | 16.72 | 2.93 | 26.80 | 15.43 | 408.77 | 131.08 |
| NOx [g/h] | 24.70 | 2.11 | 3.25 | 0.57 | 5.21 | 3.00 | 79.53 | 25.50 |
| VOC [g/h] | 29.42 | 2.52 | 3.87 | 0.68 | 6.21 | 3.58 | 94.74 | 30.38 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 21.68 | 21.68 | 21.68 | 21.68 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.586 | 1.954 | 2.372 | 1.794 |
| Crosswalk LOS | B | A | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 767 | 467 | 967 | 967 |
| d_b, Bicycle Delay [s] | 11.41 | 17.63 | 8.01 | 8.01 |
| l_b,int, Bicycle LOS Score for Intersection | 2.127 | 1.649 | 2.109 | 1.763 |
| Bicycle LOS | B | A | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 9: Slate Ave & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.005 |

**Intersection Setup**

| Name | N Park Dr | | N Park Dr | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | N Park Dr | | N Park Dr | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 1 | 1 | 1 | 1 | 1 |
| Total Analysis Volume [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.24 | 0.00 | 0.00 | 0.00 | 8.67 | 8.38 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.01 | 0.01 | 0.00 | 0.00 | 0.03 | 0.03 |
| 95th-Percentile Queue Length [m/ln] | 0.06 | 0.06 | 0.00 | 0.00 | 0.22 | 0.22 |
| d_A, Approach Delay [s/veh] | 3.62 | | 0.00 | | 8.53 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.05 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 11: N Park Dr & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 0.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.000 |

**Intersection Setup**

| Name | Keystone Dr | N Park Dr |
|---|---|---|
| Approach | Southbound | Eastbound |
| Lane Configuration |  |  |
| Turning Movement | Right | Left |
| Lane Width [m] | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | 50.00 |
| Grade [%] | 0.00 | 0.00 |
| Crosswalk | Yes | Yes |

**Volumes**

| Name | Keystone Dr | N Park Dr |
|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 5 |
| Peak Hour Factor | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 1 |
| Total Analysis Volume [veh/h] | 5 | 5 |
| Pedestrian Volume [ped/h] | 0 | 0 |

**Intersection Settings**

| | | |
|---|---|---|
| Priority Scheme | Free | Free |
| Flared Lane | | |
| Storage Area [veh] | 0 | 0 |
| Two-Stage Gap Acceptance | | |
| Number of Storage Spaces in Median | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | |
|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 |
| Movement LOS | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 0.00 | 0.00 |
| Approach LOS | A | A |
| d_I, Intersection Delay [s/veh] | 0.00 | |
| Intersection LOS | A | |

**Intersection Level Of Service Report**
**Intersection 20: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 12.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.041 |

**Intersection Setup**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 10 | 5 | 250 | 300 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 20 | 10 | 5 | 250 | 300 | 5 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 3 | 1 | 63 | 75 | 1 |
| Total Analysis Volume [veh/h] | 20 | 10 | 5 | 250 | 300 | 5 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 12.79 | 10.26 | 7.87 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.17 | 0.17 | 0.01 | 0.01 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 1.32 | 1.32 | 0.06 | 0.06 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 11.95 | | 0.15 | | 0.00 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 0.67 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 21: Slate Ave & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.005 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 1 | 1 | 1 | 1 | 1 |
| Total Analysis Volume [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.24 | 0.00 | 8.67 | 8.38 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.01 | 0.01 | 0.03 | 0.03 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.22 |
| d_A, Approach Delay [s/veh] | 0.00 | | 3.62 | | 8.53 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.05 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 22: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.005 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 | 5 | 5 | 5 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 5 | 5 | 5 | 5 | 10 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 1 | 1 | 1 | 1 | 3 |
| Total Analysis Volume [veh/h] | 5 | 5 | 5 | 5 | 5 | 10 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.24 | 0.00 | 0.00 | 0.00 | 8.68 | 8.40 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.01 | 0.01 | 0.00 | 0.00 | 0.04 | 0.04 |
| 95th-Percentile Queue Length [m/ln] | 0.06 | 0.06 | 0.00 | 0.00 | 0.33 | 0.33 |
| d_A, Approach Delay [s/veh] | 3.62 | | 0.00 | | 8.49 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.68 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 23: Boulder Blvd & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 16.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.055 |

**Intersection Setup**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 300 | 10 | 10 | 20 | 20 | 150 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 300 | 10 | 10 | 20 | 20 | 150 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 75 | 3 | 3 | 5 | 5 | 38 |
| Total Analysis Volume [veh/h] | 300 | 10 | 10 | 20 | 20 | 150 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.19 | 0.00 | 0.00 | 0.00 | 0.06 | 0.14 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.77 | 0.00 | 0.00 | 0.00 | 16.01 | 9.43 |
| Movement LOS | A | A | A | A | C | A |
| 95th-Percentile Queue Length [veh/ln] | 0.68 | 0.68 | 0.00 | 0.00 | 0.73 | 0.73 |
| 95th-Percentile Queue Length [m/ln] | 5.15 | 5.15 | 0.00 | 0.00 | 5.57 | 5.57 |
| d_A, Approach Delay [s/veh] | 7.52 | | 0.00 | | 10.20 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 7.97 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 24: Hwy 779 & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.450 |

**Intersection Setup**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 160.00 | 30.48 | 30.48 | 150.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 70.00 | | | 70.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 21 | 465 | 49 | 55 | 509 | 12 | 21 | 6 | 43 | 128 | 21 | 195 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 21 | 465 | 49 | 55 | 509 | 12 | 21 | 6 | 43 | 128 | 21 | 195 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 116 | 12 | 14 | 127 | 3 | 5 | 2 | 11 | 32 | 5 | 49 |
| Total Analysis Volume [veh/h] | 21 | 465 | 49 | 55 | 509 | 12 | 21 | 6 | 43 | 128 | 21 | 195 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 60 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 41 | 0 | 0 | 41 | 0 | 0 | 23 | 0 | 0 | 39 | 0 |
| Amber [s] | 0.0 | 4.3 | 0.0 | 0.0 | 4.3 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 4.3 | 0.0 |
| All red [s] | 0.0 | 1.5 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.5 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 3.8 | 0.0 | 0.0 | 3.8 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 3.8 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 39 | 0 | 0 | 39 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 8 | 0 | 0 | 3 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| L, Total Lost Time per Cycle [s] | 5.80 | 5.80 | 5.80 | 5.80 | 4.00 | 4.00 | 5.80 | 5.80 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 3.80 | 3.80 | 3.80 | 3.80 | 0.00 | 2.00 | 3.80 | 3.80 |
| g_i, Effective Green Time [s] | 37 | 37 | 37 | 37 | 13 | 13 | 11 | 11 |
| g / C, Green / Cycle | 0.62 | 0.62 | 0.62 | 0.62 | 0.22 | 0.22 | 0.19 | 0.19 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.31 | 0.07 | 0.31 | 0.03 | 0.03 | 0.14 | 0.14 |
| s, saturation flow rate [veh/h] | 793 | 1655 | 798 | 1676 | 915 | 1431 | 1073 | 1431 |
| c, Capacity [veh/h] | 388 | 1020 | 390 | 1033 | 207 | 315 | 316 | 272 |
| d1, Uniform Delay [s] | 13.51 | 6.40 | 14.12 | 6.41 | 19.62 | 18.80 | 23.82 | 22.77 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.27 | 1.78 | 0.76 | 1.76 | 0.28 | 0.19 | 1.10 | 3.51 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.05 | 0.50 | 0.14 | 0.50 | 0.13 | 0.14 | 0.47 | 0.72 |
| d, Delay for Lane Group [s/veh] | 13.78 | 8.18 | 14.88 | 8.16 | 19.90 | 19.00 | 24.92 | 26.29 |
| Lane Group LOS | B | A | B | A | B | B | C | C |
| Critical Lane Group | No | No | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.19 | 2.66 | 0.53 | 2.69 | 0.29 | 0.46 | 1.96 | 2.65 |
| 50th-Percentile Queue Length [m/ln] | 1.46 | 20.30 | 4.02 | 20.53 | 2.23 | 3.53 | 14.95 | 20.20 |
| 95th-Percentile Queue Length [veh/ln] | 0.34 | 4.79 | 0.95 | 4.85 | 0.53 | 0.83 | 3.53 | 4.77 |
| 95th-Percentile Queue Length [m/ln] | 2.62 | 36.53 | 7.23 | 36.96 | 4.01 | 6.35 | 26.91 | 36.35 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 13.78 | 8.18 | 8.18 | 14.88 | 8.16 | 8.16 | 19.90 | 19.90 | 19.00 | 24.92 | 24.92 | 26.29 |
| Movement LOS | B | A | A | B | A | A | B | B | B | C | C | C |
| d_A, Approach Delay [s/veh] | 8.40 | | | 8.80 | | | 19.35 | | | 25.69 | | |
| Approach LOS | A | | | A | | | B | | | C | | |
| d_I, Intersection Delay [s/veh] | 12.96 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.450 | | | | | | | | | | | |

**Emissions**

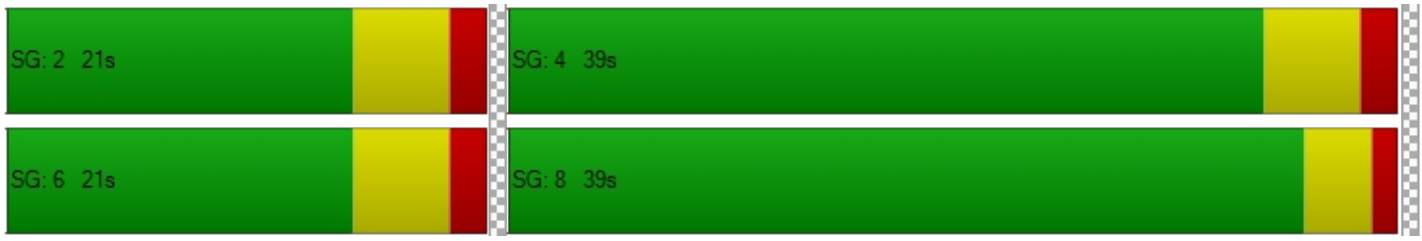
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 16.50 | 403.93 | 11.55 | 109.42 | 1.90 | 3.03 | 76.98 | 100.74 |
| Stops [stops/h] | 11.48 | 159.82 | 31.63 | 161.69 | 17.55 | 27.79 | 117.72 | 159.02 |
| Fuel consumption [L/h] | 2.07 | 43.20 | 2.96 | 19.31 | 0.99 | 1.54 | 12.82 | 17.10 |
| CO [g/h] | 38.28 | 797.70 | 54.71 | 356.53 | 18.25 | 28.45 | 236.82 | 315.78 |
| NOx [g/h] | 7.45 | 155.20 | 10.65 | 69.37 | 3.55 | 5.54 | 46.08 | 61.44 |
| VOC [g/h] | 8.87 | 184.88 | 12.68 | 82.63 | 4.23 | 6.59 | 54.88 | 73.19 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 0.000 | 0.000 |
| Crosswalk LOS | F | F | F | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 507 | 507 | 1167 | 1107 |
| d_b, Bicycle Delay [s] | 16.73 | 16.73 | 5.21 | 5.99 |
| l_b,int, Bicycle LOS Score for Intersection | 2.442 | 2.510 | 1.675 | 2.127 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Vistro File: C:\...\2025-11-24_North Industrial Development_Updated ASP_FINAL.vistro
Report File: C:\...\Opening Day (2026)_PM.pdf

Scenario 2 Opening Day (2026)_PM
11/24/2025

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Hwy 16 A & Boundary Rd | Signalized | HCM 7th Edition | EB Left | 0.611 | 23.0 | C |
| 2 | Hwy 16A & 28 St | Signalized | HCM 7th Edition | SB Left | 0.643 | 28.7 | C |
| 3 | Hwy 16A & S Park Dr/N Park Dr | Signalized | HCM 7th Edition | EB Left | 0.614 | 35.0 | C |
| 4 | Boulder Blvd & N Park Dr | Signalized | HCM 7th Edition | EB Right | 0.429 | 14.4 | B |
| 5 | N Park Dr & Quartz Ave | Two-way stop | HCM 7th Edition | WB Left | 0.338 | 11.2 | B |
| 6 | 28 St & Site Access #1 | Two-way stop | HCM 7th Edition | EB Right | 0.623 | 14.6 | B |
| 7 | Quartz Ave & Site Access #2 | Two-way stop | HCM 7th Edition | NB Left | 0.516 | 17.6 | C |
| 8 | Quartz Ave & 28 St | Two-way yield | HCM 7th Edition | EB Right | 0.080 | 4.0 | A |
| 9 | Slate Ave & N Park Dr | Two-way stop | HCM 7th Edition | EB Left | 0.005 | 8.7 | A |
| 11 | N Park Dr & Keystone Dr | Two-way stop | HCM 7th Edition | SB Right | 0.000 | 0.0 | A |
| 20 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | SB Left | 0.042 | 13.0 | B |
| 21 | Slate Ave & Golf Course Rd | Two-way stop | HCM 7th Edition | WB Left | 0.005 | 8.7 | A |
| 22 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | EB Left | 0.010 | 8.8 | A |
| 23 | Boulder Blvd & Wood Ave | Two-way stop | HCM 7th Edition | EB Left | 0.057 | 16.3 | C |
| 24 | Hwy 779 & Wood Ave | Signalized | HCM 7th Edition | WB Right | 0.469 | 13.2 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Hwy 16 A & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 23.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.611 |

**Intersection Setup**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 100.00 | 30.48 | 160.00 | 150.00 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 60.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | No | | | Yes | | |

**Volumes**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 69 | 4 | 279 | 0 | 0 | 12 | 4 | 1379 | 84 | 573 | 1253 | 8 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 126 | 0 | 0 | 0 | 0 | 0 | 0 | 260 | 130 | 0 | 252 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 196 | 4 | 285 | 0 | 0 | 12 | 4 | 1667 | 216 | 584 | 1530 | 8 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 49 | 1 | 71 | 0 | 0 | 3 | 1 | 417 | 54 | 146 | 383 | 2 |
| Total Analysis Volume [veh/h] | 196 | 4 | 285 | 0 | 0 | 12 | 4 | 1667 | 216 | 584 | 1530 | 8 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 110 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 7.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | Permiss | Permiss | Permiss | Protecte | Permiss | Unsigna | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 0 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 15 | 28 | 0 | 0 | 28 | 0 | 16 | 41 | 0 | 16 | 52 | 0 |
| Amber [s] | 4.0 | 4.7 | 0.0 | 0.0 | 4.7 | 0.0 | 3.0 | 5.2 | 0.0 | 3.0 | 5.3 | 0.0 |
| All red [s] | 1.5 | 2.1 | 0.0 | 0.0 | 2.1 | 0.0 | 1.8 | 1.8 | 0.0 | 1.8 | 1.8 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | Yes | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.8 | 0.0 | 0.0 | 4.8 | 0.0 | 2.8 | 5.0 | 0.0 | 2.8 | 5.1 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 18 | 44 | 0 | 0 | 26 | 0 | 43 | 42 | 0 | 24 | 23 | 0 |
| Lead / Lag | Lead | - | - | - | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 0 | 10 | 0 | 10 | 15 | 0 | 10 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| L, Total Lost Time per Cycle [s] | 6.80 | 6.80 | 6.80 | 4.80 | 7.00 | 4.80 | 7.10 | 7.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.80 | 4.80 | 2.80 | 5.00 | 2.80 | 5.10 | 5.10 |
| g_i, Effective Green Time [s] | 21 | 21 | 3 | 1 | 51 | 19 | 69 | 69 |
| g / C, Green / Cycle | 0.19 | 0.19 | 0.03 | 0.01 | 0.46 | 0.17 | 0.63 | 0.63 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.00 | 0.01 | 0.00 | 0.33 | 0.17 | 0.28 | 0.28 |
| s, saturation flow rate [veh/h] | 1685 | 1870 | 1166 | 1781 | 5094 | 3459 | 3560 | 1865 |
| c, Capacity [veh/h] | 405 | 359 | 66 | 21 | 2365 | 604 | 2230 | 1168 |
| d1, Uniform Delay [s] | 40.34 | 35.98 | 52.31 | 53.83 | 23.46 | 45.09 | 10.73 | 10.73 |
| k, delay calibration | 0.26 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.14 | 0.01 | 1.31 | 4.32 | 1.79 | 10.95 | 0.67 | 1.27 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.48 | 0.01 | 0.18 | 0.19 | 0.70 | 0.97 | 0.45 | 0.45 |
| d, Delay for Lane Group [s/veh] | 42.48 | 35.99 | 53.62 | 58.15 | 25.25 | 56.04 | 11.39 | 12.00 |
| Lane Group LOS | D | D | D | E | C | E | B | B |
| Critical Lane Group | Yes | No | Yes | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 4.97 | 0.09 | 0.35 | 0.13 | 10.78 | 8.45 | 5.57 | 6.03 |
| 50th-Percentile Queue Length [m/ln] | 37.88 | 0.67 | 2.65 | 1.00 | 82.17 | 64.40 | 42.43 | 45.97 |
| 95th-Percentile Queue Length [veh/ln] | 8.63 | 0.16 | 0.63 | 0.24 | 16.17 | 13.22 | 9.44 | 10.06 |
| 95th-Percentile Queue Length [m/ln] | 65.74 | 1.20 | 4.77 | 1.80 | 123.21 | 100.73 | 71.92 | 76.67 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 42.48 | 35.99 | 0.00 | 53.62 | 53.62 | 53.62 | 58.15 | 25.25 | 0.00 | 56.04 | 11.60 | 12.00 |
| Movement LOS | D | D | | D | D | D | E | C | | E | B | B |
| d_A, Approach Delay [s/veh] | 17.47 | | | 53.62 | | | 22.43 | | | 23.83 | | |
| Approach LOS | B | | | D | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 23.02 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.611 | | | | | | | | | | | |

**Emissions**

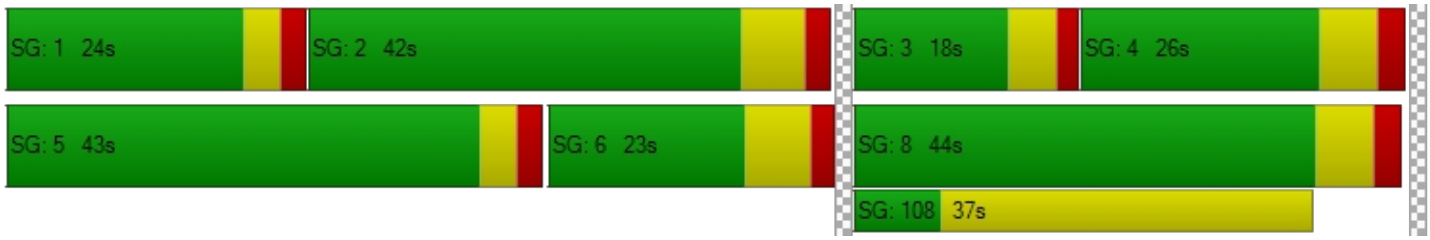
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 45.08 | 0.92 | 4.67 | 2.71 | 1129.54 | 130.54 | 225.57 | 118.22 |
| Stops [stops/h] | 162.70 | 2.86 | 11.37 | 4.29 | 1058.78 | 553.17 | 364.44 | 197.45 |
| Fuel consumption [L/h] | 15.59 | 0.28 | 1.20 | 0.64 | 182.28 | 67.27 | 47.57 | 25.55 |
| CO [g/h] | 287.88 | 5.23 | 22.07 | 11.81 | 3365.86 | 1242.17 | 878.38 | 471.75 |
| NOx [g/h] | 56.01 | 1.02 | 4.29 | 2.30 | 654.87 | 241.68 | 170.90 | 91.79 |
| VOC [g/h] | 66.72 | 1.21 | 5.11 | 2.74 | 780.07 | 287.88 | 203.57 | 109.33 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 35.0 | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 25.57 | 0.00 | 0.00 | 44.55 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.477 | 0.000 | 0.000 | 3.539 |
| Crosswalk LOS | B | F | F | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 676 | 349 | 636 | 289 |
| d_b, Bicycle Delay [s] | 24.09 | 37.48 | 25.57 | 40.25 |
| l_b,int, Bicycle LOS Score for Intersection | 1.890 | 1.579 | 2.479 | 2.727 |
| Bicycle LOS | A | A | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 2: Hwy 16A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 28.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.643 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 75.00 | 30.48 | 75.00 | 150.00 | 30.48 | 100.00 | 150.00 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 200.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | Yes | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | No | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 0 | 176 | 0 | 0 | 0 | 0 | 1292 | 52 | 50 | 1284 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0200 | 1.0000 | 1.0000 | 1.0200 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 42 | 0 | 390 | 43 | 197 | 190 | 0 | 0 | 0 | 0 | 378 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 46 | 0 | 0 | 0 | 0 | -46 | 46 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 20 | 42 | 176 | 390 | 43 | 243 | 190 | 1318 | 52 | 50 | 1264 | 424 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 11 | 44 | 98 | 11 | 61 | 48 | 330 | 13 | 13 | 316 | 106 |
| Total Analysis Volume [veh/h] | 20 | 42 | 176 | 390 | 43 | 243 | 190 | 1318 | 52 | 50 | 1264 | 424 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 110 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 49.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 30 | 0 | 11 | 47 | 0 | 20 | 12 | 0 | 22 | 14 | 0 |
| Amber [s] | 0.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 0.0 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 40 | 0 | 17 | 57 | 0 | 19 | 35 | 0 | 18 | 34 | 0 |
| Lead / Lag | - | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 7 | 10 | 0 | 12 | 10 | 0 | 12 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | No | No | | No | No | | No | No | |
| Maximum Recall | | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 17 | 17 | 34 | 34 | 13 | 48 | 9 | 44 |
| g / C, Green / Cycle | 0.15 | 0.15 | 0.31 | 0.31 | 0.12 | 0.44 | 0.09 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.13 | 0.27 | 0.02 | 0.11 | 0.26 | 0.03 | 0.25 |
| s, saturation flow rate [veh/h] | 1363 | 1637 | 1436 | 1870 | 1781 | 5094 | 1781 | 5094 |
| c, Capacity [veh/h] | 236 | 252 | 399 | 577 | 210 | 2219 | 153 | 2054 |
| d1, Uniform Delay [s] | 42.73 | 45.41 | 44.74 | 26.91 | 47.88 | 23.63 | 47.30 | 26.05 |
| k, delay calibration | 0.11 | 0.11 | 0.14 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.15 | 8.64 | 19.23 | 0.05 | 13.18 | 1.18 | 1.23 | 1.39 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.08 | 0.86 | 0.98 | 0.07 | 0.90 | 0.59 | 0.33 | 0.62 |
| d, Delay for Lane Group [s/veh] | 42.89 | 54.05 | 63.97 | 26.97 | 61.06 | 24.81 | 48.53 | 27.44 |
| Lane Group LOS | D | D | E | C | E | C | D | C |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.49 | 6.37 | 11.22 | 0.81 | 5.70 | 8.21 | 1.30 | 8.36 |
| 50th-Percentile Queue Length [m/ln] | 3.76 | 48.56 | 85.53 | 6.17 | 43.41 | 62.56 | 9.87 | 63.67 |
| 95th-Percentile Queue Length [veh/ln] | 0.89 | 10.51 | 16.72 | 1.46 | 9.61 | 12.91 | 2.33 | 13.10 |
| 95th-Percentile Queue Length [m/ln] | 6.77 | 80.11 | 127.40 | 11.11 | 73.24 | 98.36 | 17.77 | 99.79 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 42.89 | 54.05 | 54.05 | 63.97 | 26.97 | 0.00 | 61.06 | 24.81 | 0.00 | 48.53 | 27.44 | 0.00 |
| Movement LOS | D | D | D | E | C | | E | C | | D | C | |
| d_A, Approach Delay [s/veh] | 53.11 | | | 38.62 | | | 28.40 | | | 21.35 | | |
| Approach LOS | D | | | D | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 28.70 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.643 | | | | | | | | | | | |

**Emissions**

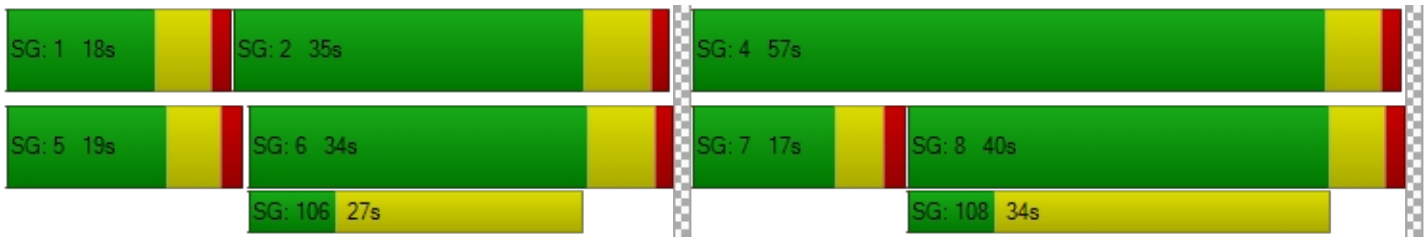
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 3.02 | 32.92 | 67.43 | 7.43 | 118.83 | 824.27 | 33.88 | 856.47 |
| Stops [stops/h] | 16.15 | 208.56 | 367.35 | 26.52 | 186.46 | 806.03 | 42.39 | 820.36 |
| Fuel consumption [L/h] | 1.31 | 16.89 | 33.87 | 2.20 | 29.01 | 136.46 | 6.97 | 141.35 |
| CO [g/h] | 24.19 | 311.81 | 625.48 | 40.54 | 535.72 | 2519.80 | 128.79 | 2610.10 |
| NOx [g/h] | 4.71 | 60.67 | 121.70 | 7.89 | 104.23 | 490.26 | 25.06 | 507.83 |
| VOC [g/h] | 5.61 | 72.26 | 144.96 | 9.40 | 124.16 | 583.99 | 29.85 | 604.92 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 44.55 | 0.00 | 44.55 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 2.309 | 0.000 | 3.596 |
| Crosswalk LOS | F | B | F | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 618 | 927 | 515 | 496 |
| d_b, Bicycle Delay [s] | 26.25 | 15.82 | 30.34 | 31.09 |
| l_b,int, Bicycle LOS Score for Intersection | 1.952 | 2.274 | 2.389 | 2.282 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 3: Hwy 16A & S Park Dr/N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 35.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.614 |

**Intersection Setup**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.50 | 3.66 | 3.66 | 3.50 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 170.00 | 30.48 | 450.00 | 250.00 | 30.48 | 165.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 210.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 225 | 106 | 230 | 315 | 139 | 61 | 33 | 799 | 209 | 375 | 732 | 197 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.50 | 0.50 | 2.00 | 2.00 | 0.50 | 0.50 | 0.50 | 0.00 | 0.50 | 2.00 | 0.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 34 | 8 | 0 | 34 | 192 | 185 | 182 | 0 | 9 | 188 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 46 | 0 | 0 | 46 | -46 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 230 | 142 | 243 | 367 | 176 | 254 | 265 | 951 | 213 | 392 | 935 | 201 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 58 | 36 | 61 | 92 | 44 | 64 | 66 | 238 | 53 | 98 | 234 | 50 |
| Total Analysis Volume [veh/h] | 230 | 142 | 243 | 367 | 176 | 254 | 265 | 951 | 213 | 392 | 935 | 201 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 110 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Protecte | Permiss | Unsigna | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 15 | 0 | 0 | 15 | 41 | 0 | 10 | 30 | 0 | 15 | 50 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.0 | 5.5 | 0.0 | 4.0 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 32 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 3.5 | 4.7 | 0.0 | 3.5 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 13 | 28 | 0 | 32 | 47 | 0 | 16 | 30 | 0 | 20 | 34 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 7 | 15 | 0 | 7 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 5.50 | 6.70 | 5.50 | 6.70 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 | 3.50 | 4.70 | 3.50 | 4.70 | 4.70 |
| g_i, Effective Green Time [s] | 45 | 19 | 19 | 45 | 32 | 32 | 10 | 33 | 14 | 37 | 37 |
| g / C, Green / Cycle | 0.40 | 0.18 | 0.18 | 0.40 | 0.29 | 0.29 | 0.09 | 0.30 | 0.13 | 0.34 | 0.34 |
| (v / s)_i Volume / Saturation Flow Rate | 0.20 | 0.08 | 0.15 | 0.26 | 0.09 | 0.16 | 0.08 | 0.18 | 0.11 | 0.18 | 0.13 |
| s, saturation flow rate [veh/h] | 1175 | 1892 | 1609 | 1405 | 1892 | 1609 | 3500 | 5176 | 3459 | 5176 | 1589 |
| c, Capacity [veh/h] | 457 | 334 | 284 | 525 | 543 | 462 | 325 | 1549 | 449 | 1741 | 535 |
| d1, Uniform Delay [s] | 23.35 | 40.32 | 43.93 | 26.17 | 30.81 | 33.19 | 48.97 | 33.08 | 46.97 | 29.57 | 27.73 |
| k, delay calibration | 0.50 | 0.11 | 0.11 | 0.22 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.92 | 0.86 | 7.71 | 3.37 | 0.34 | 1.02 | 4.99 | 1.83 | 5.43 | 1.19 | 2.01 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.50 | 0.42 | 0.86 | 0.70 | 0.32 | 0.55 | 0.82 | 0.61 | 0.87 | 0.54 | 0.38 |
| d, Delay for Lane Group [s/veh] | 27.27 | 41.18 | 51.64 | 29.54 | 31.15 | 34.21 | 53.96 | 34.91 | 52.40 | 30.76 | 29.75 |
| Lane Group LOS | C | D | D | C | C | C | D | C | D | C | C |
| Critical Lane Group | No | No | Yes | Yes | No | No | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 4.52 | 3.49 | 6.97 | 7.54 | 3.71 | 5.82 | 3.66 | 7.10 | 5.38 | 6.46 | 4.09 |
| 50th-Percentile Queue Length [m/ln] | 34.45 | 26.62 | 53.13 | 57.49 | 28.29 | 44.37 | 27.87 | 54.10 | 41.00 | 49.22 | 31.17 |
| 95th-Percentile Queue Length [veh/ln] | 8.01 | 6.29 | 11.30 | 12.05 | 6.68 | 9.78 | 6.58 | 11.47 | 9.19 | 10.63 | 7.36 |
| 95th-Percentile Queue Length [m/ln] | 61.02 | 47.91 | 86.13 | 91.81 | 50.93 | 74.53 | 50.16 | 87.40 | 69.99 | 80.98 | 56.10 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 27.27 | 41.18 | 51.64 | 29.54 | 31.15 | 34.21 | 53.96 | 34.91 | 0.00 | 52.40 | 30.76 | 29.75 |
| Movement LOS | C | D | D | C | C | C | D | C | | D | C | C |
| d_A, Approach Delay [s/veh] | 40.11 | | | 31.38 | | | 33.24 | | | 36.18 | | |
| Approach LOS | D | | | C | | | C | | | D | | |
| d_I, Intersection Delay [s/veh] | 34.98 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.614 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 30.11 | 18.59 | 31.81 | 48.51 | 23.26 | 33.57 | 403.39 | 1447.65 | 245.15 | 584.74 | 125.70 |
| Stops [stops/h] | 147.95 | 114.32 | 228.20 | 246.90 | 121.52 | 190.57 | 239.38 | 697.10 | 352.20 | 634.19 | 133.86 |
| Fuel consumption [L/h] | 11.02 | 8.84 | 17.81 | 18.50 | 9.16 | 14.16 | 56.56 | 179.73 | 55.37 | 104.67 | 22.20 |
| CO [g/h] | 203.41 | 163.18 | 328.90 | 341.70 | 169.20 | 261.51 | 1044.44 | 3318.74 | 1022.51 | 1932.84 | 409.98 |
| NOx [g/h] | 39.58 | 31.75 | 63.99 | 66.48 | 32.92 | 50.88 | 203.21 | 645.71 | 198.94 | 376.06 | 79.77 |
| VOC [g/h] | 47.14 | 37.82 | 76.22 | 79.19 | 39.21 | 60.61 | 242.06 | 769.15 | 236.98 | 447.95 | 95.02 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 44.55 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 3.501 | 0.000 |
| Crosswalk LOS | F | F | D | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 400 | 745 | 424 | 496 |
| d_b, Bicycle Delay [s] | 35.20 | 21.64 | 34.17 | 31.09 |
| l_b,int, Bicycle LOS Score for Intersection | 2.178 | 2.328 | 2.339 | 2.511 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Boulder Blvd & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 14.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.429 |

**Intersection Setup**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 276 | 27 | 41 | 5 | 44 | 5 | 3 | 12 | 318 | 100 | 21 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 219 | 0 | 0 | 226 | 8 | 7 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 62 | 0 | 0 | 62 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 276 | 246 | 41 | 5 | 332 | 13 | 10 | 74 | 318 | 100 | 21 | 2 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 69 | 62 | 10 | 1 | 83 | 3 | 3 | 19 | 80 | 25 | 5 | 1 |
| Total Analysis Volume [veh/h] | 276 | 246 | 41 | 5 | 332 | 13 | 10 | 74 | 318 | 100 | 21 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 60 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 23 | 0 | 0 | 14 | 0 | 0 | 29 | 0 | 0 | 29 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 6 | 0 | 0 | 9 | 0 | 0 | 15 | 0 | 0 | 12 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 27 | 0 | 0 | 18 | 0 | 0 | 33 | 0 | 0 | 33 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | C | R | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 36 | 36 | 36 | 32 | 32 | 16 | 16 | 16 |
| g / C, Green / Cycle | 0.61 | 0.61 | 0.61 | 0.54 | 0.54 | 0.26 | 0.26 | 0.26 |
| (v / s)_i Volume / Saturation Flow Rate | 0.28 | 0.15 | 0.03 | 0.01 | 0.21 | 0.05 | 0.22 | 0.16 |
| s, saturation flow rate [veh/h] | 970 | 1683 | 1431 | 983 | 1672 | 1660 | 1431 | 783 |
| c, Capacity [veh/h] | 634 | 1020 | 867 | 537 | 900 | 500 | 373 | 313 |
| d1, Uniform Delay [s] | 9.39 | 5.45 | 4.79 | 10.00 | 8.06 | 17.26 | 21.09 | 21.14 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.17 | 0.56 | 0.10 | 0.03 | 1.24 | 0.16 | 5.59 | 0.80 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.44 | 0.24 | 0.05 | 0.01 | 0.38 | 0.17 | 0.85 | 0.39 |
| d, Delay for Lane Group [s/veh] | 11.56 | 6.01 | 4.90 | 10.03 | 9.30 | 17.42 | 26.68 | 21.95 |
| Lane Group LOS | B | A | A | B | A | B | C | C |
| Critical Lane Group | No | No | No | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.59 | 1.20 | 0.18 | 0.04 | 2.37 | 0.85 | 4.42 | 1.51 |
| 50th-Percentile Queue Length [m/ln] | 12.12 | 9.17 | 1.36 | 0.29 | 18.09 | 6.50 | 33.69 | 11.53 |
| 95th-Percentile Queue Length [veh/ln] | 2.86 | 2.17 | 0.32 | 0.07 | 4.27 | 1.53 | 7.87 | 2.72 |
| 95th-Percentile Queue Length [m/ln] | 21.82 | 16.51 | 2.44 | 0.52 | 32.56 | 11.69 | 59.96 | 20.76 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 11.56 | 6.01 | 4.90 | 10.03 | 9.30 | 9.30 | 17.42 | 17.42 | 26.68 | 21.95 | 21.95 | 21.95 |
| Movement LOS | B | A | A | B | A | A | B | B | C | C | C | C |
| d_A, Approach Delay [s/veh] | 8.65 | | | 9.31 | | | 24.74 | | | 21.95 | | |
| Approach LOS | A | | | A | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 14.45 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.429 | | | | | | | | | | | |

**Emissions**

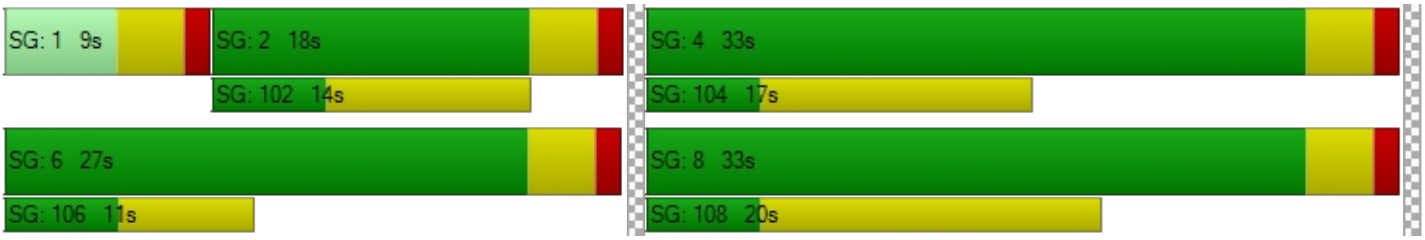
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 36.48 | 32.51 | 5.42 | 0.90 | 62.26 | 26.26 | 99.43 | 34.18 |
| Stops [stops/h] | 95.47 | 72.22 | 10.68 | 2.29 | 142.45 | 51.16 | 265.24 | 90.81 |
| Fuel consumption [L/h] | 8.07 | 5.85 | 0.91 | 0.18 | 11.59 | 4.77 | 21.95 | 7.37 |
| CO [g/h] | 149.00 | 108.08 | 16.80 | 3.25 | 214.05 | 88.15 | 405.23 | 136.07 |
| NOx [g/h] | 28.99 | 21.03 | 3.27 | 0.63 | 41.65 | 17.15 | 78.84 | 26.47 |
| VOC [g/h] | 34.53 | 25.05 | 3.89 | 0.75 | 49.61 | 20.43 | 93.92 | 31.53 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 21.68 | 21.68 | 21.68 | 21.68 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.688 | 2.140 | 2.398 | 1.825 |
| Crosswalk LOS | B | B | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 767 | 467 | 967 | 967 |
| d_b, Bicycle Delay [s] | 11.41 | 17.63 | 8.01 | 8.01 |
| l_b,int, Bicycle LOS Score for Intersection | 2.489 | 2.137 | 2.223 | 1.763 |
| Bicycle LOS | B | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 5: N Park Dr & Quartz Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.338 |

**Intersection Setup**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 33 | 0 | 10 | 50 | 0 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 226 | 4 | 0 | 234 | 5 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 62 | 0 | 0 | 62 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 33 | 288 | 14 | 50 | 296 | 15 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 72 | 4 | 13 | 74 | 4 |
| Total Analysis Volume [veh/h] | 33 | 288 | 14 | 50 | 296 | 15 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.01 | 0.00 | 0.34 | 0.01 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.92 | 0.00 | 11.20 | 8.51 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.02 | 0.02 | 1.50 | 0.04 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.18 | 0.18 | 11.44 | 0.33 |
| d_A, Approach Delay [s/veh] | 0.00 | | 1.73 | | 11.07 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 5.10 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 6: 28 St & Site Access #1**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.623 |

**Intersection Setup**

| Name | 28 St | | 28 St | | Site Access #1 | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | 28 St | | 28 St | | Site Access #1 | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 501 | 109 | 87 | 0 | 0 | 543 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 62 | 0 | 0 | 0 | 0 | 62 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 563 | 109 | 87 | 0 | 0 | 605 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 141 | 27 | 22 | 0 | 0 | 151 |
| Total Analysis Volume [veh/h] | 563 | 109 | 87 | 0 | 0 | 605 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.37 | 0.00 | 0.00 | 0.00 | 0.00 | 0.62 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.80 | 0.00 | 0.00 | 0.00 | 38.28 | 14.62 |
| Movement LOS | A | A | A | A | E | B |
| 95th-Percentile Queue Length [veh/ln] | 1.76 | 0.00 | 0.00 | 0.00 | 0.00 | 4.51 |
| 95th-Percentile Queue Length [m/ln] | 13.41 | 0.00 | 0.00 | 0.00 | 0.00 | 34.36 |
| d_A, Approach Delay [s/veh] | 7.37 | | 0.00 | | 14.62 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 10.11 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 7: Quartz Ave & Site Access #2**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 17.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.516 |

**Intersection Setup**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 238 | 87 | 0 | 230 | 109 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 62 | 0 | 0 | 62 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 300 | 87 | 0 | 292 | 109 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 75 | 22 | 0 | 73 | 27 | 0 |
| Total Analysis Volume [veh/h] | 300 | 87 | 0 | 292 | 109 | 0 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Stop | Free | Free |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.52 | 0.10 | 0.00 | 0.00 | 0.09 | 0.00 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 17.63 | 9.42 | 0.00 | 0.00 | 8.10 | 0.00 |
| Movement LOS | C | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 2.96 | 0.32 | 0.00 | 0.00 | 0.28 | 0.28 |
| 95th-Percentile Queue Length [m/ln] | 22.52 | 2.44 | 0.00 | 0.00 | 2.14 | 2.14 |
| d_A, Approach Delay [s/veh] | 15.78 | | 0.00 | | 8.10 | |
| Approach LOS | C | | A | | A | |
| d_I, Intersection Delay [s/veh] | 8.87 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 8: Quartz Ave & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way yield | Delay (sec / veh): | 4.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.080 |

**Intersection Setup**

| Name | 28 St | | 28 St | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | 28 St | | 28 St | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 109 | 0 | 0 | 0 | 0 | 87 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 109 | 0 | 0 | 0 | 0 | 87 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 27 | 0 | 0 | 0 | 0 | 22 |
| Total Analysis Volume [veh/h] | 109 | 0 | 0 | 0 | 0 | 87 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 2.71 | 0.00 | 0.00 | 0.00 | 0.00 | 4.01 |
| Movement LOS | A | | A | A | | A |
| 95th-Percentile Queue Length [veh/ln] | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 |
| 95th-Percentile Queue Length [m/ln] | 1.64 | 0.00 | 0.00 | 0.00 | 0.00 | 1.99 |
| d_A, Approach Delay [s/veh] | 2.71 | | 0.00 | | 4.01 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 3.29 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 9: Slate Ave & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.005 |

**Intersection Setup**

| Name | N Park Dr | | N Park Dr | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | N Park Dr | | N Park Dr | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 5 | 0 | 0 | 0 | 0 | 4 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 10 | 5 | 5 | 5 | 5 | 9 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 1 | 1 | 1 | 1 | 2 |
| Total Analysis Volume [veh/h] | 10 | 5 | 5 | 5 | 5 | 9 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 |
| d_M, Delay for Movement [s/veh] | 7.25 | 0.00 | 0.00 | 0.00 | 8.74 | 8.40 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.02 | 0.02 | 0.00 | 0.00 | 0.04 | 0.04 |
| 95th-Percentile Queue Length [m/ln] | 0.13 | 0.13 | 0.00 | 0.00 | 0.31 | 0.31 |
| d_A, Approach Delay [s/veh] | 4.83 | | 0.00 | | 8.52 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.92 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 11: N Park Dr & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 0.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.000 |

**Intersection Setup**

| Name | Keystone Dr | N Park Dr |
|---|---|---|
| Approach | Southbound | Eastbound |
| Lane Configuration |  |  |
| Turning Movement | Right | Left |
| Lane Width [m] | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | 50.00 |
| Grade [%] | 0.00 | 0.00 |
| Crosswalk | No | No |

**Volumes**

| Name | Keystone Dr | N Park Dr |
|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 5 |
| Peak Hour Factor | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 1 |
| Total Analysis Volume [veh/h] | 5 | 5 |
| Pedestrian Volume [ped/h] | 0 | 0 |

**Intersection Settings**

| | | |
|---|---|---|
| Priority Scheme | Free | Free |
| Flared Lane | | |
| Storage Area [veh] | 0 | 0 |
| Two-Stage Gap Acceptance | | |
| Number of Storage Spaces in Median | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | |
|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 |
| Movement LOS | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 0.00 | 0.00 |
| Approach LOS | A | A |
| d_I, Intersection Delay [s/veh] | 0.00 | |
| Intersection LOS | A | |

**Intersection Level Of Service Report**
**Intersection 20: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 13.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.042 |

**Intersection Setup**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 10 | 5 | 250 | 300 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 7 | 8 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 20 | 10 | 5 | 257 | 308 | 5 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 3 | 1 | 64 | 77 | 1 |
| Total Analysis Volume [veh/h] | 20 | 10 | 5 | 257 | 308 | 5 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 12.96 | 10.33 | 7.89 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.18 | 0.18 | 0.01 | 0.01 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 1.35 | 1.35 | 0.06 | 0.06 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 12.08 | | 0.15 | | 0.00 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 0.66 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 21: Slate Ave & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.005 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 4 | 0 | 0 | 5 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 5 | 9 | 5 | 5 | 10 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 1 | 2 | 1 | 1 | 3 |
| Total Analysis Volume [veh/h] | 5 | 5 | 9 | 5 | 5 | 10 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.25 | 0.00 | 8.73 | 8.40 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.02 | 0.02 | 0.04 | 0.04 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.11 | 0.11 | 0.33 | 0.33 |
| d_A, Approach Delay [s/veh] | 0.00 | | 4.66 | | 8.51 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.95 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 22: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.010 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 | 5 | 5 | 5 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 5 | 4 | 4 | 5 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 10 | 9 | 9 | 10 | 10 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 3 | 2 | 2 | 3 | 3 |
| Total Analysis Volume [veh/h] | 5 | 10 | 9 | 9 | 10 | 10 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.26 | 0.00 | 0.00 | 0.00 | 8.76 | 8.45 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.01 | 0.01 | 0.00 | 0.00 | 0.06 | 0.06 |
| 95th-Percentile Queue Length [m/ln] | 0.06 | 0.06 | 0.00 | 0.00 | 0.46 | 0.46 |
| d_A, Approach Delay [s/veh] | 2.42 | | 0.00 | | 8.60 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 3.93 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 23: Boulder Blvd & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 16.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.057 |

**Intersection Setup**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 300 | 10 | 10 | 20 | 20 | 150 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 4 | 5 | 4 | 0 | 0 | 3 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 304 | 15 | 14 | 20 | 20 | 153 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 76 | 4 | 4 | 5 | 5 | 38 |
| Total Analysis Volume [veh/h] | 304 | 15 | 14 | 20 | 20 | 153 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.19 | 0.00 | 0.00 | 0.00 | 0.06 | 0.15 |
| d_M, Delay for Movement [s/veh] | 7.78 | 0.00 | 0.00 | 0.00 | 16.33 | 9.49 |
| Movement LOS | A | A | A | A | C | A |
| 95th-Percentile Queue Length [veh/ln] | 0.68 | 0.68 | 0.00 | 0.00 | 0.75 | 0.75 |
| 95th-Percentile Queue Length [m/ln] | 5.17 | 5.17 | 0.00 | 0.00 | 5.75 | 5.75 |
| d_A, Approach Delay [s/veh] | 7.41 | | 0.00 | | 10.28 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 7.88 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 24: Hwy 779 & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.469 |

**Intersection Setup**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 160.00 | 30.48 | 30.48 | 150.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 70.00 | | | 70.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 21 | 465 | 49 | 55 | 509 | 12 | 21 | 6 | 43 | 128 | 21 | 195 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 32 | 0 | 3 | 31 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 21 | 497 | 49 | 58 | 540 | 12 | 21 | 6 | 43 | 128 | 21 | 199 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 124 | 12 | 15 | 135 | 3 | 5 | 2 | 11 | 32 | 5 | 50 |
| Total Analysis Volume [veh/h] | 21 | 497 | 49 | 58 | 540 | 12 | 21 | 6 | 43 | 128 | 21 | 199 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 60 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 41 | 0 | 0 | 41 | 0 | 0 | 23 | 0 | 0 | 39 | 0 |
| Amber [s] | 0.0 | 4.3 | 0.0 | 0.0 | 4.3 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 4.3 | 0.0 |
| All red [s] | 0.0 | 1.5 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.5 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 3.8 | 0.0 | 0.0 | 3.8 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 3.8 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 39 | 0 | 0 | 39 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 8 | 0 | 0 | 3 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| L, Total Lost Time per Cycle [s] | 5.80 | 5.80 | 5.80 | 5.80 | 4.00 | 4.00 | 5.80 | 5.80 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 3.80 | 3.80 | 3.80 | 3.80 | 0.00 | 2.00 | 3.80 | 3.80 |
| g_i, Effective Green Time [s] | 37 | 37 | 37 | 37 | 13 | 13 | 12 | 12 |
| g / C, Green / Cycle | 0.61 | 0.61 | 0.61 | 0.61 | 0.22 | 0.22 | 0.19 | 0.19 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.33 | 0.07 | 0.33 | 0.03 | 0.03 | 0.14 | 0.14 |
| s, saturation flow rate [veh/h] | 770 | 1657 | 774 | 1677 | 915 | 1431 | 1070 | 1431 |
| c, Capacity [veh/h] | 367 | 1017 | 368 | 1029 | 209 | 319 | 318 | 276 |
| d1, Uniform Delay [s] | 14.26 | 6.67 | 15.00 | 6.67 | 19.50 | 18.69 | 23.73 | 22.71 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.30 | 2.03 | 0.91 | 2.00 | 0.28 | 0.19 | 1.08 | 3.56 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.06 | 0.54 | 0.16 | 0.54 | 0.13 | 0.13 | 0.47 | 0.72 |
| d, Delay for Lane Group [s/veh] | 14.55 | 8.70 | 15.92 | 8.67 | 19.77 | 18.88 | 24.80 | 26.27 |
| Lane Group LOS | B | A | B | A | B | B | C | C |
| Critical Lane Group | No | Yes | No | No | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.20 | 2.96 | 0.58 | 2.98 | 0.29 | 0.46 | 1.96 | 2.71 |
| 50th-Percentile Queue Length [m/ln] | 1.52 | 22.52 | 4.45 | 22.71 | 2.22 | 3.52 | 14.92 | 20.63 |
| 95th-Percentile Queue Length [veh/ln] | 0.36 | 5.32 | 1.05 | 5.36 | 0.52 | 0.83 | 3.53 | 4.87 |
| 95th-Percentile Queue Length [m/ln] | 2.73 | 40.54 | 8.01 | 40.87 | 4.00 | 6.33 | 26.86 | 37.14 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 14.55 | 8.70 | 8.70 | 15.92 | 8.67 | 8.67 | 19.77 | 19.77 | 18.88 | 24.80 | 24.80 | 26.27 |
| Movement LOS | B | A | A | B | A | A | B | B | B | C | C | C |
| d_A, Approach Delay [s/veh] | 8.92 | | | 9.36 | | | 19.22 | | | 25.64 | | |
| Approach LOS | A | | | A | | | B | | | C | | |
| d_I, Intersection Delay [s/veh] | 13.19 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.469 | | | | | | | | | | | |

**Emissions**

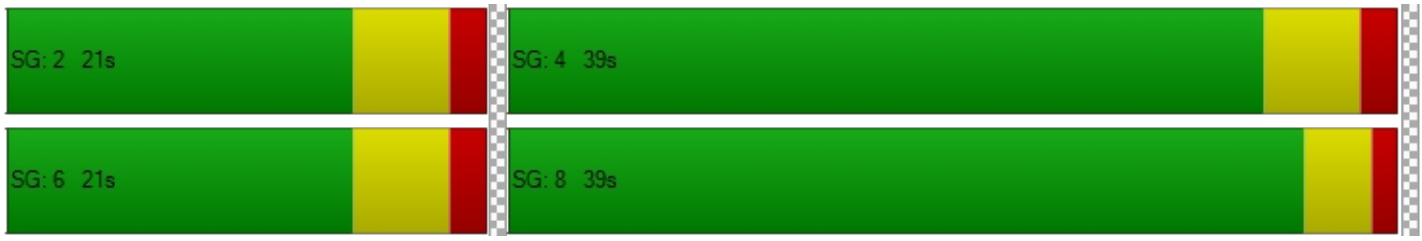
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 16.50 | 429.07 | 12.18 | 115.93 | 1.90 | 3.03 | 76.98 | 102.81 |
| Stops [stops/h] | 11.95 | 177.36 | 35.05 | 178.79 | 17.49 | 27.70 | 117.50 | 162.46 |
| Fuel consumption [L/h] | 2.11 | 46.44 | 3.25 | 21.00 | 0.98 | 1.53 | 12.81 | 17.45 |
| CO [g/h] | 38.90 | 857.58 | 59.93 | 387.79 | 18.18 | 28.34 | 236.48 | 322.27 |
| NOx [g/h] | 7.57 | 166.85 | 11.66 | 75.45 | 3.54 | 5.51 | 46.01 | 62.70 |
| VOC [g/h] | 9.02 | 198.75 | 13.89 | 89.87 | 4.21 | 6.57 | 54.81 | 74.69 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 0.000 | 0.000 |
| Crosswalk LOS | F | F | F | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 507 | 507 | 1167 | 1107 |
| d_b, Bicycle Delay [s] | 16.73 | 16.73 | 5.21 | 5.99 |
| l_b,int, Bicycle LOS Score for Intersection | 2.495 | 2.566 | 1.675 | 2.134 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Vistro File: C:\...\2025-11-24_North Industrial Development_Updated ASP_FINAL.vistro
Report File: C:\...\Opening Day (2026)_SAT_Background.pdf

Scenario 14 2026_SAT_Background Traffic
11/25/2025

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Hwy 16 A & Boundary Rd | Signalized | HCM 7th Edition | EB Left | 0.400 | 16.8 | B |
| 2 | Hwy 16A & 28 St | Two-way yield | HCM 7th Edition | NB Right | 0.332 | 14.3 | B |
| 3 | Hwy 16A & S Park Dr/N Park Dr | Signalized | HCM 7th Edition | NB Right | 0.393 | 25.9 | C |
| 4 | Boulder Blvd & N Park Dr | Signalized | HCM 7th Edition | EB Right | 0.230 | 16.4 | B |
| 9 | Slate Ave & N Park Dr | Two-way stop | HCM 7th Edition | EB Left | 0.005 | 8.7 | A |
| 11 | N Park Dr & Keystone Dr | Two-way stop | HCM 7th Edition | SB Right | 0.000 | 0.0 | A |
| 20 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | SB Left | 0.036 | 11.7 | B |
| 21 | Slate Ave & Golf Course Rd | Two-way stop | HCM 7th Edition | WB Left | 0.005 | 8.7 | A |
| 22 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | EB Left | 0.005 | 8.7 | A |
| 23 | Boulder Blvd & Wood Ave | Two-way stop | HCM 7th Edition | EB Left | 0.045 | 13.9 | B |
| 24 | Hwy 779 & Wood Ave | Signalized | HCM 7th Edition | WB Right | 0.361 | 11.5 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Hwy 16 A & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 16.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.400 |

**Intersection Setup**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 100.00 | 30.48 | 30.48 | 30.48 | 100.00 | 30.48 | 160.00 | 150.00 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 60.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | No | | | Yes | | |

**Volumes**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 55 | 3 | 223 | 0 | 0 | 10 | 3 | 1103 | 67 | 458 | 1003 | 7 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 56 | 3 | 227 | 0 | 0 | 10 | 3 | 1125 | 68 | 467 | 1023 | 7 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 14 | 1 | 57 | 0 | 0 | 3 | 1 | 281 | 17 | 117 | 256 | 2 |
| Total Analysis Volume [veh/h] | 56 | 3 | 227 | 0 | 0 | 10 | 3 | 1125 | 68 | 467 | 1023 | 7 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 100 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 12.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | Permiss | Permiss | Permiss | Protecte | Permiss | Unsigna | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 0 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 6 | 32 | 0 | 0 | 25 | 0 | 12 | 19 | 0 | 19 | 31 | 0 |
| Amber [s] | 3.0 | 4.7 | 0.0 | 0.0 | 4.7 | 0.0 | 3.0 | 5.3 | 0.0 | 3.0 | 5.3 | 0.0 |
| All red [s] | 1.8 | 2.1 | 0.0 | 0.0 | 2.1 | 0.0 | 1.8 | 1.8 | 0.0 | 1.8 | 1.8 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 30 | 0 | 0 | 10 | 0 | 0 | 18 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.8 | 4.8 | 0.0 | 0.0 | 4.8 | 0.0 | 2.8 | 5.1 | 0.0 | 2.8 | 5.1 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 12 | 42 | 0 | 0 | 30 | 0 | 20 | 36 | 0 | 22 | 38 | 0 |
| Lead / Lag | Lead | - | - | - | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 0 | 10 | 0 | 15 | 20 | 0 | 15 | 20 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | | No | | No | No | | No | No | |
| Maximum Recall | No | No | | | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 6.80 | 6.80 | 6.80 | 4.80 | 7.10 | 4.80 | 7.10 | 7.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.80 | 4.80 | 2.80 | 5.10 | 2.80 | 5.10 | 5.10 |
| g_i, Effective Green Time [s] | 13 | 13 | 2 | 1 | 53 | 16 | 67 | 67 |
| g / C, Green / Cycle | 0.13 | 0.13 | 0.02 | 0.01 | 0.53 | 0.16 | 0.67 | 0.67 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.00 | 0.01 | 0.00 | 0.22 | 0.14 | 0.19 | 0.19 |
| s, saturation flow rate [veh/h] | 1643 | 1870 | 725 | 1781 | 5094 | 3459 | 3560 | 1863 |
| c, Capacity [veh/h] | 302 | 240 | 54 | 22 | 2697 | 537 | 2393 | 1252 |
| d1, Uniform Delay [s] | 39.22 | 38.05 | 48.08 | 48.84 | 14.21 | 41.25 | 6.64 | 6.64 |
| k, delay calibration | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.29 | 0.02 | 1.62 | 2.68 | 0.48 | 4.50 | 0.30 | 0.56 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.19 | 0.01 | 0.18 | 0.13 | 0.42 | 0.87 | 0.28 | 0.28 |
| d, Delay for Lane Group [s/veh] | 39.51 | 38.07 | 49.69 | 51.52 | 14.69 | 45.75 | 6.93 | 7.20 |
| Lane Group LOS | D | D | D | D | B | D | A | A |
| Critical Lane Group | Yes | No | Yes | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 1.24 | 0.06 | 0.27 | 0.09 | 4.59 | 5.65 | 2.31 | 2.52 |
| 50th-Percentile Queue Length [m/ln] | 9.44 | 0.49 | 2.07 | 0.67 | 34.94 | 43.05 | 17.63 | 19.17 |
| 95th-Percentile Queue Length [veh/ln] | 2.23 | 0.12 | 0.49 | 0.16 | 8.10 | 9.55 | 4.16 | 4.53 |
| 95th-Percentile Queue Length [m/ln] | 17.00 | 0.88 | 3.72 | 1.20 | 61.70 | 72.75 | 31.74 | 34.50 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 39.51 | 38.07 | 0.00 | 49.69 | 49.69 | 49.69 | 51.52 | 14.69 | 0.00 | 45.75 | 7.02 | 7.20 |
| Movement LOS | D | D | | D | D | D | D | B | | D | A | A |
| d_A, Approach Delay [s/veh] | 8.14 | | | 49.69 | | | 13.95 | | | 19.10 | | |
| Approach LOS | A | | | D | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 16.82 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.400 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 12.88 | 0.69 | 3.89 | 2.01 | 754.90 | 104.39 | 151.14 | 79.10 |
| Stops [stops/h] | 44.62 | 2.32 | 9.77 | 3.16 | 495.22 | 406.78 | 166.59 | 90.56 |
| Fuel consumption [L/h] | 4.27 | 0.22 | 0.97 | 0.46 | 100.68 | 48.05 | 25.09 | 13.40 |
| CO [g/h] | 78.77 | 4.12 | 17.95 | 8.48 | 1859.11 | 887.26 | 463.36 | 247.44 |
| NOx [g/h] | 15.33 | 0.80 | 3.49 | 1.65 | 361.72 | 172.63 | 90.15 | 48.14 |
| VOC [g/h] | 18.26 | 0.95 | 4.16 | 1.97 | 430.87 | 205.63 | 107.39 | 57.35 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 0.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 41.41 | 0.00 | 0.00 | 41.41 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.434 | 0.000 | 0.000 | 3.326 |
| Crosswalk LOS | B | F | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 704 | 464 | 578 | 618 |
| d_b, Bicycle Delay [s] | 21.00 | 29.49 | 25.28 | 23.87 |
| l_b,int, Bicycle LOS Score for Intersection | 1.657 | 1.576 | 2.180 | 2.383 |
| Bicycle LOS | A | A | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 2: Hwy 16A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way yield | Delay (sec / veh): | 14.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.332 |

**Intersection Setup**

| Name | 28 St | | Hwy 16A | | Hwy 16A | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 100.00 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 50.00 | | 80.00 | | 80.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | 28 St | | Hwy 16A | | Hwy 16A | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 16 | 141 | 1033 | 42 | 40 | 1027 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0200 | 1.0000 | 1.0000 | 1.0200 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 16 | 141 | 1054 | 42 | 40 | 1048 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 35 | 264 | 11 | 10 | 262 |
| Total Analysis Volume [veh/h] | 16 | 141 | 1054 | 42 | 40 | 1048 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.33 | 0.01 | 0.00 | 0.00 | 0.01 |
| d_M, Delay for Movement [s/veh] | 0.00 | 14.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| Movement LOS | | B | A | A | | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 1.43 | 0.00 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 10.93 | 0.00 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 14.31 | | 0.00 | | 0.00 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 0.88 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**

**Intersection 3: Hwy 16A & S Park Dr/N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 25.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.393 |

**Intersection Setup**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.50 | 3.66 | 3.66 | 3.50 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 170.00 | 30.48 | 450.00 | 210.00 | 30.48 | 150.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 210.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 180 | 85 | 184 | 252 | 111 | 49 | 27 | 639 | 167 | 300 | 586 | 157 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.50 | 0.50 | 2.00 | 2.00 | 0.50 | 0.50 | 0.50 | 0.00 | 0.50 | 2.00 | 0.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 184 | 87 | 188 | 257 | 113 | 50 | 28 | 652 | 170 | 306 | 598 | 160 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 46 | 22 | 47 | 64 | 28 | 13 | 7 | 163 | 43 | 77 | 150 | 40 |
| Total Analysis Volume [veh/h] | 184 | 87 | 188 | 257 | 113 | 50 | 28 | 652 | 170 | 306 | 598 | 160 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 100 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Protecte | Permiss | Unsigna | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 8 | 36 | 0 | 7 | 35 | 0 | 24 | 9 | 0 | 23 | 8 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 32 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 13 | 43 | 0 | 13 | 43 | 0 | 13 | 24 | 0 | 20 | 31 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 7 | 15 | 0 | 14 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 | 4.70 |
| g_i, Effective Green Time [s] | 27 | 14 | 14 | 27 | 14 | 14 | 4 | 40 | 14 | 50 | 50 |
| g / C, Green / Cycle | 0.27 | 0.14 | 0.14 | 0.27 | 0.14 | 0.14 | 0.04 | 0.40 | 0.14 | 0.50 | 0.50 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.05 | 0.12 | 0.10 | 0.04 | 0.05 | 0.01 | 0.13 | 0.09 | 0.12 | 0.10 |
| s, saturation flow rate [veh/h] | 1464 | 1892 | 1609 | 2670 | 1892 | 1701 | 3500 | 5176 | 3459 | 5176 | 1589 |
| c, Capacity [veh/h] | 464 | 274 | 233 | 645 | 274 | 246 | 133 | 2061 | 484 | 2589 | 795 |
| d1, Uniform Delay [s] | 29.37 | 38.33 | 41.41 | 29.06 | 38.28 | 38.34 | 46.64 | 20.71 | 40.57 | 14.12 | 13.89 |
| k, delay calibration | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 2.53 | 0.66 | 6.49 | 0.40 | 0.63 | 0.74 | 0.77 | 0.40 | 1.37 | 0.21 | 0.57 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.40 | 0.32 | 0.81 | 0.40 | 0.31 | 0.32 | 0.21 | 0.32 | 0.63 | 0.23 | 0.20 |
| d, Delay for Lane Group [s/veh] | 31.90 | 38.99 | 47.90 | 29.46 | 38.92 | 39.08 | 47.41 | 21.11 | 41.94 | 14.33 | 14.46 |
| Lane Group LOS | C | D | D | C | D | D | D | C | D | B | B |
| Critical Lane Group | No | No | Yes | Yes | No | No | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 3.85 | 1.95 | 4.86 | 2.43 | 1.89 | 1.77 | 0.34 | 3.29 | 3.47 | 2.32 | 1.92 |
| 50th-Percentile Queue Length [m/ln] | 29.37 | 14.86 | 37.00 | 18.49 | 14.41 | 13.45 | 2.58 | 25.08 | 26.42 | 17.71 | 14.64 |
| 95th-Percentile Queue Length [veh/ln] | 6.94 | 3.51 | 8.47 | 4.37 | 3.40 | 3.18 | 0.61 | 5.92 | 6.24 | 4.18 | 3.46 |
| 95th-Percentile Queue Length [m/ln] | 52.87 | 26.75 | 64.53 | 33.28 | 25.93 | 24.21 | 4.64 | 45.14 | 47.56 | 31.88 | 26.35 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 31.90 | 38.99 | 47.90 | 29.46 | 38.96 | 39.08 | 47.41 | 21.11 | 0.00 | 41.94 | 14.33 | 14.46 |
| Movement LOS | C | D | D | C | D | D | D | C | | D | B | B |
| d_A, Approach Delay [s/veh] | 39.80 | | | 33.16 | | | 17.76 | | | 22.29 | | |
| Approach LOS | D | | | C | | | B | | | C | | |
| d_I, Intersection Delay [s/veh] | 25.92 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.393 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 24.09 | 11.39 | 24.61 | 33.97 | 11.17 | 10.38 | 42.62 | 992.50 | 193.38 | 377.91 | 101.11 |
| Stops [stops/h] | 138.77 | 70.20 | 174.78 | 174.71 | 68.06 | 63.55 | 24.35 | 355.42 | 249.66 | 251.04 | 69.16 |
| Fuel consumption [L/h] | 9.93 | 5.27 | 13.20 | 12.98 | 5.12 | 4.78 | 5.78 | 109.26 | 39.47 | 50.81 | 13.72 |
| CO [g/h] | 183.29 | 97.33 | 243.72 | 239.75 | 94.58 | 88.20 | 106.74 | 2017.47 | 728.82 | 938.24 | 253.44 |
| NOx [g/h] | 35.66 | 18.94 | 47.42 | 46.65 | 18.40 | 17.16 | 20.77 | 392.53 | 141.80 | 182.55 | 49.31 |
| VOC [g/h] | 42.48 | 22.56 | 56.48 | 55.56 | 21.92 | 20.44 | 24.74 | 467.57 | 168.91 | 217.45 | 58.74 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 41.41 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 3.260 | 0.000 |
| Crosswalk LOS | F | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 740 | 740 | 346 | 486 |
| d_b, Bicycle Delay [s] | 19.85 | 19.85 | 34.20 | 28.65 |
| l_b,int, Bicycle LOS Score for Intersection | 2.049 | 2.017 | 2.044 | 2.256 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Boulder Blvd & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 16.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.230 |

**Intersection Setup**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 221 | 22 | 33 | 5 | 35 | 4 | 2 | 10 | 254 | 80 | 17 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 221 | 22 | 33 | 5 | 35 | 4 | 2 | 10 | 254 | 80 | 17 | 2 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 55 | 6 | 8 | 1 | 9 | 1 | 1 | 3 | 64 | 20 | 4 | 1 |
| Total Analysis Volume [veh/h] | 221 | 22 | 33 | 5 | 35 | 4 | 2 | 10 | 254 | 80 | 17 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 60 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 23 | 0 | 0 | 14 | 0 | 0 | 29 | 0 | 0 | 29 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 6 | 0 | 0 | 9 | 0 | 0 | 15 | 0 | 0 | 12 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 27 | 0 | 0 | 18 | 0 | 0 | 33 | 0 | 0 | 33 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | C | R | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 39 | 39 | 39 | 35 | 35 | 13 | 13 | 13 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.65 | 0.59 | 0.59 | 0.21 | 0.21 | 0.21 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.01 | 0.02 | 0.00 | 0.02 | 0.01 | 0.18 | 0.10 |
| s, saturation flow rate [veh/h] | 1251 | 1683 | 1431 | 1214 | 1653 | 1641 | 1431 | 986 |
| c, Capacity [veh/h] | 962 | 1101 | 936 | 769 | 969 | 419 | 304 | 318 |
| d1, Uniform Delay [s] | 4.44 | 3.64 | 3.68 | 6.53 | 5.26 | 18.73 | 22.61 | 21.31 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.56 | 0.03 | 0.07 | 0.02 | 0.08 | 0.03 | 5.99 | 0.55 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.23 | 0.02 | 0.04 | 0.01 | 0.04 | 0.03 | 0.84 | 0.31 |
| d, Delay for Lane Group [s/veh] | 5.00 | 3.67 | 3.75 | 6.54 | 5.34 | 18.76 | 28.60 | 21.86 |
| Lane Group LOS | A | A | A | A | A | B | C | C |
| Critical Lane Group | Yes | No | No | No | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.87 | 0.07 | 0.11 | 0.03 | 0.18 | 0.13 | 3.66 | 1.20 |
| 50th-Percentile Queue Length [m/ln] | 6.65 | 0.56 | 0.87 | 0.21 | 1.36 | 0.96 | 27.86 | 9.11 |
| 95th-Percentile Queue Length [veh/ln] | 1.57 | 0.13 | 0.20 | 0.05 | 0.32 | 0.23 | 6.58 | 2.15 |
| 95th-Percentile Queue Length [m/ln] | 11.97 | 1.00 | 1.56 | 0.38 | 2.45 | 1.73 | 50.15 | 16.39 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 5.00 | 3.67 | 3.75 | 6.54 | 5.34 | 5.34 | 18.76 | 18.76 | 28.60 | 21.86 | 21.86 | 21.86 |
| Movement LOS | A | A | A | A | A | A | B | B | C | C | C | C |
| d_A, Approach Delay [s/veh] | 4.74 | | | 5.48 | | | 28.16 | | | 21.86 | | |
| Approach LOS | A | | | A | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 16.36 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.230 | | | | | | | | | | | |

**Emissions**

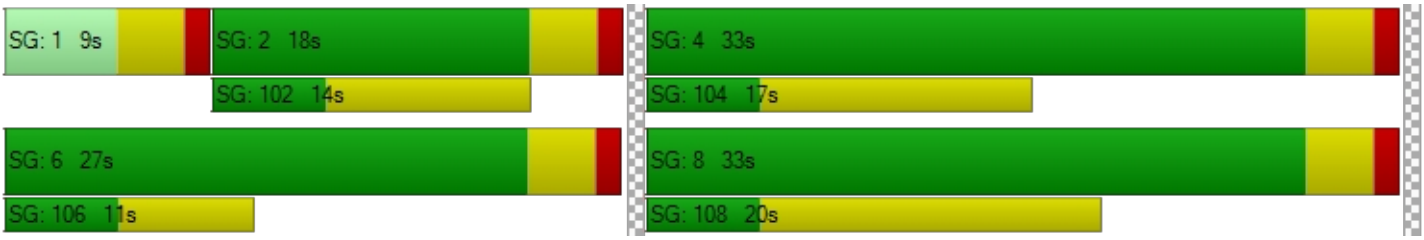
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 29.21 | 2.91 | 4.36 | 0.90 | 7.04 | 3.75 | 79.42 | 27.51 |
| Stops [stops/h] | 52.35 | 4.39 | 6.82 | 1.64 | 10.71 | 7.59 | 219.39 | 71.71 |
| Fuel consumption [L/h] | 4.80 | 0.44 | 0.66 | 0.15 | 1.07 | 0.70 | 18.07 | 5.89 |
| CO [g/h] | 88.72 | 8.08 | 12.25 | 2.73 | 19.77 | 12.94 | 333.75 | 108.83 |
| NOx [g/h] | 17.26 | 1.57 | 2.38 | 0.53 | 3.85 | 2.52 | 64.94 | 21.17 |
| VOC [g/h] | 20.56 | 1.87 | 2.84 | 0.63 | 4.58 | 3.00 | 77.35 | 25.22 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 21.68 | 21.68 | 21.68 | 21.68 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.525 | 1.947 | 2.287 | 1.777 |
| Crosswalk LOS | B | A | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 767 | 467 | 967 | 967 |
| d_b, Bicycle Delay [s] | 11.41 | 17.63 | 8.01 | 8.01 |
| l_b,int, Bicycle LOS Score for Intersection | 2.015 | 1.632 | 1.999 | 1.723 |
| Bicycle LOS | B | A | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 9: Slate Ave & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.005 |

**Intersection Setup**

| Name | N Park Dr | | N Park Dr | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | N Park Dr | | N Park Dr | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 1 | 1 | 1 | 1 | 1 |
| Total Analysis Volume [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.24 | 0.00 | 0.00 | 0.00 | 8.67 | 8.38 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.01 | 0.01 | 0.00 | 0.00 | 0.03 | 0.03 |
| 95th-Percentile Queue Length [m/ln] | 0.06 | 0.06 | 0.00 | 0.00 | 0.22 | 0.22 |
| d_A, Approach Delay [s/veh] | 3.62 | | 0.00 | | 8.53 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.05 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 11: N Park Dr & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 0.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.000 |

**Intersection Setup**

| Name | Keystone Dr | N Park Dr |
|---|---|---|
| Approach | Southbound | Eastbound |
| Lane Configuration |  |  |
| Turning Movement | Right | Left |
| Lane Width [m] | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | 50.00 |
| Grade [%] | 0.00 | 0.00 |
| Crosswalk | Yes | Yes |

**Volumes**

| Name | Keystone Dr | N Park Dr |
|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 5 |
| Peak Hour Factor | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 1 |
| Total Analysis Volume [veh/h] | 5 | 5 |
| Pedestrian Volume [ped/h] | 0 | 0 |

**Intersection Settings**

| | | |
|---|---|---|
| Priority Scheme | Free | Free |
| Flared Lane | | |
| Storage Area [veh] | 0 | 0 |
| Two-Stage Gap Acceptance | | |
| Number of Storage Spaces in Median | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | |
|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 |
| Movement LOS | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 0.00 | 0.00 |
| Approach LOS | A | A |
| d_I, Intersection Delay [s/veh] | 0.00 | |
| Intersection LOS | A | |

**Intersection Level Of Service Report**
**Intersection 20: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.036 |

**Intersection Setup**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 10 | 5 | 200 | 240 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 20 | 10 | 5 | 200 | 240 | 5 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 3 | 1 | 50 | 60 | 1 |
| Total Analysis Volume [veh/h] | 20 | 10 | 5 | 200 | 240 | 5 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 11.69 | 9.81 | 7.73 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.15 | 0.15 | 0.01 | 0.01 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 1.15 | 1.15 | 0.06 | 0.06 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 11.06 | | 0.19 | | 0.00 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 0.77 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 21: Slate Ave & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.005 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 1 | 1 | 1 | 1 | 1 |
| Total Analysis Volume [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.24 | 0.00 | 8.67 | 8.38 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.01 | 0.01 | 0.03 | 0.03 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.06 | 0.06 | 0.22 | 0.22 |
| d_A, Approach Delay [s/veh] | 0.00 | | 3.62 | | 8.53 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.05 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 22: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.005 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 | 5 | 5 | 5 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 5 | 5 | 5 | 5 | 10 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 1 | 1 | 1 | 1 | 3 |
| Total Analysis Volume [veh/h] | 5 | 5 | 5 | 5 | 5 | 10 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.24 | 0.00 | 0.00 | 0.00 | 8.68 | 8.40 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.01 | 0.01 | 0.00 | 0.00 | 0.04 | 0.04 |
| 95th-Percentile Queue Length [m/ln] | 0.06 | 0.06 | 0.00 | 0.00 | 0.33 | 0.33 |
| d_A, Approach Delay [s/veh] | 3.62 | | 0.00 | | 8.49 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.68 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 23: Boulder Blvd & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 13.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.045 |

**Intersection Setup**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 240 | 10 | 10 | 20 | 20 | 120 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 240 | 10 | 10 | 20 | 20 | 120 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 60 | 3 | 3 | 5 | 5 | 30 |
| Total Analysis Volume [veh/h] | 240 | 10 | 10 | 20 | 20 | 120 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.15 | 0.00 | 0.00 | 0.00 | 0.05 | 0.11 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.65 | 0.00 | 0.00 | 0.00 | 13.88 | 9.17 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.51 | 0.51 | 0.00 | 0.00 | 0.56 | 0.56 |
| 95th-Percentile Queue Length [m/ln] | 3.91 | 3.91 | 0.00 | 0.00 | 4.28 | 4.28 |
| d_A, Approach Delay [s/veh] | 7.34 | | 0.00 | | 9.84 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 7.65 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 24: Hwy 779 & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 11.5 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.361 |

**Intersection Setup**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 160.00 | 30.48 | 30.48 | 150.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 70.00 | | | 70.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 17 | 372 | 39 | 44 | 407 | 10 | 17 | 5 | 34 | 102 | 17 | 156 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 17 | 372 | 39 | 44 | 407 | 10 | 17 | 5 | 34 | 102 | 17 | 156 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 93 | 10 | 11 | 102 | 3 | 4 | 1 | 9 | 26 | 4 | 39 |
| Total Analysis Volume [veh/h] | 17 | 372 | 39 | 44 | 407 | 10 | 17 | 5 | 34 | 102 | 17 | 156 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 60 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 41 | 0 | 0 | 41 | 0 | 0 | 23 | 0 | 0 | 39 | 0 |
| Amber [s] | 0.0 | 4.3 | 0.0 | 0.0 | 4.3 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 4.3 | 0.0 |
| All red [s] | 0.0 | 1.5 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.5 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 3.8 | 0.0 | 0.0 | 3.8 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 3.8 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 26 | 0 | 0 | 26 | 0 | 0 | 34 | 0 | 0 | 34 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 8 | 0 | 0 | 3 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| L, Total Lost Time per Cycle [s] | 5.80 | 5.80 | 5.80 | 5.80 | 4.00 | 4.00 | 5.80 | 5.80 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 3.80 | 3.80 | 3.80 | 3.80 | 0.00 | 2.00 | 3.80 | 3.80 |
| g_i, Effective Green Time [s] | 39 | 39 | 39 | 39 | 11 | 11 | 10 | 10 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.65 | 0.65 | 0.19 | 0.19 | 0.16 | 0.16 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.25 | 0.05 | 0.25 | 0.02 | 0.02 | 0.11 | 0.11 |
| s, saturation flow rate [veh/h] | 872 | 1655 | 877 | 1676 | 968 | 1431 | 1064 | 1431 |
| c, Capacity [veh/h] | 496 | 1070 | 499 | 1083 | 197 | 272 | 282 | 229 |
| d1, Uniform Delay [s] | 9.92 | 4.99 | 10.20 | 5.00 | 20.32 | 20.14 | 24.71 | 23.74 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.13 | 1.05 | 0.35 | 1.04 | 0.25 | 0.20 | 1.00 | 3.51 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.03 | 0.38 | 0.09 | 0.39 | 0.11 | 0.12 | 0.42 | 0.68 |
| d, Delay for Lane Group [s/veh] | 10.05 | 6.04 | 10.55 | 6.03 | 20.57 | 20.35 | 25.71 | 27.25 |
| Lane Group LOS | B | A | B | A | C | C | C | C |
| Critical Lane Group | No | No | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.12 | 1.62 | 0.32 | 1.64 | 0.25 | 0.38 | 1.59 | 2.16 |
| 50th-Percentile Queue Length [m/ln] | 0.93 | 12.35 | 2.48 | 12.51 | 1.90 | 2.92 | 12.11 | 16.47 |
| 95th-Percentile Queue Length [veh/ln] | 0.22 | 2.92 | 0.58 | 2.96 | 0.45 | 0.69 | 2.86 | 3.89 |
| 95th-Percentile Queue Length [m/ln] | 1.67 | 22.23 | 4.46 | 22.52 | 3.42 | 5.26 | 21.80 | 29.64 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 10.05 | 6.04 | 6.04 | 10.55 | 6.03 | 6.03 | 20.57 | 20.57 | 20.35 | 25.71 | 25.71 | 27.25 |
| Movement LOS | B | A | A | B | A | A | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 6.20 | | | 6.46 | | | 20.43 | | | 26.58 | | |
| Approach LOS | A | | | A | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 11.55 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.361 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 13.36 | 322.98 | 9.24 | 87.57 | 1.55 | 2.39 | 61.48 | 80.59 |
| Stops [stops/h] | 7.29 | 97.24 | 19.49 | 98.51 | 14.95 | 23.00 | 95.35 | 129.67 |
| Fuel consumption [L/h] | 1.54 | 32.52 | 1.97 | 13.41 | 0.83 | 1.28 | 10.35 | 13.85 |
| CO [g/h] | 28.47 | 600.54 | 36.34 | 247.63 | 15.35 | 23.57 | 191.03 | 255.77 |
| NOx [g/h] | 5.54 | 116.84 | 7.07 | 48.18 | 2.99 | 4.59 | 37.17 | 49.76 |
| VOC [g/h] | 6.60 | 139.18 | 8.42 | 57.39 | 3.56 | 5.46 | 44.27 | 59.28 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 0.000 | 0.000 |
| Crosswalk LOS | F | F | F | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 673 | 673 | 1000 | 940 |
| d_b, Bicycle Delay [s] | 13.20 | 13.20 | 7.50 | 8.43 |
| l_b,int, Bicycle LOS Score for Intersection | 2.266 | 2.320 | 1.652 | 2.013 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Vistro File: C:\...\2025-11-24_North Industrial Development_Updated ASP_FINAL.vistro
Report File: C:\...\Opening Day (2026)_SAT.pdf

Scenario 7 Opening Day (2026)_SAT
11/24/2025

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Hwy 16 A & Boundary Rd | Signalized | HCM 7th Edition | EB Left | 0.544 | 18.2 | B |
| 2 | Hwy 16A & 28 St | Signalized | HCM 7th Edition | EB Left | 0.665 | 29.6 | C |
| 3 | Hwy 16A & S Park Dr/N Park Dr | Signalized | HCM 7th Edition | EB Left | 0.514 | 33.6 | C |
| 4 | Boulder Blvd & N Park Dr | Signalized | HCM 7th Edition | EB Right | 0.412 | 12.8 | B |
| 5 | N Park Dr & Quartz Ave | Two-way stop | HCM 7th Edition | WB Left | 0.405 | 11.9 | B |
| 7 | Quartz Ave & Site Access #2 | Two-way stop | HCM 7th Edition | NB Left | 0.705 | 27.3 | D |
| 8 | 28 St & Site Access #1 | Two-way stop | HCM 7th Edition | EB Right | 0.778 | 20.7 | C |
| 9 | Slate Ave & N Park Dr | Two-way stop | HCM 7th Edition | EB Left | 0.005 | 8.8 | A |
| 10 | Quartz Ave & 28 St | Two-way yield | HCM 7th Edition | EB Right | 0.100 | 4.2 | A |
| 11 | N Park Dr & Keystone Dr | Two-way stop | HCM 7th Edition | SB Right | 0.000 | 0.0 | A |
| 20 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | SB Left | 0.036 | 11.9 | B |
| 21 | Slate Ave & Golf Course Rd | Two-way stop | HCM 7th Edition | WB Left | 0.005 | 8.7 | A |
| 22 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | EB Left | 0.011 | 8.8 | A |
| 23 | Boulder Blvd & Wood Ave | Two-way stop | HCM 7th Edition | EB Left | 0.046 | 14.2 | B |
| 24 | Hwy 779 & Wood Ave | Signalized | HCM 7th Edition | WB Left | 4.832 | 46.3 | D |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Hwy 16 A & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.544 |

**Intersection Setup**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 100.00 | 30.48 | 160.00 | 150.00 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 60.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | No | | | Yes | | |

**Volumes**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 55 | 3 | 223 | 0 | 0 | 10 | 3 | 1103 | 67 | 458 | 1003 | 7 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 156 | 0 | 0 | 0 | 0 | 0 | 0 | 322 | 162 | 0 | 313 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 212 | 3 | 227 | 0 | 0 | 10 | 3 | 1447 | 230 | 467 | 1336 | 7 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 53 | 1 | 57 | 0 | 0 | 3 | 1 | 362 | 58 | 117 | 334 | 2 |
| Total Analysis Volume [veh/h] | 212 | 3 | 227 | 0 | 0 | 10 | 3 | 1447 | 230 | 467 | 1336 | 7 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 110 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | Permiss | Permiss | Permiss | Protecte | Permiss | Unsigna | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 0 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 13 | 32 | 0 | 0 | 13 | 0 | 45 | 33 | 0 | 26 | 13 | 0 |
| Amber [s] | 4.0 | 4.7 | 0.0 | 0.0 | 4.7 | 0.0 | 3.0 | 5.2 | 0.0 | 3.0 | 5.3 | 0.0 |
| All red [s] | 1.5 | 2.1 | 0.0 | 0.0 | 2.1 | 0.0 | 1.8 | 1.8 | 0.0 | 1.8 | 1.8 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.8 | 0.0 | 0.0 | 4.8 | 0.0 | 2.8 | 5.0 | 0.0 | 2.8 | 5.1 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 14 | 44 | 0 | 0 | 30 | 0 | 25 | 25 | 0 | 41 | 41 | 0 |
| Lead / Lag | Lead | - | - | - | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 0 | 10 | 0 | 7 | 15 | 0 | 10 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | | No | | No | No | | No | No | |
| Maximum Recall | No | No | | | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| L, Total Lost Time per Cycle [s] | 6.80 | 6.80 | 6.80 | 4.80 | 7.00 | 4.80 | 7.10 | 7.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.80 | 4.80 | 2.80 | 5.00 | 2.80 | 5.10 | 5.10 |
| g_i, Effective Green Time [s] | 17 | 17 | 3 | 1 | 57 | 18 | 74 | 74 |
| g / C, Green / Cycle | 0.15 | 0.15 | 0.02 | 0.01 | 0.52 | 0.16 | 0.67 | 0.67 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.00 | 0.01 | 0.00 | 0.28 | 0.14 | 0.25 | 0.25 |
| s, saturation flow rate [veh/h] | 1670 | 1870 | 905 | 1781 | 5094 | 3459 | 3560 | 1865 |
| c, Capacity [veh/h] | 337 | 284 | 55 | 11 | 2639 | 557 | 2392 | 1253 |
| d1, Uniform Delay [s] | 44.91 | 39.62 | 52.66 | 54.40 | 17.85 | 44.77 | 7.87 | 7.87 |
| k, delay calibration | 0.38 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.62 | 0.01 | 1.56 | 12.33 | 0.82 | 3.47 | 0.44 | 0.84 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.63 | 0.01 | 0.18 | 0.27 | 0.55 | 0.84 | 0.37 | 0.37 |
| d, Delay for Lane Group [s/veh] | 51.53 | 39.63 | 54.22 | 66.74 | 18.67 | 48.24 | 8.31 | 8.71 |
| Lane Group LOS | D | D | D | E | B | D | A | A |
| Critical Lane Group | Yes | No | Yes | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 6.08 | 0.07 | 0.29 | 0.12 | 7.57 | 6.17 | 3.79 | 4.11 |
| 50th-Percentile Queue Length [m/ln] | 46.36 | 0.53 | 2.24 | 0.90 | 57.66 | 47.02 | 28.90 | 31.33 |
| 95th-Percentile Queue Length [veh/ln] | 10.13 | 0.12 | 0.53 | 0.21 | 12.08 | 10.24 | 6.83 | 7.40 |
| 95th-Percentile Queue Length [m/ln] | 77.19 | 0.95 | 4.04 | 1.62 | 92.04 | 78.06 | 52.01 | 56.40 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 51.53 | 39.63 | 0.00 | 54.22 | 54.22 | 54.22 | 66.74 | 18.67 | 0.00 | 48.24 | 8.45 | 8.71 |
| Movement LOS | D | D | | D | D | D | E | B | | D | A | A |
| d_A, Approach Delay [s/veh] | 24.98 | | | 54.22 | | | 16.20 | | | 18.72 | | |
| Approach LOS | C | | | D | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 18.16 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.544 | | | | | | | | | | | |

**Emissions**

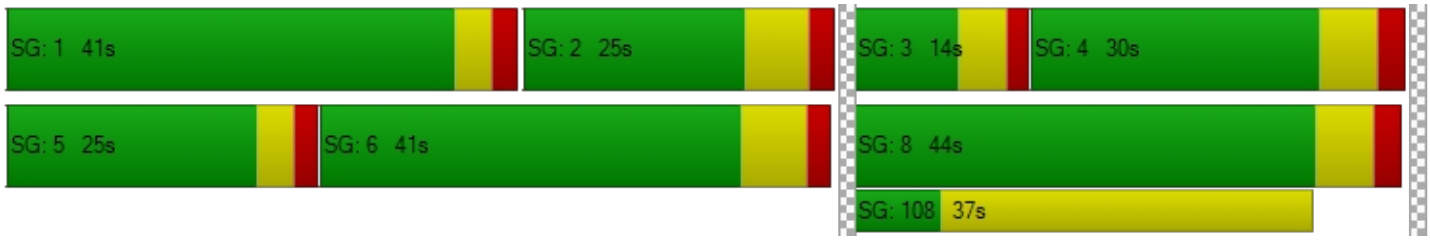
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 48.76 | 0.69 | 3.89 | 2.03 | 980.79 | 104.39 | 197.00 | 103.21 |
| Stops [stops/h] | 199.13 | 2.27 | 9.63 | 3.87 | 742.98 | 403.86 | 248.22 | 134.57 |
| Fuel consumption [L/h] | 19.09 | 0.22 | 1.00 | 0.54 | 140.80 | 48.78 | 35.43 | 18.96 |
| CO [g/h] | 352.47 | 4.15 | 18.54 | 9.91 | 2599.94 | 900.69 | 654.22 | 350.16 |
| NOx [g/h] | 68.58 | 0.81 | 3.61 | 1.93 | 505.85 | 175.24 | 127.29 | 68.13 |
| VOC [g/h] | 81.69 | 0.96 | 4.30 | 2.30 | 602.56 | 208.74 | 151.62 | 81.15 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 18.0 | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 38.47 | 0.00 | 0.00 | 44.55 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.469 | 0.000 | 0.000 | 3.443 |
| Crosswalk LOS | B | F | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 676 | 422 | 327 | 616 |
| d_b, Bicycle Delay [s] | 24.09 | 34.25 | 38.47 | 26.32 |
| l_b,int, Bicycle LOS Score for Intersection | 1.914 | 1.576 | 2.357 | 2.555 |
| Bicycle LOS | A | A | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 2: Hwy 16A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 29.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.665 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 75.00 | 30.48 | 75.00 | 150.00 | 30.48 | 100.00 | 150.00 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 200.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | No | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 16 | 0 | 141 | 0 | 0 | 0 | 0 | 1033 | 42 | 40 | 1027 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0200 | 1.0000 | 1.0000 | 1.0200 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 52 | 0 | 484 | 54 | 244 | 235 | 0 | 0 | 0 | 0 | 469 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 0 | 0 | -36 | 36 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 16 | 52 | 141 | 484 | 54 | 280 | 235 | 1054 | 42 | 40 | 1012 | 505 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 13 | 35 | 121 | 14 | 70 | 59 | 264 | 11 | 10 | 253 | 126 |
| Total Analysis Volume [veh/h] | 16 | 52 | 141 | 484 | 54 | 280 | 235 | 1054 | 42 | 40 | 1012 | 505 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 110 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 46.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 30 | 0 | 21 | 57 | 0 | 20 | 31 | 0 | 3 | 14 | 0 |
| Amber [s] | 0.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 0.0 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 27 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 9 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 38 | 0 | 24 | 62 | 0 | 27 | 30 | 0 | 18 | 21 | 0 |
| Lead / Lag | - | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 10 | 10 | 0 | 12 | 10 | 0 | 12 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 15 | 15 | 39 | 39 | 16 | 44 | 8 | 36 |
| g / C, Green / Cycle | 0.14 | 0.14 | 0.35 | 0.35 | 0.15 | 0.40 | 0.08 | 0.33 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.12 | 0.32 | 0.03 | 0.13 | 0.21 | 0.02 | 0.20 |
| s, saturation flow rate [veh/h] | 1350 | 1656 | 1523 | 1870 | 1781 | 5094 | 1781 | 5094 |
| c, Capacity [veh/h] | 208 | 227 | 513 | 664 | 267 | 2024 | 138 | 1656 |
| d1, Uniform Delay [s] | 44.53 | 46.36 | 34.87 | 23.54 | 45.81 | 25.19 | 47.89 | 31.26 |
| k, delay calibration | 0.11 | 0.11 | 0.17 | 0.11 | 0.17 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.16 | 8.61 | 12.96 | 0.05 | 13.70 | 0.96 | 1.15 | 1.69 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.08 | 0.85 | 0.94 | 0.08 | 0.88 | 0.52 | 0.29 | 0.61 |
| d, Delay for Lane Group [s/veh] | 44.68 | 54.97 | 47.83 | 23.60 | 59.51 | 26.15 | 49.03 | 32.96 |
| Lane Group LOS | D | D | D | C | E | C | D | C |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.40 | 5.67 | 13.00 | 0.94 | 7.03 | 6.65 | 1.04 | 7.34 |
| 50th-Percentile Queue Length [m/ln] | 3.08 | 43.18 | 99.08 | 7.19 | 53.54 | 50.69 | 7.95 | 55.93 |
| 95th-Percentile Queue Length [veh/ln] | 0.73 | 9.57 | 18.92 | 1.70 | 11.37 | 10.88 | 1.88 | 11.78 |
| 95th-Percentile Queue Length [m/ln] | 5.55 | 72.93 | 144.14 | 12.93 | 86.67 | 82.93 | 14.31 | 89.79 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 44.68 | 54.97 | 54.97 | 47.83 | 23.60 | 0.00 | 59.51 | 26.15 | 0.00 | 49.03 | 32.96 | 0.00 |
| Movement LOS | D | D | D | D | C | | E | C | | D | C | |
| d_A, Approach Delay [s/veh] | 54.18 | | | 29.86 | | | 31.22 | | | 22.68 | | |
| Approach LOS | D | | | C | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 29.63 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.665 | | | | | | | | | | | |

**Emissions**

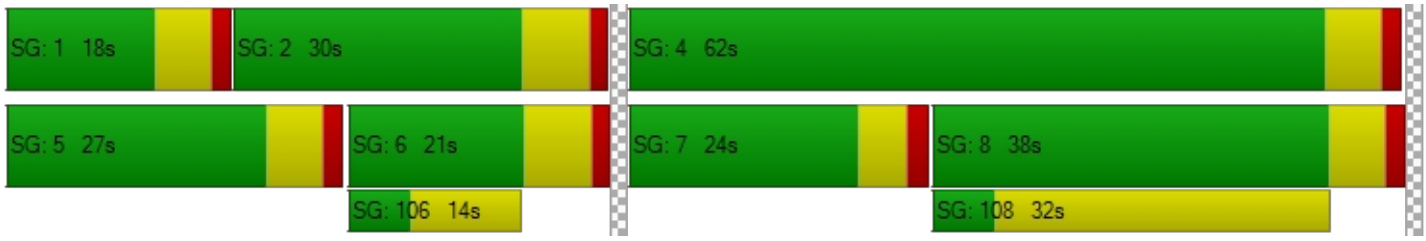
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 2.27 | 27.34 | 83.15 | 9.28 | 146.91 | 658.93 | 27.11 | 685.94 |
| Stops [stops/h] | 13.23 | 185.46 | 425.54 | 30.86 | 229.95 | 653.18 | 34.14 | 720.67 |
| Fuel consumption [L/h] | 1.06 | 14.93 | 35.29 | 2.56 | 35.56 | 110.69 | 5.61 | 121.15 |
| CO [g/h] | 19.63 | 275.76 | 651.61 | 47.21 | 656.66 | 2043.99 | 103.57 | 2237.19 |
| NOx [g/h] | 3.82 | 53.65 | 126.78 | 9.18 | 127.76 | 397.69 | 20.15 | 435.27 |
| VOC [g/h] | 4.55 | 63.91 | 151.02 | 10.94 | 152.19 | 473.72 | 24.00 | 518.49 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 46.37 | 0.00 | 46.37 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 2.350 | 0.000 | 3.486 |
| Crosswalk LOS | F | B | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 582 | 1018 | 424 | 260 |
| d_b, Bicycle Delay [s] | 27.65 | 13.25 | 34.17 | 41.63 |
| l_b,int, Bicycle LOS Score for Intersection | 1.904 | 2.447 | 2.269 | 2.138 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 3: Hwy 16A & S Park Dr/N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 33.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.514 |

**Intersection Setup**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.50 | 3.66 | 3.66 | 3.50 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 170.00 | 30.48 | 450.00 | 250.00 | 30.48 | 165.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 210.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 180 | 85 | 184 | 252 | 111 | 49 | 27 | 639 | 167 | 300 | 586 | 157 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.50 | 0.50 | 2.00 | 2.00 | 0.50 | 0.50 | 0.50 | 0.00 | 0.50 | 2.00 | 0.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 42 | 10 | 0 | 43 | 238 | 229 | 225 | 0 | 11 | 233 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 36 | 0 | 0 | 36 | -36 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 184 | 129 | 198 | 293 | 156 | 288 | 293 | 841 | 170 | 317 | 831 | 160 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 46 | 32 | 50 | 73 | 39 | 72 | 73 | 210 | 43 | 79 | 208 | 40 |
| Total Analysis Volume [veh/h] | 184 | 129 | 198 | 293 | 156 | 288 | 293 | 841 | 170 | 317 | 831 | 160 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 110 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Protecte | Permiss | Unsigna | Protecte | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 5 | 32 | 0 | 8 | 35 | 0 | 35 | 21 | 0 | 24 | 10 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 32 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 13 | 30 | 0 | 30 | 47 | 0 | 19 | 30 | 0 | 20 | 31 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 7 | 15 | 0 | 14 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C | R |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 | 4.70 |
| g_i, Effective Green Time [s] | 38 | 16 | 16 | 38 | 25 | 25 | 11 | 39 | 14 | 42 | 42 |
| g / C, Green / Cycle | 0.35 | 0.15 | 0.15 | 0.35 | 0.23 | 0.23 | 0.10 | 0.35 | 0.13 | 0.38 | 0.38 |
| (v / s)_i Volume / Saturation Flow Rate | 0.15 | 0.07 | 0.12 | 0.20 | 0.08 | 0.18 | 0.08 | 0.16 | 0.09 | 0.16 | 0.10 |
| s, saturation flow rate [veh/h] | 1199 | 1892 | 1609 | 1432 | 1892 | 1609 | 3500 | 5176 | 3459 | 5176 | 1589 |
| c, Capacity [veh/h] | 369 | 282 | 240 | 479 | 438 | 372 | 358 | 1828 | 440 | 1958 | 601 |
| d1, Uniform Delay [s] | 27.55 | 42.72 | 45.40 | 28.82 | 35.41 | 39.57 | 48.39 | 27.48 | 46.12 | 25.33 | 23.64 |
| k, delay calibration | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.77 | 1.15 | 7.00 | 1.27 | 0.49 | 3.45 | 4.67 | 0.84 | 2.23 | 0.68 | 1.08 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.50 | 0.46 | 0.82 | 0.61 | 0.36 | 0.77 | 0.82 | 0.46 | 0.72 | 0.42 | 0.27 |
| d, Delay for Lane Group [s/veh] | 32.32 | 43.87 | 52.40 | 30.09 | 35.90 | 43.03 | 53.06 | 28.32 | 48.35 | 26.00 | 24.72 |
| Lane Group LOS | C | D | D | C | D | D | D | C | D | C | C |
| Critical Lane Group | No | No | Yes | Yes | No | No | No | Yes | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 3.96 | 3.29 | 5.68 | 6.12 | 3.56 | 7.57 | 4.01 | 5.49 | 4.13 | 5.14 | 2.88 |
| 50th-Percentile Queue Length [m/ln] | 30.20 | 25.04 | 43.27 | 46.60 | 27.10 | 57.70 | 30.59 | 41.81 | 31.47 | 39.15 | 21.98 |
| 95th-Percentile Queue Length [veh/ln] | 7.13 | 5.91 | 9.59 | 10.17 | 6.40 | 12.09 | 7.23 | 9.33 | 7.43 | 8.85 | 5.19 |
| 95th-Percentile Queue Length [m/ln] | 54.35 | 45.06 | 73.05 | 77.50 | 48.78 | 92.09 | 55.07 | 71.08 | 56.65 | 67.47 | 39.56 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 32.32 | 43.87 | 52.40 | 30.09 | 35.90 | 43.03 | 53.06 | 28.32 | 0.00 | 48.35 | 26.00 | 24.72 |
| Movement LOS | C | D | D | C | D | D | D | C | | D | C | C |
| d_A, Approach Delay [s/veh] | 43.02 | | | 36.37 | | | 30.19 | | | 31.26 | | |
| Approach LOS | D | | | D | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 33.58 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.514 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 24.09 | 16.89 | 25.92 | 38.73 | 20.62 | 38.06 | 446.02 | 1280.21 | 198.18 | 519.52 | 100.03 |
| Stops [stops/h] | 129.69 | 107.53 | 185.83 | 200.14 | 116.39 | 247.82 | 262.80 | 538.73 | 270.35 | 504.38 | 94.40 |
| Fuel consumption [L/h] | 9.78 | 8.38 | 14.63 | 14.97 | 8.89 | 18.73 | 62.23 | 150.20 | 42.96 | 86.57 | 16.35 |
| CO [g/h] | 180.63 | 154.71 | 270.08 | 276.34 | 164.09 | 345.78 | 1149.07 | 2773.58 | 793.21 | 1598.53 | 301.98 |
| NOx [g/h] | 35.14 | 30.10 | 52.55 | 53.77 | 31.93 | 67.28 | 223.57 | 539.64 | 154.33 | 311.02 | 58.75 |
| VOC [g/h] | 41.86 | 35.85 | 62.59 | 64.05 | 38.03 | 80.14 | 266.31 | 642.80 | 183.83 | 370.47 | 69.99 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 44.55 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 3.435 | 0.000 |
| Crosswalk LOS | F | F | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 436 | 745 | 424 | 442 |
| d_b, Bicycle Delay [s] | 33.62 | 21.64 | 34.17 | 33.38 |
| l_b,int, Bicycle LOS Score for Intersection | 2.092 | 2.278 | 2.294 | 2.390 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Boulder Blvd & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 12.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.412 |

**Intersection Setup**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 221 | 22 | 33 | 5 | 35 | 4 | 2 | 10 | 254 | 80 | 17 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 271 | 0 | 0 | 281 | 10 | 9 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 62 | 0 | 0 | 62 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 221 | 293 | 33 | 5 | 378 | 14 | 11 | 72 | 254 | 80 | 17 | 2 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 55 | 73 | 8 | 1 | 95 | 4 | 3 | 18 | 64 | 20 | 4 | 1 |
| Total Analysis Volume [veh/h] | 221 | 293 | 33 | 5 | 378 | 14 | 11 | 72 | 254 | 80 | 17 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 60 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 23 | 0 | 0 | 14 | 0 | 0 | 29 | 0 | 0 | 29 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 6 | 0 | 0 | 9 | 0 | 0 | 15 | 0 | 0 | 12 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 27 | 0 | 0 | 18 | 0 | 0 | 33 | 0 | 0 | 33 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | C | R | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 39 | 39 | 39 | 35 | 35 | 13 | 13 | 13 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.65 | 0.58 | 0.58 | 0.22 | 0.22 | 0.22 |
| (v / s)_i Volume / Saturation Flow Rate | 0.24 | 0.17 | 0.02 | 0.01 | 0.23 | 0.05 | 0.18 | 0.13 |
| s, saturation flow rate [veh/h] | 930 | 1683 | 1431 | 948 | 1672 | 1658 | 1431 | 787 |
| c, Capacity [veh/h] | 646 | 1095 | 931 | 555 | 974 | 426 | 309 | 279 |
| d1, Uniform Delay [s] | 6.80 | 4.44 | 3.75 | 8.84 | 6.83 | 19.39 | 22.41 | 22.72 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.44 | 0.60 | 0.07 | 0.03 | 1.24 | 0.22 | 5.43 | 0.77 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.34 | 0.27 | 0.04 | 0.01 | 0.40 | 0.19 | 0.82 | 0.36 |
| d, Delay for Lane Group [s/veh] | 8.25 | 5.04 | 3.82 | 8.87 | 8.07 | 19.61 | 27.84 | 23.49 |
| Lane Group LOS | A | A | A | A | A | B | C | C |
| Critical Lane Group | No | No | No | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.00 | 1.20 | 0.12 | 0.04 | 2.38 | 0.91 | 3.60 | 1.26 |
| 50th-Percentile Queue Length [m/ln] | 7.60 | 9.18 | 0.88 | 0.27 | 18.17 | 6.95 | 27.42 | 9.63 |
| 95th-Percentile Queue Length [veh/ln] | 1.80 | 2.17 | 0.21 | 0.06 | 4.29 | 1.64 | 6.48 | 2.28 |
| 95th-Percentile Queue Length [m/ln] | 13.68 | 16.52 | 1.59 | 0.48 | 32.71 | 12.50 | 49.36 | 17.34 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.25 | 5.04 | 3.82 | 8.87 | 8.07 | 8.07 | 19.61 | 19.61 | 27.84 | 23.49 | 23.49 | 23.49 |
| Movement LOS | A | A | A | A | A | A | B | B | C | C | C | C |
| d_A, Approach Delay [s/veh] | 6.26 | | | 8.08 | | | 25.81 | | | 23.49 | | |
| Approach LOS | A | | | A | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 12.79 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.412 | | | | | | | | | | | |

**Emissions**

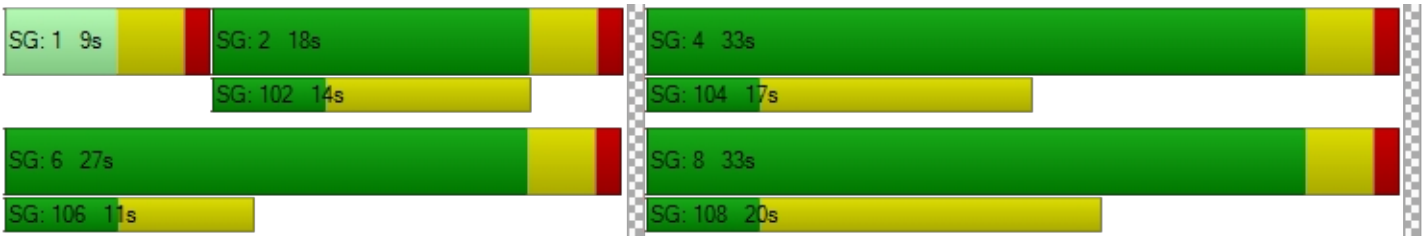
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 29.21 | 38.73 | 4.36 | 0.90 | 70.74 | 25.95 | 79.42 | 27.51 |
| Stops [stops/h] | 59.85 | 72.27 | 6.94 | 2.10 | 143.08 | 54.70 | 215.90 | 75.84 |
| Fuel consumption [L/h] | 5.53 | 6.44 | 0.67 | 0.17 | 12.38 | 4.95 | 17.85 | 6.11 |
| CO [g/h] | 102.03 | 118.96 | 12.33 | 3.09 | 228.53 | 91.41 | 329.55 | 112.83 |
| NOx [g/h] | 19.85 | 23.15 | 2.40 | 0.60 | 44.46 | 17.78 | 64.12 | 21.95 |
| VOC [g/h] | 23.65 | 27.57 | 2.86 | 0.72 | 52.97 | 21.18 | 76.38 | 26.15 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 21.68 | 21.68 | 21.68 | 21.68 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.649 | 2.173 | 2.313 | 1.808 |
| Crosswalk LOS | B | B | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 767 | 467 | 967 | 967 |
| d_b, Bicycle Delay [s] | 11.41 | 17.63 | 8.01 | 8.01 |
| l_b,int, Bicycle LOS Score for Intersection | 2.462 | 2.215 | 2.116 | 1.723 |
| Bicycle LOS | B | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 5: N Park Dr & Quartz Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.405 |

**Intersection Setup**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 33 | 0 | 10 | 50 | 0 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 280 | 5 | 0 | 291 | 6 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 62 | 0 | 0 | 62 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 33 | 342 | 15 | 50 | 353 | 16 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 86 | 4 | 13 | 88 | 4 |
| Total Analysis Volume [veh/h] | 33 | 342 | 15 | 50 | 353 | 16 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.01 | 0.00 | 0.40 | 0.02 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 8.06 | 0.00 | 11.91 | 8.51 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.03 | 0.03 | 1.98 | 0.05 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.19 | 0.19 | 15.09 | 0.36 |
| d_A, Approach Delay [s/veh] | 0.00 | | 1.86 | | 11.76 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 5.51 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 7: Quartz Ave & Site Access #2**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 27.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.705 |

**Intersection Setup**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 296 | 108 | 0 | 285 | 135 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 62 | 0 | 0 | 62 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 358 | 108 | 0 | 347 | 135 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 90 | 27 | 0 | 87 | 34 | 0 |
| Total Analysis Volume [veh/h] | 358 | 108 | 0 | 347 | 135 | 0 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.70 | 0.12 | 0.00 | 0.00 | 0.11 | 0.00 |
| d_M, Delay for Movement [s/veh] | 27.25 | 9.72 | 0.00 | 0.00 | 8.34 | 0.00 |
| Movement LOS | D | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 5.53 | 0.42 | 0.00 | 0.00 | 0.38 | 0.38 |
| 95th-Percentile Queue Length [m/ln] | 42.12 | 3.23 | 0.00 | 0.00 | 2.86 | 2.86 |
| d_A, Approach Delay [s/veh] | 23.19 | | 0.00 | | 8.34 | |
| Approach LOS | C | | A | | A | |
| d_I, Intersection Delay [s/veh] | 12.59 | | | | | |
| Intersection LOS | D | | | | | |

**Intersection Level Of Service Report**
**Intersection 8: 28 St & Site Access #1**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 20.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.778 |

**Intersection Setup**

| Name | 28 St | | 28 St | | Site Access #1 | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | 28 St | | 28 St | | Site Access #1 | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 621 | 135 | 108 | 0 | 0 | 674 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 62 | 0 | 0 | 0 | 0 | 62 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 683 | 135 | 108 | 0 | 0 | 736 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 171 | 34 | 27 | 0 | 0 | 184 |
| Total Analysis Volume [veh/h] | 683 | 135 | 108 | 0 | 0 | 736 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.46 | 0.00 | 0.00 | 0.00 | 0.00 | 0.78 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 9.48 | 0.00 | 0.00 | 0.00 | 62.95 | 20.73 |
| Movement LOS | A | A | A | A | F | C |
| 95th-Percentile Queue Length [veh/ln] | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 8.05 |
| 95th-Percentile Queue Length [m/ln] | 19.05 | 0.00 | 0.00 | 0.00 | 0.00 | 61.35 |
| d_A, Approach Delay [s/veh] | 7.92 | | 0.00 | | 20.73 | |
| Approach LOS | A | | A | | C | |
| d_I, Intersection Delay [s/veh] | 13.08 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 9: Slate Ave & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.005 |

**Intersection Setup**

| Name | N Park Dr | | N Park Dr | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | N Park Dr | | N Park Dr | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 6 | 0 | 0 | 0 | 0 | 5 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 11 | 5 | 5 | 5 | 5 | 10 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 1 | 1 | 1 | 1 | 3 |
| Total Analysis Volume [veh/h] | 11 | 5 | 5 | 5 | 5 | 10 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.25 | 0.00 | 0.00 | 0.00 | 8.76 | 8.40 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.02 | 0.02 | 0.00 | 0.00 | 0.04 | 0.04 |
| 95th-Percentile Queue Length [m/ln] | 0.14 | 0.14 | 0.00 | 0.00 | 0.34 | 0.34 |
| d_A, Approach Delay [s/veh] | 4.98 | | 0.00 | | 8.52 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 5.06 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 10: Quartz Ave & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way yield | Delay (sec / veh): | 4.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.100 |

**Intersection Setup**

| Name | 28 St | | 28 St | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | 28 St | | 28 St | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 135 | 0 | 0 | 0 | 0 | 108 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 135 | 0 | 0 | 0 | 0 | 108 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 34 | 0 | 0 | 0 | 0 | 27 |
| Total Analysis Volume [veh/h] | 135 | 0 | 0 | 0 | 0 | 108 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 |
| d_M, Delay for Movement [s/veh] | 2.83 | 0.00 | 0.00 | 0.00 | 0.00 | 4.18 |
| Movement LOS | A | | A | A | | A |
| 95th-Percentile Queue Length [veh/ln] | 0.27 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 |
| 95th-Percentile Queue Length [m/ln] | 2.07 | 0.00 | 0.00 | 0.00 | 0.00 | 2.52 |
| d_A, Approach Delay [s/veh] | 2.83 | | 0.00 | | 4.18 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 3.43 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 11: N Park Dr & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 0.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.000 |

**Intersection Setup**

| Name | Keystone Dr | N Park Dr |
|---|---|---|
| Approach | Southbound | Eastbound |
| Lane Configuration |  |  |
| Turning Movement | Right | Left |
| Lane Width [m] | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | 50.00 |
| Grade [%] | 0.00 | 0.00 |
| Crosswalk | No | No |

**Volumes**

| Name | Keystone Dr | N Park Dr |
|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 5 |
| Peak Hour Factor | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 1 |
| Total Analysis Volume [veh/h] | 5 | 5 |
| Pedestrian Volume [ped/h] | 0 | 0 |

**Intersection Settings**

| | | |
|---|---|---|
| Priority Scheme | Free | Free |
| Flared Lane | | |
| Storage Area [veh] | 0 | 0 |
| Two-Stage Gap Acceptance | | |
| Number of Storage Spaces in Median | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | |
|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 |
| Movement LOS | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 0.00 | 0.00 |
| Approach LOS | A | A |
| d_I, Intersection Delay [s/veh] | 0.00 | |
| Intersection LOS | A | |

**Intersection Level Of Service Report**
**Intersection 20: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.036 |

**Intersection Setup**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 10 | 5 | 200 | 240 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 9 | 10 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 20 | 10 | 5 | 209 | 250 | 5 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 3 | 1 | 52 | 63 | 1 |
| Total Analysis Volume [veh/h] | 20 | 10 | 5 | 209 | 250 | 5 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 11.87 | 9.88 | 7.75 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.15 | 0.15 | 0.01 | 0.01 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 1.18 | 1.18 | 0.06 | 0.06 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 11.21 | | 0.18 | | 0.00 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 0.75 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 21: Slate Ave & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.005 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 5 | 0 | 0 | 6 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 5 | 10 | 5 | 5 | 11 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 1 | 3 | 1 | 1 | 3 |
| Total Analysis Volume [veh/h] | 5 | 5 | 10 | 5 | 5 | 11 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.25 | 0.00 | 8.75 | 8.40 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.02 | 0.02 | 0.05 | 0.05 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.13 | 0.13 | 0.36 | 0.36 |
| d_A, Approach Delay [s/veh] | 0.00 | | 4.83 | | 8.51 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 5.09 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 22: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.011 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 | 5 | 5 | 5 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 6 | 5 | 5 | 6 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 11 | 10 | 10 | 11 | 10 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 3 | 3 | 3 | 3 | 3 |
| Total Analysis Volume [veh/h] | 5 | 11 | 10 | 10 | 11 | 10 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.26 | 0.00 | 0.00 | 0.00 | 8.77 | 8.46 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.01 | 0.01 | 0.00 | 0.00 | 0.06 | 0.06 |
| 95th-Percentile Queue Length [m/ln] | 0.06 | 0.06 | 0.00 | 0.00 | 0.48 | 0.48 |
| d_A, Approach Delay [s/veh] | 2.27 | | 0.00 | | 8.62 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 3.81 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 23: Boulder Blvd & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.046 |

**Intersection Setup**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 240 | 10 | 10 | 20 | 20 | 120 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 4 | 6 | 5 | 0 | 0 | 4 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 244 | 16 | 15 | 20 | 20 | 124 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 61 | 4 | 4 | 5 | 5 | 31 |
| Total Analysis Volume [veh/h] | 244 | 16 | 15 | 20 | 20 | 124 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.15 | 0.00 | 0.00 | 0.00 | 0.05 | 0.12 |
| d_M, Delay for Movement [s/veh] | 7.66 | 0.00 | 0.00 | 0.00 | 14.17 | 9.23 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.51 | 0.51 | 0.00 | 0.00 | 0.59 | 0.59 |
| 95th-Percentile Queue Length [m/ln] | 3.91 | 3.91 | 0.00 | 0.00 | 4.47 | 4.47 |
| d_A, Approach Delay [s/veh] | 7.18 | | 0.00 | | 9.92 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 7.51 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 24: Hwy 779 & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 46.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 4.832 |

**Intersection Setup**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 160.00 | 30.48 | 30.48 | 150.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 70.00 | | | 70.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 17 | 372 | 39 | 44 | 407 | 10 | 17 | 5 | 34 | 102 | 17 | 156 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 39 | 0 | 4 | 38 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 17 | 411 | 39 | 48 | 445 | 10 | 17 | 5 | 34 | 102 | 17 | 160 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 103 | 10 | 12 | 111 | 3 | 4 | 1 | 9 | 26 | 4 | 40 |
| Total Analysis Volume [veh/h] | 17 | 411 | 39 | 48 | 445 | 10 | 17 | 5 | 34 | 102 | 17 | 160 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 41 | 0 | 0 | 41 | 0 | 0 | 23 | 0 | 0 | 39 | 0 |
| Amber [s] | 0.0 | 4.3 | 0.0 | 0.0 | 4.3 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 4.3 | 0.0 |
| All red [s] | 0.0 | 1.5 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.5 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 3.8 | 0.0 | 0.0 | 3.8 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 3.8 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 33 | 0 | 0 | 33 | 0 | 0 | 47 | 0 | 0 | 47 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 8 | 0 | 0 | 3 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 5.80 | 5.80 | 5.80 | 5.80 | 4.00 | 4.00 | 5.80 | 5.80 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 3.80 | 3.80 | 3.80 | 3.80 | 0.00 | 2.00 | 3.80 | 3.80 |
| g_i, Effective Green Time [s] | 27 | 27 | 27 | 27 | 43 | 43 | 41 | 41 |
| g / C, Green / Cycle | 0.34 | 0.34 | 0.34 | 0.34 | 0.54 | 0.54 | 0.51 | 0.51 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.27 | 0.06 | 0.27 | 0.13 | 0.02 | 4.56 | 0.11 |
| s, saturation flow rate [veh/h] | 842 | 1658 | 846 | 1676 | 167 | 1431 | 26 | 1431 |
| c, Capacity [veh/h] | 158 | 567 | 158 | 573 | 116 | 766 | 97 | 734 |
| d1, Uniform Delay [s] | 34.53 | 23.78 | 35.87 | 23.78 | 17.99 | 8.83 | 37.03 | 10.67 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.50 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.37 | 10.96 | 4.90 | 10.84 | 0.78 | 0.02 | 164.58 | 0.15 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.11 | 0.79 | 0.30 | 0.79 | 0.19 | 0.04 | 1.23 | 0.22 |
| d, Delay for Lane Group [s/veh] | 35.90 | 34.74 | 40.77 | 34.62 | 18.76 | 8.86 | 201.61 | 10.82 |
| Lane Group LOS | D | C | D | C | B | A | F | B |
| Critical Lane Group | No | Yes | No | No | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.35 | 8.61 | 1.08 | 8.69 | 0.19 | 0.26 | 6.30 | 1.45 |
| 50th-Percentile Queue Length [m/ln] | 2.70 | 65.62 | 8.22 | 66.20 | 1.44 | 1.99 | 48.03 | 11.03 |
| 95th-Percentile Queue Length [veh/ln] | 0.64 | 13.42 | 1.94 | 13.52 | 0.34 | 0.47 | 11.35 | 2.60 |
| 95th-Percentile Queue Length [m/ln] | 4.86 | 102.30 | 14.79 | 103.04 | 2.60 | 3.59 | 86.45 | 19.85 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 35.90 | 34.74 | 34.74 | 40.77 | 34.62 | 34.62 | 18.76 | 18.76 | 8.86 | 201.61 | 201.61 | 10.82 |
| Movement LOS | D | C | C | D | C | C | B | B | A | F | F | B |
| d_A, Approach Delay [s/veh] | 34.79 | | | 35.21 | | | 12.75 | | | 92.20 | | |
| Approach LOS | C | | | D | | | B | | | F | | |
| d_I, Intersection Delay [s/veh] | 46.28 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 4.832 | | | | | | | | | | | |

**Emissions**

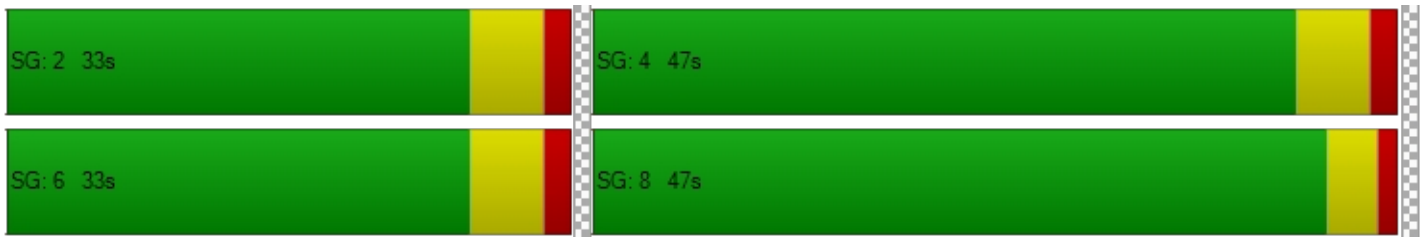
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 13.36 | 353.63 | 10.08 | 95.56 | 1.55 | 2.39 | 61.48 | 82.66 |
| Stops [stops/h] | 15.95 | 387.54 | 48.52 | 390.96 | 8.52 | 11.77 | 283.64 | 65.12 |
| Fuel consumption [L/h] | 2.26 | 57.92 | 4.46 | 37.12 | 0.66 | 0.72 | 30.69 | 10.66 |
| CO [g/h] | 41.75 | 1069.48 | 82.41 | 685.37 | 12.12 | 13.37 | 566.70 | 196.83 |
| NOx [g/h] | 8.12 | 208.08 | 16.03 | 133.35 | 2.36 | 2.60 | 110.26 | 38.30 |
| VOC [g/h] | 9.68 | 247.86 | 19.10 | 158.84 | 2.81 | 3.10 | 131.34 | 45.62 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 0.000 | 0.000 |
| Crosswalk LOS | F | F | F | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 680 | 680 | 1075 | 1030 |
| d_b, Bicycle Delay [s] | 17.42 | 17.42 | 8.56 | 9.41 |
| l_b,int, Bicycle LOS Score for Intersection | 2.330 | 2.390 | 1.652 | 2.020 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Vistro File: C:\...\2025-11-24_North Industrial Development_Updated ASP_FINAL.vistro
Report File: C:\...\Full Buildout (2046)_PM_Background.pdf

Scenario 12 2046_PM_Background Traffic
11/25/2025

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Hwy 16 A & Boundary Rd | Signalized | HCM 7th Edition | WB Left | 0.766 | 43.0 | D |
| 2 | Hwy 16A & 28 St | Signalized | HCM 7th Edition | WB Left | 0.640 | 22.4 | C |
| 3 | Hwy 16A & S Park Dr/N Park Dr | Signalized | HCM 7th Edition | EB Left | 0.750 | 41.5 | D |
| 4 | Boulder Blvd & N Park Dr | Signalized | HCM 7th Edition | EB Right | 0.487 | 18.5 | B |
| 5 | N Park Dr & Quartz Ave | Two-way stop | HCM 7th Edition | WB Left | 0.366 | 12.6 | B |
| 6 | 28 St & Site Access #1 | Two-way stop | HCM 7th Edition | EB Right | 0.589 | 14.0 | B |
| 7 | Quartz Ave & Site Access #2 | Two-way stop | HCM 7th Edition | NB Left | 0.420 | 14.4 | B |
| 8 | Quartz Ave & 28 St | Two-way stop | HCM 7th Edition | EB Right | 0.001 | 0.0 | A |
| 9 | Slate Ave & N Park Dr | Two-way stop | HCM 7th Edition | EB Left | 0.011 | 8.9 | A |
| 11 | N Park Dr & Keystone Dr | Two-way stop | HCM 7th Edition | SB Right | 0.000 | 0.0 | A |
| 20 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | SB Left | 0.026 | 14.7 | B |
| 21 | Slate Ave & Golf Course Rd | Two-way stop | HCM 7th Edition | WB Left | 0.011 | 8.9 | A |
| 22 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | EB Left | 0.011 | 8.9 | A |
| 23 | Boulder Blvd & Wood Ave | Two-way stop | HCM 7th Edition | EB Left | 0.074 | 18.4 | C |
| 24 | Hwy 779 & Wood Ave | Signalized | HCM 7th Edition | EB Left | 0.673 | 21.6 | C |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Hwy 16 A & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 43.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.766 |

**Intersection Setup**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 100.00 | 50.00 | 30.48 | 50.00 | 100.00 | 30.48 | 160.00 | 150.00 | 30.48 | 75.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 48.28 | | | 50.00 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 103 | 6 | 418 | 20 | 200 | 139 | 156 | 1919 | 126 | 660 | 1760 | 50 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 126 | 0 | 0 | 0 | 0 | 0 | 0 | 217 | 130 | 0 | 210 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 229 | 6 | 418 | 20 | 200 | 139 | 156 | 2136 | 256 | 660 | 1970 | 50 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 57 | 2 | 105 | 5 | 50 | 35 | 39 | 534 | 64 | 165 | 493 | 13 |
| Total Analysis Volume [veh/h] | 229 | 6 | 418 | 20 | 200 | 139 | 156 | 2136 | 256 | 660 | 1970 | 50 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 130 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 115.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 16 | 30 | 0 | 16 | 30 | 0 | 16 | 41 | 0 | 16 | 52 | 0 |
| Amber [s] | 3.5 | 5.2 | 0.0 | 3.5 | 5.2 | 0.0 | 3.0 | 5.2 | 0.0 | 3.0 | 5.2 | 0.0 |
| All red [s] | 1.8 | 1.8 | 0.0 | 1.8 | 1.8 | 0.0 | 1.8 | 1.8 | 0.0 | 1.8 | 1.8 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 33 | 0 | 0 | 33 | 0 | 0 | 21 | 0 | 0 | 18 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.3 | 5.0 | 0.0 | 3.3 | 5.0 | 0.0 | 2.8 | 5.0 | 0.0 | 2.8 | 5.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 13 | 45 | 0 | 13 | 45 | 0 | 12 | 48 | 0 | 24 | 60 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 7 | 15 | 0 | 10 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 7.00 | 7.00 | 7.00 | 7.00 | 4.80 | 7.00 | 4.80 | 7.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 5.00 | 0.00 | 5.00 | 2.80 | 5.00 | 2.80 | 5.00 |
| g_i, Effective Green Time [s] | 23 | 14 | 23 | 10 | 7 | 69 | 19 | 81 |
| g / C, Green / Cycle | 0.18 | 0.11 | 0.18 | 0.08 | 0.06 | 0.53 | 0.15 | 0.62 |
| (v / s)_i Volume / Saturation Flow Rate | 0.16 | 0.00 | 0.01 | 0.06 | 0.05 | 0.42 | 0.19 | 0.39 |
| s, saturation flow rate [veh/h] | 1467 | 3560 | 1521 | 3560 | 3459 | 5094 | 3459 | 5094 |
| c, Capacity [veh/h] | 283 | 389 | 352 | 277 | 192 | 2700 | 511 | 3170 |
| d1, Uniform Delay [s] | 52.83 | 51.68 | 44.45 | 58.58 | 60.74 | 24.73 | 55.40 | 15.12 |
| k, delay calibration | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 | 0.16 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 21.58 | 0.02 | 0.07 | 3.56 | 8.12 | 2.46 | 136.19 | 0.93 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.81 | 0.02 | 0.06 | 0.72 | 0.81 | 0.79 | 1.29 | 0.62 |
| d, Delay for Lane Group [s/veh] | 74.41 | 51.69 | 44.52 | 62.15 | 68.86 | 27.19 | 191.59 | 16.05 |
| Lane Group LOS | E | D | D | E | E | C | F | B |
| Critical Lane Group | Yes | No | No | Yes | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 8.75 | 0.09 | 0.55 | 3.36 | 2.77 | 17.87 | 18.02 | 11.77 |
| 50th-Percentile Queue Length [m/ln] | 66.64 | 0.68 | 4.18 | 25.58 | 21.08 | 136.18 | 137.32 | 89.71 |
| 95th-Percentile Queue Length [veh/ln] | 13.60 | 0.16 | 0.99 | 6.04 | 4.98 | 24.81 | 27.85 | 17.40 |
| 95th-Percentile Queue Length [m/ln] | 103.60 | 1.22 | 7.52 | 46.04 | 37.95 | 189.01 | 212.20 | 132.58 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 74.41 | 51.69 | 0.00 | 44.52 | 62.15 | 0.00 | 68.86 | 27.19 | 0.00 | 191.59 | 16.05 | 0.00 |
| Movement LOS | E | D | | D | E | | E | C | | F | B | |
| d_A, Approach Delay [s/veh] | 26.57 | | | 37.10 | | | 27.01 | | | 58.98 | | |
| Approach LOS | C | | | D | | | C | | | E | | |
| d_I, Intersection Delay [s/veh] | 43.04 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.766 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 52.67 | 1.38 | 8.30 | 82.96 | 104.68 | 1433.30 | 147.53 | 440.36 |
| Stops [stops/h] | 242.18 | 4.92 | 15.18 | 185.90 | 153.24 | 1484.74 | 998.07 | 978.02 |
| Fuel consumption [L/h] | 23.29 | 0.48 | 1.82 | 21.64 | 21.61 | 214.58 | 132.55 | 87.45 |
| CO [g/h] | 430.06 | 8.78 | 33.53 | 399.54 | 399.13 | 3962.32 | 2447.58 | 1614.80 |
| NOx [g/h] | 83.67 | 1.71 | 6.52 | 77.74 | 77.66 | 770.92 | 476.21 | 314.18 |
| VOC [g/h] | 99.67 | 2.03 | 7.77 | 92.60 | 92.50 | 918.31 | 567.25 | 374.25 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 56.31 | 56.31 | 56.31 | 56.31 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.650 | 2.536 | 3.496 | 3.456 |
| Crosswalk LOS | B | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 585 | 585 | 631 | 815 |
| d_b, Bicycle Delay [s] | 32.55 | 32.55 | 30.47 | 22.80 |
| l_b,int, Bicycle LOS Score for Intersection | 1.753 | 1.741 | 2.820 | 3.006 |
| Bicycle LOS | A | A | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 2: Hwy 16A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 22.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.640 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 50.00 | 75.00 | 30.48 | 75.00 | 150.00 | 30.48 | 100.00 | 150.00 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 200.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | No | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 30 | 0 | 264 | 0 | 0 | 0 | 0 | 1938 | 78 | 175 | 1826 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 42 | 0 | 347 | 43 | 204 | 190 | 0 | 0 | 0 | 0 | 336 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 46 | 0 | 0 | 0 | 0 | -46 | 46 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 30 | 42 | 264 | 347 | 43 | 250 | 190 | 1938 | 78 | 175 | 1780 | 382 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 11 | 66 | 87 | 11 | 63 | 48 | 485 | 20 | 44 | 445 | 96 |
| Total Analysis Volume [veh/h] | 30 | 42 | 264 | 347 | 43 | 250 | 190 | 1938 | 78 | 175 | 1780 | 382 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 130 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 65.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 7 | 33 | 0 | 20 | 48 | 0 | 28 | 49 | 0 | 20 | 41 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 30 | 0 | 0 | 30 | 0 | 0 | 12 | 0 | 0 | 18 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.0 | 3.5 | 0.0 | 3.0 | 3.5 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 12 | 51 | 0 | 18 | 57 | 0 | 32 | 14 | 0 | 47 | 29 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 12 | 10 | 0 | 12 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 5.50 | 5.50 | 5.50 | 5.50 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 3.50 | 0.00 | 3.50 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 26 | 8 | 26 | 16 | 16 | 76 | 15 | 75 |
| g / C, Green / Cycle | 0.20 | 0.06 | 0.20 | 0.12 | 0.12 | 0.58 | 0.11 | 0.57 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.02 | 0.21 | 0.02 | 0.11 | 0.38 | 0.10 | 0.35 |
| s, saturation flow rate [veh/h] | 1486 | 1870 | 1621 | 1870 | 1781 | 5094 | 1781 | 5094 |
| c, Capacity [veh/h] | 356 | 114 | 382 | 235 | 218 | 2962 | 205 | 2923 |
| d1, Uniform Delay [s] | 42.37 | 58.61 | 52.78 | 50.88 | 56.01 | 18.37 | 56.47 | 18.14 |
| k, delay calibration | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.10 | 1.96 | 8.40 | 0.37 | 10.15 | 1.14 | 9.74 | 0.95 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.08 | 0.37 | 0.91 | 0.18 | 0.87 | 0.65 | 0.85 | 0.61 |
| d, Delay for Lane Group [s/veh] | 42.47 | 60.57 | 61.18 | 51.25 | 66.16 | 19.51 | 66.21 | 19.10 |
| Lane Group LOS | D | E | E | D | E | B | E | B |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.80 | 1.40 | 12.11 | 1.29 | 6.74 | 13.03 | 6.20 | 11.64 |
| 50th-Percentile Queue Length [m/ln] | 6.13 | 10.64 | 92.30 | 9.81 | 51.37 | 99.31 | 47.23 | 88.70 |
| 95th-Percentile Queue Length [veh/ln] | 1.45 | 2.51 | 17.82 | 2.32 | 11.00 | 18.95 | 10.28 | 17.24 |
| 95th-Percentile Queue Length [m/ln] | 11.03 | 19.14 | 135.79 | 17.67 | 83.82 | 144.42 | 78.34 | 131.34 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 42.47 | 60.57 | 0.00 | 61.18 | 51.25 | 0.00 | 66.16 | 19.51 | 0.00 | 66.21 | 19.10 | 0.00 |
| Movement LOS | D | E | | E | D | | E | B | | E | B | |
| d_A, Approach Delay [s/veh] | 11.36 | | | 36.62 | | | 22.84 | | | 19.50 | | |
| Approach LOS | B | | | D | | | C | | | B | | |
| d_I, Intersection Delay [s/veh] | 22.40 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.640 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 4.83 | 6.77 | 59.60 | 7.39 | 120.07 | 1224.73 | 117.43 | 1194.42 |
| Stops [stops/h] | 22.28 | 38.65 | 335.44 | 35.67 | 186.68 | 1082.67 | 171.64 | 967.08 |
| Fuel consumption [L/h] | 1.92 | 3.42 | 29.14 | 3.16 | 25.21 | 170.36 | 23.88 | 162.07 |
| CO [g/h] | 35.37 | 63.21 | 538.06 | 58.32 | 465.56 | 3145.79 | 441.04 | 2992.64 |
| NOx [g/h] | 6.88 | 12.30 | 104.69 | 11.35 | 90.58 | 612.06 | 85.81 | 582.26 |
| VOC [g/h] | 8.20 | 14.65 | 124.70 | 13.52 | 107.90 | 729.07 | 102.22 | 693.57 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 56.31 | 0.00 | 56.31 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 2.302 | 0.000 | 3.470 |
| Crosswalk LOS | F | B | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 700 | 792 | 154 | 385 |
| d_b, Bicycle Delay [s] | 27.46 | 23.70 | 55.38 | 42.40 |
| l_b,int, Bicycle LOS Score for Intersection | 1.678 | 2.203 | 2.730 | 2.635 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**

**Intersection 3: Hwy 16A & S Park Dr/N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 41.5 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.750 |

**Intersection Setup**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.50 | 3.66 | 3.66 | 3.50 | 3.66 |
| No. of Lanes in Entry Pocket | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 170.00 | 30.48 | 400.00 | 250.00 | 30.48 | 160.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 338 | 106 | 345 | 315 | 139 | 61 | 33 | 1356 | 314 | 463 | 1197 | 197 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.50 | 0.50 | 2.00 | 2.00 | 0.50 | 0.50 | 0.50 | 0.00 | 0.50 | 2.00 | 0.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 34 | 8 | 0 | 30 | 174 | 182 | 182 | 0 | 13 | 191 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 46 | 0 | 0 | 46 | -46 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 338 | 140 | 353 | 361 | 169 | 235 | 261 | 1492 | 314 | 476 | 1388 | 197 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 85 | 35 | 88 | 90 | 42 | 59 | 65 | 373 | 79 | 119 | 347 | 49 |
| Total Analysis Volume [veh/h] | 338 | 140 | 353 | 361 | 169 | 235 | 261 | 1492 | 314 | 476 | 1388 | 197 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 130 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 36 | 53 | 0 | 20 | 37 | 0 | 41 | 28 | 0 | 23 | 10 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 32 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 19 | 38 | 0 | 22 | 41 | 0 | 17 | 46 | 0 | 24 | 53 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 7 | 15 | 0 | 7 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 14 | 31 | 31 | 16 | 32 | 32 | 12 | 48 | 20 | 56 |
| g / C, Green / Cycle | 0.11 | 0.24 | 0.24 | 0.12 | 0.25 | 0.25 | 0.09 | 0.37 | 0.15 | 0.43 |
| (v / s)_i Volume / Saturation Flow Rate | 0.10 | 0.07 | 0.22 | 0.10 | 0.09 | 0.15 | 0.07 | 0.29 | 0.14 | 0.27 |
| s, saturation flow rate [veh/h] | 3500 | 1892 | 1609 | 3459 | 1892 | 1609 | 3500 | 5176 | 3459 | 5176 |
| c, Capacity [veh/h] | 389 | 447 | 380 | 417 | 465 | 396 | 314 | 1907 | 524 | 2226 |
| d1, Uniform Delay [s] | 56.85 | 40.93 | 48.56 | 56.12 | 40.59 | 43.28 | 58.19 | 36.42 | 54.27 | 28.85 |
| k, delay calibration | 0.11 | 0.11 | 0.12 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.03 | 0.40 | 11.17 | 5.49 | 0.48 | 1.43 | 5.63 | 3.28 | 6.41 | 1.33 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.87 | 0.31 | 0.93 | 0.87 | 0.36 | 0.59 | 0.83 | 0.78 | 0.91 | 0.62 |
| d, Delay for Lane Group [s/veh] | 62.88 | 41.32 | 59.73 | 61.62 | 41.06 | 44.71 | 63.82 | 39.70 | 60.68 | 30.18 |
| Lane Group LOS | E | D | E | E | D | D | E | D | E | C |
| Critical Lane Group | No | No | Yes | Yes | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 5.78 | 3.77 | 12.33 | 6.13 | 4.57 | 6.85 | 4.35 | 13.87 | 7.88 | 10.89 |
| 50th-Percentile Queue Length [m/ln] | 44.06 | 28.77 | 93.92 | 46.70 | 34.84 | 52.16 | 33.13 | 105.67 | 60.05 | 82.96 |
| 95th-Percentile Queue Length [veh/ln] | 9.73 | 6.79 | 18.08 | 10.19 | 8.08 | 11.14 | 7.77 | 19.97 | 12.48 | 16.30 |
| 95th-Percentile Queue Length [m/ln] | 74.11 | 51.78 | 137.79 | 77.64 | 61.56 | 84.86 | 59.19 | 152.20 | 95.13 | 124.19 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 62.88 | 41.32 | 59.73 | 61.62 | 41.06 | 44.71 | 63.82 | 39.70 | 0.00 | 60.68 | 30.18 | 0.00 |
| Movement LOS | E | D | E | E | D | D | E | D | | E | C | |
| d_A, Approach Delay [s/veh] | 57.91 | | | 51.88 | | | 36.72 | | | 34.34 | | |
| Approach LOS | E | | | D | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 41.47 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.750 | | | | | | | | | | | |

**Emissions**

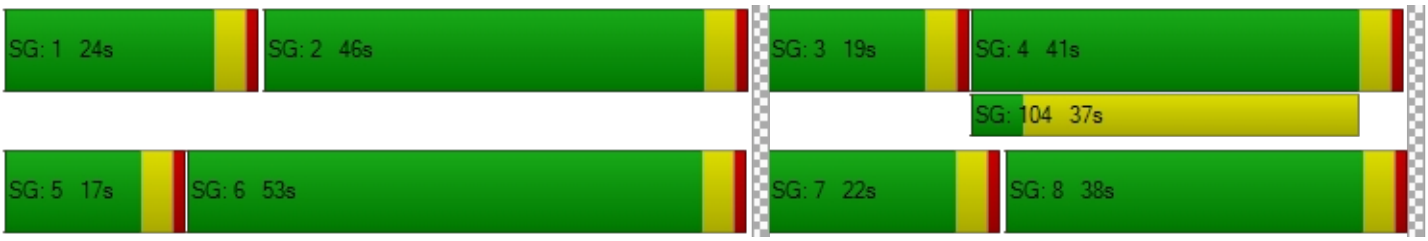
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 44.25 | 18.33 | 46.21 | 47.71 | 22.34 | 31.06 | 397.31 | 2271.19 | 300.81 | 877.16 |
| Stops [stops/h] | 320.25 | 104.54 | 341.31 | 339.42 | 126.60 | 189.57 | 240.83 | 1152.05 | 436.43 | 904.47 |
| Fuel consumption [L/h] | 27.76 | 8.55 | 28.29 | 29.29 | 10.31 | 15.30 | 57.98 | 290.83 | 71.03 | 153.36 |
| CO [g/h] | 512.69 | 157.79 | 522.44 | 540.79 | 190.38 | 282.54 | 1070.65 | 5370.38 | 1311.54 | 2831.84 |
| NOx [g/h] | 99.75 | 30.70 | 101.65 | 105.22 | 37.04 | 54.97 | 208.31 | 1044.88 | 255.18 | 550.97 |
| VOC [g/h] | 118.82 | 36.57 | 121.08 | 125.33 | 44.12 | 65.48 | 248.13 | 1244.64 | 303.96 | 656.31 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 56.31 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 3.585 | 0.000 |
| Crosswalk LOS | F | F | D | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 523 | 569 | 646 | 754 |
| d_b, Bicycle Delay [s] | 35.45 | 33.27 | 29.78 | 25.23 |
| l_b,int, Bicycle LOS Score for Intersection | 2.356 | 2.302 | 2.524 | 2.696 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Boulder Blvd & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.5 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.487 |

**Intersection Setup**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 276 | 27 | 41 | 10 | 44 | 5 | 3 | 12 | 318 | 100 | 21 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 215 | 0 | 0 | 204 | 22 | 11 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 46 | 0 | 0 | 46 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 276 | 288 | 41 | 10 | 294 | 27 | 14 | 12 | 318 | 100 | 21 | 2 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 69 | 72 | 10 | 3 | 74 | 7 | 4 | 3 | 80 | 25 | 5 | 1 |
| Total Analysis Volume [veh/h] | 276 | 288 | 41 | 10 | 294 | 27 | 14 | 12 | 318 | 100 | 21 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 5 | 23 | 0 | 0 | 14 | 0 | 0 | 29 | 0 | 0 | 29 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 6 | 0 | 0 | 9 | 0 | 0 | 15 | 0 | 0 | 12 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 9 | 35 | 0 | 0 | 26 | 0 | 0 | 55 | 0 | 0 | 55 | 0 |
| Lead / Lag | Lead | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | | No | | | No | | | No | |
| Maximum Recall | No | No | | | No | | | No | | | No | |
| Pedestrian Recall | No | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | C | R | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 60 | 60 | 60 | 51 | 51 | 22 | 22 | 22 |
| g / C, Green / Cycle | 0.66 | 0.66 | 0.66 | 0.56 | 0.56 | 0.25 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.27 | 0.17 | 0.03 | 0.01 | 0.19 | 0.02 | 0.22 | 0.13 |
| s, saturation flow rate [veh/h] | 1029 | 1683 | 1431 | 946 | 1658 | 1476 | 1431 | 948 |
| c, Capacity [veh/h] | 684 | 1115 | 948 | 512 | 933 | 428 | 355 | 308 |
| d1, Uniform Delay [s] | 7.08 | 6.18 | 5.27 | 13.40 | 10.67 | 25.82 | 32.69 | 30.24 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.77 | 0.56 | 0.09 | 0.07 | 1.01 | 0.06 | 7.98 | 0.84 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.40 | 0.26 | 0.04 | 0.02 | 0.34 | 0.06 | 0.89 | 0.40 |
| d, Delay for Lane Group [s/veh] | 8.85 | 6.74 | 5.36 | 13.47 | 11.68 | 25.88 | 40.67 | 31.08 |
| Lane Group LOS | A | A | A | B | B | C | D | C |
| Critical Lane Group | Yes | No | No | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.17 | 2.08 | 0.25 | 0.12 | 3.44 | 0.43 | 7.28 | 2.36 |
| 50th-Percentile Queue Length [m/ln] | 16.50 | 15.86 | 1.94 | 0.89 | 26.22 | 3.25 | 55.44 | 17.95 |
| 95th-Percentile Queue Length [veh/ln] | 3.90 | 3.75 | 0.46 | 0.21 | 6.19 | 0.77 | 11.70 | 4.24 |
| 95th-Percentile Queue Length [m/ln] | 29.71 | 28.54 | 3.49 | 1.61 | 47.20 | 5.84 | 89.15 | 32.31 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.85 | 6.74 | 5.36 | 13.47 | 11.68 | 11.68 | 25.88 | 25.88 | 40.67 | 31.08 | 31.08 | 31.08 |
| Movement LOS | A | A | A | B | B | B | C | C | D | C | C | C |
| d_A, Approach Delay [s/veh] | 7.61 | | | 11.73 | | | 39.55 | | | 31.08 | | |
| Approach LOS | A | | | B | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 18.47 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.487 | | | | | | | | | | | |

**Emissions**

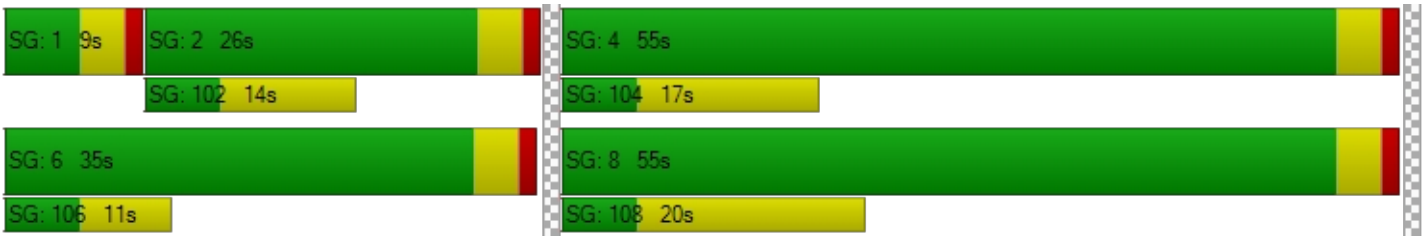
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 36.48 | 38.06 | 5.42 | 1.80 | 57.93 | 8.13 | 99.43 | 34.18 |
| Stops [stops/h] | 86.64 | 83.23 | 10.17 | 4.70 | 137.64 | 17.04 | 291.04 | 94.24 |
| Fuel consumption [L/h] | 7.30 | 6.98 | 0.91 | 0.38 | 11.49 | 1.67 | 25.95 | 8.31 |
| CO [g/h] | 134.74 | 128.96 | 16.86 | 7.03 | 212.12 | 30.91 | 479.19 | 153.46 |
| NOx [g/h] | 26.21 | 25.09 | 3.28 | 1.37 | 41.27 | 6.01 | 93.23 | 29.86 |
| VOC [g/h] | 31.23 | 29.89 | 3.91 | 1.63 | 49.16 | 7.16 | 111.06 | 35.57 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.710 | 2.175 | 2.396 | 1.824 |
| Crosswalk LOS | B | B | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 689 | 489 | 1133 | 1133 |
| d_b, Bicycle Delay [s] | 19.34 | 25.69 | 8.45 | 8.45 |
| l_b,int, Bicycle LOS Score for Intersection | 2.558 | 2.106 | 2.127 | 1.763 |
| Bicycle LOS | B | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 5: N Park Dr & Quartz Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 12.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.366 |

**Intersection Setup**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 33 | 0 | 10 | 50 | 0 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 226 | 4 | 0 | 226 | 5 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | -21 | 67 | 0 | 0 | 46 | 21 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 12 | 293 | 14 | 50 | 272 | 36 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 73 | 4 | 13 | 68 | 9 |
| Total Analysis Volume [veh/h] | 12 | 293 | 14 | 50 | 272 | 36 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.01 | 0.00 | 0.37 | 0.04 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.88 | 0.00 | 12.61 | 9.23 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.02 | 0.02 | 1.68 | 0.13 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.18 | 0.18 | 12.83 | 0.97 |
| d_A, Approach Delay [s/veh] | 0.00 | | 1.72 | | 12.22 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 5.72 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 6: 28 St & Site Access #1**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.589 |

**Intersection Setup**

| Name | 28 St | | 28 St | | Site Access #1 | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | 28 St | | 28 St | | Site Access #1 | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 492 | 76 | 78 | 0 | 0 | 516 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 46 | 0 | 0 | 46 | 0 | 46 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 538 | 76 | 78 | 46 | 0 | 562 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 135 | 19 | 20 | 12 | 0 | 141 |
| Total Analysis Volume [veh/h] | 538 | 76 | 78 | 46 | 0 | 562 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.37 | 0.00 | 0.00 | 0.00 | 0.00 | 0.59 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.89 | 0.00 | 0.00 | 0.00 | 34.98 | 14.03 |
| Movement LOS | A | A | A | A | D | B |
| 95th-Percentile Queue Length [veh/ln] | 1.72 | 0.00 | 0.00 | 0.00 | 0.00 | 3.98 |
| 95th-Percentile Queue Length [m/ln] | 13.10 | 0.00 | 0.00 | 0.00 | 0.00 | 30.29 |
| d_A, Approach Delay [s/veh] | 7.79 | | 0.00 | | 14.03 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 9.74 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 7: Quartz Ave & Site Access #2**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.420 |

**Intersection Setup**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 231 | 78 | 0 | 230 | 76 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 46 | 0 | 0 | 46 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 277 | 78 | 0 | 276 | 76 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 69 | 20 | 0 | 69 | 19 | 0 |
| Total Analysis Volume [veh/h] | 277 | 78 | 0 | 276 | 76 | 0 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Stop | Free | Free |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.42 | 0.09 | 0.00 | 0.00 | 0.06 | 0.00 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 14.36 | 9.32 | 0.00 | 0.00 | 7.97 | 0.00 |
| Movement LOS | B | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 2.08 | 0.28 | 0.00 | 0.00 | 0.19 | 0.19 |
| 95th-Percentile Queue Length [m/ln] | 15.87 | 2.14 | 0.00 | 0.00 | 1.43 | 1.43 |
| d_A, Approach Delay [s/veh] | 13.25 | | 0.00 | | 7.97 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 7.51 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 8: Quartz Ave & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 0.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.001 |

**Intersection Setup**

| Name | 28 St | Quartz Ave |
|---|---|---|
| Approach | Northbound | Eastbound |
| Lane Configuration |  |  |
| Turning Movement | Left | Right |
| Lane Width [m] | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | 48.28 |
| Grade [%] | 0.00 | 0.00 |
| Crosswalk | Yes | Yes |

**Volumes**

| Name | 28 St | Quartz Ave |
|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 |
| Site-Generated Trips [veh/h] | 76 | 78 |
| Diverted Trips [veh/h] | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 |
| Total Hourly Volume [veh/h] | 76 | 78 |
| Peak Hour Factor | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 19 | 20 |
| Total Analysis Volume [veh/h] | 76 | 78 |
| Pedestrian Volume [ped/h] | 0 | 0 |

**Intersection Settings**

| | | |
|---|---|---|
| Priority Scheme | Free | Free |
| Flared Lane | | |
| Storage Area [veh] | 0 | 0 |
| Two-Stage Gap Acceptance | | |
| Number of Storage Spaces in Median | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | |
|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 |
| Movement LOS | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 0.00 | 0.00 |
| Approach LOS | A | A |
| d_I, Intersection Delay [s/veh] | 0.00 | |
| Intersection LOS | A | |

**Intersection Level Of Service Report**
**Intersection 9: Slate Ave & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.011 |

**Intersection Setup**

| Name | N Park Dr | | N Park Dr | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | N Park Dr | | N Park Dr | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 10 | 10 | 10 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 5 | 0 | 0 | 0 | 0 | 4 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 15 | 10 | 10 | 10 | 10 | 14 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 3 | 3 | 3 | 3 | 4 |
| Total Analysis Volume [veh/h] | 15 | 10 | 10 | 10 | 10 | 14 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 |
| d_M, Delay for Movement [s/veh] | 7.27 | 0.00 | 0.00 | 0.00 | 8.90 | 8.47 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.03 | 0.03 | 0.00 | 0.00 | 0.07 | 0.07 |
| 95th-Percentile Queue Length [m/ln] | 0.19 | 0.19 | 0.00 | 0.00 | 0.56 | 0.56 |
| d_A, Approach Delay [s/veh] | 4.36 | | 0.00 | | 8.65 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.59 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 11: N Park Dr & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 0.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.000 |

**Intersection Setup**

| Name | Keystone Dr | N Park Dr |
|---|---|---|
| Approach | Southbound | Eastbound |
| Lane Configuration |  |  |
| Turning Movement | Right | Left |
| Lane Width [m] | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | 50.00 |
| Grade [%] | 0.00 | 0.00 |
| Crosswalk | Yes | Yes |

**Volumes**

| Name | Keystone Dr | N Park Dr |
|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 |
| Total Hourly Volume [veh/h] | 10 | 10 |
| Peak Hour Factor | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 3 |
| Total Analysis Volume [veh/h] | 10 | 10 |
| Pedestrian Volume [ped/h] | 0 | 0 |

**Intersection Settings**

| | | |
|---|---|---|
| Priority Scheme | Free | Free |
| Flared Lane | | |
| Storage Area [veh] | 0 | 0 |
| Two-Stage Gap Acceptance | | |
| Number of Storage Spaces in Median | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | |
|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 |
| Movement LOS | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 0.00 | 0.00 |
| Approach LOS | A | A |
| d_I, Intersection Delay [s/veh] | 0.00 | |
| Intersection LOS | A | |

**Intersection Level Of Service Report**
**Intersection 20: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.026 |

**Intersection Setup**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 100 | 10 | 250 | 290 | 10 |
| Base Volume Adjustment Factor | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 11 | 22 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 11 | 110 | 11 | 286 | 341 | 11 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 28 | 3 | 72 | 85 | 3 |
| Total Analysis Volume [veh/h] | 11 | 110 | 11 | 286 | 341 | 11 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.03 | 0.16 | 0.01 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 14.67 | 11.39 | 8.00 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.67 | 0.67 | 0.02 | 0.02 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 5.09 | 5.09 | 0.14 | 0.14 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 11.69 | | 0.30 | | 0.00 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 1.95 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 21: Slate Ave & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.011 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 10 | 10 | 10 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 4 | 0 | 0 | 5 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 10 | 10 | 14 | 10 | 10 | 15 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 3 | 4 | 3 | 3 | 4 |
| Total Analysis Volume [veh/h] | 10 | 10 | 14 | 10 | 10 | 15 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.27 | 0.00 | 8.89 | 8.47 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.02 | 0.02 | 0.08 | 0.08 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.18 | 0.18 | 0.58 | 0.58 |
| d_A, Approach Delay [s/veh] | 0.00 | | 4.24 | | 8.64 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.61 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 22: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.011 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 5 | 5 | 20 | 5 | 25 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 5 | 4 | 4 | 5 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 10 | 10 | 9 | 24 | 10 | 25 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 3 | 2 | 6 | 3 | 6 |
| Total Analysis Volume [veh/h] | 10 | 10 | 9 | 24 | 10 | 25 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.29 | 0.00 | 0.00 | 0.00 | 8.91 | 8.53 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.02 | 0.02 | 0.00 | 0.00 | 0.11 | 0.11 |
| 95th-Percentile Queue Length [m/ln] | 0.13 | 0.13 | 0.00 | 0.00 | 0.81 | 0.81 |
| d_A, Approach Delay [s/veh] | 3.65 | | 0.00 | | 8.64 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.26 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 23: Boulder Blvd & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 18.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.074 |

**Intersection Setup**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 300 | 10 | 10 | 20 | 20 | 150 |
| Base Volume Adjustment Factor | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 18 | 5 | 4 | 0 | 0 | 7 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 348 | 16 | 15 | 22 | 22 | 172 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 87 | 4 | 4 | 6 | 6 | 43 |
| Total Analysis Volume [veh/h] | 348 | 16 | 15 | 22 | 22 | 172 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.22 | 0.00 | 0.00 | 0.00 | 0.07 | 0.16 |
| d_M, Delay for Movement [s/veh] | 7.89 | 0.00 | 0.00 | 0.00 | 18.40 | 9.79 |
| Movement LOS | A | A | A | A | C | A |
| 95th-Percentile Queue Length [veh/ln] | 0.81 | 0.81 | 0.00 | 0.00 | 0.92 | 0.92 |
| 95th-Percentile Queue Length [m/ln] | 6.17 | 6.17 | 0.00 | 0.00 | 7.03 | 7.03 |
| d_A, Approach Delay [s/veh] | 7.54 | | 0.00 | | 10.77 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 8.12 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 24: Hwy 779 & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 21.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.673 |

**Intersection Setup**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 160.00 | 30.48 | 30.48 | 150.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 70.00 | | | 70.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 21 | 698 | 49 | 49 | 674 | 12 | 21 | 6 | 43 | 128 | 21 | 195 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.1000 | 1.0000 | 1.1000 | 1.1000 | 1.1000 | 1.0000 | 1.0000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 6.00 | 6.00 | 6.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 18 | 0 | 7 | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 21 | 716 | 49 | 61 | 701 | 13 | 23 | 7 | 43 | 128 | 23 | 233 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 179 | 12 | 15 | 175 | 3 | 6 | 2 | 11 | 32 | 6 | 58 |
| Total Analysis Volume [veh/h] | 21 | 716 | 49 | 61 | 701 | 13 | 23 | 7 | 43 | 128 | 23 | 233 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 70 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 8 | 0 | 7 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 5 | 14 | 0 | 5 | 14 | 0 | 0 | 38 | 0 | 10 | 38 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 9 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 9 | 26 | 0 | 9 | 26 | 0 | 0 | 26 | 0 | 9 | 35 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 0 | 10 | 0 | 5 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 | 2.00 | 0.00 | 2.00 |
| g_i, Effective Green Time [s] | 45 | 38 | 45 | 40 | 8 | 8 | 17 | 17 |
| g / C, Green / Cycle | 0.65 | 0.54 | 0.65 | 0.56 | 0.11 | 0.11 | 0.24 | 0.24 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.46 | 0.08 | 0.43 | 0.11 | 0.03 | 0.15 | 0.17 |
| s, saturation flow rate [veh/h] | 740 | 1664 | 750 | 1678 | 265 | 1431 | 992 | 1385 |
| c, Capacity [veh/h] | 397 | 896 | 373 | 946 | 120 | 160 | 334 | 332 |
| d1, Uniform Delay [s] | 8.81 | 13.80 | 11.14 | 11.59 | 31.12 | 28.48 | 22.60 | 24.30 |
| k, delay calibration | 0.11 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.05 | 10.15 | 0.94 | 5.58 | 1.07 | 0.90 | 0.96 | 2.69 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.05 | 0.85 | 0.16 | 0.75 | 0.25 | 0.27 | 0.45 | 0.70 |
| d, Delay for Lane Group [s/veh] | 8.86 | 23.94 | 12.08 | 17.17 | 32.19 | 29.38 | 23.56 | 26.99 |
| Lane Group LOS | A | C | B | B | C | C | C | C |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.08 | 10.25 | 0.31 | 7.63 | 0.53 | 0.68 | 2.07 | 3.57 |
| 50th-Percentile Queue Length [m/ln] | 0.59 | 78.13 | 2.38 | 58.18 | 4.03 | 5.15 | 15.78 | 27.21 |
| 95th-Percentile Queue Length [veh/ln] | 0.14 | 15.51 | 0.56 | 12.17 | 0.95 | 1.22 | 3.73 | 6.43 |
| 95th-Percentile Queue Length [m/ln] | 1.07 | 118.15 | 4.28 | 92.71 | 7.26 | 9.28 | 28.41 | 48.97 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.86 | 23.94 | 23.94 | 12.08 | 17.17 | 17.17 | 32.19 | 32.19 | 29.38 | 23.56 | 23.56 | 26.99 |
| Movement LOS | A | C | C | B | B | B | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 23.54 | | | 16.77 | | | 30.53 | | | 25.64 | | |
| Approach LOS | C | | | B | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 21.59 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.673 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 16.50 | 601.18 | 12.81 | 149.95 | 2.11 | 3.03 | 78.01 | 120.37 |
| Stops [stops/h] | 4.01 | 527.33 | 16.04 | 392.64 | 27.23 | 34.78 | 106.51 | 183.62 |
| Fuel consumption [L/h] | 1.67 | 86.31 | 2.32 | 38.94 | 1.56 | 2.04 | 12.55 | 20.42 |
| CO [g/h] | 30.75 | 1593.83 | 42.79 | 719.00 | 28.73 | 37.70 | 231.77 | 376.99 |
| NOx [g/h] | 5.98 | 310.10 | 8.33 | 139.89 | 5.59 | 7.33 | 45.09 | 73.35 |
| VOC [g/h] | 7.13 | 369.38 | 9.92 | 166.64 | 6.66 | 8.74 | 53.72 | 87.37 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 0.000 | 0.000 |
| Crosswalk LOS | F | F | F | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 629 | 629 | 629 | 886 |
| d_b, Bicycle Delay [s] | 16.46 | 16.46 | 16.46 | 10.86 |
| l_b,int, Bicycle LOS Score for Intersection | 2.857 | 2.838 | 1.680 | 2.193 |
| Bicycle LOS | C | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Vistro File: C:\...\2025-11-24_North Industrial Development_Updated ASP_FINAL.vistro
Report File: C:\...\Full Buildout (2046)_PM.pdf

Scenario 6 Full Buildout (2046)_PM
11/25/2025

## Intersection Analysis Summary

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Hwy 16 A & Boundary Rd | Signalized | HCM 7th Edition | WB Left | 0.904 | 67.9 | E |
| 2 | Hwy 16A & 28 St | Signalized | HCM 7th Edition | NB Thru | 0.769 | 41.6 | D |
| 3 | Hwy 16A & S Park Dr/N Park Dr | Signalized | HCM 7th Edition | WB Left | 0.889 | 98.3 | F |
| 4 | Boulder Blvd & N Park Dr | Signalized | HCM 7th Edition | EB Right | 0.731 | 22.6 | C |
| 5 | N Park Dr & Quartz Ave | Two-way stop | HCM 7th Edition | WB Left | 0.685 | 31.5 | D |
| 6 | 28 St & Site Access #1 | Signalized | HCM 7th Edition | WB Left | 0.704 | 21.9 | C |
| 7 | Quartz Ave & Site Access #2 | Two-way stop | HCM 7th Edition | NB Left | 0.666 | 31.3 | D |
| 8 | Quartz Ave & 28 St | Signalized | HCM 7th Edition | WB Left | 0.349 | 12.3 | B |
| 9 | Slate Ave & N Park Dr | Two-way stop | HCM 7th Edition | WB Left | 0.245 | 14.6 | B |
| 10 | Slate Ave & 28 St | Signalized | HCM 7th Edition | WB Left | 0.379 | 19.2 | B |
| 11 | N Park Dr & Keystone Dr | Two-way stop | HCM 7th Edition | SB Left | 0.015 | 10.9 | B |
| 12 | N Park Dr & 28 St | Two-way stop | HCM 7th Edition | EB Left | 0.031 | 14.7 | B |
| 13 | N Park Dr & New Road B | Two-way stop | HCM 7th Edition | SB Left | 0.033 | 16.3 | C |
| 14 | N Park Dr & Boundary Rd | Signalized | HCM 7th Edition | EB Left | 0.334 | 5.0 | A |
| 15 | New Road B & Keystone Dr | Two-way stop | HCM 7th Edition | WB Left | 0.046 | 9.1 | A |
| 16 | New Road B & 28 St | Two-way stop | HCM 7th Edition | WB Left | 0.093 | 11.1 | B |
| 17 | Boulder Blvd & Keystone Dr | Two-way stop | HCM 7th Edition | EB Left | 0.021 | 11.0 | B |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 18 | Boulder Blvd & 28 St | Two-way stop | HCM 7th Edition | SB Left | 0.286 | 18.9 | C |
| 19 | Boulder Blvd & Boundary Rd | Two-way stop | HCM 7th Edition | EB Left | 0.308 | 19.9 | C |
| 20 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | SB Left | 0.086 | 15.3 | C |
| 21 | Slate Ave & Golf Course Rd | Two-way stop | HCM 7th Edition | WB Left | 0.013 | 9.7 | A |
| 22 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | NB Left | 0.019 | 12.2 | B |
| 23 | Boulder Blvd & Wood Ave | Two-way stop | HCM 7th Edition | EB Left | 0.275 | 23.8 | C |
| 24 | Hwy 779 & Wood Ave | Signalized | HCM 7th Edition | WB Right | 0.476 | 18.1 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Hwy 16 A & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 67.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.904 |

**Intersection Setup**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 100.00 | 50.00 | 30.48 | 50.00 | 100.00 | 30.48 | 160.00 | 150.00 | 30.48 | 75.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 60.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | No | | | Yes | | |

**Volumes**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 103 | 6 | 418 | 20 | 200 | 139 | 156 | 1919 | 126 | 660 | 1760 | 50 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 200 | 193 | 0 | 362 | 246 | 241 | 234 | 354 | 247 | 0 | 291 | 263 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 303 | 199 | 418 | 382 | 446 | 380 | 390 | 2273 | 373 | 660 | 2051 | 313 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 76 | 50 | 105 | 96 | 112 | 95 | 98 | 568 | 93 | 165 | 513 | 78 |
| Total Analysis Volume [veh/h] | 303 | 199 | 418 | 382 | 446 | 380 | 390 | 2273 | 373 | 660 | 2051 | 313 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 134.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 16 | 35 | 0 | 26 | 45 | 0 | 16 | 30 | 0 | 23 | 38 | 0 |
| Amber [s] | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 | 3.0 | 5.2 | 0.0 | 3.0 | 5.2 | 0.0 |
| All red [s] | 1.5 | 2.1 | 0.0 | 1.5 | 2.1 | 0.0 | 1.8 | 1.8 | 0.0 | 1.8 | 1.8 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.8 | 0.0 | 3.5 | 4.8 | 0.0 | 2.8 | 5.0 | 0.0 | 2.8 | 5.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 22 | 47 | 0 | 22 | 47 | 0 | 21 | 44 | 0 | 27 | 50 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 10 | 15 | 0 | 12 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 6.80 | 6.80 | 6.80 | 6.80 | 4.80 | 7.00 | 4.80 | 7.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.80 | 0.00 | 4.80 | 2.80 | 5.00 | 2.80 | 5.00 |
| g_i, Effective Green Time [s] | 44 | 22 | 44 | 22 | 16 | 56 | 22 | 62 |
| g / C, Green / Cycle | 0.31 | 0.15 | 0.31 | 0.15 | 0.12 | 0.40 | 0.16 | 0.44 |
| (v / s)_i Volume / Saturation Flow Rate | 0.23 | 0.06 | 0.26 | 0.13 | 0.11 | 0.45 | 0.19 | 0.40 |
| s, saturation flow rate [veh/h] | 1328 | 3560 | 1457 | 3560 | 3459 | 5094 | 3459 | 5094 |
| c, Capacity [veh/h] | 396 | 550 | 493 | 550 | 400 | 2022 | 548 | 2241 |
| d1, Uniform Delay [s] | 41.02 | 53.01 | 43.84 | 57.22 | 61.69 | 42.21 | 58.90 | 36.76 |
| k, delay calibration | 0.50 | 0.11 | 0.29 | 0.11 | 0.11 | 0.50 | 0.12 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 13.23 | 0.40 | 6.93 | 2.94 | 15.69 | 62.93 | 96.06 | 7.29 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.77 | 0.36 | 0.78 | 0.81 | 0.97 | 1.12 | 1.20 | 0.92 |
| d, Delay for Lane Group [s/veh] | 54.25 | 53.42 | 50.77 | 60.16 | 77.38 | 105.14 | 154.96 | 44.06 |
| Lane Group LOS | D | D | D | E | E | F | F | D |
| Critical Lane Group | Yes | No | No | Yes | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 10.06 | 3.16 | 12.54 | 7.86 | 7.60 | 33.77 | 16.75 | 22.12 |
| 50th-Percentile Queue Length [m/ln] | 76.62 | 24.06 | 95.57 | 59.89 | 57.91 | 257.36 | 127.63 | 168.54 |
| 95th-Percentile Queue Length [veh/ln] | 15.26 | 5.68 | 18.35 | 12.46 | 12.12 | 47.00 | 25.52 | 29.83 |
| 95th-Percentile Queue Length [m/ln] | 116.25 | 43.31 | 139.83 | 94.93 | 92.36 | 358.13 | 194.47 | 227.31 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 54.25 | 53.42 | 0.00 | 50.77 | 60.16 | 0.00 | 77.38 | 105.14 | 0.00 | 154.96 | 44.06 | 0.00 |
| Movement LOS | D | D | | D | E | | E | F | | F | D | |
| d_A, Approach Delay [s/veh] | 29.42 | | | 38.27 | | | 88.65 | | | 63.70 | | |
| Approach LOS | C | | | D | | | F | | | E | | |
| d_I, Intersection Delay [s/veh] | 67.90 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.904 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 69.69 | 45.77 | 158.46 | 185.01 | 261.70 | 1525.23 | 147.53 | 458.47 |
| Stops [stops/h] | 258.56 | 162.38 | 322.52 | 404.22 | 390.83 | 2605.46 | 861.38 | 1706.25 |
| Fuel consumption [L/h] | 27.08 | 17.41 | 37.25 | 47.34 | 66.32 | 453.93 | 139.87 | 203.74 |
| CO [g/h] | 499.97 | 321.56 | 687.85 | 874.09 | 1224.66 | 8382.16 | 2582.81 | 3762.18 |
| NOx [g/h] | 97.28 | 62.56 | 133.83 | 170.07 | 238.27 | 1630.86 | 502.52 | 731.98 |
| VOC [g/h] | 115.87 | 74.52 | 159.42 | 202.58 | 283.83 | 1942.65 | 598.59 | 871.92 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 37.0 | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 37.89 | 0.00 | 0.00 | 59.43 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.781 | 0.000 | 0.000 | 4.000 |
| Crosswalk LOS | C | F | F | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 574 | 574 | 529 | 614 |
| d_b, Bicycle Delay [s] | 35.57 | 35.57 | 37.89 | 33.60 |
| l_b,int, Bicycle LOS Score for Intersection | 1.974 | 2.243 | 3.024 | 3.051 |
| Bicycle LOS | A | B | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 2: Hwy 16A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 41.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.769 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 50.00 | 75.00 | 30.48 | 30.48 | 150.00 | 30.48 | 100.00 | 150.00 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 200.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | Yes | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | No | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 30 | 0 | 264 | 0 | 0 | 0 | 0 | 1938 | 78 | 175 | 1826 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 1 | 108 | 21 | 567 | 133 | 550 | 378 | 247 | 7 | 26 | 217 | 488 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 62 | 0 | 109 | 62 | -62 | 0 | 0 | -109 | 109 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | -100 | 0 | 0 | 0 | 0 | 0 | -100 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 31 | 108 | 285 | 629 | 133 | 559 | 440 | 2123 | 85 | 201 | 1934 | 497 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 27 | 71 | 157 | 33 | 140 | 110 | 531 | 21 | 50 | 484 | 124 |
| Total Analysis Volume [veh/h] | 31 | 108 | 285 | 629 | 133 | 559 | 440 | 2123 | 85 | 201 | 1934 | 497 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 81.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 8 | 30 | 0 | 22 | 44 | 0 | 15 | 50 | 0 | 13 | 48 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 27 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 21 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 3.7 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 13 | 41 | 0 | 31 | 59 | 0 | 25 | 35 | 0 | 33 | 43 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 10 | 10 | 0 | 12 | 10 | 0 | 12 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 5.50 | 5.70 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.00 | 3.50 | 3.70 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 41 | 10 | 26 | 31 | 19 | 62 | 18 | 61 |
| g / C, Green / Cycle | 0.29 | 0.07 | 0.18 | 0.22 | 0.14 | 0.45 | 0.13 | 0.44 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.06 | 0.18 | 0.07 | 0.13 | 0.42 | 0.11 | 0.38 |
| s, saturation flow rate [veh/h] | 1364 | 1870 | 3459 | 1870 | 3459 | 5094 | 1781 | 5094 |
| c, Capacity [veh/h] | 409 | 136 | 630 | 415 | 469 | 2264 | 227 | 2222 |
| d1, Uniform Delay [s] | 35.68 | 63.84 | 57.23 | 45.60 | 59.91 | 37.04 | 60.07 | 35.86 |
| k, delay calibration | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 | 0.12 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.08 | 9.79 | 16.32 | 0.44 | 9.32 | 9.04 | 11.55 | 5.00 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.08 | 0.79 | 1.00 | 0.32 | 0.94 | 0.94 | 0.89 | 0.87 |
| d, Delay for Lane Group [s/veh] | 35.76 | 73.63 | 73.55 | 46.04 | 69.23 | 46.07 | 71.61 | 40.86 |
| Lane Group LOS | D | E | E | D | E | D | E | D |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.78 | 4.17 | 12.53 | 3.97 | 8.13 | 23.49 | 7.56 | 19.86 |
| 50th-Percentile Queue Length [m/ln] | 5.96 | 31.77 | 95.45 | 30.21 | 61.93 | 178.99 | 57.61 | 151.35 |
| 95th-Percentile Queue Length [veh/ln] | 1.41 | 7.50 | 18.33 | 7.14 | 12.80 | 31.44 | 12.07 | 27.17 |
| 95th-Percentile Queue Length [m/ln] | 10.74 | 57.19 | 139.68 | 54.38 | 97.56 | 239.56 | 91.97 | 207.04 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 35.76 | 73.63 | 0.00 | 73.55 | 46.04 | 0.00 | 69.23 | 46.07 | 0.00 | 71.61 | 40.86 | 0.00 |
| Movement LOS | D | E | | E | D | | E | D | | E | D | |
| d_A, Approach Delay [s/veh] | 21.37 | | | 39.66 | | | 48.44 | | | 35.49 | | |
| Approach LOS | C | | | D | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 41.64 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.769 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 4.50 | 15.69 | 108.03 | 22.84 | 278.06 | 1341.65 | 134.88 | 1297.76 |
| Stops [stops/h] | 20.13 | 107.21 | 644.24 | 101.96 | 417.98 | 1812.09 | 194.42 | 1532.18 |
| Fuel consumption [L/h] | 1.73 | 10.02 | 60.36 | 9.18 | 69.39 | 285.18 | 32.89 | 251.17 |
| CO [g/h] | 32.01 | 185.06 | 1114.61 | 169.46 | 1281.32 | 5266.06 | 607.25 | 4638.00 |
| NOx [g/h] | 6.23 | 36.01 | 216.86 | 32.97 | 249.30 | 1024.58 | 118.15 | 902.39 |
| VOC [g/h] | 7.42 | 42.89 | 258.32 | 39.27 | 296.96 | 1220.46 | 140.74 | 1074.90 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 61.29 | 0.00 | 61.29 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 2.696 | 0.000 | 3.749 |
| Crosswalk LOS | F | B | F | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 500 | 761 | 404 | 519 |
| d_b, Bicycle Delay [s] | 39.38 | 26.85 | 44.56 | 38.41 |
| l_b,int, Bicycle LOS Score for Intersection | 1.789 | 2.817 | 2.969 | 2.734 |
| Bicycle LOS | A | C | C | B |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 3: Hwy 16A & S Park Dr/N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 98.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.889 |

**Intersection Setup**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.50 | 3.66 | 3.66 | 3.50 | 3.66 |
| No. of Lanes in Entry Pocket | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 170.00 | 30.48 | 400.00 | 250.00 | 30.48 | 160.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 338 | 106 | 345 | 315 | 139 | 61 | 33 | 1356 | 314 | 463 | 1197 | 197 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.50 | 0.50 | 2.00 | 2.00 | 0.50 | 0.50 | 0.50 | 0.00 | 0.50 | 2.00 | 0.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 88 | 74 | 41 | 139 | 430 | 409 | 518 | 0 | 86 | 679 | 3 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 46 | 0 | 0 | 46 | -46 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 338 | 194 | 419 | 402 | 278 | 491 | 488 | 1828 | 314 | 549 | 1876 | 200 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 85 | 49 | 105 | 101 | 70 | 123 | 122 | 457 | 79 | 137 | 469 | 50 |
| Total Analysis Volume [veh/h] | 338 | 194 | 419 | 402 | 278 | 491 | 488 | 1828 | 314 | 549 | 1876 | 200 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Overlap | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | 4,5 | | | | | | |
| Maximum Green [s] | 14 | 39 | 0 | 17 | 42 | 0 | 19 | 46 | 0 | 22 | 49 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.0 | 5.5 | 0.0 | 4.0 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 32 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 3.5 | 4.7 | 0.0 | 3.5 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 18 | 42 | 0 | 23 | 47 | 0 | 23 | 50 | 0 | 25 | 52 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 7 | 15 | 0 | 7 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 5.50 | 6.00 | 6.00 | 5.50 | 6.00 | 5.50 | 6.70 | 5.50 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 3.50 | 4.00 | 4.00 | 3.50 | 4.00 | 3.50 | 4.70 | 3.50 | 4.70 |
| g_i, Effective Green Time [s] | 13 | 36 | 36 | 18 | 41 | 18 | 43 | 20 | 45 |
| g / C, Green / Cycle | 0.09 | 0.26 | 0.26 | 0.13 | 0.29 | 0.13 | 0.31 | 0.14 | 0.32 |
| (v / s)_i Volume / Saturation Flow Rate | 0.10 | 0.10 | 0.26 | 0.12 | 0.08 | 0.14 | 0.35 | 0.16 | 0.36 |
| s, saturation flow rate [veh/h] | 3500 | 1892 | 1609 | 3459 | 3603 | 3500 | 5176 | 3459 | 5176 |
| c, Capacity [veh/h] | 313 | 487 | 414 | 432 | 1055 | 438 | 1601 | 482 | 1675 |
| d1, Uniform Delay [s] | 63.75 | 43.04 | 52.00 | 60.64 | 37.93 | 61.25 | 48.35 | 60.25 | 47.35 |
| k, delay calibration | 0.11 | 0.11 | 0.38 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 49.04 | 0.53 | 41.89 | 9.23 | 0.13 | 59.42 | 71.92 | 68.85 | 62.73 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 1.08 | 0.40 | 1.01 | 0.93 | 0.26 | 1.12 | 1.14 | 1.14 | 1.12 |
| d, Delay for Lane Group [s/veh] | 112.79 | 43.57 | 93.89 | 69.87 | 38.06 | 120.67 | 120.27 | 129.10 | 110.08 |
| Lane Group LOS | F | D | F | E | D | F | F | F | F |
| Critical Lane Group | No | No | Yes | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 7.70 | 5.68 | 19.27 | 7.63 | 3.72 | 11.17 | 28.49 | 12.92 | 28.32 |
| 50th-Percentile Queue Length [m/ln] | 58.69 | 43.30 | 146.81 | 58.11 | 28.34 | 85.14 | 217.10 | 98.42 | 215.78 |
| 95th-Percentile Queue Length [veh/ln] | 12.61 | 9.59 | 26.68 | 12.16 | 6.70 | 17.44 | 40.47 | 19.92 | 39.86 |
| 95th-Percentile Queue Length [m/ln] | 96.06 | 73.09 | 203.29 | 92.62 | 51.02 | 132.88 | 308.42 | 151.79 | 303.75 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 112.79 | 43.57 | 93.89 | 69.87 | 38.06 | 0.00 | 120.67 | 120.27 | 0.00 | 129.10 | 110.08 | 0.00 |
| Movement LOS | F | D | F | E | D | | F | F | | F | F | |
| d_A, Approach Delay [s/veh] | 90.34 | | | 56.87 | | | 105.99 | | | 105.67 | | |
| Approach LOS | F | | | E | | | F | | | F | | |
| d_I, Intersection Delay [s/veh] | 98.29 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |
| Intersection V/C | 0.889 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 44.25 | 25.40 | 54.85 | 53.13 | 36.74 | 742.85 | 2782.66 | 346.94 | 1185.55 |
| Stops [stops/h] | 396.11 | 146.11 | 495.43 | 392.21 | 191.30 | 574.63 | 2197.85 | 664.25 | 2184.49 |
| Fuel consumption [L/h] | 42.46 | 12.20 | 46.63 | 35.49 | 15.94 | 136.92 | 514.92 | 120.09 | 377.98 |
| CO [g/h] | 784.00 | 225.36 | 861.11 | 655.29 | 294.29 | 2528.24 | 9508.29 | 2217.52 | 6979.66 |
| NOx [g/h] | 152.54 | 43.85 | 167.54 | 127.50 | 57.26 | 491.90 | 1849.97 | 431.45 | 1357.99 |
| VOC [g/h] | 181.70 | 52.23 | 199.57 | 151.87 | 68.20 | 585.94 | 2203.64 | 513.93 | 1617.60 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 59.43 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 3.719 | 0.000 |
| Crosswalk LOS | F | F | D | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 514 | 586 | 619 | 647 |
| d_b, Bicycle Delay [s] | 38.63 | 35.00 | 33.40 | 32.03 |
| l_b,int, Bicycle LOS Score for Intersection | 2.455 | 2.231 | 2.833 | 3.004 |
| Bicycle LOS | B | B | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Boulder Blvd & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 22.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.731 |

**Intersection Setup**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 276 | 27 | 41 | 10 | 44 | 5 | 3 | 12 | 318 | 100 | 21 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 4 | 496 | 0 | 0 | 584 | 15 | 11 | 0 | 26 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 46 | 0 | 0 | 46 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 280 | 569 | 41 | 10 | 674 | 20 | 14 | 12 | 344 | 100 | 21 | 2 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 70 | 142 | 10 | 3 | 169 | 5 | 4 | 3 | 86 | 25 | 5 | 1 |
| Total Analysis Volume [veh/h] | 280 | 569 | 41 | 10 | 674 | 20 | 14 | 12 | 344 | 100 | 21 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 5 | 23 | 0 | 0 | 14 | 0 | 0 | 29 | 0 | 0 | 29 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 6 | 0 | 0 | 9 | 0 | 0 | 15 | 0 | 0 | 12 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 9 | 35 | 0 | 0 | 26 | 0 | 0 | 55 | 0 | 0 | 55 | 0 |
| Lead / Lag | Lead | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | | No | | | No | | | No | |
| Maximum Recall | No | No | | | No | | | No | | | No | |
| Pedestrian Recall | No | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | C | R | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 58 | 58 | 58 | 49 | 49 | 24 | 24 | 24 |
| g / C, Green / Cycle | 0.64 | 0.64 | 0.64 | 0.54 | 0.54 | 0.27 | 0.27 | 0.27 |
| (v / s)_i Volume / Saturation Flow Rate | 0.36 | 0.34 | 0.03 | 0.01 | 0.41 | 0.02 | 0.24 | 0.13 |
| s, saturation flow rate [veh/h] | 787 | 1683 | 1431 | 730 | 1674 | 1470 | 1431 | 951 |
| c, Capacity [veh/h] | 389 | 1083 | 921 | 306 | 910 | 455 | 383 | 327 |
| d1, Uniform Delay [s] | 16.07 | 8.63 | 5.88 | 21.76 | 16.00 | 24.53 | 31.80 | 28.52 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 10.94 | 1.82 | 0.09 | 0.20 | 6.00 | 0.05 | 7.75 | 0.72 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.72 | 0.53 | 0.04 | 0.03 | 0.76 | 0.06 | 0.90 | 0.38 |
| d, Delay for Lane Group [s/veh] | 27.02 | 10.45 | 5.97 | 21.96 | 22.00 | 24.58 | 39.55 | 29.24 |
| Lane Group LOS | C | B | A | C | C | C | D | C |
| Critical Lane Group | Yes | No | No | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 3.20 | 5.66 | 0.27 | 0.16 | 11.54 | 0.41 | 7.80 | 2.28 |
| 50th-Percentile Queue Length [m/ln] | 24.39 | 43.16 | 2.09 | 1.23 | 87.90 | 3.15 | 59.44 | 17.34 |
| 95th-Percentile Queue Length [veh/ln] | 5.76 | 9.57 | 0.49 | 0.29 | 17.11 | 0.74 | 12.38 | 4.10 |
| 95th-Percentile Queue Length [m/ln] | 43.91 | 72.91 | 3.77 | 2.22 | 130.34 | 5.67 | 94.35 | 31.20 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 27.02 | 10.45 | 5.97 | 21.96 | 22.00 | 22.00 | 24.58 | 24.58 | 39.55 | 29.24 | 29.24 | 29.24 |
| Movement LOS | C | B | A | C | C | C | C | C | D | C | C | C |
| d_A, Approach Delay [s/veh] | 15.46 | | | 22.00 | | | 38.50 | | | 29.24 | | |
| Approach LOS | B | | | C | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 22.56 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.731 | | | | | | | | | | | |

**Emissions**

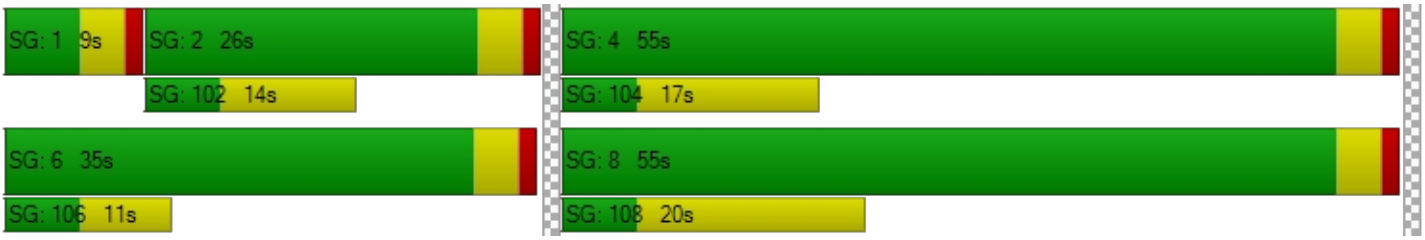
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 37.01 | 75.20 | 5.42 | 1.80 | 125.24 | 8.13 | 107.56 | 34.18 |
| Stops [stops/h] | 128.06 | 226.58 | 10.98 | 6.48 | 461.40 | 16.54 | 312.04 | 91.00 |
| Fuel consumption [L/h] | 12.22 | 16.82 | 0.95 | 0.49 | 34.03 | 1.64 | 27.71 | 8.06 |
| CO [g/h] | 225.65 | 310.59 | 17.55 | 8.98 | 628.39 | 30.22 | 511.74 | 148.90 |
| NOx [g/h] | 43.90 | 60.43 | 3.42 | 1.75 | 122.26 | 5.88 | 99.57 | 28.97 |
| VOC [g/h] | 52.30 | 71.98 | 4.07 | 2.08 | 145.63 | 7.00 | 118.60 | 34.51 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.849 | 2.395 | 2.400 | 1.824 |
| Crosswalk LOS | C | B | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 689 | 489 | 1133 | 1133 |
| d_b, Bicycle Delay [s] | 19.34 | 25.69 | 8.45 | 8.45 |
| l_b,int, Bicycle LOS Score for Intersection | 3.028 | 2.721 | 2.170 | 1.763 |
| Bicycle LOS | C | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 5: N Park Dr & Quartz Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 31.5 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.685 |

**Intersection Setup**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 33 | 0 | 10 | 50 | 0 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 239 | 268 | 4 | 371 | 228 | 5 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | -21 | 67 | 0 | 0 | 46 | 21 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 251 | 335 | 14 | 421 | 274 | 36 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 63 | 84 | 4 | 105 | 69 | 9 |
| Total Analysis Volume [veh/h] | 251 | 335 | 14 | 421 | 274 | 36 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.01 | 0.00 | 0.69 | 0.05 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 8.69 | 0.00 | 31.47 | 9.79 |
| Movement LOS | A | A | A | A | D | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.04 | 0.00 | 4.97 | 0.14 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.33 | 0.00 | 37.85 | 1.09 |
| d_A, Approach Delay [s/veh] | 0.00 | | 0.28 | | 28.96 | |
| Approach LOS | A | | A | | D | |
| d_I, Intersection Delay [s/veh] | 6.84 | | | | | |
| Intersection LOS | D | | | | | |

**Intersection Level Of Service Report**
**Intersection 6: 28 St & Site Access #1**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 21.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.704 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Site Access #1 | | | Comm Access | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Site Access #1 | | | Comm Access | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 371 | 359 | 245 | 12 | 635 | 10 | 19 | 24 | 436 | 179 | 38 | 7 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 67 | 45 | 58 | 0 | 84 | 0 | 21 | 0 | 46 | 40 | 0 | 18 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 438 | 404 | 303 | 12 | 719 | 10 | 40 | 24 | 482 | 219 | 38 | 25 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 110 | 101 | 76 | 3 | 180 | 3 | 10 | 6 | 121 | 55 | 10 | 6 |
| Total Analysis Volume [veh/h] | 438 | 404 | 303 | 12 | 719 | 10 | 40 | 24 | 482 | 219 | 38 | 25 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Overlap | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 3 | 8 | 12 | 7 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | 1,8,12 | | | |
| Maximum Green [s] | 14 | 48 | 0 | 5 | 39 | 0 | 5 | 24 | 5 | 7 | 26 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 18 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 19 | 53 | 0 | 9 | 43 | 0 | 9 | 28 | 9 | 10 | 29 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 5 | 5 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | No | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | No | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | No | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 58 | 49 | 49 | 58 | 39 | 39 | 34 | 24 | 139 | 34 | 25 |
| g / C, Green / Cycle | 0.58 | 0.49 | 0.49 | 0.58 | 0.39 | 0.39 | 0.34 | 0.24 | 1.39 | 0.34 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.47 | 0.23 | 0.23 | 0.02 | 0.22 | 0.22 | 0.03 | 0.01 | 0.34 | 0.27 | 0.04 |
| s, saturation flow rate [veh/h] | 932 | 1683 | 1447 | 780 | 1683 | 1675 | 1287 | 1683 | 1431 | 804 | 1573 |
| c, Capacity [veh/h] | 534 | 825 | 709 | 457 | 656 | 653 | 504 | 404 | 1988 | 320 | 393 |
| d1, Uniform Delay [s] | 16.22 | 16.79 | 16.81 | 10.02 | 23.76 | 23.77 | 22.39 | 29.30 | 0.00 | 32.82 | 29.30 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 13.23 | 1.85 | 2.16 | 0.11 | 3.39 | 3.40 | 0.31 | 0.28 | 0.29 | 11.25 | 0.87 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.66 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.82 | 0.46 | 0.46 | 0.03 | 0.56 | 0.56 | 0.08 | 0.06 | 0.24 | 0.68 | 0.16 |
| d, Delay for Lane Group [s/veh] | 29.45 | 18.64 | 18.97 | 10.13 | 27.15 | 27.17 | 22.70 | 29.58 | 0.29 | 44.07 | 30.17 |
| Lane Group LOS | C | B | B | B | C | C | C | C | A | D | C |
| Critical Lane Group | No | No | No | No | No | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 7.26 | 5.95 | 5.20 | 0.12 | 7.18 | 7.15 | 0.68 | 0.48 | 0.16 | 5.91 | 1.27 |
| 50th-Percentile Queue Length [m/ln] | 55.29 | 45.33 | 39.65 | 0.91 | 54.70 | 54.48 | 5.16 | 3.62 | 1.22 | 45.04 | 9.70 |
| 95th-Percentile Queue Length [veh/ln] | 11.67 | 9.95 | 8.94 | 0.22 | 11.57 | 11.53 | 1.22 | 0.86 | 0.29 | 9.90 | 2.29 |
| 95th-Percentile Queue Length [m/ln] | 88.95 | 75.81 | 68.16 | 1.64 | 88.18 | 87.89 | 9.28 | 6.52 | 2.19 | 75.43 | 17.46 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 29.45 | 18.66 | 18.97 | 10.13 | 27.16 | 27.17 | 22.70 | 29.58 | 0.29 | 44.07 | 30.17 | 30.17 |
| Movement LOS | C | B | B | B | C | C | C | C | A | D | C | C |
| d_A, Approach Delay [s/veh] | 22.87 | | | 26.88 | | | 3.22 | | | 40.97 | | |
| Approach LOS | C | | | C | | | A | | | D | | |
| d_I, Intersection Delay [s/veh] | 21.89 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.704 | | | | | | | | | | | |

**Emissions**

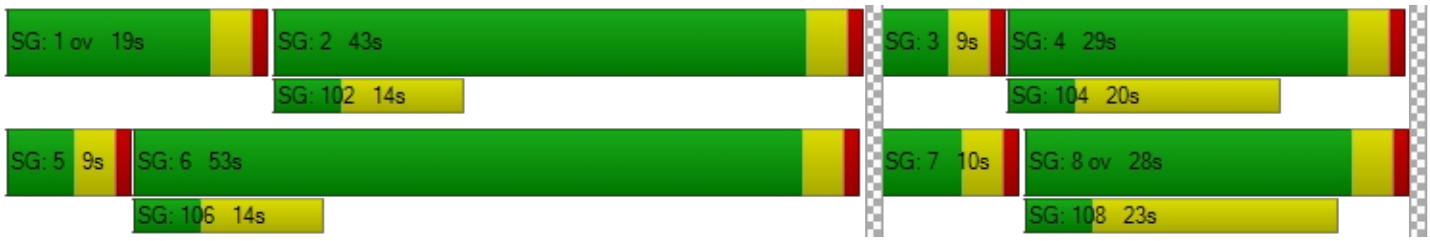
| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 75.23 | 65.16 | 56.26 | 1.70 | 51.85 | 51.62 | 2.93 | 1.76 | 35.34 | 14.12 | 4.06 |
| Stops [stops/h] | 261.19 | 214.17 | 187.33 | 4.31 | 258.41 | 257.36 | 24.37 | 17.11 | 5.75 | 212.81 | 45.83 |
| Fuel consumption [L/h] | 22.68 | 16.24 | 14.15 | 0.35 | 18.07 | 17.99 | 1.49 | 1.08 | 3.65 | 13.25 | 2.82 |
| CO [g/h] | 418.82 | 299.80 | 261.37 | 6.44 | 333.59 | 332.23 | 27.57 | 19.85 | 67.39 | 244.71 | 52.00 |
| NOx [g/h] | 81.49 | 58.33 | 50.85 | 1.25 | 64.91 | 64.64 | 5.36 | 3.86 | 13.11 | 47.61 | 10.12 |
| VOC [g/h] | 97.07 | 69.48 | 60.57 | 1.49 | 77.31 | 77.00 | 6.39 | 4.60 | 15.62 | 56.71 | 12.05 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 41.41 | 41.41 | 41.41 | 41.41 |
| l_p,int, Pedestrian LOS Score for Intersectio | 3.118 | 2.558 | 2.645 | 2.157 |
| Crosswalk LOS | C | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 980 | 780 | 480 | 500 |
| d_b, Bicycle Delay [s] | 13.01 | 18.61 | 28.88 | 28.13 |
| l_b,int, Bicycle LOS Score for Intersection | 2.504 | 2.171 | 2.461 | 2.025 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 7: Quartz Ave & Site Access #2**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 31.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.666 |

**Intersection Setup**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 187 | 202 | 41 | 231 | 190 | 46 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 67 | 0 | 0 | 67 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 254 | 202 | 41 | 298 | 190 | 46 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 64 | 51 | 10 | 75 | 48 | 12 |
| Total Analysis Volume [veh/h] | 254 | 202 | 41 | 298 | 190 | 46 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Stop | Free | Free |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.67 | 0.24 | 0.00 | 0.00 | 0.16 | 0.00 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 31.34 | 10.54 | 0.00 | 0.00 | 8.31 | 0.00 |
| Movement LOS | D | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 4.63 | 0.92 | 0.00 | 0.00 | 0.44 | 0.44 |
| 95th-Percentile Queue Length [m/ln] | 35.29 | 7.03 | 0.00 | 0.00 | 3.37 | 3.37 |
| d_A, Approach Delay [s/veh] | 22.12 | | 0.00 | | 6.69 | |
| Approach LOS | C | | A | | A | |
| d_I, Intersection Delay [s/veh] | 11.32 | | | | | |
| Intersection LOS | D | | | | | |

**Intersection Level Of Service Report**
**Intersection 8: Quartz Ave & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 12.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.349 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Quartz Ave | | | Quartz Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.50 | 3.66 | 3.66 | 3.50 | 3.50 | 3.50 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 30.48 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Quartz Ave | | | Quartz Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 0.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 101 | 187 | 97 | 9 | 375 | 88 | 93 | 45 | 104 | 178 | 47 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 26 | 58 | 0 | 44 | 0 | 0 | 0 | 0 | 40 | 0 | 18 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 101 | 213 | 155 | 9 | 419 | 88 | 93 | 45 | 104 | 218 | 47 | 18 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 25 | 53 | 39 | 2 | 105 | 22 | 23 | 11 | 26 | 55 | 12 | 5 |
| Total Analysis Volume [veh/h] | 101 | 213 | 155 | 9 | 419 | 88 | 93 | 45 | 104 | 218 | 47 | 18 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 60 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 14 | 0 | 0 | 14 | 0 | 0 | 38 | 0 | 0 | 38 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 15 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 18 | 0 | 0 | 18 | 0 | 0 | 42 | 0 | 0 | 42 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 32 | 32 | 32 | 32 | 32 | 32 | 20 | 20 | 20 | 20 |
| g / C, Green / Cycle | 0.53 | 0.53 | 0.53 | 0.53 | 0.53 | 0.53 | 0.33 | 0.33 | 0.33 | 0.33 |
| (v / s)_i Volume / Saturation Flow Rate | 0.13 | 0.11 | 0.12 | 0.01 | 0.15 | 0.15 | 0.08 | 0.10 | 0.20 | 0.04 |
| s, saturation flow rate [veh/h] | 803 | 1710 | 1478 | 912 | 1710 | 1609 | 1222 | 1498 | 1114 | 1605 |
| c, Capacity [veh/h] | 447 | 908 | 784 | 513 | 908 | 854 | 460 | 503 | 380 | 539 |
| d1, Uniform Delay [s] | 12.03 | 7.45 | 7.48 | 9.82 | 7.78 | 7.80 | 16.93 | 14.70 | 21.94 | 13.79 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.17 | 0.54 | 0.65 | 0.06 | 0.79 | 0.86 | 0.21 | 0.32 | 1.37 | 0.10 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.23 | 0.21 | 0.22 | 0.02 | 0.29 | 0.29 | 0.20 | 0.30 | 0.57 | 0.12 |
| d, Delay for Lane Group [s/veh] | 13.20 | 7.99 | 8.14 | 9.88 | 8.58 | 8.66 | 17.15 | 15.02 | 23.31 | 13.89 |
| Lane Group LOS | B | A | A | A | A | A | B | B | C | B |
| Critical Lane Group | No | No | No | No | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.95 | 1.21 | 1.11 | 0.07 | 1.70 | 1.64 | 0.95 | 1.40 | 2.83 | 0.57 |
| 50th-Percentile Queue Length [m/ln] | 7.24 | 9.22 | 8.46 | 0.52 | 12.97 | 12.49 | 7.25 | 10.70 | 21.59 | 4.35 |
| 95th-Percentile Queue Length [veh/ln] | 1.71 | 2.18 | 2.00 | 0.12 | 3.06 | 2.95 | 1.71 | 2.53 | 5.10 | 1.03 |
| 95th-Percentile Queue Length [m/ln] | 13.02 | 16.60 | 15.24 | 0.94 | 23.35 | 22.49 | 13.04 | 19.25 | 38.86 | 7.83 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 13.20 | 8.00 | 8.14 | 9.88 | 8.61 | 8.66 | 17.15 | 15.02 | 15.02 | 23.31 | 13.89 | 13.89 |
| Movement LOS | B | A | A | A | A | A | B | B | B | C | B | B |
| d_A, Approach Delay [s/veh] | 9.16 | | | 8.64 | | | 15.84 | | | 21.15 | | |
| Approach LOS | A | | | A | | | B | | | C | | |
| d_I, Intersection Delay [s/veh] | 12.30 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.349 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 14.34 | 27.54 | 24.70 | 1.41 | 40.56 | 38.67 | 19.63 | 31.45 | 43.97 | 13.11 |
| Stops [stops/h] | 56.97 | 72.63 | 66.65 | 4.12 | 102.16 | 98.37 | 57.05 | 84.22 | 170.00 | 34.26 |
| Fuel consumption [L/h] | 3.61 | 5.38 | 4.88 | 0.29 | 7.78 | 7.45 | 4.32 | 6.53 | 11.73 | 2.68 |
| CO [g/h] | 66.60 | 99.33 | 90.04 | 5.37 | 143.65 | 137.62 | 79.82 | 120.60 | 216.55 | 49.52 |
| NOx [g/h] | 12.96 | 19.33 | 17.52 | 1.05 | 27.95 | 26.78 | 15.53 | 23.47 | 42.13 | 9.63 |
| VOC [g/h] | 15.44 | 23.02 | 20.87 | 1.25 | 33.29 | 31.89 | 18.50 | 27.95 | 50.19 | 11.48 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 21.68 | 21.68 | 21.68 | 21.68 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.827 | 2.577 | 2.220 | 2.094 |
| Crosswalk LOS | C | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 467 | 467 | 1267 | 1267 |
| d_b, Bicycle Delay [s] | 17.63 | 17.63 | 4.03 | 4.03 |
| l_b,int, Bicycle LOS Score for Intersection | 1.947 | 2.096 | 1.959 | 2.027 |
| Bicycle LOS | A | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 9: Slate Ave & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.245 |

**Intersection Setup**

| Name | N Park Dr | | | N Park Dr | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | N Park Dr | | | N Park Dr | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 7 | 127 | 110 | 0 | 212 | 0 | 8 | 0 | 42 | 122 | 4 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 17 | 137 | 110 | 0 | 222 | 10 | 18 | 0 | 52 | 122 | 4 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 34 | 28 | 0 | 56 | 3 | 5 | 0 | 13 | 31 | 1 | 0 |
| Total Analysis Volume [veh/h] | 17 | 137 | 110 | 0 | 222 | 10 | 18 | 0 | 52 | 122 | 4 | 0 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.06 | 0.24 | 0.01 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.71 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 12.09 | 0.00 | 9.96 | 14.63 | 14.22 | 11.36 |
| Movement LOS | A | A | | | A | A | B | | A | B | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.32 | 0.00 | 0.32 | 0.99 | 0.99 | 0.99 |
| 95th-Percentile Queue Length [m/ln] | 0.22 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 2.44 | 0.00 | 2.44 | 7.55 | 7.55 | 7.55 |
| d_A, Approach Delay [s/veh] | 0.85 | | | 0.00 | | | 10.51 | | | 14.62 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 4.65 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 10: Slate Ave & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 19.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.379 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 89 | 110 | 81 | 0 | 182 | 20 | 22 | 46 | 160 | 130 | 46 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 63 | -20 | 0 | 0 | 0 | 0 | 20 | 0 | 44 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 152 | 90 | 81 | 0 | 182 | 20 | 42 | 46 | 204 | 130 | 46 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 38 | 23 | 20 | 0 | 46 | 5 | 11 | 12 | 51 | 33 | 12 | 0 |
| Total Analysis Volume [veh/h] | 152 | 90 | 81 | 0 | 182 | 20 | 42 | 46 | 204 | 130 | 46 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 41 | 0 | 0 | 41 | 0 | 0 | 41 | 0 | 0 | 41 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 6 | 0 | 0 | 6 | 0 | 0 | 12 | 0 | 0 | 6 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 45 | 0 | 0 | 45 | 0 | 0 | 45 | 0 | 0 | 45 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | C |
|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 58 | 58 | 58 | 24 | 24 |
| g / C, Green / Cycle | 0.64 | 0.64 | 0.64 | 0.27 | 0.27 |
| (v / s)_i Volume / Saturation Flow Rate | 0.14 | 0.11 | 0.12 | 0.19 | 0.24 |
| s, saturation flow rate [veh/h] | 1062 | 1553 | 1654 | 1565 | 745 |
| c, Capacity [veh/h] | 693 | 996 | 1101 | 468 | 271 |
| d1, Uniform Delay [s] | 6.81 | 6.50 | 6.59 | 29.69 | 32.73 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.73 | 0.37 | 0.37 | 1.37 | 2.63 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.22 | 0.17 | 0.18 | 0.62 | 0.65 |
| d, Delay for Lane Group [s/veh] | 7.54 | 6.88 | 6.96 | 31.06 | 35.36 |
| Lane Group LOS | A | A | A | C | D |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.23 | 1.28 | 1.52 | 5.71 | 3.88 |
| 50th-Percentile Queue Length [m/ln] | 9.38 | 9.72 | 11.55 | 43.53 | 29.56 |
| 95th-Percentile Queue Length [veh/ln] | 2.22 | 2.30 | 2.73 | 9.63 | 6.98 |
| 95th-Percentile Queue Length [m/ln] | 16.88 | 17.49 | 20.78 | 73.40 | 53.20 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.54 | 6.88 | 6.88 | 6.96 | 6.96 | 6.96 | 31.06 | 31.06 | 31.06 | 35.36 | 35.36 | 35.36 |
| Movement LOS | A | A | A | A | A | A | C | C | C | D | D | D |
| d_A, Approach Delay [s/veh] | 7.19 | | | 6.96 | | | 31.06 | | | 35.36 | | |
| Approach LOS | A | | | A | | | C | | | D | | |
| d_I, Intersection Delay [s/veh] | 19.16 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.379 | | | | | | | | | | | |

**Emissions**

| | | | | | |
|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 23.75 | 26.72 | 38.80 | 37.20 | 6.73 |
| Stops [stops/h] | 49.24 | 51.00 | 60.61 | 228.51 | 155.16 |
| Fuel consumption [L/h] | 4.21 | 4.56 | 6.11 | 15.37 | 8.69 |
| CO [g/h] | 77.80 | 84.21 | 112.78 | 283.76 | 160.47 |
| NOx [g/h] | 15.14 | 16.38 | 21.94 | 55.21 | 31.22 |
| VOC [g/h] | 18.03 | 19.52 | 26.14 | 65.77 | 37.19 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.522 | 1.939 | 2.181 | 1.864 |
| Crosswalk LOS | B | A | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 911 | 911 | 911 | 911 |
| d_b, Bicycle Delay [s] | 13.34 | 13.34 | 13.34 | 13.34 |
| l_b,int, Bicycle LOS Score for Intersection | 2.093 | 1.893 | 2.041 | 1.850 |
| Bicycle LOS | B | A | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 11: N Park Dr & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 10.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.015 |

**Intersection Setup**

| Name | Keystone Dr | | N Park Dr | | N Park Dr | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [m] | 3.50 | 3.66 | 3.66 | 3.66 | 3.66 | 3.50 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Keystone Dr | | N Park Dr | | N Park Dr | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 10 | 10 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 94 | 23 | 112 | 118 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 10 | 104 | 33 | 122 | 118 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 26 | 8 | 31 | 30 | 0 |
| Total Analysis Volume [veh/h] | 10 | 104 | 33 | 122 | 118 | 0 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.01 | 0.11 | 0.02 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 10.92 | 9.43 | 7.49 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.43 | 0.43 | 0.06 | 0.06 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 3.29 | 3.29 | 0.43 | 0.43 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 9.56 | | 1.59 | | 0.00 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 3.45 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 12: N Park Dr & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.031 |

**Intersection Setup**

| Name | 28 St | | | | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 50.00 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | 28 St | | | | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 32 | 100 | 0 | 4 | 173 | 40 | 14 | 79 | 29 | 0 | 85 | 8 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 32 | 100 | 0 | 4 | 173 | 40 | 14 | 79 | 29 | 0 | 85 | 8 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 25 | 0 | 1 | 43 | 10 | 4 | 20 | 7 | 0 | 21 | 2 |
| Total Analysis Volume [veh/h] | 32 | 100 | 0 | 4 | 173 | 40 | 14 | 79 | 29 | 0 | 85 | 8 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.14 | 0.03 | 0.00 | 0.16 | 0.01 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.69 | 0.00 | 0.00 | 7.42 | 0.00 | 0.00 | 14.67 | 13.21 | 10.88 | 14.50 | 13.05 | 10.07 |
| Movement LOS | A | A | A | A | A | A | B | B | B | B | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.05 | 0.05 | 0.05 | 0.01 | 0.01 | 0.01 | 0.79 | 0.79 | 0.79 | 0.60 | 0.60 | 0.60 |
| 95th-Percentile Queue Length [m/ln] | 0.41 | 0.41 | 0.41 | 0.05 | 0.05 | 0.05 | 5.98 | 5.98 | 5.98 | 4.56 | 4.56 | 4.56 |
| d_A, Approach Delay [s/veh] | 1.86 | | | 0.14 | | | 12.82 | | | 12.79 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 5.37 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 13: N Park Dr & New Road B**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 16.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.033 |

**Intersection Setup**

| Name | Quartz Ave | | | New Road B | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | Quartz Ave | | | New Road B | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 8 | 0 | 149 | 11 | 0 | 0 | 0 | 76 | 7 | 160 | 85 | 4 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 8 | 0 | 149 | 11 | 0 | 0 | 0 | 76 | 7 | 160 | 85 | 4 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 0 | 37 | 3 | 0 | 0 | 0 | 19 | 2 | 40 | 21 | 1 |
| Total Analysis Volume [veh/h] | 8 | 0 | 149 | 11 | 0 | 0 | 0 | 76 | 7 | 160 | 85 | 4 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | |
|---|---|---|---|---|
| Priority Scheme | Stop | Stop | Free | Free |
| Flared Lane | No | No | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.02 | 0.00 | 0.15 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 14.04 | 14.24 | 9.47 | 16.27 | 13.83 | 9.08 | 7.39 | 0.00 | 0.00 | 7.58 | 0.00 | 0.00 |
| Movement LOS | B | B | A | C | B | A | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.61 | 0.61 | 0.61 | 0.10 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 | 0.30 | 0.30 | 0.30 |
| 95th-Percentile Queue Length [m/ln] | 4.66 | 4.66 | 4.66 | 0.79 | 0.79 | 0.79 | 0.00 | 0.00 | 0.00 | 2.25 | 2.25 | 2.25 |
| d_A, Approach Delay [s/veh] | 9.70 | | | 16.27 | | | 0.00 | | | 4.87 | | |
| Approach LOS | A | | | C | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 5.83 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 14: N Park Dr & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 5.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.334 |

**Intersection Setup**

| Name | Boundary Rd | | Boundary Rd | | N Park Dr | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.50 | 3.66 | 3.66 | 3.50 | 3.50 | 3.50 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 75.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Boundary Rd | | Boundary Rd | | N Park Dr | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 175 | 0 | 239 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| Proportion of CAVs [%] | 0.00 | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 575 | 116 | 279 | 54 | 59 | 569 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 575 | 291 | 279 | 293 | 59 | 569 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 144 | 73 | 70 | 73 | 15 | 142 |
| Total Analysis Volume [veh/h] | 575 | 291 | 279 | 293 | 59 | 569 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 70 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPerm | Permissive | Permissive | Permissive | Permissive | Unsignalized |
|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 0 | 3 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Maximum Green [s] | 5 | 47 | 47 | 0 | 35 | 0 |
| Amber [s] | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 9 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Advanced Detector Location [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Advanced Detector Length [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Phasing & Timing: Pattern 1**

| | | | | | | |
|---|---|---|---|---|---|---|
| Split [s] | 9 | 27 | 18 | 0 | 43 | 0 |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 10 | 10 | 0 | 5 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | No | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L |
|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 70 | 70 | 70 | 70 | 70 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 59 | 59 | 50 | 50 | 3 |
| g / C, Green / Cycle | 0.84 | 0.84 | 0.71 | 0.71 | 0.05 |
| (v / s)_i Volume / Saturation Flow Rate | 0.66 | 0.09 | 0.17 | 0.20 | 0.04 |
| s, saturation flow rate [veh/h] | 871 | 3204 | 1683 | 1431 | 1629 |
| c, Capacity [veh/h] | 810 | 2676 | 1189 | 1011 | 83 |
| d1, Uniform Delay [s] | 2.54 | 1.05 | 3.62 | 3.79 | 32.72 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.24 | 0.08 | 0.46 | 0.73 | 10.84 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.71 | 0.11 | 0.23 | 0.29 | 0.71 |
| d, Delay for Lane Group [s/veh] | 7.78 | 1.13 | 4.08 | 4.52 | 43.57 |
| Lane Group LOS | A | A | A | A | D |
| Critical Lane Group | Yes | No | No | Yes | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.41 | 0.07 | 1.08 | 1.22 | 1.20 |
| 50th-Percentile Queue Length [m/ln] | 10.72 | 0.55 | 8.19 | 9.29 | 9.17 |
| 95th-Percentile Queue Length [veh/ln] | 2.53 | 0.13 | 1.94 | 2.20 | 2.17 |
| 95th-Percentile Queue Length [m/ln] | 19.29 | 0.98 | 14.75 | 16.73 | 16.51 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.78 | 1.13 | 4.08 | 4.52 | 43.57 | 0.00 |
| Movement LOS | A | A | A | A | D | |
| d_A, Approach Delay [s/veh] | 5.54 | | 4.31 | | 4.09 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 5.01 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.334 | | | | | |

**Emissions**

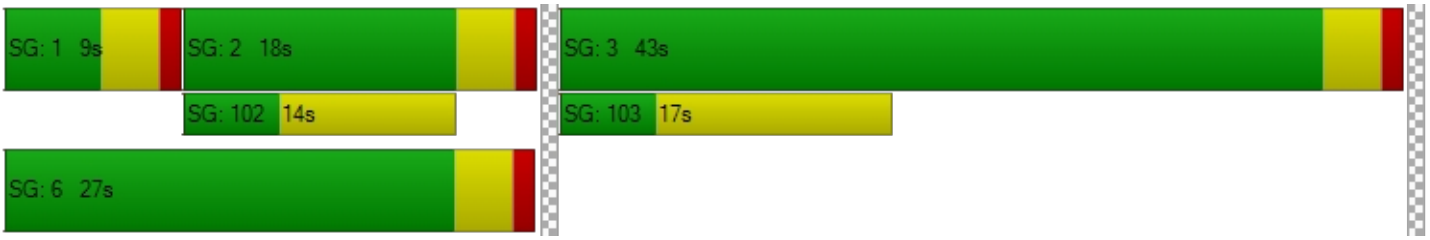
| | | | | | |
|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 238.52 | 120.71 | 161.94 | 170.07 | 6.27 |
| Stops [stops/h] | 72.32 | 7.37 | 55.29 | 62.72 | 61.89 |
| Fuel consumption [L/h] | 27.76 | 11.90 | 17.53 | 18.61 | 3.88 |
| CO [g/h] | 512.63 | 219.82 | 323.62 | 343.62 | 71.67 |
| NOx [g/h] | 99.74 | 42.77 | 62.97 | 66.86 | 13.94 |
| VOC [g/h] | 118.81 | 50.94 | 75.00 | 79.64 | 16.61 |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 26.58 | 26.58 | 26.58 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.520 | 2.353 | 2.832 |
| Crosswalk LOS | B | B | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 657 | 400 | 1114 |
| d_b, Bicycle Delay [s] | 15.78 | 22.40 | 6.86 |
| l_b,int, Bicycle LOS Score for Intersection | 2.274 | 2.032 | 1.670 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 15: New Road B & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 9.1 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.046 |

**Intersection Setup**

| Name | Keystone Dr | | | Keystone Dr | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | Keystone Dr | | | Keystone Dr | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 5 | 18 | 2 | 52 | 0 | 0 | 0 | 0 | 42 | 0 | 7 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 5 | 18 | 2 | 52 | 0 | 0 | 0 | 0 | 42 | 0 | 7 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 1 | 5 | 1 | 13 | 0 | 0 | 0 | 0 | 11 | 0 | 2 |
| Total Analysis Volume [veh/h] | 0 | 5 | 18 | 2 | 52 | 0 | 0 | 0 | 0 | 42 | 0 | 7 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.01 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.32 | 0.00 | 0.00 | 7.26 | 0.00 | 0.00 | 8.96 | 9.44 | 8.54 | 9.12 | 9.60 | 8.59 |
| Movement LOS | A | A | A | A | A | A | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.16 | 0.16 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 | 1.26 | 1.26 | 1.26 |
| d_A, Approach Delay [s/veh] | 0.00 | | | 0.27 | | | 8.98 | | | 9.05 | | |
| Approach LOS | A | | | A | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 3.63 | | | | | | | | | | | |
| Intersection LOS | A | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 16: New Road B & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.1 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.093 |

**Intersection Setup**

| Name | | | | 28 St | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | | | | 28 St | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 6 | 98 | 18 | 5 | 142 | 11 | 48 | 0 | 12 | 61 | 0 | 17 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 6 | 98 | 18 | 5 | 142 | 11 | 48 | 0 | 12 | 61 | 0 | 17 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 25 | 5 | 1 | 36 | 3 | 12 | 0 | 3 | 15 | 0 | 4 |
| Total Analysis Volume [veh/h] | 6 | 98 | 18 | 5 | 142 | 11 | 48 | 0 | 12 | 61 | 0 | 17 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.01 | 0.09 | 0.00 | 0.02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.53 | 0.00 | 0.00 | 7.45 | 0.00 | 0.00 | 11.04 | 11.32 | 9.50 | 11.13 | 11.43 | 9.44 |
| Movement LOS | A | A | A | A | A | A | B | B | A | B | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.29 | 0.29 | 0.29 | 0.37 | 0.37 | 0.37 |
| 95th-Percentile Queue Length [m/ln] | 0.08 | 0.08 | 0.08 | 0.06 | 0.06 | 0.06 | 2.18 | 2.18 | 2.18 | 2.84 | 2.84 | 2.84 |
| d_A, Approach Delay [s/veh] | 0.37 | | | 0.24 | | | 10.73 | | | 10.76 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 3.75 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 17: Boulder Blvd & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.021 |

**Intersection Setup**

| Name | Keystone Dr | | | Keystone Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | Keystone Dr | | | Keystone Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 9 | 3 | 0 | 32 | 24 | 35 | 14 | 68 | 19 | 12 | 81 | 13 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 9 | 3 | 0 | 32 | 24 | 35 | 14 | 68 | 19 | 12 | 81 | 13 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 2 | 1 | 0 | 8 | 6 | 9 | 4 | 17 | 5 | 3 | 20 | 3 |
| Total Analysis Volume [veh/h] | 9 | 3 | 0 | 32 | 24 | 35 | 14 | 68 | 19 | 12 | 81 | 13 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.02 | 0.09 | 0.02 | 0.02 | 0.11 | 0.01 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.34 | 0.00 | 0.00 | 7.27 | 0.00 | 0.00 | 11.02 | 10.54 | 9.19 | 10.99 | 10.73 | 9.11 |
| Movement LOS | A | A | A | A | A | A | B | B | A | B | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.02 | 0.02 | 0.02 | 0.06 | 0.06 | 0.06 | 0.45 | 0.45 | 0.45 | 0.49 | 0.49 | 0.49 |
| 95th-Percentile Queue Length [m/ln] | 0.11 | 0.11 | 0.11 | 0.46 | 0.46 | 0.46 | 3.41 | 3.41 | 3.41 | 3.72 | 3.72 | 3.72 |
| d_A, Approach Delay [s/veh] | 5.51 | | | 2.56 | | | 10.35 | | | 10.56 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 7.95 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 18: Boulder Blvd & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 18.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.286 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 10 | 23 | 130 | 126 | 72 | 57 | 13 | 77 | 9 | 78 | 39 | 32 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 10 | 23 | 130 | 126 | 72 | 57 | 13 | 77 | 9 | 78 | 39 | 32 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 6 | 33 | 32 | 18 | 14 | 3 | 19 | 2 | 20 | 10 | 8 |
| Total Analysis Volume [veh/h] | 10 | 23 | 130 | 126 | 72 | 57 | 13 | 77 | 9 | 78 | 39 | 32 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | |
|---|---|---|---|---|
| Priority Scheme | Stop | Stop | Free | Free |
| Flared Lane | No | No | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.02 | 0.04 | 0.13 | 0.29 | 0.13 | 0.06 | 0.01 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 14.12 | 12.62 | 9.75 | 18.95 | 17.24 | 14.34 | 7.37 | 0.00 | 0.00 | 7.49 | 0.00 | 0.00 |
| Movement LOS | B | B | A | C | C | B | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.73 | 0.73 | 0.73 | 2.50 | 2.50 | 2.50 | 0.02 | 0.02 | 0.02 | 0.15 | 0.15 | 0.15 |
| 95th-Percentile Queue Length [m/ln] | 5.56 | 5.56 | 5.56 | 19.04 | 19.04 | 19.04 | 0.17 | 0.17 | 0.17 | 1.13 | 1.13 | 1.13 |
| d_A, Approach Delay [s/veh] | 10.42 | | | 17.44 | | | 0.97 | | | 3.92 | | |
| Approach LOS | B | | | C | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 10.25 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 19: Boulder Blvd & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 19.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.308 |

**Intersection Setup**

| Name | Boundary Rd | | Boundary Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Boundary Rd | | Boundary Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 175 | 239 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 116 | 59 | 54 | 76 | 107 | 279 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 116 | 234 | 293 | 76 | 107 | 279 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 29 | 59 | 73 | 19 | 27 | 70 |
| Total Analysis Volume [veh/h] | 116 | 234 | 293 | 76 | 107 | 279 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.10 | 0.00 | 0.00 | 0.00 | 0.31 | 0.34 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.36 | 0.00 | 0.00 | 0.00 | 19.93 | 11.56 |
| Movement LOS | A | A | A | A | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.32 | 0.00 | 0.00 | 0.00 | 1.28 | 1.50 |
| 95th-Percentile Queue Length [m/ln] | 2.47 | 0.00 | 0.00 | 0.00 | 9.77 | 11.40 |
| d_A, Approach Delay [s/veh] | 2.77 | | 0.00 | | 13.88 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 5.73 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 20: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 15.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.086 |

**Intersection Setup**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 100 | 10 | 250 | 290 | 10 |
| Base Volume Adjustment Factor | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 26 | 0 | 0 | 11 | 15 | 4 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 37 | 110 | 11 | 286 | 334 | 15 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 9 | 28 | 3 | 72 | 84 | 4 |
| Total Analysis Volume [veh/h] | 37 | 110 | 11 | 286 | 334 | 15 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.09 | 0.16 | 0.01 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 15.29 | 12.04 | 7.99 | 0.00 | 0.00 | 0.00 |
| Movement LOS | C | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.95 | 0.95 | 0.02 | 0.02 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 7.22 | 7.22 | 0.14 | 0.14 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 12.85 | | 0.30 | | 0.00 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 2.49 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 21: Slate Ave & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 9.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.013 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 10 | 10 | 10 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 4 | 0 | 49 | 26 | 0 | 11 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 14 | 10 | 59 | 36 | 10 | 21 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 3 | 15 | 9 | 3 | 5 |
| Total Analysis Volume [veh/h] | 14 | 10 | 59 | 36 | 10 | 21 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.04 | 0.00 | 0.01 | 0.02 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.33 | 0.00 | 9.71 | 8.53 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.10 | 0.10 | 0.10 | 0.10 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.77 | 0.77 | 0.77 | 0.77 |
| d_A, Approach Delay [s/veh] | 0.00 | | 4.55 | | 8.91 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.72 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 22: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 12.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.019 |

**Intersection Setup**

| Name | Golf Course Rd | | | Golf Course Rd | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | Golf Course Rd | | | Golf Course Rd | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 5 | 0 | 0 | 5 | 20 | 5 | 0 | 25 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 13 | 2 | 19 | 48 | 34 | 16 | 41 | 0 | 28 | 111 | 16 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 10 | 18 | 2 | 19 | 53 | 54 | 21 | 41 | 25 | 28 | 111 | 16 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 5 | 1 | 5 | 13 | 14 | 5 | 10 | 6 | 7 | 28 | 4 |
| Total Analysis Volume [veh/h] | 10 | 18 | 2 | 19 | 53 | 54 | 21 | 41 | 25 | 28 | 111 | 16 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | |
|---|---|---|---|---|
| Priority Scheme | Stop | Stop | Free | Free |
| Flared Lane | No | No | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.02 | 0.03 | 0.00 | 0.03 | 0.09 | 0.06 | 0.01 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 12.20 | 11.25 | 8.88 | 11.79 | 12.02 | 9.93 | 7.49 | 0.00 | 0.00 | 7.38 | 0.00 | 0.00 |
| Movement LOS | B | B | A | B | B | A | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.16 | 0.16 | 0.16 | 0.63 | 0.63 | 0.63 | 0.04 | 0.04 | 0.04 | 0.05 | 0.05 | 0.05 |
| 95th-Percentile Queue Length [m/ln] | 1.22 | 1.22 | 1.22 | 4.83 | 4.83 | 4.83 | 0.29 | 0.29 | 0.29 | 0.37 | 0.37 | 0.37 |
| d_A, Approach Delay [s/veh] | 11.41 | | | 11.09 | | | 1.81 | | | 1.33 | | |
| Approach LOS | B | | | B | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 5.29 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 23: Boulder Blvd & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 23.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.275 |

**Intersection Setup**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 300 | 10 | 10 | 20 | 20 | 150 |
| Base Volume Adjustment Factor | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 11 | 5 | 4 | 141 | 52 | 7 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 341 | 16 | 15 | 163 | 74 | 172 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 85 | 4 | 4 | 41 | 19 | 43 |
| Total Analysis Volume [veh/h] | 341 | 16 | 15 | 163 | 74 | 172 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.24 | 0.00 | 0.00 | 0.00 | 0.28 | 0.18 |
| d_M, Delay for Movement [s/veh] | 8.34 | 0.00 | 0.00 | 0.00 | 23.80 | 14.17 |
| Movement LOS | A | A | A | A | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.92 | 0.92 | 0.00 | 0.00 | 2.35 | 2.35 |
| 95th-Percentile Queue Length [m/ln] | 6.98 | 6.98 | 0.00 | 0.00 | 17.89 | 17.89 |
| d_A, Approach Delay [s/veh] | 7.96 | | 0.00 | | 17.06 | |
| Approach LOS | A | | A | | C | |
| d_I, Intersection Delay [s/veh] | 9.01 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 24: Hwy 779 & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.1 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.476 |

**Intersection Setup**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 160.00 | 30.48 | 30.48 | 150.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 30.48 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 70.00 | | | 70.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 21 | 698 | 49 | 49 | 764 | 12 | 21 | 6 | 43 | 128 | 21 | 195 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.1000 | 1.0000 | 1.1000 | 1.1000 | 1.1000 | 1.0000 | 1.0000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 6.00 | 6.00 | 6.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 94 | 39 | 20 | 91 | 0 | 0 | 0 | 0 | 100 | 0 | 52 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 21 | 792 | 88 | 74 | 855 | 13 | 23 | 7 | 43 | 228 | 23 | 267 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 198 | 22 | 19 | 214 | 3 | 6 | 2 | 11 | 57 | 6 | 67 |
| Total Analysis Volume [veh/h] | 21 | 792 | 88 | 74 | 855 | 13 | 23 | 7 | 43 | 228 | 23 | 267 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 8 | 0 | 7 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 5 | 14 | 0 | 5 | 14 | 0 | 0 | 38 | 0 | 10 | 38 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 9 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 9 | 18 | 0 | 9 | 18 | 0 | 0 | 54 | 0 | 9 | 63 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 0 | 10 | 0 | 5 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 2.00 |
| g_i, Effective Green Time [s] | 63 | 55 | 55 | 63 | 57 | 57 | 10 | 10 | 19 | 19 |
| g / C, Green / Cycle | 0.70 | 0.61 | 0.61 | 0.70 | 0.63 | 0.63 | 0.11 | 0.11 | 0.21 | 0.21 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.27 | 0.27 | 0.11 | 0.26 | 0.26 | 0.09 | 0.03 | 0.23 | 0.19 |
| s, saturation flow rate [veh/h] | 641 | 1683 | 1625 | 670 | 1683 | 1674 | 349 | 1431 | 1081 | 1385 |
| c, Capacity [veh/h] | 460 | 1027 | 991 | 475 | 1066 | 1060 | 109 | 157 | 301 | 290 |
| d1, Uniform Delay [s] | 5.65 | 9.33 | 9.33 | 6.18 | 8.16 | 8.16 | 40.48 | 36.79 | 35.88 | 34.83 |
| k, delay calibration | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.04 | 1.35 | 1.40 | 0.70 | 1.16 | 1.17 | 1.35 | 0.94 | 5.99 | 11.67 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.05 | 0.44 | 0.44 | 0.16 | 0.41 | 0.41 | 0.28 | 0.27 | 0.83 | 0.92 |
| d, Delay for Lane Group [s/veh] | 5.69 | 10.68 | 10.73 | 6.88 | 9.32 | 9.32 | 41.83 | 37.72 | 41.87 | 46.50 |
| Lane Group LOS | A | B | B | A | A | A | D | D | D | D |
| Critical Lane Group | No | No | Yes | Yes | No | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.09 | 4.19 | 4.06 | 0.40 | 3.66 | 3.64 | 0.69 | 0.90 | 5.54 | 6.51 |
| 50th-Percentile Queue Length [m/ln] | 0.68 | 31.93 | 30.93 | 3.04 | 27.86 | 27.72 | 5.30 | 6.84 | 42.21 | 49.61 |
| 95th-Percentile Queue Length [veh/ln] | 0.16 | 7.54 | 7.31 | 0.72 | 6.58 | 6.55 | 1.25 | 1.62 | 9.40 | 10.70 |
| 95th-Percentile Queue Length [m/ln] | 1.22 | 57.47 | 55.68 | 5.47 | 50.14 | 49.90 | 9.53 | 12.32 | 71.62 | 81.50 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 5.69 | 10.70 | 10.73 | 6.88 | 9.32 | 9.32 | 41.83 | 41.83 | 37.72 | 41.87 | 41.87 | 46.50 |
| Movement LOS | A | B | B | A | A | A | D | D | D | D | D | D |
| d_A, Approach Delay [s/veh] | 10.58 | | | 9.13 | | | 39.41 | | | 44.26 | | |
| Approach LOS | B | | | A | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 18.05 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.476 | | | | | | | | | | | |

**Emissions**

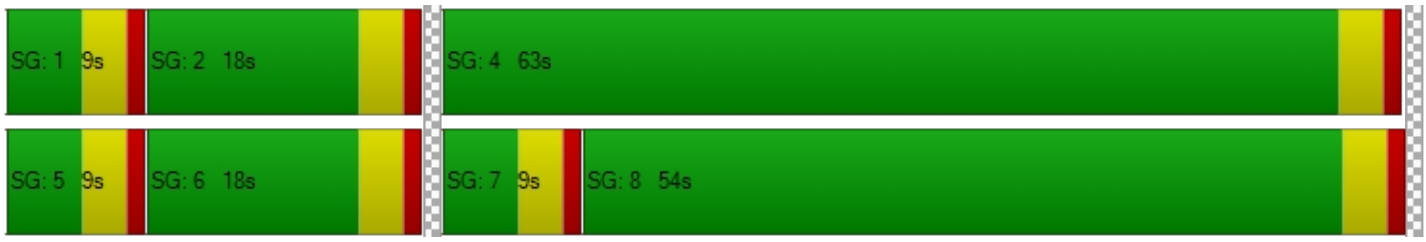
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 16.50 | 351.84 | 339.71 | 15.54 | 91.39 | 90.90 | 2.11 | 3.03 | 129.67 | 137.94 |
| Stops [stops/h] | 3.57 | 167.60 | 162.37 | 15.95 | 146.22 | 145.53 | 27.80 | 35.93 | 221.58 | 260.44 |
| Fuel consumption [L/h] | 1.59 | 39.74 | 38.41 | 2.36 | 17.00 | 16.92 | 1.79 | 2.34 | 25.40 | 28.53 |
| CO [g/h] | 29.45 | 733.80 | 709.23 | 43.59 | 313.99 | 312.43 | 33.08 | 43.27 | 469.08 | 526.83 |
| NOx [g/h] | 5.73 | 142.77 | 137.99 | 8.48 | 61.09 | 60.79 | 6.44 | 8.42 | 91.27 | 102.50 |
| VOC [g/h] | 6.82 | 170.07 | 164.37 | 10.10 | 72.77 | 72.41 | 7.67 | 10.03 | 108.71 | 122.10 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 0.000 | 0.000 |
| Crosswalk LOS | F | F | F | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 311 | 311 | 1111 | 1311 |
| d_b, Bicycle Delay [s] | 32.09 | 32.09 | 8.89 | 5.34 |
| l_b,int, Bicycle LOS Score for Intersection | 2.303 | 2.337 | 1.680 | 2.414 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Vistro File: C:\...\2025-11-24_North Industrial Development_Updated ASP_FINAL.vistro
Report File: C:\...\Full Buildout (2046)_SAT_Background.pdf

Scenario 13 2046_SAT_Background Traffic
11/25/2025

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Hwy 16 A & Boundary Rd | Signalized | HCM 7th Edition | NB Left | 0.676 | 27.9 | C |
| 2 | Hwy 16A & 28 St | Signalized | HCM 7th Edition | WB Left | 0.677 | 32.2 | C |
| 3 | Hwy 16A & S Park Dr/N Park Dr | Signalized | HCM 7th Edition | EB Left | 0.604 | 38.8 | D |
| 4 | Boulder Blvd & N Park Dr | Signalized | HCM 7th Edition | EB Right | 0.412 | 12.8 | B |
| 5 | N Park Dr & Quartz Ave | Two-way stop | HCM 7th Edition | WB Left | 0.405 | 11.9 | B |
| 7 | Quartz Ave & Site Access #2 | Two-way stop | HCM 7th Edition | NB Left | 0.631 | 21.6 | C |
| 8 | 28 St & Site Access #1 | Two-way stop | HCM 7th Edition | EB Right | 0.778 | 20.7 | C |
| 9 | Slate Ave & N Park Dr | Two-way stop | HCM 7th Edition | EB Left | 0.011 | 8.9 | A |
| 10 | Quartz Ave & 28 St | Signalized | HCM 7th Edition | | 0.000 | 0.0 | A |
| 11 | N Park Dr & Keystone Dr | Two-way stop | HCM 7th Edition | SB Right | 0.000 | 0.0 | A |
| 20 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | SB Left | 0.036 | 11.9 | B |
| 21 | Slate Ave & Golf Course Rd | Two-way stop | HCM 7th Edition | WB Left | 0.005 | 8.7 | A |
| 22 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | EB Left | 0.011 | 8.8 | A |
| 23 | Boulder Blvd & Wood Ave | Two-way stop | HCM 7th Edition | EB Left | 0.046 | 14.2 | B |
| 24 | Hwy 779 & Wood Ave | Signalized | HCM 7th Edition | WB Right | 0.527 | 13.0 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Hwy 16 A & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 27.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.676 |

**Intersection Setup**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 50.00 | 100.00 | 30.48 | 160.00 | 150.00 | 30.48 | 75.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 48.28 | | | 50.00 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 82 | 3 | 334 | 20 | 160 | 110 | 125 | 1535 | 101 | 528 | 1409 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 156 | 0 | 0 | 0 | 0 | 0 | 0 | 322 | 162 | 0 | 313 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 238 | 3 | 334 | 20 | 160 | 110 | 125 | 1857 | 263 | 528 | 1722 | 40 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 60 | 1 | 84 | 5 | 40 | 28 | 31 | 464 | 66 | 132 | 431 | 10 |
| Total Analysis Volume [veh/h] | 238 | 3 | 334 | 20 | 160 | 110 | 125 | 1857 | 263 | 528 | 1722 | 40 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 36.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 16 | 30 | 0 | 16 | 30 | 0 | 20 | 40 | 0 | 25 | 40 | 0 |
| Amber [s] | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 | 3.0 | 5.2 | 0.0 | 3.0 | 5.3 | 0.0 |
| All red [s] | 1.5 | 2.1 | 0.0 | 1.5 | 2.1 | 0.0 | 1.8 | 1.8 | 0.0 | 1.8 | 1.8 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 30 | 0 | 0 | 27 | 0 | 0 | 18 | 0 | 0 | 6 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.8 | 0.0 | 3.5 | 4.8 | 0.0 | 2.8 | 5.0 | 0.0 | 2.8 | 5.1 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 16 | 42 | 0 | 13 | 39 | 0 | 15 | 58 | 0 | 27 | 70 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 10 | 15 | 0 | 10 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 6.80 | 6.80 | 6.80 | 6.80 | 4.80 | 7.00 | 4.80 | 7.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.80 | 0.00 | 4.80 | 2.80 | 5.00 | 2.80 | 5.10 |
| g_i, Effective Green Time [s] | 26 | 17 | 26 | 10 | 10 | 73 | 22 | 85 |
| g / C, Green / Cycle | 0.19 | 0.12 | 0.19 | 0.07 | 0.07 | 0.52 | 0.16 | 0.61 |
| (v / s)_i Volume / Saturation Flow Rate | 0.16 | 0.00 | 0.01 | 0.04 | 0.04 | 0.36 | 0.15 | 0.34 |
| s, saturation flow rate [veh/h] | 1523 | 3560 | 1516 | 3560 | 3459 | 5094 | 3459 | 5094 |
| c, Capacity [veh/h] | 314 | 428 | 360 | 258 | 245 | 2658 | 548 | 3101 |
| d1, Uniform Delay [s] | 54.84 | 54.22 | 46.81 | 63.05 | 62.69 | 25.20 | 58.49 | 16.19 |
| k, delay calibration | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 15.77 | 0.01 | 0.06 | 2.42 | 1.64 | 1.55 | 11.05 | 0.72 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.76 | 0.01 | 0.06 | 0.62 | 0.51 | 0.70 | 0.96 | 0.56 |
| d, Delay for Lane Group [s/veh] | 70.61 | 54.22 | 46.88 | 65.47 | 64.33 | 26.75 | 69.54 | 16.91 |
| Lane Group LOS | E | D | D | E | E | C | E | B |
| Critical Lane Group | Yes | No | No | Yes | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 9.28 | 0.05 | 0.59 | 2.86 | 2.21 | 15.67 | 10.14 | 10.88 |
| 50th-Percentile Queue Length [m/ln] | 70.68 | 0.36 | 4.47 | 21.83 | 16.85 | 119.38 | 77.25 | 82.90 |
| 95th-Percentile Queue Length [veh/ln] | 14.27 | 0.09 | 1.06 | 5.16 | 3.98 | 22.16 | 15.36 | 16.29 |
| 95th-Percentile Queue Length [m/ln] | 108.74 | 0.65 | 8.05 | 39.29 | 30.34 | 168.84 | 117.04 | 124.13 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 70.61 | 54.22 | 0.00 | 46.88 | 65.47 | 0.00 | 64.33 | 26.75 | 0.00 | 69.54 | 16.91 | 0.00 |
| Movement LOS | E | D | | D | E | | E | C | | E | B | |
| d_A, Approach Delay [s/veh] | 29.51 | | | 39.35 | | | 25.71 | | | 28.75 | | |
| Approach LOS | C | | | D | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 27.90 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.676 | | | | | | | | | | | |

**Emissions**

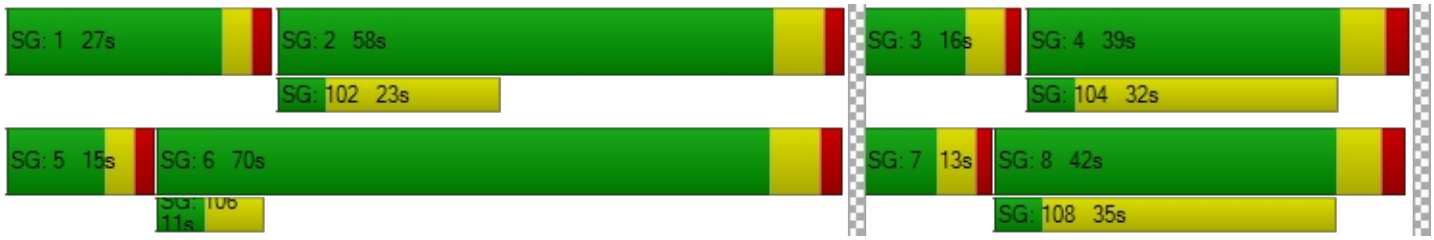
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 54.74 | 0.69 | 7.78 | 62.26 | 83.88 | 1246.09 | 118.03 | 384.92 |
| Stops [stops/h] | 238.51 | 2.44 | 15.10 | 147.31 | 113.74 | 1208.53 | 521.38 | 839.31 |
| Fuel consumption [L/h] | 23.23 | 0.24 | 1.80 | 17.30 | 16.69 | 184.19 | 50.61 | 77.26 |
| CO [g/h] | 428.99 | 4.49 | 33.26 | 319.38 | 308.27 | 3401.28 | 934.57 | 1426.65 |
| NOx [g/h] | 83.47 | 0.87 | 6.47 | 62.14 | 59.98 | 661.76 | 181.83 | 277.57 |
| VOC [g/h] | 99.42 | 1.04 | 7.71 | 74.02 | 71.44 | 788.28 | 216.60 | 330.64 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 61.29 | 61.29 | 61.29 | 61.29 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.626 | 2.527 | 3.422 | 3.395 |
| Crosswalk LOS | B | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 503 | 460 | 729 | 899 |
| d_b, Bicycle Delay [s] | 39.23 | 41.50 | 28.29 | 21.23 |
| l_b,int, Bicycle LOS Score for Intersection | 1.758 | 1.708 | 2.650 | 2.797 |
| Bicycle LOS | A | A | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 2: Hwy 16A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 32.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.677 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 50.00 | 75.00 | 30.48 | 75.00 | 150.00 | 30.48 | 100.00 | 150.00 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 200.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | No | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 24 | 0 | 211 | 0 | 0 | 0 | 0 | 1550 | 62 | 160 | 1441 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0200 | 1.0000 | 1.0000 | 1.0200 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 52 | 0 | 484 | 54 | 244 | 235 | 0 | 0 | 0 | 0 | 469 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 0 | 0 | -36 | 36 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 24 | 52 | 211 | 484 | 54 | 280 | 235 | 1581 | 62 | 160 | 1434 | 505 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 13 | 53 | 121 | 14 | 70 | 59 | 395 | 16 | 40 | 359 | 126 |
| Total Analysis Volume [veh/h] | 24 | 52 | 211 | 484 | 54 | 280 | 235 | 1581 | 62 | 160 | 1434 | 505 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 95.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 3 | 38 | 0 | 28 | 61 | 0 | 35 | 10 | 0 | 48 | 23 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 27 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 12 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 13 | 38 | 0 | 33 | 58 | 0 | 34 | 49 | 0 | 20 | 35 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 12 | 10 | 0 | 12 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.00 | 0.00 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 42 | 9 | 42 | 32 | 20 | 66 | 14 | 59 |
| g / C, Green / Cycle | 0.30 | 0.06 | 0.30 | 0.23 | 0.15 | 0.47 | 0.10 | 0.42 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.03 | 0.29 | 0.03 | 0.13 | 0.31 | 0.09 | 0.28 |
| s, saturation flow rate [veh/h] | 1430 | 1870 | 1670 | 1870 | 1781 | 5094 | 1781 | 5094 |
| c, Capacity [veh/h] | 475 | 117 | 542 | 428 | 261 | 2384 | 178 | 2148 |
| d1, Uniform Delay [s] | 34.96 | 63.27 | 48.06 | 42.89 | 58.75 | 28.72 | 62.30 | 32.59 |
| k, delay calibration | 0.11 | 0.11 | 0.21 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.04 | 2.62 | 9.46 | 0.13 | 10.91 | 1.47 | 14.63 | 1.67 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.05 | 0.44 | 0.89 | 0.13 | 0.90 | 0.66 | 0.90 | 0.67 |
| d, Delay for Lane Group [s/veh] | 35.01 | 65.89 | 57.52 | 43.02 | 69.66 | 30.19 | 76.93 | 34.25 |
| Lane Group LOS | D | E | E | D | E | C | E | C |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.60 | 1.88 | 17.65 | 1.52 | 9.00 | 13.92 | 6.37 | 13.37 |
| 50th-Percentile Queue Length [m/ln] | 4.57 | 14.34 | 134.51 | 11.61 | 68.55 | 106.06 | 48.54 | 101.85 |
| 95th-Percentile Queue Length [veh/ln] | 1.08 | 3.39 | 24.54 | 2.74 | 13.92 | 20.04 | 10.51 | 19.36 |
| 95th-Percentile Queue Length [m/ln] | 8.23 | 25.81 | 187.02 | 20.90 | 106.03 | 152.68 | 80.07 | 147.54 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 35.01 | 65.89 | 0.00 | 57.52 | 43.02 | 0.00 | 69.66 | 30.19 | 0.00 | 76.93 | 34.25 | 0.00 |
| Movement LOS | D | E | | E | D | | E | C | | E | C | |
| d_A, Approach Delay [s/veh] | 14.87 | | | 36.87 | | | 34.13 | | | 29.27 | | |
| Approach LOS | B | | | D | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 32.21 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.677 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 3.94 | 8.53 | 83.13 | 9.27 | 148.51 | 999.13 | 107.36 | 962.25 |
| Stops [stops/h] | 15.42 | 48.38 | 453.92 | 39.19 | 231.33 | 1073.72 | 163.79 | 1031.12 |
| Fuel consumption [L/h] | 1.35 | 4.48 | 38.99 | 3.51 | 31.83 | 155.97 | 23.30 | 152.57 |
| CO [g/h] | 24.95 | 82.67 | 719.90 | 64.76 | 587.71 | 2880.02 | 430.27 | 2817.37 |
| NOx [g/h] | 4.85 | 16.09 | 140.07 | 12.60 | 114.35 | 560.35 | 83.72 | 548.16 |
| VOC [g/h] | 5.78 | 19.16 | 166.84 | 15.01 | 136.21 | 667.47 | 99.72 | 652.95 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 61.29 | 0.00 | 61.29 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 2.355 | 0.000 | 3.359 |
| Crosswalk LOS | F | B | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 457 | 743 | 604 | 404 |
| d_b, Bicycle Delay [s] | 41.66 | 27.66 | 34.09 | 44.56 |
| l_b,int, Bicycle LOS Score for Intersection | 1.685 | 2.447 | 2.558 | 2.436 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 3: Hwy 16A & S Park Dr/N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 38.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.604 |

**Intersection Setup**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.50 | 3.66 | 3.66 | 3.50 | 3.66 |
| No. of Lanes in Entry Pocket | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 170.00 | 30.48 | 400.00 | 250.00 | 30.48 | 160.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 210.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 271 | 85 | 276 | 252 | 111 | 49 | 27 | 1084 | 251 | 350 | 957 | 157 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.50 | 0.50 | 2.00 | 2.00 | 0.50 | 0.50 | 0.50 | 0.00 | 0.50 | 2.00 | 0.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 | 1.0200 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 42 | 10 | 0 | 43 | 238 | 229 | 225 | 0 | 11 | 233 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 36 | 0 | 0 | 36 | -36 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 276 | 129 | 292 | 293 | 156 | 288 | 293 | 1295 | 256 | 368 | 1209 | 160 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 69 | 32 | 73 | 73 | 39 | 72 | 73 | 324 | 64 | 92 | 302 | 40 |
| Total Analysis Volume [veh/h] | 276 | 129 | 292 | 293 | 156 | 288 | 293 | 1295 | 256 | 368 | 1209 | 160 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 7 | 45 | 0 | 7 | 45 | 0 | 54 | 33 | 0 | 39 | 18 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 0 | 0 | 32 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 18 | 40 | 0 | 21 | 43 | 0 | 22 | 53 | 0 | 26 | 57 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 7 | 15 | 0 | 14 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 45 | 28 | 28 | 45 | 29 | 29 | 14 | 59 | 17 | 62 |
| g / C, Green / Cycle | 0.32 | 0.20 | 0.20 | 0.32 | 0.21 | 0.21 | 0.10 | 0.42 | 0.12 | 0.45 |
| (v / s)_i Volume / Saturation Flow Rate | 0.12 | 0.07 | 0.18 | 0.12 | 0.08 | 0.18 | 0.08 | 0.25 | 0.11 | 0.23 |
| s, saturation flow rate [veh/h] | 2361 | 1892 | 1609 | 2391 | 1892 | 1609 | 3500 | 5176 | 3459 | 5176 |
| c, Capacity [veh/h] | 552 | 384 | 326 | 547 | 396 | 337 | 345 | 2185 | 422 | 2306 |
| d1, Uniform Delay [s] | 37.19 | 47.72 | 54.33 | 37.61 | 47.69 | 53.30 | 62.09 | 31.17 | 60.40 | 28.07 |
| k, delay calibration | 0.12 | 0.11 | 0.12 | 0.11 | 0.11 | 0.12 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.76 | 0.51 | 9.54 | 0.82 | 0.64 | 6.70 | 5.87 | 1.19 | 5.75 | 0.86 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.50 | 0.34 | 0.89 | 0.54 | 0.39 | 0.86 | 0.85 | 0.59 | 0.87 | 0.52 |
| d, Delay for Lane Group [s/veh] | 37.95 | 48.23 | 63.87 | 38.42 | 48.33 | 60.01 | 67.96 | 32.36 | 66.14 | 28.93 |
| Lane Group LOS | D | D | E | D | D | E | E | C | E | C |
| Critical Lane Group | No | No | Yes | Yes | No | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 3.57 | 3.94 | 10.88 | 3.81 | 4.80 | 10.39 | 5.28 | 10.99 | 6.59 | 9.52 |
| 50th-Percentile Queue Length [m/ln] | 27.20 | 30.03 | 82.90 | 29.06 | 36.59 | 79.17 | 40.26 | 83.73 | 50.23 | 72.54 |
| 95th-Percentile Queue Length [veh/ln] | 6.43 | 7.09 | 16.29 | 6.86 | 8.40 | 15.68 | 9.05 | 16.42 | 10.80 | 14.58 |
| 95th-Percentile Queue Length [m/ln] | 48.96 | 54.05 | 124.12 | 52.31 | 63.97 | 119.46 | 68.98 | 125.15 | 82.31 | 111.10 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 37.95 | 48.23 | 63.87 | 38.42 | 48.33 | 60.01 | 67.96 | 32.36 | 0.00 | 66.14 | 28.93 | 0.00 |
| Movement LOS | D | D | E | D | D | E | E | C | | E | C | |
| d_A, Approach Delay [s/veh] | 50.72 | | | 48.95 | | | 33.52 | | | 34.15 | | |
| Approach LOS | D | | | D | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 38.81 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.604 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 36.13 | 16.89 | 38.23 | 38.73 | 20.62 | 38.06 | 446.02 | 1971.30 | 232.56 | 764.04 |
| Stops [stops/h] | 183.58 | 101.33 | 279.77 | 196.12 | 123.47 | 267.18 | 271.71 | 847.62 | 338.98 | 734.42 |
| Fuel consumption [L/h] | 15.62 | 8.67 | 24.28 | 16.75 | 10.54 | 22.93 | 66.10 | 236.35 | 56.55 | 129.35 |
| CO [g/h] | 288.51 | 160.14 | 448.31 | 309.39 | 194.59 | 423.34 | 1220.59 | 4364.41 | 1044.22 | 2388.46 |
| NOx [g/h] | 56.13 | 31.16 | 87.23 | 60.20 | 37.86 | 82.37 | 237.48 | 849.16 | 203.17 | 464.71 |
| VOC [g/h] | 66.86 | 37.11 | 103.90 | 71.70 | 45.10 | 98.11 | 282.88 | 1011.49 | 242.01 | 553.55 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 61.29 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 3.619 | 0.000 |
| Crosswalk LOS | F | F | D | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 486 | 529 | 661 | 719 |
| d_b, Bicycle Delay [s] | 40.13 | 37.89 | 31.36 | 28.74 |
| l_b,int, Bicycle LOS Score for Intersection | 2.245 | 2.278 | 2.544 | 2.538 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Boulder Blvd & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 12.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.412 |

**Intersection Setup**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 221 | 22 | 33 | 5 | 35 | 4 | 2 | 10 | 254 | 80 | 17 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 271 | 0 | 0 | 281 | 10 | 9 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 62 | 0 | 0 | 62 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 221 | 293 | 33 | 5 | 378 | 14 | 11 | 72 | 254 | 80 | 17 | 2 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 55 | 73 | 8 | 1 | 95 | 4 | 3 | 18 | 64 | 20 | 4 | 1 |
| Total Analysis Volume [veh/h] | 221 | 293 | 33 | 5 | 378 | 14 | 11 | 72 | 254 | 80 | 17 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 60 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 23 | 0 | 0 | 14 | 0 | 0 | 29 | 0 | 0 | 29 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 6 | 0 | 0 | 9 | 0 | 0 | 15 | 0 | 0 | 12 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 27 | 0 | 0 | 18 | 0 | 0 | 33 | 0 | 0 | 33 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | C | R | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 39 | 39 | 39 | 35 | 35 | 13 | 13 | 13 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.65 | 0.58 | 0.58 | 0.22 | 0.22 | 0.22 |
| (v / s)_i Volume / Saturation Flow Rate | 0.24 | 0.17 | 0.02 | 0.01 | 0.23 | 0.05 | 0.18 | 0.13 |
| s, saturation flow rate [veh/h] | 930 | 1683 | 1431 | 948 | 1672 | 1658 | 1431 | 787 |
| c, Capacity [veh/h] | 646 | 1095 | 931 | 555 | 974 | 426 | 309 | 279 |
| d1, Uniform Delay [s] | 6.80 | 4.44 | 3.75 | 8.84 | 6.83 | 19.39 | 22.41 | 22.72 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.44 | 0.60 | 0.07 | 0.03 | 1.24 | 0.22 | 5.43 | 0.77 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.34 | 0.27 | 0.04 | 0.01 | 0.40 | 0.19 | 0.82 | 0.36 |
| d, Delay for Lane Group [s/veh] | 8.25 | 5.04 | 3.82 | 8.87 | 8.07 | 19.61 | 27.84 | 23.49 |
| Lane Group LOS | A | A | A | A | A | B | C | C |
| Critical Lane Group | No | No | No | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.00 | 1.20 | 0.12 | 0.04 | 2.38 | 0.91 | 3.60 | 1.26 |
| 50th-Percentile Queue Length [m/ln] | 7.60 | 9.18 | 0.88 | 0.27 | 18.17 | 6.95 | 27.42 | 9.63 |
| 95th-Percentile Queue Length [veh/ln] | 1.80 | 2.17 | 0.21 | 0.06 | 4.29 | 1.64 | 6.48 | 2.28 |
| 95th-Percentile Queue Length [m/ln] | 13.68 | 16.52 | 1.59 | 0.48 | 32.71 | 12.50 | 49.36 | 17.34 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.25 | 5.04 | 3.82 | 8.87 | 8.07 | 8.07 | 19.61 | 19.61 | 27.84 | 23.49 | 23.49 | 23.49 |
| Movement LOS | A | A | A | A | A | A | B | B | C | C | C | C |
| d_A, Approach Delay [s/veh] | 6.26 | | | 8.08 | | | 25.81 | | | 23.49 | | |
| Approach LOS | A | | | A | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 12.79 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.412 | | | | | | | | | | | |

**Emissions**

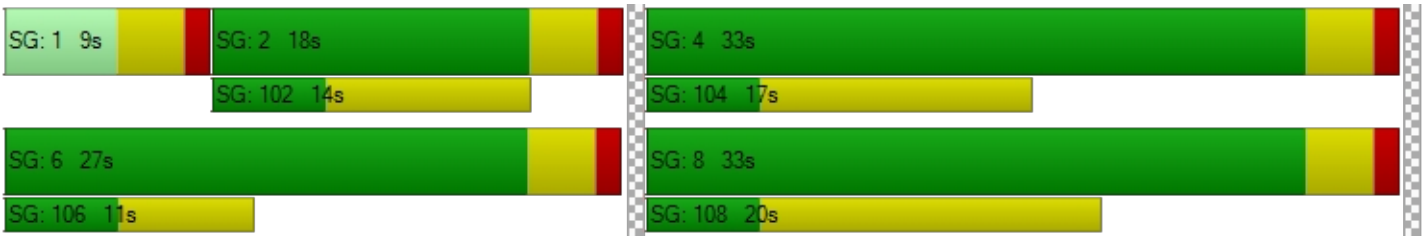
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 29.21 | 38.73 | 4.36 | 0.90 | 70.74 | 25.95 | 79.42 | 27.51 |
| Stops [stops/h] | 59.85 | 72.27 | 6.94 | 2.10 | 143.08 | 54.70 | 215.90 | 75.84 |
| Fuel consumption [L/h] | 5.53 | 6.44 | 0.67 | 0.17 | 12.38 | 4.95 | 17.85 | 6.11 |
| CO [g/h] | 102.03 | 118.96 | 12.33 | 3.09 | 228.53 | 91.41 | 329.55 | 112.83 |
| NOx [g/h] | 19.85 | 23.15 | 2.40 | 0.60 | 44.46 | 17.78 | 64.12 | 21.95 |
| VOC [g/h] | 23.65 | 27.57 | 2.86 | 0.72 | 52.97 | 21.18 | 76.38 | 26.15 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 21.68 | 21.68 | 21.68 | 21.68 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.649 | 2.173 | 2.313 | 1.808 |
| Crosswalk LOS | B | B | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 767 | 467 | 967 | 967 |
| d_b, Bicycle Delay [s] | 11.41 | 17.63 | 8.01 | 8.01 |
| l_b,int, Bicycle LOS Score for Intersection | 2.462 | 2.215 | 2.116 | 1.723 |
| Bicycle LOS | B | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 5: N Park Dr & Quartz Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.405 |

**Intersection Setup**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 33 | 0 | 10 | 50 | 0 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 280 | 5 | 0 | 291 | 6 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 62 | 0 | 0 | 62 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 33 | 342 | 15 | 50 | 353 | 16 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 86 | 4 | 13 | 88 | 4 |
| Total Analysis Volume [veh/h] | 33 | 342 | 15 | 50 | 353 | 16 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.01 | 0.00 | 0.40 | 0.02 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 8.06 | 0.00 | 11.91 | 8.51 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.03 | 0.03 | 1.98 | 0.05 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.19 | 0.19 | 15.09 | 0.36 |
| d_A, Approach Delay [s/veh] | 0.00 | | 1.86 | | 11.76 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 5.51 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 7: Quartz Ave & Site Access #2**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 21.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.631 |

**Intersection Setup**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 296 | 108 | 0 | 285 | 104 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 62 | 0 | 0 | 62 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 358 | 108 | 0 | 347 | 104 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 90 | 27 | 0 | 87 | 26 | 0 |
| Total Analysis Volume [veh/h] | 358 | 108 | 0 | 347 | 104 | 0 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.63 | 0.12 | 0.00 | 0.00 | 0.09 | 0.00 |
| d_M, Delay for Movement [s/veh] | 21.55 | 9.72 | 0.00 | 0.00 | 8.25 | 0.00 |
| Movement LOS | C | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 4.39 | 0.42 | 0.00 | 0.00 | 0.28 | 0.28 |
| 95th-Percentile Queue Length [m/ln] | 33.45 | 3.23 | 0.00 | 0.00 | 2.14 | 2.14 |
| d_A, Approach Delay [s/veh] | 18.81 | | 0.00 | | 8.25 | |
| Approach LOS | C | | A | | A | |
| d_I, Intersection Delay [s/veh] | 10.49 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 8: 28 St & Site Access #1**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 20.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.778 |

**Intersection Setup**

| Name | 28 St | | 28 St | | Site Access #1 | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | 28 St | | 28 St | | Site Access #1 | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 652 | 104 | 108 | 0 | 0 | 674 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 62 | 0 | 0 | 0 | 0 | 62 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 714 | 104 | 108 | 0 | 0 | 736 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 179 | 26 | 27 | 0 | 0 | 184 |
| Total Analysis Volume [veh/h] | 714 | 104 | 108 | 0 | 0 | 736 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.48 | 0.00 | 0.00 | 0.00 | 0.00 | 0.78 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 9.66 | 0.00 | 0.00 | 0.00 | 67.99 | 20.73 |
| Movement LOS | A | A | A | A | F | C |
| 95th-Percentile Queue Length [veh/ln] | 2.71 | 0.00 | 0.00 | 0.00 | 0.00 | 8.05 |
| 95th-Percentile Queue Length [m/ln] | 20.65 | 0.00 | 0.00 | 0.00 | 0.00 | 61.35 |
| d_A, Approach Delay [s/veh] | 8.43 | | 0.00 | | 20.73 | |
| Approach LOS | A | | A | | C | |
| d_I, Intersection Delay [s/veh] | 13.33 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 9: Slate Ave & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.011 |

**Intersection Setup**

| Name | N Park Dr | | N Park Dr | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | N Park Dr | | N Park Dr | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 10 | 10 | 10 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 6 | 0 | 0 | 0 | 0 | 5 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 16 | 10 | 10 | 10 | 10 | 15 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 3 | 3 | 3 | 3 | 4 |
| Total Analysis Volume [veh/h] | 16 | 10 | 10 | 10 | 10 | 15 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.27 | 0.00 | 0.00 | 0.00 | 8.92 | 8.47 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.03 | 0.03 | 0.00 | 0.00 | 0.08 | 0.08 |
| 95th-Percentile Queue Length [m/ln] | 0.20 | 0.20 | 0.00 | 0.00 | 0.58 | 0.58 |
| d_A, Approach Delay [s/veh] | 4.48 | | 0.00 | | 8.65 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.68 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 10: Quartz Ave & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 0.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.000 |

**Intersection Setup**

| Name | 28 St | Quartz Ave |
|---|---|---|
| Approach | Northbound | Eastbound |
| Lane Configuration |  |  |
| Turning Movement | Left | Right |
| Lane Width [m] | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | 48.28 |
| Grade [%] | 0.00 | 0.00 |
| Curb Present | No | No |
| Crosswalk | Yes | Yes |

**Volumes**

| Name | 28 St | Quartz Ave |
|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | |
| Growth Factor | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 |
| Site-Generated Trips [veh/h] | 104 | 108 |
| Diverted Trips [veh/h] | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 |
| Total Hourly Volume [veh/h] | 104 | 108 |
| Peak Hour Factor | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 26 | 27 |
| Total Analysis Volume [veh/h] | 104 | 108 |
| Presence of On-Street Parking | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | 0 |
| v_di, Inbound Pedestrian Volume crossing m | 0 | 0 |
| v_co, Outbound Pedestrian Volume crossing | 0 | 0 |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | 0 |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | 0 |
| Bicycle Volume [bicycles/h] | 0 | 0 |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permissive | Permissive |
|---|---|---|
| Signal Group | 0 | 0 |
| Auxiliary Signal Groups | | |
| Maximum Green [s] | 0 | 0 |
| Amber [s] | 0.0 | 0.0 |
| All red [s] | 0.0 | 0.0 |
| Walk [s] | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 |
| Rest In Walk | | |
| I1, Start-Up Lost Time [s] | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 |
| Detector Location [m] | 0.0 | 0.0 |
| Detector Length [m] | 0.0 | 0.0 |
| Advanced Detector Location [m] | 0.0 | 0.0 |
| Advanced Detector Length [m] | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 |

**Phasing & Timing: Pattern 1**

| | | |
|---|---|---|
| Split [s] | 0 | 0 |
| Lead / Lag | - | - |
| Minimum Green [s] | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 |
| Minimum Recall | | |
| Maximum Recall | | |
| Pedestrian Recall | | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

**Lane Group Results**

**Movement, Approach, & Intersection Results**

| | | |
|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 |
| Movement LOS | | |
| d_A, Approach Delay [s/veh] | 0.00 | 0.00 |
| Approach LOS | A | A |
| d_I, Intersection Delay [s/veh] | 0.00 | |
| Intersection LOS | A | |
| Intersection V/C | 0.000 | |

**Emissions**

**Other Modes**

| | | |
|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | -∞ | -∞ |
| Crosswalk LOS | A | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 0 | 0 |
| d_b, Bicycle Delay [s] | 0.00 | 0.00 |
| l_b,int, Bicycle LOS Score for Intersection | 1.560 | 1.560 |
| Bicycle LOS | A | A |

**Intersection Level Of Service Report**
**Intersection 11: N Park Dr & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 0.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.000 |

**Intersection Setup**

| Name | Keystone Dr | N Park Dr |
|---|---|---|
| Approach | Southbound | Eastbound |
| Lane Configuration |  |  |
| Turning Movement | Right | Left |
| Lane Width [m] | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | 50.00 |
| Grade [%] | 0.00 | 0.00 |
| Crosswalk | Yes | Yes |

**Volumes**

| Name | Keystone Dr | N Park Dr |
|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 |
| Total Hourly Volume [veh/h] | 10 | 10 |
| Peak Hour Factor | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 3 |
| Total Analysis Volume [veh/h] | 10 | 10 |
| Pedestrian Volume [ped/h] | 0 | 0 |

**Intersection Settings**

| | | |
|---|---|---|
| Priority Scheme | Free | Free |
| Flared Lane | | |
| Storage Area [veh] | 0 | 0 |
| Two-Stage Gap Acceptance | | |
| Number of Storage Spaces in Median | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | |
|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 |
| Movement LOS | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 0.00 | 0.00 |
| Approach LOS | A | A |
| d_I, Intersection Delay [s/veh] | 0.00 | |
| Intersection LOS | A | |

**Intersection Level Of Service Report**
**Intersection 20: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.036 |

**Intersection Setup**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 10 | 5 | 200 | 240 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 9 | 10 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 20 | 10 | 5 | 209 | 250 | 5 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 3 | 1 | 52 | 63 | 1 |
| Total Analysis Volume [veh/h] | 20 | 10 | 5 | 209 | 250 | 5 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 11.87 | 9.88 | 7.75 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.15 | 0.15 | 0.01 | 0.01 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 1.18 | 1.18 | 0.06 | 0.06 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 11.21 | | 0.18 | | 0.00 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 0.75 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 21: Slate Ave & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.005 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 | 5 | 5 | 5 | 5 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 5 | 0 | 0 | 6 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 5 | 10 | 5 | 5 | 11 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 1 | 3 | 1 | 1 | 3 |
| Total Analysis Volume [veh/h] | 5 | 5 | 10 | 5 | 5 | 11 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.25 | 0.00 | 8.75 | 8.40 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.02 | 0.02 | 0.05 | 0.05 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.13 | 0.13 | 0.36 | 0.36 |
| d_A, Approach Delay [s/veh] | 0.00 | | 4.83 | | 8.51 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 5.09 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 22: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 8.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.011 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 5 | 5 | 5 | 5 | 5 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 6 | 5 | 5 | 6 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 5 | 11 | 10 | 10 | 11 | 10 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 3 | 3 | 3 | 3 | 3 |
| Total Analysis Volume [veh/h] | 5 | 11 | 10 | 10 | 11 | 10 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 |
| d_M, Delay for Movement [s/veh] | 7.26 | 0.00 | 0.00 | 0.00 | 8.77 | 8.46 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.01 | 0.01 | 0.00 | 0.00 | 0.06 | 0.06 |
| 95th-Percentile Queue Length [m/ln] | 0.06 | 0.06 | 0.00 | 0.00 | 0.48 | 0.48 |
| d_A, Approach Delay [s/veh] | 2.27 | | 0.00 | | 8.62 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 3.81 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 23: Boulder Blvd & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.046 |

**Intersection Setup**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 240 | 10 | 10 | 20 | 20 | 120 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 4 | 6 | 5 | 0 | 0 | 4 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 244 | 16 | 15 | 20 | 20 | 124 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 61 | 4 | 4 | 5 | 5 | 31 |
| Total Analysis Volume [veh/h] | 244 | 16 | 15 | 20 | 20 | 124 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.15 | 0.00 | 0.00 | 0.00 | 0.05 | 0.12 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.66 | 0.00 | 0.00 | 0.00 | 14.17 | 9.23 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.51 | 0.51 | 0.00 | 0.00 | 0.59 | 0.59 |
| 95th-Percentile Queue Length [m/ln] | 3.91 | 3.91 | 0.00 | 0.00 | 4.47 | 4.47 |
| d_A, Approach Delay [s/veh] | 7.18 | | 0.00 | | 9.92 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 7.51 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 24: Hwy 779 & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 13.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.527 |

**Intersection Setup**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 160.00 | 30.48 | 30.48 | 150.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 70.00 | | | 70.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 21 | 558 | 49 | 55 | 611 | 39 | 17 | 5 | 34 | 102 | 17 | 156 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 39 | 0 | 4 | 38 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 21 | 597 | 49 | 59 | 649 | 39 | 17 | 5 | 34 | 102 | 17 | 160 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 149 | 12 | 15 | 162 | 10 | 4 | 1 | 9 | 26 | 4 | 40 |
| Total Analysis Volume [veh/h] | 21 | 597 | 49 | 59 | 649 | 39 | 17 | 5 | 34 | 102 | 17 | 160 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 70 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 41 | 0 | 0 | 41 | 0 | 0 | 23 | 0 | 0 | 39 | 0 |
| Amber [s] | 0.0 | 4.3 | 0.0 | 0.0 | 4.3 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 4.3 | 0.0 |
| All red [s] | 0.0 | 1.5 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.5 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 3.8 | 0.0 | 0.0 | 3.8 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 3.8 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 33 | 0 | 0 | 33 | 0 | 0 | 37 | 0 | 0 | 37 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 8 | 0 | 0 | 3 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |
| L, Total Lost Time per Cycle [s] | 5.80 | 5.80 | 5.80 | 5.80 | 4.00 | 4.00 | 5.80 | 5.80 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 3.80 | 3.80 | 3.80 | 3.80 | 0.00 | 2.00 | 3.80 | 3.80 |
| g_i, Effective Green Time [s] | 47 | 47 | 47 | 47 | 13 | 13 | 11 | 11 |
| g / C, Green / Cycle | 0.68 | 0.68 | 0.68 | 0.68 | 0.18 | 0.18 | 0.16 | 0.16 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.39 | 0.08 | 0.41 | 0.02 | 0.02 | 0.11 | 0.11 |
| s, saturation flow rate [veh/h] | 679 | 1661 | 706 | 1666 | 921 | 1431 | 1045 | 1431 |
| c, Capacity [veh/h] | 335 | 1124 | 359 | 1128 | 173 | 262 | 260 | 225 |
| d1, Uniform Delay [s] | 15.67 | 5.98 | 15.49 | 6.22 | 24.67 | 23.93 | 29.18 | 27.99 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.36 | 2.14 | 0.98 | 2.46 | 0.33 | 0.22 | 1.26 | 4.13 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.06 | 0.57 | 0.16 | 0.61 | 0.13 | 0.13 | 0.46 | 0.71 |
| d, Delay for Lane Group [s/veh] | 16.04 | 8.11 | 16.47 | 8.68 | 24.99 | 24.15 | 30.43 | 32.11 |
| Lane Group LOS | B | A | B | A | C | C | C | C |
| Critical Lane Group | No | No | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.24 | 3.61 | 0.67 | 4.03 | 0.30 | 0.47 | 1.93 | 2.68 |
| 50th-Percentile Queue Length [m/ln] | 1.79 | 27.52 | 5.11 | 30.73 | 2.32 | 3.56 | 14.70 | 20.43 |
| 95th-Percentile Queue Length [veh/ln] | 0.42 | 6.50 | 1.21 | 7.26 | 0.55 | 0.84 | 3.47 | 4.83 |
| 95th-Percentile Queue Length [m/ln] | 3.23 | 49.53 | 9.19 | 55.32 | 4.18 | 6.41 | 26.47 | 36.78 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.04 | 8.11 | 8.11 | 16.47 | 8.68 | 8.68 | 24.99 | 24.99 | 24.15 | 30.43 | 30.43 | 32.11 |
| Movement LOS | B | A | A | B | A | A | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 8.36 | | | 9.29 | | | 24.48 | | | 31.40 | | |
| Approach LOS | A | | | A | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 12.95 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.527 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 16.50 | 507.66 | 12.39 | 144.49 | 1.55 | 2.39 | 61.48 | 82.66 |
| Stops [stops/h] | 12.10 | 185.71 | 34.46 | 207.42 | 15.67 | 24.03 | 99.23 | 137.91 |
| Fuel consumption [L/h] | 2.14 | 53.59 | 3.27 | 25.50 | 0.92 | 1.40 | 10.87 | 14.92 |
| CO [g/h] | 39.46 | 989.65 | 60.46 | 470.89 | 17.03 | 25.84 | 200.63 | 275.44 |
| NOx [g/h] | 7.68 | 192.55 | 11.76 | 91.62 | 3.31 | 5.03 | 39.04 | 53.59 |
| VOC [g/h] | 9.15 | 229.36 | 14.01 | 109.13 | 3.95 | 5.99 | 46.50 | 63.83 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 0.000 | 0.000 |
| Crosswalk LOS | F | F | F | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 777 | 777 | 943 | 891 |
| d_b, Bicycle Delay [s] | 13.08 | 13.08 | 9.78 | 10.75 |
| l_b,int, Bicycle LOS Score for Intersection | 2.660 | 2.792 | 1.652 | 2.020 |
| Bicycle LOS | B | C | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Vistro File: C:\...\2025-11-24_North Industrial Development_Updated ASP_FINAL.vistro
Report File: C:\...\Full Buildout (2046)_SAT.pdf

Scenario 8 Full Buildout (2046)_SAT
11/25/2025

## Intersection Analysis Summary

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Hwy 16 A & Boundary Rd | Signalized | HCM 7th Edition | WB Left | 0.889 | 52.4 | D |
| 2 | Hwy 16A & 28 St | Signalized | HCM 7th Edition | NB Thru | 0.799 | 41.8 | D |
| 3 | Hwy 16A & S Park Dr/N Park Dr | Signalized | HCM 7th Edition | EB Thru | 0.810 | 65.6 | E |
| 4 | Boulder Blvd & N Park Dr | Signalized | HCM 7th Edition | EB Right | 0.696 | 19.7 | B |
| 5 | N Park Dr & Quartz Ave | Two-way stop | HCM 7th Edition | WB Left | 0.841 | 51.2 | F |
| 6 | 28 St & Site Access #1 | Signalized | HCM 7th Edition | WB Left | 0.779 | 24.8 | C |
| 7 | Quartz Ave & Site Access #2 | Two-way stop | HCM 7th Edition | NB Left | 0.729 | 36.2 | E |
| 8 | Quartz Ave & 28 St | Signalized | HCM 7th Edition | WB Left | 0.308 | 11.5 | B |
| 9 | Slate Ave & N Park Dr | Two-way stop | HCM 7th Edition | WB Left | 0.283 | 16.5 | C |
| 10 | Slate Ave & 28 St | Signalized | HCM 7th Edition | WB Left | 0.407 | 17.8 | B |
| 11 | N Park Dr & Keystone Dr | Two-way stop | HCM 7th Edition | SB Left | 0.016 | 11.6 | B |
| 12 | N Park Dr & 28 St | Two-way stop | HCM 7th Edition | WB Left | 0.114 | 16.4 | C |
| 13 | N Park Dr & New Road B | Two-way stop | HCM 7th Edition | SB Left | 0.068 | 25.0 | D |
| 14 | N Park Dr & Boundary Rd | Signalized | HCM 7th Edition | EB Left | 0.315 | 5.0 | A |
| 15 | New Road B & Keystone Dr | Two-way stop | HCM 7th Edition | WB Left | 0.053 | 9.3 | A |
| 16 | New Road B & 28 St | Two-way stop | HCM 7th Edition | WB Left | 0.122 | 12.4 | B |
| 17 | Boulder Blvd & Keystone Dr | Two-way stop | HCM 7th Edition | EB Left | 0.038 | 11.8 | B |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 18 | Boulder Blvd & 28 St | Two-way stop | HCM 7th Edition | SB Left | 0.435 | 32.0 | D |
| 19 | Boulder Blvd & Boundary Rd | Two-way stop | HCM 7th Edition | EB Left | 0.451 | 28.6 | D |
| 20 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | SB Left | 0.082 | 13.8 | B |
| 21 | Slate Ave & Golf Course Rd | Two-way stop | HCM 7th Edition | WB Left | 0.014 | 10.1 | B |
| 22 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | NB Left | 0.023 | 14.0 | B |
| 23 | Boulder Blvd & Wood Ave | Two-way stop | HCM 7th Edition | EB Left | 0.367 | 23.6 | C |
| 24 | Hwy 779 & Wood Ave | Signalized | HCM 7th Edition | WB Left | 0.488 | 16.0 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Hwy 16 A & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 52.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.889 |

**Intersection Setup**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 100.00 | 50.00 | 30.48 | 50.00 | 100.00 | 30.48 | 160.00 | 150.00 | 30.48 | 75.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 60.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | No | | | Yes | | |

**Volumes**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 82 | 3 | 334 | 20 | 160 | 110 | 125 | 1535 | 101 | 528 | 1409 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 299 | 216 | 0 | 406 | 300 | 349 | 255 | 367 | 269 | 0 | 384 | 313 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 381 | 219 | 334 | 426 | 460 | 459 | 380 | 1902 | 370 | 528 | 1793 | 353 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 95 | 55 | 84 | 107 | 115 | 115 | 95 | 476 | 93 | 132 | 448 | 88 |
| Total Analysis Volume [veh/h] | 381 | 219 | 334 | 426 | 460 | 459 | 380 | 1902 | 370 | 528 | 1793 | 353 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 128.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 6 | 35 | 0 | 6 | 35 | 0 | 15 | 45 | 0 | 19 | 48 | 0 |
| Amber [s] | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 | 3.0 | 5.2 | 0.0 | 3.0 | 5.3 | 0.0 |
| All red [s] | 1.5 | 2.1 | 0.0 | 1.5 | 2.1 | 0.0 | 1.8 | 1.8 | 0.0 | 1.8 | 1.8 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.8 | 0.0 | 3.5 | 4.8 | 0.0 | 2.8 | 5.0 | 0.0 | 2.8 | 5.1 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 29 | 47 | 0 | 26 | 44 | 0 | 21 | 42 | 0 | 25 | 46 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 7 | 15 | 0 | 10 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | Yes | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 6.80 | 6.80 | 6.80 | 6.80 | 4.80 | 7.00 | 4.80 | 7.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.80 | 0.00 | 4.80 | 2.80 | 5.00 | 2.80 | 5.10 |
| g_i, Effective Green Time [s] | 51 | 25 | 51 | 22 | 16 | 50 | 20 | 54 |
| g / C, Green / Cycle | 0.36 | 0.18 | 0.36 | 0.16 | 0.12 | 0.36 | 0.14 | 0.39 |
| (v / s)_i Volume / Saturation Flow Rate | 0.28 | 0.06 | 0.29 | 0.13 | 0.11 | 0.37 | 0.15 | 0.35 |
| s, saturation flow rate [veh/h] | 1382 | 3560 | 1454 | 3560 | 3459 | 5094 | 3459 | 5094 |
| c, Capacity [veh/h] | 471 | 630 | 551 | 555 | 400 | 1834 | 499 | 1976 |
| d1, Uniform Delay [s] | 37.67 | 50.51 | 38.68 | 57.27 | 61.49 | 44.80 | 59.90 | 40.47 |
| k, delay calibration | 0.50 | 0.11 | 0.48 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 13.95 | 0.33 | 9.74 | 3.25 | 11.97 | 31.29 | 36.34 | 7.56 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.81 | 0.35 | 0.77 | 0.83 | 0.95 | 1.04 | 1.06 | 0.91 |
| d, Delay for Lane Group [s/veh] | 51.62 | 50.84 | 48.43 | 60.52 | 73.46 | 76.09 | 96.24 | 48.03 |
| Lane Group LOS | D | D | D | E | E | F | F | D |
| Critical Lane Group | Yes | No | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 12.29 | 3.39 | 13.74 | 8.15 | 7.20 | 25.46 | 11.12 | 19.83 |
| 50th-Percentile Queue Length [m/ln] | 93.62 | 25.83 | 104.67 | 62.12 | 54.86 | 194.00 | 84.73 | 151.12 |
| 95th-Percentile Queue Length [veh/ln] | 18.04 | 6.10 | 19.81 | 12.84 | 11.60 | 34.61 | 17.02 | 27.14 |
| 95th-Percentile Queue Length [m/ln] | 137.43 | 46.50 | 150.99 | 97.80 | 88.39 | 263.74 | 129.72 | 206.77 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 51.62 | 50.84 | 0.00 | 48.43 | 60.52 | 0.00 | 73.46 | 76.09 | 0.00 | 96.24 | 48.03 | 0.00 |
| Movement LOS | D | D | | D | E | | E | F | | F | D | |
| d_A, Approach Delay [s/veh] | 32.98 | | | 36.04 | | | 65.10 | | | 51.21 | | |
| Approach LOS | C | | | D | | | E | | | D | | |
| d_I, Intersection Delay [s/veh] | 52.41 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.889 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 87.63 | 50.37 | 176.71 | 190.82 | 254.99 | 1276.29 | 118.03 | 400.79 |
| Stops [stops/h] | 315.94 | 174.34 | 353.22 | 419.27 | 370.23 | 1964.05 | 571.88 | 1529.89 |
| Fuel consumption [L/h] | 32.98 | 18.59 | 40.63 | 49.00 | 62.87 | 324.88 | 81.29 | 185.79 |
| CO [g/h] | 608.92 | 343.25 | 750.19 | 904.87 | 1160.86 | 5999.17 | 1501.04 | 3430.74 |
| NOx [g/h] | 118.47 | 66.78 | 145.96 | 176.06 | 225.86 | 1167.22 | 292.05 | 667.50 |
| VOC [g/h] | 141.12 | 79.55 | 173.86 | 209.71 | 269.04 | 1390.36 | 347.88 | 795.11 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 35.0 | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 39.38 | 0.00 | 0.00 | 59.43 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.778 | 0.000 | 0.000 | 3.874 |
| Crosswalk LOS | C | F | F | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 574 | 531 | 500 | 556 |
| d_b, Bicycle Delay [s] | 35.57 | 37.74 | 39.38 | 36.50 |
| l_b,int, Bicycle LOS Score for Intersection | 2.055 | 2.291 | 2.815 | 2.836 |
| Bicycle LOS | B | B | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 2: Hwy 16A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 41.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.799 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 50.00 | 75.00 | 30.48 | 30.48 | 150.00 | 30.48 | 100.00 | 150.00 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 200.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | No | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 24 | 0 | 211 | 0 | 0 | 0 | 0 | 1550 | 62 | 60 | 1541 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 3 | 146 | 24 | 598 | 157 | 506 | 496 | 269 | 8 | 26 | 454 | 553 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 52 | 0 | 88 | 52 | -52 | 0 | 0 | -88 | 88 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 27 | 146 | 235 | 650 | 157 | 594 | 548 | 1767 | 70 | 86 | 1907 | 641 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 37 | 59 | 163 | 39 | 149 | 137 | 442 | 18 | 22 | 477 | 160 |
| Total Analysis Volume [veh/h] | 27 | 146 | 235 | 650 | 157 | 594 | 548 | 1767 | 70 | 86 | 1907 | 641 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 4 | 30 | 0 | 20 | 46 | 0 | 16 | 40 | 0 | 15 | 39 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 27 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 13 | 39 | 0 | 32 | 58 | 0 | 29 | 51 | 0 | 18 | 40 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 12 | 10 | 0 | 12 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 5.50 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.00 | 3.50 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 45 | 13 | 27 | 35 | 23 | 65 | 12 | 53 |
| g / C, Green / Cycle | 0.32 | 0.09 | 0.19 | 0.25 | 0.16 | 0.46 | 0.08 | 0.38 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.08 | 0.19 | 0.08 | 0.16 | 0.35 | 0.05 | 0.37 |
| s, saturation flow rate [veh/h] | 1328 | 1870 | 3459 | 1870 | 3459 | 5094 | 1781 | 5094 |
| c, Capacity [veh/h] | 424 | 175 | 655 | 468 | 568 | 2351 | 147 | 1935 |
| d1, Uniform Delay [s] | 32.96 | 62.37 | 56.66 | 42.95 | 58.09 | 31.09 | 61.89 | 43.03 |
| k, delay calibration | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.06 | 9.82 | 14.77 | 0.42 | 11.00 | 2.27 | 3.63 | 17.31 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.06 | 0.83 | 0.99 | 0.34 | 0.96 | 0.75 | 0.58 | 0.99 |
| d, Delay for Lane Group [s/veh] | 33.02 | 72.19 | 71.43 | 43.37 | 69.10 | 33.36 | 65.52 | 60.33 |
| Lane Group LOS | C | E | E | D | E | C | E | E |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.65 | 5.60 | 12.79 | 4.55 | 10.22 | 15.96 | 3.03 | 23.75 |
| 50th-Percentile Queue Length [m/ln] | 4.95 | 42.65 | 97.44 | 34.67 | 77.87 | 121.63 | 23.09 | 180.98 |
| 95th-Percentile Queue Length [veh/ln] | 1.17 | 9.48 | 18.65 | 8.05 | 15.46 | 22.51 | 5.46 | 31.74 |
| 95th-Percentile Queue Length [m/ln] | 8.91 | 72.21 | 142.13 | 61.33 | 117.82 | 171.56 | 41.57 | 241.88 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 33.02 | 72.19 | 0.00 | 71.43 | 43.37 | 0.00 | 69.10 | 33.36 | 0.00 | 65.52 | 60.33 | 0.00 |
| Movement LOS | C | E | | E | D | | E | C | | E | E | |
| d_A, Approach Delay [s/veh] | 28.02 | | | 38.00 | | | 40.59 | | | 45.82 | | |
| Approach LOS | C | | | D | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 41.75 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.799 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 3.72 | 20.14 | 111.64 | 26.96 | 346.31 | 1116.67 | 57.71 | 1279.64 |
| Stops [stops/h] | 16.71 | 143.92 | 657.63 | 117.01 | 525.57 | 1231.33 | 77.93 | 1832.18 |
| Fuel consumption [L/h] | 1.42 | 13.26 | 61.13 | 10.43 | 86.65 | 204.15 | 13.37 | 294.72 |
| CO [g/h] | 26.15 | 244.89 | 1128.84 | 192.68 | 1600.05 | 3769.74 | 246.79 | 5442.25 |
| NOx [g/h] | 5.09 | 47.65 | 219.63 | 37.49 | 311.31 | 733.46 | 48.02 | 1058.86 |
| VOC [g/h] | 6.06 | 56.76 | 261.62 | 44.66 | 370.83 | 873.67 | 57.20 | 1261.29 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 61.29 | 0.00 | 61.29 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 2.728 | 0.000 | 3.663 |
| Crosswalk LOS | F | B | F | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 471 | 743 | 633 | 476 |
| d_b, Bicycle Delay [s] | 40.89 | 27.66 | 32.71 | 40.66 |
| l_b,int, Bicycle LOS Score for Intersection | 1.845 | 2.891 | 2.833 | 2.656 |
| Bicycle LOS | A | C | C | B |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 3: Hwy 16A & S Park Dr/N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 65.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.810 |

**Intersection Setup**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.50 | 3.66 | 3.66 | 3.50 | 3.66 |
| No. of Lanes in Entry Pocket | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 170.00 | 30.48 | 400.00 | 250.00 | 30.48 | 160.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 271 | 85 | 276 | 252 | 111 | 49 | 27 | 1084 | 251 | 450 | 957 | 157 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.50 | 0.50 | 2.00 | 2.00 | 0.50 | 0.50 | 0.50 | 0.00 | 0.50 | 2.00 | 0.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 126 | 89 | 46 | 161 | 450 | 477 | 638 | 0 | 95 | 734 | 133 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 46 | 0 | 0 | 46 | -46 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 271 | 211 | 365 | 344 | 272 | 499 | 550 | 1676 | 251 | 545 | 1691 | 290 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 68 | 53 | 91 | 86 | 68 | 125 | 138 | 419 | 63 | 136 | 423 | 73 |
| Total Analysis Volume [veh/h] | 271 | 211 | 365 | 344 | 272 | 499 | 550 | 1676 | 251 | 545 | 1691 | 290 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Overlap | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 9 | 32 | 0 | 16 | 39 | 0 | 19 | 38 | 0 | 19 | 38 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 32 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 18 | 45 | 0 | 20 | 47 | 0 | 28 | 46 | 0 | 29 | 47 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 7 | 15 | 0 | 14 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 5.50 | 6.00 | 6.00 | 5.50 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 3.50 | 4.00 | 4.00 | 3.50 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 13 | 34 | 34 | 15 | 36 | 22 | 44 | 23 | 45 |
| g / C, Green / Cycle | 0.09 | 0.24 | 0.24 | 0.10 | 0.26 | 0.16 | 0.32 | 0.16 | 0.32 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.11 | 0.23 | 0.10 | 0.08 | 0.16 | 0.32 | 0.16 | 0.33 |
| s, saturation flow rate [veh/h] | 3500 | 1892 | 1609 | 3459 | 3603 | 3500 | 5176 | 3459 | 5176 |
| c, Capacity [veh/h] | 313 | 461 | 392 | 358 | 929 | 550 | 1634 | 568 | 1671 |
| d1, Uniform Delay [s] | 62.93 | 45.07 | 51.80 | 62.46 | 41.70 | 59.00 | 47.90 | 58.03 | 47.40 |
| k, delay calibration | 0.11 | 0.11 | 0.30 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.24 | 0.71 | 21.65 | 14.50 | 0.17 | 17.82 | 29.09 | 10.30 | 25.04 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.87 | 0.46 | 0.93 | 0.96 | 0.29 | 1.00 | 1.03 | 0.96 | 1.01 |
| d, Delay for Lane Group [s/veh] | 70.17 | 45.78 | 73.45 | 76.97 | 41.87 | 76.82 | 76.99 | 68.34 | 72.44 |
| Lane Group LOS | E | D | E | E | D | E | F | E | F |
| Critical Lane Group | No | No | Yes | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 5.09 | 6.38 | 14.87 | 6.82 | 3.84 | 10.82 | 22.56 | 10.10 | 22.41 |
| 50th-Percentile Queue Length [m/ln] | 38.75 | 48.64 | 113.29 | 51.97 | 29.25 | 82.47 | 171.91 | 76.99 | 170.77 |
| 95th-Percentile Queue Length [veh/ln] | 8.78 | 10.53 | 21.19 | 11.10 | 6.91 | 16.22 | 30.87 | 15.32 | 30.42 |
| 95th-Percentile Queue Length [m/ln] | 66.93 | 80.22 | 161.48 | 84.60 | 52.65 | 123.58 | 235.26 | 116.71 | 231.82 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 70.17 | 45.78 | 73.45 | 76.97 | 41.87 | 0.00 | 76.82 | 76.99 | 0.00 | 68.34 | 72.44 | 0.00 |
| Movement LOS | E | D | E | E | D | | E | F | | E | F | |
| d_A, Approach Delay [s/veh] | 65.51 | | | 61.47 | | | 69.15 | | | 63.24 | | |
| Approach LOS | E | | | E | | | E | | | E | | |
| d_I, Intersection Delay [s/veh] | 65.60 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.810 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 35.48 | 27.62 | 47.78 | 45.47 | 35.95 | 837.23 | 2551.28 | 344.42 | 1068.64 |
| Stops [stops/h] | 261.54 | 164.15 | 382.30 | 350.73 | 197.42 | 556.60 | 1740.34 | 519.60 | 1728.80 |
| Fuel consumption [L/h] | 23.89 | 13.75 | 33.77 | 32.59 | 16.62 | 130.51 | 400.46 | 85.68 | 277.88 |
| CO [g/h] | 441.14 | 253.93 | 623.62 | 601.72 | 306.92 | 2409.94 | 7394.77 | 1582.13 | 5131.23 |
| NOx [g/h] | 85.83 | 49.41 | 121.33 | 117.07 | 59.72 | 468.89 | 1438.75 | 307.82 | 998.35 |
| VOC [g/h] | 102.24 | 58.85 | 144.53 | 139.45 | 71.13 | 558.53 | 1713.81 | 366.67 | 1189.21 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 59.43 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 3.664 | 0.000 |
| Crosswalk LOS | F | F | D | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 557 | 586 | 561 | 576 |
| d_b, Bicycle Delay [s] | 36.43 | 35.00 | 36.22 | 35.50 |
| l_b,int, Bicycle LOS Score for Intersection | 2.369 | 2.179 | 2.784 | 2.900 |
| Bicycle LOS | B | B | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Boulder Blvd & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 19.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.696 |

**Intersection Setup**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 221 | 22 | 33 | 5 | 35 | 4 | 2 | 10 | 254 | 80 | 17 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 30 | 706 | 0 | 0 | 628 | 27 | 13 | 0 | 29 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 36 | 0 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 251 | 764 | 33 | 5 | 699 | 31 | 15 | 10 | 283 | 80 | 17 | 2 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 63 | 191 | 8 | 1 | 175 | 8 | 4 | 3 | 71 | 20 | 4 | 1 |
| Total Analysis Volume [veh/h] | 251 | 764 | 33 | 5 | 699 | 31 | 15 | 10 | 283 | 80 | 17 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 5 | 23 | 0 | 0 | 14 | 0 | 0 | 29 | 0 | 0 | 29 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 6 | 0 | 0 | 9 | 0 | 0 | 15 | 0 | 0 | 12 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 9 | 27 | 0 | 0 | 18 | 0 | 0 | 63 | 0 | 0 | 63 | 0 |
| Lead / Lag | Lead | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | | No | | | No | | | No | |
| Maximum Recall | No | No | | | No | | | No | | | No | |
| Pedestrian Recall | No | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | C | R | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 62 | 62 | 62 | 53 | 53 | 20 | 20 | 20 |
| g / C, Green / Cycle | 0.69 | 0.69 | 0.69 | 0.59 | 0.59 | 0.22 | 0.22 | 0.22 |
| (v / s)_i Volume / Saturation Flow Rate | 0.33 | 0.45 | 0.02 | 0.01 | 0.44 | 0.02 | 0.20 | 0.10 |
| s, saturation flow rate [veh/h] | 760 | 1683 | 1431 | 613 | 1670 | 1455 | 1431 | 980 |
| c, Capacity [veh/h] | 416 | 1156 | 982 | 252 | 980 | 391 | 321 | 292 |
| d1, Uniform Delay [s] | 13.71 | 8.09 | 4.52 | 23.51 | 13.65 | 27.48 | 33.75 | 31.04 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.38 | 2.98 | 0.06 | 0.14 | 5.13 | 0.07 | 7.87 | 0.68 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.60 | 0.66 | 0.03 | 0.02 | 0.74 | 0.06 | 0.88 | 0.34 |
| d, Delay for Lane Group [s/veh] | 20.09 | 11.07 | 4.58 | 23.65 | 18.78 | 27.55 | 41.61 | 31.72 |
| Lane Group LOS | C | B | A | C | B | C | D | C |
| Critical Lane Group | Yes | No | No | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.19 | 7.78 | 0.18 | 0.09 | 10.97 | 0.43 | 6.51 | 1.90 |
| 50th-Percentile Queue Length [m/ln] | 16.68 | 59.31 | 1.39 | 0.66 | 83.56 | 3.24 | 49.64 | 14.49 |
| 95th-Percentile Queue Length [veh/ln] | 3.94 | 12.36 | 0.33 | 0.15 | 16.40 | 0.77 | 10.70 | 3.42 |
| 95th-Percentile Queue Length [m/ln] | 30.02 | 94.18 | 2.50 | 1.18 | 124.94 | 5.84 | 81.54 | 26.07 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 20.09 | 11.07 | 4.58 | 23.65 | 18.78 | 18.78 | 27.55 | 27.55 | 41.61 | 31.72 | 31.72 | 31.72 |
| Movement LOS | C | B | A | C | B | B | C | C | D | C | C | C |
| d_A, Approach Delay [s/veh] | 13.02 | | | 18.82 | | | 40.47 | | | 31.72 | | |
| Approach LOS | B | | | B | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 19.67 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.696 | | | | | | | | | | | |

**Emissions**

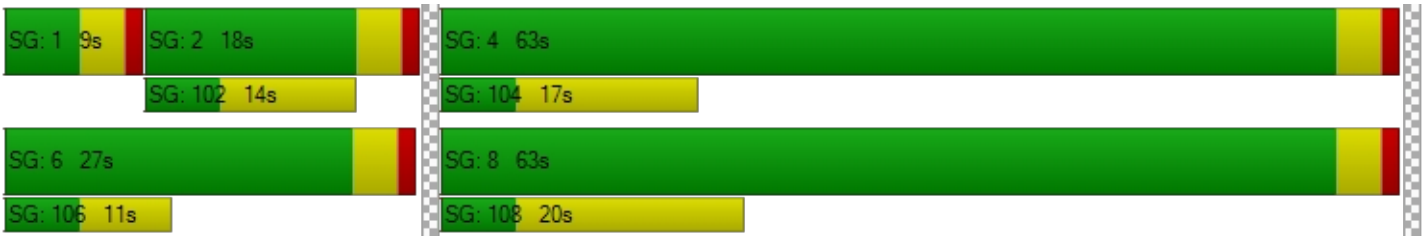
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 33.17 | 100.98 | 4.36 | 0.90 | 131.74 | 7.82 | 88.48 | 27.51 |
| Stops [stops/h] | 87.54 | 311.36 | 7.29 | 3.44 | 438.63 | 17.02 | 260.58 | 76.04 |
| Fuel consumption [L/h] | 9.00 | 23.11 | 0.70 | 0.25 | 32.94 | 1.66 | 23.34 | 6.74 |
| CO [g/h] | 166.26 | 426.66 | 12.83 | 4.69 | 608.19 | 30.58 | 430.90 | 124.49 |
| NOx [g/h] | 32.35 | 83.01 | 2.50 | 0.91 | 118.33 | 5.95 | 83.84 | 24.22 |
| VOC [g/h] | 38.53 | 98.88 | 2.97 | 1.09 | 140.95 | 7.09 | 99.87 | 28.85 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.841 | 2.473 | 2.364 | 1.798 |
| Crosswalk LOS | C | B | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 511 | 311 | 1311 | 1311 |
| d_b, Bicycle Delay [s] | 24.94 | 32.09 | 5.34 | 5.34 |
| l_b,int, Bicycle LOS Score for Intersection | 3.289 | 2.772 | 2.068 | 1.723 |
| Bicycle LOS | C | C | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 5: N Park Dr & Quartz Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 51.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.841 |

**Intersection Setup**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 33 | 0 | 10 | 50 | 0 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 306 | 413 | 5 | 396 | 260 | 6 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | -24 | 60 | 0 | 0 | 36 | 24 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 315 | 473 | 15 | 446 | 296 | 40 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 79 | 118 | 4 | 112 | 74 | 10 |
| Total Analysis Volume [veh/h] | 315 | 473 | 15 | 446 | 296 | 40 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.02 | 0.00 | 0.84 | 0.06 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 9.41 | 0.00 | 51.20 | 10.25 |
| Movement LOS | A | A | A | A | F | B |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.06 | 0.00 | 7.60 | 0.17 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.42 | 0.00 | 57.92 | 1.33 |
| d_A, Approach Delay [s/veh] | 0.00 | | 0.31 | | 46.32 | |
| Approach LOS | A | | A | | E | |
| d_I, Intersection Delay [s/veh] | 9.91 | | | | | |
| Intersection LOS | F | | | | | |

**Intersection Level Of Service Report**
**Intersection 6: 28 St & Site Access #1**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 24.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.779 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Site Access #1 | | | Comm Access | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Site Access #1 | | | Comm Access | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 428 | 408 | 359 | 8 | 524 | 28 | 10 | 57 | 517 | 220 | 63 | 26 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 60 | 19 | 61 | 0 | 67 | 0 | 24 | 0 | 36 | 36 | 0 | 25 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 488 | 427 | 420 | 8 | 591 | 28 | 34 | 57 | 553 | 256 | 63 | 51 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 122 | 107 | 105 | 2 | 148 | 7 | 9 | 14 | 138 | 64 | 16 | 13 |
| Total Analysis Volume [veh/h] | 488 | 427 | 420 | 8 | 591 | 28 | 34 | 57 | 553 | 256 | 63 | 51 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Overlap | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 3 | 8 | 12 | 7 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | 1,8,12 | | | |
| Maximum Green [s] | 14 | 48 | 0 | 5 | 39 | 0 | 5 | 24 | 5 | 7 | 26 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 18 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 21 | 52 | 0 | 9 | 40 | 0 | 9 | 28 | 9 | 11 | 30 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 5 | 5 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | No | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | No | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | No | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | R | L | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 57 | 48 | 48 | 57 | 36 | 36 | 35 | 24 | 141 | 35 | 26 |
| g / C, Green / Cycle | 0.57 | 0.48 | 0.48 | 0.57 | 0.36 | 0.36 | 0.35 | 0.24 | 1.41 | 0.35 | 0.26 |
| (v / s)_i Volume / Saturation Flow Rate | 0.48 | 0.25 | 0.29 | 0.01 | 0.19 | 0.19 | 0.03 | 0.03 | 0.39 | 0.35 | 0.07 |
| s, saturation flow rate [veh/h] | 1017 | 1683 | 1431 | 710 | 1683 | 1656 | 1241 | 1683 | 1431 | 730 | 1560 |
| c, Capacity [veh/h] | 578 | 808 | 687 | 382 | 606 | 596 | 471 | 404 | 2017 | 293 | 406 |
| d1, Uniform Delay [s] | 16.44 | 18.12 | 19.14 | 11.66 | 25.13 | 25.15 | 21.76 | 29.89 | 0.00 | 36.88 | 29.54 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 14.05 | 2.47 | 4.04 | 0.10 | 3.10 | 3.16 | 0.30 | 0.73 | 0.34 | 28.15 | 1.73 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.65 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.84 | 0.53 | 0.61 | 0.02 | 0.51 | 0.52 | 0.07 | 0.14 | 0.27 | 0.87 | 0.28 |
| d, Delay for Lane Group [s/veh] | 30.49 | 20.59 | 23.17 | 11.76 | 28.24 | 28.31 | 22.06 | 30.62 | 0.34 | 65.03 | 31.27 |
| Lane Group LOS | C | C | C | B | C | C | C | C | A | E | C |
| Critical Lane Group | No | No | No | No | No | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 8.61 | 7.17 | 7.64 | 0.08 | 6.22 | 6.14 | 0.57 | 1.16 | 0.19 | 8.67 | 2.37 |
| 50th-Percentile Queue Length [m/ln] | 65.63 | 54.62 | 58.24 | 0.64 | 47.39 | 46.82 | 4.31 | 8.82 | 1.44 | 66.04 | 18.04 |
| 95th-Percentile Queue Length [veh/ln] | 13.43 | 11.56 | 12.18 | 0.15 | 10.31 | 10.21 | 1.02 | 2.08 | 0.34 | 13.50 | 4.26 |
| 95th-Percentile Queue Length [m/ln] | 102.30 | 88.08 | 92.79 | 1.15 | 78.55 | 77.80 | 7.76 | 15.87 | 2.59 | 102.84 | 32.48 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 30.49 | 20.59 | 23.17 | 11.76 | 28.27 | 28.31 | 22.06 | 30.62 | 0.34 | 65.03 | 31.27 | 31.27 |
| Movement LOS | C | C | C | B | C | C | C | C | A | E | C | C |
| d_A, Approach Delay [s/veh] | 25.02 | | | 28.06 | | | 4.16 | | | 54.63 | | |
| Approach LOS | C | | | C | | | A | | | D | | |
| d_I, Intersection Delay [s/veh] | 24.83 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.779 | | | | | | | | | | | |

**Emissions**

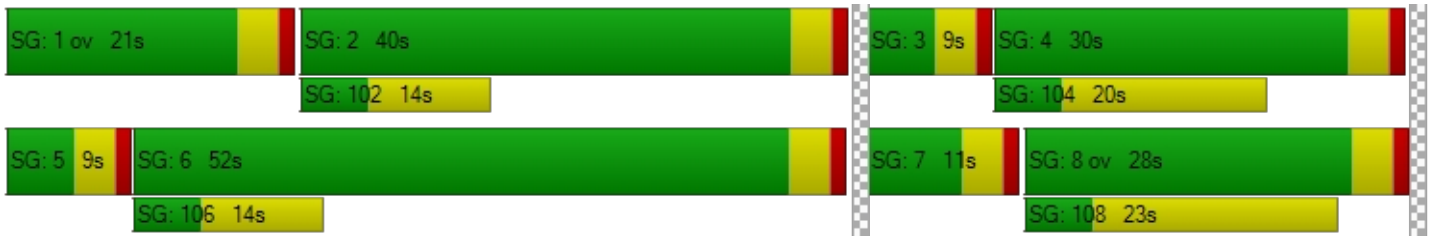
| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 83.81 | 73.34 | 72.13 | 1.14 | 44.24 | 43.62 | 2.49 | 4.18 | 40.54 | 9.79 | 4.36 |
| Stops [stops/h] | 310.05 | 258.07 | 275.15 | 3.01 | 223.88 | 221.20 | 20.37 | 41.66 | 6.79 | 312.02 | 85.24 |
| Fuel consumption [L/h] | 26.06 | 19.27 | 20.24 | 0.25 | 15.74 | 15.55 | 1.25 | 2.62 | 4.21 | 20.30 | 4.95 |
| CO [g/h] | 481.24 | 355.83 | 373.69 | 4.53 | 290.73 | 287.19 | 22.99 | 48.39 | 77.77 | 374.78 | 91.41 |
| NOx [g/h] | 93.63 | 69.23 | 72.71 | 0.88 | 56.57 | 55.88 | 4.47 | 9.42 | 15.13 | 72.92 | 17.78 |
| VOC [g/h] | 111.53 | 82.47 | 86.61 | 1.05 | 67.38 | 66.56 | 5.33 | 11.22 | 18.02 | 86.86 | 21.18 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 41.41 | 41.41 | 41.41 | 41.41 |
| l_p,int, Pedestrian LOS Score for Intersectio | 3.204 | 2.542 | 2.700 | 2.230 |
| Crosswalk LOS | C | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 960 | 720 | 480 | 520 |
| d_b, Bicycle Delay [s] | 13.52 | 20.48 | 28.88 | 27.38 |
| l_b,int, Bicycle LOS Score for Intersection | 2.661 | 2.077 | 2.622 | 2.170 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 7: Quartz Ave & Site Access #2**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 36.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.729 |

**Intersection Setup**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 216 | 279 | 53 | 365 | 158 | 49 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 60 | 0 | 0 | 60 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 276 | 279 | 53 | 425 | 158 | 49 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 69 | 70 | 13 | 106 | 40 | 12 |
| Total Analysis Volume [veh/h] | 276 | 279 | 53 | 425 | 158 | 49 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.73 | 0.36 | 0.00 | 0.00 | 0.15 | 0.00 |
| d_M, Delay for Movement [s/veh] | 36.23 | 12.26 | 0.00 | 0.00 | 8.66 | 0.00 |
| Movement LOS | E | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 5.61 | 1.65 | 0.00 | 0.00 | 0.39 | 0.39 |
| 95th-Percentile Queue Length [m/ln] | 42.78 | 12.57 | 0.00 | 0.00 | 2.94 | 2.94 |
| d_A, Approach Delay [s/veh] | 24.18 | | 0.00 | | 6.61 | |
| Approach LOS | C | | A | | A | |
| d_I, Intersection Delay [s/veh] | 11.93 | | | | | |
| Intersection LOS | E | | | | | |

**Intersection Level Of Service Report**
**Intersection 8: Quartz Ave & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 11.5 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.308 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Quartz Ave | | | Quartz Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.50 | 3.66 | 3.66 | 3.50 | 3.50 | 3.50 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 30.48 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Quartz Ave | | | Quartz Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 0.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 16 | 294 | 135 | 6 | 372 | 116 | 104 | 99 | 129 | 59 | 75 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 6 | 61 | 0 | 31 | 0 | 0 | 0 | 0 | 36 | 0 | 25 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 16 | 300 | 196 | 6 | 403 | 116 | 104 | 99 | 129 | 95 | 75 | 25 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 75 | 49 | 2 | 101 | 29 | 26 | 25 | 32 | 24 | 19 | 6 |
| Total Analysis Volume [veh/h] | 16 | 300 | 196 | 6 | 403 | 116 | 104 | 99 | 129 | 95 | 75 | 25 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 60 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 38 | 0 | 0 | 38 | 0 | 0 | 18 | 0 | 0 | 18 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 15 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 34 | 0 | 0 | 34 | 0 | 0 | 26 | 0 | 0 | 26 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 35 | 35 | 35 | 35 | 35 | 35 | 17 | 17 | 17 | 17 |
| g / C, Green / Cycle | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.28 | 0.28 | 0.28 | 0.28 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.15 | 0.16 | 0.01 | 0.16 | 0.16 | 0.09 | 0.15 | 0.09 | 0.06 |
| s, saturation flow rate [veh/h] | 794 | 1710 | 1490 | 811 | 1710 | 1581 | 1184 | 1530 | 1037 | 1612 |
| c, Capacity [veh/h] | 504 | 1000 | 871 | 513 | 1000 | 925 | 348 | 431 | 237 | 454 |
| d1, Uniform Delay [s] | 8.18 | 6.11 | 6.14 | 8.04 | 6.13 | 6.15 | 21.44 | 18.18 | 25.99 | 16.49 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.12 | 0.64 | 0.76 | 0.04 | 0.66 | 0.73 | 0.48 | 1.01 | 1.09 | 0.24 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.03 | 0.26 | 0.27 | 0.01 | 0.27 | 0.27 | 0.30 | 0.53 | 0.40 | 0.22 |
| d, Delay for Lane Group [s/veh] | 8.29 | 6.74 | 6.90 | 8.08 | 6.79 | 6.88 | 21.91 | 19.18 | 27.08 | 16.73 |
| Lane Group LOS | A | A | A | A | A | A | C | B | C | B |
| Critical Lane Group | No | No | No | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.11 | 1.43 | 1.31 | 0.04 | 1.47 | 1.40 | 1.25 | 2.55 | 1.31 | 1.00 |
| 50th-Percentile Queue Length [m/ln] | 0.84 | 10.88 | 10.00 | 0.31 | 11.19 | 10.65 | 9.52 | 19.43 | 10.02 | 7.60 |
| 95th-Percentile Queue Length [veh/ln] | 0.20 | 2.57 | 2.36 | 0.07 | 2.64 | 2.52 | 2.25 | 4.59 | 2.37 | 1.79 |
| 95th-Percentile Queue Length [m/ln] | 1.51 | 19.58 | 18.00 | 0.56 | 20.13 | 19.18 | 17.14 | 34.97 | 18.03 | 13.68 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.29 | 6.76 | 6.90 | 8.08 | 6.82 | 6.88 | 21.91 | 19.18 | 19.18 | 27.08 | 16.73 | 16.73 |
| Movement LOS | A | A | A | A | A | A | C | B | B | C | B | B |
| d_A, Approach Delay [s/veh] | 6.86 | | | 6.85 | | | 20.04 | | | 21.77 | | |
| Approach LOS | A | | | A | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 11.51 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.308 | | | | | | | | | | | |

**Emissions**

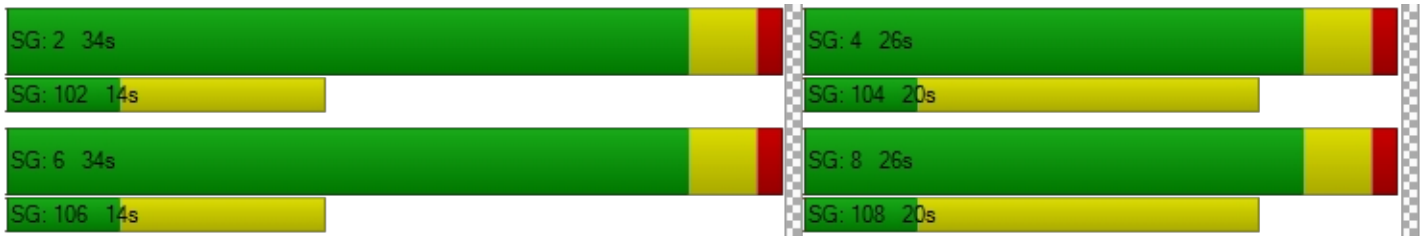
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 2.27 | 37.10 | 33.30 | 0.94 | 41.81 | 39.29 | 21.95 | 48.13 | 19.16 | 20.17 |
| Stops [stops/h] | 6.61 | 85.64 | 78.73 | 2.43 | 88.07 | 83.88 | 74.97 | 153.00 | 78.89 | 59.83 |
| Fuel consumption [L/h] | 0.46 | 6.74 | 6.12 | 0.18 | 7.29 | 6.89 | 5.45 | 11.23 | 5.49 | 4.49 |
| CO [g/h] | 8.50 | 124.50 | 112.97 | 3.31 | 134.62 | 127.25 | 100.62 | 207.36 | 101.32 | 82.97 |
| NOx [g/h] | 1.65 | 24.22 | 21.98 | 0.64 | 26.19 | 24.76 | 19.58 | 40.34 | 19.71 | 16.14 |
| VOC [g/h] | 1.97 | 28.85 | 26.18 | 0.77 | 31.20 | 29.49 | 23.32 | 48.06 | 23.48 | 19.23 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 21.68 | 21.68 | 21.68 | 21.68 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.638 | 2.614 | 2.119 | 2.091 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1000 | 1000 | 733 | 733 |
| d_b, Bicycle Delay [s] | 7.50 | 7.50 | 12.03 | 12.03 |
| l_b,int, Bicycle LOS Score for Intersection | 1.982 | 2.104 | 2.107 | 1.881 |
| Bicycle LOS | A | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 9: Slate Ave & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 16.5 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.283 |

**Intersection Setup**

| Name | N Park Dr | | | N Park Dr | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | N Park Dr | | | N Park Dr | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 12 | 168 | 133 | 0 | 228 | 0 | 11 | 0 | 48 | 125 | 4 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 22 | 178 | 133 | 0 | 238 | 10 | 21 | 0 | 58 | 125 | 4 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 45 | 33 | 0 | 60 | 3 | 5 | 0 | 15 | 31 | 1 | 0 |
| Total Analysis Volume [veh/h] | 22 | 178 | 133 | 0 | 238 | 10 | 21 | 0 | 58 | 125 | 4 | 0 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.07 | 0.28 | 0.01 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 12.99 | 0.00 | 10.21 | 16.45 | 15.77 | 12.47 |
| Movement LOS | A | A | | | A | A | B | | B | C | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.39 | 0.00 | 0.39 | 1.20 | 1.20 | 1.20 |
| 95th-Percentile Queue Length [m/ln] | 0.28 | 0.28 | 0.00 | 0.00 | 0.00 | 0.00 | 2.97 | 0.00 | 2.97 | 9.11 | 9.11 | 9.11 |
| d_A, Approach Delay [s/veh] | 0.85 | | | 0.00 | | | 10.95 | | | 16.43 | | |
| Approach LOS | A | | | A | | | B | | | C | | |
| d_I, Intersection Delay [s/veh] | 4.81 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 10: Slate Ave & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 17.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.407 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 125 | 147 | 126 | 0 | 218 | 66 | 22 | 59 | 154 | 122 | 75 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 52 | -21 | 0 | 0 | 0 | 0 | 21 | 0 | 31 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 177 | 126 | 126 | 0 | 218 | 66 | 43 | 59 | 185 | 122 | 75 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 44 | 32 | 32 | 0 | 55 | 17 | 11 | 15 | 46 | 31 | 19 | 0 |
| Total Analysis Volume [veh/h] | 177 | 126 | 126 | 0 | 218 | 66 | 43 | 59 | 185 | 122 | 75 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 41 | 0 | 0 | 41 | 0 | 0 | 41 | 0 | 0 | 41 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 6 | 0 | 0 | 6 | 0 | 0 | 12 | 0 | 0 | 6 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 45 | 0 | 0 | 45 | 0 | 0 | 45 | 0 | 0 | 45 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | C |
|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 59 | 59 | 59 | 23 | 23 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.65 | 0.26 | 0.26 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.16 | 0.18 | 0.19 | 0.23 |
| s, saturation flow rate [veh/h] | 985 | 1547 | 1617 | 1532 | 867 |
| c, Capacity [veh/h] | 623 | 1005 | 1090 | 447 | 291 |
| d1, Uniform Delay [s] | 6.81 | 6.60 | 6.70 | 30.25 | 32.50 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 1.14 | 0.60 | 0.58 | 1.55 | 2.73 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.28 | 0.25 | 0.26 | 0.64 | 0.68 |
| d, Delay for Lane Group [s/veh] | 7.95 | 7.20 | 7.28 | 31.80 | 35.24 |
| Lane Group LOS | A | A | A | C | D |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.47 | 1.93 | 2.19 | 5.71 | 4.33 |
| 50th-Percentile Queue Length [m/ln] | 11.23 | 14.70 | 16.70 | 43.49 | 32.97 |
| 95th-Percentile Queue Length [veh/ln] | 2.65 | 3.47 | 3.95 | 9.63 | 7.74 |
| 95th-Percentile Queue Length [m/ln] | 20.22 | 26.46 | 30.07 | 73.34 | 58.96 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.95 | 7.20 | 7.20 | 7.28 | 7.28 | 7.28 | 31.80 | 31.80 | 31.80 | 35.24 | 35.24 | 35.24 |
| Movement LOS | A | A | A | A | A | A | C | C | C | D | D | D |
| d_A, Approach Delay [s/veh] | 7.51 | | | 7.28 | | | 31.80 | | | 35.24 | | |
| Approach LOS | A | | | A | | | C | | | D | | |
| d_I, Intersection Delay [s/veh] | 17.84 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.407 | | | | | | | | | | | |

**Emissions**

| | | | | | |
|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 27.66 | 39.38 | 54.54 | 36.56 | 7.53 |
| Stops [stops/h] | 58.97 | 77.16 | 87.69 | 228.29 | 173.07 |
| Fuel consumption [L/h] | 5.00 | 6.82 | 8.71 | 15.35 | 9.70 |
| CO [g/h] | 92.25 | 126.02 | 160.81 | 283.37 | 179.04 |
| NOx [g/h] | 17.95 | 24.52 | 31.29 | 55.13 | 34.83 |
| VOC [g/h] | 21.38 | 29.21 | 37.27 | 65.67 | 41.49 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.539 | 1.998 | 2.263 | 1.903 |
| Crosswalk LOS | B | A | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 911 | 911 | 911 | 911 |
| d_b, Bicycle Delay [s] | 13.34 | 13.34 | 13.34 | 13.34 |
| l_b,int, Bicycle LOS Score for Intersection | 2.267 | 2.028 | 2.033 | 1.885 |
| Bicycle LOS | B | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 11: N Park Dr & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.016 |

**Intersection Setup**

| Name | Keystone Dr | | N Park Dr | | N Park Dr | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [m] | 3.50 | 3.66 | 3.66 | 3.66 | 3.66 | 3.50 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Keystone Dr | | N Park Dr | | N Park Dr | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 10 | 10 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 106 | 43 | 135 | 122 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 10 | 116 | 53 | 145 | 122 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 29 | 13 | 36 | 31 | 0 |
| Total Analysis Volume [veh/h] | 10 | 116 | 53 | 145 | 122 | 0 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.02 | 0.12 | 0.04 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 11.59 | 9.54 | 7.52 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.49 | 0.49 | 0.09 | 0.09 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 3.74 | 3.74 | 0.69 | 0.69 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 9.70 | | 2.01 | | 0.00 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 3.63 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 12: N Park Dr & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 16.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.114 |

**Intersection Setup**

| Name | 28 St | | | | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 50.00 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | 28 St | | | | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 26 | 143 | 0 | 6 | 197 | 45 | 27 | 83 | 44 | 43 | 34 | 10 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 26 | 143 | 0 | 6 | 197 | 45 | 27 | 83 | 44 | 43 | 34 | 10 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 36 | 0 | 2 | 49 | 11 | 7 | 21 | 11 | 11 | 9 | 3 |
| Total Analysis Volume [veh/h] | 26 | 143 | 0 | 6 | 197 | 45 | 27 | 83 | 44 | 43 | 34 | 10 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.16 | 0.05 | 0.11 | 0.07 | 0.01 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.75 | 0.00 | 0.00 | 7.51 | 0.00 | 0.00 | 15.12 | 14.53 | 11.81 | 16.44 | 14.24 | 10.90 |
| Movement LOS | A | A | A | A | A | A | C | B | B | C | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.04 | 0.04 | 0.04 | 0.01 | 0.01 | 0.01 | 1.11 | 1.11 | 1.11 | 0.71 | 0.71 | 0.71 |
| 95th-Percentile Queue Length [m/ln] | 0.33 | 0.33 | 0.33 | 0.08 | 0.08 | 0.08 | 8.49 | 8.49 | 8.49 | 5.41 | 5.41 | 5.41 |
| d_A, Approach Delay [s/veh] | 1.19 | | | 0.18 | | | 13.86 | | | 14.94 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 5.59 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 13: N Park Dr & New Road B**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 25.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.068 |

**Intersection Setup**

| Name | Quartz Ave | | | New Road B | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Quartz Ave | | | New Road B | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 10 | 0 | 330 | 13 | 0 | 0 | 0 | 78 | 11 | 200 | 77 | 8 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 10 | 0 | 330 | 13 | 0 | 0 | 0 | 78 | 11 | 200 | 77 | 8 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 0 | 83 | 3 | 0 | 0 | 0 | 20 | 3 | 50 | 19 | 2 |
| Total Analysis Volume [veh/h] | 10 | 0 | 330 | 13 | 0 | 0 | 0 | 78 | 11 | 200 | 77 | 8 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Stop | Stop | Free | Free |
|---|---|---|---|---|
| Flared Lane | No | No | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.03 | 0.00 | 0.34 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.80 | 16.88 | 10.89 | 25.04 | 16.05 | 10.03 | 7.38 | 0.00 | 0.00 | 7.65 | 0.00 | 0.00 |
| Movement LOS | C | C | B | D | C | B | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 1.68 | 1.68 | 1.68 | 0.22 | 0.22 | 0.22 | 0.00 | 0.00 | 0.00 | 0.38 | 0.38 | 0.38 |
| 95th-Percentile Queue Length [m/ln] | 12.84 | 12.84 | 12.84 | 1.64 | 1.64 | 1.64 | 0.00 | 0.00 | 0.00 | 2.91 | 2.91 | 2.91 |
| d_A, Approach Delay [s/veh] | 11.06 | | | 25.04 | | | 0.00 | | | 5.37 | | |
| Approach LOS | B | | | D | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 7.73 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 14: N Park Dr & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 5.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.315 |

**Intersection Setup**

| Name | Boundary Rd | | Boundary Rd | | N Park Dr | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.50 | 3.66 | 3.66 | 3.50 | 3.50 | 3.50 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 75.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Boundary Rd | | Boundary Rd | | N Park Dr | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 175 | 0 | 239 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| Proportion of CAVs [%] | 0.00 | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 620 | 163 | 320 | 73 | 69 | 735 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 620 | 338 | 320 | 312 | 69 | 735 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 155 | 85 | 80 | 78 | 17 | 184 |
| Total Analysis Volume [veh/h] | 620 | 338 | 320 | 312 | 69 | 735 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPerm | Permissive | Permissive | Permissive | Permissive | Unsignalized |
|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 0 | 3 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Maximum Green [s] | 5 | 47 | 47 | 0 | 35 | 0 |
| Amber [s] | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 9 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Advanced Detector Location [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Advanced Detector Length [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Phasing & Timing: Pattern 1**

| | | | | | | |
|---|---|---|---|---|---|---|
| Split [s] | 10 | 28 | 18 | 0 | 62 | 0 |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 10 | 10 | 0 | 5 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | No | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L |
|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 77 | 77 | 67 | 67 | 5 |
| g / C, Green / Cycle | 0.86 | 0.86 | 0.75 | 0.75 | 0.05 |
| (v / s)_i Volume / Saturation Flow Rate | 0.68 | 0.09 | 0.17 | 0.20 | 0.04 |
| s, saturation flow rate [veh/h] | 911 | 3560 | 1870 | 1593 | 1810 |
| c, Capacity [veh/h] | 842 | 3057 | 1398 | 1191 | 95 |
| d1, Uniform Delay [s] | 2.47 | 0.99 | 3.45 | 3.58 | 42.01 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.70 | 0.07 | 0.38 | 0.55 | 10.13 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.74 | 0.11 | 0.23 | 0.27 | 0.73 |
| d, Delay for Lane Group [s/veh] | 8.17 | 1.07 | 3.82 | 4.12 | 52.14 |
| Lane Group LOS | A | A | A | A | D |
| Critical Lane Group | Yes | No | No | Yes | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.88 | 0.14 | 1.42 | 1.50 | 1.76 |
| 50th-Percentile Queue Length [m/ln] | 14.29 | 1.06 | 10.83 | 11.45 | 13.39 |
| 95th-Percentile Queue Length [veh/ln] | 3.38 | 0.25 | 2.56 | 2.70 | 3.16 |
| 95th-Percentile Queue Length [m/ln] | 25.73 | 1.90 | 19.49 | 20.61 | 24.11 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.17 | 1.07 | 3.83 | 4.12 | 52.14 | 0.00 |
| Movement LOS | A | A | A | A | D | |
| d_A, Approach Delay [s/veh] | 5.66 | | 3.97 | | 4.48 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.97 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.315 | | | | | |

**Emissions**

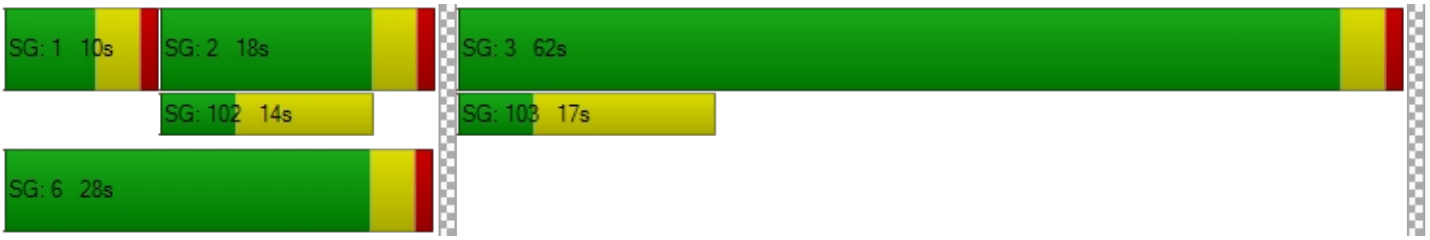
| | | | | | |
|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 257.19 | 140.21 | 183.42 | 183.42 | 7.33 |
| Stops [stops/h] | 75.04 | 11.08 | 56.84 | 60.09 | 70.31 |
| Fuel consumption [L/h] | 30.05 | 13.87 | 19.66 | 19.80 | 5.05 |
| CO [g/h] | 554.97 | 256.06 | 363.00 | 365.68 | 93.18 |
| NOx [g/h] | 107.98 | 49.82 | 70.63 | 71.15 | 18.13 |
| VOC [g/h] | 128.62 | 59.34 | 84.13 | 84.75 | 21.60 |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.559 | 2.395 | 2.958 |
| Crosswalk LOS | B | B | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 533 | 311 | 1289 |
| d_b, Bicycle Delay [s] | 24.20 | 32.09 | 5.69 |
| l_b,int, Bicycle LOS Score for Intersection | 2.350 | 2.081 | 1.670 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 15: New Road B & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 9.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.053 |

**Intersection Setup**

| Name | Keystone Dr | | | Keystone Dr | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Keystone Dr | | | Keystone Dr | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 10 | 33 | 4 | 59 | 0 | 0 | 0 | 0 | 47 | 0 | 8 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 10 | 33 | 4 | 59 | 0 | 0 | 0 | 0 | 47 | 0 | 8 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 3 | 8 | 1 | 15 | 0 | 0 | 0 | 0 | 12 | 0 | 2 |
| Total Analysis Volume [veh/h] | 0 | 10 | 33 | 4 | 59 | 0 | 0 | 0 | 0 | 47 | 0 | 8 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.01 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.33 | 0.00 | 0.00 | 7.30 | 0.00 | 0.00 | 9.11 | 9.63 | 8.58 | 9.31 | 9.79 | 8.69 |
| Movement LOS | A | A | A | A | A | A | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.19 | 0.19 | 0.19 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 1.47 | 1.47 | 1.47 |
| d_A, Approach Delay [s/veh] | 0.00 | | | 0.46 | | | 9.10 | | | 9.22 | | |
| Approach LOS | A | | | A | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 3.33 | | | | | | | | | | | |
| Intersection LOS | A | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 16: New Road B & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 12.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.122 |

**Intersection Setup**

| Name | | | | 28 St | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | | | | 28 St | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 13 | 133 | 34 | 9 | 168 | 20 | 62 | 0 | 10 | 69 | 0 | 19 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 133 | 34 | 9 | 168 | 20 | 62 | 0 | 10 | 69 | 0 | 19 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 33 | 9 | 2 | 42 | 5 | 16 | 0 | 3 | 17 | 0 | 5 |
| Total Analysis Volume [veh/h] | 13 | 133 | 34 | 9 | 168 | 20 | 62 | 0 | 10 | 69 | 0 | 19 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.11 | 0.00 | 0.01 | 0.12 | 0.00 | 0.02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.61 | 0.00 | 0.00 | 7.56 | 0.00 | 0.00 | 12.36 | 12.58 | 10.03 | 12.37 | 12.63 | 10.00 |
| Movement LOS | A | A | A | A | A | A | B | B | B | B | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.42 | 0.42 | 0.42 | 0.50 | 0.50 | 0.50 |
| 95th-Percentile Queue Length [m/ln] | 0.17 | 0.17 | 0.17 | 0.12 | 0.12 | 0.12 | 3.20 | 3.20 | 3.20 | 3.80 | 3.80 | 3.80 |
| d_A, Approach Delay [s/veh] | 0.55 | | | 0.35 | | | 12.04 | | | 11.86 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 3.87 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 17: Boulder Blvd & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.038 |

**Intersection Setup**

| Name | Keystone Dr | | | Keystone Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Keystone Dr | | | Keystone Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 12 | 6 | 0 | 36 | 26 | 40 | 24 | 88 | 24 | 13 | 87 | 23 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 12 | 6 | 0 | 36 | 26 | 40 | 24 | 88 | 24 | 13 | 87 | 23 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 2 | 0 | 9 | 7 | 10 | 6 | 22 | 6 | 3 | 22 | 6 |
| Total Analysis Volume [veh/h] | 12 | 6 | 0 | 36 | 26 | 40 | 24 | 88 | 24 | 13 | 87 | 23 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.04 | 0.12 | 0.02 | 0.02 | 0.12 | 0.02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.36 | 0.00 | 0.00 | 7.28 | 0.00 | 0.00 | 11.81 | 11.09 | 9.61 | 11.69 | 11.09 | 9.31 |
| Movement LOS | A | A | A | A | A | A | B | B | A | B | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.02 | 0.02 | 0.02 | 0.07 | 0.07 | 0.07 | 0.67 | 0.67 | 0.67 | 0.59 | 0.59 | 0.59 |
| 95th-Percentile Queue Length [m/ln] | 0.15 | 0.15 | 0.15 | 0.52 | 0.52 | 0.52 | 5.10 | 5.10 | 5.10 | 4.51 | 4.51 | 4.51 |
| d_A, Approach Delay [s/veh] | 4.90 | | | 2.57 | | | 10.95 | | | 10.82 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 8.37 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 18: Boulder Blvd & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 32.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.435 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 14 | 44 | 157 | 140 | 82 | 65 | 24 | 88 | 11 | 104 | 44 | 60 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 14 | 44 | 157 | 140 | 82 | 65 | 24 | 88 | 11 | 104 | 44 | 60 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 11 | 39 | 35 | 21 | 16 | 6 | 22 | 3 | 26 | 11 | 15 |
| Total Analysis Volume [veh/h] | 14 | 44 | 157 | 140 | 82 | 65 | 24 | 88 | 11 | 104 | 44 | 60 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | |
|---|---|---|---|---|
| Priority Scheme | Stop | Stop | Free | Free |
| Flared Lane | No | No | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.04 | 0.10 | 0.16 | 0.43 | 0.17 | 0.07 | 0.02 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 17.58 | 15.02 | 10.87 | 32.00 | 28.45 | 24.46 | 7.45 | 0.00 | 0.00 | 7.56 | 0.00 | 0.00 |
| Movement LOS | C | C | B | D | D | C | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 1.26 | 1.26 | 1.26 | 4.85 | 4.85 | 4.85 | 0.04 | 0.04 | 0.04 | 0.21 | 0.21 | 0.21 |
| 95th-Percentile Queue Length [m/ln] | 9.60 | 9.60 | 9.60 | 36.99 | 36.99 | 36.99 | 0.32 | 0.32 | 0.32 | 1.57 | 1.57 | 1.57 |
| d_A, Approach Delay [s/veh] | 12.16 | | | 29.28 | | | 1.45 | | | 3.78 | | |
| Approach LOS | B | | | D | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 14.38 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 19: Boulder Blvd & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 28.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.451 |

**Intersection Setup**

| Name | Boundary Rd | | Boundary Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Boundary Rd | | Boundary Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 175 | 239 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 163 | 69 | 73 | 100 | 123 | 320 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 163 | 244 | 312 | 100 | 123 | 320 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 41 | 61 | 78 | 25 | 31 | 80 |
| Total Analysis Volume [veh/h] | 163 | 244 | 312 | 100 | 123 | 320 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.14 | 0.00 | 0.00 | 0.00 | 0.45 | 0.40 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.67 | 0.00 | 0.00 | 0.00 | 28.65 | 12.46 |
| Movement LOS | A | A | A | A | D | B |
| 95th-Percentile Queue Length [veh/ln] | 0.50 | 0.00 | 0.00 | 0.00 | 2.21 | 1.94 |
| 95th-Percentile Queue Length [m/ln] | 3.79 | 0.00 | 0.00 | 0.00 | 16.83 | 14.75 |
| d_A, Approach Delay [s/veh] | 3.47 | | 0.00 | | 16.96 | |
| Approach LOS | A | | A | | C | |
| d_I, Intersection Delay [s/veh] | 7.07 | | | | | |
| Intersection LOS | D | | | | | |

**Intersection Level Of Service Report**

**Intersection 20: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 13.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.082 |

**Intersection Setup**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 80 | 10 | 200 | 230 | 10 |
| Base Volume Adjustment Factor | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 29 | 0 | 0 | 13 | 27 | 30 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 40 | 88 | 11 | 233 | 280 | 41 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 22 | 3 | 58 | 70 | 10 |
| Total Analysis Volume [veh/h] | 40 | 88 | 11 | 233 | 280 | 41 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.08 | 0.12 | 0.01 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 13.80 | 11.29 | 7.92 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.75 | 0.75 | 0.02 | 0.02 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 5.69 | 5.69 | 0.14 | 0.14 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 12.08 | | 0.36 | | 0.00 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 2.36 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 21: Slate Ave & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 10.1 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.014 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 10 | 10 | 10 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 30 | 0 | 58 | 29 | 0 | 16 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 40 | 10 | 68 | 39 | 10 | 26 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 3 | 17 | 10 | 3 | 7 |
| Total Analysis Volume [veh/h] | 40 | 10 | 68 | 39 | 10 | 26 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.04 | 0.00 | 0.01 | 0.03 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.39 | 0.00 | 10.06 | 8.67 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.12 | 0.12 | 0.12 | 0.12 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.90 | 0.90 | 0.93 | 0.93 |
| d_A, Approach Delay [s/veh] | 0.00 | | 4.70 | | 9.06 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.29 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 22: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.023 |

**Intersection Setup**

| Name | Golf Course Rd | | | Golf Course Rd | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | Golf Course Rd | | | Golf Course Rd | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 5 | 0 | 0 | 5 | 20 | 5 | 0 | 25 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 40 | 6 | 24 | 56 | 40 | 28 | 74 | 0 | 31 | 126 | 13 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 10 | 45 | 6 | 24 | 61 | 60 | 33 | 74 | 25 | 31 | 126 | 13 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 11 | 2 | 6 | 15 | 15 | 8 | 19 | 6 | 8 | 32 | 3 |
| Total Analysis Volume [veh/h] | 10 | 45 | 6 | 24 | 61 | 60 | 33 | 74 | 25 | 31 | 126 | 13 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | |
|---|---|---|---|---|
| Priority Scheme | Stop | Stop | Free | Free |
| Flared Lane | No | No | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.02 | 0.08 | 0.01 | 0.05 | 0.11 | 0.07 | 0.02 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 14.00 | 12.43 | 9.53 | 13.67 | 13.27 | 10.55 | 7.53 | 0.00 | 0.00 | 7.45 | 0.00 | 0.00 |
| Movement LOS | B | B | A | B | B | B | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.37 | 0.37 | 0.37 | 0.86 | 0.86 | 0.86 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 |
| 95th-Percentile Queue Length [m/ln] | 2.85 | 2.85 | 2.85 | 6.56 | 6.56 | 6.56 | 0.45 | 0.45 | 0.45 | 0.41 | 0.41 | 0.41 |
| d_A, Approach Delay [s/veh] | 12.40 | | | 12.21 | | | 1.88 | | | 1.36 | | |
| Approach LOS | B | | | B | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 5.92 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 23: Boulder Blvd & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 23.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.367 |

**Intersection Setup**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 240 | 10 | 10 | 20 | 20 | 120 |
| Base Volume Adjustment Factor | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 22 | 6 | 5 | 161 | 96 | 8 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 286 | 17 | 16 | 183 | 118 | 140 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 72 | 4 | 4 | 46 | 30 | 35 |
| Total Analysis Volume [veh/h] | 286 | 17 | 16 | 183 | 118 | 140 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.21 | 0.00 | 0.00 | 0.00 | 0.37 | 0.15 |
| d_M, Delay for Movement [s/veh] | 8.24 | 0.00 | 0.00 | 0.00 | 23.56 | 16.17 |
| Movement LOS | A | A | A | A | C | C |
| 95th-Percentile Queue Length [veh/ln] | 0.74 | 0.74 | 0.00 | 0.00 | 2.90 | 2.90 |
| 95th-Percentile Queue Length [m/ln] | 5.63 | 5.63 | 0.00 | 0.00 | 22.13 | 22.13 |
| d_A, Approach Delay [s/veh] | 7.78 | | 0.00 | | 19.55 | |
| Approach LOS | A | | A | | C | |
| d_I, Intersection Delay [s/veh] | 9.74 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**
**Intersection 24: Hwy 779 & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 16.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.488 |

**Intersection Setup**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 160.00 | 30.48 | 30.48 | 150.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 30.48 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 70.00 | | | 70.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 17 | 558 | 39 | 39 | 611 | 10 | 17 | 5 | 34 | 102 | 17 | 156 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.1000 | 1.0000 | 1.1000 | 1.1000 | 1.1000 | 1.0000 | 1.0000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 6.00 | 6.00 | 6.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 98 | 72 | 32 | 115 | 0 | 0 | 0 | 0 | 115 | 0 | 68 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 17 | 656 | 111 | 75 | 726 | 11 | 19 | 6 | 34 | 217 | 19 | 240 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 164 | 28 | 19 | 182 | 3 | 5 | 2 | 9 | 54 | 5 | 60 |
| Total Analysis Volume [veh/h] | 17 | 656 | 111 | 75 | 726 | 11 | 19 | 6 | 34 | 217 | 19 | 240 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 8 | 0 | 7 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 5 | 14 | 0 | 5 | 14 | 0 | 0 | 38 | 0 | 10 | 38 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 9 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 9 | 18 | 0 | 9 | 18 | 0 | 0 | 44 | 0 | 9 | 53 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 0 | 10 | 0 | 5 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 | 2.00 |
| g_i, Effective Green Time [s] | 55 | 47 | 47 | 55 | 50 | 50 | 8 | 8 | 17 | 17 |
| g / C, Green / Cycle | 0.69 | 0.59 | 0.59 | 0.69 | 0.62 | 0.62 | 0.09 | 0.09 | 0.21 | 0.21 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.23 | 0.23 | 0.10 | 0.22 | 0.22 | 0.12 | 0.02 | 0.26 | 0.17 |
| s, saturation flow rate [veh/h] | 711 | 1683 | 1599 | 737 | 1683 | 1674 | 203 | 1431 | 909 | 1385 |
| c, Capacity [veh/h] | 541 | 995 | 945 | 551 | 1047 | 1041 | 99 | 137 | 280 | 288 |
| d1, Uniform Delay [s] | 4.47 | 8.73 | 8.73 | 4.89 | 7.33 | 7.33 | 36.06 | 33.51 | 31.92 | 30.34 |
| k, delay calibration | 0.11 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.02 | 1.18 | 1.24 | 0.51 | 0.94 | 0.94 | 1.33 | 0.94 | 6.74 | 6.20 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.03 | 0.40 | 0.40 | 0.14 | 0.35 | 0.35 | 0.25 | 0.25 | 0.84 | 0.83 |
| d, Delay for Lane Group [s/veh] | 4.50 | 9.90 | 9.97 | 5.41 | 8.26 | 8.27 | 37.40 | 34.45 | 38.66 | 36.54 |
| Lane Group LOS | A | A | A | A | A | A | D | C | D | D |
| Critical Lane Group | No | No | Yes | Yes | No | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.06 | 3.18 | 3.05 | 0.34 | 2.59 | 2.57 | 0.52 | 0.63 | 4.61 | 4.76 |
| 50th-Percentile Queue Length [m/ln] | 0.46 | 24.25 | 23.22 | 2.60 | 19.70 | 19.61 | 3.97 | 4.83 | 35.12 | 36.26 |
| 95th-Percentile Queue Length [veh/ln] | 0.11 | 5.73 | 5.49 | 0.61 | 4.65 | 4.63 | 0.94 | 1.14 | 8.13 | 8.34 |
| 95th-Percentile Queue Length [m/ln] | 0.83 | 43.65 | 41.80 | 4.68 | 35.46 | 35.30 | 7.14 | 8.70 | 61.94 | 63.52 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 4.50 | 9.93 | 9.97 | 5.41 | 8.27 | 8.27 | 37.40 | 37.40 | 34.45 | 38.66 | 38.66 | 36.54 |
| Movement LOS | A | A | A | A | A | A | D | D | C | D | D | D |
| d_A, Approach Delay [s/veh] | 9.82 | | | 8.00 | | | 35.70 | | | 37.59 | | |
| Approach LOS | A | | | A | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 16.05 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.488 | | | | | | | | | | | |

**Emissions**

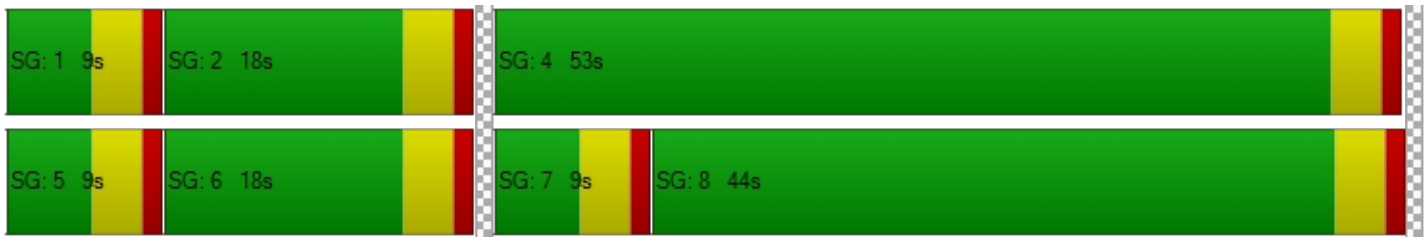
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 13.36 | 308.78 | 293.97 | 15.75 | 77.59 | 77.19 | 1.76 | 2.39 | 121.92 | 123.99 |
| Stops [stops/h] | 2.74 | 143.20 | 137.14 | 15.35 | 116.33 | 115.81 | 23.42 | 28.53 | 207.38 | 214.14 |
| Fuel consumption [L/h] | 1.27 | 34.47 | 32.87 | 2.27 | 13.79 | 13.73 | 1.41 | 1.77 | 23.28 | 23.36 |
| CO [g/h] | 23.42 | 636.51 | 607.01 | 41.95 | 254.71 | 253.49 | 26.09 | 32.68 | 429.90 | 431.28 |
| NOx [g/h] | 4.56 | 123.84 | 118.10 | 8.16 | 49.56 | 49.32 | 5.08 | 6.36 | 83.64 | 83.91 |
| VOC [g/h] | 5.43 | 147.52 | 140.68 | 9.72 | 59.03 | 58.75 | 6.05 | 7.57 | 99.63 | 99.95 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 0.000 | 0.000 |
| Crosswalk LOS | F | F | F | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 350 | 350 | 1000 | 1225 |
| d_b, Bicycle Delay [s] | 27.23 | 27.23 | 10.00 | 6.01 |
| l_b,int, Bicycle LOS Score for Intersection | 2.206 | 2.230 | 1.657 | 2.345 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



# APPENDIX E

EAST-WEST LINK ANALYSIS RESULTS

Vistro File: C:\...\2025-11-24_North Industrial Development_Updated ASP_FINAL.vistro
Report File: C:\...\Full Buildout (2046)_PM_North Connection.pdf

Scenario 9 Full Buildout (2046)_PM_North Connection

11/25/2025

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Hwy 16 A & Boundary Rd | Signalized | HCM 7th Edition | WB Left | 0.838 | 44.1 | D |
| 2 | Hwy 16A & 28 St | Signalized | HCM 7th Edition | NB Thru | 0.675 | 34.5 | C |
| 3 | Hwy 16A & S Park Dr/N Park Dr | Signalized | HCM 7th Edition | EB Left | 0.794 | 57.8 | E |
| 4 | Boulder Blvd & N Park Dr | Signalized | HCM 7th Edition | EB Right | 0.545 | 18.4 | B |
| 5 | N Park Dr & Quartz Ave | All-way stop | HCM 7th Edition | WB Left | 0.492 | 13.4 | B |
| 6 | 28 St & Site Access #1 | Signalized | HCM 7th Edition | SB Right | 0.412 | 21.4 | C |
| 7 | Quartz Ave & Site Access #2 | Two-way stop | HCM 7th Edition | NB Left | 0.666 | 31.3 | D |
| 8 | Quartz Ave & 28 St | Signalized | HCM 7th Edition | WB Left | 0.282 | 11.7 | B |
| 9 | Slate Ave & N Park Dr | Two-way stop | HCM 7th Edition | NB Left | 0.105 | 15.0 | C |
| 10 | Slate Ave & 28 St | Signalized | HCM 7th Edition | WB Left | 0.368 | 19.0 | B |
| 11 | N Park Dr & Keystone Dr | Two-way stop | HCM 7th Edition | SB Left | 0.034 | 10.2 | B |
| 12 | N Park Dr & 28 St | Two-way stop | HCM 7th Edition | WB Left | 0.123 | 14.8 | B |
| 13 | N Park Dr & New Road B | Two-way stop | HCM 7th Edition | WB Left | 0.269 | 14.7 | B |
| 14 | N Park Dr & Boundary Rd | Signalized | HCM 7th Edition | SB Right | 0.705 | 21.2 | C |
| 15 | New Road B & Keystone Dr | Two-way stop | HCM 7th Edition | WB Left | 0.048 | 9.5 | A |
| 16 | New Road B & 28 St | Two-way stop | HCM 7th Edition | WB Thru | 0.036 | 11.4 | B |
| 17 | Boulder Blvd & Keystone Dr | Two-way stop | HCM 7th Edition | WB Left | 0.024 | 14.1 | B |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 18 | Boulder Blvd & 28 St | Two-way stop | HCM 7th Edition | WB Left | 0.266 | 22.0 | C |
| 19 | Boulder Blvd & Boundary Rd | Two-way stop | HCM 7th Edition | EB Left | 0.325 | 21.5 | C |
| 20 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | SB Left | 0.034 | 13.7 | B |
| 21 | Slate Ave & Golf Course Rd | Two-way stop | HCM 7th Edition | WB Left | 0.013 | 10.0 | B |
| 22 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | EB Left | 0.062 | 22.7 | C |
| 23 | Boulder Blvd & Wood Ave | Two-way stop | HCM 7th Edition | EB Left | 0.145 | 14.6 | B |
| 24 | Hwy 779 & Wood Ave | Signalized | HCM 7th Edition | EB Left | 0.798 | 19.2 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Hwy 16 A & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 44.1 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.838 |

**Intersection Setup**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 100.00 | 50.00 | 30.48 | 50.00 | 100.00 | 30.48 | 160.00 | 150.00 | 30.48 | 75.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 60.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | No | | | Yes | | |

**Volumes**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 103 | 6 | 418 | 20 | 200 | 139 | 156 | 1919 | 126 | 660 | 1760 | 50 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.1000 | 0.9000 | 1.0000 | 1.1000 | 1.0000 | 1.0000 | 0.9000 | 1.0000 | 0.9000 | 0.9000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 200 | 193 | 0 | 382 | 260 | 232 | 215 | 334 | 233 | 0 | 283 | 271 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | -70 | 0 | -350 | 0 | 0 | -110 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 303 | 200 | 376 | 402 | 480 | 301 | 371 | 1711 | 359 | 594 | 1757 | 321 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 76 | 50 | 94 | 101 | 120 | 75 | 93 | 428 | 90 | 149 | 439 | 80 |
| Total Analysis Volume [veh/h] | 303 | 200 | 376 | 402 | 480 | 301 | 371 | 1711 | 359 | 594 | 1757 | 321 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 127.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 7 | 35 | 0 | 7 | 0 | 0 | 53 | 48 | 0 | 25 | 19 | 0 |
| Amber [s] | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 | 3.0 | 5.2 | 0.0 | 3.0 | 5.3 | 0.0 |
| All red [s] | 1.5 | 2.1 | 0.0 | 1.5 | 2.1 | 0.0 | 1.8 | 1.8 | 0.0 | 1.8 | 1.8 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.8 | 0.0 | 3.5 | 4.8 | 0.0 | 2.8 | 5.0 | 0.0 | 2.8 | 5.1 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 25 | 45 | 0 | 27 | 47 | 0 | 23 | 39 | 0 | 29 | 45 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 7 | 15 | 0 | 7 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 6.80 | 6.80 | 6.80 | 6.80 | 4.80 | 7.00 | 4.80 | 7.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.80 | 0.00 | 4.80 | 2.80 | 5.00 | 2.80 | 5.10 |
| g_i, Effective Green Time [s] | 47 | 20 | 47 | 22 | 17 | 50 | 24 | 57 |
| g / C, Green / Cycle | 0.34 | 0.15 | 0.34 | 0.16 | 0.12 | 0.36 | 0.17 | 0.41 |
| (v / s)_i Volume / Saturation Flow Rate | 0.23 | 0.06 | 0.27 | 0.13 | 0.11 | 0.34 | 0.17 | 0.34 |
| s, saturation flow rate [veh/h] | 1334 | 3560 | 1498 | 3560 | 3459 | 5094 | 3459 | 5094 |
| c, Capacity [veh/h] | 415 | 520 | 530 | 572 | 419 | 1810 | 598 | 2069 |
| d1, Uniform Delay [s] | 38.46 | 54.07 | 40.24 | 57.00 | 60.55 | 43.81 | 57.82 | 37.68 |
| k, delay calibration | 0.50 | 0.11 | 0.37 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 10.76 | 0.47 | 7.38 | 3.39 | 6.35 | 11.68 | 15.67 | 4.59 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.73 | 0.38 | 0.76 | 0.84 | 0.88 | 0.95 | 0.99 | 0.85 |
| d, Delay for Lane Group [s/veh] | 49.22 | 54.54 | 47.61 | 60.39 | 66.90 | 55.49 | 73.49 | 42.27 |
| Lane Group LOS | D | D | D | E | E | E | E | D |
| Critical Lane Group | Yes | No | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 9.46 | 3.21 | 12.92 | 8.51 | 6.69 | 20.23 | 11.48 | 18.13 |
| 50th-Percentile Queue Length [m/ln] | 72.07 | 24.48 | 98.42 | 64.88 | 50.94 | 154.17 | 87.48 | 138.18 |
| 95th-Percentile Queue Length [veh/ln] | 14.50 | 5.78 | 18.81 | 13.30 | 10.93 | 27.61 | 17.04 | 25.12 |
| 95th-Percentile Queue Length [m/ln] | 110.50 | 44.06 | 143.34 | 101.35 | 83.26 | 210.38 | 129.82 | 191.39 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 49.22 | 54.54 | 0.00 | 47.61 | 60.39 | 0.00 | 66.90 | 55.49 | 0.00 | 73.49 | 42.27 | 0.00 |
| Movement LOS | D | D | | D | E | | E | E | | E | D | |
| d_A, Approach Delay [s/veh] | 29.38 | | | 40.68 | | | 49.06 | | | 44.13 | | |
| Approach LOS | C | | | D | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 44.10 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.838 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 69.69 | 46.00 | 166.76 | 199.11 | 248.95 | 1148.12 | 132.78 | 392.75 |
| Stops [stops/h] | 243.19 | 165.22 | 332.14 | 437.91 | 343.83 | 1560.81 | 590.42 | 1398.87 |
| Fuel consumption [L/h] | 25.41 | 17.74 | 38.06 | 51.09 | 58.49 | 253.28 | 78.00 | 168.51 |
| CO [g/h] | 469.12 | 327.57 | 702.79 | 943.49 | 1080.02 | 4676.98 | 1440.35 | 3111.59 |
| NOx [g/h] | 91.27 | 63.73 | 136.74 | 183.57 | 210.13 | 909.97 | 280.24 | 605.40 |
| VOC [g/h] | 108.72 | 75.92 | 162.88 | 218.66 | 250.31 | 1083.93 | 333.82 | 721.14 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 32.0 | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 41.66 | 0.00 | 0.00 | 59.43 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.778 | 0.000 | 0.000 | 3.800 |
| Crosswalk LOS | C | F | F | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 546 | 574 | 457 | 541 |
| d_b, Bicycle Delay [s] | 37.01 | 35.57 | 41.66 | 37.23 |
| l_b,int, Bicycle LOS Score for Intersection | 1.975 | 2.287 | 2.705 | 2.853 |
| Bicycle LOS | A | B | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 2: Hwy 16A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 34.5 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.675 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 50.00 | 75.00 | 30.48 | 30.48 | 150.00 | 30.48 | 100.00 | 150.00 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 200.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | No | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 30 | 0 | 264 | 0 | 0 | 0 | 0 | 1938 | 78 | 175 | 1826 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 | 1.0000 | 1.0000 | 0.9000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 1 | 108 | 21 | 567 | 133 | 455 | 336 | 194 | 7 | 26 | 207 | 483 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | -70 | 0 | -350 | 0 | 0 | -110 | -40 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 62 | 0 | 109 | 62 | -62 | 0 | 0 | -109 | 109 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 31 | 108 | 285 | 629 | 133 | 494 | 398 | 1526 | 85 | 201 | 1631 | 552 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 27 | 71 | 157 | 33 | 124 | 100 | 382 | 21 | 50 | 408 | 138 |
| Total Analysis Volume [veh/h] | 31 | 108 | 285 | 629 | 133 | 494 | 398 | 1526 | 85 | 201 | 1631 | 552 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 77.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 8 | 30 | 0 | 22 | 44 | 0 | 14 | 37 | 0 | 16 | 39 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 13 | 44 | 0 | 32 | 63 | 0 | 29 | 32 | 0 | 32 | 35 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 12 | 10 | 0 | 12 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 5.50 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.00 | 3.50 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 42 | 10 | 27 | 32 | 18 | 61 | 18 | 61 |
| g / C, Green / Cycle | 0.30 | 0.07 | 0.19 | 0.23 | 0.13 | 0.44 | 0.13 | 0.43 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.06 | 0.18 | 0.07 | 0.12 | 0.30 | 0.11 | 0.32 |
| s, saturation flow rate [veh/h] | 1361 | 1870 | 3459 | 1870 | 3459 | 5094 | 1781 | 5094 |
| c, Capacity [veh/h] | 420 | 137 | 655 | 425 | 455 | 2228 | 227 | 2207 |
| d1, Uniform Delay [s] | 34.94 | 63.82 | 56.24 | 45.00 | 59.68 | 31.64 | 60.09 | 33.07 |
| k, delay calibration | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 | 0.13 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.07 | 9.67 | 9.47 | 0.42 | 5.48 | 1.74 | 12.75 | 2.27 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.07 | 0.79 | 0.96 | 0.31 | 0.88 | 0.69 | 0.89 | 0.74 |
| d, Delay for Lane Group [s/veh] | 35.02 | 73.49 | 65.71 | 45.41 | 65.16 | 33.38 | 72.84 | 35.34 |
| Lane Group LOS | D | E | E | D | E | C | E | D |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.77 | 4.17 | 11.85 | 3.93 | 7.09 | 13.48 | 7.64 | 15.05 |
| 50th-Percentile Queue Length [m/ln] | 5.89 | 31.74 | 90.33 | 29.98 | 54.04 | 102.75 | 58.19 | 114.65 |
| 95th-Percentile Queue Length [veh/ln] | 1.39 | 7.50 | 17.50 | 7.08 | 11.46 | 19.51 | 12.17 | 21.41 |
| 95th-Percentile Queue Length [m/ln] | 10.61 | 57.13 | 133.35 | 53.97 | 87.33 | 148.64 | 92.73 | 163.12 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 35.02 | 73.49 | 0.00 | 65.71 | 45.41 | 0.00 | 65.16 | 33.38 | 0.00 | 72.84 | 35.34 | 0.00 |
| Movement LOS | D | E | | E | D | | E | C | | E | D | |
| d_A, Approach Delay [s/veh] | 21.28 | | | 37.72 | | | 38.26 | | | 30.32 | | |
| Approach LOS | C | | | D | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 34.54 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.675 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 5.30 | 18.47 | 108.03 | 22.84 | 251.52 | 964.37 | 134.88 | 1094.44 |
| Stops [stops/h] | 19.89 | 107.11 | 609.62 | 101.18 | 364.75 | 1040.23 | 196.38 | 1160.69 |
| Fuel consumption [L/h] | 1.79 | 10.27 | 55.79 | 9.10 | 60.75 | 175.00 | 33.19 | 197.34 |
| CO [g/h] | 32.99 | 189.69 | 1030.15 | 167.95 | 1121.78 | 3231.46 | 612.82 | 3643.93 |
| NOx [g/h] | 6.42 | 36.91 | 200.43 | 32.68 | 218.26 | 628.72 | 119.23 | 708.98 |
| VOC [g/h] | 7.65 | 43.96 | 238.75 | 38.92 | 259.98 | 748.92 | 142.03 | 844.52 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 59.43 | 0.00 | 59.43 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 2.687 | 0.000 | 3.586 |
| Crosswalk LOS | F | B | F | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 543 | 814 | 361 | 404 |
| d_b, Bicycle Delay [s] | 37.16 | 24.60 | 46.99 | 44.56 |
| l_b,int, Bicycle LOS Score for Intersection | 1.789 | 2.817 | 2.618 | 2.567 |
| Bicycle LOS | A | C | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**

**Intersection 3: Hwy 16A & S Park Dr/N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 57.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | E |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.794 |

**Intersection Setup**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.50 | 3.66 | 3.66 | 3.50 | 3.66 |
| No. of Lanes in Entry Pocket | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 170.00 | 30.48 | 400.00 | 250.00 | 30.48 | 160.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 338 | 106 | 345 | 315 | 139 | 61 | 33 | 1356 | 314 | 463 | 1197 | 197 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.50 | 0.50 | 2.00 | 2.00 | 0.50 | 0.50 | 0.50 | 0.00 | 0.50 | 2.00 | 0.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 | 1.0000 | 0.9000 | 0.9000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 88 | 74 | 7 | 127 | 334 | 379 | 457 | 0 | 98 | 564 | 1 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | -70 | 0 | -350 | 0 | 0 | -110 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 46 | 0 | 0 | 46 | -46 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 338 | 194 | 419 | 368 | 266 | 325 | 458 | 1281 | 314 | 515 | 1531 | 198 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 85 | 49 | 105 | 92 | 67 | 81 | 115 | 320 | 79 | 129 | 383 | 50 |
| Total Analysis Volume [veh/h] | 338 | 194 | 419 | 368 | 266 | 325 | 458 | 1281 | 314 | 515 | 1531 | 198 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 36 | 59 | 0 | 26 | 49 | 0 | 21 | 8 | 0 | 32 | 9 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 32 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 21 | 46 | 0 | 22 | 47 | 0 | 25 | 42 | 0 | 30 | 47 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 7 | 15 | 0 | 14 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 5.50 | 6.00 | 6.00 | 5.50 | 6.00 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 3.50 | 4.00 | 4.00 | 3.50 | 4.00 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 15 | 38 | 38 | 17 | 39 | 39 | 19 | 38 | 23 | 42 |
| g / C, Green / Cycle | 0.11 | 0.27 | 0.27 | 0.12 | 0.28 | 0.28 | 0.14 | 0.27 | 0.16 | 0.30 |
| (v / s)_i Volume / Saturation Flow Rate | 0.10 | 0.10 | 0.26 | 0.11 | 0.14 | 0.20 | 0.13 | 0.25 | 0.15 | 0.30 |
| s, saturation flow rate [veh/h] | 3500 | 1892 | 1609 | 3459 | 1892 | 1609 | 3500 | 5176 | 3459 | 5176 |
| c, Capacity [veh/h] | 384 | 518 | 440 | 408 | 534 | 454 | 475 | 1410 | 564 | 1552 |
| d1, Uniform Delay [s] | 61.42 | 41.14 | 49.93 | 60.96 | 42.00 | 45.23 | 60.16 | 49.24 | 57.60 | 48.73 |
| k, delay calibration | 0.11 | 0.11 | 0.17 | 0.11 | 0.11 | 0.13 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.65 | 0.45 | 15.81 | 7.56 | 0.72 | 2.64 | 12.43 | 10.16 | 6.23 | 19.87 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.88 | 0.37 | 0.95 | 0.90 | 0.50 | 0.72 | 0.96 | 0.91 | 0.91 | 0.99 |
| d, Delay for Lane Group [s/veh] | 68.07 | 41.59 | 65.74 | 68.52 | 42.72 | 47.88 | 72.60 | 59.41 | 63.84 | 68.60 |
| Lane Group LOS | E | D | E | E | D | D | E | E | E | E |
| Critical Lane Group | No | No | Yes | Yes | No | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 6.28 | 5.54 | 16.28 | 6.89 | 7.84 | 10.51 | 8.68 | 15.23 | 9.19 | 19.85 |
| 50th-Percentile Queue Length [m/ln] | 47.88 | 42.19 | 124.03 | 52.49 | 59.77 | 80.11 | 66.14 | 116.06 | 70.05 | 151.22 |
| 95th-Percentile Queue Length [veh/ln] | 10.39 | 9.40 | 22.89 | 11.19 | 12.44 | 15.83 | 13.51 | 21.63 | 14.17 | 27.15 |
| 95th-Percentile Queue Length [m/ln] | 79.20 | 71.60 | 174.45 | 85.28 | 94.77 | 120.63 | 102.96 | 164.84 | 107.95 | 206.89 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 68.07 | 41.59 | 65.74 | 68.52 | 42.72 | 47.88 | 72.60 | 59.41 | 0.00 | 63.84 | 68.60 | 0.00 |
| Movement LOS | E | D | E | E | D | D | E | E | | E | E | |
| d_A, Approach Delay [s/veh] | 61.64 | | | 54.37 | | | 53.26 | | | 61.45 | | |
| Approach LOS | E | | | D | | | D | | | E | | |
| d_I, Intersection Delay [s/veh] | 57.79 | | | | | | | | | | | |
| Intersection LOS | E | | | | | | | | | | | |
| Intersection V/C | 0.794 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 44.25 | 25.40 | 54.85 | 48.64 | 35.16 | 42.96 | 697.19 | 1949.99 | 325.46 | 967.53 |
| Stops [stops/h] | 323.13 | 142.38 | 418.55 | 354.23 | 201.69 | 270.35 | 446.41 | 1175.00 | 472.81 | 1530.92 |
| Fuel consumption [L/h] | 29.18 | 11.82 | 35.82 | 31.99 | 16.62 | 22.14 | 106.21 | 279.82 | 78.13 | 245.09 |
| CO [g/h] | 538.82 | 218.35 | 661.48 | 590.78 | 306.93 | 408.76 | 1961.18 | 5166.98 | 1442.77 | 4525.80 |
| NOx [g/h] | 104.83 | 42.48 | 128.70 | 114.94 | 59.72 | 79.53 | 381.57 | 1005.31 | 280.71 | 880.56 |
| VOC [g/h] | 124.88 | 50.60 | 153.30 | 136.92 | 71.13 | 94.73 | 454.52 | 1197.50 | 334.38 | 1048.90 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 59.43 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 3.623 | 0.000 |
| Crosswalk LOS | F | F | D | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 571 | 586 | 504 | 576 |
| d_b, Bicycle Delay [s] | 35.71 | 35.00 | 39.15 | 35.50 |
| l_b,int, Bicycle LOS Score for Intersection | 2.455 | 2.462 | 2.516 | 2.796 |
| Bicycle LOS | B | B | B | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Boulder Blvd & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.545 |

**Intersection Setup**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 276 | 27 | 41 | 10 | 44 | 5 | 3 | 12 | 318 | 100 | 21 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 4 | 464 | 0 | 0 | 463 | 5 | 11 | 0 | 5 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | -70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 46 | 0 | 0 | 46 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 280 | 537 | 41 | 10 | 483 | 10 | 14 | 12 | 323 | 100 | 21 | 2 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 70 | 134 | 10 | 3 | 121 | 3 | 4 | 3 | 81 | 25 | 5 | 1 |
| Total Analysis Volume [veh/h] | 280 | 537 | 41 | 10 | 483 | 10 | 14 | 12 | 323 | 100 | 21 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 23 | 0 | 0 | 14 | 0 | 0 | 29 | 0 | 0 | 29 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 6 | 0 | 0 | 9 | 0 | 0 | 15 | 0 | 0 | 12 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 27 | 0 | 0 | 18 | 0 | 0 | 63 | 0 | 0 | 63 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | C | R | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 59 | 59 | 59 | 55 | 55 | 23 | 23 | 23 |
| g / C, Green / Cycle | 0.66 | 0.66 | 0.66 | 0.61 | 0.61 | 0.25 | 0.25 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.33 | 0.32 | 0.03 | 0.01 | 0.29 | 0.02 | 0.23 | 0.13 |
| s, saturation flow rate [veh/h] | 841 | 1683 | 1431 | 752 | 1677 | 1475 | 1431 | 950 |
| c, Capacity [veh/h] | 522 | 1109 | 943 | 388 | 1029 | 433 | 361 | 312 |
| d1, Uniform Delay [s] | 15.18 | 7.69 | 5.39 | 15.87 | 9.51 | 25.56 | 32.51 | 29.88 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.93 | 1.51 | 0.09 | 0.12 | 1.60 | 0.06 | 7.90 | 0.81 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.54 | 0.48 | 0.04 | 0.03 | 0.48 | 0.06 | 0.90 | 0.39 |
| d, Delay for Lane Group [s/veh] | 19.11 | 9.20 | 5.48 | 15.99 | 11.11 | 25.62 | 40.41 | 30.69 |
| Lane Group LOS | B | A | A | B | B | C | D | C |
| Critical Lane Group | No | Yes | No | No | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 2.46 | 4.87 | 0.26 | 0.13 | 5.14 | 0.42 | 7.37 | 2.34 |
| 50th-Percentile Queue Length [m/ln] | 18.76 | 37.09 | 1.97 | 1.01 | 39.14 | 3.23 | 56.19 | 17.82 |
| 95th-Percentile Queue Length [veh/ln] | 4.43 | 8.49 | 0.46 | 0.24 | 8.85 | 0.76 | 11.83 | 4.21 |
| 95th-Percentile Queue Length [m/ln] | 33.77 | 64.66 | 3.54 | 1.82 | 67.47 | 5.81 | 90.12 | 32.08 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 19.11 | 9.20 | 5.48 | 15.99 | 11.11 | 11.11 | 25.62 | 25.62 | 40.41 | 30.69 | 30.69 | 30.69 |
| Movement LOS | B | A | A | B | B | B | C | C | D | C | C | C |
| d_A, Approach Delay [s/veh] | 12.26 | | | 11.21 | | | 39.31 | | | 30.69 | | |
| Approach LOS | B | | | B | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 18.36 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.545 | | | | | | | | | | | |

**Emissions**

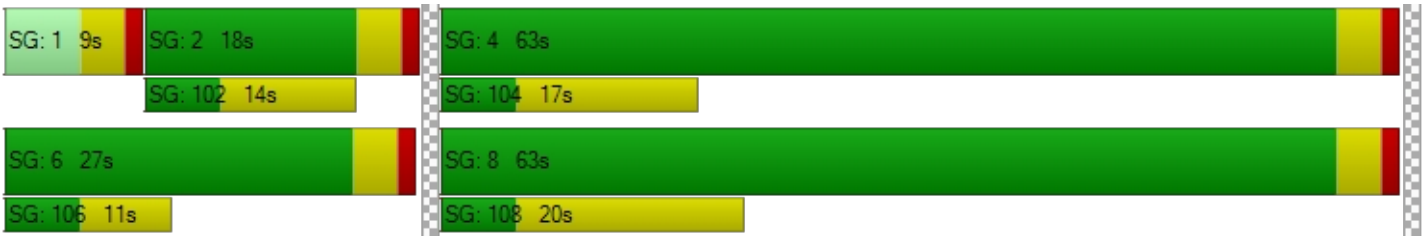
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 37.01 | 70.98 | 5.42 | 1.80 | 88.97 | 8.13 | 100.99 | 34.18 |
| Stops [stops/h] | 98.49 | 194.70 | 10.33 | 5.31 | 205.48 | 16.94 | 294.96 | 93.55 |
| Fuel consumption [L/h] | 9.85 | 14.93 | 0.92 | 0.41 | 17.29 | 1.67 | 26.28 | 8.26 |
| CO [g/h] | 181.92 | 275.63 | 16.99 | 7.64 | 319.36 | 30.77 | 485.27 | 152.50 |
| NOx [g/h] | 35.40 | 53.63 | 3.31 | 1.49 | 62.14 | 5.99 | 94.41 | 29.67 |
| VOC [g/h] | 42.16 | 63.88 | 3.94 | 1.77 | 74.02 | 7.13 | 112.46 | 35.34 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.800 | 2.317 | 2.459 | 1.824 |
| Crosswalk LOS | C | B | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 511 | 311 | 1311 | 1311 |
| d_b, Bicycle Delay [s] | 24.94 | 32.09 | 5.34 | 5.34 |
| l_b,int, Bicycle LOS Score for Intersection | 2.975 | 2.390 | 2.135 | 1.763 |
| Bicycle LOS | C | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 5: N Park Dr & Quartz Ave**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 13.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.492 |

**Intersection Setup**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 33 | 0 | 10 | 50 | 0 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 207 | 268 | 4 | 274 | 193 | 40 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | -70 | 0 | 0 |
| Pass-by Trips [veh/h] | -21 | 67 | 0 | 0 | 46 | 21 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 219 | 335 | 14 | 254 | 239 | 71 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 55 | 84 | 4 | 64 | 60 | 18 |
| Total Analysis Volume [veh/h] | 219 | 335 | 14 | 254 | 239 | 71 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | | | |
|---|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 600 | 680 | 593 | 509 | 614 |
| Degree of Utilization, x | 0.37 | 0.49 | 0.45 | 0.47 | 0.12 |

**Movement, Approach, & Intersection Results**

| | | | | | |
|---|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 1.67 | 2.74 | 2.34 | 2.47 | 0.39 |
| 95th-Percentile Queue Length [m] | 12.70 | 20.86 | 17.85 | 18.85 | 2.97 |
| Approach Delay [s/veh] | 12.66 | | 13.99 | 14.37 | |
| Approach LOS | B | | B | B | |
| Intersection Delay [s/veh] | 13.44 | | | | |
| Intersection LOS | B | | | | |

**Intersection Level Of Service Report**
**Intersection 6: 28 St & Site Access #1**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 21.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.412 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Site Access #1 | | | Comm Access | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Site Access #1 | | | Comm Access | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 371 | 311 | 245 | 12 | 540 | 10 | 19 | 24 | 436 | 179 | 38 | 7 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | -70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 67 | 45 | 58 | 0 | 84 | 0 | 21 | 0 | 46 | 40 | 0 | 18 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 438 | 356 | 303 | 12 | 554 | 10 | 40 | 24 | 482 | 219 | 38 | 25 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 110 | 89 | 76 | 3 | 139 | 3 | 10 | 6 | 121 | 55 | 10 | 6 |
| Total Analysis Volume [veh/h] | 438 | 356 | 303 | 12 | 554 | 10 | 40 | 24 | 482 | 219 | 38 | 25 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 80 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Overlap | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 3 | 8 | 0 | 7 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 14 | 48 | 0 | 5 | 39 | 0 | 5 | 24 | 0 | 7 | 26 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 18 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 15 | 35 | 0 | 9 | 29 | 0 | 9 | 27 | 0 | 9 | 27 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| g_i, Effective Green Time [s] | 40 | 31 | 31 | 40 | 25 | 25 | 32 | 23 | 32 | 23 |
| g / C, Green / Cycle | 0.50 | 0.39 | 0.39 | 0.50 | 0.31 | 0.31 | 0.40 | 0.29 | 0.40 | 0.29 |
| (v / s)_i Volume / Saturation Flow Rate | 0.38 | 0.19 | 0.19 | 0.01 | 0.15 | 0.15 | 0.03 | 0.01 | 0.15 | 0.04 |
| s, saturation flow rate [veh/h] | 1150 | 1870 | 1590 | 951 | 1870 | 1858 | 1436 | 1870 | 1473 | 1748 |
| c, Capacity [veh/h] | 606 | 725 | 616 | 498 | 584 | 581 | 673 | 538 | 711 | 502 |
| d1, Uniform Delay [s] | 14.54 | 18.53 | 18.54 | 10.91 | 22.27 | 22.28 | 14.76 | 20.57 | 16.42 | 21.07 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.33 | 2.37 | 2.80 | 0.09 | 2.85 | 2.88 | 0.17 | 0.16 | 1.12 | 0.51 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.72 | 0.49 | 0.49 | 0.02 | 0.48 | 0.48 | 0.06 | 0.04 | 0.31 | 0.13 |
| d, Delay for Lane Group [s/veh] | 21.87 | 20.90 | 21.34 | 11.00 | 25.13 | 25.15 | 14.93 | 20.73 | 17.55 | 21.58 |
| Lane Group LOS | C | C | C | B | C | C | B | C | B | C |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 5.98 | 5.17 | 4.48 | 0.11 | 4.58 | 4.56 | 0.46 | 0.34 | 2.82 | 0.91 |
| 50th-Percentile Queue Length [m/ln] | 45.59 | 39.39 | 34.13 | 0.85 | 34.86 | 34.71 | 3.48 | 2.57 | 21.48 | 6.97 |
| 95th-Percentile Queue Length [veh/ln] | 9.99 | 8.90 | 7.95 | 0.20 | 8.08 | 8.06 | 0.82 | 0.61 | 5.07 | 1.65 |
| 95th-Percentile Queue Length [m/ln] | 76.16 | 67.81 | 60.58 | 1.52 | 61.59 | 61.38 | 6.27 | 4.62 | 38.66 | 12.55 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 21.87 | 20.90 | 21.34 | 11.00 | 25.14 | 25.15 | 14.93 | 20.73 | 0.00 | 17.55 | 21.58 | 21.58 |
| Movement LOS | C | C | C | B | C | C | B | C | | B | C | C |
| d_A, Approach Delay [s/veh] | 21.41 | | | 24.85 | | | 2.00 | | | 18.45 | | |
| Approach LOS | C | | | C | | | A | | | B | | |
| d_I, Intersection Delay [s/veh] | 21.36 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.412 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 75.23 | 61.11 | 52.07 | 1.70 | 40.13 | 39.92 | 2.93 | 1.76 | 8.37 | 2.41 |
| Stops [stops/h] | 269.25 | 232.63 | 201.58 | 5.00 | 205.88 | 204.99 | 20.57 | 15.16 | 126.85 | 41.16 |
| Fuel consumption [L/h] | 20.58 | 16.76 | 14.46 | 0.38 | 13.91 | 13.85 | 1.20 | 0.89 | 6.60 | 2.20 |
| CO [g/h] | 379.95 | 309.53 | 267.03 | 6.94 | 256.84 | 255.69 | 22.17 | 16.45 | 121.91 | 40.62 |
| NOx [g/h] | 73.92 | 60.22 | 51.96 | 1.35 | 49.97 | 49.75 | 4.31 | 3.20 | 23.72 | 7.90 |
| VOC [g/h] | 88.06 | 71.74 | 61.89 | 1.61 | 59.53 | 59.26 | 5.14 | 3.81 | 28.25 | 9.41 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 31.51 | 31.51 | 31.51 | 31.51 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.771 | 2.515 | 2.476 | 2.152 |
| Crosswalk LOS | C | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 775 | 625 | 575 | 575 |
| d_b, Bicycle Delay [s] | 15.01 | 18.91 | 20.31 | 20.31 |
| l_b,int, Bicycle LOS Score for Intersection | 2.465 | 2.035 | 1.665 | 2.025 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 7: Quartz Ave & Site Access #2**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 31.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.666 |

**Intersection Setup**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 187 | 202 | 41 | 231 | 190 | 46 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 67 | 0 | 0 | 67 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 254 | 202 | 41 | 298 | 190 | 46 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 64 | 51 | 10 | 75 | 48 | 12 |
| Total Analysis Volume [veh/h] | 254 | 202 | 41 | 298 | 190 | 46 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.67 | 0.24 | 0.00 | 0.00 | 0.16 | 0.00 |
| d_M, Delay for Movement [s/veh] | 31.34 | 10.54 | 0.00 | 0.00 | 8.31 | 0.00 |
| Movement LOS | D | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 4.63 | 0.92 | 0.00 | 0.00 | 0.44 | 0.44 |
| 95th-Percentile Queue Length [m/ln] | 35.29 | 7.03 | 0.00 | 0.00 | 3.37 | 3.37 |
| d_A, Approach Delay [s/veh] | 22.12 | | 0.00 | | 6.69 | |
| Approach LOS | C | | A | | A | |
| d_I, Intersection Delay [s/veh] | 11.32 | | | | | |
| Intersection LOS | D | | | | | |

**Intersection Level Of Service Report**
**Intersection 8: Quartz Ave & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 11.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.282 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Quartz Ave | | | Quartz Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.50 | 3.66 | 3.66 | 3.50 | 3.50 | 3.50 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 30.48 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Quartz Ave | | | Quartz Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 0.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 101 | 168 | 68 | 9 | 312 | 88 | 93 | 45 | 104 | 146 | 47 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | -70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 26 | 58 | 0 | 44 | 0 | 0 | 0 | 0 | 40 | 0 | 18 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 101 | 194 | 126 | 9 | 286 | 88 | 93 | 45 | 104 | 186 | 47 | 18 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 25 | 49 | 32 | 2 | 72 | 22 | 23 | 11 | 26 | 47 | 12 | 5 |
| Total Analysis Volume [veh/h] | 101 | 194 | 126 | 9 | 286 | 88 | 93 | 45 | 104 | 186 | 47 | 18 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 60 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 16 | 0 | 0 | 16 | 0 | 0 | 36 | 0 | 0 | 36 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 15 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 40 | 0 | 0 | 40 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 38 | 38 | 38 | 38 | 38 | 38 | 14 | 14 | 14 | 14 |
| g / C, Green / Cycle | 0.63 | 0.63 | 0.63 | 0.63 | 0.63 | 0.63 | 0.23 | 0.23 | 0.23 | 0.23 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.10 | 0.10 | 0.01 | 0.11 | 0.12 | 0.08 | 0.10 | 0.17 | 0.04 |
| s, saturation flow rate [veh/h] | 907 | 1710 | 1492 | 954 | 1710 | 1576 | 1222 | 1498 | 1114 | 1605 |
| c, Capacity [veh/h] | 531 | 1081 | 943 | 561 | 1081 | 996 | 397 | 352 | 346 | 377 |
| d1, Uniform Delay [s] | 10.10 | 4.50 | 4.53 | 8.76 | 4.58 | 4.59 | 19.41 | 19.51 | 22.90 | 18.31 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.79 | 0.31 | 0.37 | 0.05 | 0.36 | 0.40 | 0.30 | 0.81 | 1.30 | 0.22 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.19 | 0.16 | 0.16 | 0.02 | 0.18 | 0.18 | 0.23 | 0.42 | 0.54 | 0.17 |
| d, Delay for Lane Group [s/veh] | 10.89 | 4.81 | 4.89 | 8.82 | 4.94 | 5.00 | 19.70 | 20.32 | 24.21 | 18.53 |
| Lane Group LOS | B | A | A | A | A | A | B | C | C | B |
| Critical Lane Group | No | No | No | No | No | Yes | No | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.82 | 0.69 | 0.65 | 0.06 | 0.81 | 0.78 | 1.04 | 1.71 | 2.45 | 0.69 |
| 50th-Percentile Queue Length [m/ln] | 6.28 | 5.29 | 4.93 | 0.48 | 6.16 | 5.94 | 7.93 | 13.06 | 18.67 | 5.27 |
| 95th-Percentile Queue Length [veh/ln] | 1.48 | 1.25 | 1.16 | 0.11 | 1.46 | 1.40 | 1.87 | 3.08 | 4.41 | 1.25 |
| 95th-Percentile Queue Length [m/ln] | 11.31 | 9.52 | 8.87 | 0.87 | 11.09 | 10.69 | 14.27 | 23.50 | 33.61 | 9.49 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 10.89 | 4.82 | 4.89 | 8.82 | 4.96 | 5.00 | 19.70 | 20.32 | 20.32 | 24.21 | 18.53 | 18.53 |
| Movement LOS | B | A | A | A | A | A | B | C | C | C | B | B |
| d_A, Approach Delay [s/veh] | 6.30 | | | 5.06 | | | 20.08 | | | 22.74 | | |
| Approach LOS | A | | | A | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 11.69 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.282 | | | | | | | | | | | |

**Emissions**

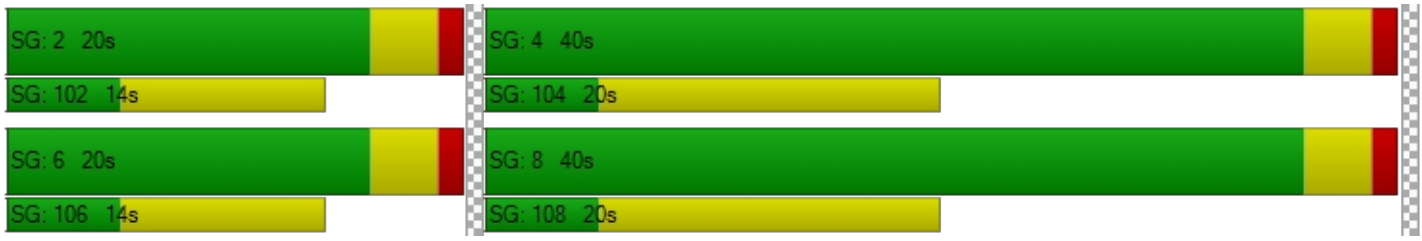
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 14.34 | 23.78 | 21.64 | 1.41 | 29.99 | 28.46 | 19.63 | 31.45 | 37.51 | 13.11 |
| Stops [stops/h] | 49.47 | 41.63 | 38.81 | 3.80 | 48.52 | 46.75 | 62.42 | 102.82 | 147.02 | 41.51 |
| Fuel consumption [L/h] | 3.27 | 3.79 | 3.48 | 0.28 | 4.65 | 4.43 | 4.62 | 7.53 | 10.18 | 3.07 |
| CO [g/h] | 60.39 | 70.06 | 64.29 | 5.11 | 85.84 | 81.88 | 85.28 | 139.02 | 187.90 | 56.60 |
| NOx [g/h] | 11.75 | 13.63 | 12.51 | 0.99 | 16.70 | 15.93 | 16.59 | 27.05 | 36.56 | 11.01 |
| VOC [g/h] | 14.00 | 16.24 | 14.90 | 1.18 | 19.89 | 18.98 | 19.76 | 32.22 | 43.55 | 13.12 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 21.68 | 21.68 | 21.68 | 21.68 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.740 | 2.547 | 2.220 | 2.074 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 533 | 533 | 1200 | 1200 |
| d_b, Bicycle Delay [s] | 16.13 | 16.13 | 4.80 | 4.80 |
| l_b,int, Bicycle LOS Score for Intersection | 1.907 | 1.986 | 1.959 | 1.974 |
| Bicycle LOS | A | A | A | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 9: Slate Ave & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 15.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.105 |

**Intersection Setup**

| Name | N Park Dr | | | N Park Dr | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | N Park Dr | | | N Park Dr | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 40 | 97 | 110 | 0 | 151 | 0 | 8 | 0 | 6 | 122 | 21 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | -40 | 0 | 0 | 0 | 0 | -30 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 50 | 107 | 110 | 0 | 121 | 10 | 18 | 0 | 16 | 92 | 21 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 27 | 28 | 0 | 30 | 3 | 5 | 0 | 4 | 23 | 5 | 0 |
| Total Analysis Volume [veh/h] | 50 | 107 | 110 | 0 | 121 | 10 | 18 | 0 | 16 | 92 | 21 | 0 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Stop | Stop | Free | Free |
|---|---|---|---|---|
| Flared Lane | | No | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.10 | 0.18 | 0.00 | 0.00 | 0.20 | 0.01 | 0.01 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 15.04 | 13.41 | 0.00 | 0.00 | 12.51 | 9.94 | 7.29 | 0.00 | 0.00 | 7.36 | 0.00 | 0.00 |
| Movement LOS | C | B | | | B | A | A | | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 1.14 | 1.14 | 0.00 | 0.00 | 0.79 | 0.79 | 0.04 | 0.00 | 0.04 | 0.16 | 0.16 | 0.16 |
| 95th-Percentile Queue Length [m/ln] | 8.72 | 8.72 | 0.00 | 0.00 | 6.01 | 6.01 | 0.28 | 0.00 | 0.28 | 1.23 | 1.23 | 1.23 |
| d_A, Approach Delay [s/veh] | 13.93 | | | 12.31 | | | 3.86 | | | 5.99 | | |
| Approach LOS | B | | | B | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 10.59 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 10: Slate Ave & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 19.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.368 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 89 | 92 | 81 | 0 | 136 | 75 | 22 | 46 | 143 | 130 | 46 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 63 | -20 | 0 | 0 | 0 | 0 | 20 | 0 | 44 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 152 | 72 | 81 | 0 | 136 | 75 | 42 | 46 | 187 | 130 | 46 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 38 | 18 | 20 | 0 | 34 | 19 | 11 | 12 | 47 | 33 | 12 | 0 |
| Total Analysis Volume [veh/h] | 152 | 72 | 81 | 0 | 136 | 75 | 42 | 46 | 187 | 130 | 46 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 41 | 0 | 0 | 41 | 0 | 0 | 41 | 0 | 0 | 41 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 6 | 0 | 0 | 6 | 0 | 0 | 12 | 0 | 0 | 6 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 39 | 0 | 0 | 39 | 0 | 0 | 51 | 0 | 0 | 51 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | C |
|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 59 | 59 | 59 | 23 | 23 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.65 | 0.26 | 0.26 |
| (v / s)_i Volume / Saturation Flow Rate | 0.14 | 0.10 | 0.13 | 0.18 | 0.22 |
| s, saturation flow rate [veh/h] | 1053 | 1539 | 1584 | 1564 | 785 |
| c, Capacity [veh/h] | 691 | 1000 | 1069 | 455 | 275 |
| d1, Uniform Delay [s] | 6.50 | 6.13 | 6.37 | 29.96 | 32.89 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.73 | 0.32 | 0.41 | 1.30 | 2.48 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.22 | 0.15 | 0.20 | 0.60 | 0.64 |
| d, Delay for Lane Group [s/veh] | 7.24 | 6.45 | 6.78 | 31.26 | 35.38 |
| Lane Group LOS | A | A | A | C | D |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.19 | 1.08 | 1.55 | 5.39 | 3.86 |
| 50th-Percentile Queue Length [m/ln] | 9.05 | 8.25 | 11.78 | 41.08 | 29.44 |
| 95th-Percentile Queue Length [veh/ln] | 2.14 | 1.95 | 2.78 | 9.20 | 6.95 |
| 95th-Percentile Queue Length [m/ln] | 16.29 | 14.86 | 21.20 | 70.10 | 52.99 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.24 | 6.45 | 6.45 | 6.78 | 6.78 | 6.78 | 31.26 | 31.26 | 31.26 | 35.38 | 35.38 | 35.38 |
| Movement LOS | A | A | A | A | A | A | C | C | C | D | D | D |
| d_A, Approach Delay [s/veh] | 6.84 | | | 6.78 | | | 31.26 | | | 35.38 | | |
| Approach LOS | A | | | A | | | C | | | D | | |
| d_I, Intersection Delay [s/veh] | 18.97 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.368 | | | | | | | | | | | |

**Emissions**

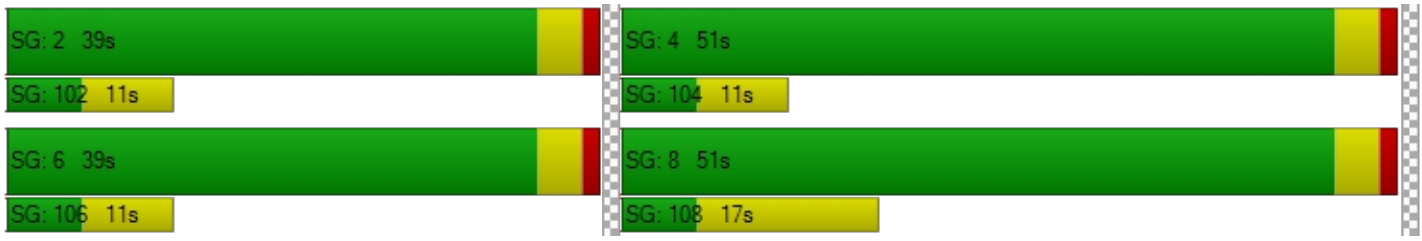
| | | | | | |
|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 23.75 | 23.91 | 40.52 | 35.03 | 6.73 |
| Stops [stops/h] | 47.51 | 43.33 | 61.82 | 215.66 | 154.53 |
| Fuel consumption [L/h] | 4.14 | 3.98 | 6.32 | 14.53 | 8.68 |
| CO [g/h] | 76.47 | 73.53 | 116.68 | 268.22 | 160.28 |
| NOx [g/h] | 14.88 | 14.31 | 22.70 | 52.19 | 31.18 |
| VOC [g/h] | 17.72 | 17.04 | 27.04 | 62.16 | 37.15 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.502 | 1.935 | 2.200 | 1.864 |
| Crosswalk LOS | B | A | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 778 | 778 | 1044 | 1044 |
| d_b, Bicycle Delay [s] | 16.81 | 16.81 | 10.27 | 10.27 |
| l_b,int, Bicycle LOS Score for Intersection | 2.063 | 1.908 | 2.013 | 1.850 |
| Bicycle LOS | B | A | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 11: N Park Dr & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 10.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.034 |

**Intersection Setup**

| Name | Keystone Dr | | N Park Dr | | N Park Dr | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [m] | 3.50 | 3.66 | 3.66 | 3.66 | 3.66 | 3.50 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Keystone Dr | | N Park Dr | | N Park Dr | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 10 | 10 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 16 | 83 | 9 | 96 | 69 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 26 | 93 | 19 | 106 | 69 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 23 | 5 | 27 | 17 | 0 |
| Total Analysis Volume [veh/h] | 26 | 93 | 19 | 106 | 69 | 0 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.03 | 0.09 | 0.01 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 10.24 | 9.18 | 7.37 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.44 | 0.44 | 0.03 | 0.03 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 3.32 | 3.32 | 0.24 | 0.24 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 9.41 | | 1.12 | | 0.00 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 4.03 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 12: N Park Dr & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.123 |

**Intersection Setup**

| Name | 28 St | | | | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 50.00 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 31 | 83 | 0 | 33 | 127 | 11 | 14 | 79 | 29 | 55 | 30 | 40 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 31 | 83 | 0 | 33 | 127 | 11 | 14 | 79 | 29 | 55 | 30 | 40 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 21 | 0 | 8 | 32 | 3 | 4 | 20 | 7 | 14 | 8 | 10 |
| Total Analysis Volume [veh/h] | 31 | 83 | 0 | 33 | 127 | 11 | 14 | 79 | 29 | 55 | 30 | 40 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.02 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.03 | 0.14 | 0.03 | 0.12 | 0.05 | 0.04 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.53 | 0.00 | 0.00 | 7.42 | 0.00 | 0.00 | 13.68 | 13.02 | 10.44 | 14.77 | 13.31 | 10.43 |
| Movement LOS | A | A | A | A | A | A | B | B | B | B | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.05 | 0.05 | 0.05 | 0.06 | 0.06 | 0.06 | 0.75 | 0.75 | 0.75 | 0.83 | 0.83 | 0.83 |
| 95th-Percentile Queue Length [m/ln] | 0.40 | 0.40 | 0.40 | 0.43 | 0.43 | 0.43 | 5.73 | 5.73 | 5.73 | 6.29 | 6.29 | 6.29 |
| d_A, Approach Delay [s/veh] | 2.05 | | | 1.43 | | | 12.48 | | | 13.03 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 6.82 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 13: N Park Dr & New Road B**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.269 |

**Intersection Setup**

| Name | Quartz Ave | | | New Road B | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Quartz Ave | | | New Road B | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 40 | 0 | 149 | 11 | 0 | 0 | 0 | 76 | 36 | 160 | 85 | 4 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 40 | 0 | 149 | 11 | 0 | 0 | 0 | 76 | 36 | 160 | 85 | 4 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 0 | 37 | 3 | 0 | 0 | 0 | 19 | 9 | 40 | 21 | 1 |
| Total Analysis Volume [veh/h] | 40 | 0 | 149 | 11 | 0 | 0 | 0 | 76 | 36 | 160 | 85 | 4 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.02 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.12 | 0.03 | 0.27 | 0.12 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.28 | 0.00 | 0.00 | 7.53 | 0.00 | 0.00 | 11.68 | 11.62 | 9.22 | 14.75 | 13.90 | 12.34 |
| Movement LOS | A | A | A | A | A | A | B | B | A | B | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.08 | 0.08 | 0.08 | 0.02 | 0.02 | 0.02 | 0.54 | 0.54 | 0.54 | 1.89 | 1.89 | 1.89 |
| 95th-Percentile Queue Length [m/ln] | 0.63 | 0.63 | 0.63 | 0.18 | 0.18 | 0.18 | 4.13 | 4.13 | 4.13 | 14.40 | 14.40 | 14.40 |
| d_A, Approach Delay [s/veh] | 1.54 | | | 7.53 | | | 10.85 | | | 14.42 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 9.23 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 14: N Park Dr & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 21.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.705 |

**Intersection Setup**

| Name | Boundary Rd | | Boundary Rd | | N Park Dr | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.50 | 3.66 | 3.66 | 3.50 | 3.50 | 3.50 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 75.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Boundary Rd | | Boundary Rd | | N Park Dr | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 175 | 0 | 239 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| Proportion of CAVs [%] | 0.00 | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 557 | 122 | 324 | 73 | 79 | 550 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | -70 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 557 | 297 | 324 | 312 | 79 | 480 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 139 | 74 | 81 | 78 | 20 | 120 |
| Total Analysis Volume [veh/h] | 557 | 297 | 324 | 312 | 79 | 480 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 60 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPerm | Permissive | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 0 | 3 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Maximum Green [s] | 5 | 47 | 47 | 0 | 35 | 0 |
| Amber [s] | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 9 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Advanced Detector Location [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Advanced Detector Length [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Phasing & Timing: Pattern 1**

| | | | | | | |
|---|---|---|---|---|---|---|
| Split [s] | 15 | 35 | 20 | 0 | 25 | 0 |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 10 | 10 | 0 | 5 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | No | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L | R |
|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 60 | 60 | 60 | 60 | 60 | 60 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 32 | 32 | 17 | 17 | 20 | 20 |
| g / C, Green / Cycle | 0.54 | 0.54 | 0.29 | 0.29 | 0.33 | 0.33 |
| (v / s)_i Volume / Saturation Flow Rate | 0.46 | 0.08 | 0.17 | 0.20 | 0.04 | 0.30 |
| s, saturation flow rate [veh/h] | 1207 | 3560 | 1870 | 1594 | 1810 | 1615 |
| c, Capacity [veh/h] | 687 | 1925 | 543 | 463 | 590 | 527 |
| d1, Uniform Delay [s] | 11.41 | 6.91 | 18.19 | 18.86 | 14.25 | 19.39 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 10.01 | 0.17 | 4.56 | 8.05 | 0.10 | 6.53 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| X, volume / capacity | 0.81 | 0.15 | 0.59 | 0.69 | 0.13 | 0.91 |
| d, Delay for Lane Group [s/veh] | 21.42 | 7.08 | 22.76 | 26.91 | 14.35 | 25.92 |
| Lane Group LOS | C | A | C | C | B | C |
| Critical Lane Group | Yes | No | No | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 5.71 | 0.81 | 4.09 | 4.56 | 0.71 | 6.66 |
| 50th-Percentile Queue Length [m/ln] | 43.47 | 6.17 | 31.18 | 34.78 | 5.39 | 50.77 |
| 95th-Percentile Queue Length [veh/ln] | 9.62 | 1.46 | 7.37 | 8.07 | 1.27 | 10.90 |
| 95th-Percentile Queue Length [m/ln] | 73.32 | 11.10 | 56.12 | 61.48 | 9.70 | 83.03 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 21.42 | 7.08 | 22.83 | 26.91 | 14.35 | 25.92 |
| Movement LOS | C | A | C | C | B | C |
| d_A, Approach Delay [s/veh] | 16.43 | | 24.84 | | 24.28 | |
| Approach LOS | B | | C | | C | |
| d_I, Intersection Delay [s/veh] | 21.18 | | | | | |
| Intersection LOS | C | | | | | |
| Intersection V/C | 0.705 | | | | | |

**Emissions**

| | | | | | | |
|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 231.06 | 123.20 | 184.58 | 184.58 | 8.39 | 51.01 |
| Stops [stops/h] | 342.31 | 97.14 | 245.50 | 273.86 | 42.42 | 399.79 |
| Fuel consumption [L/h] | 38.85 | 15.52 | 28.64 | 30.30 | 2.57 | 22.88 |
| CO [g/h] | 717.44 | 286.61 | 528.93 | 559.48 | 47.52 | 422.55 |
| NOx [g/h] | 139.59 | 55.76 | 102.91 | 108.86 | 9.25 | 82.21 |
| VOC [g/h] | 166.27 | 66.42 | 122.58 | 129.67 | 11.01 | 97.93 |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 21.68 | 21.68 | 21.68 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.615 | 2.367 | 2.642 |
| Crosswalk LOS | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1033 | 533 | 700 |
| d_b, Bicycle Delay [s] | 7.01 | 16.13 | 12.68 |
| l_b,int, Bicycle LOS Score for Intersection | 2.264 | 2.084 | 1.670 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 15: New Road B & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 9.5 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.048 |

**Intersection Setup**

| Name | Keystone Dr | | | Keystone Dr | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Keystone Dr | | | Keystone Dr | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 5 | 4 | 16 | 57 | 0 | 0 | 0 | 0 | 42 | 0 | 51 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 5 | 4 | 16 | 57 | 0 | 0 | 0 | 0 | 42 | 0 | 51 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 1 | 1 | 4 | 14 | 0 | 0 | 0 | 0 | 11 | 0 | 13 |
| Total Analysis Volume [veh/h] | 0 | 5 | 4 | 16 | 57 | 0 | 0 | 0 | 0 | 42 | 0 | 51 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.05 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.33 | 0.00 | 0.00 | 7.25 | 0.00 | 0.00 | 9.47 | 9.59 | 8.57 | 9.49 | 9.97 | 8.74 |
| Movement LOS | A | A | A | A | A | A | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 | 0.32 | 0.32 | 0.32 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.00 | 0.20 | 0.20 | 0.20 | 0.00 | 0.00 | 0.00 | 2.40 | 2.40 | 2.40 |
| d_A, Approach Delay [s/veh] | 0.00 | | | 1.59 | | | 9.21 | | | 9.08 | | |
| Approach LOS | A | | | A | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 5.49 | | | | | | | | | | | |
| Intersection LOS | A | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 16: New Road B & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.036 |

**Intersection Setup**

| Name | | | | 28 St | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | | | | 28 St | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 4 | 117 | 16 | 5 | 114 | 14 | 48 | 0 | 12 | 44 | 23 | 17 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 4 | 117 | 16 | 5 | 114 | 14 | 48 | 0 | 12 | 44 | 23 | 17 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 1 | 29 | 4 | 1 | 29 | 4 | 12 | 0 | 3 | 11 | 6 | 4 |
| Total Analysis Volume [veh/h] | 4 | 117 | 16 | 5 | 114 | 14 | 48 | 0 | 12 | 44 | 23 | 17 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.00 | 0.01 | 0.07 | 0.04 | 0.02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.47 | 0.00 | 0.00 | 7.49 | 0.00 | 0.00 | 11.26 | 11.23 | 9.39 | 11.09 | 11.41 | 9.60 |
| Movement LOS | A | A | A | A | A | A | B | B | A | B | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.29 | 0.29 | 0.29 | 0.41 | 0.41 | 0.41 |
| 95th-Percentile Queue Length [m/ln] | 0.05 | 0.05 | 0.05 | 0.07 | 0.07 | 0.07 | 2.23 | 2.23 | 2.23 | 3.12 | 3.12 | 3.12 |
| d_A, Approach Delay [s/veh] | 0.22 | | | 0.28 | | | 10.88 | | | 10.87 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 3.95 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**

**Intersection 17: Boulder Blvd & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.1 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.024 |

**Intersection Setup**

| Name | Keystone Dr | | | Keystone Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Keystone Dr | | | Keystone Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 53 | 3 | 0 | 32 | 12 | 46 | 14 | 107 | 49 | 12 | 142 | 13 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 53 | 3 | 0 | 32 | 12 | 46 | 14 | 107 | 49 | 12 | 142 | 13 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 1 | 0 | 8 | 3 | 12 | 4 | 27 | 12 | 3 | 36 | 3 |
| Total Analysis Volume [veh/h] | 53 | 3 | 0 | 32 | 12 | 46 | 14 | 107 | 49 | 12 | 142 | 13 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.03 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.03 | 0.16 | 0.05 | 0.02 | 0.22 | 0.01 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.40 | 0.00 | 0.00 | 7.27 | 0.00 | 0.00 | 13.96 | 12.12 | 10.07 | 14.07 | 12.65 | 10.29 |
| Movement LOS | A | A | A | A | A | A | B | B | B | B | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.10 | 0.10 | 0.10 | 0.06 | 0.06 | 0.06 | 0.93 | 0.93 | 0.93 | 1.04 | 1.04 | 1.04 |
| 95th-Percentile Queue Length [m/ln] | 0.77 | 0.77 | 0.77 | 0.48 | 0.48 | 0.48 | 7.12 | 7.12 | 7.12 | 7.90 | 7.90 | 7.90 |
| d_A, Approach Delay [s/veh] | 7.01 | | | 2.59 | | | 11.68 | | | 12.57 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 9.75 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 18: Boulder Blvd & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 22.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.266 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 42 | 10 | 130 | 137 | 14 | 103 | 26 | 75 | 38 | 81 | 22 | 32 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 42 | 10 | 130 | 137 | 14 | 103 | 26 | 75 | 38 | 81 | 22 | 32 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 11 | 3 | 33 | 34 | 4 | 26 | 7 | 19 | 10 | 20 | 6 | 8 |
| Total Analysis Volume [veh/h] | 42 | 10 | 130 | 137 | 14 | 103 | 26 | 75 | 38 | 81 | 22 | 32 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.03 | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | 0.07 | 0.20 | 0.04 | 0.27 | 0.06 | 0.03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.51 | 0.00 | 0.00 | 7.73 | 0.00 | 0.00 | 18.22 | 18.00 | 12.08 | 21.98 | 19.50 | 13.80 |
| Movement LOS | A | A | A | A | A | A | C | C | B | C | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.09 | 0.09 | 0.09 | 0.29 | 0.29 | 0.29 | 1.29 | 1.29 | 1.29 | 1.58 | 1.58 | 1.58 |
| 95th-Percentile Queue Length [m/ln] | 0.65 | 0.65 | 0.65 | 2.24 | 2.24 | 2.24 | 9.80 | 9.80 | 9.80 | 12.01 | 12.01 | 12.01 |
| d_A, Approach Delay [s/veh] | 1.73 | | | 4.17 | | | 16.42 | | | 19.64 | | |
| Approach LOS | A | | | A | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 8.88 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 19: Boulder Blvd & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 21.5 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.325 |

**Intersection Setup**

| Name | Boundary Rd | | Boundary Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Boundary Rd | | Boundary Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 175 | 239 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 111 | 90 | 101 | 80 | 104 | 297 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 111 | 265 | 340 | 80 | 104 | 297 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 28 | 66 | 85 | 20 | 26 | 74 |
| Total Analysis Volume [veh/h] | 111 | 265 | 340 | 80 | 104 | 297 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.10 | 0.00 | 0.00 | 0.00 | 0.32 | 0.37 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.51 | 0.00 | 0.00 | 0.00 | 21.54 | 12.19 |
| Movement LOS | A | A | A | A | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.32 | 0.00 | 0.00 | 0.00 | 1.37 | 1.74 |
| 95th-Percentile Queue Length [m/ln] | 2.47 | 0.00 | 0.00 | 0.00 | 10.46 | 13.25 |
| d_A, Approach Delay [s/veh] | 2.51 | | 0.00 | | 14.62 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 5.69 | | | | | |
| Intersection LOS | C | | | | | |

**Intersection Level Of Service Report**

**Intersection 20: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 13.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.034 |

**Intersection Setup**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 100 | 10 | 250 | 290 | 10 |
| Base Volume Adjustment Factor | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 5 | 0 | 0 | 11 | 5 | 4 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | -120 | 120 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 16 | 110 | 11 | 286 | 204 | 135 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 28 | 3 | 72 | 51 | 34 |
| Total Analysis Volume [veh/h] | 16 | 110 | 11 | 286 | 204 | 135 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.03 | 0.14 | 0.01 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 13.72 | 10.78 | 7.96 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.64 | 0.64 | 0.02 | 0.02 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 4.88 | 4.88 | 0.14 | 0.14 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 11.15 | | 0.29 | | 0.00 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 1.96 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 21: Slate Ave & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 10.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.013 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 10 | 10 | 10 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 4 | 0 | 13 | 5 | 0 | 61 |
| Diverted Trips [veh/h] | 120 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 134 | 10 | 23 | 15 | 10 | 71 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 34 | 3 | 6 | 4 | 3 | 18 |
| Total Analysis Volume [veh/h] | 134 | 10 | 23 | 15 | 10 | 71 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.02 | 0.00 | 0.01 | 0.08 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.53 | 0.00 | 10.04 | 9.36 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.04 | 0.04 | 0.30 | 0.30 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.30 | 0.30 | 2.28 | 2.28 |
| d_A, Approach Delay [s/veh] | 0.00 | | 4.56 | | 9.45 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 3.57 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 22: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 22.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.062 |

**Intersection Setup**

| Name | Golf Course Rd | | | Golf Course Rd | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Golf Course Rd | | | Golf Course Rd | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 5 | 0 | 0 | 5 | 20 | 5 | 0 | 25 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 65 | 0 | 98 | 17 | 4 | 9 | 43 | 0 | 2 | 68 | 263 |
| Diverted Trips [veh/h] | 0 | 120 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 10 | 190 | 0 | 98 | 22 | 24 | 14 | 43 | 25 | 2 | 68 | 263 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 48 | 0 | 25 | 6 | 6 | 4 | 11 | 6 | 1 | 17 | 66 |
| Total Analysis Volume [veh/h] | 10 | 190 | 0 | 98 | 22 | 24 | 14 | 43 | 25 | 2 | 68 | 263 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | 0.06 | 0.09 | 0.02 | 0.00 | 0.15 | 0.31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.32 | 0.00 | 0.00 | 7.74 | 0.00 | 0.00 | 22.69 | 14.33 | 10.14 | 17.92 | 16.95 | 13.40 |
| Movement LOS | A | A | A | A | A | A | C | B | B | C | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.02 | 0.02 | 0.02 | 0.19 | 0.19 | 0.19 | 0.64 | 0.64 | 0.64 | 2.44 | 2.44 | 2.44 |
| 95th-Percentile Queue Length [m/ln] | 0.13 | 0.13 | 0.13 | 1.46 | 1.46 | 1.46 | 4.88 | 4.88 | 4.88 | 18.58 | 18.58 | 18.58 |
| d_A, Approach Delay [s/veh] | 0.37 | | | 5.27 | | | 14.48 | | | 14.15 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 8.87 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 23: Boulder Blvd & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.145 |

**Intersection Setup**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 300 | 10 | 10 | 20 | 20 | 150 |
| Base Volume Adjustment Factor | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 5 | 4 | 68 | 47 | 7 |
| Diverted Trips [veh/h] | -120 | 0 | 0 | -50 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 210 | 16 | 15 | 40 | 69 | 172 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 53 | 4 | 4 | 10 | 17 | 43 |
| Total Analysis Volume [veh/h] | 210 | 16 | 15 | 40 | 69 | 172 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.14 | 0.00 | 0.00 | 0.00 | 0.14 | 0.17 |
| d_M, Delay for Movement [s/veh] | 7.64 | 0.00 | 0.00 | 0.00 | 14.64 | 10.55 |
| Movement LOS | A | A | A | A | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.44 | 0.44 | 0.00 | 0.00 | 1.33 | 1.33 |
| 95th-Percentile Queue Length [m/ln] | 3.32 | 3.32 | 0.00 | 0.00 | 10.10 | 10.10 |
| d_A, Approach Delay [s/veh] | 7.10 | | 0.00 | | 11.72 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 8.48 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 24: Hwy 779 & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 19.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.798 |

**Intersection Setup**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 160.00 | 30.48 | 30.48 | 150.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 70.00 | | | 70.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 21 | 698 | 49 | 49 | 764 | 12 | 21 | 6 | 43 | 128 | 21 | 195 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.1000 | 1.0000 | 1.1000 | 1.1000 | 1.1000 | 1.0000 | 1.0000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 6.00 | 6.00 | 6.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 19 | 47 | 7 | 178 | 0 | 0 | 0 | 0 | 68 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | -110 | 0 | 0 | -350 | 0 | 0 | 0 | 0 | 0 | 0 | -120 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 21 | 607 | 96 | 61 | 592 | 13 | 23 | 7 | 43 | 196 | 23 | 95 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 152 | 24 | 15 | 148 | 3 | 6 | 2 | 11 | 49 | 6 | 24 |
| Total Analysis Volume [veh/h] | 21 | 607 | 96 | 61 | 592 | 13 | 23 | 7 | 43 | 196 | 23 | 95 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 70 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 8 | 0 | 7 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 5 | 14 | 0 | 5 | 14 | 0 | 0 | 38 | 0 | 10 | 38 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 9 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 9 | 34 | 0 | 9 | 34 | 0 | 0 | 18 | 0 | 9 | 27 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 0 | 10 | 0 | 5 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 | 2.00 | 0.00 | 2.00 |
| g_i, Effective Green Time [s] | 45 | 38 | 45 | 39 | 8 | 8 | 17 | 17 |
| g / C, Green / Cycle | 0.64 | 0.54 | 0.64 | 0.56 | 0.11 | 0.11 | 0.24 | 0.24 |
| (v / s)_i Volume / Saturation Flow Rate | 0.03 | 0.43 | 0.08 | 0.36 | 0.23 | 0.03 | 0.27 | 0.07 |
| s, saturation flow rate [veh/h] | 804 | 1643 | 783 | 1677 | 129 | 1431 | 802 | 1385 |
| c, Capacity [veh/h] | 482 | 882 | 418 | 943 | 105 | 162 | 306 | 335 |
| d1, Uniform Delay [s] | 6.77 | 13.12 | 9.36 | 10.48 | 31.28 | 28.35 | 25.04 | 21.58 |
| k, delay calibration | 0.11 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.04 | 7.41 | 0.74 | 3.35 | 1.46 | 0.86 | 3.12 | 0.46 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.04 | 0.80 | 0.15 | 0.64 | 0.28 | 0.26 | 0.72 | 0.28 |
| d, Delay for Lane Group [s/veh] | 6.81 | 20.53 | 10.09 | 13.83 | 32.74 | 29.21 | 28.16 | 22.04 |
| Lane Group LOS | A | C | B | B | C | C | C | C |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.08 | 8.55 | 0.30 | 5.60 | 0.54 | 0.67 | 3.28 | 1.25 |
| 50th-Percentile Queue Length [m/ln] | 0.59 | 65.18 | 2.30 | 42.65 | 4.15 | 5.14 | 24.99 | 9.52 |
| 95th-Percentile Queue Length [veh/ln] | 0.14 | 13.35 | 0.54 | 9.48 | 0.98 | 1.21 | 5.90 | 2.25 |
| 95th-Percentile Queue Length [m/ln] | 1.06 | 101.73 | 4.14 | 72.21 | 7.46 | 9.24 | 44.97 | 17.13 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 6.81 | 20.53 | 20.53 | 10.09 | 13.83 | 13.83 | 32.74 | 32.74 | 29.21 | 28.16 | 28.16 | 22.04 |
| Movement LOS | A | C | C | B | B | B | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 20.13 | | | 13.49 | | | 30.66 | | | 26.31 | | |
| Approach LOS | C | | | B | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 19.16 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.798 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 16.50 | 552.45 | 53.82 | 533.74 | 2.11 | 3.03 | 113.14 | 49.08 |
| Stops [stops/h] | 3.98 | 439.91 | 15.51 | 287.83 | 27.98 | 34.66 | 168.63 | 64.24 |
| Fuel consumption [L/h] | 1.63 | 75.50 | 5.54 | 62.62 | 1.59 | 2.03 | 19.30 | 7.72 |
| CO [g/h] | 30.11 | 1394.22 | 102.37 | 1156.30 | 29.27 | 37.55 | 356.35 | 142.62 |
| NOx [g/h] | 5.86 | 271.26 | 19.92 | 224.97 | 5.70 | 7.31 | 69.33 | 27.75 |
| VOC [g/h] | 6.98 | 323.12 | 23.73 | 267.98 | 6.78 | 8.70 | 82.59 | 33.05 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 26.58 | 26.58 | 26.58 | 26.58 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.706 | 2.617 | 1.990 | 2.139 |
| Crosswalk LOS | B | B | A | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 857 | 857 | 400 | 657 |
| d_b, Bicycle Delay [s] | 11.43 | 11.43 | 22.40 | 15.78 |
| l_b,int, Bicycle LOS Score for Intersection | 2.754 | 2.659 | 1.680 | 2.078 |
| Bicycle LOS | C | B | A | B |

## Sequence

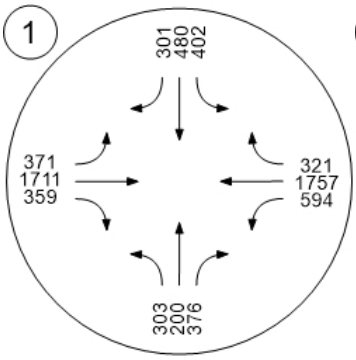
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



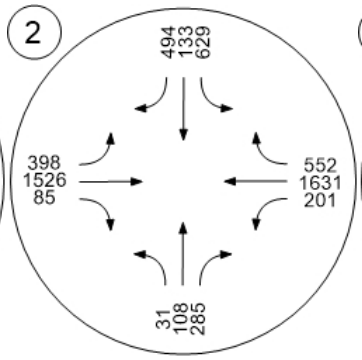
## Traffic Volume - Future Total Volume



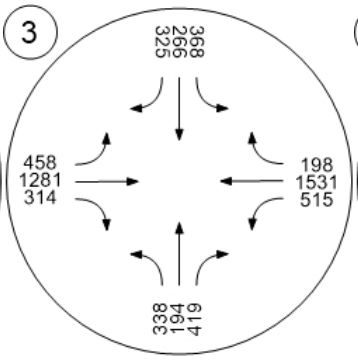

### Hwy 16 A & Boundary Rd



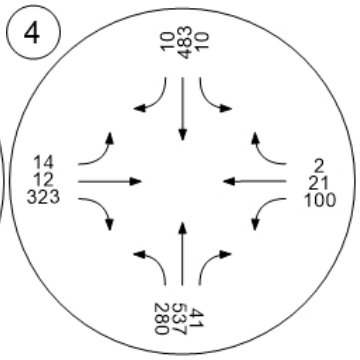

### Hwy 16A & 28 St



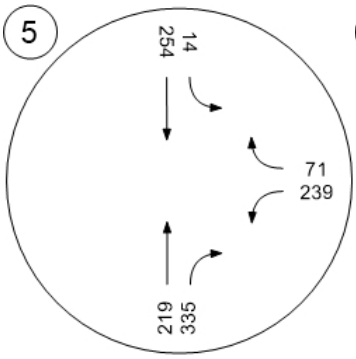

### Hwy 16A & S Park Dr/N Park



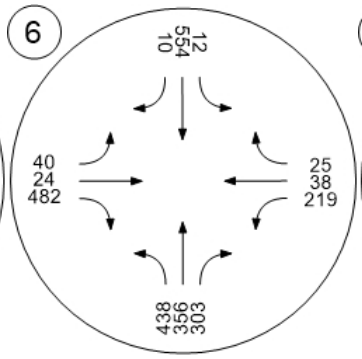

### Boulder Blvd & N Park Dr



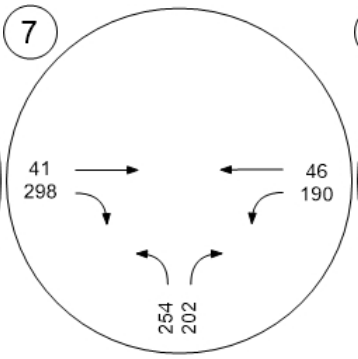

### N Park Dr & Quartz Ave



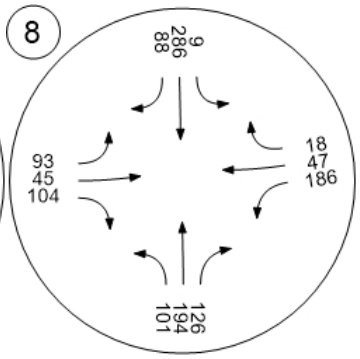

### 28 St & Site Access #1




### Quartz Ave & Site Access #2



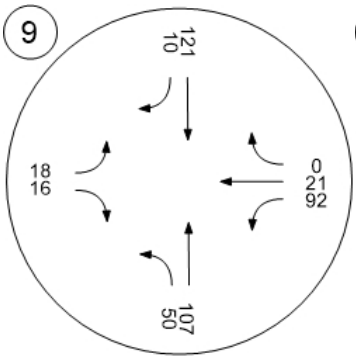

### Quartz Ave & 28 St



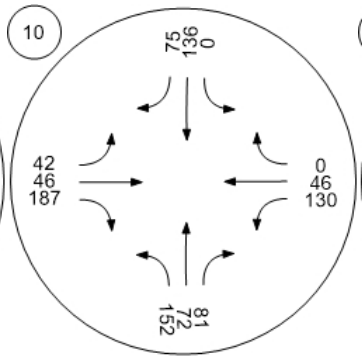
## Traffic Volume - Future Total Volume



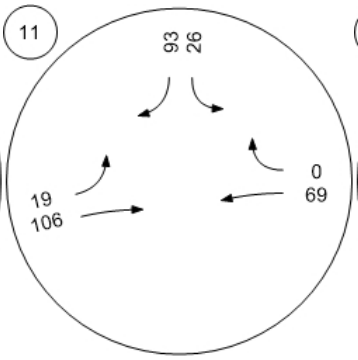

### Slate Ave & N Park Dr



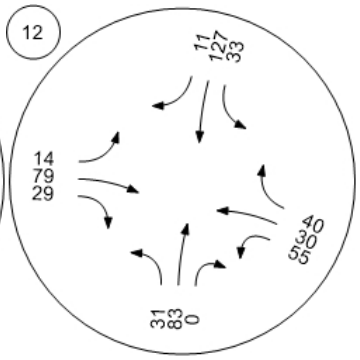

### Slate Ave & 28 St



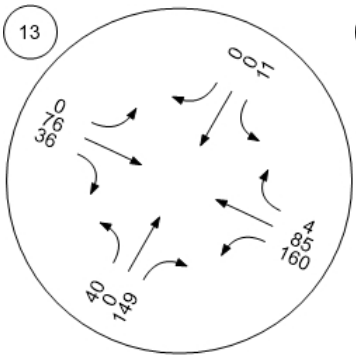

### N Park Dr & Keystone Dr



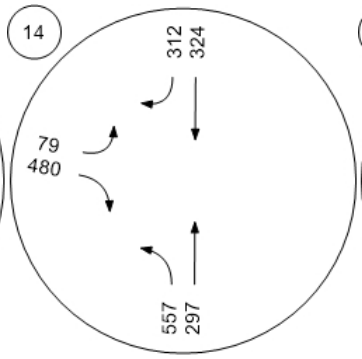

### N Park Dr & 28 St



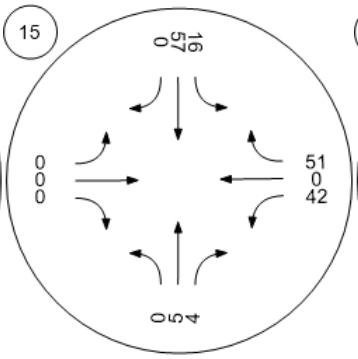

### N Park Dr & New Road B



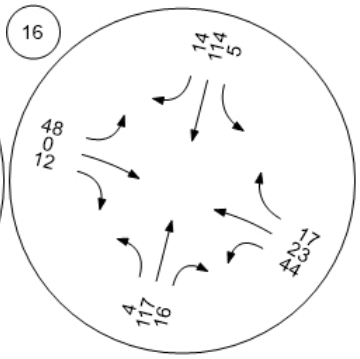

### N Park Dr & Boundary Rd



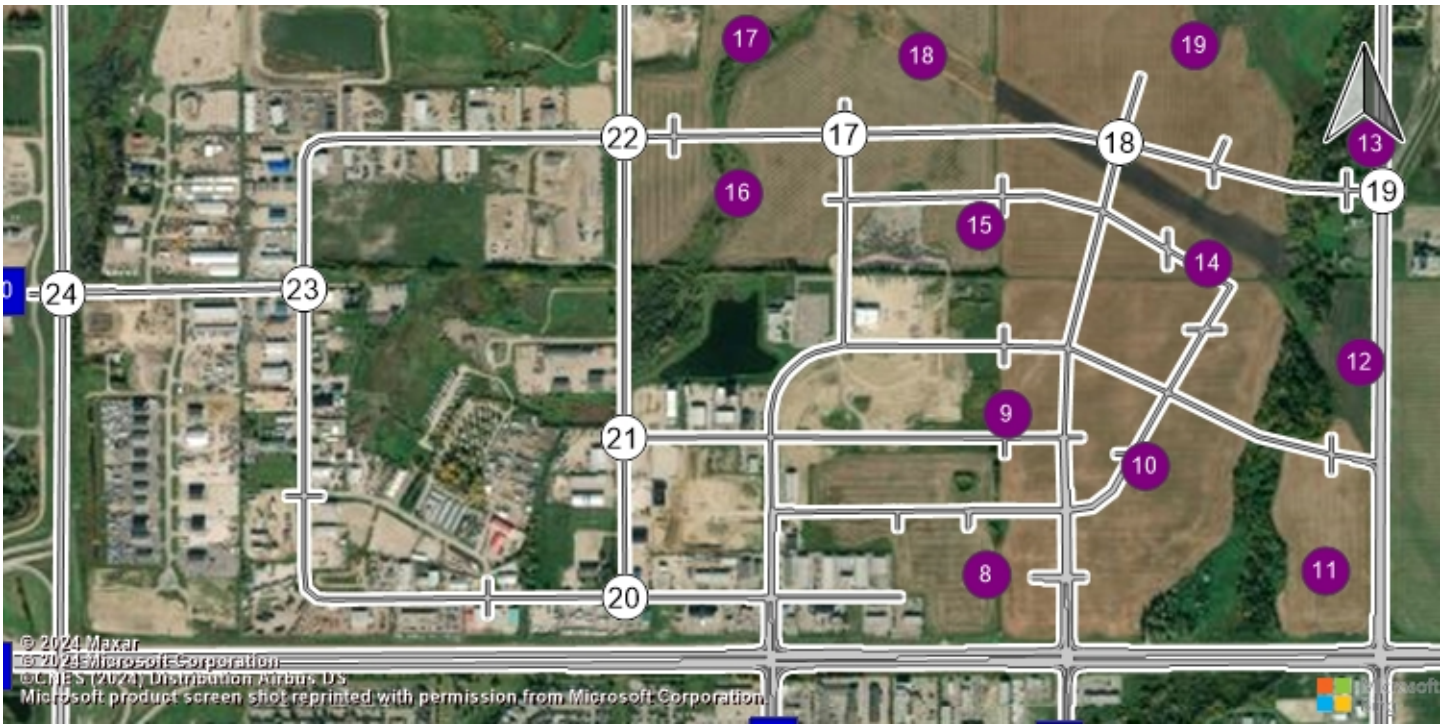

### New Road B & Keystone Dr



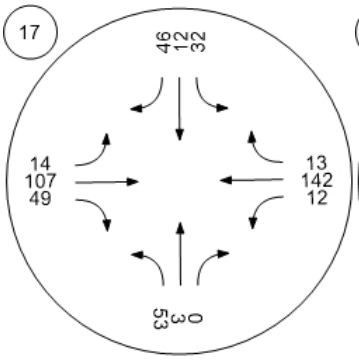

### New Road B & 28 St



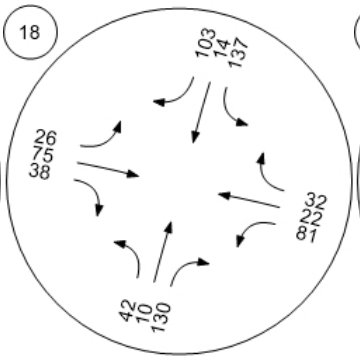
## Traffic Volume - Future Total Volume



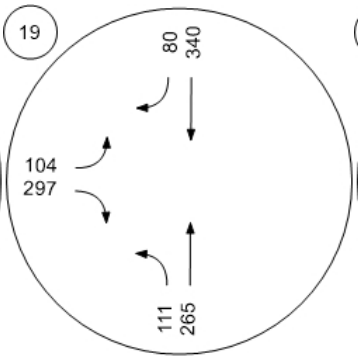

### Boulder Blvd & Keystone Dr



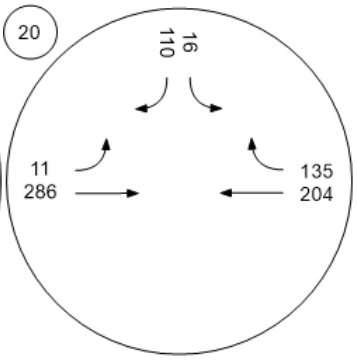

### Boulder Blvd & 28 St



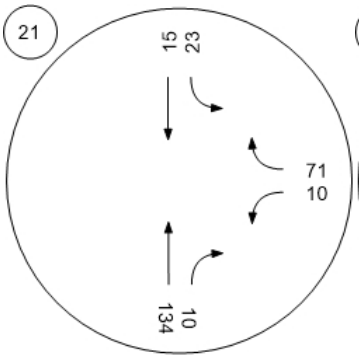

### Boulder Blvd & Boundary Rd



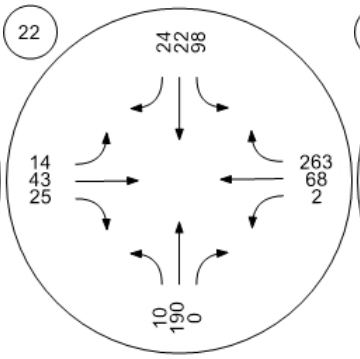

### Boulder Blvd & Golf Course



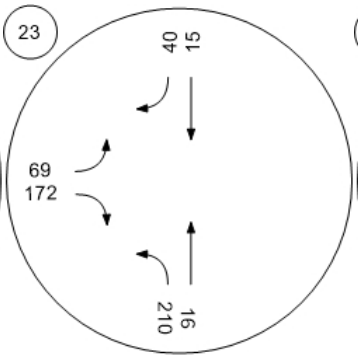

### Slate Ave & Golf Course Rd



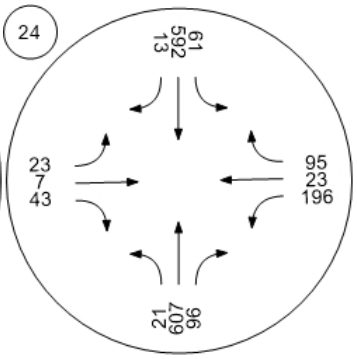

### Boulder Blvd & Golf Course




### Boulder Blvd & Wood Ave




### Hwy 779 & Wood Ave



Vistro File: C:\...\2025-11-24_North Industrial Development_Updated ASP_FINAL.vistro
Report File: C:\...\Full Buildout (2046)_SAT_North Connection.pdf

Scenario 10 Full Buildout (2046)_SAT_North Connection

11/25/2025

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 1 | Hwy 16 A & Boundary Rd | Signalized | HCM 7th Edition | EB Left | 0.745 | 40.6 | D |
| 2 | Hwy 16A & 28 St | Signalized | HCM 7th Edition | NB Thru | 0.713 | 37.1 | D |
| 3 | Hwy 16A & S Park Dr/N Park Dr | Signalized | HCM 7th Edition | NB Left | 0.738 | 50.7 | D |
| 4 | Boulder Blvd & N Park Dr | Signalized | HCM 7th Edition | EB Right | 0.641 | 16.5 | B |
| 5 | N Park Dr & Quartz Ave | All-way stop | HCM 7th Edition | SB Thru | 0.708 | 19.7 | C |
| 6 | 28 St & Site Access #1 | Signalized | HCM 7th Edition | WB Thru | 0.449 | 21.6 | C |
| 7 | Quartz Ave & Site Access #2 | Two-way stop | HCM 7th Edition | NB Left | 0.712 | 34.2 | D |
| 8 | New Road A & 28 St | Signalized | HCM 7th Edition | WB Left | 0.285 | 11.5 | B |
| 9 | Slate Ave & N Park Dr | Two-way stop | HCM 7th Edition | NB Left | 0.129 | 20.2 | C |
| 10 | Slate Ave & 28 St | Signalized | HCM 7th Edition | WB Left | 0.390 | 18.3 | B |
| 11 | N Park Dr & Keystone Dr | Two-way stop | HCM 7th Edition | SB Left | 0.041 | 11.0 | B |
| 12 | N Park Dr & 28 St | Two-way stop | HCM 7th Edition | WB Left | 0.094 | 14.4 | B |
| 13 | N Park Dr & New Road B | Two-way stop | HCM 7th Edition | WB Left | 0.492 | 23.4 | C |
| 14 | N Park Dr & Boundary Rd | Signalized | HCM 7th Edition | EB Left | 0.382 | 6.4 | A |
| 15 | New Road B & Keystone Dr | Two-way stop | HCM 7th Edition | WB Left | 0.060 | 9.9 | A |
| 16 | New Road B & 28 St | Two-way stop | HCM 7th Edition | WB Thru | 0.011 | 12.6 | B |
| 17 | Boulder Blvd & Keystone Dr | Two-way stop | HCM 7th Edition | EB Left | 0.048 | 14.1 | B |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 18 | Boulder Blvd & 28 St | Two-way stop | HCM 7th Edition | WB Left | 0.400 | 31.5 | D |
| 19 | Boulder Blvd & Boundary Rd | Two-way stop | HCM 7th Edition | EB Left | 0.490 | 33.3 | D |
| 20 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | SB Left | 0.074 | 12.8 | B |
| 21 | Slate Ave & Golf Course Rd | Two-way stop | HCM 7th Edition | WB Left | 0.015 | 10.7 | B |
| 22 | Boulder Blvd & Golf Course Rd | Two-way stop | HCM 7th Edition | EB Left | 0.119 | 27.8 | D |
| 23 | Boulder Blvd & Wood Ave | Two-way stop | HCM 7th Edition | EB Left | 0.126 | 13.3 | B |
| 24 | Hwy 779 & Wood Ave | Signalized | HCM 7th Edition | EB Left | 0.659 | 16.0 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 1: Hwy 16 A & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 40.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.745 |

**Intersection Setup**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 100.00 | 50.00 | 30.48 | 50.00 | 100.00 | 30.48 | 160.00 | 150.00 | 30.48 | 75.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 48.28 | | | 50.00 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | No | | | No | | | Yes | | |

**Volumes**

| Name | Veterans Blvd | | | Boundary Rd | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 82 | 3 | 334 | 20 | 160 | 110 | 125 | 1535 | 101 | 528 | 1409 | 40 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.1000 | 1.0000 | 1.0000 | 0.9000 | 1.0000 | 0.9000 | 0.9000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 299 | 216 | 0 | 406 | 300 | 329 | 234 | 367 | 269 | 0 | 384 | 313 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | -50 | 0 | 0 | 0 | -280 | 0 | 0 | -90 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 381 | 219 | 334 | 376 | 476 | 439 | 359 | 1469 | 370 | 475 | 1562 | 353 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 95 | 55 | 84 | 94 | 119 | 110 | 90 | 367 | 93 | 119 | 391 | 88 |
| Total Analysis Volume [veh/h] | 381 | 219 | 334 | 376 | 476 | 439 | 359 | 1469 | 370 | 475 | 1562 | 353 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 54.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 16 | 30 | 0 | 16 | 30 | 0 | 16 | 41 | 0 | 16 | 52 | 0 |
| Amber [s] | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 | 3.0 | 5.2 | 0.0 | 3.0 | 5.3 | 0.0 |
| All red [s] | 1.5 | 2.1 | 0.0 | 2.1 | 2.1 | 0.0 | 1.8 | 1.8 | 0.0 | 1.8 | 1.8 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.8 | 0.0 | 4.1 | 4.8 | 0.0 | 2.8 | 5.0 | 0.0 | 2.8 | 5.1 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 37 | 44 | 0 | 20 | 27 | 0 | 21 | 50 | 0 | 26 | 55 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 6.80 | 6.80 | 6.80 | 6.80 | 4.80 | 7.00 | 4.80 | 7.10 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.80 | 0.00 | 4.80 | 2.80 | 5.00 | 2.80 | 5.10 |
| g_i, Effective Green Time [s] | 54 | 34 | 54 | 22 | 16 | 46 | 21 | 51 |
| g / C, Green / Cycle | 0.39 | 0.24 | 0.39 | 0.16 | 0.12 | 0.33 | 0.15 | 0.37 |
| (v / s)_i Volume / Saturation Flow Rate | 0.27 | 0.06 | 0.27 | 0.13 | 0.10 | 0.29 | 0.14 | 0.31 |
| s, saturation flow rate [veh/h] | 1391 | 3560 | 1369 | 3560 | 3459 | 5094 | 3459 | 5094 |
| c, Capacity [veh/h] | 491 | 863 | 545 | 568 | 400 | 1691 | 519 | 1862 |
| d1, Uniform Delay [s] | 35.49 | 42.82 | 35.49 | 57.07 | 61.08 | 43.89 | 58.63 | 40.64 |
| k, delay calibration | 0.50 | 0.11 | 0.50 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 11.37 | 0.15 | 6.99 | 3.38 | 7.31 | 6.35 | 6.90 | 4.72 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.78 | 0.25 | 0.69 | 0.84 | 0.90 | 0.87 | 0.92 | 0.84 |
| d, Delay for Lane Group [s/veh] | 46.86 | 42.98 | 42.48 | 60.45 | 68.39 | 50.24 | 65.53 | 45.36 |
| Lane Group LOS | D | D | D | E | E | D | E | D |
| Critical Lane Group | Yes | No | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 11.74 | 3.12 | 11.05 | 8.43 | 6.72 | 16.89 | 8.80 | 17.18 |
| 50th-Percentile Queue Length [m/ln] | 89.46 | 23.77 | 84.23 | 64.26 | 51.18 | 128.70 | 67.08 | 130.92 |
| 95th-Percentile Queue Length [veh/ln] | 17.36 | 5.61 | 16.51 | 13.20 | 10.97 | 23.63 | 13.67 | 23.98 |
| 95th-Percentile Queue Length [m/ln] | 132.28 | 42.78 | 125.78 | 100.56 | 83.57 | 180.06 | 104.16 | 182.72 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 46.86 | 42.98 | 0.00 | 42.48 | 60.45 | 0.00 | 68.39 | 50.24 | 0.00 | 65.53 | 45.36 | 0.00 |
| Movement LOS | D | D | | D | E | | E | D | | E | D | |
| d_A, Approach Delay [s/veh] | 29.19 | | | 34.66 | | | 44.75 | | | 42.67 | | |
| Approach LOS | C | | | C | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 40.58 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.745 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 87.63 | 50.37 | 155.97 | 197.46 | 240.90 | 985.73 | 106.18 | 349.16 |
| Stops [stops/h] | 301.88 | 160.41 | 284.25 | 433.73 | 345.42 | 1302.96 | 452.76 | 1325.44 |
| Fuel consumption [L/h] | 28.55 | 15.48 | 33.52 | 50.68 | 49.46 | 179.55 | 43.72 | 116.10 |
| CO [g/h] | 527.23 | 285.88 | 618.96 | 935.86 | 913.32 | 3315.43 | 807.38 | 2143.88 |
| NOx [g/h] | 102.58 | 55.62 | 120.43 | 182.08 | 177.70 | 645.06 | 157.09 | 417.12 |
| VOC [g/h] | 122.19 | 66.26 | 143.45 | 216.89 | 211.67 | 768.38 | 187.12 | 496.87 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 43.0 | 0.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 33.60 | 0.00 | 0.00 | 59.43 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.703 | 0.000 | 0.000 | 3.539 |
| Crosswalk LOS | B | F | F | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 531 | 289 | 614 | 684 |
| d_b, Bicycle Delay [s] | 37.74 | 51.26 | 33.60 | 30.29 |
| l_b,int, Bicycle LOS Score for Intersection | 2.055 | 2.263 | 2.565 | 2.680 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 2: Hwy 16A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 37.1 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.713 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 50.00 | 75.00 | 30.48 | 30.48 | 150.00 | 30.48 | 100.00 | 150.00 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 200.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | No | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 24 | 0 | 211 | 0 | 0 | 0 | 0 | 1550 | 62 | 160 | 1441 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 | 1.0000 | 1.0000 | 0.9000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 3 | 146 | 24 | 598 | 157 | 398 | 438 | 248 | 8 | 26 | 434 | 553 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | -50 | 0 | -280 | 0 | 0 | -90 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 52 | 0 | 88 | 52 | -52 | 0 | 0 | -88 | 88 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 27 | 146 | 235 | 650 | 157 | 436 | 490 | 1311 | 70 | 186 | 1553 | 641 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 37 | 59 | 163 | 39 | 109 | 123 | 328 | 18 | 47 | 388 | 160 |
| Total Analysis Volume [veh/h] | 27 | 146 | 235 | 650 | 157 | 436 | 490 | 1311 | 70 | 186 | 1553 | 641 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 111.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 7 | 33 | 0 | 20 | 48 | 0 | 28 | 49 | 0 | 20 | 41 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 13 | 47 | 0 | 32 | 66 | 0 | 27 | 29 | 0 | 32 | 34 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 12 | 10 | 0 | 12 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 5.50 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.00 | 3.50 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 45 | 13 | 27 | 35 | 21 | 60 | 17 | 55 |
| g / C, Green / Cycle | 0.32 | 0.09 | 0.19 | 0.25 | 0.15 | 0.43 | 0.12 | 0.39 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.08 | 0.19 | 0.08 | 0.14 | 0.26 | 0.10 | 0.30 |
| s, saturation flow rate [veh/h] | 1328 | 1870 | 3459 | 1870 | 3459 | 5094 | 1781 | 5094 |
| c, Capacity [veh/h] | 427 | 176 | 655 | 469 | 519 | 2163 | 212 | 2006 |
| d1, Uniform Delay [s] | 32.90 | 62.31 | 56.66 | 42.90 | 58.92 | 31.20 | 60.65 | 37.01 |
| k, delay calibration | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.06 | 9.57 | 14.77 | 0.42 | 9.30 | 1.27 | 10.91 | 2.99 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.06 | 0.83 | 0.99 | 0.33 | 0.94 | 0.61 | 0.88 | 0.77 |
| d, Delay for Lane Group [s/veh] | 32.96 | 71.88 | 71.43 | 43.32 | 68.22 | 32.48 | 71.56 | 40.00 |
| Lane Group LOS | C | E | E | D | E | C | E | D |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.65 | 5.59 | 12.81 | 4.56 | 9.28 | 11.71 | 7.16 | 15.95 |
| 50th-Percentile Queue Length [m/ln] | 4.96 | 42.62 | 97.59 | 34.72 | 70.73 | 89.24 | 54.55 | 121.55 |
| 95th-Percentile Queue Length [veh/ln] | 1.17 | 9.47 | 18.68 | 8.06 | 14.28 | 17.32 | 11.55 | 22.50 |
| 95th-Percentile Queue Length [m/ln] | 8.93 | 72.17 | 142.31 | 61.40 | 108.80 | 132.00 | 87.99 | 171.47 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 32.96 | 71.88 | 0.00 | 71.43 | 43.32 | 0.00 | 68.22 | 32.48 | 0.00 | 71.56 | 40.00 | 0.00 |
| Movement LOS | C | E | | E | D | | E | C | | E | D | |
| d_A, Approach Delay [s/veh] | 27.90 | | | 42.82 | | | 40.62 | | | 31.70 | | |
| Approach LOS | C | | | D | | | D | | | C | | |
| d_I, Intersection Delay [s/veh] | 37.09 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.713 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 4.08 | 22.06 | 111.64 | 26.96 | 309.66 | 828.50 | 124.81 | 1042.10 |
| Stops [stops/h] | 16.74 | 143.81 | 658.62 | 117.17 | 477.36 | 903.41 | 184.10 | 1230.59 |
| Fuel consumption [L/h] | 1.43 | 13.23 | 60.34 | 10.30 | 65.72 | 131.91 | 26.19 | 174.50 |
| CO [g/h] | 26.42 | 244.24 | 1114.27 | 190.19 | 1213.47 | 2435.83 | 483.56 | 3222.16 |
| NOx [g/h] | 5.14 | 47.52 | 216.80 | 37.00 | 236.10 | 473.92 | 94.08 | 626.92 |
| VOC [g/h] | 6.12 | 56.60 | 258.24 | 44.08 | 281.23 | 564.53 | 112.07 | 746.77 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 59.43 | 0.00 | 59.43 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 2.708 | 0.000 | 3.271 |
| Crosswalk LOS | F | B | F | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 586 | 857 | 319 | 390 |
| d_b, Bicycle Delay [s] | 35.00 | 22.86 | 49.48 | 45.36 |
| l_b,int, Bicycle LOS Score for Intersection | 1.845 | 2.891 | 2.550 | 2.516 |
| Bicycle LOS | A | C | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 3: Hwy 16A & S Park Dr/N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 50.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.738 |

**Intersection Setup**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.50 | 3.66 | 3.66 | 3.50 | 3.66 |
| No. of Lanes in Entry Pocket | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 170.00 | 30.48 | 400.00 | 250.00 | 30.48 | 160.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 75.00 | 0.00 | 0.00 | 75.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | Yes | | | No | | |

**Volumes**

| Name | S Park Dr | | | N Park Dr | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 271 | 85 | 276 | 252 | 111 | 49 | 27 | 1084 | 251 | 350 | 957 | 157 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.50 | 0.50 | 2.00 | 2.00 | 0.50 | 0.50 | 0.50 | 0.00 | 0.50 | 2.00 | 0.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9000 | 1.0000 | 1.0000 | 0.9000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 126 | 89 | 46 | 161 | 417 | 403 | 559 | 0 | 95 | 606 | 133 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | -50 | 0 | -280 | 0 | 0 | -90 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 46 | 0 | 0 | 46 | -46 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 271 | 211 | 365 | 344 | 272 | 416 | 476 | 1209 | 251 | 445 | 1377 | 290 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 68 | 53 | 91 | 86 | 68 | 104 | 119 | 302 | 63 | 111 | 344 | 73 |
| Total Analysis Volume [veh/h] | 271 | 211 | 365 | 344 | 272 | 416 | 476 | 1209 | 251 | 445 | 1377 | 290 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Protecte | Permiss | Permiss | Protecte | Permiss | Permiss | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 31 | 55 | 0 | 28 | 52 | 0 | 21 | 10 | 0 | 22 | 11 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 32 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 18 | 42 | 0 | 23 | 47 | 0 | 27 | 47 | 0 | 28 | 48 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 7 | 15 | 0 | 14 | 15 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 5.50 | 6.00 | 6.00 | 5.50 | 6.00 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 3.50 | 4.00 | 4.00 | 3.50 | 4.00 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 13 | 35 | 35 | 16 | 38 | 38 | 21 | 45 | 20 | 44 |
| g / C, Green / Cycle | 0.09 | 0.25 | 0.25 | 0.11 | 0.27 | 0.27 | 0.15 | 0.32 | 0.14 | 0.32 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.11 | 0.23 | 0.10 | 0.14 | 0.26 | 0.14 | 0.23 | 0.13 | 0.27 |
| s, saturation flow rate [veh/h] | 3500 | 1892 | 1609 | 3459 | 1892 | 1609 | 3500 | 5176 | 3459 | 5176 |
| c, Capacity [veh/h] | 313 | 471 | 400 | 395 | 518 | 440 | 520 | 1658 | 497 | 1633 |
| d1, Uniform Delay [s] | 62.93 | 44.45 | 51.09 | 61.00 | 43.13 | 49.81 | 58.72 | 42.18 | 58.89 | 44.68 |
| k, delay calibration | 0.11 | 0.11 | 0.14 | 0.11 | 0.11 | 0.22 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.24 | 0.67 | 10.22 | 6.05 | 0.83 | 18.09 | 6.81 | 2.85 | 5.92 | 5.50 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.87 | 0.45 | 0.91 | 0.87 | 0.53 | 0.94 | 0.91 | 0.73 | 0.89 | 0.84 |
| d, Delay for Lane Group [s/veh] | 70.17 | 45.12 | 61.31 | 67.06 | 43.96 | 67.90 | 65.53 | 45.04 | 64.81 | 50.18 |
| Lane Group LOS | E | D | E | E | D | E | E | D | E | D |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 5.09 | 6.33 | 13.54 | 6.35 | 8.16 | 16.42 | 8.57 | 12.34 | 7.95 | 15.11 |
| 50th-Percentile Queue Length [m/ln] | 38.75 | 48.22 | 103.20 | 48.41 | 62.20 | 125.12 | 65.31 | 94.01 | 60.57 | 115.13 |
| 95th-Percentile Queue Length [veh/ln] | 8.78 | 10.45 | 19.58 | 10.49 | 12.85 | 23.07 | 13.37 | 18.10 | 12.57 | 21.48 |
| 95th-Percentile Queue Length [m/ln] | 66.93 | 79.65 | 149.19 | 79.91 | 97.90 | 175.76 | 101.90 | 137.91 | 95.80 | 163.71 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 70.17 | 45.12 | 61.31 | 67.06 | 43.96 | 67.90 | 65.53 | 45.04 | 0.00 | 64.81 | 50.18 | 0.00 |
| Movement LOS | E | D | E | E | D | E | E | D | | E | D | |
| d_A, Approach Delay [s/veh] | 60.12 | | | 61.31 | | | 44.24 | | | 46.37 | | |
| Approach LOS | E | | | E | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 50.73 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.738 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 35.48 | 27.62 | 47.78 | 45.47 | 35.95 | 54.98 | 724.59 | 1840.39 | 281.22 | 870.21 |
| Stops [stops/h] | 261.54 | 162.71 | 348.25 | 326.76 | 209.90 | 422.24 | 440.80 | 951.78 | 408.80 | 1165.55 |
| Fuel consumption [L/h] | 23.89 | 13.61 | 29.60 | 29.42 | 17.34 | 36.46 | 106.46 | 241.68 | 67.86 | 188.76 |
| CO [g/h] | 441.14 | 251.35 | 546.50 | 543.30 | 320.16 | 673.26 | 1965.85 | 4462.77 | 1253.10 | 3485.66 |
| NOx [g/h] | 85.83 | 48.90 | 106.33 | 105.71 | 62.29 | 130.99 | 382.48 | 868.29 | 243.81 | 678.18 |
| VOC [g/h] | 102.24 | 58.25 | 126.66 | 125.92 | 74.20 | 156.03 | 455.61 | 1034.29 | 290.42 | 807.84 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 11.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 59.43 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 3.593 | 0.000 |
| Crosswalk LOS | F | F | D | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 514 | 586 | 576 | 590 |
| d_b, Bicycle Delay [s] | 38.63 | 35.00 | 35.50 | 34.79 |
| l_b,int, Bicycle LOS Score for Intersection | 2.369 | 2.522 | 2.486 | 2.673 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 4: Boulder Blvd & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 16.5 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.641 |

**Intersection Setup**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | N Park Dr | | | N Park Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 221 | 22 | 33 | 5 | 35 | 4 | 2 | 10 | 254 | 80 | 17 | 2 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 30 | 632 | 0 | 0 | 596 | 6 | 5 | 0 | 29 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | -50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 36 | 0 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 251 | 690 | 33 | 5 | 617 | 10 | 7 | 10 | 283 | 80 | 17 | 2 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 63 | 173 | 8 | 1 | 154 | 3 | 2 | 3 | 71 | 20 | 4 | 1 |
| Total Analysis Volume [veh/h] | 251 | 690 | 33 | 5 | 617 | 10 | 7 | 10 | 283 | 80 | 17 | 2 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 70 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 5 | 23 | 0 | 0 | 14 | 0 | 0 | 29 | 0 | 0 | 29 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 6 | 0 | 0 | 9 | 0 | 0 | 15 | 0 | 0 | 12 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 9 | 27 | 0 | 0 | 18 | 0 | 0 | 43 | 0 | 0 | 43 | 0 |
| Lead / Lag | Lead | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | | No | | | No | | | No | |
| Maximum Recall | No | No | | | No | | | No | | | No | |
| Pedestrian Recall | No | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | C | R | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 46 | 46 | 46 | 37 | 37 | 16 | 16 | 16 |
| g / C, Green / Cycle | 0.66 | 0.66 | 0.66 | 0.53 | 0.53 | 0.23 | 0.23 | 0.23 |
| (v / s)_i Volume / Saturation Flow Rate | 0.29 | 0.41 | 0.02 | 0.01 | 0.37 | 0.01 | 0.20 | 0.10 |
| s, saturation flow rate [veh/h] | 853 | 1683 | 1431 | 657 | 1678 | 1555 | 1431 | 976 |
| c, Capacity [veh/h] | 495 | 1103 | 938 | 261 | 884 | 431 | 329 | 318 |
| d1, Uniform Delay [s] | 9.68 | 7.04 | 4.25 | 20.35 | 12.50 | 20.95 | 25.85 | 23.81 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.69 | 2.68 | 0.07 | 0.13 | 4.79 | 0.04 | 6.54 | 0.55 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.51 | 0.63 | 0.04 | 0.02 | 0.71 | 0.04 | 0.86 | 0.31 |
| d, Delay for Lane Group [s/veh] | 13.37 | 9.72 | 4.32 | 20.49 | 17.29 | 20.99 | 32.39 | 24.37 |
| Lane Group LOS | B | A | A | C | B | C | C | C |
| Critical Lane Group | Yes | No | No | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 1.62 | 5.21 | 0.15 | 0.07 | 7.44 | 0.21 | 4.85 | 1.40 |
| 50th-Percentile Queue Length [m/ln] | 12.38 | 39.72 | 1.11 | 0.53 | 56.66 | 1.61 | 36.94 | 10.69 |
| 95th-Percentile Queue Length [veh/ln] | 2.92 | 8.96 | 0.26 | 0.12 | 11.91 | 0.38 | 8.46 | 2.53 |
| 95th-Percentile Queue Length [m/ln] | 22.28 | 68.25 | 1.99 | 0.95 | 90.74 | 2.90 | 64.46 | 19.25 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 13.37 | 9.72 | 4.32 | 20.49 | 17.29 | 17.29 | 20.99 | 20.99 | 32.39 | 24.37 | 24.37 | 24.37 |
| Movement LOS | B | A | A | C | B | B | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 10.48 | | | 17.32 | | | 31.75 | | | 24.37 | | |
| Approach LOS | B | | | B | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 16.50 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.641 | | | | | | | | | | | |

**Emissions**

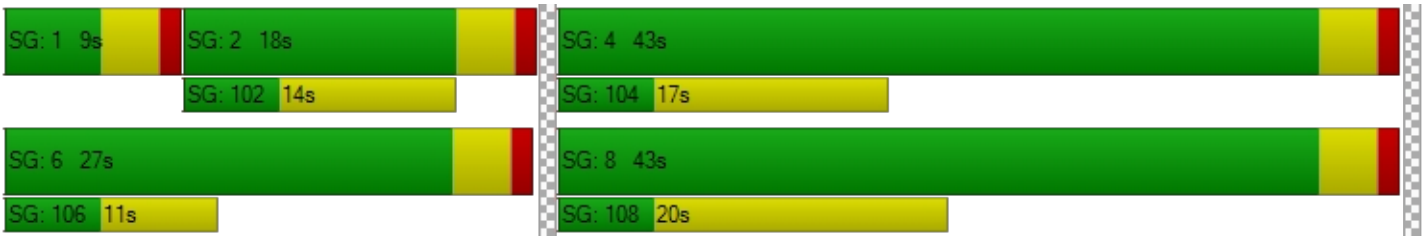
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 33.17 | 91.20 | 4.36 | 0.90 | 113.15 | 5.32 | 88.48 | 27.51 |
| Stops [stops/h] | 83.54 | 268.08 | 7.46 | 3.57 | 382.42 | 10.87 | 249.33 | 72.16 |
| Fuel consumption [L/h] | 7.61 | 19.86 | 0.69 | 0.24 | 27.70 | 1.02 | 21.07 | 6.09 |
| CO [g/h] | 140.61 | 366.71 | 12.78 | 4.52 | 511.42 | 18.92 | 389.13 | 112.54 |
| NOx [g/h] | 27.36 | 71.35 | 2.49 | 0.88 | 99.50 | 3.68 | 75.71 | 21.90 |
| VOC [g/h] | 32.59 | 84.99 | 2.96 | 1.05 | 118.53 | 4.38 | 90.18 | 26.08 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 26.58 | 26.58 | 26.58 | 26.58 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.797 | 2.387 | 2.322 | 1.785 |
| Crosswalk LOS | C | B | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 657 | 400 | 1114 | 1114 |
| d_b, Bicycle Delay [s] | 15.78 | 22.40 | 6.86 | 6.86 |
| l_b,int, Bicycle LOS Score for Intersection | 3.167 | 2.602 | 2.055 | 1.723 |
| Bicycle LOS | C | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 5: N Park Dr & Quartz Ave**

| | | | |
|---|---|---|---|
| Control Type: | All-way stop | Delay (sec / veh): | 19.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.708 |

**Intersection Setup**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | N Park Dr | | N Park Dr | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 33 | 0 | 10 | 50 | 0 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 253 | 384 | 5 | 363 | 238 | 27 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | -50 | 0 | 0 |
| Pass-by Trips [veh/h] | -24 | 60 | 0 | 0 | 36 | 24 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 262 | 444 | 15 | 363 | 274 | 61 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 66 | 111 | 4 | 91 | 69 | 15 |
| Total Analysis Volume [veh/h] | 262 | 444 | 15 | 363 | 274 | 61 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

**Lanes**

| | | | | | |
|---|---|---|---|---|---|
| Capacity per Entry Lane [veh/h] | 558 | 627 | 556 | 467 | 556 |
| Degree of Utilization, x | 0.47 | 0.71 | 0.68 | 0.59 | 0.11 |

**Movement, Approach, & Intersection Results**

| | | | | | |
|---|---|---|---|---|---|
| 95th-Percentile Queue Length [veh] | 2.49 | 5.80 | 5.17 | 3.69 | 0.37 |
| 95th-Percentile Queue Length [m] | 18.97 | 44.23 | 39.41 | 28.12 | 2.80 |
| Approach Delay [s/veh] | 18.76 | | 22.13 | 18.79 | |
| Approach LOS | C | | C | C | |
| Intersection Delay [s/veh] | 19.67 | | | | |
| Intersection LOS | C | | | | |

**Intersection Level Of Service Report**
**Intersection 6: 28 St & Site Access #1**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 21.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.449 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Site Access #1 | | | Comm Access | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Site Access #1 | | | Comm Access | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 437 | 342 | 359 | 8 | 416 | 49 | 10 | 57 | 517 | 220 | 63 | 26 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | -50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 60 | 19 | 61 | 0 | 67 | 0 | 24 | 0 | 36 | 36 | 0 | 25 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 497 | 361 | 420 | 8 | 433 | 49 | 34 | 57 | 553 | 256 | 63 | 51 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 124 | 90 | 105 | 2 | 108 | 12 | 9 | 14 | 138 | 64 | 16 | 13 |
| Total Analysis Volume [veh/h] | 497 | 361 | 420 | 8 | 433 | 49 | 34 | 57 | 553 | 256 | 63 | 51 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Overlap | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 3 | 8 | 0 | 7 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 14 | 48 | 0 | 5 | 39 | 0 | 5 | 24 | 0 | 7 | 26 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 18 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 20 | 44 | 0 | 9 | 33 | 0 | 9 | 27 | 0 | 10 | 28 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| g_i, Effective Green Time [s] | 49 | 40 | 40 | 49 | 29 | 29 | 33 | 23 | 33 | 24 |
| g / C, Green / Cycle | 0.54 | 0.44 | 0.44 | 0.54 | 0.32 | 0.32 | 0.37 | 0.26 | 0.37 | 0.27 |
| (v / s)_i Volume / Saturation Flow Rate | 0.40 | 0.19 | 0.26 | 0.01 | 0.13 | 0.13 | 0.02 | 0.03 | 0.18 | 0.07 |
| s, saturation flow rate [veh/h] | 1232 | 1870 | 1589 | 847 | 1870 | 1804 | 1385 | 1870 | 1451 | 1733 |
| c, Capacity [veh/h] | 696 | 831 | 706 | 443 | 603 | 581 | 561 | 478 | 620 | 462 |
| d1, Uniform Delay [s] | 14.00 | 17.21 | 18.88 | 11.19 | 23.78 | 23.81 | 18.52 | 25.72 | 21.41 | 25.90 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 6.15 | 1.65 | 3.66 | 0.07 | 2.02 | 2.12 | 0.21 | 0.51 | 2.02 | 1.27 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.71 | 0.43 | 0.59 | 0.02 | 0.41 | 0.41 | 0.06 | 0.12 | 0.41 | 0.25 |
| d, Delay for Lane Group [s/veh] | 20.15 | 18.86 | 22.54 | 11.27 | 25.80 | 25.93 | 18.73 | 26.23 | 23.44 | 27.17 |
| Lane Group LOS | C | B | C | B | C | C | B | C | C | C |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 7.05 | 5.30 | 7.00 | 0.08 | 4.29 | 4.19 | 0.48 | 0.99 | 4.22 | 2.05 |
| 50th-Percentile Queue Length [m/ln] | 53.74 | 40.42 | 53.34 | 0.59 | 32.68 | 31.95 | 3.67 | 7.56 | 32.16 | 15.61 |
| 95th-Percentile Queue Length [veh/ln] | 11.41 | 9.08 | 11.34 | 0.14 | 7.68 | 7.55 | 0.87 | 1.79 | 7.59 | 3.69 |
| 95th-Percentile Queue Length [m/ln] | 86.93 | 69.20 | 86.41 | 1.06 | 58.56 | 57.51 | 6.60 | 13.61 | 57.83 | 28.09 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 20.15 | 18.86 | 22.54 | 11.27 | 25.86 | 25.93 | 18.73 | 26.23 | 0.00 | 23.44 | 27.17 | 27.17 |
| Movement LOS | C | B | C | B | C | C | B | C | | C | C | C |
| d_A, Approach Delay [s/veh] | 20.57 | | | 25.63 | | | 3.31 | | | 24.59 | | |
| Approach LOS | C | | | C | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 21.65 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.449 | | | | | | | | | | | |

**Emissions**

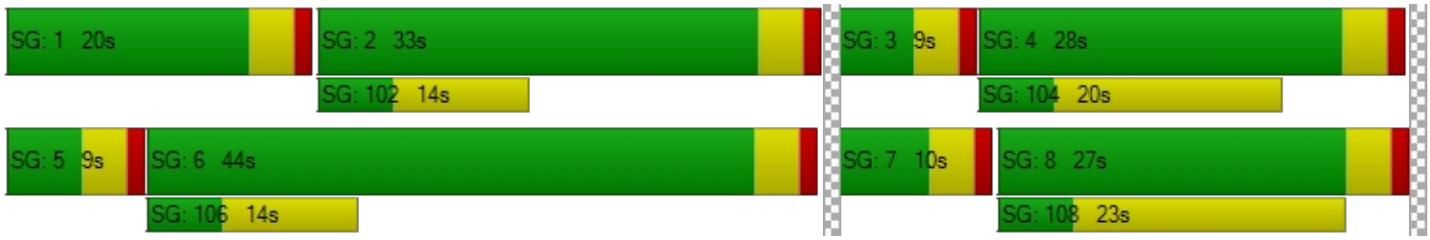
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 85.36 | 62.00 | 72.13 | 1.14 | 34.67 | 33.74 | 2.49 | 4.18 | 9.79 | 4.36 |
| Stops [stops/h] | 282.12 | 212.18 | 280.02 | 3.10 | 171.55 | 167.73 | 19.24 | 39.69 | 168.81 | 81.93 |
| Fuel consumption [L/h] | 21.88 | 15.69 | 20.13 | 0.24 | 11.80 | 11.52 | 1.13 | 2.39 | 9.10 | 4.52 |
| CO [g/h] | 404.03 | 289.67 | 371.78 | 4.51 | 217.88 | 212.81 | 20.95 | 44.07 | 168.03 | 83.50 |
| NOx [g/h] | 78.61 | 56.36 | 72.34 | 0.88 | 42.39 | 41.41 | 4.08 | 8.57 | 32.69 | 16.25 |
| VOC [g/h] | 93.64 | 67.13 | 86.16 | 1.05 | 50.50 | 49.32 | 4.85 | 10.21 | 38.94 | 19.35 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.786 | 2.498 | 2.547 | 2.225 |
| Crosswalk LOS | C | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 889 | 644 | 511 | 533 |
| d_b, Bicycle Delay [s] | 13.89 | 20.67 | 24.94 | 24.20 |
| l_b,int, Bicycle LOS Score for Intersection | 2.614 | 1.964 | 1.710 | 2.170 |
| Bicycle LOS | B | A | A | B |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 7: Quartz Ave & Site Access #2**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 34.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.712 |

**Intersection Setup**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration | | | | | | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Site Access #2 | | Quartz Ave | | Quartz Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 216 | 279 | 53 | 336 | 158 | 49 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 60 | 0 | 0 | 60 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 276 | 279 | 53 | 396 | 158 | 49 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 69 | 70 | 13 | 99 | 40 | 12 |
| Total Analysis Volume [veh/h] | 276 | 279 | 53 | 396 | 158 | 49 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Stop | Free | Free |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.71 | 0.35 | 0.00 | 0.00 | 0.14 | 0.00 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 34.18 | 12.06 | 0.00 | 0.00 | 8.56 | 0.00 |
| Movement LOS | D | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 5.36 | 1.60 | 0.00 | 0.00 | 0.38 | 0.38 |
| 95th-Percentile Queue Length [m/ln] | 40.82 | 12.23 | 0.00 | 0.00 | 2.86 | 2.86 |
| d_A, Approach Delay [s/veh] | 23.06 | | 0.00 | | 6.53 | |
| Approach LOS | C | | A | | A | |
| d_I, Intersection Delay [s/veh] | 11.68 | | | | | |
| Intersection LOS | D | | | | | |

**Intersection Level Of Service Report**
**Intersection 8: New Road A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 11.5 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.285 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Quartz Ave | | | Quartz Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.50 | 3.66 | 3.66 | 3.50 | 3.50 | 3.50 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 | 50.00 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 30.48 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Quartz Ave | | | Quartz Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 0.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 16 | 270 | 93 | 6 | 324 | 116 | 104 | 99 | 129 | 20 | 75 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | -50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 6 | 61 | 0 | 31 | 0 | 0 | 0 | 0 | 36 | 0 | 25 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 16 | 276 | 154 | 6 | 305 | 116 | 104 | 99 | 129 | 56 | 75 | 25 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 69 | 39 | 2 | 76 | 29 | 26 | 25 | 32 | 14 | 19 | 6 |
| Total Analysis Volume [veh/h] | 16 | 276 | 154 | 6 | 305 | 116 | 104 | 99 | 129 | 56 | 75 | 25 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 60 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 21 | 0 | 0 | 21 | 0 | 0 | 31 | 0 | 0 | 31 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 15 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 25 | 0 | 0 | 25 | 0 | 0 | 35 | 0 | 0 | 35 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 37 | 37 | 37 | 37 | 37 | 37 | 15 | 15 | 15 | 15 |
| g / C, Green / Cycle | 0.62 | 0.62 | 0.62 | 0.62 | 0.62 | 0.62 | 0.24 | 0.24 | 0.24 | 0.24 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.13 | 0.14 | 0.01 | 0.13 | 0.13 | 0.09 | 0.15 | 0.05 | 0.06 |
| s, saturation flow rate [veh/h] | 869 | 1710 | 1510 | 862 | 1710 | 1554 | 1184 | 1530 | 1037 | 1612 |
| c, Capacity [veh/h] | 586 | 1062 | 938 | 580 | 1062 | 965 | 306 | 376 | 197 | 396 |
| d1, Uniform Delay [s] | 6.56 | 4.95 | 4.98 | 6.56 | 4.93 | 4.95 | 23.36 | 20.07 | 27.19 | 18.21 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.09 | 0.45 | 0.54 | 0.03 | 0.44 | 0.50 | 0.65 | 1.59 | 0.78 | 0.33 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.03 | 0.21 | 0.22 | 0.01 | 0.20 | 0.21 | 0.34 | 0.61 | 0.28 | 0.25 |
| d, Delay for Lane Group [s/veh] | 6.65 | 5.41 | 5.52 | 6.59 | 5.37 | 5.45 | 24.01 | 21.66 | 27.97 | 18.54 |
| Lane Group LOS | A | A | A | A | A | A | C | C | C | B |
| Critical Lane Group | No | No | Yes | No | No | No | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.09 | 1.02 | 0.95 | 0.03 | 0.98 | 0.93 | 1.33 | 2.77 | 0.79 | 1.07 |
| 50th-Percentile Queue Length [m/ln] | 0.71 | 7.74 | 7.25 | 0.26 | 7.46 | 7.10 | 10.14 | 21.08 | 5.99 | 8.17 |
| 95th-Percentile Queue Length [veh/ln] | 0.17 | 1.83 | 1.71 | 0.06 | 1.76 | 1.68 | 2.39 | 4.98 | 1.42 | 1.93 |
| 95th-Percentile Queue Length [m/ln] | 1.27 | 13.94 | 13.04 | 0.47 | 13.42 | 12.79 | 18.24 | 37.95 | 10.79 | 14.70 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 6.65 | 5.43 | 5.52 | 6.59 | 5.39 | 5.45 | 24.01 | 21.66 | 21.66 | 27.97 | 18.54 | 18.54 |
| Movement LOS | A | A | A | A | A | A | C | C | C | C | B | B |
| d_A, Approach Delay [s/veh] | 5.50 | | | 5.42 | | | 22.40 | | | 21.93 | | |
| Approach LOS | A | | | A | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 11.48 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.285 | | | | | | | | | | | |

**Emissions**

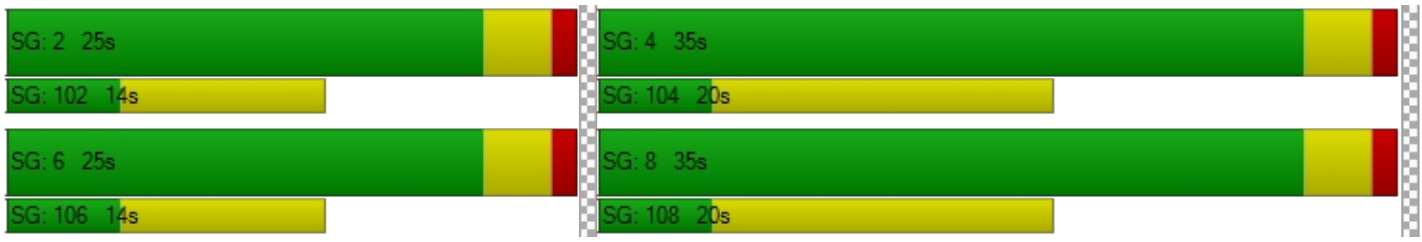
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 2.27 | 31.88 | 29.15 | 0.94 | 33.99 | 31.80 | 21.95 | 48.13 | 11.29 | 20.17 |
| Stops [stops/h] | 5.56 | 60.96 | 57.06 | 2.08 | 58.73 | 55.93 | 79.81 | 166.00 | 47.20 | 64.30 |
| Fuel consumption [L/h] | 0.42 | 5.30 | 4.89 | 0.16 | 5.42 | 5.10 | 5.72 | 11.94 | 3.29 | 4.73 |
| CO [g/h] | 7.72 | 97.82 | 90.29 | 3.04 | 100.06 | 94.24 | 105.60 | 220.42 | 60.71 | 87.28 |
| NOx [g/h] | 1.50 | 19.03 | 17.57 | 0.59 | 19.47 | 18.33 | 20.55 | 42.89 | 11.81 | 16.98 |
| VOC [g/h] | 1.79 | 22.67 | 20.92 | 0.70 | 23.19 | 21.84 | 24.47 | 51.08 | 14.07 | 20.23 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 21.68 | 21.68 | 21.68 | 21.68 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.543 | 2.591 | 2.119 | 2.064 |
| Crosswalk LOS | B | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 700 | 700 | 1033 | 1033 |
| d_b, Bicycle Delay [s] | 12.68 | 12.68 | 7.01 | 7.01 |
| l_b,int, Bicycle LOS Score for Intersection | 1.928 | 2.023 | 2.107 | 1.817 |
| Bicycle LOS | A | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 9: Slate Ave & N Park Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 20.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.129 |

**Intersection Setup**

| Name | N Park Dr | | | N Park Dr | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | N Park Dr | | | N Park Dr | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 0 | 0 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 33 | 115 | 133 | 0 | 215 | 0 | 11 | 0 | 28 | 125 | 21 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | -50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 43 | 125 | 133 | 0 | 175 | 10 | 21 | 0 | 38 | 125 | 21 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 11 | 31 | 33 | 0 | 44 | 3 | 5 | 0 | 10 | 31 | 5 | 0 |
| Total Analysis Volume [veh/h] | 43 | 125 | 133 | 0 | 175 | 10 | 21 | 0 | 38 | 125 | 21 | 0 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Stop | Stop | Free | Free |
|---|---|---|---|---|
| Flared Lane | | No | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.13 | 0.23 | 0.00 | 0.00 | 0.34 | 0.01 | 0.01 | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 20.22 | 16.15 | 0.00 | 0.00 | 15.44 | 11.92 | 7.29 | 0.00 | 0.00 | 7.44 | 0.00 | 0.00 |
| Movement LOS | C | C | | | C | B | A | | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 1.64 | 1.64 | 0.00 | 0.00 | 1.53 | 1.53 | 0.04 | 0.00 | 0.04 | 0.22 | 0.22 | 0.22 |
| 95th-Percentile Queue Length [m/ln] | 12.52 | 12.52 | 0.00 | 0.00 | 11.68 | 11.68 | 0.32 | 0.00 | 0.32 | 1.70 | 1.70 | 1.70 |
| d_A, Approach Delay [s/veh] | 17.19 | | | 15.25 | | | 2.60 | | | 6.37 | | |
| Approach LOS | C | | | C | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 12.17 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 10: Slate Ave & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 18.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.390 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Slate Ave | | | Slate Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 125 | 123 | 126 | 0 | 187 | 66 | 22 | 59 | 137 | 122 | 75 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | -50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 52 | -21 | 0 | 0 | 0 | 0 | 21 | 0 | 31 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 177 | 102 | 126 | 0 | 137 | 66 | 43 | 59 | 168 | 122 | 75 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 44 | 26 | 32 | 0 | 34 | 17 | 11 | 15 | 42 | 31 | 19 | 0 |
| Total Analysis Volume [veh/h] | 177 | 102 | 126 | 0 | 137 | 66 | 43 | 59 | 168 | 122 | 75 | 0 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 41 | 0 | 0 | 41 | 0 | 0 | 41 | 0 | 0 | 41 | 0 |
| Amber [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 6 | 0 | 0 | 6 | 0 | 0 | 12 | 0 | 0 | 6 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 44 | 0 | 0 | 44 | 0 | 0 | 46 | 0 | 0 | 46 | 0 |
| Lead / Lag | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | | No | | | No | | | No | |
| Maximum Recall | | No | | | No | | | No | | | No | |
| Pedestrian Recall | | No | | | No | | | No | | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | C |
|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 2.00 | 2.00 | 2.00 |
| l2, Clearance Lost Time [s] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 59 | 59 | 59 | 23 | 23 |
| g / C, Green / Cycle | 0.65 | 0.65 | 0.65 | 0.26 | 0.26 |
| (v / s)_i Volume / Saturation Flow Rate | 0.17 | 0.15 | 0.13 | 0.18 | 0.22 |
| s, saturation flow rate [veh/h] | 1061 | 1533 | 1592 | 1530 | 884 |
| c, Capacity [veh/h] | 703 | 1003 | 1081 | 440 | 292 |
| d1, Uniform Delay [s] | 6.53 | 6.33 | 6.18 | 30.19 | 32.67 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.86 | 0.53 | 0.38 | 1.40 | 2.71 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.25 | 0.23 | 0.19 | 0.61 | 0.67 |
| d, Delay for Lane Group [s/veh] | 7.39 | 6.86 | 6.56 | 31.58 | 35.37 |
| Lane Group LOS | A | A | A | C | D |
| Critical Lane Group | Yes | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.40 | 1.68 | 1.45 | 5.33 | 4.33 |
| 50th-Percentile Queue Length [m/ln] | 10.67 | 12.84 | 11.06 | 40.58 | 32.96 |
| 95th-Percentile Queue Length [veh/ln] | 2.52 | 3.03 | 2.61 | 9.11 | 7.74 |
| 95th-Percentile Queue Length [m/ln] | 19.20 | 23.10 | 19.91 | 69.42 | 58.96 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.39 | 6.86 | 6.86 | 6.56 | 6.56 | 6.56 | 31.58 | 31.58 | 31.58 | 35.37 | 35.37 | 35.37 |
| Movement LOS | A | A | A | A | A | A | C | C | C | D | D | D |
| d_A, Approach Delay [s/veh] | 7.09 | | | 6.56 | | | 31.58 | | | 35.37 | | |
| Approach LOS | A | | | A | | | C | | | D | | |
| d_I, Intersection Delay [s/veh] | 18.33 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.390 | | | | | | | | | | | |

**Emissions**

| | | | | | |
|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 27.66 | 35.63 | 38.99 | 34.40 | 7.53 |
| Stops [stops/h] | 56.00 | 67.38 | 58.05 | 213.02 | 173.04 |
| Fuel consumption [L/h] | 4.86 | 6.06 | 6.02 | 14.35 | 9.72 |
| CO [g/h] | 89.70 | 111.97 | 111.08 | 265.07 | 179.42 |
| NOx [g/h] | 17.45 | 21.79 | 21.61 | 51.57 | 34.91 |
| VOC [g/h] | 20.79 | 25.95 | 25.74 | 61.43 | 41.58 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 | 36.45 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.509 | 1.947 | 2.255 | 1.903 |
| Crosswalk LOS | B | A | B | A |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 889 | 889 | 933 | 933 |
| d_b, Bicycle Delay [s] | 13.89 | 13.89 | 12.80 | 12.80 |
| l_b,int, Bicycle LOS Score for Intersection | 2.228 | 1.895 | 2.005 | 1.885 |
| Bicycle LOS | B | A | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 11: N Park Dr & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 11.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.041 |

**Intersection Setup**

| Name | Keystone Dr | | N Park Dr | | N Park Dr | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [m] | 3.50 | 3.66 | 3.66 | 3.66 | 3.66 | 3.50 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Keystone Dr | | N Park Dr | | N Park Dr | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 10 | 10 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 18 | 93 | 17 | 108 | 122 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 28 | 103 | 27 | 118 | 122 | 0 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 26 | 7 | 30 | 31 | 0 |
| Total Analysis Volume [veh/h] | 28 | 103 | 27 | 118 | 122 | 0 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.04 | 0.11 | 0.02 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 10.98 | 9.62 | 7.49 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.53 | 0.53 | 0.05 | 0.05 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 4.06 | 4.06 | 0.35 | 0.35 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 9.91 | | 1.39 | | 0.00 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 3.77 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 12: N Park Dr & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.094 |

**Intersection Setup**

| Name | 28 St | | | | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 50.00 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 26 | 119 | 0 | 6 | 166 | 45 | 18 | 83 | 44 | 43 | 34 | 49 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | -50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 26 | 119 | 0 | 6 | 116 | 45 | 18 | 83 | 44 | 43 | 34 | 49 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 30 | 0 | 2 | 29 | 11 | 5 | 21 | 11 | 11 | 9 | 12 |
| Total Analysis Volume [veh/h] | 26 | 119 | 0 | 6 | 116 | 45 | 18 | 83 | 44 | 43 | 34 | 49 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.14 | 0.05 | 0.09 | 0.06 | 0.05 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.57 | 0.00 | 0.00 | 7.46 | 0.00 | 0.00 | 13.61 | 12.82 | 10.59 | 14.39 | 12.91 | 10.39 |
| Movement LOS | A | A | A | A | A | A | B | B | B | B | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.04 | 0.04 | 0.04 | 0.01 | 0.01 | 0.01 | 0.86 | 0.86 | 0.86 | 0.77 | 0.77 | 0.77 |
| 95th-Percentile Queue Length [m/ln] | 0.33 | 0.33 | 0.33 | 0.08 | 0.08 | 0.08 | 6.58 | 6.58 | 6.58 | 5.88 | 5.88 | 5.88 |
| d_A, Approach Delay [s/veh] | 1.36 | | | 0.27 | | | 12.24 | | | 12.43 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 6.15 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 13: N Park Dr & New Road B**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 23.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.492 |

**Intersection Setup**

| Name | Quartz Ave | | | New Road B | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Quartz Ave | | | New Road B | | | N Park Dr | | | N Park Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 49 | 0 | 330 | 13 | 0 | 0 | 0 | 78 | 11 | 242 | 77 | 8 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 49 | 0 | 330 | 13 | 0 | 0 | 0 | 78 | 11 | 242 | 77 | 8 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 12 | 0 | 83 | 3 | 0 | 0 | 0 | 20 | 3 | 61 | 19 | 2 |
| Total Analysis Volume [veh/h] | 49 | 0 | 330 | 13 | 0 | 0 | 0 | 78 | 11 | 242 | 77 | 8 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.03 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.16 | 0.01 | 0.49 | 0.13 | 0.01 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.30 | 0.00 | 0.00 | 7.96 | 0.00 | 0.00 | 13.49 | 14.01 | 9.79 | 23.45 | 22.23 | 20.23 |
| Movement LOS | A | A | A | A | A | A | B | B | A | C | C | C |
| 95th-Percentile Queue Length [veh/ln] | 0.10 | 0.10 | 0.10 | 0.03 | 0.03 | 0.03 | 0.62 | 0.62 | 0.62 | 4.34 | 4.34 | 4.34 |
| 95th-Percentile Queue Length [m/ln] | 0.77 | 0.77 | 0.77 | 0.24 | 0.24 | 0.24 | 4.74 | 4.74 | 4.74 | 33.09 | 33.09 | 33.09 |
| d_A, Approach Delay [s/veh] | 0.94 | | | 7.96 | | | 13.49 | | | 23.08 | | |
| Approach LOS | A | | | A | | | B | | | C | | |
| d_I, Intersection Delay [s/veh] | 11.40 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 14: N Park Dr & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 6.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.382 |

**Intersection Setup**

| Name | Boundary Rd | | Boundary Rd | | N Park Dr | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.50 | 3.66 | 3.66 | 3.50 | 3.50 | 3.50 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 75.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Boundary Rd | | Boundary Rd | | N Park Dr | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 175 | 0 | 239 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| Proportion of CAVs [%] | 0.00 | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 600 | 162 | 319 | 136 | 89 | 716 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | -50 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 600 | 337 | 319 | 375 | 89 | 666 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 150 | 84 | 80 | 94 | 22 | 167 |
| Total Analysis Volume [veh/h] | 600 | 337 | 319 | 375 | 89 | 666 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPerm | Permissive | Permissive | Permissive | Permissive | Unsignalized |
|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 2 | 0 | 3 | 0 |
| Auxiliary Signal Groups | | | | | | |
| Maximum Green [s] | 5 | 47 | 47 | 0 | 35 | 0 |
| Amber [s] | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 5 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 10 | 9 | 0 | 12 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | No | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 0.0 |
| Detector Location [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Advanced Detector Location [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Advanced Detector Length [m] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Phasing & Timing: Pattern 1**

| | | | | | | |
|---|---|---|---|---|---|---|
| Split [s] | 39 | 69 | 30 | 0 | 21 | 0 |
| Lead / Lag | Lead | - | - | - | Lead | - |
| Minimum Green [s] | 5 | 10 | 10 | 0 | 5 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | No | | No | |
| Maximum Recall | No | No | No | | No | |
| Pedestrian Recall | No | No | No | | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | C | L |
|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 90 | 90 | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| g_i, Effective Green Time [s] | 76 | 76 | 62 | 62 | 6 |
| g / C, Green / Cycle | 0.85 | 0.85 | 0.69 | 0.69 | 0.06 |
| (v / s)_i Volume / Saturation Flow Rate | 0.64 | 0.09 | 0.17 | 0.24 | 0.05 |
| s, saturation flow rate [veh/h] | 935 | 3560 | 1870 | 1589 | 1810 |
| c, Capacity [veh/h] | 831 | 3015 | 1280 | 1088 | 116 |
| d1, Uniform Delay [s] | 4.01 | 1.16 | 5.39 | 5.86 | 41.45 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.40 | 0.08 | 0.47 | 0.87 | 10.03 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | |
|---|---|---|---|---|---|
| X, volume / capacity | 0.72 | 0.11 | 0.25 | 0.34 | 0.77 |
| d, Delay for Lane Group [s/veh] | 9.42 | 1.24 | 5.86 | 6.72 | 51.48 |
| Lane Group LOS | A | A | A | A | D |
| Critical Lane Group | Yes | No | No | Yes | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.05 | 0.20 | 2.06 | 2.68 | 2.24 |
| 50th-Percentile Queue Length [m/ln] | 15.60 | 1.50 | 15.70 | 20.42 | 17.10 |
| 95th-Percentile Queue Length [veh/ln] | 3.69 | 0.36 | 3.71 | 4.82 | 4.04 |
| 95th-Percentile Queue Length [m/ln] | 28.08 | 2.71 | 28.25 | 36.75 | 30.78 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 9.42 | 1.24 | 5.86 | 6.72 | 51.48 | 0.00 |
| Movement LOS | A | A | A | A | D | |
| d_A, Approach Delay [s/veh] | 6.47 | | 6.33 | | 6.07 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 6.39 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.382 | | | | | |

**Emissions**

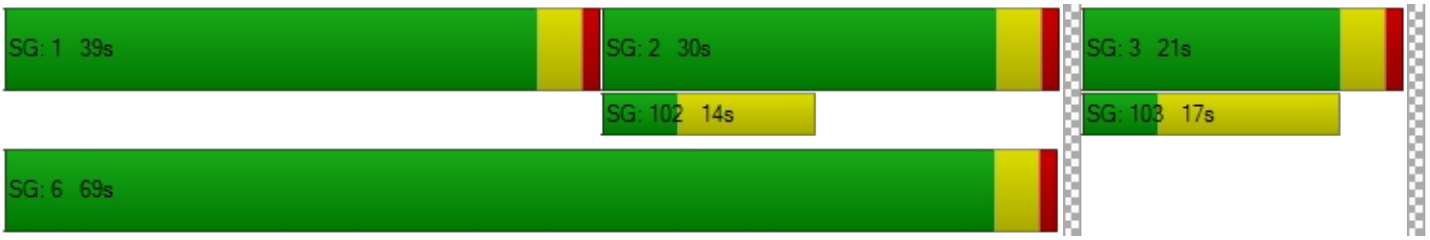
| | | | | | |
|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 248.89 | 139.80 | 185.16 | 217.66 | 9.46 |
| Stops [stops/h] | 81.90 | 15.80 | 82.40 | 107.17 | 89.75 |
| Fuel consumption [L/h] | 29.87 | 13.98 | 20.91 | 25.06 | 6.32 |
| CO [g/h] | 551.56 | 258.10 | 386.04 | 462.68 | 116.74 |
| NOx [g/h] | 107.31 | 50.22 | 75.11 | 90.02 | 22.71 |
| VOC [g/h] | 127.83 | 59.82 | 89.47 | 107.23 | 27.06 |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 36.45 | 36.45 | 36.45 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.555 | 2.415 | 2.892 |
| Crosswalk LOS | B | B | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1444 | 578 | 378 |
| d_b, Bicycle Delay [s] | 3.47 | 22.76 | 29.61 |
| l_b,int, Bicycle LOS Score for Intersection | 2.333 | 2.132 | 1.670 |
| Bicycle LOS | B | B | A |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 15: New Road B & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 9.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.060 |

**Intersection Setup**

| Name | Keystone Dr | | | Keystone Dr | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Keystone Dr | | | Keystone Dr | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 10 | 7 | 42 | 64 | 0 | 0 | 0 | 0 | 47 | 0 | 14 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 10 | 7 | 42 | 64 | 0 | 0 | 0 | 0 | 47 | 0 | 14 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 3 | 2 | 11 | 16 | 0 | 0 | 0 | 0 | 12 | 0 | 4 |
| Total Analysis Volume [veh/h] | 0 | 10 | 7 | 42 | 64 | 0 | 0 | 0 | 0 | 47 | 0 | 14 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.01 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.34 | 0.00 | 0.00 | 7.30 | 0.00 | 0.00 | 9.72 | 10.09 | 8.60 | 9.95 | 10.41 | 8.72 |
| Movement LOS | A | A | A | A | A | A | A | B | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.00 | 0.07 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 | 0.24 | 0.24 | 0.24 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.00 | 0.55 | 0.55 | 0.55 | 0.00 | 0.00 | 0.00 | 1.80 | 1.80 | 1.80 |
| d_A, Approach Delay [s/veh] | 0.00 | | | 2.89 | | | 9.47 | | | 9.66 | | |
| Approach LOS | A | | | A | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 4.87 | | | | | | | | | | | |
| Intersection LOS | A | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 16: New Road B & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 12.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.011 |

**Intersection Setup**

| Name | | | | 28 St | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | | | | 28 St | | | New Road B | | | New Road B | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 13 | 148 | 25 | 9 | 137 | 20 | 62 | 12 | 10 | 69 | 6 | 19 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 13 | 148 | 25 | 9 | 137 | 20 | 62 | 12 | 10 | 69 | 6 | 19 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 37 | 6 | 2 | 34 | 5 | 16 | 3 | 3 | 17 | 2 | 5 |
| Total Analysis Volume [veh/h] | 13 | 148 | 25 | 9 | 137 | 20 | 62 | 12 | 10 | 69 | 6 | 19 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.11 | 0.02 | 0.01 | 0.12 | 0.01 | 0.02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.55 | 0.00 | 0.00 | 7.58 | 0.00 | 0.00 | 12.41 | 12.51 | 10.02 | 12.46 | 12.55 | 10.15 |
| Movement LOS | A | A | A | A | A | A | B | B | B | B | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.50 | 0.50 | 0.50 | 0.54 | 0.54 | 0.54 |
| 95th-Percentile Queue Length [m/ln] | 0.17 | 0.17 | 0.17 | 0.12 | 0.12 | 0.12 | 3.78 | 3.78 | 3.78 | 4.14 | 4.14 | 4.14 |
| d_A, Approach Delay [s/veh] | 0.53 | | | 0.41 | | | 12.14 | | | 12.00 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 4.37 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 17: Boulder Blvd & Keystone Dr**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.1 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.048 |

**Intersection Setup**

| Name | Keystone Dr | | | Keystone Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Keystone Dr | | | Keystone Dr | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 18 | 6 | 0 | 36 | 13 | 53 | 24 | 121 | 80 | 13 | 170 | 23 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 18 | 6 | 0 | 36 | 13 | 53 | 24 | 121 | 80 | 13 | 170 | 23 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 2 | 0 | 9 | 3 | 13 | 6 | 30 | 20 | 3 | 43 | 6 |
| Total Analysis Volume [veh/h] | 18 | 6 | 0 | 36 | 13 | 53 | 24 | 121 | 80 | 13 | 170 | 23 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.05 | 0.17 | 0.08 | 0.03 | 0.25 | 0.02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.36 | 0.00 | 0.00 | 7.28 | 0.00 | 0.00 | 14.09 | 12.01 | 10.45 | 14.03 | 12.33 | 10.45 |
| Movement LOS | A | A | A | A | A | A | B | B | B | B | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.03 | 0.03 | 0.03 | 0.07 | 0.07 | 0.07 | 1.23 | 1.23 | 1.23 | 1.22 | 1.22 | 1.22 |
| 95th-Percentile Queue Length [m/ln] | 0.23 | 0.23 | 0.23 | 0.54 | 0.54 | 0.54 | 9.39 | 9.39 | 9.39 | 9.30 | 9.30 | 9.30 |
| d_A, Approach Delay [s/veh] | 5.52 | | | 2.57 | | | 11.68 | | | 12.23 | | |
| Approach LOS | A | | | A | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 9.95 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 18: Boulder Blvd & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 31.5 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.400 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 53 | 20 | 157 | 140 | 30 | 117 | 48 | 76 | 32 | 104 | 36 | 60 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 53 | 20 | 157 | 140 | 30 | 117 | 48 | 76 | 32 | 104 | 36 | 60 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 13 | 5 | 39 | 35 | 8 | 29 | 12 | 19 | 8 | 26 | 9 | 15 |
| Total Analysis Volume [veh/h] | 53 | 20 | 157 | 140 | 30 | 117 | 48 | 76 | 32 | 104 | 36 | 60 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.04 | 0.00 | 0.00 | 0.10 | 0.00 | 0.00 | 0.17 | 0.23 | 0.03 | 0.40 | 0.11 | 0.06 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.59 | 0.00 | 0.00 | 7.80 | 0.00 | 0.00 | 24.64 | 23.12 | 15.93 | 31.51 | 28.28 | 21.43 |
| Movement LOS | A | A | A | A | A | A | C | C | C | D | D | C |
| 95th-Percentile Queue Length [veh/ln] | 0.11 | 0.11 | 0.11 | 0.30 | 0.30 | 0.30 | 2.08 | 2.08 | 2.08 | 3.36 | 3.36 | 3.36 |
| 95th-Percentile Queue Length [m/ln] | 0.82 | 0.82 | 0.82 | 2.26 | 2.26 | 2.26 | 15.88 | 15.88 | 15.88 | 25.60 | 25.60 | 25.60 |
| d_A, Approach Delay [s/veh] | 1.75 | | | 3.81 | | | 22.11 | | | 27.90 | | |
| Approach LOS | A | | | A | | | C | | | D | | |
| d_I, Intersection Delay [s/veh] | 12.06 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 19: Boulder Blvd & Boundary Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 33.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.490 |

**Intersection Setup**

| Name | Boundary Rd | | Boundary Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Boundary Rd | | Boundary Rd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 175 | 239 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 162 | 89 | 136 | 103 | 119 | 319 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 162 | 264 | 375 | 103 | 119 | 319 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 41 | 66 | 94 | 26 | 30 | 80 |
| Total Analysis Volume [veh/h] | 162 | 264 | 375 | 103 | 119 | 319 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.15 | 0.00 | 0.00 | 0.00 | 0.49 | 0.42 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.92 | 0.00 | 0.00 | 0.00 | 33.32 | 13.08 |
| Movement LOS | A | A | A | A | D | B |
| 95th-Percentile Queue Length [veh/ln] | 0.53 | 0.00 | 0.00 | 0.00 | 2.49 | 2.08 |
| 95th-Percentile Queue Length [m/ln] | 4.01 | 0.00 | 0.00 | 0.00 | 18.95 | 15.86 |
| d_A, Approach Delay [s/veh] | 3.39 | | 0.00 | | 18.58 | |
| Approach LOS | A | | A | | C | |
| d_I, Intersection Delay [s/veh] | 7.14 | | | | | |
| Intersection LOS | D | | | | | |

**Intersection Level Of Service Report**

**Intersection 20: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 12.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.074 |

**Intersection Setup**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Approach | Southbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Left | Thru | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Boulder Blvd | | Boulder Blvd | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 80 | 10 | 200 | 230 | 10 |
| Base Volume Adjustment Factor | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 29 | 0 | 0 | 5 | 6 | 30 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | -100 | 100 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 40 | 88 | 11 | 225 | 159 | 141 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 10 | 22 | 3 | 56 | 40 | 35 |
| Total Analysis Volume [veh/h] | 40 | 88 | 11 | 225 | 159 | 141 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Stop | Free | Free |
| Flared Lane | No | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.07 | 0.11 | 0.01 | 0.00 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh] | 12.79 | 10.59 | 7.87 | 0.00 | 0.00 | 0.00 |
| Movement LOS | B | B | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.66 | 0.66 | 0.02 | 0.02 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [m/ln] | 5.06 | 5.06 | 0.14 | 0.14 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 11.28 | | 0.37 | | 0.00 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 2.30 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 21: Slate Ave & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 10.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.015 |

**Intersection Setup**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Golf Course Rd | | Golf Course Rd | | Slate Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 10 | 10 | 10 | 10 | 10 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 30 | 0 | 39 | 29 | 0 | 54 |
| Diverted Trips [veh/h] | 100 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 140 | 10 | 49 | 39 | 10 | 64 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 35 | 3 | 12 | 10 | 3 | 16 |
| Total Analysis Volume [veh/h] | 140 | 10 | 49 | 39 | 10 | 64 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.03 | 0.00 | 0.01 | 0.07 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.57 | 0.00 | 10.66 | 9.38 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.08 | 0.08 | 0.28 | 0.28 |
| 95th-Percentile Queue Length [m/ln] | 0.00 | 0.00 | 0.64 | 0.64 | 2.13 | 2.13 |
| d_A, Approach Delay [s/veh] | 0.00 | | 4.22 | | 9.55 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 3.45 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 22: Boulder Blvd & Golf Course Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 27.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.119 |

**Intersection Setup**

| Name | Golf Course Rd | | | Golf Course Rd | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 50.00 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | Golf Course Rd | | | Golf Course Rd | | | Boulder Blvd | | | Boulder Blvd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 10 | 5 | 0 | 0 | 5 | 20 | 5 | 0 | 25 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 78 | 6 | 163 | 44 | 22 | 17 | 35 | 0 | 23 | 39 | 245 |
| Diverted Trips [veh/h] | 0 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 10 | 183 | 6 | 163 | 49 | 42 | 22 | 35 | 25 | 23 | 39 | 245 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 3 | 46 | 2 | 41 | 12 | 11 | 6 | 9 | 6 | 6 | 10 | 61 |
| Total Analysis Volume [veh/h] | 10 | 183 | 6 | 163 | 49 | 42 | 22 | 35 | 25 | 23 | 39 | 245 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop | Stop |
|---|---|---|---|---|
| Flared Lane | | | No | No |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.01 | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.12 | 0.10 | 0.03 | 0.08 | 0.11 | 0.29 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 7.41 | 0.00 | 0.00 | 7.84 | 0.00 | 0.00 | 27.83 | 18.41 | 11.98 | 21.72 | 20.19 | 14.09 |
| Movement LOS | A | A | A | A | A | A | D | C | B | C | C | B |
| 95th-Percentile Queue Length [veh/ln] | 0.02 | 0.02 | 0.02 | 0.33 | 0.33 | 0.33 | 0.93 | 0.93 | 0.93 | 2.54 | 2.54 | 2.54 |
| 95th-Percentile Queue Length [m/ln] | 0.13 | 0.13 | 0.13 | 2.50 | 2.50 | 2.50 | 7.09 | 7.09 | 7.09 | 19.39 | 19.39 | 19.39 |
| d_A, Approach Delay [s/veh] | 0.37 | | | 5.03 | | | 18.98 | | | 15.44 | | |
| Approach LOS | A | | | A | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 9.08 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 23: Boulder Blvd & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 13.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.126 |

**Intersection Setup**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 50.00 | | 50.00 | | 50.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | Yes | | Yes | | Yes | |

**Volumes**

| Name | Boulder Blvd | | Boulder Blvd | | Wood Ave | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 240 | 10 | 10 | 20 | 20 | 120 |
| Base Volume Adjustment Factor | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 6 | 5 | 56 | 46 | 0 |
| Diverted Trips [veh/h] | -100 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 164 | 17 | 16 | 78 | 68 | 132 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 41 | 4 | 4 | 20 | 17 | 33 |
| Total Analysis Volume [veh/h] | 164 | 17 | 16 | 78 | 68 | 132 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.11 | 0.00 | 0.00 | 0.00 | 0.13 | 0.13 |
| d_M, Delay for Movement [s/veh] | 7.64 | 0.00 | 0.00 | 0.00 | 13.27 | 10.14 |
| Movement LOS | A | A | A | A | B | B |
| 95th-Percentile Queue Length [veh/ln] | 0.33 | 0.33 | 0.00 | 0.00 | 1.02 | 1.02 |
| 95th-Percentile Queue Length [m/ln] | 2.54 | 2.54 | 0.00 | 0.00 | 7.78 | 7.78 |
| d_A, Approach Delay [s/veh] | 6.93 | | 0.00 | | 11.21 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 7.36 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 24: Hwy 779 & Wood Ave**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 16.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.659 |

**Intersection Setup**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 160.00 | 30.48 | 30.48 | 150.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 70.00 | | | 70.00 | | | 50.00 | | | 50.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | No | | | No | | | No | | |

**Volumes**

| Name | | | | Hwy 779 | | | Wood Ave | | | Wood Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 21 | 558 | 39 | 39 | 611 | 10 | 17 | 5 | 34 | 102 | 17 | 156 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.1000 | 1.0000 | 1.1000 | 1.1000 | 1.1000 | 1.0000 | 1.0000 | 1.1000 | 1.1000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 6.00 | 6.00 | 6.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 107 | 46 | 0 | 164 | 0 | 0 | 0 | 0 | 56 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | -90 | 0 | 0 | -280 | 0 | 0 | 0 | 0 | 0 | 0 | -100 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 21 | 575 | 85 | 43 | 495 | 11 | 19 | 6 | 34 | 158 | 19 | 72 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 144 | 21 | 11 | 124 | 3 | 5 | 2 | 9 | 40 | 5 | 18 |
| Total Analysis Volume [veh/h] | 21 | 575 | 85 | 43 | 495 | 11 | 19 | 6 | 34 | 158 | 19 | 72 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 70 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Semi-actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 8 | 0 | 7 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 5 | 14 | 0 | 5 | 14 | 0 | 0 | 38 | 0 | 10 | 38 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 9 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 16 | 33 | 0 | 9 | 26 | 0 | 0 | 19 | 0 | 9 | 28 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | - | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 0 | 10 | 0 | 5 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | C | R | C | R |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 0.00 | 2.00 | 2.00 | 2.00 | 0.00 | 2.00 |
| g_i, Effective Green Time [s] | 46 | 39 | 46 | 40 | 7 | 7 | 16 | 16 |
| g / C, Green / Cycle | 0.66 | 0.56 | 0.66 | 0.58 | 0.10 | 0.10 | 0.23 | 0.23 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.40 | 0.05 | 0.30 | 0.15 | 0.02 | 0.20 | 0.05 |
| s, saturation flow rate [veh/h] | 869 | 1646 | 792 | 1677 | 169 | 1431 | 878 | 1385 |
| c, Capacity [veh/h] | 563 | 923 | 459 | 966 | 107 | 141 | 309 | 314 |
| d1, Uniform Delay [s] | 5.52 | 11.27 | 7.62 | 8.99 | 31.03 | 29.14 | 23.94 | 22.06 |
| k, delay calibration | 0.11 | 0.50 | 0.50 | 0.50 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.03 | 4.72 | 0.40 | 2.03 | 1.10 | 0.88 | 1.66 | 0.37 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.04 | 0.72 | 0.09 | 0.52 | 0.23 | 0.24 | 0.57 | 0.23 |
| d, Delay for Lane Group [s/veh] | 5.55 | 15.99 | 8.03 | 11.02 | 32.13 | 30.02 | 25.61 | 22.43 |
| Lane Group LOS | A | B | A | B | C | C | C | C |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.07 | 6.75 | 0.19 | 3.96 | 0.45 | 0.54 | 2.56 | 0.95 |
| 50th-Percentile Queue Length [m/ln] | 0.54 | 51.47 | 1.45 | 30.21 | 3.41 | 4.14 | 19.51 | 7.25 |
| 95th-Percentile Queue Length [veh/ln] | 0.13 | 11.02 | 0.34 | 7.14 | 0.81 | 0.98 | 4.61 | 1.71 |
| 95th-Percentile Queue Length [m/ln] | 0.97 | 83.95 | 2.61 | 54.37 | 6.14 | 7.45 | 35.12 | 13.05 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 5.55 | 15.99 | 15.99 | 8.03 | 11.02 | 11.02 | 32.13 | 32.13 | 30.02 | 25.61 | 25.61 | 22.43 |
| Movement LOS | A | B | B | A | B | B | C | C | C | C | C | C |
| d_A, Approach Delay [s/veh] | 15.67 | | | 10.79 | | | 30.91 | | | 24.69 | | |
| Approach LOS | B | | | B | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 15.97 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.659 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 16.50 | 518.66 | 36.04 | 424.08 | 1.76 | 2.39 | 91.44 | 37.20 |
| Stops [stops/h] | 3.64 | 347.38 | 9.77 | 203.86 | 23.02 | 27.93 | 131.68 | 48.94 |
| Fuel consumption [L/h] | 1.60 | 65.69 | 3.63 | 47.84 | 1.30 | 1.64 | 15.15 | 5.88 |
| CO [g/h] | 29.46 | 1213.07 | 67.10 | 883.31 | 24.05 | 30.29 | 279.67 | 108.59 |
| NOx [g/h] | 5.73 | 236.02 | 13.05 | 171.86 | 4.68 | 5.89 | 54.41 | 21.13 |
| VOC [g/h] | 6.83 | 281.14 | 15.55 | 204.72 | 5.57 | 7.02 | 64.82 | 25.17 |

**Other Modes**

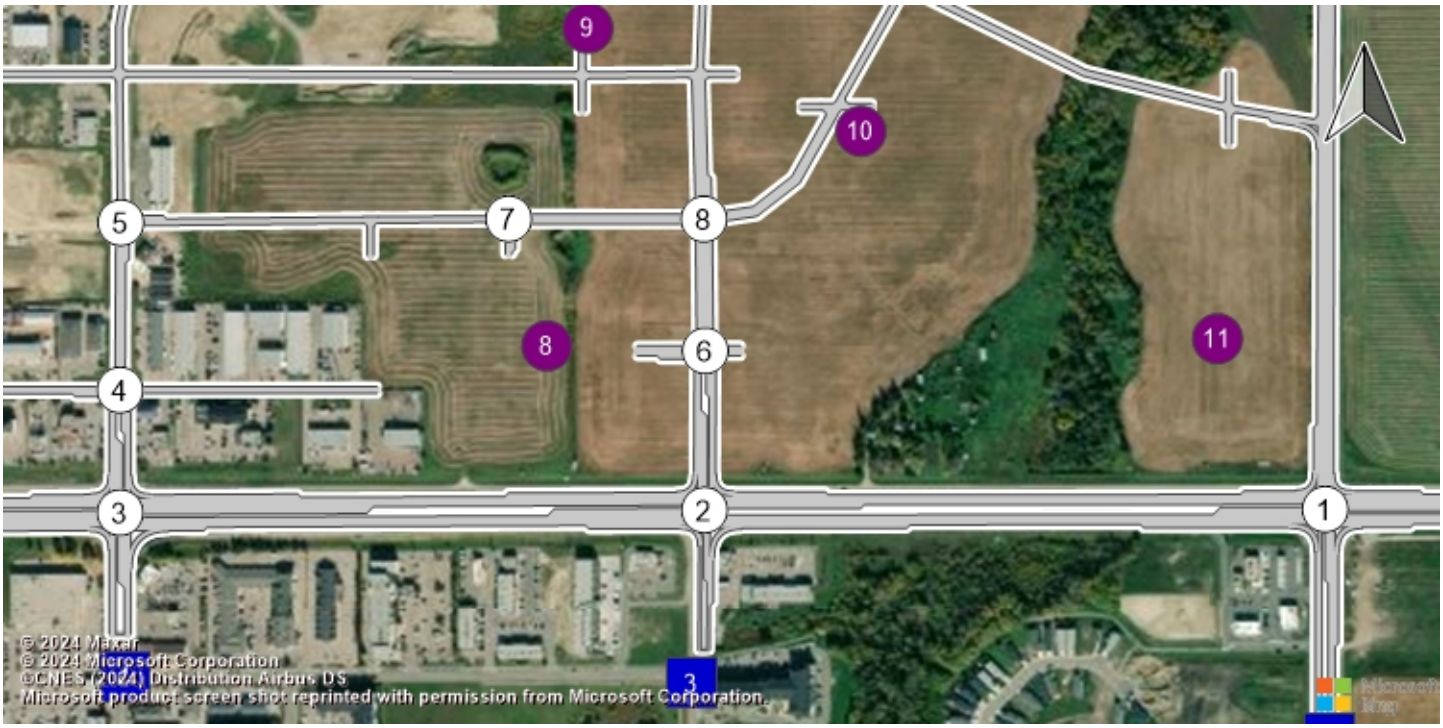
| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 0.0 | 0.0 | 0.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 0.000 | 0.000 | 0.000 |
| Crosswalk LOS | F | F | F | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 829 | 629 | 429 | 686 |
| d_b, Bicycle Delay [s] | 12.01 | 16.46 | 21.61 | 15.11 |
| l_b,int, Bicycle LOS Score for Intersection | 2.683 | 2.465 | 1.657 | 1.970 |
| Bicycle LOS | B | B | A | A |

## Sequence

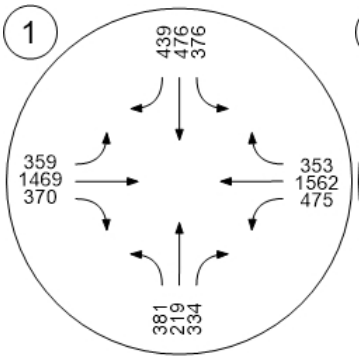
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



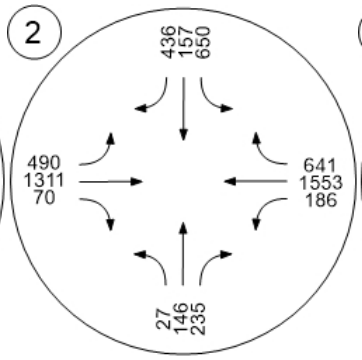
## Traffic Volume - Future Total Volume



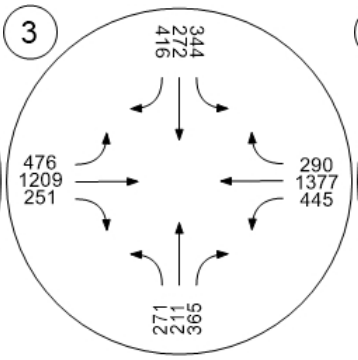

### Hwy 16 A & Boundary Rd



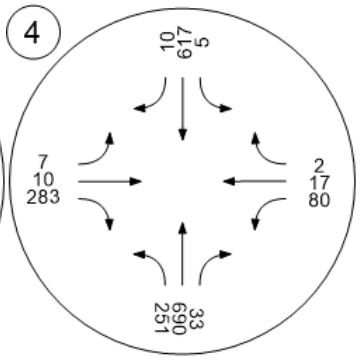

### Hwy 16A & 28 St



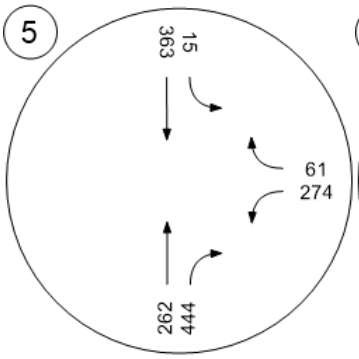

### Hwy 16A & S Park Dr/N Park



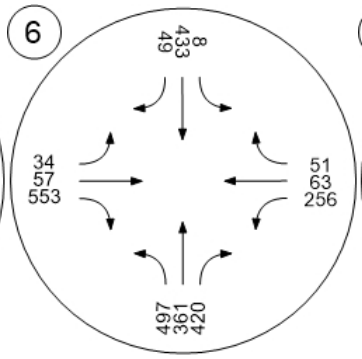

### Boulder Blvd & N Park Dr



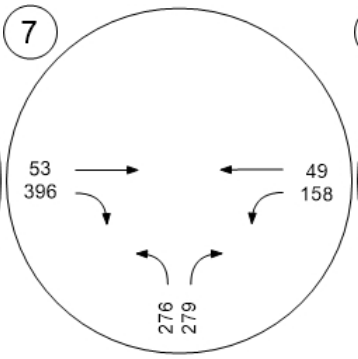

### N Park Dr & Quartz Ave



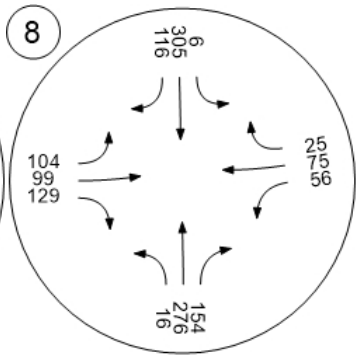

### 28 St & Site Access #1




### Quartz Ave & Site Access #2



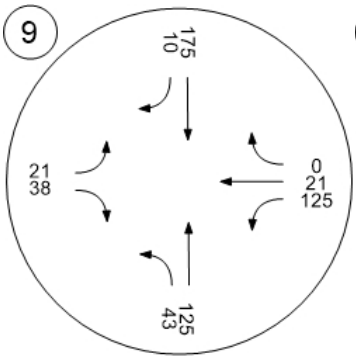

### New Road A & 28 St



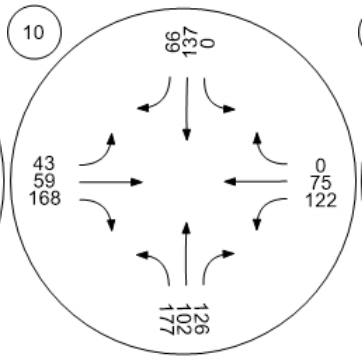
## Traffic Volume - Future Total Volume



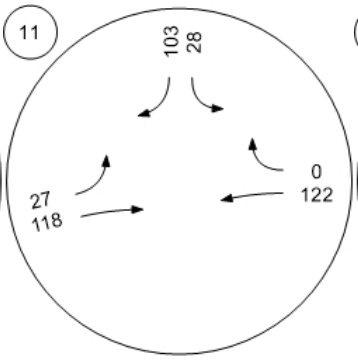

### Slate Ave & N Park Dr



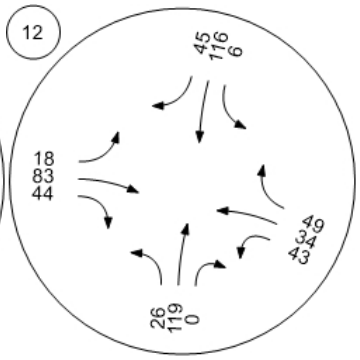

### Slate Ave & 28 St



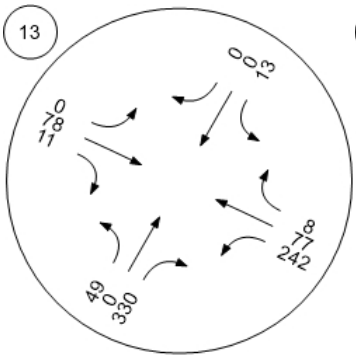

### N Park Dr & Keystone Dr



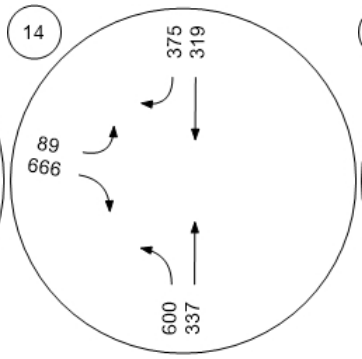

### N Park Dr & 28 St



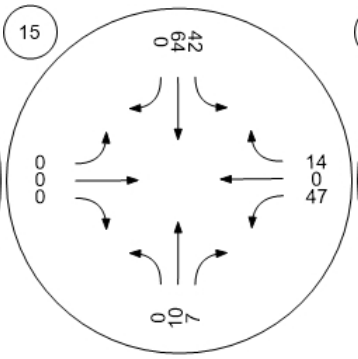

### N Park Dr & New Road B



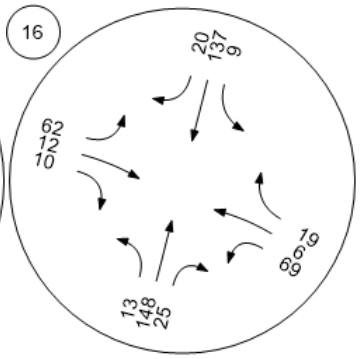

### N Park Dr & Boundary Rd



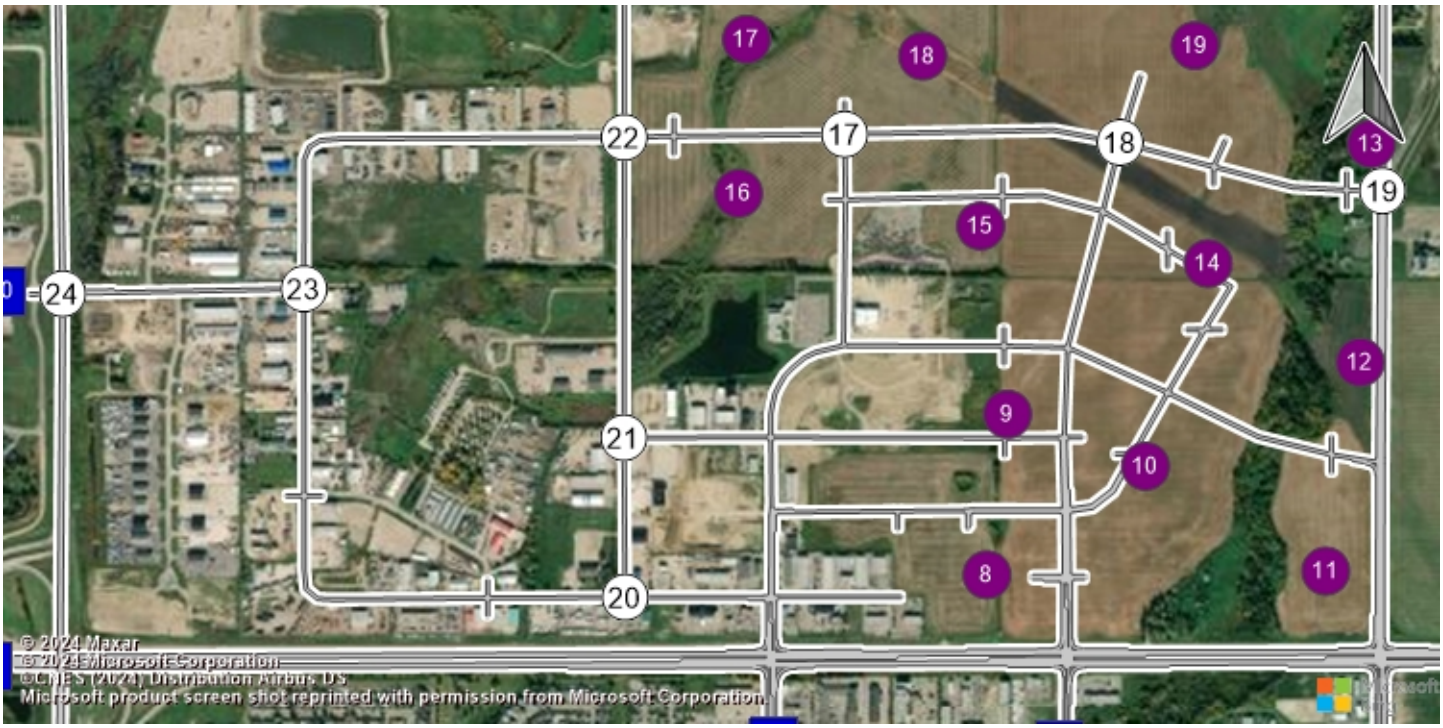

### New Road B & Keystone Dr



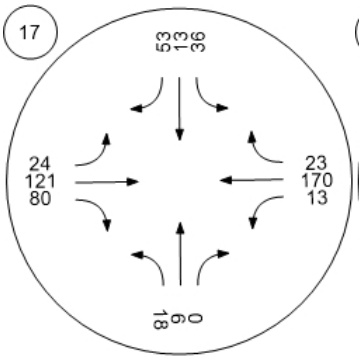

### New Road B & 28 St



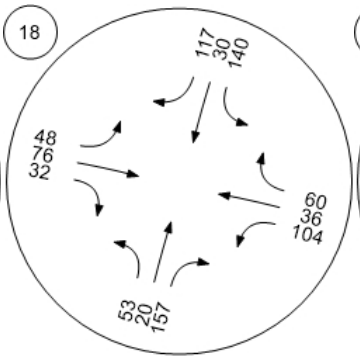
## Traffic Volume - Future Total Volume



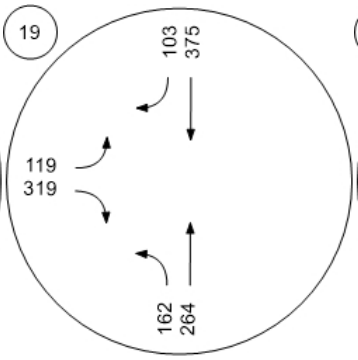

### Boulder Blvd & Keystone Dr



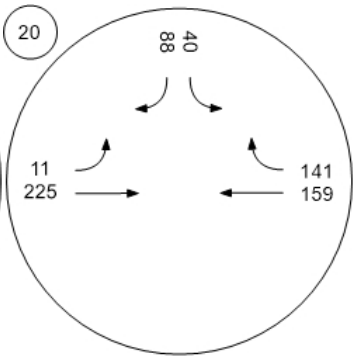

### Boulder Blvd & 28 St



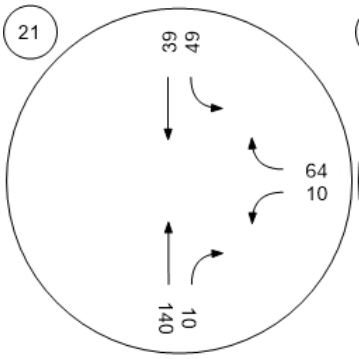

### Boulder Blvd & Boundary Rd



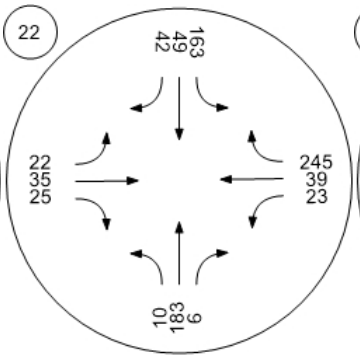

### Boulder Blvd & Golf Course



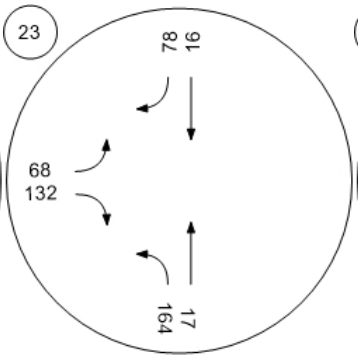

### Slate Ave & Golf Course Rd



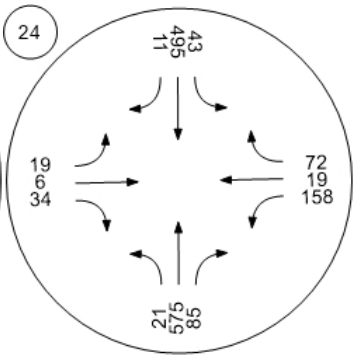

### Boulder Blvd & Golf Course




### Boulder Blvd & Wood Ave




### Hwy 779 & Wood Ave



# APPENDIX F

RIGHT-IN/RIGHT-OUT ANALYSIS RESULTS

Vistro File: C:\...\2025-11-24_North Industrial Development_Updated ASP_FINAL.vistro
Report File: C:\...\Opening Day (2026)_PM_RIRO.pdf

Scenario 17 Opening Day (2026)_PM_RIRO
11/24/2025

## Intersection Analysis Summary

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 2 | Hwy 16A & 28 St | Signalized | HCM 7th Edition | SB Left | 0.659 | 29.7 | C |
| 6 | 28 St & Site Access #1 | Two-way stop | HCM 7th Edition | EB Right | 0.623 | 14.6 | B |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 2: Hwy 16A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 29.7 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.659 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 75.00 | 30.48 | 75.00 | 150.00 | 30.48 | 100.00 | 150.00 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 200.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | Yes | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | No | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 0 | 176 | 0 | 0 | 0 | 0 | 1292 | 52 | 50 | 1284 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0200 | 1.0000 | 1.0000 | 1.0200 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 42 | 0 | 390 | 43 | 197 | 190 | 0 | 0 | 0 | 0 | 378 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | -50 | 0 | 0 | 0 | 0 | 85 | -85 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 46 | 0 | 0 | 0 | 0 | -46 | 46 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 20 | 42 | 176 | 390 | 43 | 193 | 190 | 1318 | 52 | 50 | 1349 | 339 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 11 | 44 | 98 | 11 | 48 | 48 | 330 | 13 | 13 | 337 | 85 |
| Total Analysis Volume [veh/h] | 20 | 42 | 176 | 390 | 43 | 193 | 190 | 1318 | 52 | 50 | 1349 | 339 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 110 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 49.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 30 | 0 | 11 | 47 | 0 | 20 | 12 | 0 | 22 | 14 | 0 |
| Amber [s] | 0.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 0.0 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 40 | 0 | 17 | 57 | 0 | 19 | 35 | 0 | 18 | 34 | 0 |
| Lead / Lag | - | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 7 | 10 | 0 | 12 | 10 | 0 | 12 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | No | No | | No | No | | No | No | |
| Maximum Recall | | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 17 | 17 | 34 | 34 | 13 | 48 | 9 | 44 |
| g / C, Green / Cycle | 0.15 | 0.15 | 0.31 | 0.31 | 0.12 | 0.44 | 0.09 | 0.40 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.13 | 0.27 | 0.02 | 0.11 | 0.26 | 0.03 | 0.26 |
| s, saturation flow rate [veh/h] | 1363 | 1637 | 1436 | 1870 | 1781 | 5094 | 1781 | 5094 |
| c, Capacity [veh/h] | 236 | 252 | 399 | 577 | 210 | 2219 | 153 | 2054 |
| d1, Uniform Delay [s] | 42.73 | 45.41 | 44.74 | 26.91 | 47.88 | 23.63 | 47.30 | 26.64 |
| k, delay calibration | 0.11 | 0.11 | 0.14 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.15 | 8.64 | 19.23 | 0.05 | 13.18 | 1.18 | 1.23 | 1.66 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.08 | 0.86 | 0.98 | 0.07 | 0.90 | 0.59 | 0.33 | 0.66 |
| d, Delay for Lane Group [s/veh] | 42.89 | 54.05 | 63.97 | 26.97 | 61.06 | 24.81 | 48.53 | 28.30 |
| Lane Group LOS | D | D | E | C | E | C | D | C |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.49 | 6.37 | 11.22 | 0.81 | 5.70 | 8.21 | 1.30 | 9.15 |
| 50th-Percentile Queue Length [m/ln] | 3.76 | 48.56 | 85.53 | 6.17 | 43.41 | 62.56 | 9.87 | 69.70 |
| 95th-Percentile Queue Length [veh/ln] | 0.89 | 10.51 | 16.72 | 1.46 | 9.61 | 12.91 | 2.33 | 14.11 |
| 95th-Percentile Queue Length [m/ln] | 6.77 | 80.11 | 127.40 | 11.11 | 73.24 | 98.36 | 17.77 | 107.49 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 42.89 | 54.05 | 54.05 | 63.97 | 26.97 | 0.00 | 61.06 | 24.81 | 0.00 | 48.53 | 28.30 | 0.00 |
| Movement LOS | D | D | D | E | C | | E | C | | D | C | |
| d_A, Approach Delay [s/veh] | 53.11 | | | 41.71 | | | 28.40 | | | 23.36 | | |
| Approach LOS | D | | | D | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 29.68 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.659 | | | | | | | | | | | |

**Emissions**

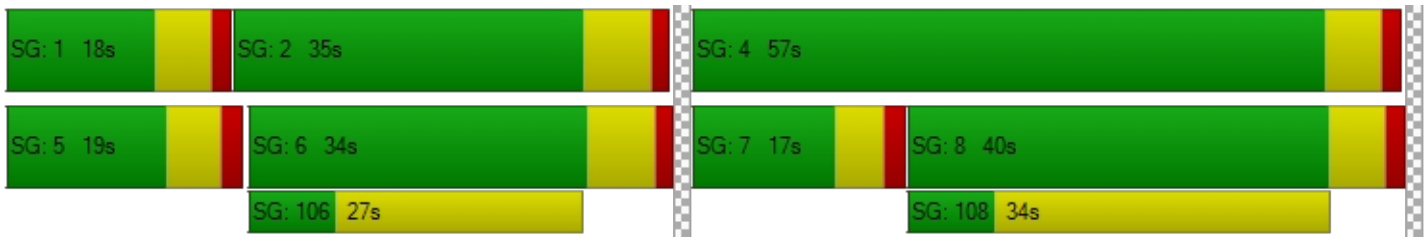
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 3.02 | 32.92 | 67.43 | 7.43 | 118.83 | 824.27 | 33.88 | 914.06 |
| Stops [stops/h] | 16.15 | 208.56 | 367.35 | 26.52 | 186.46 | 806.03 | 42.39 | 898.03 |
| Fuel consumption [L/h] | 1.31 | 16.89 | 33.87 | 2.20 | 29.01 | 136.46 | 6.97 | 153.04 |
| CO [g/h] | 24.19 | 311.81 | 625.48 | 40.54 | 535.72 | 2519.80 | 128.79 | 2825.97 |
| NOx [g/h] | 4.71 | 60.67 | 121.70 | 7.89 | 104.23 | 490.26 | 25.06 | 549.83 |
| VOC [g/h] | 5.61 | 72.26 | 144.96 | 9.40 | 124.16 | 583.99 | 29.85 | 654.95 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 11.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 44.55 | 0.00 | 44.55 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 2.309 | 0.000 | 3.611 |
| Crosswalk LOS | F | B | F | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 618 | 927 | 515 | 496 |
| d_b, Bicycle Delay [s] | 26.25 | 15.82 | 30.34 | 31.09 |
| l_b,int, Bicycle LOS Score for Intersection | 1.952 | 2.274 | 2.389 | 2.329 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 6: 28 St & Site Access #1**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 14.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.623 |

**Intersection Setup**

| Name | 28 St | | 28 St | | Site Access #1 | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | 28 St | | 28 St | | Site Access #1 | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 501 | 109 | 87 | 0 | 0 | 543 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 62 | 0 | 0 | 0 | 0 | 62 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 563 | 109 | 87 | 0 | 0 | 605 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 141 | 27 | 22 | 0 | 0 | 151 |
| Total Analysis Volume [veh/h] | 563 | 109 | 87 | 0 | 0 | 605 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.37 | 0.00 | 0.00 | 0.00 | 0.00 | 0.62 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 8.80 | 0.00 | 0.00 | 0.00 | 38.28 | 14.62 |
| Movement LOS | A | A | A | A | E | B |
| 95th-Percentile Queue Length [veh/ln] | 1.76 | 0.00 | 0.00 | 0.00 | 0.00 | 4.51 |
| 95th-Percentile Queue Length [m/ln] | 13.41 | 0.00 | 0.00 | 0.00 | 0.00 | 34.36 |
| d_A, Approach Delay [s/veh] | 7.37 | | 0.00 | | 14.62 | |
| Approach LOS | A | | A | | B | |
| d_I, Intersection Delay [s/veh] | 10.11 | | | | | |
| Intersection LOS | B | | | | | |

Vistro File: C:\...\2025-11-24_North Industrial Development_Updated ASP_FINAL.vistro
Report File: C:\...\Opening Day (2026)_SAT_RIRO.pdf

Scenario 18 Opening Day (2026)_SAT_RIRO
11/24/2025

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 2 | Hwy 16A & 28 St | Signalized | HCM 7th Edition | EB Left | 0.685 | 30.9 | C |
| 8 | 28 St & Site Access #1 | Two-way stop | HCM 7th Edition | EB Right | 0.719 | 17.9 | C |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 2: Hwy 16A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 30.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.685 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 75.00 | 30.48 | 75.00 | 150.00 | 30.48 | 100.00 | 150.00 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 200.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | No | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 16 | 0 | 141 | 0 | 0 | 0 | 0 | 1033 | 42 | 40 | 1027 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0200 | 1.0000 | 1.0000 | 1.0200 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 52 | 0 | 484 | 54 | 244 | 235 | 0 | 0 | 0 | 0 | 469 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | -56 | 0 | 0 | 0 | 0 | 101 | -101 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 0 | 0 | -36 | 36 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 16 | 52 | 141 | 484 | 54 | 224 | 235 | 1054 | 42 | 40 | 1113 | 404 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 13 | 35 | 121 | 14 | 56 | 59 | 264 | 11 | 10 | 278 | 101 |
| Total Analysis Volume [veh/h] | 16 | 52 | 141 | 484 | 54 | 224 | 235 | 1054 | 42 | 40 | 1113 | 404 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 110 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 46.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | Permiss | Permiss | Permiss | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 0 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 0 | 30 | 0 | 21 | 57 | 0 | 20 | 31 | 0 | 3 | 14 | 0 |
| Amber [s] | 0.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 0.0 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 27 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 9 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 0 | 38 | 0 | 24 | 62 | 0 | 27 | 30 | 0 | 18 | 21 | 0 |
| Lead / Lag | - | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 0 | 10 | 0 | 10 | 10 | 0 | 12 | 10 | 0 | 12 | 10 | 0 |
| Vehicle Extension [s] | 0.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.00 | 4.00 | 0.00 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 15 | 15 | 39 | 39 | 16 | 44 | 8 | 36 |
| g / C, Green / Cycle | 0.14 | 0.14 | 0.35 | 0.35 | 0.15 | 0.40 | 0.08 | 0.33 |
| (v / s)_i Volume / Saturation Flow Rate | 0.01 | 0.12 | 0.32 | 0.03 | 0.13 | 0.21 | 0.02 | 0.22 |
| s, saturation flow rate [veh/h] | 1350 | 1656 | 1523 | 1870 | 1781 | 5094 | 1781 | 5094 |
| c, Capacity [veh/h] | 208 | 227 | 513 | 664 | 267 | 2024 | 138 | 1656 |
| d1, Uniform Delay [s] | 44.53 | 46.36 | 34.87 | 23.54 | 45.81 | 25.19 | 47.89 | 32.06 |
| k, delay calibration | 0.11 | 0.11 | 0.17 | 0.11 | 0.17 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.16 | 8.61 | 12.96 | 0.05 | 13.70 | 0.96 | 1.15 | 2.20 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.08 | 0.85 | 0.94 | 0.08 | 0.88 | 0.52 | 0.29 | 0.67 |
| d, Delay for Lane Group [s/veh] | 44.68 | 54.97 | 47.83 | 23.60 | 59.51 | 26.15 | 49.03 | 34.25 |
| Lane Group LOS | D | D | D | C | E | C | D | C |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.40 | 5.67 | 13.00 | 0.94 | 7.03 | 6.65 | 1.04 | 8.32 |
| 50th-Percentile Queue Length [m/ln] | 3.08 | 43.18 | 99.08 | 7.19 | 53.54 | 50.69 | 7.95 | 63.41 |
| 95th-Percentile Queue Length [veh/ln] | 0.73 | 9.57 | 18.92 | 1.70 | 11.37 | 10.88 | 1.88 | 13.05 |
| 95th-Percentile Queue Length [m/ln] | 5.55 | 72.93 | 144.14 | 12.93 | 86.67 | 82.93 | 14.31 | 99.46 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 44.68 | 54.97 | 54.97 | 47.83 | 23.60 | 0.00 | 59.51 | 26.15 | 0.00 | 49.03 | 34.25 | 0.00 |
| Movement LOS | D | D | D | D | C | | E | C | | D | C | |
| d_A, Approach Delay [s/veh] | 54.18 | | | 32.05 | | | 31.22 | | | 25.74 | | |
| Approach LOS | D | | | C | | | C | | | C | | |
| d_I, Intersection Delay [s/veh] | 30.89 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.685 | | | | | | | | | | | |

**Emissions**

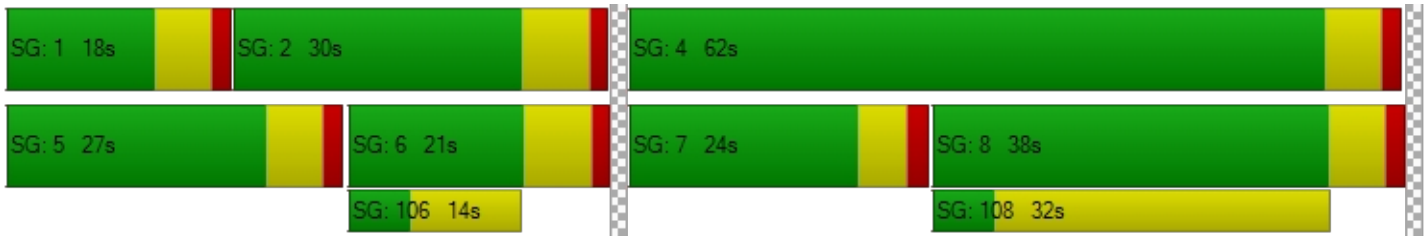
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 2.27 | 27.34 | 83.15 | 9.28 | 146.91 | 658.93 | 27.11 | 754.40 |
| Stops [stops/h] | 13.23 | 185.46 | 425.54 | 30.86 | 229.95 | 653.18 | 34.14 | 817.04 |
| Fuel consumption [L/h] | 1.06 | 14.93 | 35.29 | 2.56 | 35.56 | 110.69 | 5.61 | 135.76 |
| CO [g/h] | 19.63 | 275.76 | 651.61 | 47.21 | 656.66 | 2043.99 | 103.57 | 2506.91 |
| NOx [g/h] | 3.82 | 53.65 | 126.78 | 9.18 | 127.76 | 397.69 | 20.15 | 487.75 |
| VOC [g/h] | 4.55 | 63.91 | 151.02 | 10.94 | 152.19 | 473.72 | 24.00 | 581.00 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 46.37 | 0.00 | 46.37 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 2.350 | 0.000 | 3.504 |
| Crosswalk LOS | F | B | F | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 582 | 1018 | 424 | 260 |
| d_b, Bicycle Delay [s] | 27.65 | 13.25 | 34.17 | 41.63 |
| l_b,int, Bicycle LOS Score for Intersection | 1.904 | 2.447 | 2.269 | 2.194 |
| Bicycle LOS | A | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 8: 28 St & Site Access #1**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 17.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.719 |

**Intersection Setup**

| Name | 28 St | | 28 St | | Site Access #1 | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Eastbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Thru | Thru | Right | Left | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 0 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | 48.28 | | 48.28 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | 28 St | | 28 St | | Site Access #1 | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 621 | 135 | 108 | 0 | 0 | 674 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | -56 |
| Pass-by Trips [veh/h] | 62 | 0 | 0 | 0 | 0 | 62 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 683 | 135 | 108 | 0 | 0 | 680 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 171 | 34 | 27 | 0 | 0 | 170 |
| Total Analysis Volume [veh/h] | 683 | 135 | 108 | 0 | 0 | 680 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| Priority Scheme | Free | Free | Stop |
|---|---|---|---|
| Flared Lane | | | |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.46 | 0.00 | 0.00 | 0.00 | 0.00 | 0.72 |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 9.48 | 0.00 | 0.00 | 0.00 | 62.95 | 17.89 |
| Movement LOS | A | A | A | A | F | C |
| 95th-Percentile Queue Length [veh/ln] | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 6.43 |
| 95th-Percentile Queue Length [m/ln] | 19.05 | 0.00 | 0.00 | 0.00 | 0.00 | 48.99 |
| d_A, Approach Delay [s/veh] | 7.92 | | 0.00 | | 17.89 | |
| Approach LOS | A | | A | | C | |
| d_I, Intersection Delay [s/veh] | 11.61 | | | | | |
| Intersection LOS | C | | | | | |

Vistro File: C:\...\2025-11-24_North Industrial Development_Updated ASP_FINAL.vistro
Report File: C:\...\Full Buildout (2046)_PM_RIRO.pdf

Scenario 15 Full Buildout (2046)_PM_RIRO
11/25/2025

## Intersection Analysis Summary

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 2 | Hwy 16A & 28 St | Signalized | HCM 7th Edition | EB Left | 0.769 | 49.1 | D |
| 6 | 28 St & Site Access #1 | Signalized | HCM 7th Edition | WB Thru | 0.461 | 22.6 | C |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 2: Hwy 16A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 49.1 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.769 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 50.00 | 75.00 | 30.48 | 30.48 | 150.00 | 30.48 | 100.00 | 150.00 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 200.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | Yes | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | No | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 30 | 0 | 264 | 0 | 0 | 0 | 0 | 1938 | 78 | 175 | 1826 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 1 | 108 | 21 | 567 | 133 | 550 | 378 | 247 | 7 | 26 | 217 | 488 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | -96 | 0 | 0 | 0 | 0 | 100 | -100 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 62 | 0 | 109 | 62 | -62 | 0 | 0 | -109 | 109 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | -100 | 0 | 0 | 0 | 0 | 0 | -100 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 31 | 108 | 285 | 629 | 133 | 463 | 440 | 2123 | 85 | 201 | 2034 | 397 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 27 | 71 | 157 | 33 | 116 | 110 | 531 | 21 | 50 | 509 | 99 |
| Total Analysis Volume [veh/h] | 31 | 108 | 285 | 629 | 133 | 463 | 440 | 2123 | 85 | 201 | 2034 | 397 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 81.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 8 | 30 | 0 | 22 | 44 | 0 | 15 | 50 | 0 | 13 | 48 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 27 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 21 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 3.7 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 17 | 38 | 0 | 27 | 48 | 0 | 21 | 54 | 0 | 21 | 54 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 10 | 10 | 0 | 12 | 10 | 0 | 12 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | Yes | No | | Yes | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 5.50 | 5.70 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.00 | 3.50 | 3.70 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 37 | 10 | 22 | 27 | 15 | 69 | 15 | 69 |
| g / C, Green / Cycle | 0.27 | 0.07 | 0.15 | 0.19 | 0.11 | 0.49 | 0.11 | 0.49 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.06 | 0.18 | 0.07 | 0.13 | 0.42 | 0.11 | 0.40 |
| s, saturation flow rate [veh/h] | 1376 | 1870 | 3459 | 1870 | 3459 | 5094 | 1781 | 5094 |
| c, Capacity [veh/h] | 369 | 136 | 531 | 361 | 371 | 2514 | 191 | 2514 |
| d1, Uniform Delay [s] | 38.66 | 63.87 | 59.25 | 49.06 | 62.50 | 30.77 | 62.50 | 29.88 |
| k, delay calibration | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 | 0.37 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.10 | 9.92 | 87.38 | 0.63 | 90.52 | 3.69 | 70.62 | 2.93 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.08 | 0.79 | 1.18 | 0.37 | 1.19 | 0.84 | 1.05 | 0.81 |
| d, Delay for Lane Group [s/veh] | 38.76 | 73.78 | 146.63 | 49.69 | 153.02 | 34.46 | 133.12 | 32.81 |
| Lane Group LOS | D | E | F | D | F | C | F | C |
| Critical Lane Group | No | Yes | Yes | No | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.82 | 4.17 | 15.85 | 4.14 | 11.08 | 20.14 | 10.36 | 18.62 |
| 50th-Percentile Queue Length [m/ln] | 6.24 | 31.80 | 120.80 | 31.53 | 84.43 | 153.50 | 78.91 | 141.90 |
| 95th-Percentile Queue Length [veh/ln] | 1.47 | 7.51 | 24.16 | 7.45 | 17.66 | 27.50 | 15.97 | 25.70 |
| 95th-Percentile Queue Length [m/ln] | 11.23 | 57.25 | 184.12 | 56.75 | 134.56 | 209.59 | 121.71 | 195.83 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 38.76 | 73.78 | 0.00 | 146.63 | 49.69 | 0.00 | 153.02 | 34.46 | 0.00 | 133.12 | 32.81 | 0.00 |
| Movement LOS | D | E | | F | D | | F | C | | F | C | |
| d_A, Approach Delay [s/veh] | 21.63 | | | 80.68 | | | 53.06 | | | 35.52 | | |
| Approach LOS | C | | | F | | | D | | | D | | |
| d_I, Intersection Delay [s/veh] | 49.11 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.769 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 4.50 | 15.69 | 108.03 | 22.84 | 278.06 | 1341.65 | 134.88 | 1364.86 |
| Stops [stops/h] | 21.06 | 107.33 | 815.32 | 106.39 | 569.82 | 1553.97 | 266.30 | 1436.54 |
| Fuel consumption [L/h] | 1.83 | 10.04 | 99.60 | 9.65 | 106.50 | 251.37 | 46.54 | 241.50 |
| CO [g/h] | 33.72 | 185.35 | 1839.18 | 178.20 | 1966.63 | 4641.69 | 859.30 | 4459.50 |
| NOx [g/h] | 6.56 | 36.06 | 357.84 | 34.67 | 382.63 | 903.10 | 167.19 | 867.66 |
| VOC [g/h] | 7.82 | 42.96 | 426.25 | 41.30 | 455.78 | 1075.76 | 199.15 | 1033.53 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 61.29 | 0.00 | 61.29 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 2.696 | 0.000 | 3.767 |
| Crosswalk LOS | F | B | F | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 457 | 604 | 676 | 676 |
| d_b, Bicycle Delay [s] | 41.66 | 34.09 | 30.69 | 30.69 |
| l_b,int, Bicycle LOS Score for Intersection | 1.789 | 2.817 | 2.969 | 2.789 |
| Bicycle LOS | A | C | C | C |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 6: 28 St & Site Access #1**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 22.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.461 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Site Access #1 | | | Comm Access | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Site Access #1 | | | Comm Access | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 371 | 359 | 245 | 12 | 635 | 10 | 19 | 24 | 436 | 179 | 38 | 7 |
| Diverted Trips [veh/h] | -98 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 67 | 45 | 58 | 0 | 84 | 0 | 21 | 0 | 46 | 40 | 0 | 18 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 340 | 404 | 303 | 12 | 719 | 10 | 40 | 24 | 482 | 219 | 38 | 25 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 85 | 101 | 76 | 3 | 180 | 3 | 10 | 6 | 121 | 55 | 10 | 6 |
| Total Analysis Volume [veh/h] | 340 | 404 | 303 | 12 | 719 | 10 | 40 | 24 | 482 | 219 | 38 | 25 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Overlap | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 3 | 8 | 0 | 7 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 14 | 48 | 0 | 5 | 39 | 0 | 5 | 24 | 0 | 7 | 26 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 18 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 19 | 53 | 0 | 9 | 43 | 0 | 9 | 28 | 0 | 10 | 29 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| g_i, Effective Green Time [s] | 58 | 49 | 49 | 58 | 39 | 39 | 34 | 24 | 34 | 25 |
| g / C, Green / Cycle | 0.58 | 0.49 | 0.49 | 0.58 | 0.39 | 0.39 | 0.34 | 0.24 | 0.34 | 0.25 |
| (v / s)_i Volume / Saturation Flow Rate | 0.36 | 0.23 | 0.23 | 0.02 | 0.22 | 0.22 | 0.03 | 0.01 | 0.16 | 0.04 |
| s, saturation flow rate [veh/h] | 932 | 1683 | 1446 | 780 | 1683 | 1675 | 1287 | 1683 | 1332 | 1573 |
| c, Capacity [veh/h] | 534 | 825 | 709 | 457 | 656 | 653 | 504 | 404 | 543 | 393 |
| d1, Uniform Delay [s] | 14.18 | 16.80 | 16.80 | 10.02 | 23.76 | 23.77 | 22.39 | 29.30 | 25.51 | 29.30 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 5.71 | 1.85 | 2.16 | 0.11 | 3.39 | 3.40 | 0.31 | 0.28 | 2.22 | 0.87 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.64 | 0.46 | 0.46 | 0.03 | 0.56 | 0.56 | 0.08 | 0.06 | 0.40 | 0.16 |
| d, Delay for Lane Group [s/veh] | 19.89 | 18.65 | 18.96 | 10.12 | 27.15 | 27.17 | 22.70 | 29.58 | 27.73 | 30.17 |
| Lane Group LOS | B | B | B | B | C | C | C | C | C | C |
| Critical Lane Group | Yes | No | No | No | No | Yes | Yes | No | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 4.64 | 5.96 | 5.19 | 0.12 | 7.18 | 7.15 | 0.68 | 0.48 | 4.25 | 1.27 |
| 50th-Percentile Queue Length [m/ln] | 35.33 | 45.44 | 39.55 | 0.91 | 54.70 | 54.48 | 5.16 | 3.62 | 32.41 | 9.70 |
| 95th-Percentile Queue Length [veh/ln] | 8.17 | 9.97 | 8.93 | 0.22 | 11.57 | 11.53 | 1.22 | 0.86 | 7.64 | 2.29 |
| 95th-Percentile Queue Length [m/ln] | 62.25 | 75.96 | 68.02 | 1.64 | 88.18 | 87.89 | 9.28 | 6.52 | 58.19 | 17.46 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 19.89 | 18.67 | 18.96 | 10.12 | 27.16 | 27.17 | 22.70 | 29.58 | 0.00 | 27.73 | 30.17 | 30.17 |
| Movement LOS | B | B | B | B | C | C | C | C | | C | C | C |
| d_A, Approach Delay [s/veh] | 19.15 | | | 26.88 | | | 2.96 | | | 28.27 | | |
| Approach LOS | B | | | C | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 22.55 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.461 | | | | | | | | | | | |

**Emissions**

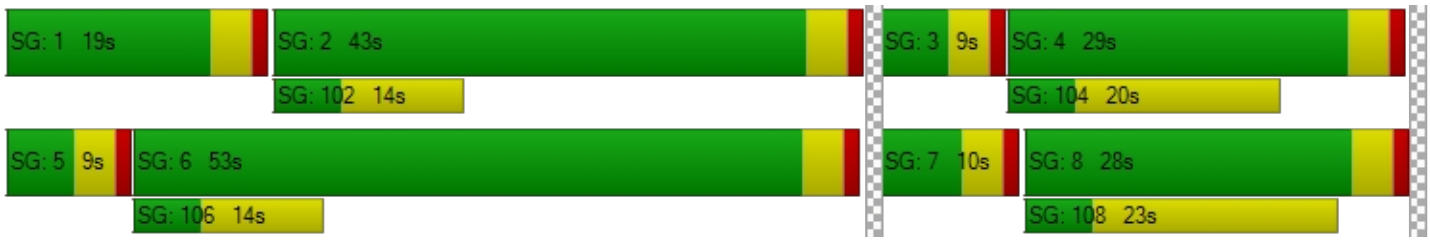
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 58.39 | 65.28 | 56.15 | 1.70 | 51.85 | 51.62 | 2.93 | 1.76 | 14.12 | 4.06 |
| Stops [stops/h] | 166.94 | 214.68 | 186.84 | 4.31 | 258.41 | 257.36 | 24.37 | 17.11 | 153.14 | 45.83 |
| Fuel consumption [L/h] | 14.35 | 16.27 | 14.12 | 0.35 | 18.07 | 17.99 | 1.49 | 1.08 | 9.25 | 2.82 |
| CO [g/h] | 265.07 | 300.47 | 260.71 | 6.44 | 333.59 | 332.23 | 27.57 | 19.85 | 170.76 | 52.00 |
| NOx [g/h] | 51.57 | 58.46 | 50.73 | 1.25 | 64.91 | 64.64 | 5.36 | 3.86 | 33.22 | 10.12 |
| VOC [g/h] | 61.43 | 69.64 | 60.42 | 1.49 | 77.31 | 77.00 | 6.39 | 4.60 | 39.58 | 12.05 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 41.41 | 41.41 | 41.41 | 41.41 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.777 | 2.558 | 2.446 | 2.157 |
| Crosswalk LOS | C | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 980 | 780 | 480 | 500 |
| d_b, Bicycle Delay [s] | 13.01 | 18.61 | 28.88 | 28.13 |
| l_b,int, Bicycle LOS Score for Intersection | 2.423 | 2.171 | 1.665 | 2.025 |
| Bicycle LOS | B | B | A | B |

## Sequence

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Vistro File: C:\...\2025-11-24_North Industrial Development_Updated ASP_FINAL.vistro
Report File: C:\...\Full Buildout (2046)_SAT_RIRO.pdf

Scenario 16 Full Buildout (2046)_SAT_RIRO
11/24/2025

**Intersection Analysis Summary**

| ID | Intersection Name | Control Type | Method | Worst Mvmt | V/C | Delay (s/veh) | LOS |
|---|---|---|---|---|---|---|---|
| 2 | Hwy 16A & 28 St | Signalized | HCM 7th Edition | WB Thru | 0.824 | 49.0 | D |
| 6 | 28 St & Site Access #1 | Signalized | HCM 7th Edition | NB Right | 0.462 | 25.0 | C |

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**
**Intersection 2: Hwy 16A & 28 St**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 49.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | D |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.824 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 |
| Entry Pocket Length [m] | 50.00 | 30.48 | 50.00 | 75.00 | 30.48 | 30.48 | 150.00 | 30.48 | 100.00 | 150.00 | 30.48 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 200.00 |
| Speed [km/h] | 50.00 | | | 50.00 | | | 80.00 | | | 80.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | No | | | Yes | | | No | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Hwy 16A | | | Hwy 16A | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 24 | 0 | 211 | 0 | 0 | 0 | 0 | 1550 | 62 | 60 | 1541 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 3 | 146 | 24 | 598 | 157 | 506 | 496 | 269 | 8 | 26 | 454 | 553 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | -110 | 0 | 0 | 0 | 0 | 128 | -128 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 52 | 0 | 88 | 52 | -52 | 0 | 0 | -88 | 88 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 27 | 146 | 235 | 650 | 157 | 484 | 548 | 1767 | 70 | 86 | 2035 | 513 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 37 | 59 | 163 | 39 | 121 | 137 | 442 | 18 | 22 | 509 | 128 |
| Total Analysis Volume [veh/h] | 27 | 146 | 235 | 650 | 157 | 484 | 548 | 1767 | 70 | 86 | 2035 | 513 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | 1 - Coordination Group |
| Cycle Length [s] | 140 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Semi-actuated |
| Offset [s] | 71.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna | Protecte | Permiss | Unsigna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 3 | 8 | 0 | 7 | 4 | 0 | 5 | 2 | 0 | 1 | 6 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 4 | 30 | 0 | 20 | 46 | 0 | 16 | 40 | 0 | 15 | 39 | 0 |
| Amber [s] | 4.0 | 4.5 | 0.0 | 4.0 | 4.5 | 0.0 | 4.5 | 5.5 | 0.0 | 4.5 | 5.5 | 0.0 |
| All red [s] | 1.5 | 1.5 | 0.0 | 1.5 | 1.5 | 0.0 | 1.5 | 1.2 | 0.0 | 1.5 | 1.2 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 27 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.5 | 4.0 | 0.0 | 3.5 | 4.0 | 0.0 | 4.0 | 4.7 | 0.0 | 4.0 | 4.7 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 13 | 38 | 0 | 32 | 57 | 0 | 29 | 37 | 0 | 33 | 41 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 7 | 10 | 0 | 7 | 10 | 0 | 12 | 10 | 0 | 12 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | L | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| L, Total Lost Time per Cycle [s] | 6.00 | 6.00 | 5.50 | 6.00 | 6.00 | 6.70 | 6.00 | 6.70 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 4.00 | 3.50 | 4.00 | 4.00 | 4.70 | 4.00 | 4.70 |
| g_i, Effective Green Time [s] | 45 | 13 | 27 | 35 | 23 | 65 | 12 | 53 |
| g / C, Green / Cycle | 0.32 | 0.09 | 0.19 | 0.25 | 0.16 | 0.46 | 0.08 | 0.38 |
| (v / s)_i Volume / Saturation Flow Rate | 0.02 | 0.08 | 0.19 | 0.08 | 0.16 | 0.35 | 0.05 | 0.40 |
| s, saturation flow rate [veh/h] | 1328 | 1870 | 3459 | 1870 | 3459 | 5094 | 1781 | 5094 |
| c, Capacity [veh/h] | 422 | 174 | 655 | 468 | 568 | 2350 | 148 | 1937 |
| d1, Uniform Delay [s] | 33.01 | 62.42 | 56.66 | 42.98 | 58.09 | 31.09 | 61.83 | 43.38 |
| k, delay calibration | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.50 | 0.11 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.06 | 10.05 | 14.77 | 0.42 | 11.00 | 2.27 | 3.57 | 35.24 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.06 | 0.84 | 0.99 | 0.34 | 0.96 | 0.75 | 0.58 | 1.05 |
| d, Delay for Lane Group [s/veh] | 33.07 | 72.47 | 71.43 | 43.40 | 69.10 | 33.36 | 65.41 | 78.62 |
| Lane Group LOS | C | E | E | D | E | C | E | F |
| Critical Lane Group | No | Yes | Yes | No | Yes | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.65 | 5.61 | 12.79 | 4.55 | 10.22 | 15.96 | 3.03 | 27.49 |
| 50th-Percentile Queue Length [m/ln] | 4.95 | 42.73 | 97.44 | 34.68 | 77.87 | 121.63 | 23.08 | 209.44 |
| 95th-Percentile Queue Length [veh/ln] | 1.17 | 9.49 | 18.65 | 8.05 | 15.46 | 22.51 | 5.45 | 37.38 |
| 95th-Percentile Queue Length [m/ln] | 8.92 | 72.32 | 142.13 | 61.34 | 117.82 | 171.56 | 41.54 | 284.86 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 33.07 | 72.47 | 0.00 | 71.43 | 43.40 | 0.00 | 69.10 | 33.36 | 0.00 | 65.41 | 78.62 | 0.00 |
| Movement LOS | C | E | | E | D | | E | C | | E | F | |
| d_A, Approach Delay [s/veh] | 28.12 | | | 41.24 | | | 40.59 | | | 62.88 | | |
| Approach LOS | C | | | D | | | D | | | E | | |
| d_I, Intersection Delay [s/veh] | 49.02 | | | | | | | | | | | |
| Intersection LOS | D | | | | | | | | | | | |
| Intersection V/C | 0.824 | | | | | | | | | | | |

**Emissions**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 3.72 | 20.14 | 111.64 | 26.96 | 346.31 | 1116.67 | 57.71 | 1365.53 |
| Stops [stops/h] | 16.72 | 144.19 | 657.63 | 117.04 | 525.57 | 1231.38 | 77.87 | 2120.33 |
| Fuel consumption [L/h] | 1.42 | 13.30 | 61.13 | 10.44 | 86.65 | 204.16 | 13.35 | 352.66 |
| CO [g/h] | 26.17 | 245.59 | 1128.84 | 192.77 | 1600.05 | 3769.91 | 246.59 | 6512.00 |
| NOx [g/h] | 5.09 | 47.78 | 219.63 | 37.51 | 311.31 | 733.49 | 47.98 | 1267.00 |
| VOC [g/h] | 6.06 | 56.92 | 261.62 | 44.68 | 370.83 | 873.71 | 57.15 | 1509.22 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 0.0 | 9.0 | 0.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 0.00 | 61.29 | 0.00 | 61.29 |
| l_p,int, Pedestrian LOS Score for Intersectio | 0.000 | 2.728 | 0.000 | 3.686 |
| Crosswalk LOS | F | B | F | D |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 457 | 729 | 433 | 490 |
| d_b, Bicycle Delay [s] | 41.66 | 28.29 | 42.98 | 39.90 |
| l_b,int, Bicycle LOS Score for Intersection | 1.845 | 2.891 | 2.833 | 2.726 |
| Bicycle LOS | A | C | C | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



**Intersection Level Of Service Report**
**Intersection 6: 28 St & Site Access #1**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 25.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.462 |

**Intersection Setup**

| Name | 28 St | | | 28 St | | | Site Access #1 | | | Comm Access | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [m] | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 | 3.66 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [m] | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 | 30.48 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [m] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [km/h] | 48.28 | | | 48.28 | | | 48.28 | | | 48.28 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | Yes | | |

**Volumes**

| Name | 28 St | | | 28 St | | | Site Access #1 | | | Comm Access | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 428 | 408 | 359 | 8 | 524 | 28 | 10 | 57 | 517 | 220 | 63 | 26 |
| Diverted Trips [veh/h] | -128 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -110 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 60 | 19 | 61 | 0 | 67 | 0 | 24 | 0 | 36 | 36 | 0 | 25 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 360 | 427 | 420 | 8 | 591 | 28 | 34 | 57 | 443 | 256 | 63 | 51 |
| Peak Hour Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 90 | 107 | 105 | 2 | 148 | 7 | 9 | 14 | 111 | 64 | 16 | 13 |
| Total Analysis Volume [veh/h] | 360 | 427 | 420 | 8 | 591 | 28 | 34 | 57 | 443 | 256 | 63 | 51 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | Yes |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Active Pattern | Pattern 1 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fixed time |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing (Basic)**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Overlap | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 3 | 8 | 0 | 7 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Maximum Green [s] | 14 | 48 | 0 | 5 | 39 | 0 | 5 | 24 | 0 | 7 | 26 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 | 1.0 | 1.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 |
| Pedestrian Clearance [s] | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 18 | 0 | 0 | 15 | 0 |
| Delayed Vehicle Green [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 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Detector Location [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 Length [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 |
| Advanced Detector Location [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 |
| Advanced Detector Length [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 |
| I, Upstream Filtering 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 |

**Phasing & Timing: Pattern 1**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Split [s] | 14 | 48 | 0 | 9 | 43 | 0 | 9 | 32 | 0 | 11 | 34 | 0 |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C | L | C | C | L | C | L | C |
|---|---|---|---|---|---|---|---|---|---|---|
| C, Calculated Cycle Length [s] | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| L, Total Lost Time per Cycle [s] | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 | 0.00 | 2.00 | 0.00 | 2.00 |
| g_i, Effective Green Time [s] | 53 | 44 | 44 | 53 | 39 | 39 | 39 | 28 | 39 | 30 |
| g / C, Green / Cycle | 0.53 | 0.44 | 0.44 | 0.53 | 0.39 | 0.39 | 0.39 | 0.28 | 0.39 | 0.30 |
| (v / s)_i Volume / Saturation Flow Rate | 0.39 | 0.25 | 0.29 | 0.01 | 0.19 | 0.19 | 0.03 | 0.03 | 0.20 | 0.07 |
| s, saturation flow rate [veh/h] | 923 | 1683 | 1431 | 720 | 1683 | 1656 | 1232 | 1683 | 1302 | 1560 |
| c, Capacity [veh/h] | 493 | 741 | 629 | 349 | 656 | 646 | 521 | 471 | 581 | 468 |
| d1, Uniform Delay [s] | 17.81 | 21.01 | 22.20 | 13.85 | 22.83 | 22.84 | 19.17 | 26.83 | 22.69 | 26.43 |
| k, delay calibration | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 9.22 | 3.26 | 5.53 | 0.12 | 2.45 | 2.50 | 0.24 | 0.52 | 2.42 | 1.23 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.73 | 0.58 | 0.67 | 0.02 | 0.47 | 0.48 | 0.07 | 0.12 | 0.44 | 0.24 |
| d, Delay for Lane Group [s/veh] | 27.03 | 24.27 | 27.73 | 13.97 | 25.29 | 25.35 | 19.41 | 27.35 | 25.11 | 27.67 |
| Lane Group LOS | C | C | C | B | C | C | B | C | C | C |
| Critical Lane Group | Yes | No | No | No | No | Yes | No | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 5.98 | 7.92 | 8.50 | 0.09 | 5.83 | 5.75 | 0.52 | 1.08 | 4.67 | 2.20 |
| 50th-Percentile Queue Length [m/ln] | 45.60 | 60.35 | 64.78 | 0.71 | 44.39 | 43.85 | 3.99 | 8.22 | 35.61 | 16.74 |
| 95th-Percentile Queue Length [veh/ln] | 10.00 | 12.53 | 13.28 | 0.17 | 9.78 | 9.69 | 0.94 | 1.94 | 8.22 | 3.95 |
| 95th-Percentile Queue Length [m/ln] | 76.17 | 95.52 | 101.21 | 1.28 | 74.55 | 73.83 | 7.18 | 14.79 | 62.63 | 30.14 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 27.03 | 24.27 | 27.73 | 13.97 | 25.32 | 25.35 | 19.41 | 27.35 | 0.00 | 25.11 | 27.67 | 27.67 |
| Movement LOS | C | C | C | B | C | C | B | C | | C | C | C |
| d_A, Approach Delay [s/veh] | 26.30 | | | 25.17 | | | 4.16 | | | 25.89 | | |
| Approach LOS | C | | | C | | | A | | | C | | |
| d_I, Intersection Delay [s/veh] | 25.05 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |
| Intersection V/C | 0.462 | | | | | | | | | | | |

**Emissions**

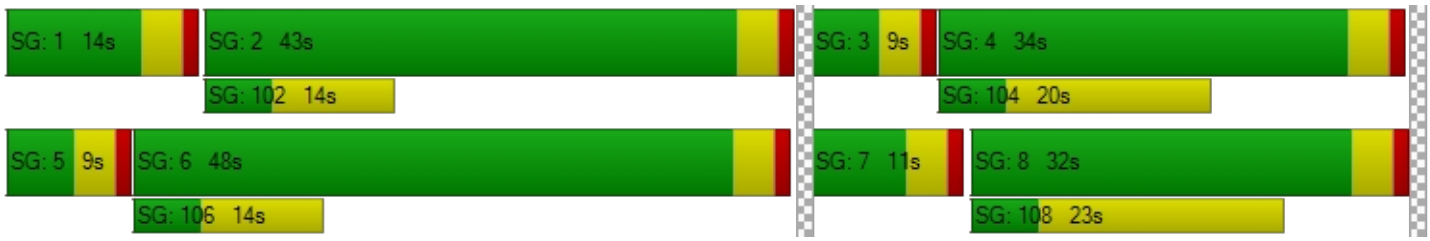
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Kilometers Traveled [km/h] | 61.83 | 73.34 | 72.13 | 1.14 | 44.24 | 43.62 | 2.49 | 4.18 | 9.79 | 4.36 |
| Stops [stops/h] | 215.42 | 285.11 | 306.03 | 3.37 | 209.71 | 207.17 | 18.84 | 38.83 | 168.25 | 79.10 |
| Fuel consumption [L/h] | 17.99 | 21.05 | 22.36 | 0.27 | 14.74 | 14.56 | 1.14 | 2.42 | 9.42 | 4.51 |
| CO [g/h] | 332.18 | 388.62 | 412.82 | 4.92 | 272.19 | 268.82 | 21.12 | 44.64 | 173.89 | 83.20 |
| NOx [g/h] | 64.63 | 75.61 | 80.32 | 0.96 | 52.96 | 52.30 | 4.11 | 8.69 | 33.83 | 16.19 |
| VOC [g/h] | 76.99 | 90.07 | 95.67 | 1.14 | 63.08 | 62.30 | 4.89 | 10.35 | 40.30 | 19.28 |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | 9.0 | 9.0 | 9.0 |
| M_corner, Corner Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [m²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 41.41 | 41.41 | 41.41 | 41.41 |
| l_p,int, Pedestrian LOS Score for Intersectio | 2.820 | 2.544 | 2.480 | 2.230 |
| Crosswalk LOS | C | B | B | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 880 | 780 | 560 | 600 |
| d_b, Bicycle Delay [s] | 15.68 | 18.61 | 25.92 | 24.50 |
| l_b,int, Bicycle LOS Score for Intersection | 2.555 | 2.077 | 1.710 | 2.170 |
| Bicycle LOS | B | B | A | B |

## Sequence

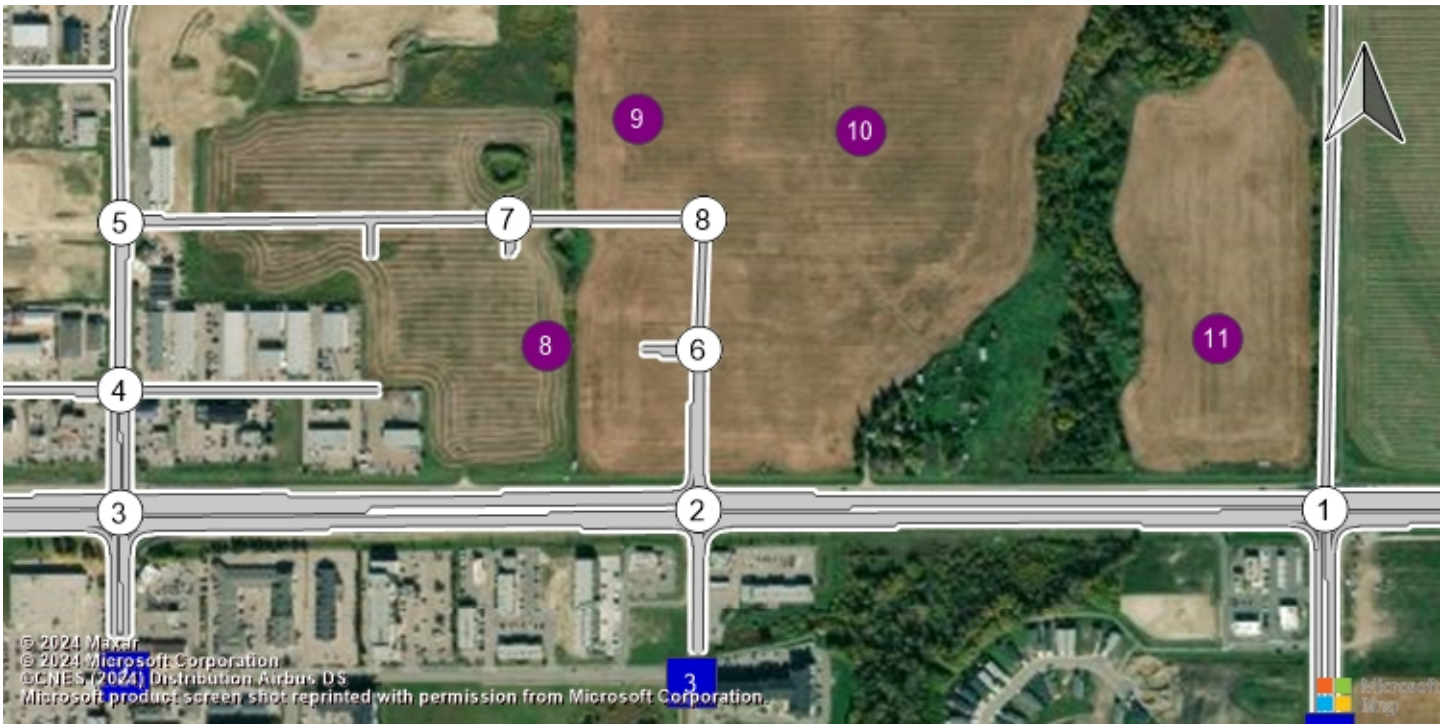
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



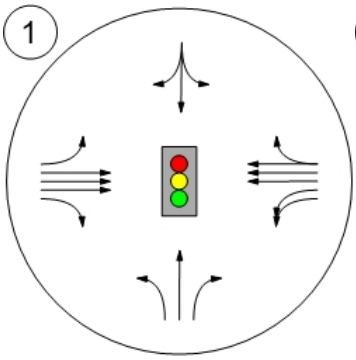
# APPENDIX G

PROPOSED INTERSECTION CONFIGURATION AND CONTROL

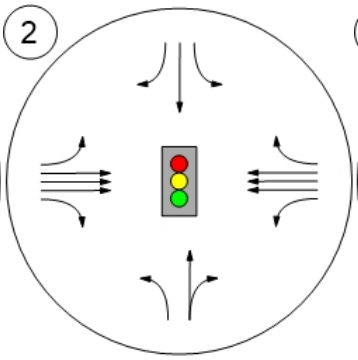
## Lane Configuration and Traffic Control



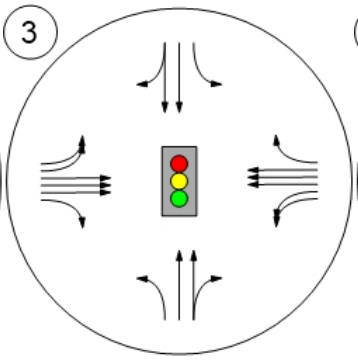

Hwy 16 A & Boundary Rd



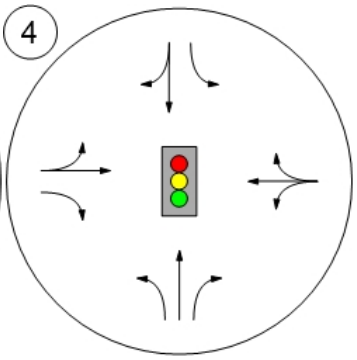

Hwy 16A & 28 St



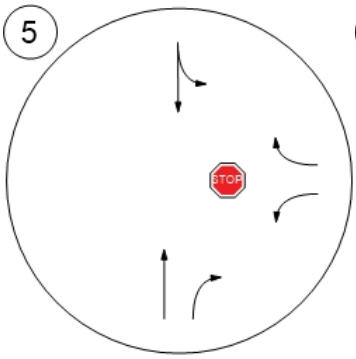

Hwy 16A & S Park Dr/N Park



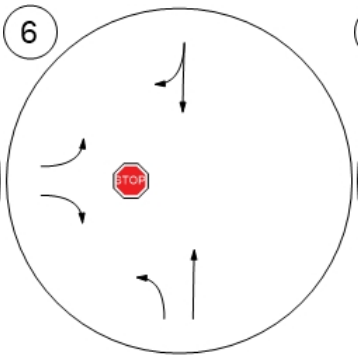

Boulder Blvd & N Park Dr



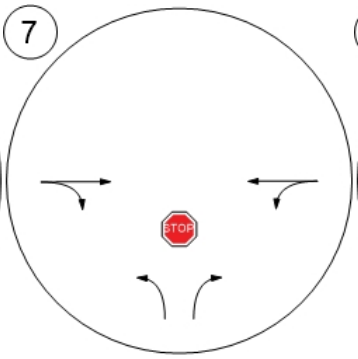

N Park Dr & Quartz Ave



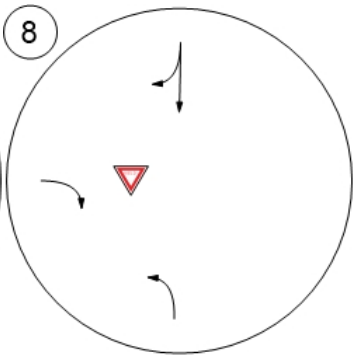

28 St & Site Access #1




Quartz Ave & Site Access #2



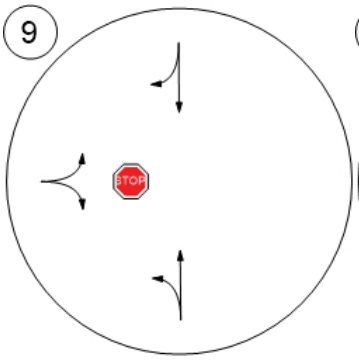

Quartz Ave & 28 St



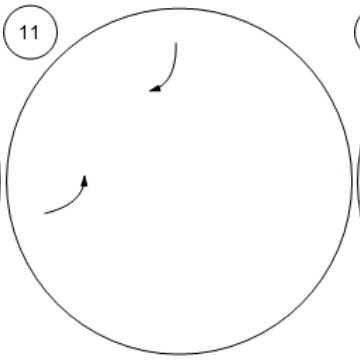
## Lane Configuration and Traffic Control



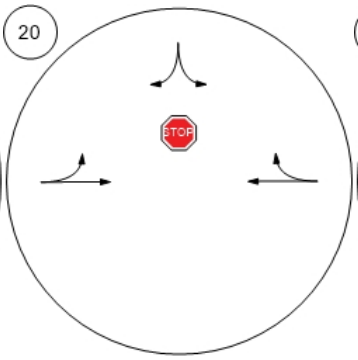

Slate Ave & N Park Dr



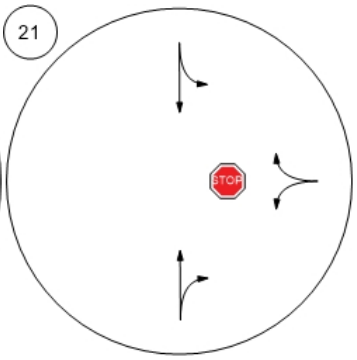

N Park Dr & Keystone Dr



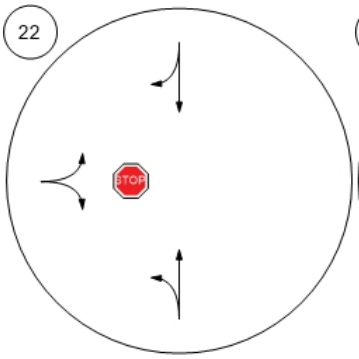

Boulder Blvd & Golf Course



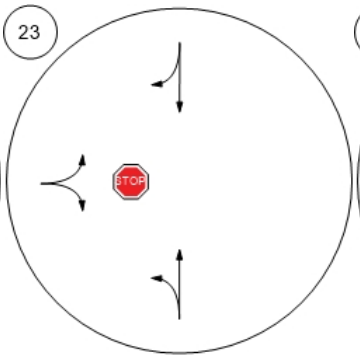

Slate Ave & Golf Course Rd



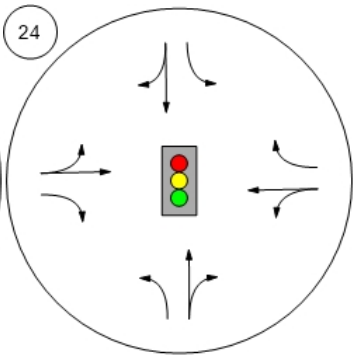

Boulder Blvd & Golf Course




Boulder Blvd & Wood Ave



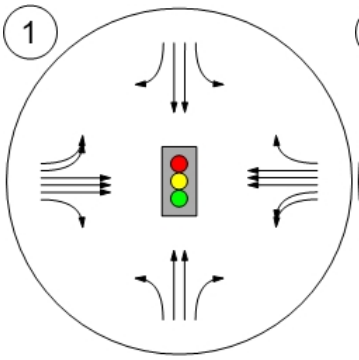

Hwy 779 & Wood Ave



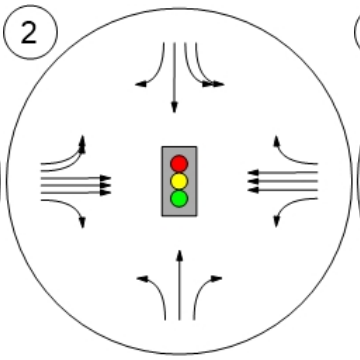
## Lane Configuration and Traffic Control



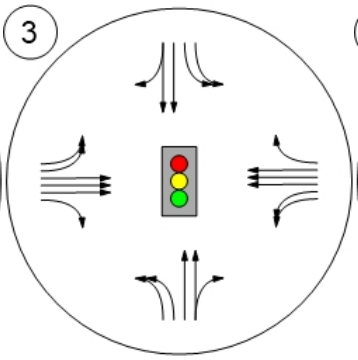

Hwy 16 A & Boundary Rd



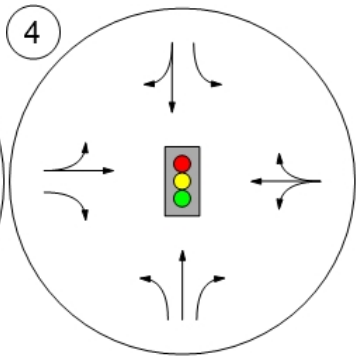

Hwy 16A & 28 St



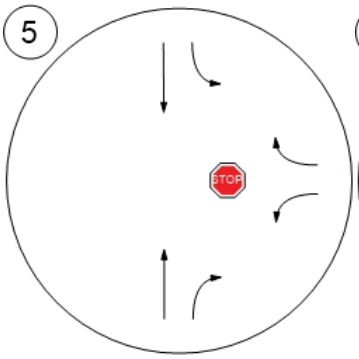

Hwy 16A & S Park Dr/N Park



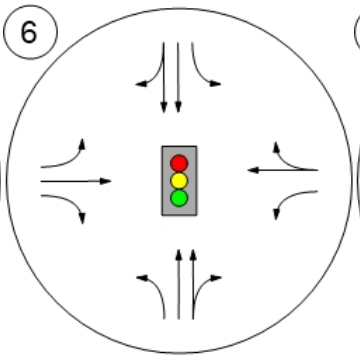

Boulder Blvd & N Park Dr



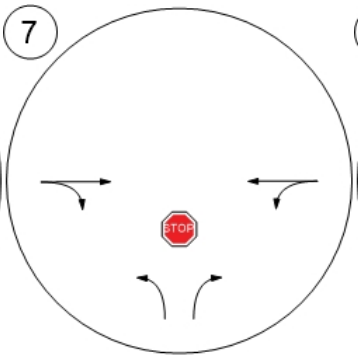

N Park Dr & Quartz Ave



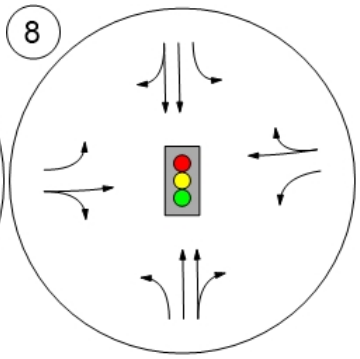

28 St & Site Access #1




Quartz Ave & Site Access #2



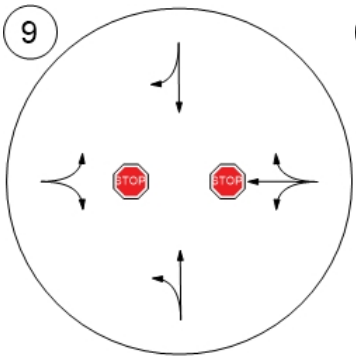

Quartz Ave & 28 St



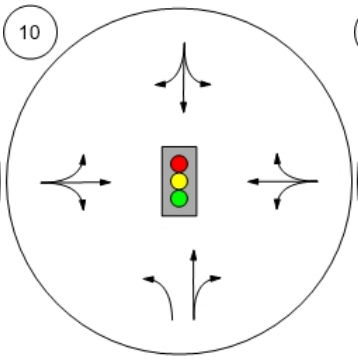
## Lane Configuration and Traffic Control



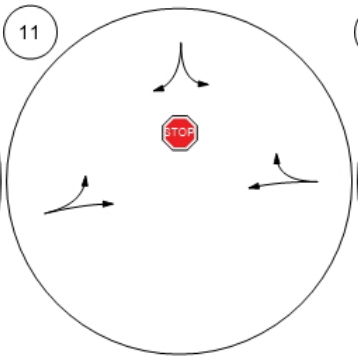

Slate Ave & N Park Dr



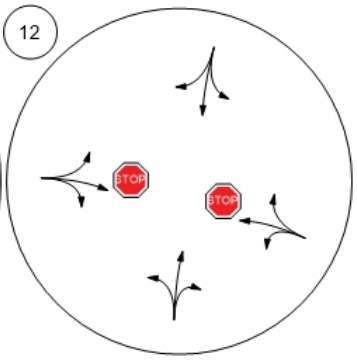

Slate Ave & 28 St



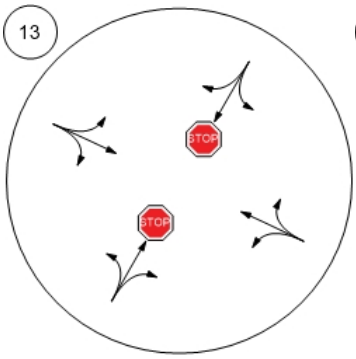

N Park Dr & Keystone Dr



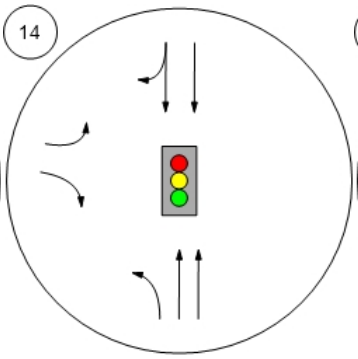

N Park Dr & 28 St



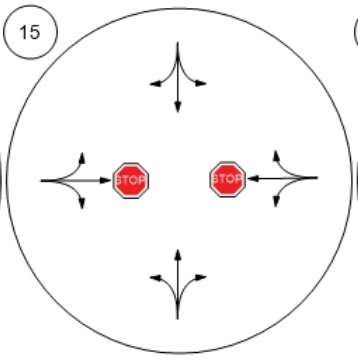

N Park Dr & New Road B



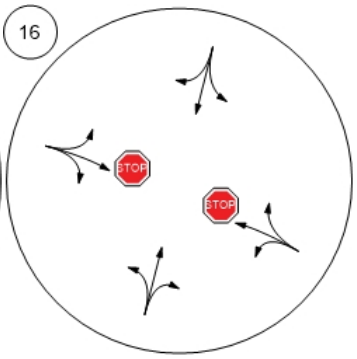

N Park Dr & Boundary Rd



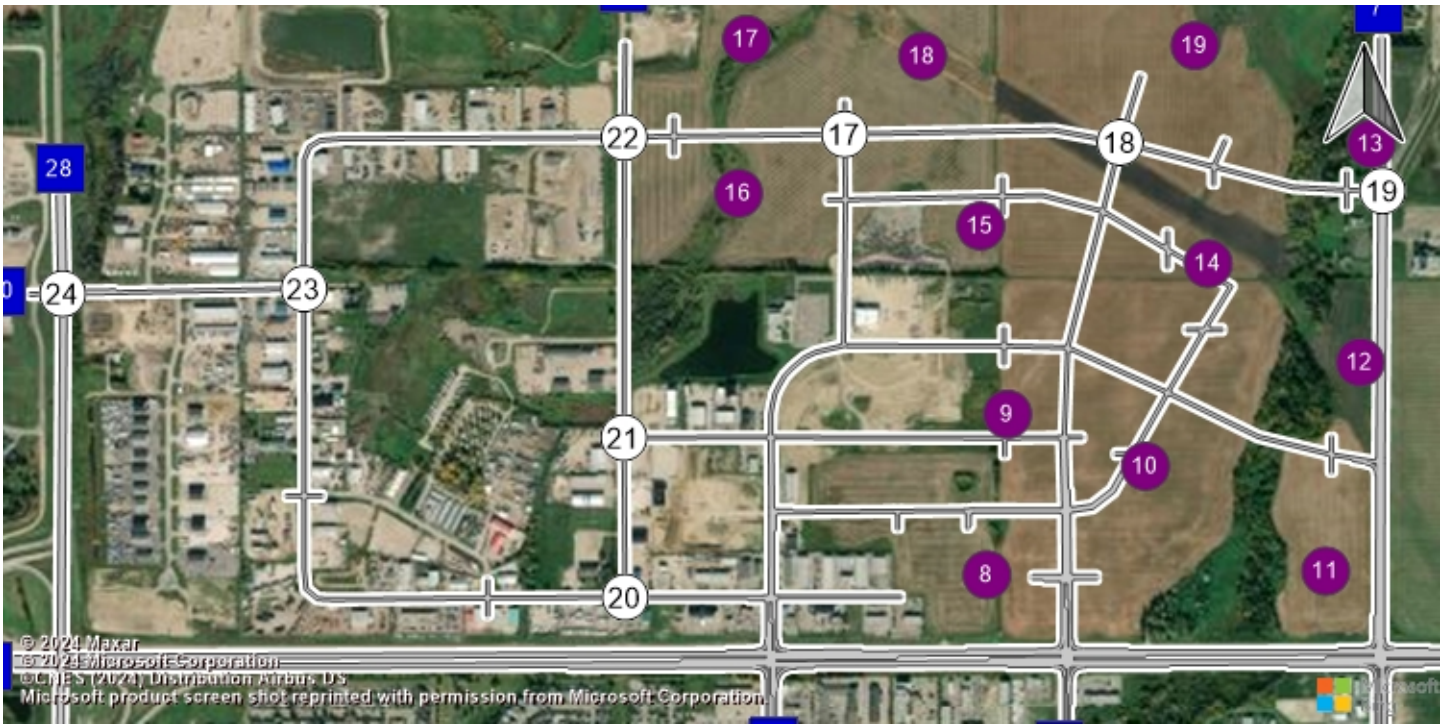

New Road B & Keystone Dr



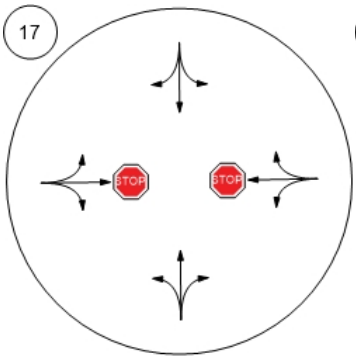

New Road B & 28 St



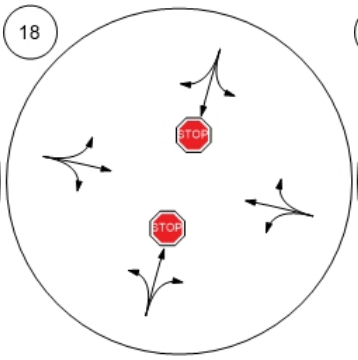
## Lane Configuration and Traffic Control



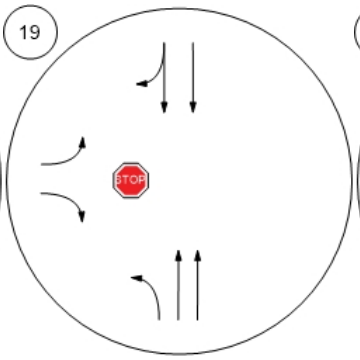

Boulder Blvd & Keystone Dr



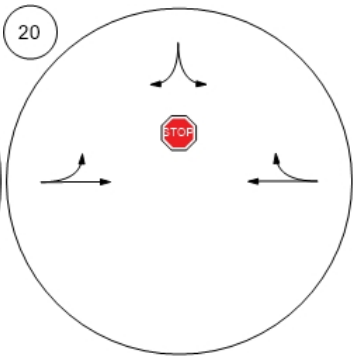

Boulder Blvd & 28 St



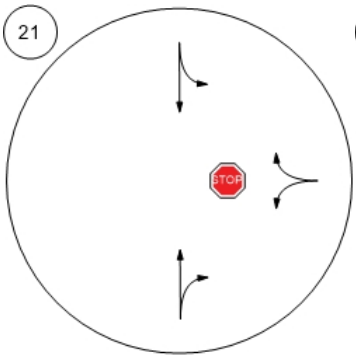

Boulder Blvd & Boundary Rd



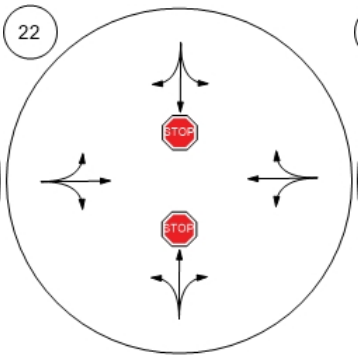

Boulder Blvd & Golf Course



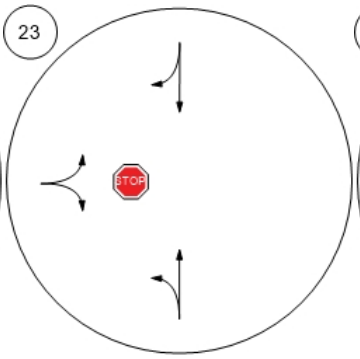

Slate Ave & Golf Course Rd




Boulder Blvd & Golf Course




Boulder Blvd & Wood Ave




Hwy 779 & Wood Ave

