TRAFFIC IMPACT STUDY

Proposed AdventHealth ED & Clinic
Plum Creek Boulevard & Crystal Valley Parkway

Castle Rock, Colorado

April 8, 2025

20240028

Prepared by:

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This report has been prepared by the staff of CivTrans Engineering Inc. on behalf of AdventHealth (Rocky Mountain Region) and Boulder Associates under the direction of the undersigned professional engineer whose seal and signature appears hereon.

Digitally signed by Craig MacPhee
Reason: I am the author of this document
Date: 2025.04.08 14:24:11-06'00'

Craig A. MacPhee, PE, PTOE

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EXECUTIVE SUMMARY

This Traffic Impact Study (TIS) document has been prepared to supplement the proposed development of an emergency department (ED) and clinic in Castle Rock, Colorado. The following is a summary of the traffic information and findings included in this report.

1. The proposed project is located at the southwest corner of Plum Creek Boulevard & Crystal Valley Parkway within the Town of Castle Rock, Colorado. A vicinity map is included as **Exhibit 1**.

2. AdventHealth is proposing to develop the vacant site into a 24,450± square feet ED and clinic. The site is proposed to be accessed from Plum Creek Boulevard with a full-movement driveway. A right-turn ingress-only driveway is proposed from Crystal Valley Parkway. Access through the adjacent retail site to the west is proposed, which will provide cross-access for the existing retail site to the west. Completion and occupancy of the project is anticipated by the end of 2026. A current site plan is included as **Exhibit 2** and a recent aerial of the study area has been provided and is shown on **Exhibit 3**, herein.

3. The proposed site is anticipated to generate up to 920 daily trips with approximately 67 during the AM peak hour and 90 during the PM peak hour.

4. The study area was identified to include the following intersections.

    - Plum Creek Boulevard & Crystal Valley Parkway
    - 484/488 Retail Driveway / Fire Sta 152 & Crystal Valley Pkwy
    - Plum Creek Boulevard & Burnham Trail / Site Access

    These intersections were analyzed for the weekday AM and PM peak hour. The southbound approach from the fire station was not included in the capacity evaluation as there were zero trips exiting the fire station site during peak hours and an emergency traffic signal exists for vehicles to egress during an active emergency.

5. The analysis horizons considered and evaluated in this report include:

    - Existing Condition (Year 2024)
    - Short-term Condition (Year 2027) without the project
    - Short-term Condition (Year 2027) with the project
    - Long-range Condition (Year 2045) without the project
    - Long-range Condition (Year 2045) with the project

    Each of these analysis horizons included intersection capacity and queuing analysis. The short-term build condition includes auxiliary lane evaluation and sight distance evaluation for the proposed site access driveways.

6. The Town of Castle Rock has established a minimum level of service D (LOS D) for acceptable operations at signalized intersection and unsignalized (stop controlled) approaches. The analysis results indicate all the study area

intersections are currently operating at acceptable LOS A and are not anticipated to degrade below acceptable levels in the future with or without the project.

7. Queuing was evaluated at the study area intersections for all conditions. There are no queuing issues anticipated for the study area currently or in the future with or without the project.

8. The proposed project is not anticipated to have a significant impact on the capacity (level of service) of the study area intersections or significantly increase estimated queues at the intersection approaches.

9. An evaluation was conducted to determine if auxiliary lanes are required at the site accesses to Plum Creek Boulevard and Crystal Valley Parkway. The proposed Plum Creek driveway already has turn lanes serving the future driveway and no changes should be necessary. The proposed ingress driveway along Crystal Valley Parkway is anticipated have sufficient right turning vehicles to require a deceleration lane, which is planned and shown on the site plan.

10. Sight distance requirements for the site driveways were estimated utilizing AASHTO's *A Policy on Geometric Design of Highways and Streets.* Plum Creek Boulevard is posted at 30 mph and Crystal Valley Parkway is posted at 45 mph at the proposed site accesses. Per tables 9-7 and 9-9 within the AASHTO reference, the required sight distance for a vehicle to make a left turn from the Plum Creek driveway (looking right / south) is 335' and to make a right turn from the Plum Creek driveway (looking left / north) is 290'. Left turns from the retail driveway and egress from the site driveway along Crystal Valley Parkway are prohibited. The required sight distance (per AASHTO) to make a right turn onto Crystal Valley Parkway is 430'. The resulting line-of-sight creates a "sight triangle" where plantings or other visual obstructions within this triangle area should not exceed 3.5 feet in height. These should be depicted on the landscaping and site civil plans.

Based on the analysis, findings and conclusions discussed in this report, this project is not anticipated to have significant impact on the surrounding transportation system and no mitigation should be required.

INTRODUCTION

Project Overview

AdventHealth is proposing to construct an emergency department (ED) and health clinic at the southwest corner of Plum Creek Boulevard & Crystal Valley Parkway in the Town of Castle Rock, Colorado. The development will accommodate a two-story, 24,450± square foot (SF) building for the ED and clinic. The site is planned to be accessed via one full-movement driveway to Plum Creek Boulevard, a right-in driveway from Crystal Valley Parkway, and connect to the existing ¾ movement driveway that currently serves the retail site at 484 and 488 Crystal Valley Parkway to the west. The connection to the existing retail driveway will provide cross access between the two sites and a direct access for the retail uses to Plum Creek Boulevard. The full-movement driveway along Plum Creek Boulevard will align with Burnham Trail. Surface parking will be provided for employees and visitors with access directly from Plum Creek Boulevard and Crystal Valley Parkway. Completion of the project is anticipated by the end of 2026.

The property that will accommodate the proposed development is currently vacant. The project site is surrounded by developed properties, which are primarily residential uses. Strip retail borders the site to the west and a fire station is immediately north. The site lies in the southern portion of Castle Rock, which has two large ongoing residential developments, The Lanterns and Crystal Valley Ranch. In the last three years, over 1,300 single family home have been constructed within these developments, which lie south of Crystal Valley Parkway and east of the site.

The site is bound by developed and undeveloped property to the west, Crystal Valley Parkway to the north, Plum Creek Boulevard to the east and vacant property to the south. A heavy rail line and East Plum Creek run north-south less than ¼ mile to the west of the site. Regional access to the area is accommodated primarily by Crystal Valley Parkway, which generally traverses east-west. It provides a connection to Wilcox Street and the I-25 Frontage Road west of the site and Lake Gulch Road east of the site. An I-25 interchange for Crystal Valley Parkway is currently under construction and anticipated to be completed by the end of 2027. Plum Creek Boulevard provides a north-south connection through residential neighborhoods, connecting Crystal Valley to commercial uses to the north.

Purpose of Report

The purpose of this study is to review, assess and identify potential traffic related impacts that the proposed project may have on the transportation network and recommend mitigation to minimize these impacts where necessary and possible. **Exhibit 1** shows the general vicinity of the project in the Town of Castle Rock. A current site plan is shown in **Exhibit 2** and a current aerial image of the study area is included as **Exhibit 3**.

The assumptions utilized in conducting the traffic analysis are based on coordination with the Town of Castle Rock development review team. The traffic impact study (TIS) was

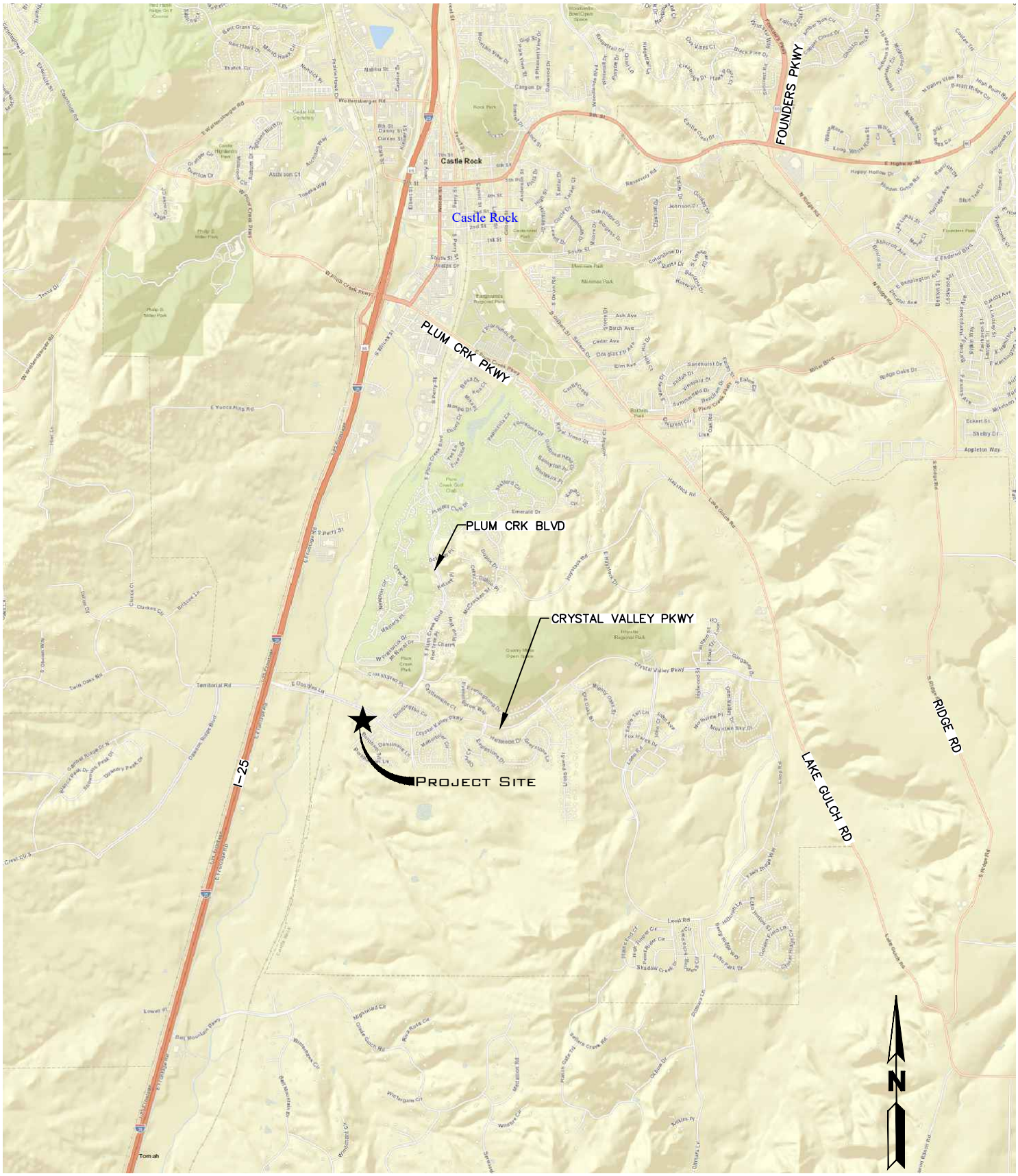
completed in accordance with the current traffic guidelines for the Town of Castle Rock as established in Douglas County's *Roadway Design and Construction Standards, Appendix B*.

This report includes an evaluation and assessment of the study area for the existing conditions, short-term conditions and the long-range conditions. The short-term condition considers the transportation network shortly after completion of the proposed project. The long-range conditions considered the potential growth in traffic within the study area and how the existing transportation system will handle those volumes with and without the proposed project approximately 20 years into the future (Year 2045). Weekday AM and PM peak hours of traffic operations were used as the basis of this study.

Resources

The key resources referenced in this TIS included the following:

1. Douglas County's *Roadway Design and Construction Standards, Appendix B*, which provides the criteria and requirements for a Traffic Impact Study.
2. The Colorado Department of Transportation's (CDOT) *State Highway Access Code (2002)*, which provides auxiliary turn lane criteria.
3. The Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 11th Edition*, which compiles and quantifies empirical trip generation rates for specific land uses within the US, UK and Canada.
4. The *Highway Capacity Manual (HCM), 7th Edition (2022)* published by the Transportation Research Board, which includes methodologies and procedures for analyzing intersection capacity based on geometry, traffic volumes, intersection control and various other parameters and variables.



SOURCE: JEFFERSON COUNTY GIS

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EXHIBIT 1

VICINITY MAP

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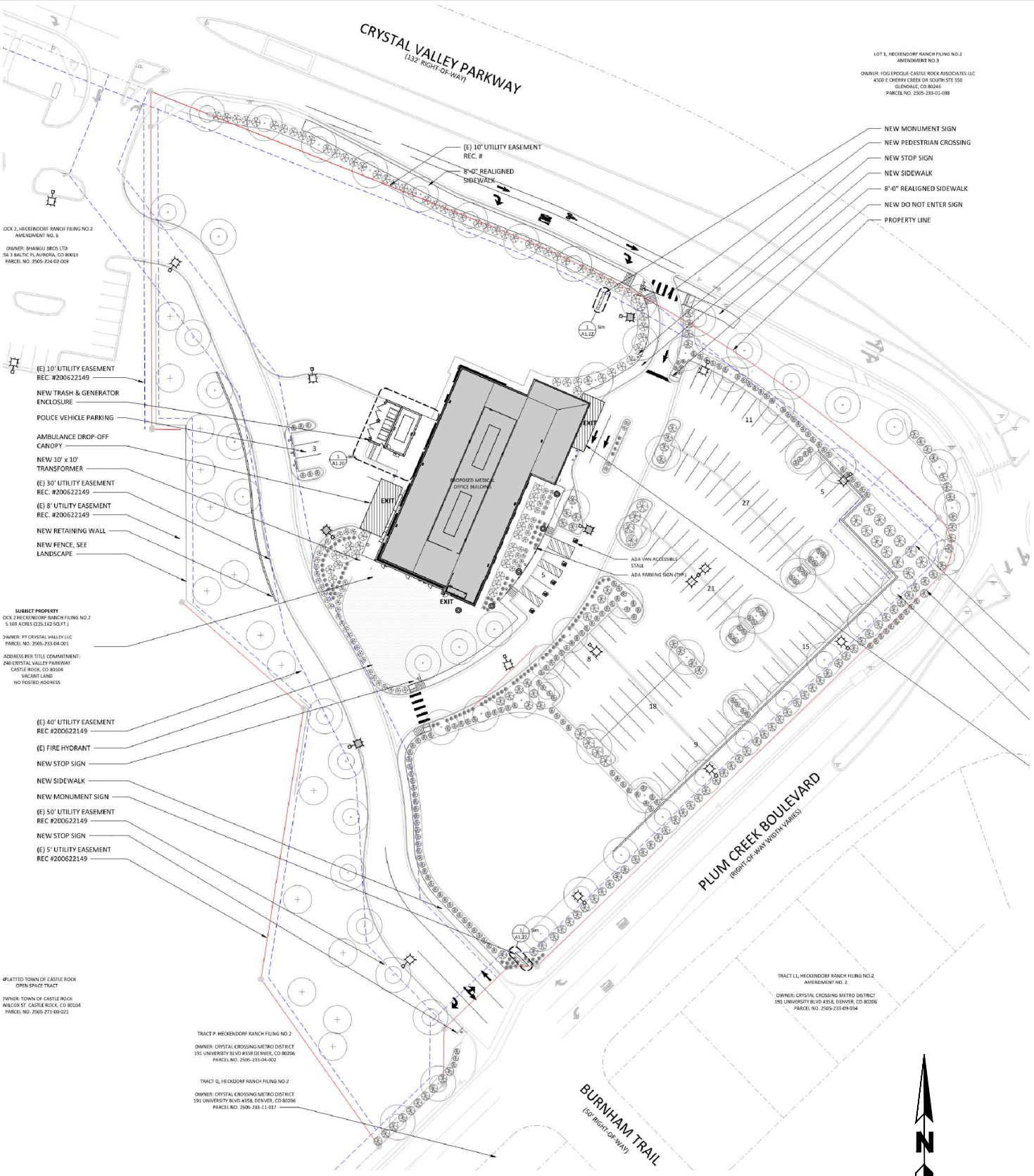

SOURCE: BOULDER ASSOCIATES

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EXHIBIT 2

CURRENT SITE PLAN

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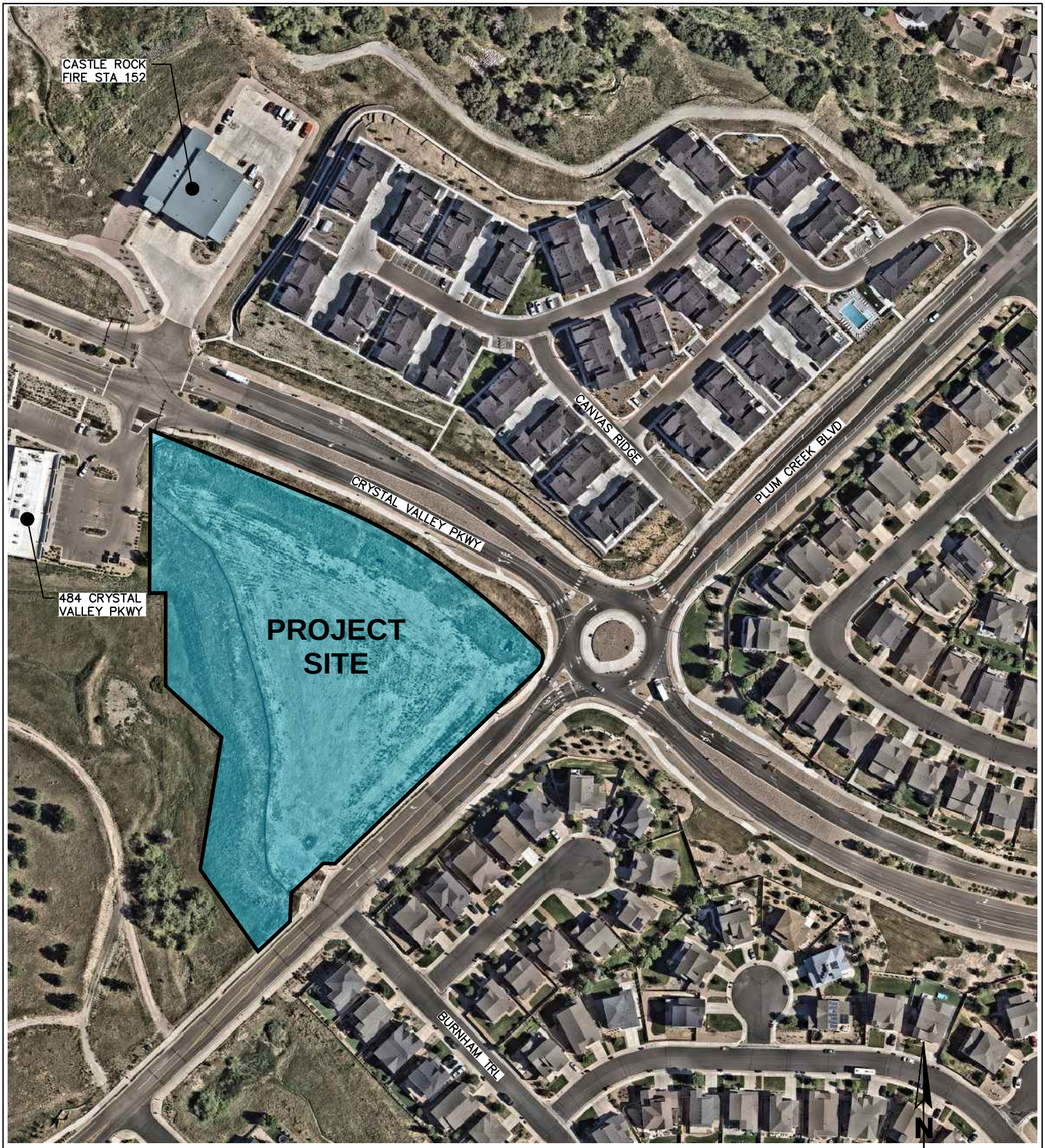

SOURCE: NEARMAP (AUGUST 2024)

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EXHIBIT 3

CURRENT AERIAL

Civtrans ENGINEERING INC.

ANALYSIS METHODOLOGY

The various analyses conducted and reported in this document include intersection capacity analysis, queuing analysis, auxiliary lane evaluation and sight distance analysis.

Capacity Analysis

The analyses described in this report were performed in accordance with the procedures in the *Highway Capacity Manual* (HCM) and as described below. The analyses and procedures conducted are based upon the worst-case conditions that occur during a typical weekday. Therefore, most of each weekday and the weekends will experience traffic conditions better than those described within this document, which represent the peak hours of operation only.

Level of Service (LOS) is an empirical premise developed by the transportation profession to quantify driver perception for such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles afforded to drivers who utilize the transportation network. LOS has been defined by the Transportation Research Board in the *Highway Capacity Manual, 7th Edition (2022)*. This document has quantified level of service into a range from "A" which indicates little, if any, vehicle delay, to "F" which indicates significant vehicle delay and traffic congestion that may lead to system breakdown due to volumes that may far exceed capacity.

The *Highway Capacity Manual* defines the level of service for a signalized intersection as the average delay per vehicle (amount of time a vehicle must spend at the intersection) for the overall intersection. For unsignalized intersections that include both stop-controlled and uncontrolled approaches (known as through/stop controlled), the *Highway Capacity Manual* defines the level of service as the average delay per vehicle for the worst approach, not the overall intersection. Roundabouts within the study area were evaluated utilizing Rodel software, which follows its own methodology based on historic roundabout data.

The level of service letter grades as defined by the Transportation Research Board and the associated amount of delay in seconds per vehicle, as well as a brief description of the operating condition, for both signalized and unsignalized intersections are included for reference in **Table 1** on the next page.

A threshold of level of service D was utilized as the minimum acceptable intersection operating condition, which is the industry standard for urbanized areas. Analysis results indicating operations worse than the minimum acceptable level were considered for mitigation measures. In the cases where existing conditions currently operate at or future background conditions are projected to operate at states poorer than the minimum acceptable level, the future with project conditions will be evaluated to maintain the current or projected operating conditions.

Table 1 – Intersection Analysis Criteria

Signalized Intersection Level of Service Criteria

Level of Service	Delay Range (seconds/vehicle)	Expected Delay at Intersection
A	≤ 10	Very low delay. Most vehicles do not stop.
B	> 10 and ≤ 20	Generally good progression of vehicles. Slight delays.
C	> 20 and ≤ 35	Fair progression. Increased number of stopped vehicles.
D	> 35 and ≤ 55	Noticeable congestion. Large portion of vehicles stopped.
E	> 55 and ≤ 80	Poor progression. High delays and frequent cycle failure.
F	> 80	Oversaturation. Forced flow. Extensive queuing.

Unsignalized Intersection Level of Service Criteria

Level of Service	Delay Range (seconds/vehicle)	Expected Delay to Minor Street Traffic
A	≤ 10	Little or no conflicting traffic for minor street approach.
B	> 10 and ≤ 15	Minor street approach begins to notice absence of available gaps.
C	> 15 and ≤ 25	Minor street approach begins experiencing delays for available gaps.
D	> 25 and ≤ 35	Minor street approach experiences queuing due to a reduction in available gaps.
E	> 35 and ≤ 50	Extensive minor street queuing due to insufficient gaps.
F	> 50	Insufficient gaps of suitable size to allow minor street traffic demand to cross safely through a major traffic stream.

Source: Highway Capacity Manual (Transportation Research Board, 2022).

Queuing Analysis

Queuing (95th percentile) lengths (feet) at the study area intersections are included in the Synchro and Rodel reports within the technical appendix. The reported 95th percentile queues are number of vehicles, which are assumed to equate to 25' per vehicle. The reported queue length should be utilized when designing turn lanes.

Auxiliary Lane Evaluation

The Town of Castle Rock and Douglas County do not have any criteria for auxiliary lanes. Therefore, the Colorado Department of Transportation *State Highway Access Code* was used for determining the need for auxiliary lanes for the intersections within the study area. The roadway classification, design speed, and design hourly turning volume are all factors used to determine the need for acceleration, deceleration and turn lanes.

Sight Distance Analysis

The American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets ("Green Book")* was utilized for sight distance requirements at intersections. The "Green Book" provides recommended sight distances for vehicles departing a minor street approach or driveway based on design speed and grade of the major roadway. The resulting line-of-sight creates a "sight triangle" where plantings or other visual obstructions within this triangle area should not exceed 3.5 feet in height.

Analysis Horizons

The following scenarios were analyzed as part of this study during both the AM and PM peak hours, with the corresponding volume and network configurations as indicated:

1. Existing Conditions

   Analysis of the existing conditions at the study area intersections was based on the 2023 traffic volume estimates within the Crystal Valley Shops traffic study completed by Hales Engineering. The 2023 volumes were based on 2021 traffic counts collected for the Crystal Valley Interchange Project report. Hales' 2023 volumes were increased by 2% to estimate 2024 conditions. The intersection geometry and traffic control are based on field observations and measurements.

2. Short-term without Project Conditions

   The short-term future year analysis includes the same roadway geometry as for the existing conditions. The forecast volumes were calculated by applying the anticipated ambient growth rate over the next three years.

3. Short-term with Project Conditions

   The short-term "build" condition takes the short-term no-project traffic volumes and adds the trips associated with the proposed project.

4. Long-range without Project Conditions

   The long-range future year analysis includes the same roadway geometry as for the short-term no-project conditions. The forecast volumes were calculated taking the traffic counts and applying the anticipated ambient growth rate over the next 20+ years. The Crystal Valley Interchange is anticipated to be completed and operational prior to the long-range conditions.

5. Long-range with Project Conditions

   The long-range "build" analysis includes the same roadway geometry as for the short-term build conditions. The forecast volumes were calculated by adding the trips associated with the proposed project to the long-range no project volumes.

EXISTING CONDITIONS

Existing Conditions within the Study Area

The purpose of this section is to document the existing conditions within the study area for the proposed project.

Land Use

The site for the proposed project is currently vacant and part of The Lanterns Amendment No. 4 Planned Development with a zoning of NR-CM-1 (non-residential, commercial), which is appropriate for the proposed use. The surrounding uses are primarily zoned for residential uses. West of the site in unincorporated Douglas County, properties are zone A1 (Agriculture). The parcel bordering the site to the west is zone CO-OF (Commercial / Light Office).

Existing Roadways

As shown on the site plan, the site fronts Crystal Valley Parkway and Plum Creek Boulevard. Access is proposed directly to these roadways. The following is a list of the surrounding streets, their functional classification, and general geometry.

Crystal Valley Parkway is an east-west, 4-lane major arterial that extends a little under three miles from Wilcox Street (I-25 Frontage Road) to Lake Gulch Road. It primarily serves residential uses along its length and provides a grade-separated crossing of East Plum Creek and a heavy rail line. It has a posted speed limit of 45 mph west of the site and transitions to 35 mph at Plum Creek Boulevard.

Plum Creek Boulevard is a north-south, divided two-lane collector roadway connects Crystal Valley to Plum Creek Parkway. South of the site it creates a loop through The Lanterns development with Montaine Circle and Old Lanterns Parkway before reconnecting to Crystal Valley Parkway less than ¼ mile east of the site. Between Crystal Valley Parkway and Plum Creek Parkway, it provides access for residential uses and the Plum Creek Golf Club. At its northern terminus, it aligns with the Douglas County Fairground access. It has separated bicycle lanes in each direction north of Crystal Valley Parkway and has a posted speed limit of 30 mph.

Burnham Trail is a two-lane local access roadway that provides access residences within the Kings Ridge development. It extends a couple of blocks and is posted at 25 mph.

Study Area Intersections

The project study area intersections were identified through conversations with the Town of Castle Rock staff. The study area includes the following intersections:

- Plum Creek Boulevard & Crystal Valley Parkway
- 484 Crystal Valley Pkwy / Fire Sta #152 Driveway & Crystal Valley Pkwy
- Plum Creek Boulevard & Burnham Trail / Site Access

These intersections have been analyzed for level of service (LOS) for the weekday AM & PM peak hours and form the basis of this document.

Traffic Control and Descriptions

Plum Creek Boulevard & Crystal Valley Parkway is a multi-lane roundabout intersection with the following lane configuration. Plum Creek is generally oriented north-south.

- Eastbound (Crystal Valley): One left-through lane, one right-through lane
- Westbound (Crystal Valley): One left-through lane, one right-through lane
- Northbound (Plum Creek): One left turn lane, one left-through-right lane
- Southbound (Plum Creek): One left-through-right lane

The roundabout has two circulation lanes on all legs except for the west leg. There are two exit lanes for the Crystal Valley Parkway approaches and one exit lane for each of the Plum Creek Boulevard approaches. Pedestrian crosswalks with rectangular rapid flashing beacons (RRFB) are located on all four legs of the intersection.

484 Crystal Valley Parkway / Fire Station 152 Driveway & Crystal Valley Parkway is a stop-controlled intersection with and emergency vehicle signal. Crystal Valley Parkway forms the eastbound and westbound approaches and operates freely. Each approach has a left turn lane, two through lanes and a right turn lane. A driveway serving commercial buildings at 484 and 488 Crystal Valley Parkway forms the northbound approach with a right-only lane, which is channelized with a curbed median and stop-controlled. The fire station driveway forms the southbound approach with no turn restrictions. It is stop controlled, but has the option to trigger the signal during an emergency.

Plum Creek Boulevard & Burnham Trail is an unsignalized, stop-controlled tee intersection with Burnham Trail stopping for free-flowing traffic on Plum Creek Boulevard. Burnham Trail forms the westbound approach with a single lane. Curb returns have been installed on the west leg of the intersection to serve the project site, but it is chained off to prevent usage. The northbound approach has a left turn lane (for future use) and a through-right lane. The southbound approach has a left turn lane, a through lane, and a right turn lane (future use).

The existing geometry at each of the study area intersections is depicted in **Exhibit 4**, which follows.

Traffic Volumes and Peak Hours of Operation

No traffic counts were collected for this traffic study as major road construction and detours were present along Crystal Valley Parkway as part of the Crystal Valley Interchange project. Therefore, 2023 traffic volumes from the *Crystal Valley Shops Traffic Impact Analysis* report produced by Hales Engineering were utilized. These volumes were derived from 2021 traffic counts collected as a part of the I-25 & Crystal Valley Parkway Interchange Project traffic study completed by Apex Design (Consor). No traffic count raw data was available. The 2023 traffic volumes were increased by 2% to estimate 2024 traffic volumes, which is consistent with the Crystal Valley Roundabout Analysis report. The estimated 2024 peak hour volumes are shown in **Exhibit 5**.

Background Projects

Background projects are land development projects that have not yet been constructed but are anticipated to be completed in the near future. Therefore, their traffic would not have been included in the traffic counts collected, but should be included for future analyses. The Lanterns and Crystal Valley Ranch residential developments are ongoing with several hundred homes to be built. However, for this study, no background projects were identified by the Town of Castle Rock for inclusion in this study. It is assumed that growth rate projections will account for the Lanterns, Crystal Valley Ranch and other future developments.

Planned Transportation Improvements

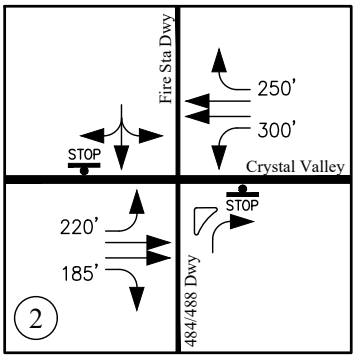
The intersection of Plum Creek Boulevard & Crystal Valley Parkway was converted to a multi-lane roundabout in 2023. The Wilcox Street / I-25 Frontage Road & Crystal Valley Parkway roundabout construction is nearly complete. An interchange along I-25 for Crystal Valley Parkway is anticipated to be completed by the summer of 2027, which will reduce the usage of Wilcox Street, but is unlikely to impact the study area of this report. Roadway construction continues within The Lanterns and Crystal Valley Ranch developments to accommodate new-build residences. No transportation improvements were identified within the study area for this project.

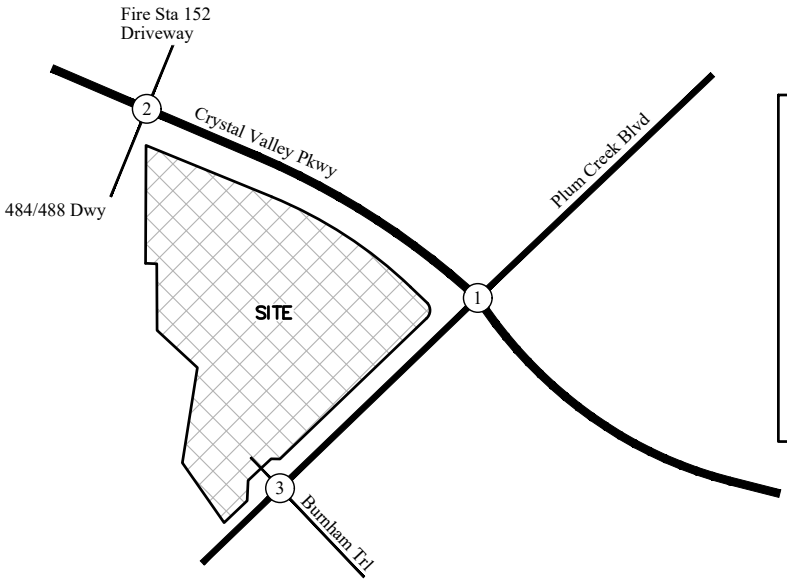
Ambient Traffic Growth

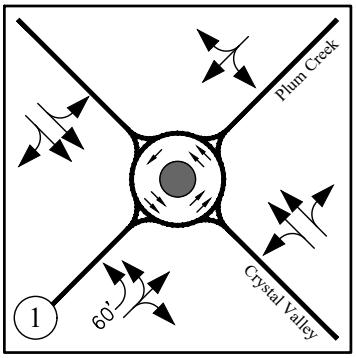
The Town of Castle Rock provided a recent roadway volume for Crystal Valley Parkway of 9,400 vehicles per day. Their 2050 projection estimates a volume of 37,000 average daily trips (ADT). This corresponds to a little over 5% per year of annual growth projected for the corridor. Therefore, to account for future development and traffic growth through the study area, a 5% annual growth rate was applied to the 2024 traffic volumes for future condition analyses. This growth rate was applied to Crystal Valley Parkway and Plum Creek Boulevard. Since Burnham Trail is developed, an annual growth rate of 1% for this roadway. No growth was applied to the 484/488 or fire station driveways.

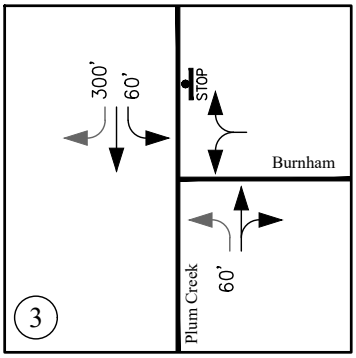
Peak Hour Factor

A peak hour factor (PHF) is used to convert the hourly traffic volume into a flow rate that represents the busiest 15 minutes of the peak hour. Since raw traffic data was provided, default PHF values of 0.92 (Synchro) and 0.90 (Rodel) were utilized, which were consistent with the *Crystal Valley Shops Traffic Impact Analysis.*









– Roundabout Intersection (with number of circulating lanes for each leg)

– Signalized Intersection

STOP – Stop–controlled Intersection

XXX' – Approximate storage length of turn lane without transition taper

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EXHIBIT 4

EXISTING LANE GEOMETRY

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EXISTING LEVEL OF SERVICE AND TRAFFIC ANALYSIS

Level of Service

The existing levels of service at the subject intersections were calculated using the methods from the *7th Edition Highway Capacity Manual (HCM)* as implemented in Synchro (version 12) and Rodel (version 1.96). The existing levels of service (LOS) for the intersections within the study area are summarized on the following table. The existing traffic volumes used for this report are shown on Exhibit 5. Please note, the southbound approach from the fire station was not included in the capacity evaluation as there were zero trips exiting the fire station site during peak hours and an emergency traffic signal exists for vehicles to egress during an active emergency.

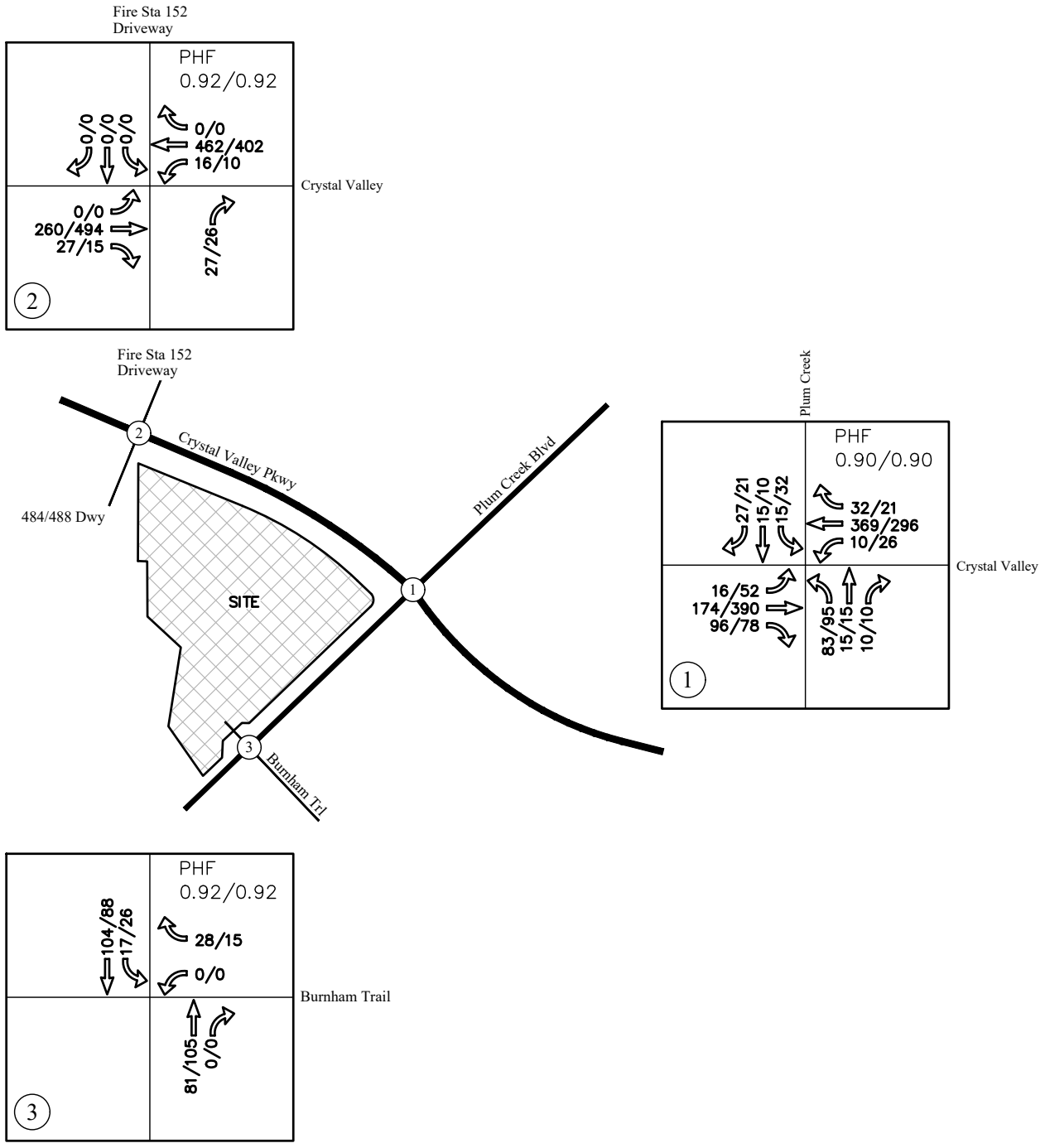
Table 2 -2024 Existing Intersections Levels of Service

INTERSECTION (S)ignalized (U)nsignalized (R)oundabout		Approach Or Overall	AM Peak		PM Peak	
			Delay (sec)	LOS	Delay (sec)	LOS
Plum Creek Blvd & Crystal Valley Pkwy	R	SB	5.7	A	6.1	A
484 / Fire Sta Dwy & Crystal Valley Pkwy	U	NB	9.2	A	10.1	B
Plum Creek Blvd & Burnham Trl	U	WB	8.9	A	9.0	A

Level of service (LOS) D should be used as a guideline to maintain overall operations of signalized and roundabout intersections and unsignalized intersection approaches. Mitigation measures should be considered for overall signalized or roundabout intersections or unsignalized approaches reported to be operating at LOS E or F. As shown in the table above, all of the intersections are operating at acceptable levels of service. The Rodel and Synchro level of service report are included in the technical appendix.

Queuing

The estimated 95th percentile queues for each intersection approach were calculated utilizing Synchro and Rodel. There were no significant queues for the existing conditions reports. Queue results are included in the Synchro and Rodel reports in the technical appendix. It should be noted that these reports quantify queues as number of vehicles and each vehicle is assumed to equate to 25’ of required queue storage.



12/34 – AM Peak Hour/PM Peak Hour
PHF – Peak Hour Factor

Source: 2023 Traffic Volumes from the Crystal Valley Shops TIA (Aug 16, 2023) by Hales Engineering. Volumes were increased 2% to estimate 2024 conditions.

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EXHIBIT 5

EXISTING (2024) TRAFFIC VOLUMES

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TRIP GENERATION AND DISTRIBUTION

Trip Generation

The *Trip Generation Manual, 11th Edition* published by the Institute of Transportation Engineers (ITE) is typically used to determine the number of trips generated by a proposed land use. The purpose of the Trip Generation Manual (TGM) is to compile and quantify empirical trip generation rates for specific land uses within the US, UK and Canada. The closest matching land use category within the Trip Generation Manual for the proposed use, ED and clinic, is 630 "Clinic."

The table below summarizes the trip generation estimate for the site based on this land use category.

Table 3 – Project Trip Generation

Land Use	ITE Code	Size	Units	Daily Trips	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
Clinic	630	24.45	KSF*	920	54	13	67	27	63	90

*KSF = 1,000 square feet

As shown above, the ED/clinic is estimated to generate approximately 67 trips during the AM peak hour and 90 trips during the PM peak hour with 920 trips daily. A vehicle entering and exiting the site creates two trips.

Trip Types

Nearly all developments are made up of the following six trip types: new (destination) trips, pass-by trips, diverted trips, shared (internal) trips, multi-modal (non-vehicular) trips, and transit-oriented trips. In order to better understand the trip types available for land access and how they relate to this project, a description of each specific type follows.

New (Destination) Trips – These types of trips occur to access a specific land use such as a new retail development or a new residential subdivision. These types of trips will travel to and from the new site and a single other destination such as home or work. This is the only trip type that will result in a net increase in the total amount of traffic within the study area. The reason primarily is that these trips represent planned trips to a specific destination that never took trips to that part of the City prior to the development being constructed and occupied. This project will develop new trips.

Pass-by Trips – These trips represent vehicles which currently use adjacent roadways providing primary access to new land uses or projects. These trips, however, have an ultimate destination other than the project in question. They should be viewed as drop-in customers who stop in on their way home from work. A good example is a quick stop at the grocery store to pick up an ingredient for dinner on the way home from work or at a latte stand to grab a coffee on the way to work. This can make this trip pre-determined,

but the stop is still on the way by. Another example would be on payday, where an individual generally drives by their bank every day without stopping, except on payday. On that day, this driver would drive into the bank, perform the prerequisite banking and then continue home. In this example, the trip started from work with a destination of home, however on the way, the driver stopped at the grocery store/latte stand and/or bank directly adjacent to their path. Pass-by trips are most always associated with commercial/retail types of developments. Therefore, no pass-by trips are anticipated for this project.

Diverted (Linked) Trips - Diverted trips are like pass-by trips, but diverted trips occur from roadways that do not provide direct access to the site. Instead, one or more streets must be utilized to get to and from the site. Similar to pass-by trips, diverted trips are most always associated with commercial/retail type developments. Due to the type of use diverted trips are not anticipated for this project.

Shared Trips - Internal trips are the portion of trips generated by a mixed-use development that both begin and end within the development. When estimating trip generation for a development with several uses, each use will generate its own trips. If those trips occur between two of the onsite uses without using the external roadway system, it is considered a shared or internal trip. This trip type reduces the number of new trips generated on the public road system and is most commonly used for commercial or mix-use developments. Determining these trip types is more difficult to quantify and without specific guidance are usually determined by engineering judgment on a project by project basis. For this project, the ED/clinic will be the only use on the site and access to the adjacent retail site will be restricted from the general public. Therefore, no shared (internal) trip reduction was applied to this project.

Multi-Modal Trips - These are non-vehicular trips to and from the site, mostly comprised of pedestrian and bicycle trips. Generally, they are local trips from the surrounding neighborhood or adjacent businesses. If a development is in an area with a high amount of bicycle and pedestrian activity, such as a downtown setting or college campus, a reduction of vehicular trips would be anticipated. The type of use does not experience a significant portion of pedestrian or bicycle trips. Additionally, very few pedestrians or bicycles were observed at the study area intersections.

Transit Trip - The Denver Metro area is served by Regional Transportation District (RTD) with public bus and light rail. However, RTD does not provide service to Castle Rock and the Town does not have a public bus system in place. The Town offers taxi vouchers to seniors and other residents that cannot drive. With the lack of a public bus or transit system, no transit trips are anticipated for the project.

Trip Distribution

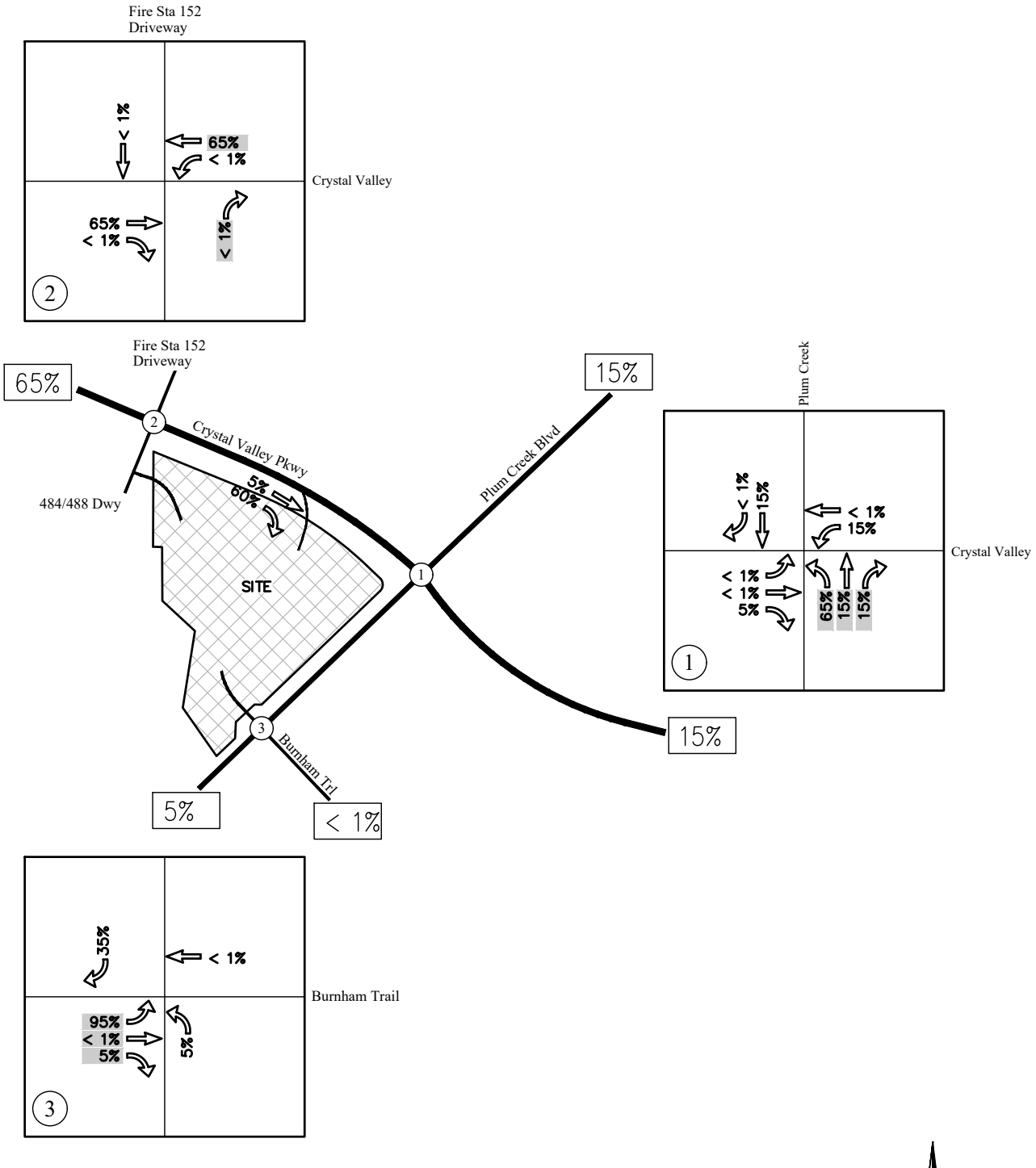
As shown in the site plan, the site is proposed to be accessed with movement-restricted access from Crystal Valley Parkway and full-movement access to Plum Creek Boulevard. Ingress trips can enter the site as right turns from eastbound Crystal Valley Parkway.

Ingress trips from other directions will have to use the Plum Creek Boulevard access. All egress trips are assumed to utilize the Plum Creek Boulevard access.

The project is expected to draw locally and regionally from the Crystal Valley and greater Castle Rock area. Based on existing travel patterns, traffic observations, areas of population and the available transportation network, the trips associated with the project are anticipated to distribute as follows:

- Crystal Valley east of the site – 15%
- Crystal Valley west of the site – 65%
- Plum Creek Blvd north of the site – 15%
- Plum Creek south of the site – 5%

These trip distribution percentages are illustrated in **Exhibit 6**. The site-generated peak hour vehicular trips are illustrated in **Exhibit 7**.



XX% – GENERAL TRIP DISTRIBUTION

XX% – PROJECT GENERATED INGRESS TRIPS (%)

YY% – PROJECT GENERATED EGRESS TRIPS (%)

N

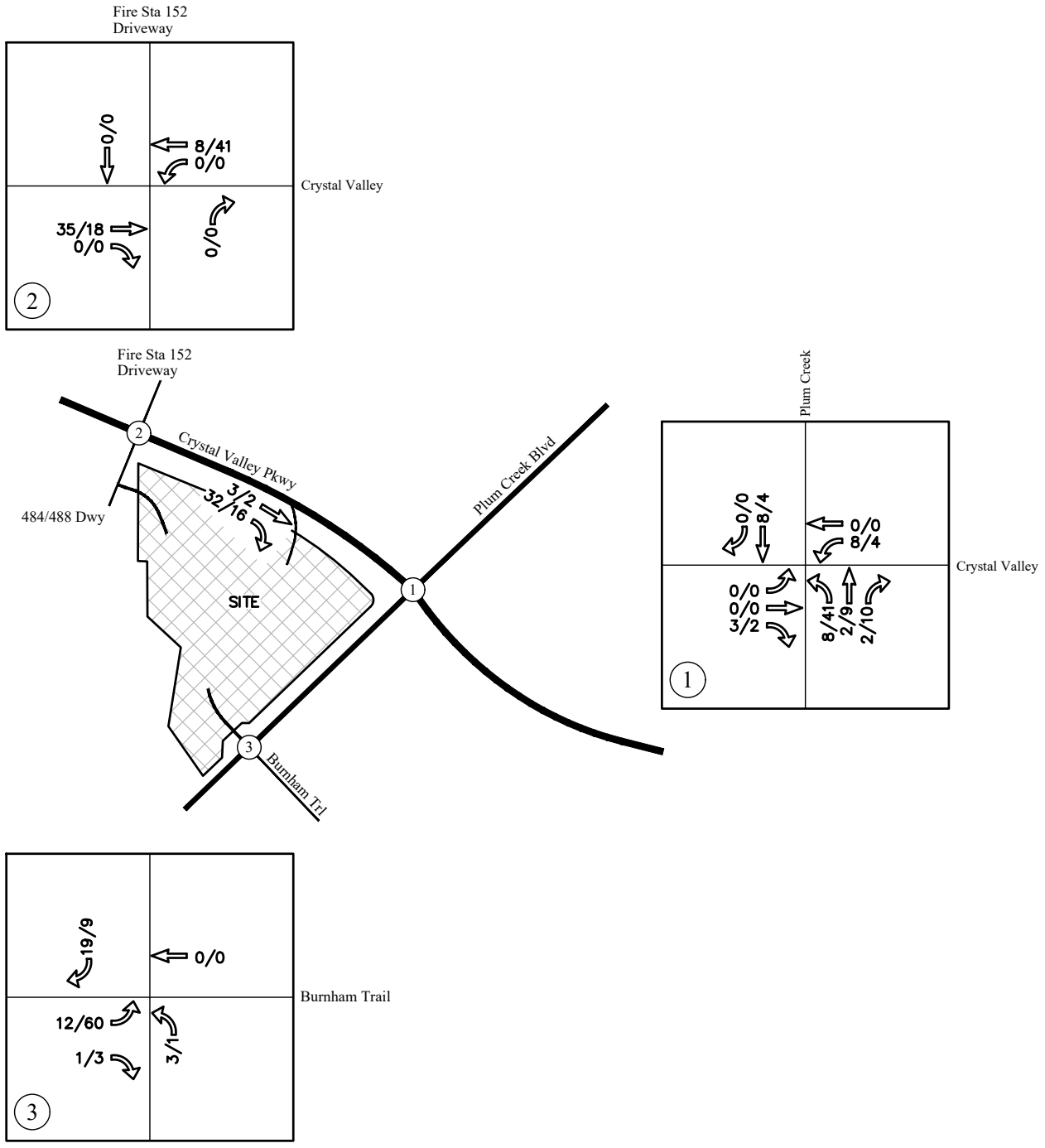
NOT TO SCALE

APRIL 8, 2025

EXHIBIT 6

PROJECT TRIP DISTRIBUTION

Civtrans ENGINEERING INC.



12/34 – AM Peak Hour/PM Peak Hour

N

NOT TO SCALE

APRIL 8, 2025

EXHIBIT 7

SITE-GENERATED TRIPS

Civtrans ENGINEERING INC.

FUTURE YEAR TRAFFIC IMPACT ANALYSIS

Level of service calculations for the short-term (Year 2027) and long-range (Year 2045) conditions assumed that the existing traffic volumes as shown on Exhibit 5 experience a background increase above the 2024 volumes at 5.0% per year along Plum Creek Boulevard and Crystal Valley Parkway and 1.0% along Burnham Trail. Two scenarios were examined for each of the future scenarios, one without the proposed project and one with the proposed project completed. A list of the future scenarios follows.

- Short-term Condition (Year 2027) without the Project
- Short-term Condition (Year 2027) with the Project
- Long-range Condition (Year 2045) without the Project
- Long-range Condition (Year 2045) with the Project

These scenarios will allow a specific comparison of impacts to the study area intersections and allow a determination to be made as to the extent of the project's impact and if any mitigation measures will be required.

Short-Term Condition (Year 2027) without the project

Level of Service

The intersections were analyzed for capacity, delay and level of service using Highway Capacity Manual methodologies as implemented within the Synchro software (version 12) and Rodel (version 1.96). The traffic volumes for this scenario include the existing (Year 2024) traffic volumes as shown on Exhibit 5 with three years of ambient growth applied. The total traffic volumes anticipated under this condition are shown on Exhibit 8. A summary of the results is shown in the following table

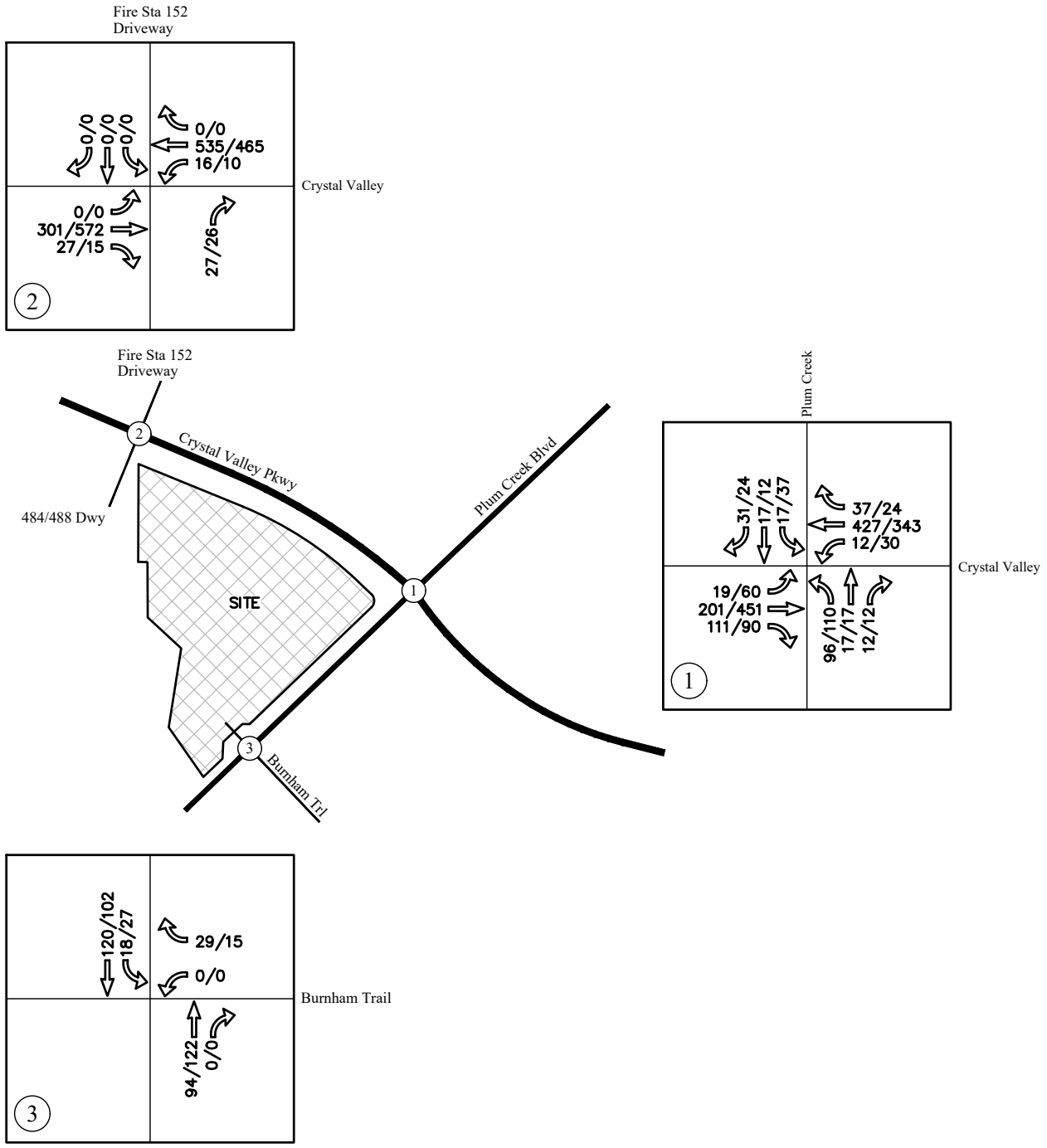
Table 4 -Year 2027 Levels of Service without Project

INTERSECTION (S)ignalized (U)nsignalized (R)oundabout		Approach Or Overall	AM Peak		PM Peak	
			Delay (sec)	LOS	Delay (sec)	LOS
Plum Creek Blvd & Crystal Valley Pkwy	R	SB	6.3	A	6.2	A
484 / Fire Sta Dwy & Crystal Valley Pkwy	U	NB	9.4	A	10.5	B
Plum Creek Blvd & Burnham Trl	U	WB	9.0	A	9.1	A

With the anticipated increase in traffic over the next three years, the intersections within the study area are anticipated to operate almost identical to the existing conditions.

Queuing

The 95th percentile queue results for the short-term no-project condition were reviewed. No significant queues are anticipated at the study area intersections for this scenario.



12/34 – AM Peak Hour/PM Peak Hour

N

NOT TO SCALE

APRIL 8, 2025

EXHIBIT 8

SHORT-TERM (2027) NO PROJECT TRAFFIC VOLUMES

Civtrans ENGINEERING INC.

Short-term Condition (Year 2027) with the Project

The traffic volumes included in this scenario include the short-term (year 2027) no-project traffic volumes as shown on Exhibit 8 plus the additional traffic from the proposed ED/clinic project, as shown on Exhibit 7. The total traffic volumes anticipated under this condition are shown on Exhibit 9. A summary of the Highway Capacity Manual and Rodel results is shown in the following table.

Table 5 -Year 2027 Levels of Service with Project

INTERSECTION (S)ignalized (U)nsignalized (R)oundabout		Approach Or Overall	AM Peak		PM Peak	
			Delay (sec)	LOS	Delay (sec)	LOS
Plum Creek Blvd & Crystal Valley Pkwy	R	SB	6.5	A	6.5	A
484 / Fire Sta Dwy & Crystal Valley Pkwy	U	NB	9.5	A	15.6	B
Plum Creek Blvd & Burnham Trl	U	EB WB	10.6 9.0	B A	11.4 9.0	B A

With the additional traffic generated by the proposed project, all of the study area intersections are anticipated to operate at acceptable levels of service with little change to the overall level of service shown in the existing conditions. The added driveway approach to the Plum Creek Boulevard & Burnham Trail intersection is shown to operate at LOS B. A portion of existing trips associated with the adjacent retail site will utilize the cross-access driveway directly to/from Plum Creek Boulevard. Based on the existing peak hour trips accessing the retail site, less than 10 peak hour trips are anticipated to utilize the cross-access driveway and very few will make a left turn onto Plum Creek Boulevard. The level of service reports for the short-term with the project condition are provided in the technical appendix.

Queuing

The 95th percentile queue results for the short-term with project condition were reviewed. No significant queues are anticipated at the study area intersections for this scenario.

Auxiliary Lane Evaluation

An evaluation was conducted to determine if auxiliary lanes are required at the site accesses to Crystal Valley Parkway and Plum Creek Boulevard as a result of the proposed project. The Colorado Department of Transportation (CDOT) State Highway Access Code (SHAC) (2002) was utilized to determine the need for auxiliary lanes. Crystal Valley Parkway and Plum Creek Boulevard are not CDOT classified roadways, but generally equate to NR-B and NR-C (non-rural arterial) respectively.

The CDOT access code has a threshold of 50 turning vehicles per hour (vph) for requiring a right turn deceleration lane and a threshold of 25 vph for requiring a left turn deceleration lane. When the posted speed exceeds 40 mph, these thresholds are 25 and 10

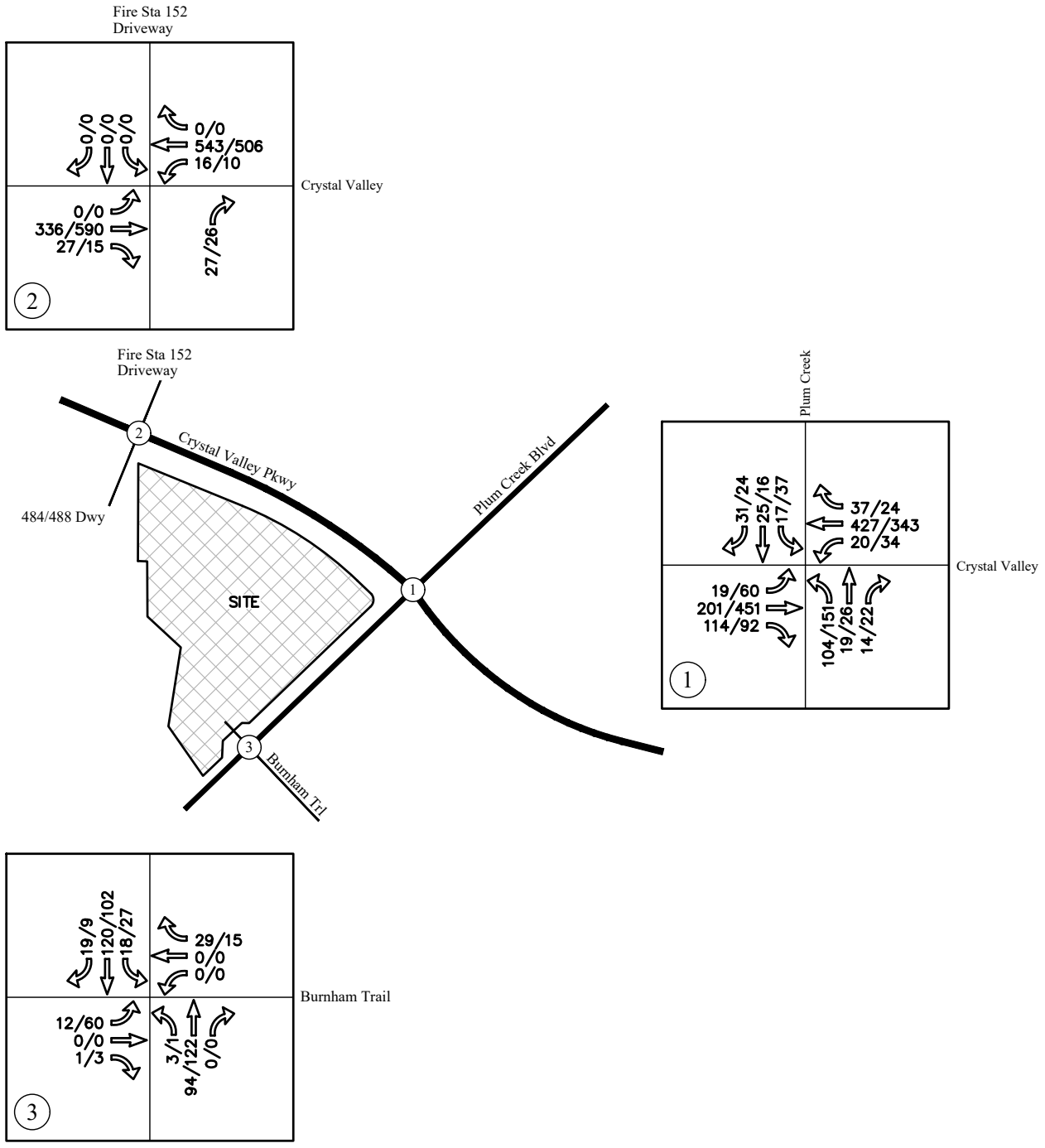
respectively. Additionally, acceleration lanes are generally not required on roadways with a posted speed less than 45 mph.

The Plum Creek Boulevard & Burnham Trail intersection already provides a left turn and right turn lane for the future access. Although the left turn lane is only 60' in length (not including taper), the volume of left turns entering the site is anticipated to be small. At the 484/488 Retail Driveway & Crystal Valley Parkway intersection, there are currently left and right turn lanes along Crystal Valley Parkway. No modifications to the current turn lanes should be necessary to accommodate the project traffic.

The proposed right turn ingress driveway from Crystal Valley Parkway is anticipated to have 32 right turn ingress trips during the AM peak hour, which exceeds the threshold for requiring a right turn lane along an arterial with a posted speed of 45 mph. A right turn deceleration lane is planned for this access as shown on the site plan.

Sight Distance Analysis

The American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets ("Green Book")* was utilized for sight distance requirements at intersections. The "Green Book" provides recommended sight distances for vehicles departing a minor street approach or driveway based on design speed and grade of the major roadway. Plum Creek Boulevard is posted at 30 mph and Crystal Valley Parkway is posted at 45 mph at the proposed site accesses. Per tables 9-7 and 9-9 within the AASHTO reference, the required sight distance for a vehicle to make a left turn from the Plum Creek driveway (looking right / south) is 335' and to make a right turn from the Plum Creek driveway (looking left / north) is 290'. Left turns from the retail driveway and egress from the site driveway along Crystal Valley Parkway are prohibited. The required sight distance (per AASHTO) to make a right turn onto Crystal Valley Parkway is 430'. The resulting line-of-sight creates a "sight triangle" where plantings or other visual obstructions within this triangle area should not exceed 3.5 feet in height. These should be depicted on the landscaping and site civil plans.



12/34 – AM Peak Hour/PM Peak Hour

N

NOT TO SCALE

APRIL 8, 2025

EXHIBIT 9

SHORT-TERM (2027) WITH PROJECT TRAFFIC VOLUMES

Civtrans ENGINEERING INC.

Long-Range Condition (Year 2045) without the Project

This section focuses on the long-range scenario of the year 2045. This scenario assumes that the ED/clinic project has not been constructed and the site remains undeveloped. This analysis will show how the future traffic volumes will be handled by the existing facilities and what new elements may be needed for the traffic system to continue functioning at an acceptable level of service. The traffic volumes for this condition include the existing traffic, as shown on Exhibit 5 with an ambient background growth applied over the next twenty-one years. Please see Exhibit 10 for the traffic volumes used for this scenario. A summary of the level of service results are shown in the following table

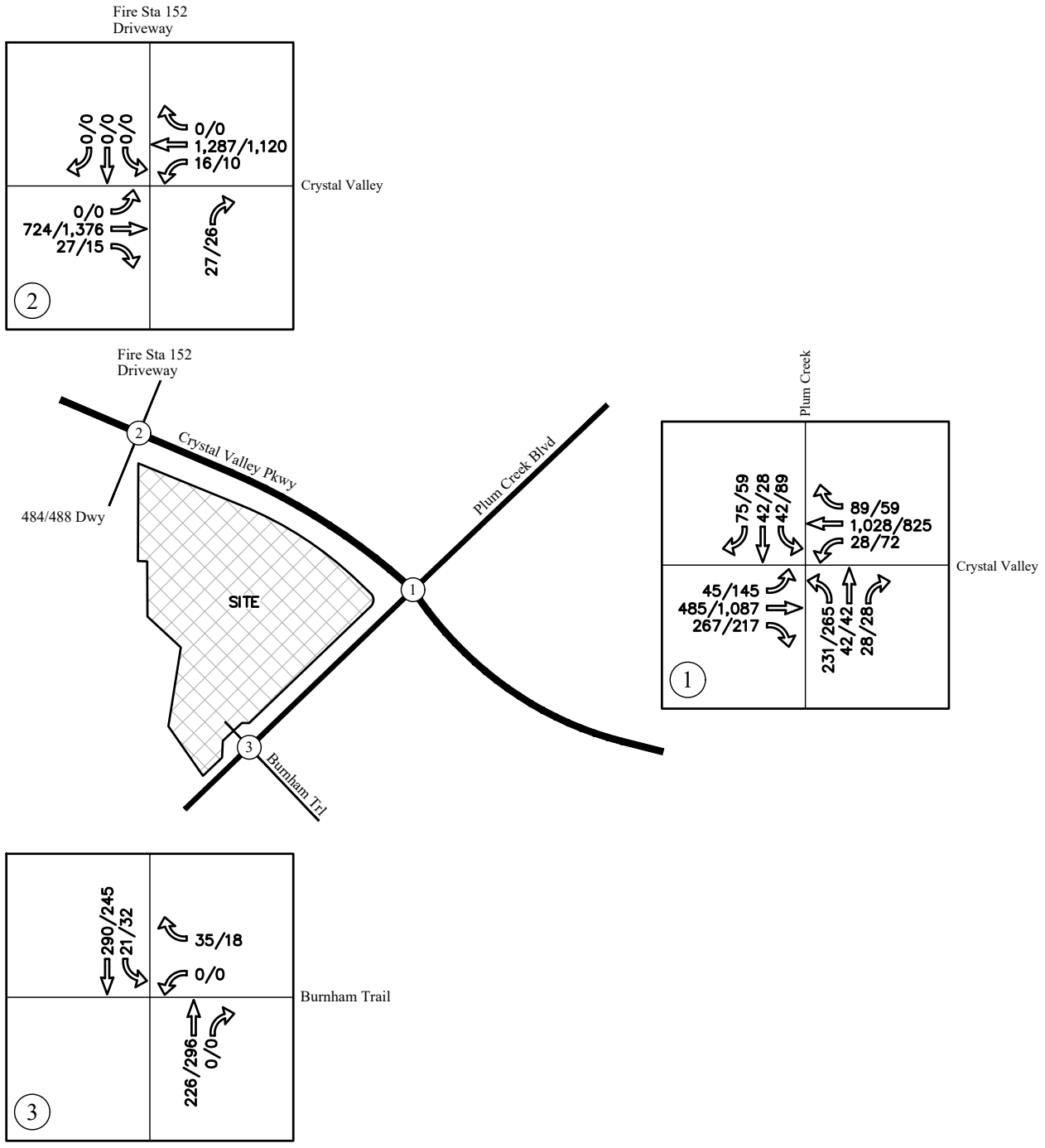
Table 6 -Year 2045 Levels of Service without Project

INTERSECTION (S)ignalized (U)nsignalized (R)oundabout		Approach Or Overall	AM Peak		PM Peak	
			Delay (sec)	LOS	Delay (sec)	LOS
Plum Creek Blvd & Crystal Valley Pkwy	R	SB	15.0	C	13.8	B
484 / Fire Sta Dwy & Crystal Valley Pkwy	U	NB	11.3	B	16.0	C
Plum Creek Blvd & Burnham Trl	U	WB	9.9	A	10.3	B

For the long-range condition without the proposed project, the study area intersections are anticipated to operate at acceptable levels of service and within capacity. The level of service reports for the long-range no project conditions are provided in the technical appendix.

Queuing

For the long-range condition, 95th percentile queue estimates are generally not anticipated to be of concern. The longest queue reported is on the eastbound approach of the Crystal Valley & Plum Creek roundabout at 11.93 vehicles during the PM peak hour, which equates to nearly 300'. The nearest upstream intersection (fire station driveway) is over 600' from the roundabout. Therefore, there is sufficient capacity to accommodate the queue without blocking the upstream intersection.



12/34 – AM Peak Hour/PM Peak Hour

N

NOT TO SCALE

APRIL 8, 2025

EXHIBIT 10

LONG-RANGE (2045) NO PROJECT TRAFFIC VOLUMES

Civtrans ENGINEERING INC.

Long-Range Conditions (Year 2045) with the Project

The traffic volumes included in this scenario include the long-range (Year 2045) traffic volumes as shown on Exhibit 10, and the additional traffic from the proposed project, as shown on Exhibit 7. The total traffic volumes anticipated under this condition are shown on Exhibit 11. A summary of the results is shown in the following table.

Table 7 - Year 2045 Levels of Service with the Project

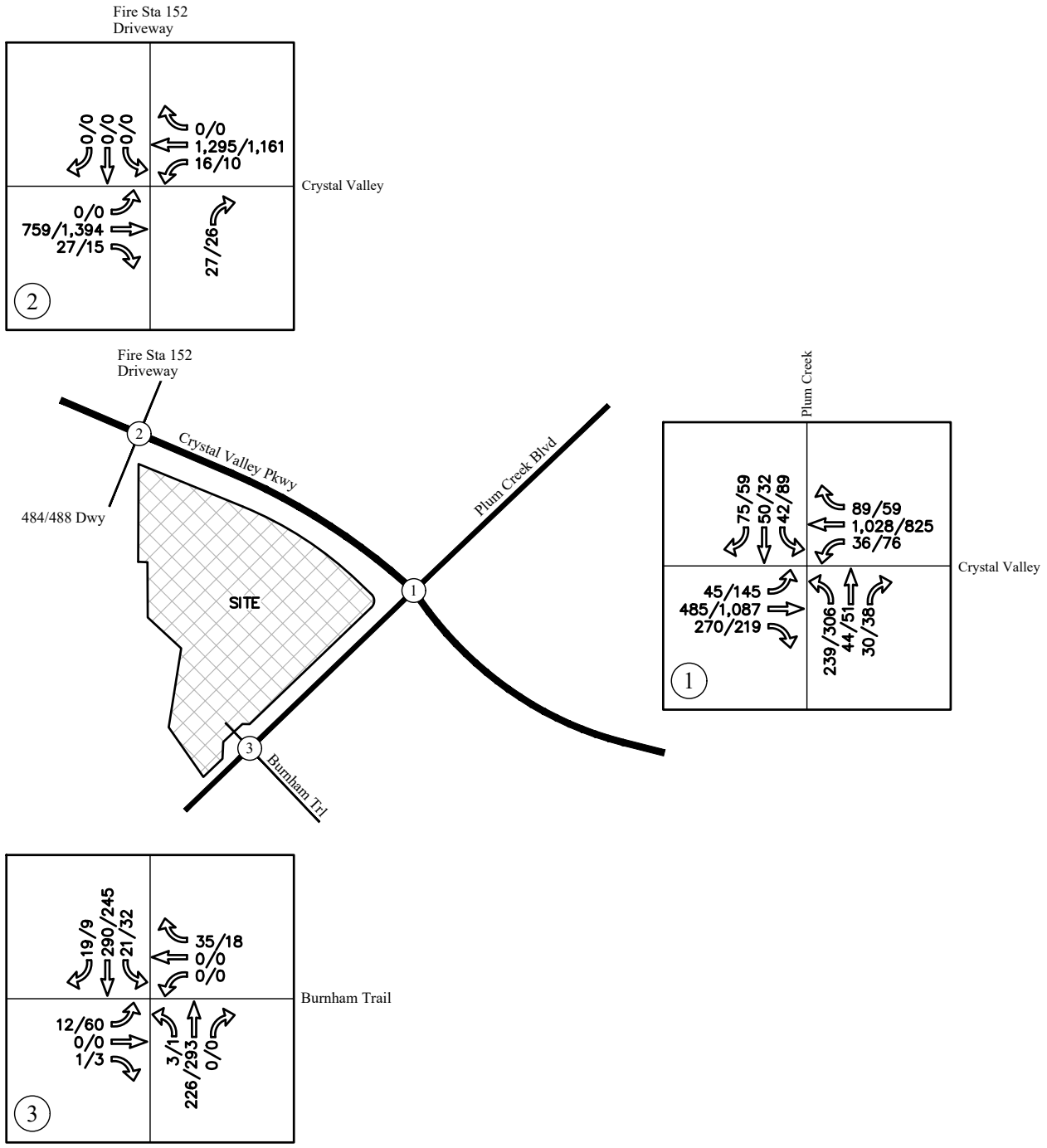
INTERSECTION (S)ignalized (U)nsignalized (R)oundabout		Approach Or Overall	AM Peak		PM Peak	
			Delay (sec)	LOS	Delay (sec)	LOS
Plum Creek Blvd & Crystal Valley Pkwy	R	SB	15.8	C	14.7	B
484 / Fire Sta Dwy & Crystal Valley Pkwy	U	NB	11.4	B	16.2	C
Plum Creek Blvd & Burnham Trl	U	EB WB	14.5 9.9	B A	17.1 10.4	C B

The long-range condition with the proposed project results in similar operations at the study area intersection as the no-project condition. Therefore, no improvements are anticipated to be required by the project for the long-range condition. The level of service reports for the long-range with the project condition (Year 2045) are provided in the technical appendix.

Auxiliary lane and sight distance evaluation conducted for the short-term build condition also applied for the long-range conditions.

Queuing

With the project in the long-range condition, the 95th percentile queue on the eastbound approach of the Crystal Valley & Plum Creek roundabout is estimated to be 12.3 vehicles or 308'. The queue is not anticipated to block the proposed ingress driveway serving the site from Crystal Valley Parkway. There are no queuing concerns anticipated at any of the other study area intersections.



12/34 – AM Peak Hour/PM Peak Hour

N

NOT TO SCALE

APRIL 8, 2025

EXHIBIT 11

LONG-RANGE (2045) WITH PROJECT TRAFFIC VOLUMES

Civtrans ENGINEERING INC.

CONCLUSIONS & RECOMMENDATIONS

Based on the analysis, findings and conclusions discussed in this report, this project is not anticipated to have significant impact on the surrounding transportation system and no mitigation should be required.

The analysis results indicate that all of the intersections within the study are currently operating at acceptable levels of service and will continue to operate at acceptable levels with the project and in the long-range conditions.

Queuing was evaluated at the study area intersections for all conditions. There are no queuing issues anticipated for the study area currently or in the future with or without the project.

The proposed site accesses to Crystal Valley Parkway and Plum Creek Boulevard were evaluated for auxiliary turn lanes utilizing warrant thresholds within the Colorado Department of Transportation's (CDOT) *State Highway Access Code (2002)*. The Plum Creek Boulevard driveway already has a left turn and a right turn lane along Plum Creek to serve the future driveway and no changes should be necessary. The proposed right turn ingress driveway along Crystal Valley Parkway is anticipated to experience sufficient volume of right turning vehicles during peak hours to warrant a right turn deceleration lane, which is planned to be constructed as shown on the site plan. The site will also provide access for ambulances and emergency vehicles through the existing retail site to the west. Its access to Crystal Valley Parkway already has a right turn and a left turn lane along Crystal Valley Parkway. No modifications to these turn lanes should be necessary.

Sight distance requirements for the site driveways were estimated utilizing AASHTO's *A Policy on Geometric Design of Highways and Streets.* Plum Creek Boulevard is posted at 30 mph and Crystal Valley Parkway is posted at 45 mph at the proposed site accesses. Per tables 9-7 and 9-9 within the AASHTO reference, the required sight distance for a vehicle to make a left turn from the Plum Creek driveway (looking right / south) is 335' and to make a right turn from the Plum Creek driveway (looking left / north) is 290'. Left turns from the retail driveway and egress from the site driveway along Crystal Valley Parkway are prohibited. The required sight distance (per AASHTO) to make a right turn onto Crystal Valley Parkway is 430'. The resulting line-of-sight creates a "sight triangle" where plantings or other visual obstructions within this triangle area should not exceed 3.5 feet in height. These should be depicted on the landscaping and site civil plans.

Traffic Impact Study
Castle Rock AdventHealth

TECHNICAL APPENDIX
April 8, 2025

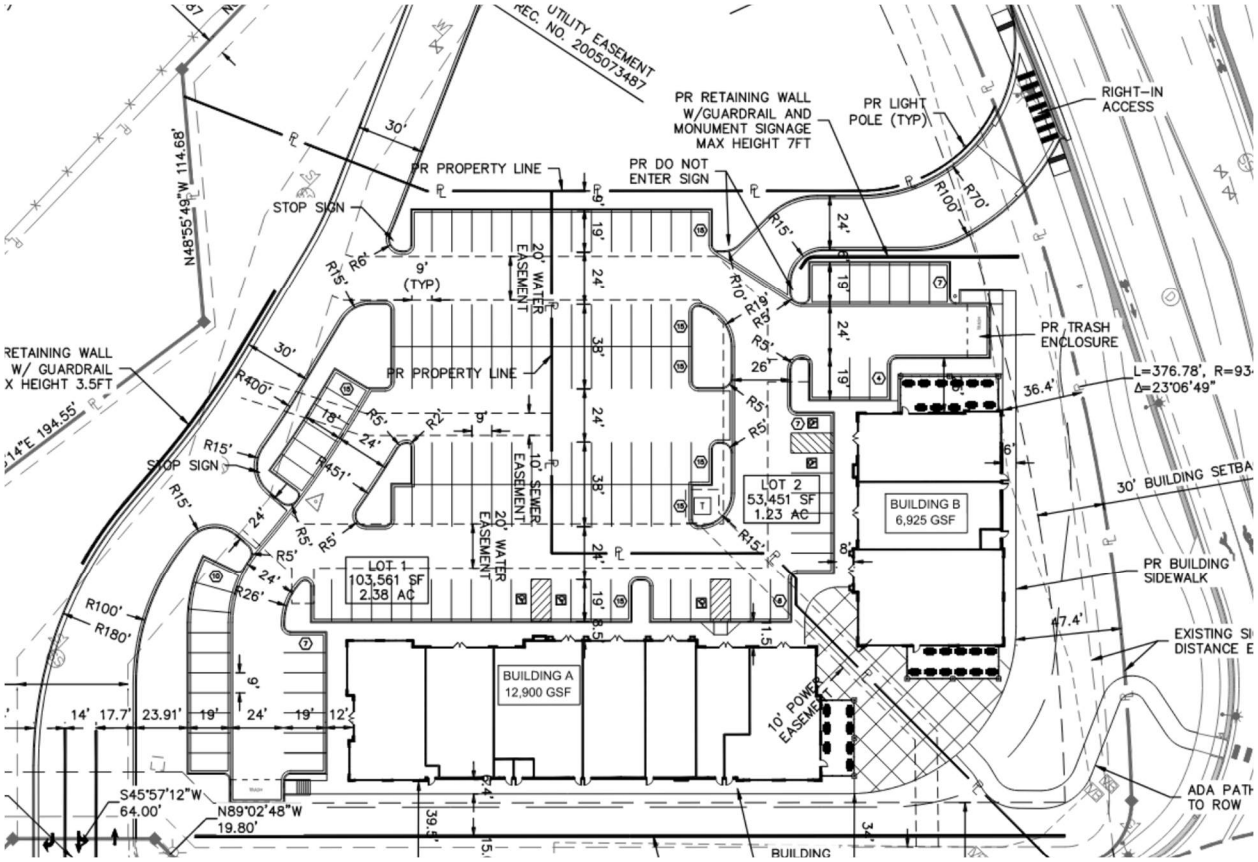
CivTrans ENGINEERING INC.

TRAFFIC VOLUME DATA

HALES ENGINEERING
innovative transportation solutions

Crystal Valley Shops

Traffic Impact Assessment



Castle Rock, Colorado

[redacted]

August 16, 2023

UT23-2533

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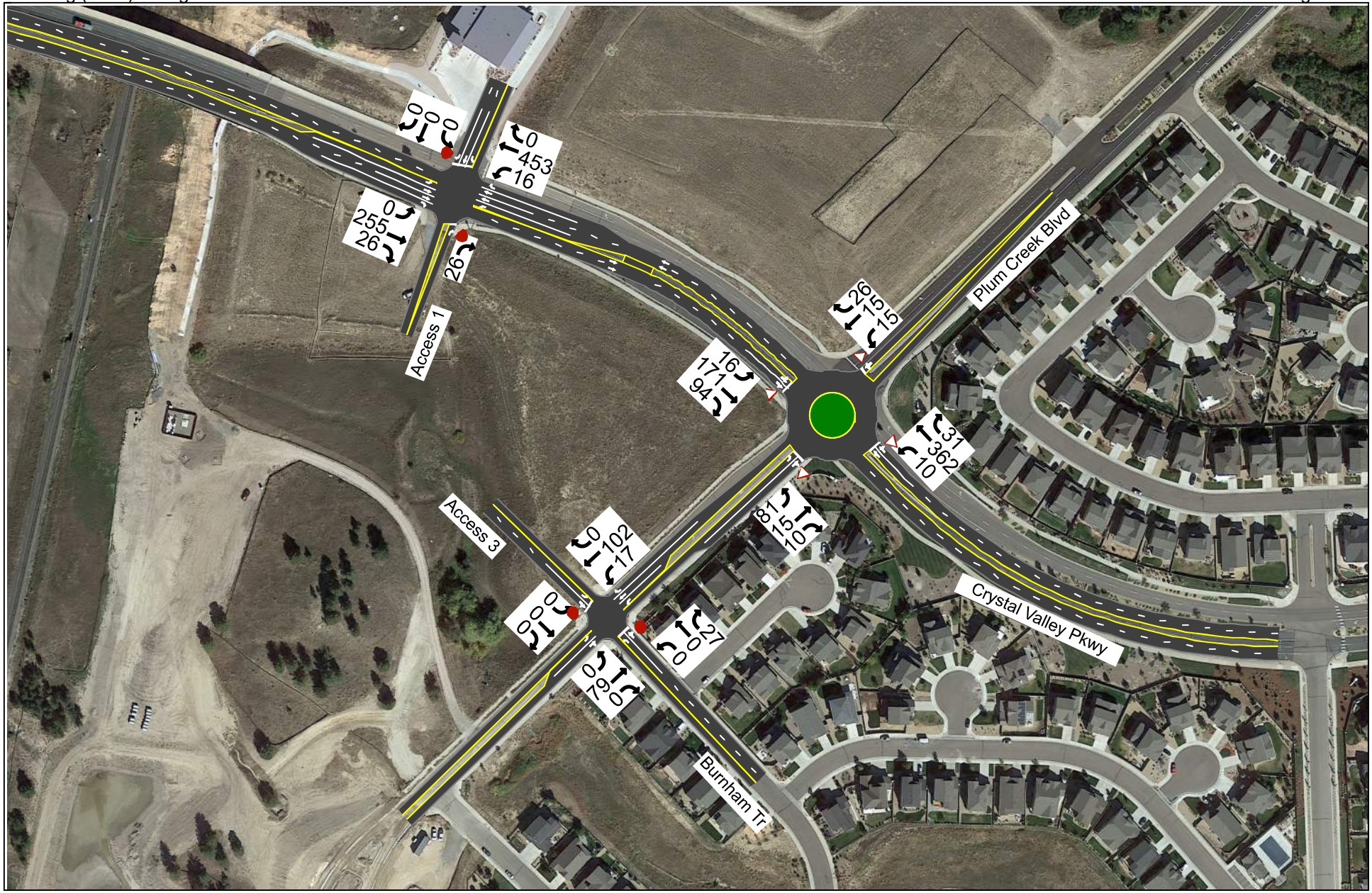
0
0
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453
16
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255
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26
Access 1
16
171
94
26
15
15
Plum Creek Blvd
31
362
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81
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Access 3
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102
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79
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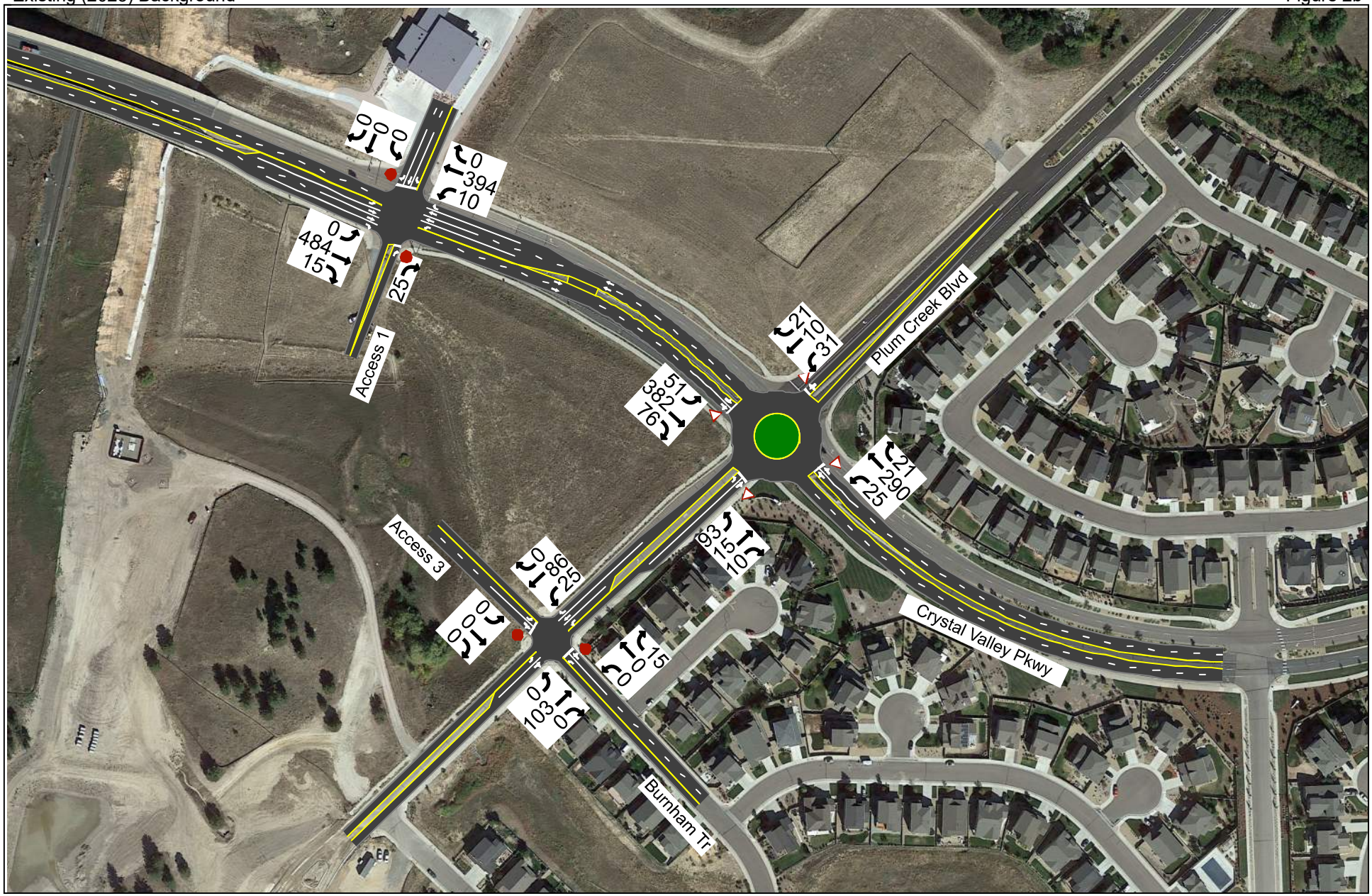
Crystal Valley Pkwy
Burnham Tr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484
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25
Access 1
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31
Plum Creek Blvd
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382
76
21
290
25
Access 3
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86
25
93
15
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Crystal Valley Pkwy
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103
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Burnham Tr

TRIP GENERATION CALCULATIONS

Trip Generation for Proposed Advent Health ED and MOB

The current project is proposing to construct a 24,450 SF ED / clinic building. Therefore, LUC 630 was used. According to the *Trip Generation Handbook* , a fitted curve equation for estimating trips should be used if an equation is provided and the number of studies exceeds 20. If the number of studies is less than 20, then R^2 should be equal to or greater than 0.75 and the standard deviation equal or less than 0.55. The rate or equation is highlighted below, which indicates which was used.

Trip Generation

Per Trip Generation Manual, the following land use categories were applied.

LUC 630 - Clinic

Weekday	Equation	Rate	% in	%out	# Studies	Std Dev	R^2
AM Peak:	T=2.19(X)+8.68	2.75	81%	19%	9	1.04	0.98
PM Peak:	T=3.53(X)+2.98	3.69	30%	70%	11	3.00	0.72
ADT:	T=35.86(X)+34.88	37.60	50%	50%	9	25.52	0.76

			Total	In	Out
For X=	24.45	**AM Peak=**	**67**	**54**	**13**
		PM Peak=	**90**	**27**	**63**
		ADT=	**920**		

EXISTING (2024) CONDITIONS
LEVEL OF SERVICE AND QUEUING
CALCULATIONS

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	NB Plum Creek	0	0	12.00	1	26.00	2	150.00	100.00	37.10
2	WB Crystal Valley	90	0	24.00	2	26.00	2	91.00	120.00	33.10
3	SB Plum Creek	180	0	12.00	1	15.00	1	47.00	100.00	43.50
4	EB Crystal Valley	270	0	24.00	2	26.00	2	94.00	120.00	24.60

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB Plum Creek	162.00	32.00	2	15.00	1	12.00	1
2	WB Crystal Valley	150.00	32.00	2	26.00	2	24.00	2
3	SB Plum Creek	150.00	32.00	2	15.00	1	12.00	1
4	EB Crystal Valley	142.00	22.00	1	26.00	2	24.00	2

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
2	WB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0
3	SB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
4	EB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0

Traffic Flow Data (veh/hr)

2024 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	NB Plum Creek	0	83	15	10	0	2.0	1.00	0.900
2	WB Crystal Valley	0	10	369	32	0	2.0	1.00	0.900
3	SB Plum Creek	0	15	15	27	0	2.0	1.00	0.900
4	EB Crystal Valley	0	16	174	96	0	2.0	1.00	0.900

Operational Results

2024 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB Plum Creek	None	108		205		121	1623		0.0666	
2	WB Crystal Valley	None	411		114		199	1990		0.2066	
3	SB Plum Creek	None	57		462		63	786		0.0725	
4	EB Crystal Valley	None	286		40		479	2100		0.1362	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Plum Creek	None	3.66		3.66	0.27		A		A
2	WB Crystal Valley	None	4.39		4.39	0.83		A		A
3	SB Plum Creek	None	5.86		5.86	0.25		A		A
4	EB Crystal Valley	None	4.24		4.24	0.69		A		A

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	260	27	16	462	1	0	0	27	1	1	1
Future Vol, veh/h	1	260	27	16	462	1	0	0	27	1	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	220	-	185	300	-	250	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	283	29	17	502	1	0	0	29	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	503	0	0	312	0	0	-	-	141	680	851	251
Stage 1	-	-	-	-	-	-	-	-	-	537	537	-
Stage 2	-	-	-	-	-	-	-	-	-	143	314	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	-	-	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1057	-	-	1245	-	-	0	0	881	337	296	749
Stage 1	-	-	-	-	-	-	0	0	-	496	521	-
Stage 2	-	-	-	-	-	-	0	0	-	845	655	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1057	-	-	1245	-	-	-	-	881	321	291	749
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	321	291	-
Stage 1	-	-	-	-	-	-	-	-	-	489	514	-
Stage 2	-	-	-	-	-	-	-	-	-	816	654	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.03	0.26	9.23	14.55
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	881	1057	-	-	1245	-	-	380
HCM Lane V/C Ratio	0.033	0.001	-	-	0.014	-	-	0.009
HCM Control Delay (s/veh)	9.2	8.4	-	-	7.9	-	-	14.5
HCM Lane LOS	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	1.7

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	1	28	81	1	17	104
Future Vol, veh/h	1	28	81	1	17	104
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	30	88	1	18	113

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	239	89	0	0	89	0
Stage 1	89	-	-	-	-	-
Stage 2	150	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	750	970	-	-	1506	-
Stage 1	935	-	-	-	-	-
Stage 2	878	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	740	970	-	-	1506	-
Mov Cap-2 Maneuver	740	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	867	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s/v	8.88	0	1.04
HCM LOS	A		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWL	SWT
Capacity (veh/h)	-	-	959	1506	-
HCM Lane V/C Ratio	-	-	0.033	0.012	-
HCM Control Delay (s/veh)	-	-	8.9	7.4	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	NB Plum Creek	0	0	12.00	1	26.00	2	150.00	100.00	37.10
2	WB Crystal Valley	90	0	24.00	2	26.00	2	91.00	120.00	33.10
3	SB Plum Creek	180	0	12.00	1	15.00	1	47.00	100.00	43.50
4	EB Crystal Valley	270	0	24.00	2	26.00	2	94.00	120.00	24.60

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB Plum Creek	162.00	32.00	2	15.00	1	12.00	1
2	WB Crystal Valley	150.00	32.00	2	26.00	2	24.00	2
3	SB Plum Creek	150.00	32.00	2	15.00	1	12.00	1
4	EB Crystal Valley	142.00	22.00	1	26.00	2	24.00	2

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
2	WB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0
3	SB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
4	EB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0

Traffic Flow Data (veh/hr)

2024 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	NB Plum Creek	0	95	15	10	0	2.0	1.00	0.900
2	WB Crystal Valley	0	26	296	21	0	2.0	1.00	0.900
3	SB Plum Creek	0	32	10	21	0	2.0	1.00	0.900
4	EB Crystal Valley	0	52	390	78	0	2.0	1.00	0.900

Operational Results

2024 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB Plum Creek	None	120		474		114	1443		0.0832	
2	WB Crystal Valley	None	343		162		432	1953		0.1756	
3	SB Plum Creek	None	63		417		88	804		0.0784	
4	EB Crystal Valley	None	520		68		412	2069		0.2513	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Plum Creek	None	4.16		4.16	0.34		A		A
2	WB Crystal Valley	None	4.08		4.08	0.68		A		A
3	SB Plum Creek	None	5.83		5.83	0.27		A		A
4	EB Crystal Valley	None	4.87		4.87	1.16		A		A

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	494	15	10	402	1	0	0	26	1	1	1
Future Vol, veh/h	1	494	15	10	402	1	0	0	26	1	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	220	-	185	300	-	250	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	537	16	11	437	1	0	0	28	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	438	0	0	553	0	0	-	-	268	729	1014	218
Stage 1	-	-	-	-	-	-	-	-	-	459	459	-
Stage 2	-	-	-	-	-	-	-	-	-	271	555	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	-	-	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1118	-	-	1013	-	-	0	0	730	310	237	786
Stage 1	-	-	-	-	-	-	0	0	-	552	565	-
Stage 2	-	-	-	-	-	-	0	0	-	712	511	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1118	-	-	1013	-	-	-	-	730	295	234	786
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	295	234	-
Stage 1	-	-	-	-	-	-	-	-	-	546	559	-
Stage 2	-	-	-	-	-	-	-	-	-	684	511	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.02	0.21	10.13	15.82
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	730	1118	-	-	1013	-	-	336
HCM Lane V/C Ratio	0.039	0.001	-	-	0.011	-	-	0.01
HCM Control Delay (s/veh)	10.1	8.2	-	-	8.6	-	-	15.8
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	1.4

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	1	15	105	1	26	88
Future Vol, veh/h	1	15	105	1	26	88
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	16	114	1	28	96

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	267	115	0	0	115	0
Stage 1	115	-	-	-	-	-
Stage 2	152	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	722	938	-	-	1474	-
Stage 1	910	-	-	-	-	-
Stage 2	876	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	708	938	-	-	1474	-
Mov Cap-2 Maneuver	708	-	-	-	-	-
Stage 1	910	-	-	-	-	-
Stage 2	859	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s/v	8.99	0	1.71
HCM LOS	A		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWL	SWT
Capacity (veh/h)	-	-	919	1474	-
HCM Lane V/C Ratio	-	-	0.019	0.019	-
HCM Control Delay (s/veh)	-	-	9	7.5	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

SHORT-TERM (2027) CONDITIONS
WITHOUT PROJECT
LEVEL OF SERVICE AND QUEUING
CALCULATIONS

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	NB Plum Creek	0	0	12.00	1	26.00	2	150.00	100.00	37.10
2	WB Crystal Valley	90	0	24.00	2	26.00	2	91.00	120.00	33.10
3	SB Plum Creek	180	0	12.00	1	15.00	1	47.00	100.00	43.50
4	EB Crystal Valley	270	0	24.00	2	26.00	2	94.00	120.00	24.60

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB Plum Creek	162.00	32.00	2	15.00	1	12.00	1
2	WB Crystal Valley	150.00	32.00	2	26.00	2	24.00	2
3	SB Plum Creek	150.00	32.00	2	15.00	1	12.00	1
4	EB Crystal Valley	142.00	22.00	1	26.00	2	24.00	2

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
2	WB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0
3	SB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
4	EB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0

Traffic Flow Data (veh/hr)

2027 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	NB Plum Creek	0	96	17	12	0	2.0	1.00	0.900
2	WB Crystal Valley	0	12	427	37	0	2.0	1.00	0.900
3	SB Plum Creek	0	17	17	31	0	2.0	1.00	0.900
4	EB Crystal Valley	0	19	201	111	0	2.0	1.00	0.900

Operational Results

2027 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB Plum Creek	None	125		237		140	1601		0.0781	
2	WB Crystal Valley	None	476		132		230	1976		0.2409	
3	SB Plum Creek	None	65		535		73	758		0.0858	
4	EB Crystal Valley	None	331		46		554	2093		0.1581	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Plum Creek	None	3.84		3.84	0.32		A		A
2	WB Crystal Valley	None	4.69		4.69	1.01		A		A
3	SB Plum Creek	None	6.26		6.26	0.30		A		A
4	EB Crystal Valley	None	4.53		4.53	0.82		A		A

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	301	27	16	535	1	0	0	27	1	1	1
Future Vol, veh/h	1	301	27	16	535	1	0	0	27	1	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	220	-	185	300	-	250	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	327	29	17	582	1	0	0	29	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	583	0	0	357	0	0	-	-	164	782	975	291
Stage 1	-	-	-	-	-	-	-	-	-	616	616	-
Stage 2	-	-	-	-	-	-	-	-	-	166	359	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	-	-	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	988	-	-	1199	-	-	0	0	852	284	250	706
Stage 1	-	-	-	-	-	-	0	0	-	444	480	-
Stage 2	-	-	-	-	-	-	0	0	-	820	626	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	988	-	-	1199	-	-	-	-	852	270	246	706
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	270	246	-
Stage 1	-	-	-	-	-	-	-	-	-	438	473	-
Stage 2	-	-	-	-	-	-	-	-	-	791	625	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.03	0.23	9.37	16.13
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	852	988	-	-	1199	-	-	327
HCM Lane V/C Ratio	0.034	0.001	-	-	0.015	-	-	0.01
HCM Control Delay (s/veh)	9.4	8.6	-	-	8	-	-	16.1
HCM Lane LOS	A	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	1.5

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	1	29	94	1	18	120
Future Vol, veh/h	1	29	94	1	18	120
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	32	102	1	20	130

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	272	103	0	0	103	0
Stage 1	103	-	-	-	-	-
Stage 2	170	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	717	952	-	-	1489	-
Stage 1	921	-	-	-	-	-
Stage 2	860	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	708	952	-	-	1489	-
Mov Cap-2 Maneuver	708	-	-	-	-	-
Stage 1	921	-	-	-	-	-
Stage 2	849	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s/v	8.96	0	0.97
HCM LOS	A		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWL	SWT
Capacity (veh/h)	-	-	941	1489	-
HCM Lane V/C Ratio	-	-	0.035	0.013	-
HCM Control Delay (s/veh)	-	-	9	7.5	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	NB Plum Creek	0	0	12.00	1	26.00	2	150.00	100.00	37.10
2	WB Crystal Valley	90	0	24.00	2	26.00	2	91.00	120.00	33.10
3	SB Plum Creek	180	0	12.00	1	15.00	1	47.00	100.00	43.50
4	EB Crystal Valley	270	0	24.00	2	26.00	2	94.00	120.00	24.60

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB Plum Creek	162.00	32.00	2	15.00	1	12.00	1
2	WB Crystal Valley	150.00	32.00	2	26.00	2	24.00	2
3	SB Plum Creek	150.00	32.00	2	15.00	1	12.00	1
4	EB Crystal Valley	142.00	22.00	1	26.00	2	24.00	2

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
2	WB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0
3	SB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
4	EB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0

Traffic Flow Data (veh/hr)

2027 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	NB Plum Creek	0	110	17	12	0	2.0	1.00	0.900
2	WB Crystal Valley	0	30	343	24	0	2.0	1.00	0.900
3	SB Plum Creek	0	37	12	24	0	2.0	1.00	0.900
4	EB Crystal Valley	0	60	451	90	0	2.0	1.00	0.900

Operational Results

2027 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB Plum Creek	None	139		548		132	1393		0.0998	
2	WB Crystal Valley	None	397		187		500	1935		0.2052	
3	SB Plum Creek	None	73		483		101	778		0.0938	
4	EB Crystal Valley	None	601		79		477	2057		0.2921	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Plum Creek	None	4.49		4.49	0.42		A		A
2	WB Crystal Valley	None	4.44		4.44	0.82		A		A
3	SB Plum Creek	None	6.24		6.24	0.33		A		A
4	EB Crystal Valley	None	5.23		5.23	1.43		A		A

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	572	15	10	465	1	0	0	26	1	1	1
Future Vol, veh/h	1	572	15	10	465	1	0	0	26	1	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	220	-	185	300	-	250	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	622	16	11	505	1	0	0	28	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	507	0	0	638	0	0	-	-	311	840	1167	253
Stage 1	-	-	-	-	-	-	-	-	-	527	527	-
Stage 2	-	-	-	-	-	-	-	-	-	313	640	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	-	-	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1054	-	-	942	-	-	0	0	685	258	192	747
Stage 1	-	-	-	-	-	-	0	0	-	502	526	-
Stage 2	-	-	-	-	-	-	0	0	-	672	468	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1054	-	-	942	-	-	-	-	685	244	190	747
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	244	190	-
Stage 1	-	-	-	-	-	-	-	-	-	497	520	-
Stage 2	-	-	-	-	-	-	-	-	-	644	468	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.01	0.19	10.48	17.99
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	685	1054	-	-	942	-	-	280
HCM Lane V/C Ratio	0.041	0.001	-	-	0.012	-	-	0.012
HCM Control Delay (s/veh)	10.5	8.4	-	-	8.9	-	-	18
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	1.3

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	1	15	122	1	27	102
Future Vol, veh/h	1	15	122	1	27	102
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	16	133	1	29	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	303	133	0	0	134	0
Stage 1	133	-	-	-	-	-
Stage 2	170	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	689	916	-	-	1451	-
Stage 1	893	-	-	-	-	-
Stage 2	860	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	675	916	-	-	1451	-
Mov Cap-2 Maneuver	675	-	-	-	-	-
Stage 1	893	-	-	-	-	-
Stage 2	843	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s/v	9.1	0	1.58
HCM LOS	A		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWL	SWT
Capacity (veh/h)	-	-	896	1451	-
HCM Lane V/C Ratio	-	-	0.019	0.02	-
HCM Control Delay (s/veh)	-	-	9.1	7.5	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

SHORT-TERM (2027) CONDITIONS
WITH PROJECT
LEVEL OF SERVICE AND QUEUING
CALCULATIONS

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	NB Plum Creek	0	0	12.00	1	26.00	2	150.00	100.00	37.10
2	WB Crystal Valley	90	0	24.00	2	26.00	2	91.00	120.00	33.10
3	SB Plum Creek	180	0	12.00	1	15.00	1	47.00	100.00	43.50
4	EB Crystal Valley	270	0	24.00	2	26.00	2	94.00	120.00	24.60

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB Plum Creek	162.00	32.00	2	15.00	1	12.00	1
2	WB Crystal Valley	150.00	32.00	2	26.00	2	24.00	2
3	SB Plum Creek	150.00	32.00	2	15.00	1	12.00	1
4	EB Crystal Valley	142.00	22.00	1	26.00	2	24.00	2

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
2	WB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0
3	SB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
4	EB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0

Traffic Flow Data (veh/hr)

2027 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	NB Plum Creek	0	104	19	14	0	2.0	1.00	0.900
2	WB Crystal Valley	0	20	427	37	0	2.0	1.00	0.900
3	SB Plum Creek	0	17	25	31	0	2.0	1.00	0.900
4	EB Crystal Valley	0	19	201	114	0	2.0	1.00	0.900

Operational Results

2027 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB Plum Creek	None	137		237		159	1601		0.0856	
2	WB Crystal Valley	None	484		142		232	1968		0.2459	
3	SB Plum Creek	None	73		551		75	752		0.0971	
4	EB Crystal Valley	None	334		62		562	2076		0.1609	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Plum Creek	None	3.97		3.97	0.36		A		A
2	WB Crystal Valley	None	4.74		4.74	1.04		A		A
3	SB Plum Creek	None	6.48		6.48	0.35		A		A
4	EB Crystal Valley	None	4.63		4.63	0.85		A		A

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	336	27	16	543	1	0	0	27	1	1	1
Future Vol, veh/h	1	336	27	16	543	1	0	0	27	1	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	220	-	185	300	-	250	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	365	29	17	590	1	0	0	29	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	591	0	0	395	0	0	-	-	183	810	1022	295
Stage 1	-	-	-	-	-	-	-	-	-	625	625	-
Stage 2	-	-	-	-	-	-	-	-	-	185	397	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	-	-	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	980	-	-	1161	-	-	0	0	829	272	235	701
Stage 1	-	-	-	-	-	-	0	0	-	439	475	-
Stage 2	-	-	-	-	-	-	0	0	-	799	602	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	980	-	-	1161	-	-	-	-	829	258	231	701
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	258	231	-
Stage 1	-	-	-	-	-	-	-	-	-	433	468	-
Stage 2	-	-	-	-	-	-	-	-	-	770	601	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.02	0.23	9.5	16.69
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	829	980	-	-	1161	-	-	311
HCM Lane V/C Ratio	0.035	0.001	-	-	0.015	-	-	0.01
HCM Control Delay (s/veh)	9.5	8.7	-	-	8.1	-	-	16.7
HCM Lane LOS	A	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	1.9

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	12	0	1	1	0	29	3	94	1	18	120	19
Future Vol, veh/h	12	0	1	1	0	29	3	94	1	18	120	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	60	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	0	1	1	0	32	3	102	1	20	130	21

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	278	279	130	279	299	103	151	0	0	103	0	0
Stage 1	170	170	-	109	109	-	-	-	-	-	-	-
Stage 2	109	110	-	170	190	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	674	629	919	674	613	952	1430	-	-	1489	-	-
Stage 1	832	758	-	896	805	-	-	-	-	-	-	-
Stage 2	897	804	-	832	743	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	642	619	919	662	603	952	1430	-	-	1489	-	-
Mov Cap-2 Maneuver	642	619	-	662	603	-	-	-	-	-	-	-
Stage 1	821	748	-	894	803	-	-	-	-	-	-	-
Stage 2	865	803	-	820	733	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s/v	10.6	8.97	0.23	0.85
HCM LOS	B	A		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1430	-	-	939	657	1489	-	-
HCM Lane V/C Ratio	0.002	-	-	0.035	0.022	0.013	-	-
HCM Control Delay (s/veh)	7.5	-	-	9	10.6	7.5	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	NB Plum Creek	0	0	12.00	1	26.00	2	150.00	100.00	37.10
2	WB Crystal Valley	90	0	24.00	2	26.00	2	91.00	120.00	33.10
3	SB Plum Creek	180	0	12.00	1	15.00	1	47.00	100.00	43.50
4	EB Crystal Valley	270	0	24.00	2	26.00	2	94.00	120.00	24.60

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB Plum Creek	162.00	32.00	2	15.00	1	12.00	1
2	WB Crystal Valley	150.00	32.00	2	26.00	2	24.00	2
3	SB Plum Creek	150.00	32.00	2	15.00	1	12.00	1
4	EB Crystal Valley	142.00	22.00	1	26.00	2	24.00	2

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
2	WB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0
3	SB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
4	EB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0

Traffic Flow Data (veh/hr)

2027 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	NB Plum Creek	0	151	26	22	0	2.0	1.00	0.900
2	WB Crystal Valley	0	34	343	24	0	2.0	1.00	0.900
3	SB Plum Creek	0	37	16	24	0	2.0	1.00	0.900
4	EB Crystal Valley	0	60	451	92	0	2.0	1.00	0.900

Operational Results

2027 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB Plum Creek	None	199		548		142	1393		0.1428	
2	WB Crystal Valley	None	401		237		510	1897		0.2114	
3	SB Plum Creek	None	77		528		110	761		0.1012	
4	EB Crystal Valley	None	603		87		518	2049		0.2943	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Plum Creek	None	5.25		5.25	0.66		A		A
2	WB Crystal Valley	None	4.58		4.58	0.87		A		A
3	SB Plum Creek	None	6.48		6.48	0.36		A		A
4	EB Crystal Valley	None	5.27		5.27	1.45		A		A

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	590	15	10	506	1	0	0	26	1	1	1
Future Vol, veh/h	1	590	15	10	506	1	0	0	26	1	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	220	-	185	300	-	250	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	641	16	11	550	1	0	0	28	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	551	0	0	658	0	0	-	-	321	895	1232	275
Stage 1	-	-	-	-	-	-	-	-	-	572	572	-
Stage 2	-	-	-	-	-	-	-	-	-	323	660	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	-	-	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1015	-	-	926	-	-	0	0	675	236	176	722
Stage 1	-	-	-	-	-	-	0	0	-	473	503	-
Stage 2	-	-	-	-	-	-	0	0	-	663	458	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1015	-	-	926	-	-	-	-	675	223	174	722
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	223	174	-
Stage 1	-	-	-	-	-	-	-	-	-	467	497	-
Stage 2	-	-	-	-	-	-	-	-	-	635	458	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.01	0.17	10.57	19.13
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	675	1015	-	-	926	-	-	258
HCM Lane V/C Ratio	0.042	0.001	-	-	0.012	-	-	0.013
HCM Control Delay (s/veh)	10.6	8.6	-	-	8.9	-	-	19.1
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	3.1

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	60	0	3	1	0	15	1	122	1	27	102	9
Future Vol, veh/h	60	0	3	1	0	15	1	122	1	27	102	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	60	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	0	3	1	0	16	1	133	1	29	111	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	304	305	111	305	315	133	121	0	0	134	0	0
Stage 1	170	170	-	135	135	-	-	-	-	-	-	-
Stage 2	135	136	-	170	179	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	648	608	942	647	601	916	1467	-	-	1451	-	-
Stage 1	832	758	-	868	784	-	-	-	-	-	-	-
Stage 2	869	784	-	832	751	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	623	595	942	632	588	916	1467	-	-	1451	-	-
Mov Cap-2 Maneuver	623	595	-	632	588	-	-	-	-	-	-	-
Stage 1	816	743	-	867	784	-	-	-	-	-	-	-
Stage 2	852	783	-	813	736	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s/v	11.37	9.12	0.06	1.47
HCM LOS	B	A		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1467	-	-	891	633	1451	-	-
HCM Lane V/C Ratio	0.001	-	-	0.02	0.108	0.02	-	-
HCM Control Delay (s/veh)	7.5	-	-	9.1	11.4	7.5	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.4	0.1	-	-

LONG-RANGE (2045) CONDITIONS WITHOUT PROJECT LEVEL OF SERVICE AND QUEUING CALCULATIONS

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	NB Plum Creek	0	0	12.00	1	26.00	2	150.00	100.00	37.10
2	WB Crystal Valley	90	0	24.00	2	26.00	2	91.00	120.00	33.10
3	SB Plum Creek	180	0	12.00	1	15.00	1	47.00	100.00	43.50
4	EB Crystal Valley	270	0	24.00	2	26.00	2	94.00	120.00	24.60

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB Plum Creek	162.00	32.00	2	15.00	1	12.00	1
2	WB Crystal Valley	150.00	32.00	2	26.00	2	24.00	2
3	SB Plum Creek	150.00	32.00	2	15.00	1	12.00	1
4	EB Crystal Valley	142.00	22.00	1	26.00	2	24.00	2

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
2	WB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0
3	SB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
4	EB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0

Traffic Flow Data (veh/hr)

2045 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	NB Plum Creek	0	231	42	28	0	2.0	1.00	0.900
2	WB Crystal Valley	0	28	1028	89	0	2.0	1.00	0.900
3	SB Plum Creek	0	42	42	75	0	2.0	1.00	0.900
4	EB Crystal Valley	0	45	485	267	0	2.0	1.00	0.900

Operational Results

2045 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB Plum Creek	None	301		572		337	1377		0.2186	
2	WB Crystal Valley	None	1145		318		555	1836		0.6236	
3	SB Plum Creek	None	159		1287		176	464		0.3429	
4	EB Crystal Valley	None	797		112		1334	2022		0.3943	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Plum Creek	None	6.27		6.27	1.10		A		A
2	WB Crystal Valley	None	9.41		9.41	5.81		A		A
3	SB Plum Creek	None	15.03		15.03	1.99		C		C
4	EB Crystal Valley	None	7.16		7.16	2.90		A		A

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	724	27	16	1287	1	0	0	27	1	1	1
Future Vol, veh/h	1	724	27	16	1287	1	0	0	27	1	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	220	-	185	300	-	250	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	787	29	17	1399	1	0	0	29	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1400	0	0	816	0	0	-	-	393	1829	2252	699
Stage 1	-	-	-	-	-	-	-	-	-	1434	1434	-
Stage 2	-	-	-	-	-	-	-	-	-	396	818	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	-	-	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	484	-	-	807	-	-	0	0	606	48	41	382
Stage 1	-	-	-	-	-	-	0	0	-	141	198	-
Stage 2	-	-	-	-	-	-	0	0	-	601	388	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	484	-	-	807	-	-	-	-	606	44	40	382
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	44	40	-
Stage 1	-	-	-	-	-	-	-	-	-	138	193	-
Stage 2	-	-	-	-	-	-	-	-	-	571	387	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.02	0.12	11.25	68.73
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	606	484	-	-	807	-	-	60
HCM Lane V/C Ratio	0.048	0.002	-	-	0.022	-	-	0.055
HCM Control Delay (s/veh)	11.2	12.5	-	-	9.6	-	-	68.7
HCM Lane LOS	B	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.2

Intersection	
Int Delay, s/veh	0.9

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	1	35	226	1	21	290
Future Vol, veh/h	1	35	226	1	21	290
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	38	246	1	23	315

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	607	246	0	0	247	0
Stage 1	246	-	-	-	-	-
Stage 2	361	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	460	793	-	-	1319	-
Stage 1	795	-	-	-	-	-
Stage 2	705	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	452	793	-	-	1319	-
Mov Cap-2 Maneuver	452	-	-	-	-	-
Stage 1	795	-	-	-	-	-
Stage 2	693	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s/v	9.88	0	0.53
HCM LOS	A		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWL	SWT
Capacity (veh/h)	-	-	776	1319	-
HCM Lane V/C Ratio	-	-	0.05	0.017	-
HCM Control Delay (s/veh)	-	-	9.9	7.8	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	NB Plum Creek	0	0	12.00	1	26.00	2	150.00	100.00	37.10
2	WB Crystal Valley	90	0	24.00	2	26.00	2	91.00	120.00	33.10
3	SB Plum Creek	180	0	12.00	1	15.00	1	47.00	100.00	43.50
4	EB Crystal Valley	270	0	24.00	2	26.00	2	94.00	120.00	24.60

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB Plum Creek	162.00	32.00	2	15.00	1	12.00	1
2	WB Crystal Valley	150.00	32.00	2	26.00	2	24.00	2
3	SB Plum Creek	150.00	32.00	2	15.00	1	12.00	1
4	EB Crystal Valley	142.00	22.00	1	26.00	2	24.00	2

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
2	WB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0
3	SB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
4	EB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0

Traffic Flow Data (veh/hr)

2045 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	NB Plum Creek	0	265	42	28	0	2.0	1.00	0.900
2	WB Crystal Valley	0	72	825	59	0	2.0	1.00	0.900
3	SB Plum Creek	0	89	28	59	0	2.0	1.00	0.900
4	EB Crystal Valley	0	145	1087	217	0	2.0	1.00	0.900

Operational Results

2045 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB Plum Creek	None	335		1321		317	876		0.3824	
2	WB Crystal Valley	None	956		452		1204	1735		0.5509	
3	SB Plum Creek	None	176		1162		246	513		0.3434	
4	EB Crystal Valley	None	1449		189		1149	1938		0.7478	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Plum Creek	None	11.05		11.05	2.78		B		B
2	WB Crystal Valley	None	8.46		8.46	4.25		A		A
3	SB Plum Creek	None	13.80		13.80	1.92		B		B
4	EB Crystal Valley	None	12.81		12.81	11.93		B		B

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1376	15	10	1120	1	0	0	26	1	1	1
Future Vol, veh/h	1	1376	15	10	1120	1	0	0	26	1	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	220	-	185	300	-	250	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1496	16	11	1217	1	0	0	28	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1218	0	0	1512	0	0	-	-	748	1989	2753	609
Stage 1	-	-	-	-	-	-	-	-	-	1239	1239	-
Stage 2	-	-	-	-	-	-	-	-	-	750	1514	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	-	-	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	568	-	-	438	-	-	0	0	355	36	19	438
Stage 1	-	-	-	-	-	-	0	0	-	186	246	-
Stage 2	-	-	-	-	-	-	0	0	-	369	181	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	568	-	-	438	-	-	-	-	355	32	19	438
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	32	19	-
Stage 1	-	-	-	-	-	-	-	-	-	181	240	-
Stage 2	-	-	-	-	-	-	-	-	-	339	180	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.01	0.12	16.02	118.87
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	355	568	-	-	438	-	-	35
HCM Lane V/C Ratio	0.08	0.002	-	-	0.025	-	-	0.094
HCM Control Delay (s/veh)	16	11.3	-	-	13.4	-	-	118.9
HCM Lane LOS	C	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.3

Intersection	
Int Delay, s/veh	0.8

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	1	18	293	1	32	245
Future Vol, veh/h	1	18	293	1	32	245
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	20	318	1	35	266

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	655	319	0	0	320	0
Stage 1	319	-	-	-	-	-
Stage 2	336	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	431	722	-	-	1240	-
Stage 1	737	-	-	-	-	-
Stage 2	724	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	419	722	-	-	1240	-
Mov Cap-2 Maneuver	419	-	-	-	-	-
Stage 1	737	-	-	-	-	-
Stage 2	704	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s/v	10.34	0	0.92
HCM LOS	B		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWL	SWT
Capacity (veh/h)	-	-	695	1240	-
HCM Lane V/C Ratio	-	-	0.03	0.028	-
HCM Control Delay (s/veh)	-	-	10.3	8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

LONG-RANGE (2045) CONDITIONS
WITH PROJECT
LEVEL OF SERVICE AND QUEUING
CALCULATIONS

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	NB Plum Creek	0	0	12.00	1	26.00	2	150.00	100.00	37.10
2	WB Crystal Valley	90	0	24.00	2	26.00	2	91.00	120.00	33.10
3	SB Plum Creek	180	0	12.00	1	15.00	1	47.00	100.00	43.50
4	EB Crystal Valley	270	0	24.00	2	26.00	2	94.00	120.00	24.60

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB Plum Creek	162.00	32.00	2	15.00	1	12.00	1
2	WB Crystal Valley	150.00	32.00	2	26.00	2	24.00	2
3	SB Plum Creek	150.00	32.00	2	15.00	1	12.00	1
4	EB Crystal Valley	142.00	22.00	1	26.00	2	24.00	2

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
2	WB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0
3	SB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
4	EB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0

Traffic Flow Data (veh/hr)

2045 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	NB Plum Creek	0	239	44	30	0	2.0	1.00	0.900
2	WB Crystal Valley	0	36	1028	89	0	2.0	1.00	0.900
3	SB Plum Creek	0	42	50	75	0	2.0	1.00	0.900
4	EB Crystal Valley	0	45	485	270	0	2.0	1.00	0.900

Operational Results

2045 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB Plum Creek	None	313		572		356	1377		0.2273	
2	WB Crystal Valley	None	1153		328		557	1828		0.6306	
3	SB Plum Creek	None	167		1303		178	457		0.3651	
4	EB Crystal Valley	None	800		128		1342	2004		0.3992	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Plum Creek	None	6.38		6.38	1.16		A		A
2	WB Crystal Valley	None	9.56		9.56	6.01		A		A
3	SB Plum Creek	None	15.76		15.76	2.23		C		C
4	EB Crystal Valley	None	7.28		7.28	2.98		A		A

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	759	27	16	1295	1	0	0	27	1	1	1
Future Vol, veh/h	1	759	27	16	1295	1	0	0	27	1	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	220	-	185	300	-	250	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	825	29	17	1408	1	0	0	29	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1409	0	0	854	0	0	-	-	413	1857	2299	704
Stage 1	-	-	-	-	-	-	-	-	-	1442	1442	-
Stage 2	-	-	-	-	-	-	-	-	-	415	857	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	-	-	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	480	-	-	781	-	-	0	0	589	45	38	380
Stage 1	-	-	-	-	-	-	0	0	-	139	196	-
Stage 2	-	-	-	-	-	-	0	0	-	586	372	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	480	-	-	781	-	-	-	-	589	42	37	380
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	42	37	-
Stage 1	-	-	-	-	-	-	-	-	-	136	191	-
Stage 2	-	-	-	-	-	-	-	-	-	555	371	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.02	0.12	11.44	72.76
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	589	480	-	-	781	-	-	56
HCM Lane V/C Ratio	0.05	0.002	-	-	0.022	-	-	0.058
HCM Control Delay (s/veh)	11.4	12.5	-	-	9.7	-	-	72.8
HCM Lane LOS	B	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.2

Intersection	
Int Delay, s/veh	1.2

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	12	0	1	1	0	35	3	226	1	21	290	19
Future Vol, veh/h	12	0	1	1	0	35	3	226	1	21	290	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	60	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	0	1	1	0	38	3	246	1	23	315	21

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	613	614	315	614	634	246	336	0	0	247	0	0
Stage 1	361	361	-	253	253	-	-	-	-	-	-	-
Stage 2	252	253	-	361	382	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	405	407	725	404	396	793	1223	-	-	1319	-	-
Stage 1	658	626	-	752	698	-	-	-	-	-	-	-
Stage 2	752	698	-	658	613	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	378	399	725	396	388	793	1223	-	-	1319	-	-
Mov Cap-2 Maneuver	378	399	-	396	388	-	-	-	-	-	-	-
Stage 1	646	615	-	750	696	-	-	-	-	-	-	-
Stage 2	714	696	-	645	602	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s/v	14.53	9.92	0.1	0.49
HCM LOS	B	A		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1223	-	-	771	392	1319	-	-
HCM Lane V/C Ratio	0.003	-	-	0.051	0.036	0.017	-	-
HCM Control Delay (s/veh)	8	-	-	9.9	14.5	7.8	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0.1	-	-

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	NB Plum Creek	0	0	12.00	1	26.00	2	150.00	100.00	37.10
2	WB Crystal Valley	90	0	24.00	2	26.00	2	91.00	120.00	33.10
3	SB Plum Creek	180	0	12.00	1	15.00	1	47.00	100.00	43.50
4	EB Crystal Valley	270	0	24.00	2	26.00	2	94.00	120.00	24.60

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB Plum Creek	162.00	32.00	2	15.00	1	12.00	1
2	WB Crystal Valley	150.00	32.00	2	26.00	2	24.00	2
3	SB Plum Creek	150.00	32.00	2	15.00	1	12.00	1
4	EB Crystal Valley	142.00	22.00	1	26.00	2	24.00	2

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
2	WB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0
3	SB Plum Creek	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
4	EB Crystal Valley	0	1.000	0	1.000	20.00	3584	0	24.00	3584	0

Traffic Flow Data (veh/hr)

2045 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	NB Plum Creek	0	306	51	38	0	2.0	1.00	0.900
2	WB Crystal Valley	0	76	825	59	0	2.0	1.00	0.900
3	SB Plum Creek	0	89	32	59	0	2.0	1.00	0.900
4	EB Crystal Valley	0	145	1087	219	0	2.0	1.00	0.900

Operational Results

2045 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB Plum Creek	None	395		1321		327	876		0.4508	
2	WB Crystal Valley	None	960		502		1214	1698		0.5655	
3	SB Plum Creek	None	180		1207		255	495		0.3637	
4	EB Crystal Valley	None	1451		197		1190	1929		0.7522	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Plum Creek	None	12.62		12.62	3.88		B		B
2	WB Crystal Valley	None	8.82		8.82	4.58		A		A
3	SB Plum Creek	None	14.68		14.68	2.14		B		B
4	EB Crystal Valley	None	13.02		13.02	12.30		B		B

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1394	15	10	1161	1	0	0	26	1	1	1
Future Vol, veh/h	1	1394	15	10	1161	1	0	0	26	1	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	220	-	185	300	-	250	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1515	16	11	1262	1	0	0	28	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1263	0	0	1532	0	0	-	-	758	2043	2817	631
Stage 1	-	-	-	-	-	-	-	-	-	1284	1284	-
Stage 2	-	-	-	-	-	-	-	-	-	760	1534	-
Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	-	-	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	546	-	-	431	-	-	0	0	350	33	18	424
Stage 1	-	-	-	-	-	-	0	0	-	174	234	-
Stage 2	-	-	-	-	-	-	0	0	-	364	177	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	546	-	-	431	-	-	-	-	350	29	17	424
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	29	17	-
Stage 1	-	-	-	-	-	-	-	-	-	170	228	-
Stage 2	-	-	-	-	-	-	-	-	-	334	176	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.01	0.12	16.19	131.51
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	350	546	-	-	431	-	-	32
HCM Lane V/C Ratio	0.081	0.002	-	-	0.025	-	-	0.103
HCM Control Delay (s/veh)	16.2	11.6	-	-	13.6	-	-	131.5
HCM Lane LOS	C	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.3

Intersection	
Int Delay, s/veh	2.3

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	60	0	3	1	0	18	1	293	1	32	245	9
Future Vol, veh/h	60	0	3	1	0	18	1	293	1	32	245	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	60	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	0	3	1	0	20	1	318	1	35	266	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	657	658	266	657	667	319	276	0	0	320	0	0
Stage 1	336	336	-	321	321	-	-	-	-	-	-	-
Stage 2	321	322	-	336	346	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	378	384	772	378	380	722	1287	-	-	1240	-	-
Stage 1	678	642	-	691	652	-	-	-	-	-	-	-
Stage 2	691	651	-	678	636	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	358	373	772	366	369	722	1287	-	-	1240	-	-
Mov Cap-2 Maneuver	358	373	-	366	369	-	-	-	-	-	-	-
Stage 1	659	624	-	690	651	-	-	-	-	-	-	-
Stage 2	672	651	-	656	618	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s/v	17.05	10.41	0.03	0.89
HCM LOS	C	B		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1287	-	-	686	367	1240	-	-
HCM Lane V/C Ratio	0.001	-	-	0.03	0.187	0.028	-	-
HCM Control Delay (s/veh)	7.8	-	-	10.4	17	8	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.7	0.1	-	-