TRANSPORTATION PLANNERS AND ENGINEERS

Greater Bragg Creek Transportation Network Analysis

Final Report

Final

Prepared for

Rocky View County

Date

September 29,2025

Project Number

02-24-0168

Bunt & Associates acknowledges and respects the Traditional Territories upon which our work spans, and from which we benefit. We are grateful for the unique cultures and histories of Indigenous Peoples that enrich our understanding and connection to the lands we call home. We honour learning, listening, and truth in our journey to reconciliation.

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Written with respect and gratitude for the Traditional Territories upon which we work and live.

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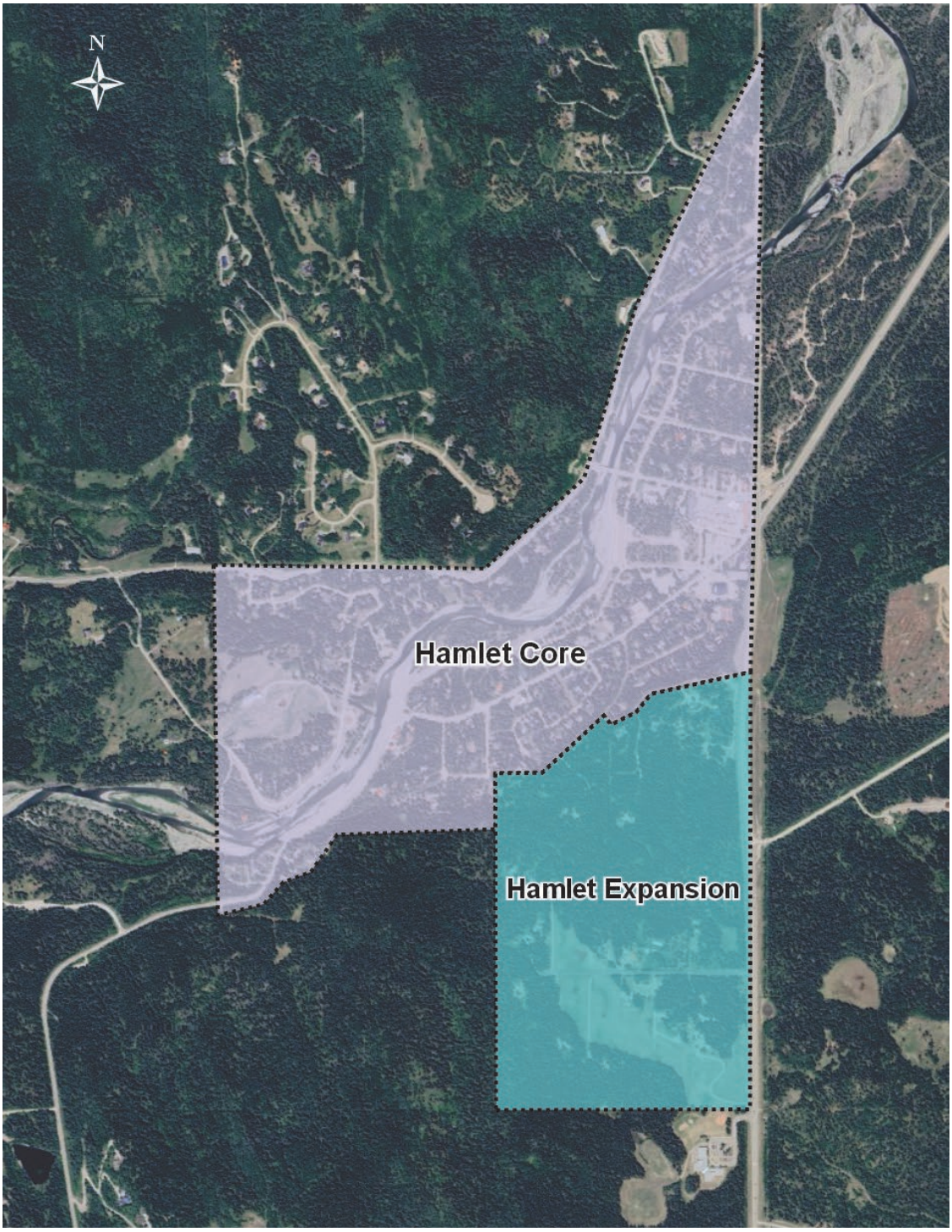
1. STUDY BACKGROUND & OBJECTIVES

Bunt & Associates Engineering Ltd. (Bunt) was engaged by Rocky View County (RVC) to undertake a review of the Greater Bragg Creek transportation network. This analysis will be used by Rocky View as part of an amendment to their Area Structure Plan (ASP) for the Bragg Creek Hamlet Growth Area, which encompasses the Hamlet Core and Hamlet Expansion lands as shown in **Figure 1.1**. The Proposal submitted by Bunt and approved by RVC can be found in **Appendix A**.

The Hamlet of Bragg Creek (Bragg Creek) is challenged by three main transportation constraints, all of which are related. One involves the limitation of access to West Bragg Creek as a result of a single bridge crossing of the Elbow River. The second involves the requirement for the vast majority of in and outbound Bragg Creek destined traffic to pass through the closely spaced trio of Highway 22 intersections at Balsam Avenue/Burnside Drive/White Avenue. The third involves limitations in additional access opportunities due to geography and/or external control of certain roadway corridors.

The goal of this study was to assess expected growth options within the area and identify expected impacts and develop transportation mitigation measures worthy of consideration in managing that growth. The three main transportation constraints to the area create issues related to traffic congestion, bike/pedestrian mobility and safety, as well as emergency vehicle accessibility and evacuation planning. It is these issues that the transportation study had to consider, assess and mitigate.

Figure 1.1: Bragg Creek Hamlet Core and Expansion



2. PROCESS & METHODOLOGY

In completing the transportation work in support of the ASP, Bunt focused on the following main goals:

- Ensuring all available data was acquired and interpreted appropriately, with due consideration of seasonal variations in traffic.
- Respecting and considering local characteristics in traffic flow and other factors that would impact the metrics used in assessing intersections.
- Recognizing that the interest in a second river crossing is related to emergency response, active modes mobility/connectivity as well as, but not exclusively because of, the desire of or need for future traffic capacity.

The work program for this study was broken down and completed in stages. Two workpapers were completed and submitted to RVC for review and consideration before blending the resulting conclusions and recommendations into a Final Report document. A detailed summary of the methodology outlined for each workpaper is summarized in **Section 2.1**and **Section2.2**. The full Workpaper 1 report can be found in **Appendix B** and the Response to Comments in **Appendix C**. The full Workpaper 2 report can be found in **Appendix D**.

2.1 Workpaper 1

The task for Workpaper 1 was to undertake and report on the following tasks:

- Data collection and preliminary analysis of existing conditions, including identification of peak traffic period.
- Analysis of existing conditions to identify existing pinch points where congestion, connectivity or safety are of concern.
- Analysis of the existing active transportation network, and identification of any future active transportation improvement plans.
- Re-assignment of existing volumes during peak periods to assess the impact of providing a second access to West Bragg Creek / Wintergreen (West Bragg). Re-analysis of key locations after re-assigning traffic to account for a second river access.
- Observations and conclusions related to the existing network and anticipated impacts of providing a second access.

2.2 Workpaper 2

Workpaper 2 built on the findings of Workpaper 1 and the subsequent commentary provided by RVC through the review process. Workpaper 2 then continued where Workpaper 1 left off and undertook to assess and report on the following tasks:

- Collection and summary of peak hour volumes (i.e. during the summer weekend period) at key intersections identified in Workpaper 1.
- Develop forecasts of future traffic volumes using counted peak hour volumes and anticipated future development site traffic.

- Analysis of future forecast conditions to identify/confirm pinch points determined in Workpaper 1.
- Re-assignment of future volumes during peak period to assess the impact of providing network improvements. Re-analysis to account for a roundabout at Highway 22, or signalization at Highway 22 & Balsam Avenue.
- Re-assignment of future volumes during peak periods to assess the impact of providing a second access to West Bragg. Re-analysis to account for a second river access to the North or West of the existing Balsam Avenue bridge.
- Re-assignment of future volumes during peak periods to assess the impact of providing a combined solution including an improvement to Highway 22, and a second access to West Bragg. Re-analysis of pinch points to account for these solutions.
- Identification of gaps in the network, locations where improvements would differ between all analyzed improvement options. Identification of the best and most appropriate road network mitigations and improvements.
- Summarize findings and develop a phasing plan for of improvements necessary to accommodate growth over multiple horizons.

3. CONCLUSIONS

3.1 Existing Conditions

3.1.1 Design Period

The data collected by Bunt throughout the winter and summer of 2025 was amalgamated and assessed to establish the baseline design period for analysis. This involved determining the busiest time of the year, week, and day for conservative, robust, and accurate conclusions to be drawn. This is discussed in more detail in Workpaper 1.

Conclusion: The Summer Weekend Peak Hour was found to best represent the design period and was subsequently used as a basis for analysis in the report.

3.1.2 Safety Pinch Points

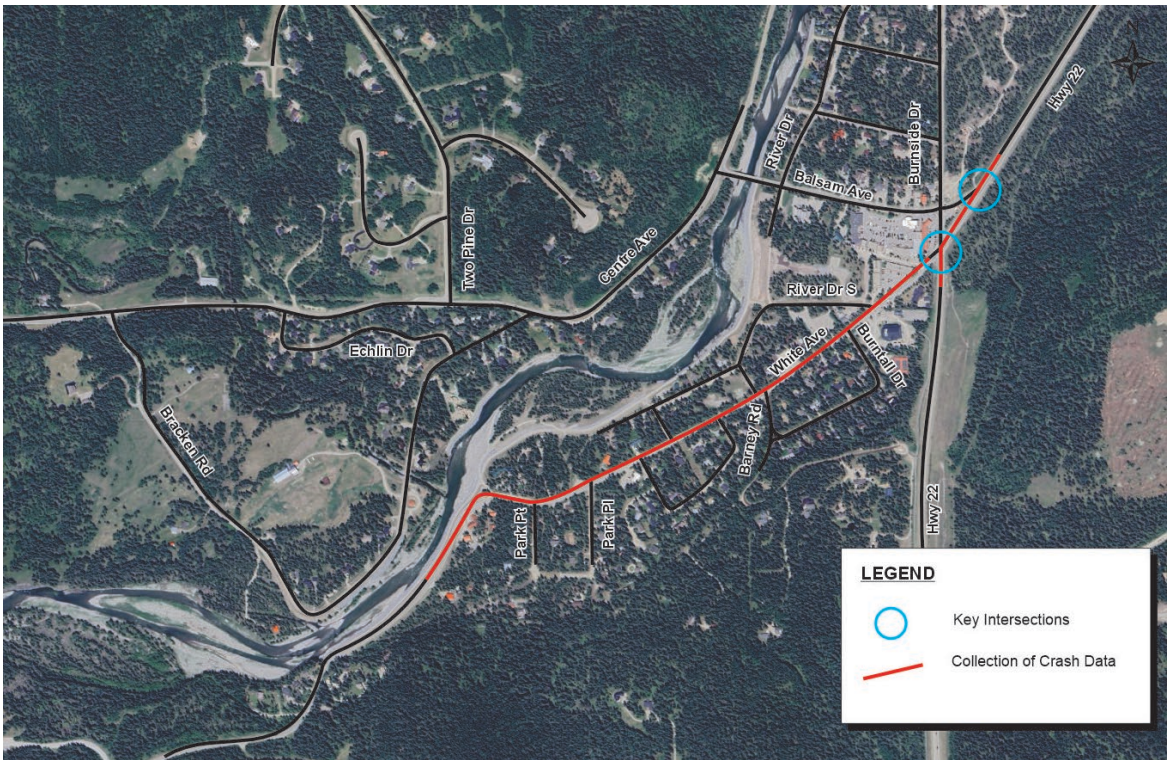
The collision history for highways surrounding Bragg Creek determined that the intersection at Highway 22/Burnside Drive & Highway 22/White Avenue, and Highway 22 & Balsam Avenue are areas of safety concern. The location of data collection and pinch points are displayed in **Figure 1.1** and discussed in detail in Workpaper 1.

Conclusion: The outcome of the work program identified several short-term improvements to this location for consideration by RVC and TEC with or without consideration of longer-term capacity resolution solutions or designs for these intersections. These are identified in Workpaper 2.

Also worth noting is that at present, the West Bragg area is accessible only via the Balsam Avenue bridge. A second access to this area would be beneficial in terms of emergency accessibility as well as road network capacity and active transportation network planning. The focus of this study was related to

capacity and as such, the second access to West Bragg was viewed through that lens. As a practical application, emergency accessibility would be immediately beneficial and as such, should be given due consideration by RVC regardless of the timelines being assessed in this study.

Figure 3.1: Location of Collision Data Collection and Safety Pinch Points



3.1.3 Volume Capacity Pinch Points

While the installation of the traffic signal at Highway 22/Burnside Drive & Highway 22/White Avenue in May 2021 has improved the ability to accommodate peak seasonal traffic volumes, constraints to capacity and queues continue to exist. A long-term plan for improvements at the trio of intersections at Highway 22 is unquestionably required to accommodate future horizon volumes.

Conclusion: The existing road network will not support future growth within the Hamlet. Network improvements will be required.

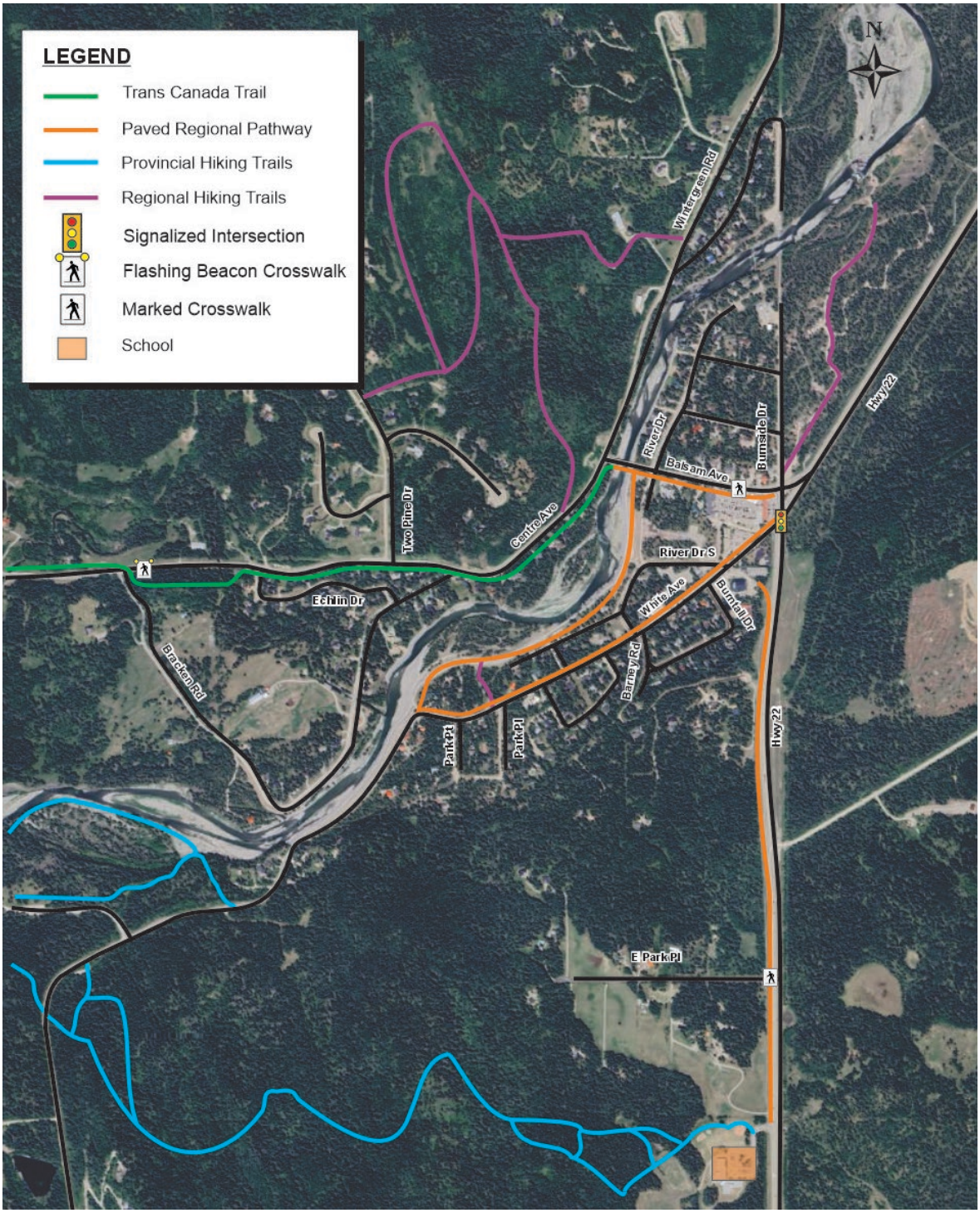
3.1.4 Active Transportation

The Active modes network is quite robust in terms of linear connectivity west of the Balsam Avenue bridge access on both sides of the river, as well as connecting the Hamlet Core to the Banded Peak school site atop the hill, south on Highway 22. However, the main network is essentially W-shaped and would benefit from additional connectivity to enhance access and usage by residents and visitors. Proposed improvements to active transport have been recommended for the Hamlet in Bragg Creek in previous

studies. The existing active transportation network is illustrated in **Figure 3.2** and includes a variety of formal connections throughout the community.

Conclusion: All on-going efforts to develop further active transport connectivity within the network should be pursued. The ability to accommodate these future connections is linked to, but not dependent on, future decisions made by RVC regarding locations for secondary access to West Bragg.

Figure 3.2: Active Transport Network



3.2 End State Conditions

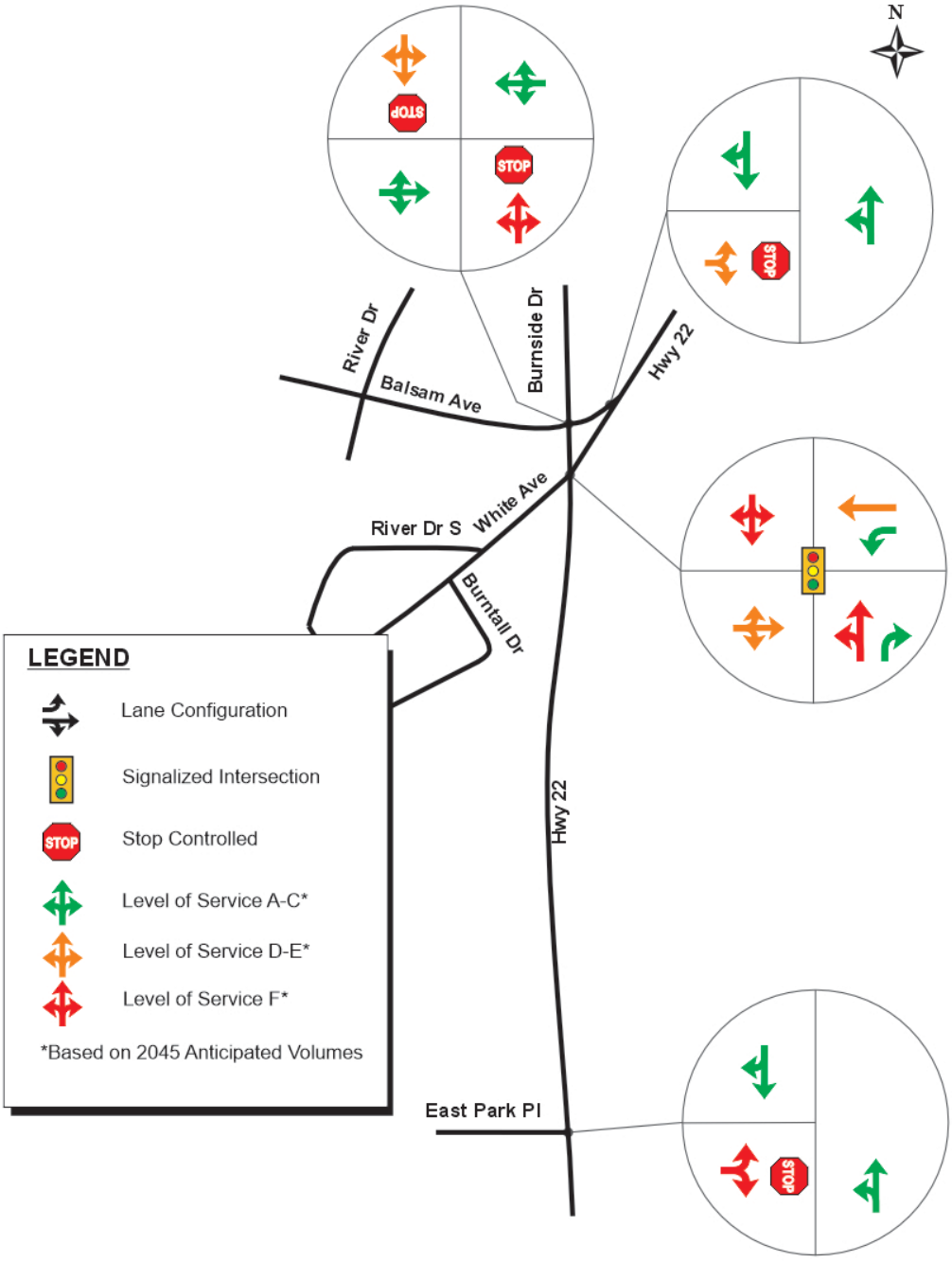
3.2.1 Overview

Specific locations and issues of concern identified in the capacity analysis of the Bragg Creek network were the trio of intersections at Highway 22, and the intersection at Highway 22 & East Park Place (once adjacent development is completed). Early analysis of 2045 conditions with full development of the Hamlet area established that future traffic conditions will fully saturate the network and necessitate improvements. Major roadway design improvements at the key pinch point, the trio of intersections at Highway 22/Balsam Avenue/White Avenue, will be required, and were explored as well as the impact of providing a second access to the West Bragg Creek area.

A summary of 2045 conditions at these pinch points is displayed in **Figure 3.3.** The Level of Service rating is based on average vehicle delays with A indicating minimal delays, and F indicating significant delays.

Conclusion: Any and all on-going efforts to develop and implement design solutions for the trio of intersections at Highway 22/Balsam Avenue/White Avenue should continue to be pursued with the goal of implementing upgraded intersections as soon as reasonably possible. As well, signalization of the Highway 22/East Park Place intersection should accompany the development of the lands in that area.

Figure 3.3: Capacity Conditions at Pinch Points



In terms of the major roadway design improvements, two preliminary options were explored, as follows:

- **Roundabout Option**: The three intersections at Highway 22 converted into a single multi-leg roundabout.
- **Modified Signalised Option**: The three intersections at Highway 22 converted into four modified intersections, with the intersection of Highway 22 & Balsam Avenue signalised.

Both of these options have been considered in the past but the purpose of this exercise was to test the principle of the design ideals with up to date traffic forecast data to test the relative effectiveness of the options. To be clear, no designs have been approved for these intersections and this analysis sought to create a relative comparison based on a realistic set of design principles.

As well, two fundamental options for a second point of access were explored. A West Access which was assumed to be located west/upstream of the existing Balsam Avenue bridge, and a North Access which was assumed to be located to the northeast/downstream as an extension of Wintergreen Road. It is understood that this latter connection is currently the preferred option for RVC. High level conceptual plans showing the general location of the two access options are displayed in **Figure 3.4.**

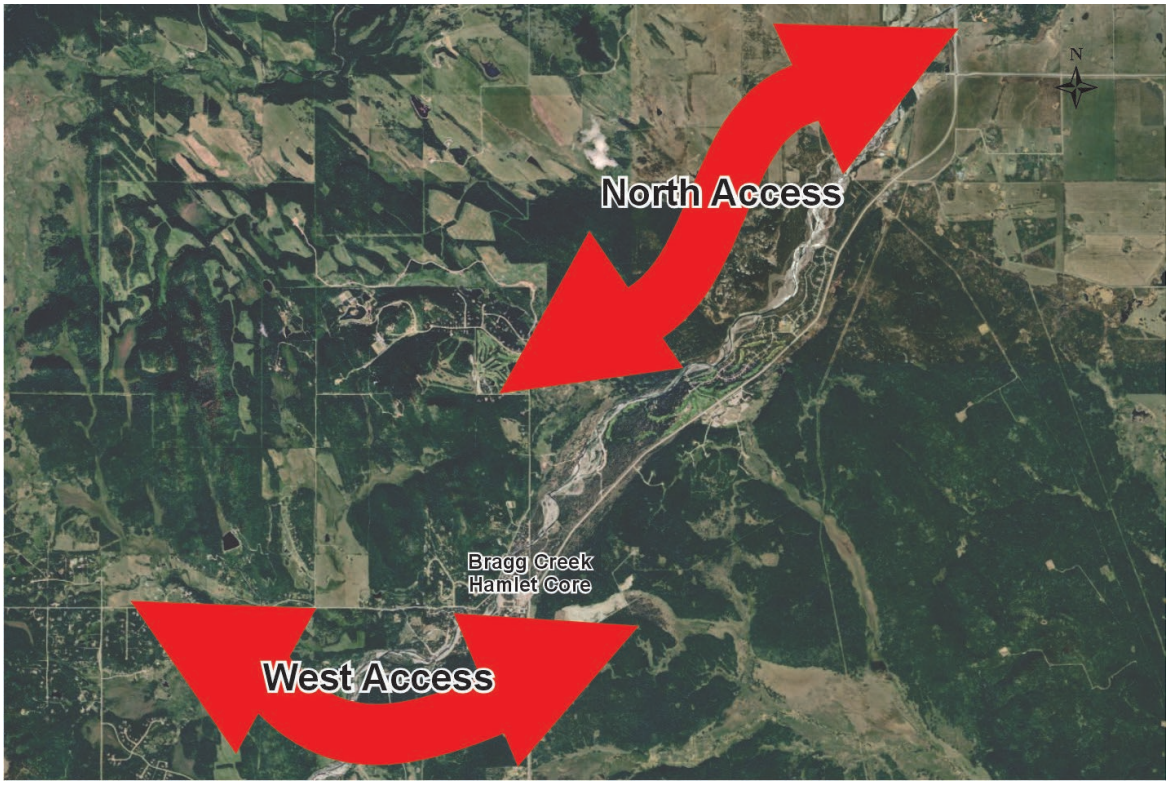
3.2.2 Findings

The results of the 2045 analysis confirmed the following and the full development of assumptions, methodology and analysis are outlined in Workpaper 2:

- The provision of a second crossing of the Elbow River to West Bragg does not resolve the future congestion issues related to the trio of intersections at Highway 22/Balsam Avenue/White Avenue. There is a modest positive impact on overall traffic operations as a result of adding a connection, but the primary benefit of the connection is related to emergency access and active transportation network planning.
- Of the two major intersection improvements considered for the intersections at Highway 22/Balsam Avenue/White Avenue, the roundabout option was found to provide a larger overall benefit to traffic congestion and accommodation than the signalized option. It was found that the roundabout option would accommodate the 2045 design period traffic flows using estimated future volumes.
- The combination of a roundabout and a second access to West Bragg was found to further enhance overall traffic conditions, particularly if the North Access option were to be selected.
- Signalization of the Highway 22/East Park Place intersection will also be required at the time of development of the adjacent lands.

Conclusions: RVC and TEC should continue to work towards developing and implementation a roundabout at the Highway 22/Balsam Avenue/White Avenue intersection, together with the provision of a second access to West Bragg.

Figure 3.4: Potential Second West Bragg / Wintergreen Access Options



3.3 Phasing of Improvements

As noted, provision of a second access to West Bragg would not in and of itself provide sufficient improvement to the overall network. However, the combination of a roundabout at the Highway 22 intersections with a second access to West Bragg would improve overall conditions. From a capacity improvement standpoint, a North Access option is preferred compared to a West access option. However, it is recommended that design options and phasing be considered based on both the technical findings and external factors such as community connectivity, active transportation, and emergency access. Active transport conditions found that a West Access would have a greater overall positive impact on connectivity compared to a North Access.

A summary of the specific improvements and their recommended timeline are summarized in **Table 3.1**. Timing of improvements was broken into a two-phased plan. These phases are as follows:

- **Phase 1:** Refers to improvements required prior to 2035.
- **Phase 2:** Refers to improvements required prior to 2045. These improvements are not restricted to being implemented after Phase 1, though they are not required prior to 2035.

Table 3.1: Summary of Recommendations

IMPROVEMENT	PHASE	OPTION	COMMENTS
Improvements to existing signal at Highway 22/Burnside Drive & Highway 22/White Avenue	Interim	Adjustments to Signal	The existing signalization hardware at the intersection poses concerns regarding safety and operational conditions. Interim adjustments should be made until improvements are implemented at the intersections on Highway 22 at Balsam Ave/White Ave.
Improvements to Intersections on Highway 22 at Balsam Ave/White Ave	Phase 1 (2035)	Roundabout Option	Roundabout Option would accommodate Phase 1 traffic and have the greatest positive impact on the forecast volumes. Northbound right-only limitation at Burnside Drive & Balsam Avenue recommended to be implemented in tandem with roundabout.
		Signalised Option	Signalised Option would accommodate Phase 1. However, capacity would not be met after Phase 1 even with the provision of second access to West Bragg.
Second Access to West Bragg	Phase 2 (2045)	Second Access	While a second access would have a modest impact on accommodating additional traffic capacity, the primary purpose would be to establish additional emergency access routing and improved active modes network planning. In terms of capacity, the North Access option provides the most positive benefit to the overall network.
Highway 22 & East Park Place	Phase 2*	Signalisation	Signalisation warranted upon the completion of Development Site 5.

*Falls withing Phase 2 timeline, but it is recommended to be implemented in tandem with the development of the Proposed Development Site 5.

APPENDIX A

Proposal

ROCKY VIEW COUNTY
RFP 24-018

TRANSPORTATION NETWORK ANALYSIS GREATER BRAGG CREEK ASP REVIEW

SUBMITTED October 22, 2024

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OUR VISION

All communities are healthy and connected in equitable and sustainable ways.

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bunt&associates has been the transportation consultant of choice for hundreds of repeat public and private sector clients for 30 years. **Our reputation is the result of our values** - doing the right things for the right reasons and doing them well, while providing fulfilling careers for our employees, working as a team, and delivering exceptional service and successful projects for our clients.

OUR UNDERSTANDING

There are many rural municipalities in the Calgary region that experience surges in visitation due to their popularity as recreational destinations, or simply because they are beautiful places to visit. Bragg Creek is perhaps the busiest of those options surrounding Calgary after the Kananaskis area on Highway 40 and Banff National Park itself.

Rocky View County (RVC) is undertaking an amendment to an existing Area Structure Plan (ASP) within Bragg Creek. Specifically, this ASP Amendment examines the Hamlet Growth Area, including the Hamlet Core and Hamlet Expansion lands. The goal of the transportation exercise is to assess expected growth options within the area and identify expected impacts and develop transportation mitigation measures worthy of consideration in managing that growth.

To this end, Bragg Creek is challenged by three main transportation constraints, all of which are related. One involves the limitation of access to West Bragg Creek as a result of a single bridge crossing of the Elbow River. The second involves the requirement for the vast majority of in and outbound Bragg Creek destined traffic to pass through the closely spaced pair of Highway 22 intersections at Balsam Avenue and Burnside Drive/Highway 758. The third involves limitations in additional access opportunities due to geography and/or external control of certain roadway corridors. These three constraints currently throttle the accessibility and permeability of Bragg Creek, and create issues related to traffic congestion, bike/pedestrian mobility and safety, as well as emergency vehicle accessibility and evacuation planning. It is these issues that the transportation study must consider, assess and mitigate to the extent possible.

In completing the transportation work in support of the ASP, Bunt would focus on the following main goals:

- **Ensure that all available data has been acquired and interpreted appropriately, with due consideration of seasonal variations in traffic. The summer, winter and off-season traffic volumes differ within the Bragg Creek region.** One such driver of this variance is the West Bragg Creek Day Use Area, which has seen usage expand substantially in recent years during all times of the year, but with different levels of use occurring at different times of the year and on different days of the week. For these reasons Bunt proposes to include a traffic network analysis at key locations that assesses Weekend fair-weather traffic conditions in addition to the traditional Weekday AM/PM peak hours normally assessed in a typical ASP exercise, and as typically provided by the RVC forecasting model. The unique placement of Bragg Creek as a recreational destination, the wide variations in traffic volumes caused by seasonal and daily weather conditions, and the substantive frequency with which those conditions occur render an assessment of Weekend conditions crucial to understanding the operational limitations and opportunities within the network.
- **Respect and consider local characteristics in traffic flow related to the propensity for larger vehicles, horse trailers, local driver habits, weather and other factors that would impact the metrics used in assessing intersections such as saturation flows, peak hour factors and heavy vehicle proportions.** Substantive observations and local measurements on more than just baseline traffic volumes will need to be collected and assessed. Generic industry standards may not be as appropriate for use here as would be the case in other locations such as the City of Calgary.
- **Recognition that the need for a second river crossing is related to emergency response, active modes mobility/network permeability as well as but not exclusively because of future traffic capacity.** There will be impacts to adjacent residents of any corridor that is selected for this crossing and balancing the need for the crossing on the basis of network permeability and emergency response versus purely for vehicle capacity will need to be assessed carefully, and in detail. At the end of the day, even with a second crossing, most traffic may still have to pass through the same intersection pair on Highway 22 to enter or leave the area, and so capacity alone may not be the heaviest influence on the need for the second crossing. The optics of this situation will need to be carefully and fully assessed and presented in order to provide the public and RVC the best and most objective conclusions and recommendations.

Key to the understanding of the project is the recognition that a considerable amount of work has been completed previously in terms of transportation planning and traffic analysis, and that the goal of this RFP is to build on top of that work and not undertake a wholesale re-do of effort. There is no need to re-invent any wheels, and so the focus of the Bunt Team would be efficiency, and on ensuring that key pressure point items are given more attention while concurrently reducing effort on items where solutions are either already known or easily confirmed.

There are many rural municipalities in the Calgary region that experience surges in visitation due to their popularity as recreational destinations, or simply because they are beautiful places to visit. Bragg Creek is perhaps the busiest of those options surrounding Calgary after the Kananaskis area on Highway 40 and Banff National Park itself. This is not lost on the Hamlet residents that experience those surges, nor is it lost on Bunt as the firm potentially tasked with assessing the traffic conditions as they exist today, and as they may exist tomorrow. Bunt welcomes the challenge, and the opportunity to be involved.

METHODOLOGY

OVERVIEW

The RFP for the project is well written and extremely clear in terms of expectations related to the necessary Transportation Network Analysis. The goal of the exercise is to undertake an analysis of future development impacts related to the build-out of the ASP, using available data and resources (augmenting those as necessary, and avoiding any unnecessary duplication of previous efforts) and submitting a report that builds on the previous 2020 Transportation Network Review, compliments the amended ASP document, and provides insight and recommendations into the accommodation of future traffic growth.

The methodology used by Bunt will be clear, simple and iterative in order to respond to any shifts in thinking that become necessary should the initial results show unexpected or unmanageable outcomes. The basic methodology will be as follows:

- Collect and review all available data as outlined in the RFP, and undertake discussions with RVC, TEC and other affected parties as directed by RVC.
- Identify any gaps in the data and undertake necessary additional data collection (in-field surveys and/or desktop research) as necessary. Note that one specific item recommended and included in the Bunt program will be the collection of Weekend Peak Period data at key locations. The Weekday Peak Period will continue to be the main design period for the future analysis, but an understanding of Weekday AM and Weekend Peak Period conditions at several key locations will be vital in ensuring that adequate attention and mitigation consideration has been given to an ongoing congestion concern raised previously by residents. Other data to be collected that was not identified in the RFP will be crash history data at several key locations.
- Analyse the data to identify/confirm existing hot spots where congestion, permeability or safety are currently of concern and identify any immediate mitigation opportunities to resolve or at least improve those situations. This will not be an exhaustive exercise but will be important in terms of setting the stage for future growth analysis. Note that this task would be completed for all of the Weekday AM, PM and Weekend Peak Periods, recognizing that the availability of output data from the RVC model will be limited to the Weekday PM Peak Hour.
- Review the ASP development program and compare it with the RVC forecast model assumptions. It has been assumed for the purpose of budgeting that the ASP goals will not yet be included in the available RVC forecast model, and that a linear extrapolation of the current model outputs will be necessary to develop updated Weekday PM Peak Period volumes for each of the 5, 10 and 20 year fast/slow scenarios, and that a wholesale updated run of the model will not be undertaken by RVC. The model and the future analysis in the previous 2020 Transportation Network Study were wholly based on the Weekday PM Period. While this is appropriate for purposes of assessing link capacities and many critical intersection movements, the absence of an AM analysis in particular may miss key aspects of the network operation that could be critical to maintaining operational mobility at an acceptable level. Bunt views the Weekday AM assessment as vital to the process. The extension to also include the Weekend Peak Period is also germane in this regard, but only at key locations.
- Complete a sensitivity analysis to review the impact of adding a secondary access to West Bragg Creek. This will represent a monumental shift in how the Hamlet functions in terms of both internal traffic as well as through traffic. A considered reassignment of existing traffic will be

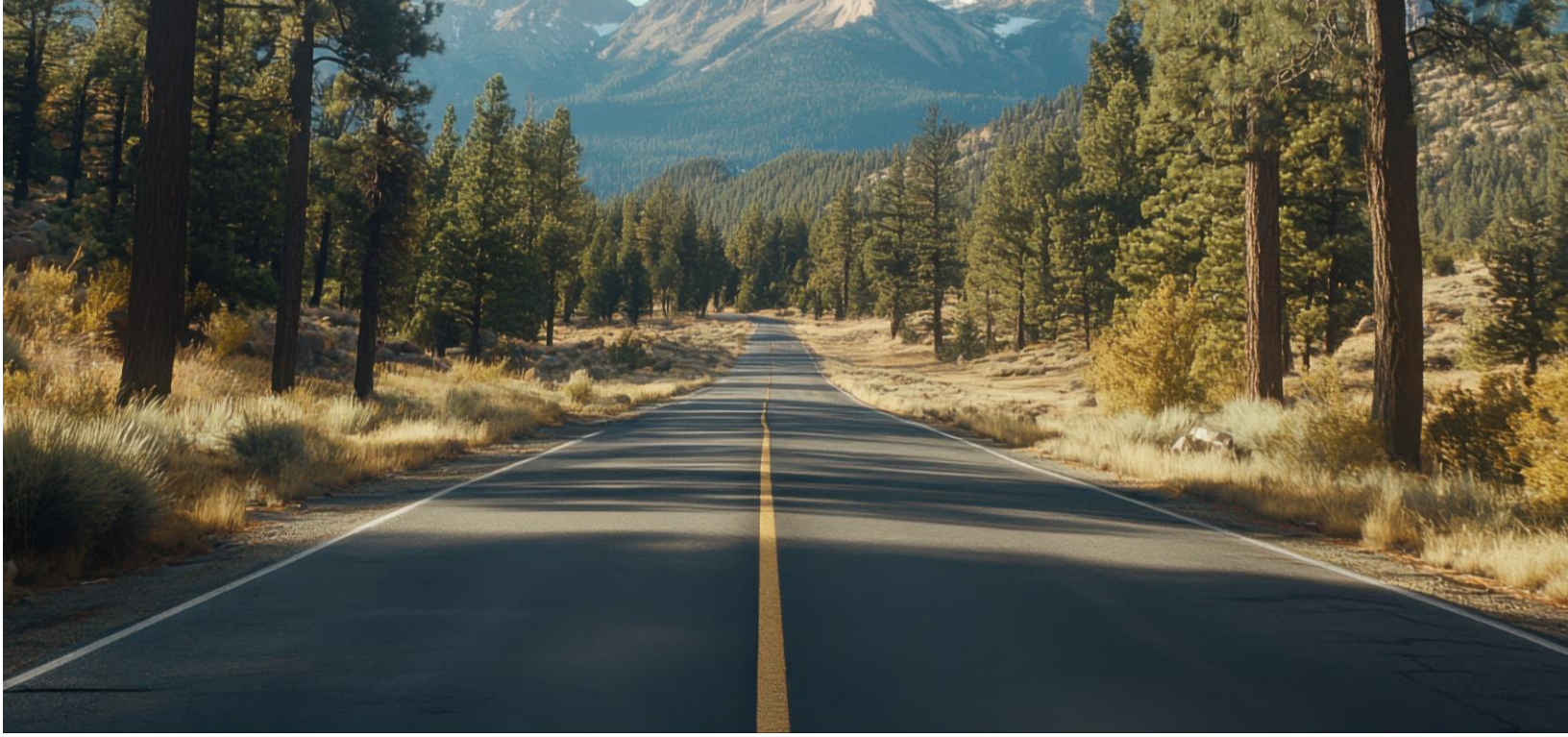
necessary in order to create updated baseline conditions that can then be extrapolated to create updated future volumes. This reassignment will be completed with due consideration of regional and local flows and destinations. Traffic volumes will then be extrapolated for the future horizons to test the network links and nodes under worst case conditions (20-year, fast build-out). A full re-assessment of all ASP development intensity options is not expected to be necessary for this sensitivity analysis. Rather, it is proposed to text the worst case alone to establish the maximum volume of traffic that would be expected to be in place on key road links and through key pinch point locations. This aspect of the project can be enhanced should RVC determine that a more fulsome analysis is required. However, for the purpose of the description in the RFP, the analysis of worst-case conditions should suffice at this time.

- Provide direct and comprehensive insight and input into the site planning related to the ASP with the goal of ensuring an adequate and comprehensive road network is included in the plan, with insight on how and when various network elements may be required. This will build on the access considerations noted in the 2020 Transportation Network Study, as well as the findings of the 2020 Bragg Creek Hamlet Core Transportation Study as completed by Bunt Considerations of road classicisation, rights of way, intersection layout and positioning of access and driveways will be reviewed. It will not be enough to simply make recommendations in this regard. Effort will be required and undertaken to confirm the viability of the proposed recommendations and how those recommendations might best be achieved. This task will include the development of conceptual design plans for key locations and recommended improvements, as well a recommendation of phasing of those improvements. Should limitations in the ability to accommodate the improvements be found (ie. through limitations in right of way, for example), then alternative and sympathetic cross sections and intersection layouts will be prepared.
- The overall program would be compiled into a single report that would stand alone as a 2024/25 Hamlet Transportation Network Analysis and also be included as a key part of the ASP for the Bragg Creek Hamlet Growth Area.

As noted earlier, the underlying understanding in developing this proposal is that the work undertaken by Bunt would need to augment and not re-invent the work completed previously. Validity of previous work will obviously be checked, and gaps will be filled, but the goal is to use as much as what has already been done as possible to minimize the cost and effort moving forward. This is a comfortable process, and the methodology as outlined here is achievable within the timeline identified in the RFP and represents a logical extension of the base program outlined in the RFP. Bunt is willing and able to deliver on this effort.

In terms of communication, the methodology outlined here assumes the following for the purpose of budgeting:

- Multiple (up to 12) Team meetings of one hour duration each, held virtually throughout the study process.
- Multiple (up to three) in-person Milestone Meetings or workshops related to site planning and/or TIA process and interim findings review.
- Attendance at up to public open houses of two hours during each, plus preparation as necessary. It is noted that this task was not identified in the RFP but has been included for completeness in the event that it is necessary.
- Preparation of three stage-gate Work Papers at key project milestones.



DETAILED WORK PROGRAM

The overall methodology outlined in the previous section has been expanded to develop a detailed work plan as outlined in the following sections.

PROJECT START UP

- Meet with the RVC Project Team to confirm scope, timelines, process and general programming for the project.
- Collect all available information that has not already been obtained or provided.
- Review overall ASP process and confirm schedule.
- Meet with ATEC to discuss Highway 22/758 upgrades and issues/opportunities.
- Confirm the study area, road links, intersections and other specific areas of interest to be assessed as part of the work program.
- Recommend, discuss and obtain approval for a variety of trip generation rates for the expected land uses within the ASP. This is confirmation of rates and not the density or size of the uses themselves.
- Develop and submit a draft Table of Contents for the Final Transportation Network Analysis report document.

DATA COLLECTION

- Confirm the expected land uses and densities of those uses within the ASP area. It is recognized that there are currently uses and densities assumed for this area that may or may not be consistent with what will be proposed within the amended ASP. It is also recognized that at this point in the project there may not yet be confirmed uses and densities available. The intent here is to obtain the current thinking for the purposes of preliminary traffic generation to get a feel for the scale of the volumes being contemplated by the ASP. Changes are expected to occur as the project progresses.
- Undertake manual traffic counts where necessary to fill any gaps in the existing count base. A substantial amount of data exists as a result of other studies completed in the area, and so this

data collection exercise will focus on collecting up to date data at up to six key locations for the Weekday AM/PM Peak Period, and up to three locations for the Weekend Peak Period. The Weekend data will be used as a proxy to factor Weekday PM data as obtained from the RVC forecasting model.

- Collect available crash data for study area intersections.
- Obtain available base mapping and right of way information.
- Complete an inventory of on-site conditions to confirm road dimensions, lanings, intersection controls/geometry, lighting, sight lines, speed zones, parking, pathways and any other germane information necessary for the completion of the study.
- Collect available RVC forecast model data for the future horizon identified in the RFP. It has been assumed for the purpose of budgeting that the model will only contain Weekday PM Peak Period outputs.
- Convert the model outputs from Weekday PM Peak to Weekday AM Peak volumes using factors obtained from the intersection count data noted above. Also convert the PM data to Weekend Peak volumes for key locations using the same methodology.
- Meet twice with the Project Team during the course of the Data Collection phase to provide input into site planning activities as necessary and appropriate.

PRELIMINARY ANALYSIS

- Complete a capacity analysis of existing intersections and road links within the study area. Identify any current capacity constraints affecting traffic flow, pedestrian/bicycle mobility and general permeability.
- Complete a review of available crash data for existing intersections and road links within the study area. Identify any current hot spots and possible issues affecting traffic flow, pedestrian/bicycle mobility and general permeability. Note that this is not an In-Service Audit. The effort outlined here would be a Safety Review.
- Undertale a preliminary estimate of ASP site traffic volumes using anticipated land uses and densities for the purpose of illustrating the scale of difference between existing and ultimate end state volumes. No analysis or assignment of these future volumes will be undertaken at this point in the analysis program. This is a conceptual exercise and is expected to be revised during the Development of Traffic Forecasts component of the work program.
- Undertake a manual re-assignment of existing volumes within the network assuming the inclusion of a second river crossing within the study area. It has been assumed for the purpose of budgeting that the RVC forecast model will not have data related to this network change and that the adjustments will need to be made manually. If additional model data does exist, then this task will be reduced in scope and a savings in budget will be realized. This will be discussed with the Project Tema if found to be necessary.
- Re-analyze three key intersections under Weekday AM, PM and Weekend conditions with the second crossing ion place to assess the relative difference in overall network operation and estimated travel times from several key origin/destination pairs. Also estimate approximate daily traffic volumes on key traffic links to compare with and without the inclusion of the second crossing. This is a preliminary analysis preceding the larger analysis of the second crossing later in the work program.
- Meet twice with the Project Team during the course of the Preliminary Analysis phase to provide input into site planning activities as necessary and appropriate.

WORK PAPER #1

- Summarize the data collection and preliminary analysis in a work paper with suitable exhibits and appendices.
- Circulate to the Project Team for review and information. Respond to any queries or points of clarification and edit as necessary and appropriate.
- Submit the Final Work Paper to the Project Team for their information, noting that this Work Paper will be repeated verbatim as an individual chapter within the Draft and Final Reports.

DEVELOPMENT OF FUTURE TRAFFIC FORECASTS

- Review the RVC forecast data for the future horizons and confirm the level of development, density and uses assumed within the model outputs.
- Manually extract any traffic assumed to be assigned to the study area.
- Manipulate the Weekday PM peak period forecast outputs to generate data sets for each of the Weekday AM and Weekend peak periods for the necessary study area intersections for the 5, 10 and 20 year horizons under fast/slow growth rates.
- Reconfirm the uses and densities assumed within the ASP with the Project Team in the event that anything has changed within the site plan since the work program commenced. Using the approved trip generation rates, develop estimated site (ASP) traffic volumes for the various 5, 10 and 20 year development horizons and for each of the Weekday AM, PM and Weekend peak periods.
- Undertake an internal peer review of the generation, assignment and manipulations to ensure the appropriateness and adequacy of the overall process and outputs.
- Assign the ASP site traffic to the network with due consideration of access locations (existing and proposed), road network limitations, capacity constraints and any other factors likely to affect directional flow. This would be completed for all of the scenarios and for all of the three analysis periods but without consideration of a second river crossing.
- Meet once with the RVC transportation representative to review and confirm/sign off on the volumes.
- Combine the forecast volumes and estimated ASP site traffic volumes to create total After Development traffic volumes for each analysis scenario and each of the three analysis periods.
- Meet twice with the Project Team during the course of the Development of Future Forecasts phase to provide input into site planning activities as necessary and appropriate.

ANALYSIS OF FUTURE TRAFFIC CONDITIONS

- Complete a capacity analysis each scenario for all three analysis periods for study area intersections and road links. Identify any current capacity constraints affecting traffic flow, pedestrian/bicycle mobility and general permeability.
- **KEY CONSIDERATION:** The analysis of the stated intersections and horizons appears on the surface to be an enormous task. To manage that effort and streamline it to the extent possible, the 20-year scenarios will be analyzed first, followed by the shorter term or less intense scenarios. In this manner, redundant intersection analysis can be deleted from the program, optimizing efficiency in terms of time and budget. For example, if Intersection X is found to operate acceptably under the End State Full Development condition, then it need not be examined for any other scenario unless there is a specific improvement required. This process will be managed carefully by the Project Manager with input from the Responsible Principal. It represents a

substantial reduction in effort within a complicated task with many layers, and so multiple eyes-on-the-process will be critical.
- Meet twice with the Project Team during the course of the Analysis of Future Traffic Conditions phase to provide input into site planning activities as necessary and appropriate.

WORK PAPER #2

- Summarize the development of forecasts and the analysis of future conditions in a work paper with suitable exhibits and appendices.
- Circulate to the Project Team for review and information. Respond to any queries or points of clarification and edit as necessary and appropriate.
- Submit the Final Work Paper to the Project Team for their information, noting that this Work Paper will be repeated verbatim as two individual chapters within the Draft and Final Reports.

COMPLETION OF SENSITIVITY ANALYSIS

- Review the end-state 20-year forecasts and analysis results and apply a manual adjustment to the After Development volumes to create a second data set inclusive of a second river crossing. This process will mirror the process undertaken earlier in the project to create the estimate of existing volumes with the second crossing included.
- Compare the intersection turning volumes and link volumes at the 20-year end state condition with the second crossing against the existing condition with a second crossing as developed earlier in the analysis
- Identify any necessary adjustments to calibrate the long-term volumes based on various factors related to site planning, local intersection performance etc.
- Repeat the 20-year capacity analysis for the Weekday AM, PM and Weekend peak periods to establish the end state difference between the inclusion and excluding of the second crossing. Note that this means the comparison will be made between Existing (with and without the crossing) and 20-year full build out (with and without the crossing).
- Gaps in the network, locations where improvements will differ between the two scenarios and all other relevant details related to the incremental impact of adding the second crossing will be identified.
- Undertake additional spot analysis as/where necessary to assess any specific abnormalities noted in the network.
- In consultation with the Project Team, provide insight and input to the ASP site plan and road network with due consideration of the needs and differing outcomes (if any) of including versus excluding the second crossing.

DEVELOPMENT OF RECOMMENDATIONS

- Utilize the outputs and findings of the Sensitivity Analysis in conjunction with the baseline Future Analysis to identify the best and most appropriate road network, to identify necessary improvements required to accommodate partial and full development under the Fast and Slow rates of growth.
- Develop a schedule of improvements necessary to be implemented to accommodate growth at the 5, 10 and 20 year horizons with and without inclusion of the second crossing. Within this, identify the most logical and appropriate time to add the second crossing due to capacity needs if not being undertaken for purposes of emergency service access/evacuation or network permeability.

- Identify any opportunities or constraints related to the developability of the recommended network improvements. In essence, this task will seek to illustrate how the improvements can be achieved within the context of the network and available road rights of way etc.

WORK PAPER #3

- Summarize the sensitivity analysis in a work paper with suitable exhibits and appendices.
- Circulate to the Project Team for review and information. Respond to any queries or points of clarification and edit as necessary and appropriate.
- Submit the Final Work Paper to the Project Team for their information, noting that this Work Paper will be repeated verbatim as two chapters within the Draft and Final Reports.

PREPARATION OF DRAFT REPORT

- Compile the edited and finalized Work Papers into a single report template and expand detail and background information as necessary to produce a Draft Transportation Network Analysis report, referenced as Draft Report V1.
- Circulate Draft Report V1 to the Project Team for review, editing and comments.
- Meet once with the Project Team to review Draft Report V1.
- Undertake edits to the Draft Report to create Draft Report V2. Note that the scope and budget assume that there will be a need for revisions to text, clarifications and expansion of some discussions, but that no new data collection or analysis will be required. Should additional data collection or analysis be found to be necessary, then a modification to the project budget would be required. This would be discussed with the Project Team only if found to be necessary.
- Attend up to two Public Open Houses to present the findings of the study and respond to questions. Make any minor adjustments to Draft Report V2 as deemed necessary by the Project Team to issue Draft Report V3.
- Meet once with the Project Team to discuss the outcome of the Public Hearing, and collect comments and recommendations for further, final edits. Note that attendance at additional Public Open Houses, Council or Committee meetings is not included in the program or budget.

SUBMISSION OF FINAL REPORT

- The Update the Draft Report to Draft Report V4 and circulate to the Project Team for a final review prior to issuing the Final Report. Should additional versions of the Draft or Final report be required, this would represent a change in scope and would necessitate discussions related to budget. This will be discussed with the Project Team only if found to be necessary.
- The Final Report will be a full report to be appended to the Greater Bragg Creek ASP document.

As noted in the Work Program, the preliminary results of the analysis will be shared with the Project Team at key milestones as Work Papers. These Work Papers will form the basis of the overall Draft Report but provide opportunities to circulate findings with the Project Team in real time during the execution of the tasks. All Work Papers (as well as the Draft and Final Report) will be reviewed and fact-checked for technical and optical accuracy by the Bunt Responsible Principal prior to being issued. While all analysis, findings and recommendations will be provided in a Draft and Final report, several stage-gate summaries will be provided to the Project Team throughout the program.

VALUE ADDED

Although the RFP was very clear in terms of identifying the purpose and goals of the exercise, there are opportunities to leverage items to add value and accuracy to the outcomes of the study. Three items identified by Bunt include the analysis of weekend conditions at key locations, the enhanced consideration of active transportation and mobility, and submission of analytical findings through Work Papers.

WEEKEND CONDITIONS

In addition to being a vibrant residential Hamlet with a proud and resilient population, Bragg Creek is also a substantial recreation destination for many activities, including but not limited to walking, hiking, running, horseback riding, mountain/road/snow cycling, cross country skiing, snow shoeing, golf, fishing and assorted motorized offroad activities. There are also campgrounds, picnic areas and Group Camps as well as a film set and regional connectivity to Kananaskis Country (including Powderface Trail to Sibbald Flats). The Hamlet Core is the kick-off point for most of these activities, and can therefore be a very busy place, and busier still on summer weekends when the weather is good. The pressure placed on many aspects of the community infrastructure is substantial during these periods, in particular the roadways and intersections near the Hamlet Core.

The development of an overall transportation network as required in the RFP would typically look at future conditions for a weekday peak hour and use that data to develop a network with intersection designs that deal with expected "rush hour" conditions. The issue for Bragg Creek is that their rush hour often occurs on weekends, and it occurs with sufficient frequency to warrant being considered a de-facto design condition. Bunt therefore seeks to include within the scope an analysis of key locations during the weekend period. This was not addressed in the 2020 Bragg Creek ASP Network Review TIA study, nor is it included in the RVC forecasting model.

The effort required to leverage the available data to include consideration of weekend conditions is significant, but not enormous. It requires additional traffic counts at several (but not all) intersections, and it requires effort in manually extrapolation the weekday data generated by the RVC forecasting model to create weekend conditions. This would be undertaken by establishing the delta between existing weekday and existing weekend conditions, and than applying that factor to the future forecasts, with due consideration of changes in land use, route choice and other factors. In completing this task, the report outcomes will be more relevant to the peak periods that occur in the area. Were the summer peaks an occasional event, then this would not be necessary. However, the regularity and frequency of such conditions renders this additional task worthy and, in the view of Bunt, vita to the development of the best product possible.

All effort to undertake this task is accounted for within the proposed budget outlined in this document.

ACTIVE TRANSPORTATION AND MOBILITY PLANNING

The ASP program identifies Project Objectives related to pedestrian and non-vehicular linkages. However, the scope for the previous 2020 Bragg Creek ASP Network Review TIA did not include substantive consideration of these elements. In completing the work for the current ASP project, Bunt would include additional effort specifically targeting the development and optimization of non-auto modes within the context of the network analysis. Permeability is key for emergency accessibility and optimization of traffic

flows and congestion management, but it is also vital to accommodate the desired connectivity for those seeking to move through the community without the need for a motorized vehicle. In many respects, the Active Transportation components can be implicitly included in whatever network is developed, but at the same time, the optimization of an Active Modes network in the context of developing a healthy future community could lead and not follow the analysis and development of mitigation measures.

Bunt proposes to include an Active Transportation expert within the Key Team members, specifically to provide oversight and drive opportunities to take a good outcome and make it into a great outcome. The budget effort required to accommodate this has been factored into the budget proposed for the project.

WORK PAPERS

Although not identified in the RFP, Bunt proposes to provide a summary of analysis and findings at key project milestones through the preparation of Work Papers. These Work Papers will be summaries of analysis outcomes, conclusions and preliminary recommendations intended to provide the project Team with real-time information as it occurs, so as to provide more useful insights into site planning and public communications efforts. A total of three Work Papers will be produced, and each will ultimately form a chapter within the Draft/Final report for the project.

As a Quality Control measure, each Work Paper will be reviewed in detail by the Responsible Principal as well as the Project Manager prior to being issued.

Bunt has found the production of Work Papers is an excellent tool not only for the dissemination of key milestone information, they are also useful in maintaining progress and process within the Project Team and as well, focussing the Bunt work program and budget tracking as an efficient and effective package.

ATTENDANCE AT PUBLIC OPEN HOUSES

As noted in the Addendum #1, attendance at public open houses is not part of the anticipated scope of work for this project.

However, Bunt is of the opinion that there will be a need to present the findings of the study to the public through Open House forums. A total of two such forums have therefore been included in the work program for consideration by RVC. This effort includes preparation and attendance at two sessions of up to two hours each by a senior member of the Bunt Team. Details related to this task will be discussed as the project progresses.

THANK YOU!

Questions? Please Contact Us.

bunteng.com

Written with respect and gratitude for the Traditional Territories upon which we work and live.

APPENDIX B

Workpaper 1

TRANSPORTATION PLANNERS AND ENGINEERS

Greater Bragg Creek Transportation Network Analysis

Work Paper 1

Final Version 2

Prepared for

Rocky View County

Date

September 29, 2025

Project Number

02-24-0168

Bunt & Associates acknowledges and respects the Traditional Territories upon which our work spans, and from which we benefit. We are grateful for the unique cultures and histories of Indigenous Peoples that enrich our understanding and connection to the lands we call home. We honour learning, listening, and truth in our journey to reconciliation.

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Written with respect and gratitude for the Traditional Territories upon which we work and live.

This electronic document includes a certified digital signature and represents the original document retained on file. Any printed versions of this report are considered copies and can be confirmed by referring to the original electronic document.

This document entitled "Greater Bragg Creek Transportation Network Analysis – Work Paper 1" was prepared by Bunt & Associates for the benefit of Rocky View County in support of the Area Structure Plan amendment to the Hamlet Growth Area. The analysis and conclusions/recommendations in the report reflect Bunt & Associates' best professional judgment in light of the knowledge and information available to Bunt & Associates at the time of preparation.

Rocky View County, including employees, members of Council, and Regulatory Board members shall be entitled to rely on this report for the specific purpose for which it was prepared. Rocky View County may also provide copies of the report to external governmental bodies having jurisdiction related to the project for which it was prepared.

Any use made of this report by a third party beyond those specifically noted here, or any reliance on or decisions based on it by any such third party, are the responsibility of such third parties. Bunt & Associates accepts no responsibility for damages, if any, suffered by such third parties as a result of decisions made or actions based on this report.

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1. EXECUTIVE SUMMARY

1.1 Overview

Bunt & Associates Engineering Ltd. (Bunt) was engaged by Rocky View County to undertake a review of the Greater Bragg Creek transportation network. This analysis will be used by Rocky View as part of an amendment to their Area Structure Plan (ASP) for the Bragg Creek Hamlet Growth Area, which encompasses the Hamlet Core and Hamlet Expansion lands as shown in **Figure 1.1**.

The approved Work Program for the transportation network analysis includes the preparation of several Work Papers that will ultimately be compiled into a comprehensive Final Report. This document represents the first of those Work Papers and provides a summary and assessment of the following:

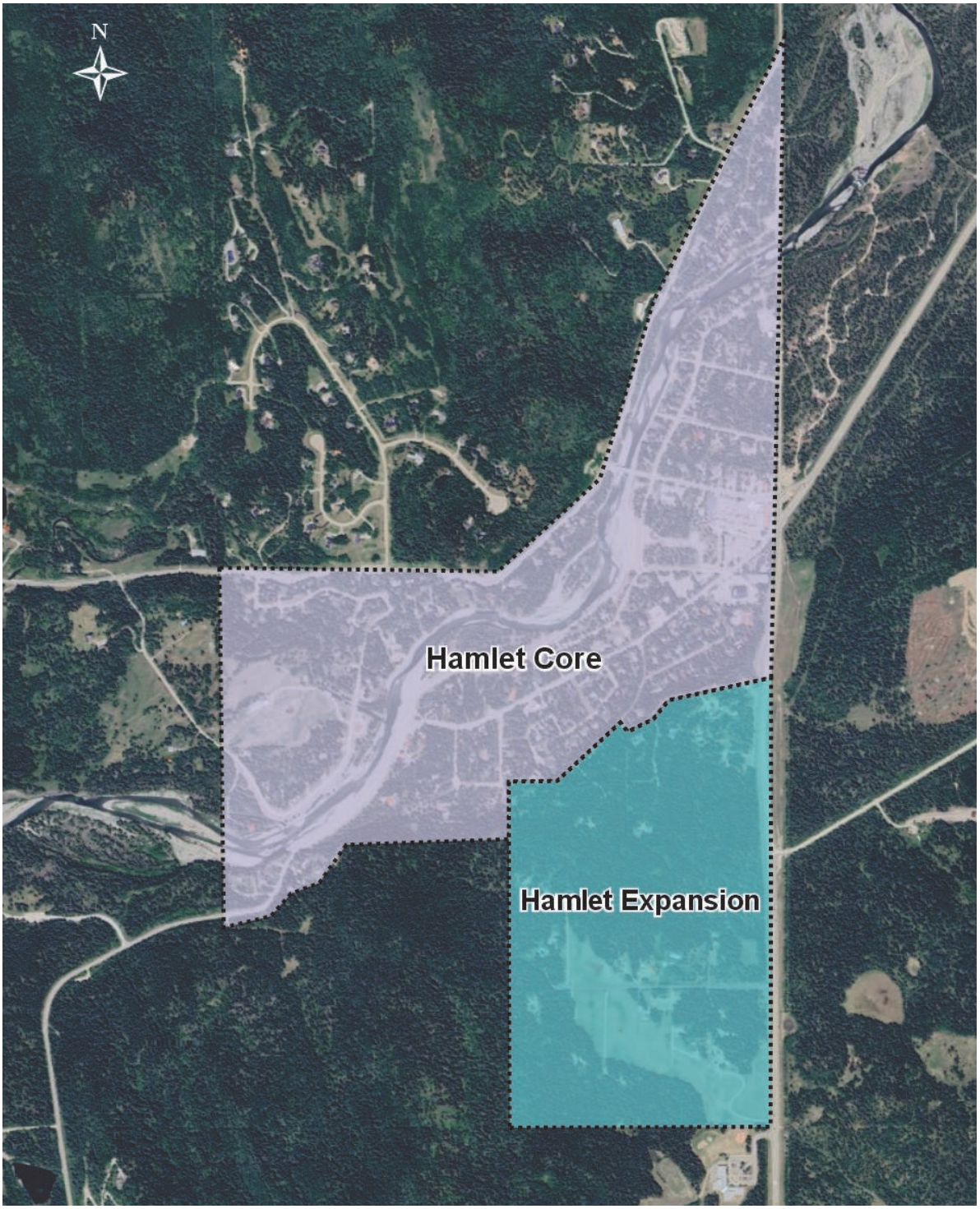
- Data collection and preliminary analysis of existing conditions, including identification of peak periods and corresponding intersection and link capacity analysis, plus key locations related to safety and intersection operational issues.
- Re-assignment of existing volumes during peak periods to assess the impact of providing a second access to West Bragg Creek / Wintergreen at a location either upstream or downstream of the existing Balsam Avenue bridge access (two sets of re-assignments will be completed).
- Re-analysis of key locations after re-assigning traffic to account for a second river access.
- Observations and conclusions related to the existing network and anticipated impacts of providing a second access, and the relative differences between the positioning of that access upstream versus downstream of the current Balsam Avenue bridge.

In essence, this Work Paper was primarily focussed on developing appropriate baseline Design Hour traffic volumes through a review, amalgamation and analysis of various data sets, as well as providing an overview of traffic and active transportation key locations/linkages and the shift in traffic volumes that might be expected as a result of providing a second access to the West Bragg Creek/Wintergreen area.

One additional task that was identified in the proposed work program but unable to be completed as part of this Work Paper was the development of expected traffic volumes associated with the amended ASP lands and a comparison of those future volumes with existing volumes. Information necessary to complete that task was unavailable at the time of preparing Work Paper 1. As a result, that task, together with the subsequent task of analyzing the future volumes, will be the subject of Work Paper 2.

Findings as they related to the four above noted bulleted tasks are outlined below.

Figure 1.1: Site Context



1.2 Findings and Preliminary Conclusions

The transportation activity that occurs in the Bragg Creek area is not simple. The existing road network is complicated, and connectivity is limited. However, activity levels are high and vary widely by day of week and time of year. The analysis of existing conditions confirmed the following:

- While different key intersections were found to experience different peaks for different movements at different times, the overall peak period for the Hamlet that should be used as a basis for road network planning and design was determined to be the Summer Weekend Afternoon Peak Hour. These Design Hour volumes were established through the manual collection of traffic data in February 2025 augmented with historic data collected by Bunt and others throughout different times of the year from 2019 through to 2024, as well as a review of germane documents related to master planning and other aspects of growth within the overall Bragg Creek area. Due consideration was made to account for the influences of the COVID pandemic on any data collected in 2020 and 2021.
- Key locations in terms of safety currently exist at the intersection of Burnside Drive/Highway 22 & White Avenue/Highway 22. This is due to high volumes of traffic through and offset geometry of the intersection.
- The Active Modes network is quite robust in terms of linear connectivity west of the Balsam Avenue bridge access on both sides of the river (White Avenue and the Berm on the south side and West Bragg Creek Road on the north side), as well as connecting the Hamlet Core to the Banded Peak school site atop the hill, south on Highway 22. However, the main network is essentially W-shaped and would benefit from additional connectivity to enhance access and usage by residents and visitors.
- Current traffic operation constraints are evident at the trio of intersections at Highway 22/White Avenue/Balsam Avenue/Burnside Drive. This was expected, and while the installation of the traffic signal in May 2021 has improved the ability for these intersections to accommodate peak seasonal traffic volumes, constraints to capacity/queues continue to exist.
- Re-assessing existing 100th highest hour traffic conditions with the inclusion of a second access to the West Bragg Creek/Wintergreen area found that a second access located north (downstream) from the Balsam Avenue bridge would likely be simpler to design and implement compared to a west (downstream) access requiring a river crossing. Additionally, it would reduce traffic volumes at the trio of intersections at Highway 22/White Avenue/Balsam Avenue/Burnside Drive. This is due primarily to the larger draw of traffic to/from Calgary generated via Highway 8 and Highway 22 north to the Trans Canada Highway.
- Re-assessing Active Transportation conditions with the inclusion of a second point of access found the opposite to be the case. A second access west (Upstream) from the Balsam Avenue bridge would have a greater positive impact on Active Transportation connectivity than would be the case if the second access were to be provided north (Downstream) of the Balsam Avenue bridge. This is due primarily to the location and shape of the current Active Modes network that exists almost exclusively west (upstream) of the Balsam Avenue bridge access.

Existing intersection configuration is illustrated in **Exhibit 1.1**.

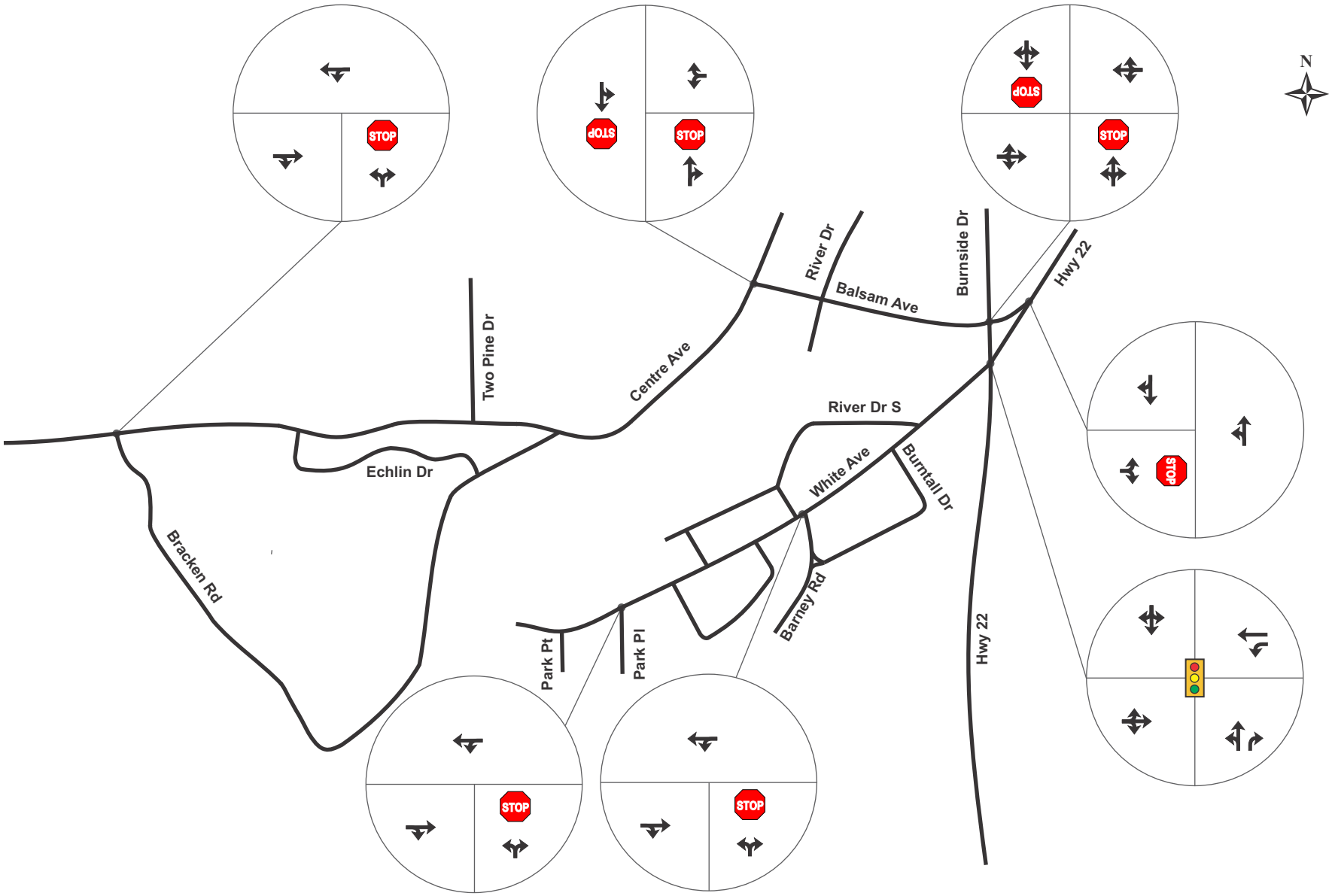


Exhibit 1.1

Existing Intersection Configurations

1.3 Next Steps

Upon receipt of feedback from RVC regarding Work Paper 1, Bunt will continue with the analysis outlined in the approved proposal, primarily related to developing detailed Design Hour (summer peak hour) traffic forecasts for future horizons and an assessment of the anticipated end state conditions. That analysis will provide more detail and clarity related to anticipated congestion pinch points and will offer more conclusive statements related to recommended network upgrades.

2. DATA COLLECTION

2.1 Traffic

2.1.1 Overview

The purpose of this task was to assess and amalgamate a variety of data sets collected by Bunt and others over various times of the day, days of the week and months of the year. The outcome of this exercise focused on determining an appropriate Design Hour for analysis, to ensure that the assessment of existing and future traffic volumes would represent a reasonable condition as would be experienced by the residents of, and visitors to, the Bragg Creek area. The traditional industry standard of designing road networks based on Weekday AM/PM peak hour volumes was not expected to adequately represent conditions appropriate for design in the case of Bragg Creek.

The data collection exercises related to traffic volumes included the following:

- Collection and review of previous transportation studies including Bunt 2020/22 TIA[1], WATT 2020 TIA[2], RVC 2007 ASP[3].
- Manual collection of traffic count data at Highway 22 & Balsam Avenue, Burnside Drive & Balsam Avenue, Burnside Drive/Highway 22 & White Avenue/Highway 22, Centre Avenue& Balsam Avenue, Centre Avenue& Bracken Road West as illustrated in **Figure 2.1**.
- Collection of available crash history data from Alberta Transportation and Economic Corridors (TEC) at Highway 22, and Highway 758 (White Avenue) as illustrated in **Figure 2.2**.
- Collection of available traffic count data, and signal timing plans from TEC.
- Collection of available mapping, traffic count data from Rocky View County (RVC).

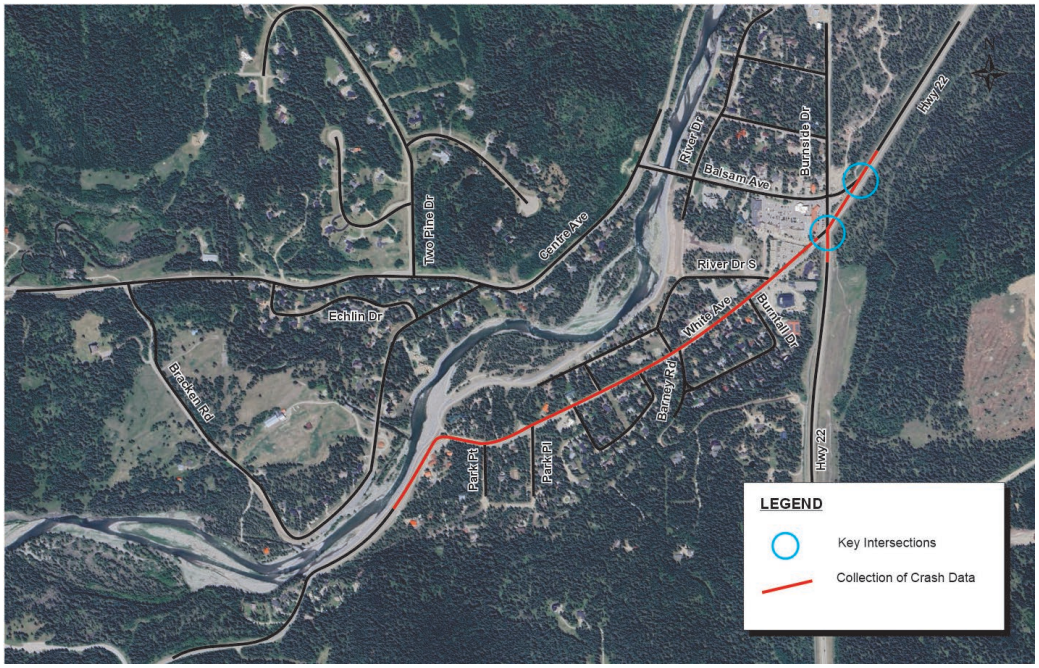
The data was amalgamated and assessed to establish the baseline design period for analysis. In the case of the traffic volumes this involved determining the appropriate season for analysis, and then converting

[1] 02-20-35 Bragg Creek Hamlet Core TIA – Final, Bunt & Associates Engineering Ltd., 2020 & 2022
[2] Bragg Creek ASP Network Review TIA - Final, WATT Consulting Group, January 2020
[3] ASP Greater Bragg Creek, Rocky View County, Feb 2007

the available weekday AM, PM and weekend data sets into comparative Summer Design volumes and then comparing them with observed TEC 100th Highest hour Design volumes.

Figure 2.1: Manual Count Intersections

Figure 2.2: Collection of Historical Crash Data Locations



2.1.2 Determination of Seasonal Variation

Consideration of seasonal variation between winter and summer traffic volumes surrounding Bragg Creek was determined necessary to account for major season-based tourist attractions. These attractions can be simplified into two key areas, the Bragg Creek Hamlet Core and the West Bragg Recreation Area. The Hamlet Core attracts summer tourists with attractions like shops, restaurants, and Bragg Creek Provincial Park. Comparatively the West Bragg Creek Recreation area attracts tourists both in the summer for activities like hiking and biking and in the winter for activities like skiing and snowshoeing. Based on the West Bragg 2024 Report[4] the volume of visitors is slightly higher in the winter compared to the summer but considered negligible for the purpose of this report.

Two different conversion factors are needed to adequately convert winter to summer traffic volumes. One conversion for traffic traveling between Highway 22 and the Hamlet Core only, and the second for traffic volumes traveling between Highway 22 and the West Bragg Recreation Area (movements which also travel to the Hamlet Core).

TEC Automated Traffic Recorders (ATRs) surrounding Bragg Creek were used to determine an overall seasonal conversion factor to convert winter traffic volumes to summer traffic volumes. Weekend daily total volumes from the winter and summer months were used to establish seasonal average daily volumes. A standard growth formula was applied to these values to quantify a seasonal variation into a percentage at each ATR. In comparing these percentages, a seasonal conversion factor of 2.0 for winter to summer was determined. These calculations are summarized in **Table 2.1**.

Table 2.1: Seasonal Conversion Factor Calculations

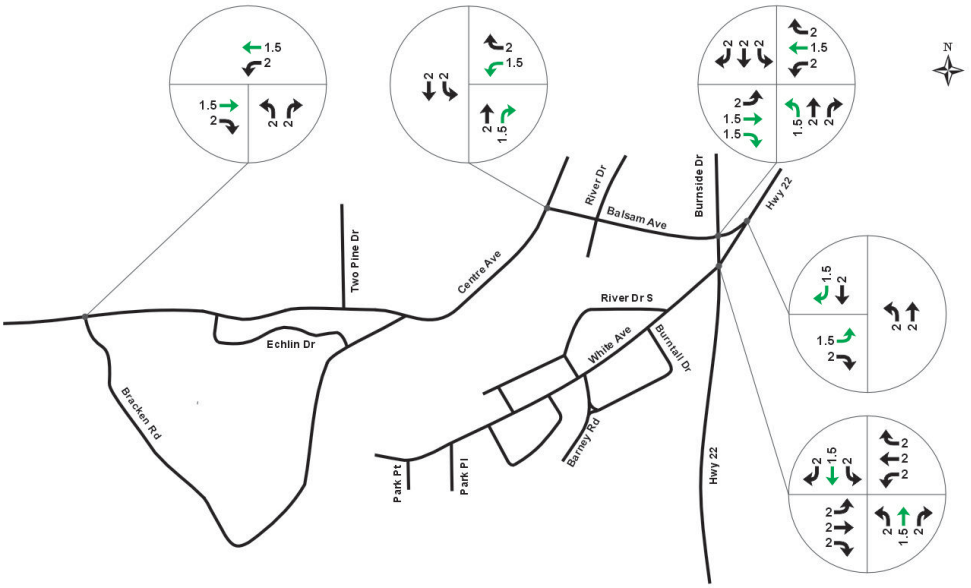
ATR	DAILY AVERAGE WEEKEND		GROWTH PERCENTAGE
	Winter	Summer	
Hwy 22 & Hwy 8	3,781	6,761	79%
Hwy 22 near Priddis	4,070	8,602	111%
		Seasonal Conversion Factor	**2 (96%)**

To convert winter volumes into summer volumes all movements between Highway 22 and the Hamlet Core were multiplied by the full conversion factor of 2. All movements travelling between Highway 22 and the West Bragg Recreation Area pass through the Hamlet Core. There for the conversion factor applied to these movements need to account for an increase in volume to Hamlet Core and no increase to volume to West Bragg Recreation area. Therefore, a conversion factor of 1.5 was applied, assuming half of the traffic will enter the Hamlet Core, and the other half will continue to West Bragg.

The winter to summer seasonal conversion factors is summarized in **Figure 2.3**.

[4] West Bragg Creek Trails Master Plan, January 2024

Figure 2.3: Winter to Summer conversion by Movements



2.1.3 Amalgamation of Weekday Data Sets

The primary data set used to create a weekday data set was the Bunt 2025 count program, being the most recent and relevant to the area. To extend the data set to include a more fulsome network, volumes at other intersections not counted by Bunt in 2025 were sourced from previous study counts. The most relevant study was used based on the counted intersections and to account for the influences of the COVID pandemic.

The 2019 counts sourced from the Bragg Creek ASP Network Review, pg. 7[5] were included to complete the weekday data set. These counts were collected on a weekday in September 2019. Since this day was not a summer holiday or weekend, this data was found to be acceptable to include in weekday winter data sets without applying a seasonal conversion. Traffic volumes collected to create weekday data sets are summarized in **Table 2.2**.

The AM and PM Peak Hour volumes were balanced where possible and organized to optimize consistency between in and outbound directions throughout the network. To ensure the most conservative data set, the total network volumes were summed for every hour in 15-minute increments. The AM and PM hours with the greatest total network volumes were then selected as the representative peak hours. The weekday AM Peak Hour was identified as 8:00am – 9:00am, and the weekday PM Peak Hour was identified as 4:30pm - 5:30pm. This exercise excluded consideration of the 2019 Network Review volumes in which only volumes of set times are available. At Park Place & White Avenue the AM-Peak hour is 7:15-8:15am,

[5] Bragg Creek ASP Network Review TIA - Final, WATT Consulting Group, January 2020, pg. 7

and the PM-Peak hour is 4:15-5:15pm. At Burney Road & White Avenue the AM-Peak hour is 7:15-8:15am and the PM peak hour is 4:00-5:00pm. These times are similar enough to the other 5 intersection peak hours that this variance was considered negligible for the purpose of this study.

Table 2.2: Weekday Data Collection Summary

INTERSECTION	COUNT DATE	DAY OF WEEK	SOURCE
Burnside Dr/ Hwy 22 & White Ave / Hwy 22	2025-02-06	Thursday	Bunt & Associates
Hwy 22 & Balsam Ave	2025-02-06	Thursday	Bunt & Associates
Burnside Dr & Balsam Ave / Hwy 22	2025-02-06	Thursday	Bunt & Associates
Centre Ave / Wintergreen Rd & Balsam Ave	2025-02-06	Thursday	Bunt & Associates
Centre Ave / W Bragg Creek Rd & Bracken Rd (West)	2025-02-06	Thursday	Bunt & Associates
Burney Rd (West) & White Ave	2019-09-24	Tuesday	RVC
Park Pl & White Ave	2019-09-25	Wednesday	RVC

2.1.4 Amalgamation of Weekend Data Sets

Similarly to weekdays, the primary count used to create a weekend data set was the Bunt 2025 data set. However, no other data was used to extend the weekend data set to other intersections. This is because of factors such as the inability to fully utilize counts collected during the COVID. Traffic volumes used to create weekday data sets are summarized in **Table 2.4**.

The same basic method was used to determine weekend highest hour as for the weekday AM and PM peak hour data set, with both Saturday and Sunday volumes being evaluated. The weekend highest hour was determined to be Saturday from 12:45–1:45pm.

Table 2.3: Weekend Data Collection Summary

INTERSECTION	COUNT DATE	DAY OF WEEK	SOURCE
Burnside Dr/ Hwy 22 & White Ave / Hwy 22	2025-02-08	Saturday	Bunt & Associates
Hwy 22 & Balsam Ave	2025-02-08	Saturday	Bunt & Associates
Burnside Dr & Balsam Ave / Hwy 22	2025-02-08	Saturday	Bunt & Associates
Centre Ave / Wintergreen Rd & Balsam Ave	2025-02-08	Saturday	Bunt & Associates
Centre Ave / W Bragg Creek Rd & Bracken Rd (West)	2025-02-08	Saturday	Bunt & Associates

2.1.5 Development of 100th Highest Hour Volumes

To develop a 100th highest hour volume set Bunt 2025 counts were compared to TEC 2024 100th highest hour counts to develop 100th highest hour volumes for purposes of analysis. Since TEC 100th highest hour volumes were only available for Burnside Drive/Highway 22 & White Avenue/Highway 22, only the trio of intersections at Highway 22/White Avenue/Balsam Avenue where included in this data set. The sources of data used to develop the 100th highest hour volumes are summarized in **Table 2.5**.

Table 2.4: 100th Highest Hour Data Collection Summary

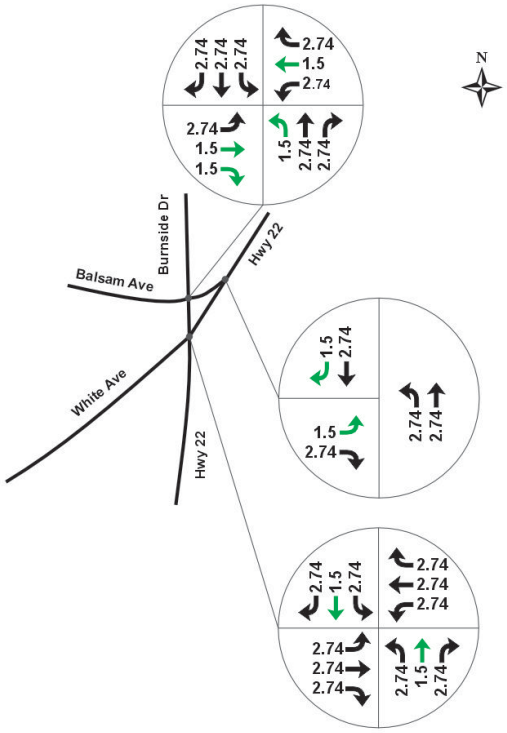
INTERSECTION	COUNT DATE	DAY OF WEEK	SOURCE
Burnside Dr/ Hwy 22 & White Ave / Hwy 22	2025-02-08	Saturday	Bunt & Associates
	AM 100TH Highest Hour		TEC (Ref #: 997123)
	PM 100TH Highest Hour		TEC (Ref #: 997123)
Hwy 22 & Balsam Ave	2025-02-08	Saturday	Bunt & Associates
Burnside Dr & Balsam Ave / Hwy 22	2025-02-08	Saturday	Bunt & Associates

Bunt 2025 weekend highest hour volumes were compared to TEC AM and PM 100th highest hour. A conversion factor of 2.74 was found to be representative of the average increase between winter weekend highest hour volumes volume and 100th highest hour volumes. The conversion factor of 2.74 was calculated using the overall difference in vehicle volumes between Bunt 2025 winter weekend highest hour counts and TEC 100th highest hour data at Highway 22/Burnside Drive & Highway 22/White Avenue. For each count/data set a sum of total hourly vehicles entering the intersection was calculated. The difference in total hourly entering volumes was found to be 2.74 times greater for 100th highest hour volumes. Therefore, the conversion factor of 2.74 was used throughout the study area.

Similarly to seasonal conversion this conversion was relevant to traffic traveling between Highway 22 and the Hamlet Core. It was decided that the same conversion factor for seasonal variance,1.5, could be applied to applied to traffic passing through the Hamlet Core to West Bragg Recreation Area.

The 100th highest hour conversion is summarized in **Figure 2.4**.

Figure 2.4: 2025 Bunt Count to 100th Highest Hour conversion by Movements



The development of multiple data sets of traffic volumes allows for comparison of multiple scenarios during analysis. In analyzing multiple scenarios, a more wholesome picture of existing conditions in Bragg Creek is painted compared to a single analysis. Further explanation will be provided in section **3.1.1** as to which volume set will be used for future analysis and design.

Existing Traffic volumes for winter, summer and 100th highest hour are illustrated in Exhibits **2.1**, **2.2** and, **2.3**.

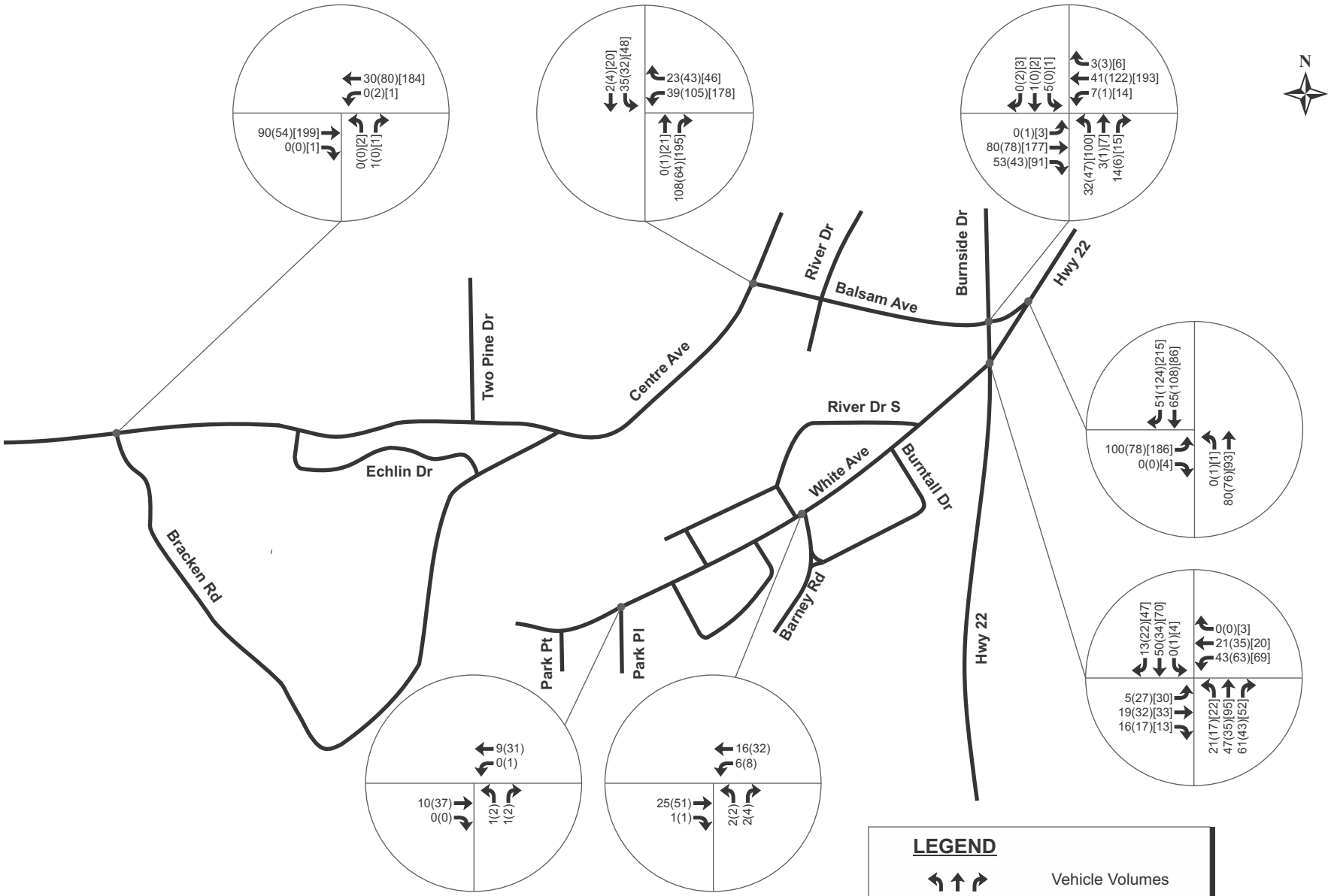


Exhibit 2.1

Winter Existing Traffic Volumes

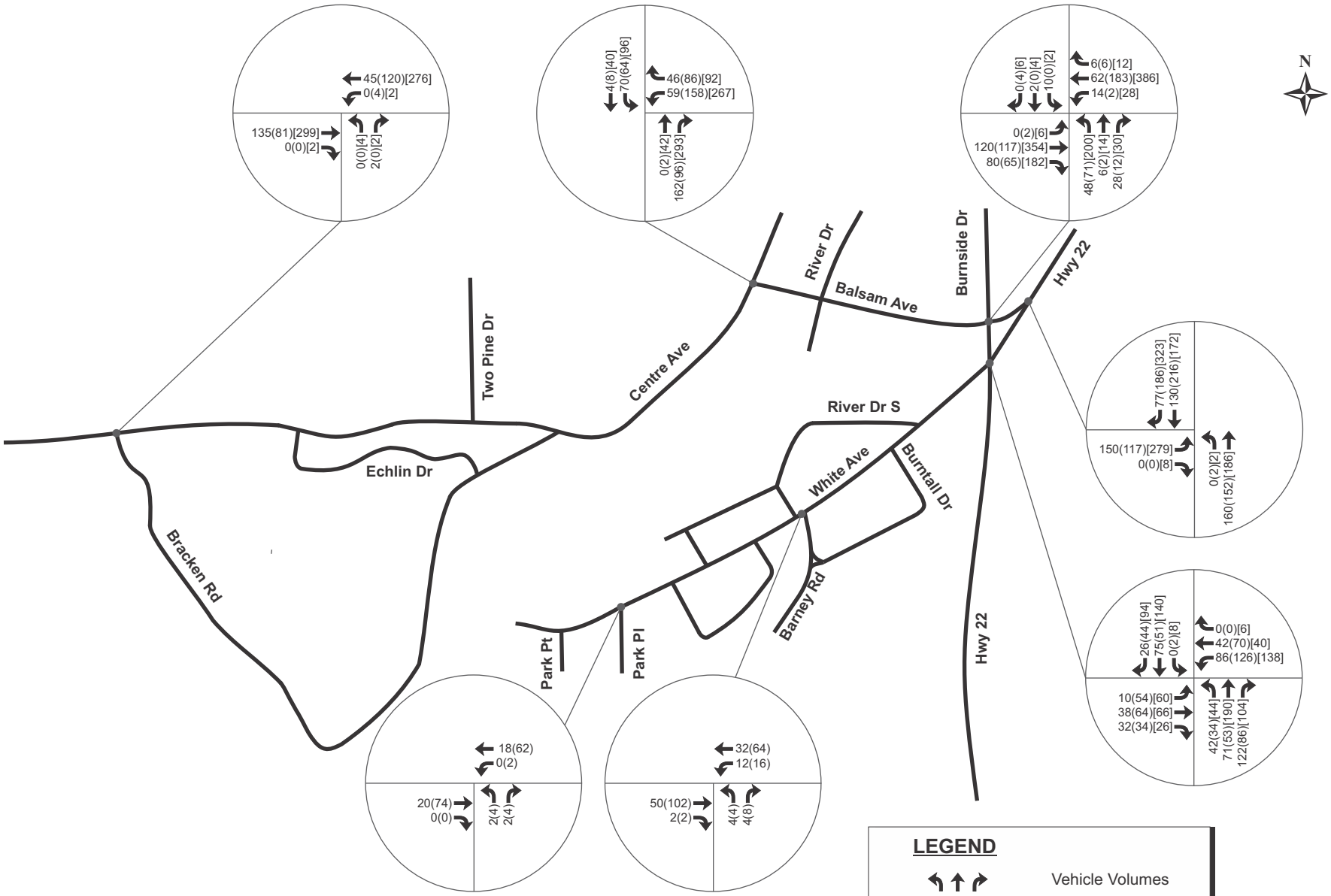


Exhibit 2.2

Summer Existing Traffic Volumes

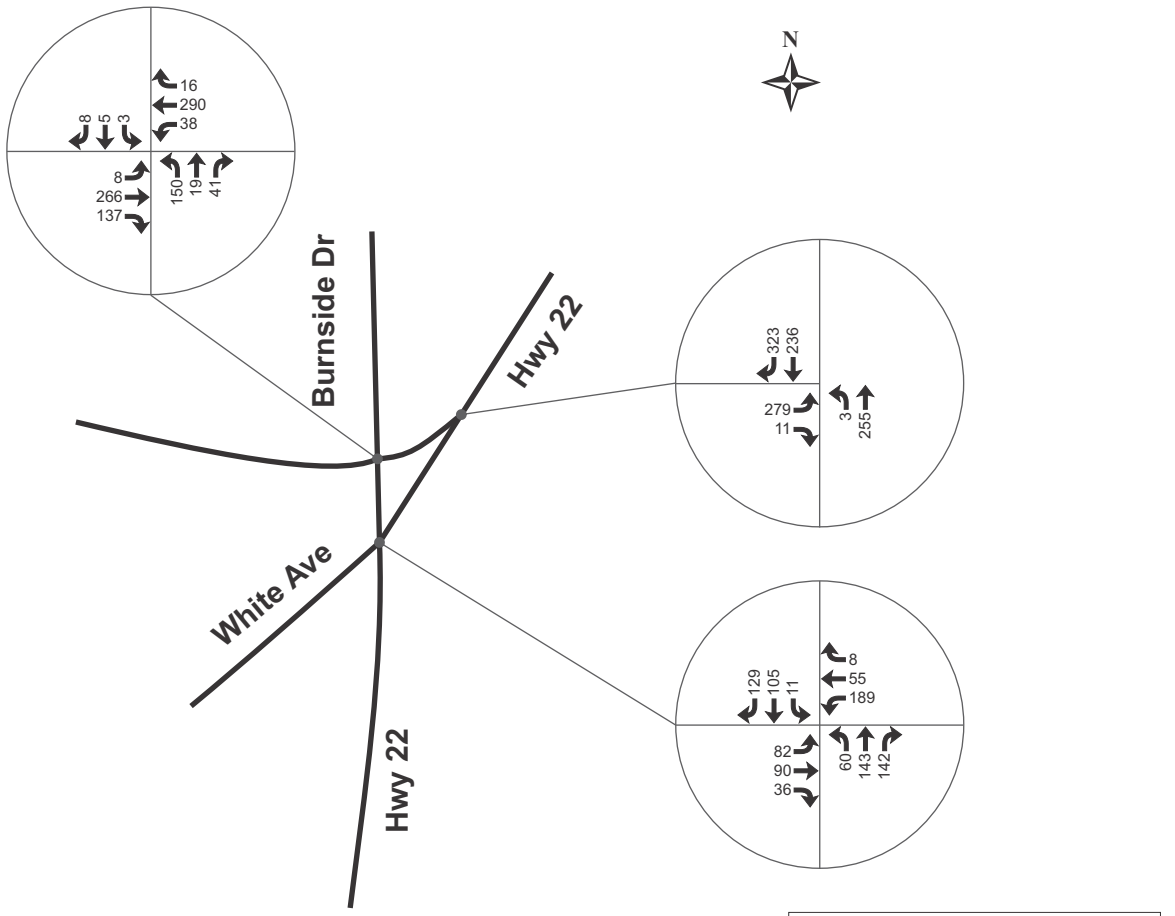


Exhibit 2.3

100th Highest Hour Existing Traffic Volumes

2.2 Active Transportation

The data collection exercises related to active transportation included the following:

- The collection and review of previous transportation studies including RVC ATP 2018[6], Bragg Creek Revitalization Plan 2015[7], and West Bragg 2024.
- Request for available pedestrian and bicycle volume data from RVC.

As with the traffic data, the active transportation data was amalgamated and assessed to establish the baseline period for analysis. It should be noted that limited data was available related to active transportation. RVC was unable to provide pedestrian or bicycle volumes. Additionally, because 2025 counts and historical counts were necessarily collected during the winter, there were limited pedestrian and bicycle volumes available to be analyzed. It is recommended that the principles and directions proposed in the aforementioned studies be applied as/when possible to continue to expand the active modes network within the area, particularly within the ASP area where additional links could provide greatly enhanced connectivity for origins/destination pairs such as Banded Peak School and the Elbow River pathway system.

3. ANALYSIS OF EXISTING CONDITIONS

3.1 Traffic

3.1.1 Intersection Capacity Analysis

Synchro 11 traffic analysis software was used to review intersection operational conditions based on the methods outlined in the Highway Capacity Manual. Traffic operations were assessed using the performance measures of volume-to-capacity (v/c) and Level of Service (LOS).

The volume-to-capacity (v/c) ratio of an intersection movement represents the ratio between the demand volume and available capacity. TEC guidelines accept a v/c ratio of 0.85 or less. The Level of Service (LOS) rating is based on average vehicle delays ranging from LOS A (minimal delay) to LOS F (significant delay). TEC guidelines accept an overall LOS C at highway access intersections with a LOS D on any single approach at full-build out.

Intersection capacity analysis was completed for the following scenarios:

- Existing Winter
  - AM Peak Hour
  - PM Peak Hour
  - Weekend Peak Hour
- Existing Summer

[6]Active Transportation Plan South County, Rocky View County, October 2018

[7] Bragg Creek Revitalization Plan, McElhanney and MVH Planning & Design, 2015

- AM Peak Hour
- PM Peak Hour
- Weekend Peak Hour

- 100th Highest Hour

The analysis was completed as per TEC TIA guidelines with a saturation flow rate of 1900 vehicles per hour and a peak hour factor of 0.92. The analysis used a minimum hourly volume of 5 vehicles per movement. The volume to capacity (v/c) ratio, level of service, average control delay (in seconds), and 95th percentile queue (in metres) are summarized in this report. Synchro output reports are provided in **Appendix A**.

Existing intersection analysis is summarized in **Table 3.1**through **Table 3.5**.

Table 3.1: Winter Weekday Peak Hours

INTERSECTION	MOVEMENT & LANES		AM PEAK HOUR				PM PEAK HOUR			
			v/c	LOS	Delay	Queue	v/c	LOS	Delay	Queue
Burnside Dr/ Hwy 22 & White Ave / Hwy 22 *(Signalized)*	EB	1	0.08	B	15	10	0.19	C	21	18
	WBL	1	0.05	B	19	13	0.10	C	22	17
	WBT	1	0.02	A	8	<5	0.03	A	7	6
	NBT/L	1	0.14	C	20	18	0.13	C	23	15
	NBR	1	0.07	A	1	<5	0.07	A	1	<5
	SB	1	0.13	B	20	18	0.14	C	23	17
	Overall		-	*B*	*14*	-	-	*B*	*18*	-
Hwy 22 & Balsam Ave *(EB Stop)*	EB	1	0.14	B	10	<5	0.13	B	11	<5
	NB	1	<0.02	A	0	<5	<0.02	A	1	<5
	SB	1	0.07	A	0	<5	0.15	A	0	<5
	Overall		-	*A*	*4*	-	-	*A*	*2*	-
Burnside Dr & Balsam Ave / Hwy 22 *(NB and SB Stop)*	EB	1	<0.02	A	1	<5	<0.02	A	1	<5
	WB	1	<0.02	A	1	<5	<0.02	A	1	<5
	NB	1	0.07	B	10	<5	0.09	B	11	<5
	SB	1	<0.02	A	10	<5	0.02	B	10	<5
	Overall		-	*A*	*3*	-	-	*A*	*3*	-
Centre Ave / Wintergreen Rd & Balsam Ave *(All-Way Stop)*	WB	1	0.08	A	8	-	0.19	A	8	-
	NB	1	0.12	A	7	-	0.08	A	7	-
	SB	1	0.05	A	8	-	0.05	A	8	-
	Overall		-	*A*	*7*	-	-	*A*	*8*	-
Centre Ave / W Bragg Creek Rd & Bracken Rd (West) *(WB Stop)*	WB	1	<0.02	A	9	<5	<0.02	A	9	<5
	NB	1	0.06	A	0	<5	0.04	A	0	<5
	SB	1	<0.02	A	1	<5	<0.02	A	1	<5
	Overall		-	*A*	*1*	-	-	*A*	*1*	-
Burney Rd (West) & White Ave *(NB Stop)*	EB	1	0.02	A	0	<5	0.04	A	0	<5
	WB	1	<0.02	A	2	<5	<0.02	A	2	<5
	NB	1	<0.02	A	9	<5	<0.02	A	9	<5
	Overall		-	*A*	*2*	-	-	*A*	*1*	-
Park Pl & White Ave *(NB Stop)*	EB	1	<0.02	A	0	<5	0.03	A	0	<5
	WB	1	<0.02	A	2	<5	<0.02	A	1	<5
	NB	1	<0.02	A	9	<5	<0.02	A	9	<5
	Overall		-	*A*	*3*	-	-	*A*	*1*	-

Table 3.2: Winter Weekend Peak Hour

INTERSECTION	MOVEMENT & LANES		WEEKEND PEAK HOUR			
			v/c	LOS	Delay	Queue
Burnside Dr/ Hwy 22 & White Ave / Hwy 22 *(Signalized)*	EB	1	0.20	C	22	19
	WBL	1	0.11	C	23	18
	WBT	1	0.02	A	8	<5
	NBT/L	1	0.29	C	26	28
	NBR	1	0.09	A	1	<5
	SB	1	0.29	C	26	29
	Overall		-	*B*	*21*	-
Hwy 22 & Balsam Ave *(EB Stop)*	EB	1	0.31	B	13	10
	NB	1	<0.02	A	1	<5
	SB	1	0.19	A	0	<5
	Overall		-	*A*	*4*	-
Burnside Dr & Balsam Ave / Hwy 22 *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	<0.02	A	1	<5
	NB	1	0.28	C	15	9
	SB	1	0.03	B	12	<5
	Overall		-	*A*	*4*	-
Centre Ave / Wintergreen Rd & Balsam Ave *(All-Way Stop)*	WB	1	0.31	A	10	-
	NB	1	0.27	A	9	-
	SB	1	0.10	A	9	-
	Overall		-	*A*	*9*	-
Centre Ave / W Bragg Creek Rd & Bracken Rd (West) *(WB Stop)*	WB	1	<0.02	B	10	<5
	NB	1	0.13	A	0	<5
	SB	1	<0.02	A	1	<5
	Overall		-	*A*	*1*	-

Table 3.3: Summer Weekday Peak Hours

INTERSECTION	MOVEMENT & LANES		AM PEAK HOUR				PM PEAK HOUR			
			v/c	LOS	Delay	Queue	v/c	LOS	Delay	Queue
Burnside Dr/ Hwy 22 & White Ave / Hwy 22 *(Signalized)*	EB	1	0.20	B	18	17	0.38	C	25	34
	WBL	1	0.14	C	24	22	0.21	C	25	31
	WBT	1	0.04	A	8	7	0.06	A	8	10
	NBT/L	1	0.33	C	27	28	0.23	C	26	23
	NBR	1	0.21	A	5	10	0.14	A	2	4
	SB	1	0.27	C	25	26	0.23	C	25	25
	Overall		-	*B*	*18*	-	-	*C*	*20*	-
Hwy 22 & Balsam Ave *(EB Stop)*	EB	1	0.27	B	13	8	0.26	B	14	8
	NB	1	<0.02	A	1	<5	<0.02	A	1	<5
	SB	1	0.13	A	0	<5	0.26	A	1	<5
	Overall		-	*A*	*4*	-	-	*A*	*3*	-
Burnside Dr & Balsam Ave / Hwy 22 *(NB and SB Stop)*	EB	1	<0.02	A	1	<5	<0.02	A	1	<5
	WB	1	<0.02	A	1	<5	<0.02	A	1	<5
	NB	1	0.13	B	11	<5	0.17	B	13	<5
	SB	1	0.03	B	11	<5	0.03	B	11	<5
	Overall		-	*A*	*3*	-	-	*A*	*3*	-
Centre Ave / Wintergreen Rd & Balsam Ave *(All-Way Stop)*	WB	1	0.14	A	8	-	0.32	A	9	-
	NB	1	0.19	A	8	-	0.12	A	8	-
	SB	1	0.10	A	8	-	0.11	A	8	-
	Overall		-	*A*	*8*	-	-	*A*	*9*	-
Centre Ave / W Bragg Creek Rd & Bracken Rd (West) *(WB Stop)*	WB	1	<0.02	A	10	<5	<0.02	A	9	<5
	NB	1	0.09	A	0	<5	0.05	A	0	<5
	SB	1	<0.02	A	1	<5	<0.02	A	1	<5
	Overall		-	*A*	*1*	-	-	*A*	*1*	-
Burney Rd (West) & White Ave *(NB Stop)*	EB	1	0.03	A	0	<5	0.07	A	0	<5
	WB	1	<0.02	A	2	<5	<0.02	A	2	<5
	NB	1	<0.02	A	9	<5	0.02	A	9	<5
	Overall		-	*A*	*2*	-	-	*A*	*1*	-
Park Pl & White Ave *(NB Stop)*	EB	1	0.02	A	0	<5	0.05	A	0	<5
	WB	1	<0.02	A	0	<5	<0.02	A	1	<5
	NB	1	<0.02	A	9	<5	<0.02	A	9	<5
	Overall		-	*A*	*2*	-	-	*A*	*1*	-

Table 3.4: Summer Weekend Peak Hour

INTERSECTION	MOVEMENT & LANES		WEEKEND PEAK HOUR			
			v/c	LOS	Delay	Queue
Burnside Dr/ Hwy 22 & White Ave / Hwy 22 *(Signalized)*	EB	1	0.52	C	33	39
	WBL	1	0.43	C	32	37
	WBT	1	0.05	B	10	8
	NBT/L	1	0.44	C	27	45
	NBR	1	0.29	A	8	12
	SB	1	0.46	C	27	49
	Overall		-	*B*	*26*	-
Hwy 22 & Balsam Ave *(EB Stop)*	EB	1	0.65	D	25	35
	NB	1	<0.02	A	1	<5
	SB	1	0.32	A	0	<5
	Overall		-	*A*	*8*	-
Burnside Dr & Balsam Ave / Hwy 22 *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	0.03	A	1	<5
	NB	1	0.64	D	24	34
	SB	1	0.03	B	14	<5
	Overall		-	*A*	*8*	-
Centre Ave / Wintergreen Rd & Balsam Ave *(All-Way Stop)*	WB	1	0.57	B	15	-
	NB	1	0.48	B	12	-
	SB	1	0.23	B	10	-
	Overall		-	*B*	*13*	-
Centre Ave / W Bragg Creek Rd & Bracken Rd (West) *(WB Stop)*	WB	1	0.02	B	12	<5
	NB	1	0.19	A	0	<5
	SB	1	<0.02	A	1	<5
	Overall		-	*A*	*1*	-

Table 3.5: 100th Highest Hour

INTERSECTION	MOVEMENT & LANES		WEEKEND PEAK HOUR			
			v/c	LOS	Delay	Queue
Burnside Dr/ Hwy 22 & White Ave / Hwy 22 *(Signalized)*	EB	1	0.66	D	38	57
	WBL	1	0.56	D	37	53
	WBT	1	0.06	A	10	9
	NBT/L	1	0.57	C	34	60
	NBR	1	0.36	A	8	15
	SB	1	0.57	C	33	70
	Overall		-	*C*	*30*	-
Hwy 22 & Balsam Ave *(EB Stop)*	EB	1	0.79	E	41	52
	NB	1	<0.02	A	1	<5
	SB	1	0.36	A	0	<5
	Overall		-	*B*	*11*	-
Burnside Dr & Balsam Ave / Hwy 22 *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	0.04	A	1	<5
	NB	1	0.72	E	40	40
	SB	1	0.05	C	15	<5
	Overall		-	*A*	*10*	-

Overall, the results of analysis determine that existing conditions within Bragg Creek do not vary significantly in terms of intersection functionality between various data sets. However, the variance between data sets indicated that development of proposed ASP lands could easily exceed current intersection capacity leading to need to improved infrastructure. Specifically, the need for an additional West Bragg access route, and / or a roundabout connecting Highway 22 to Bragg Creek.

The results of the analysis of the various data sets confirm the following:

- Summer Weekend Peak Hour volumes represent the most reasonable data set to be used in the development of future forecasts in the study area, when combined with available weekday forecasting data previously developed by RVC. This will be assessed and analyzed in subsequent Work Papers.
- The 100th Highest Hour volumes represent reasonable figures to be used in undertaking high-level manual re-assignments of traffic to assess impacts of additional access connections to the West Bragg Creek/Wintergreen area. However, their use in developing forecasts for future growth may overstate actual operating conditions experienced at those future horizon years.

These findings were extremely useful in that they confirmed the need to base future transportation planning on summer weekend conditions as opposed to the typical weekday AM or PM peak hour conditions that have been utilized previously per typical industry standards. The uniqueness of Bragg Creek lends itself to a different approach, and the Weekend Design Hour volumes form the basis for that work moving forward.

3.1.2 Link Capacity Analysis

To review roadway classifications and capacities, daily vehicle traffic volumes were calculated and compared to TEC Classification[8] , TEC Highway Design Guide 2018[9] and RVC Standards[10] guidelines. Daily traffic volumes were calculated using summer weekend volumes as these represented the Design Volumes recommended by Bunt for use in this study. Daily traffic volumes are summarized in **Table 3.6**.

[8] Alberta Functional Classification, TEC 2020

[9] Alberta Transportation Highway Geometric Design Guide, April 2018, Chapter A: Basic Design Principles

[10] Rocky View County Servicing-Standards, April 2025.

Table 3.6: Daily Volume Analysis

ROADWAY	TYPE	SECTION	DAILY VOLUME GUIDELINE	DAILY VOLUMES**	
				Lowest (Winter Weekday)	Highest (100th Highest Hour / Summer Weekend)
Highway 22	Level 2 TEC Hwy	North of Bragg Creek	10,000-15,000*	4,000	11,000
Highway 22	Level 2 TEC Hwy	South of Bragg Creek	10,000-15,000*	2,000	7,000
White Ave (Highway 758)	Level 4 TEC Hwy	Highway 22 to Highway 66	10,000-15,000*	2,000	5,000
Balsam Ave	Rural Primary Collector	Hwy 22 to Centre Ave	2,500-5,000	3,000	9,000
Wintergreen Rd	Rural Primary Collector	North of Balsam Ave	2,500-5,000	1,000	3,000
Centre Ave / W Bragg Creek Rd	Rural Primary Collector	Balsam Ave to Bracken Rd	2,500-5,000	2,000	7,000
W Bragg Creek Rd	Rural Primary Collector	West of Bracken Rd West	2,500-5,000	2,000	6,000

**Indicative volume when twinning should be considered*

***Existing daily volumes are determined by applying a standard factor of 10 to PM peak-hour volumes.*

Based on link capacity analysis, roadways within and surrounding Bragg Creek do not fall within the typical daily capacity listed in the TEC Highway Design Guide 2018 or the daily capacity listed in the RVC design standards. It should be noted that the daily capacities listed by TEC are anticipated daily volumes and not guidelines. Therefore, cannot be used as design guidelines, but as a comparison to other Alberta Highways.

Highway 22 is classified by TEC as level 2 Highway and is functioning close to typical daily capacity listed by TEC of 5,000-10,000 vehicles per day. However, 100th highest hour volumes North of Bragg Creek are above the this. White Avenue is classified by TEC as a level 4 Highway but is functioning with over twice the typical daily capacity listed by TEC for a level 4 Highway of 100-1,000. The 100th highest hour volume along White Avenue are five times greater than this.

As defined in the RVC Standards report the width of Balsam Avenue, Wintergreen Road, Centre Avenue and West Bragg Creek Road all fall within rural primary collector road classification. For existing winter weekday conditions Balsam Avenue, Wintergreen Road, Centre Avenue and West Bragg Creek Road all fall below this guideline. However, the 100th highest hour volumes for Balsam Avenue, Centre Avenue and West Bragg Creek Road are all above the guideline for regional collectors.

Future road network expansion plans, RVC Bylaw C-8549-2024 [11]identify that some of these roadways will be expanded. These include Centre Avenue / West Bragg Creek Road west of Balsam Avenue, and Balsam Avenue between Highway 22 and Centre Avenue. Centre Avenue and Balsam Avenue will be built up to a

[11] Rocky View Country Bylaw C-8549-2024 Regional Transportation Off-Site Levy Bylaw, pg.17-18

Network 'A' road to expand a width of 11.4 metres of paved surface within a 36 metre right of way. This will be considered in future phases of this study.

3.1.3 Crash History Analysis

The collision history for highways surrounding Bragg Creek was sourced from the Alberta database[12]. The history of collisions was collected from 2015-2019 for the following sections of Provincial Highways where data could be obtained:

- Highway 22 from km 22.970 to km 23.031
- Highway 758 (White Avenue) from km 3.300 to km 23.165

It should be noted that collision data from 2019 onwards is not available at this time. Collision data from 2015-2019 was analysed, however, is unlikely to be representative of current conditions due to intersection signalization at Burnside Drive/White Avenue/Highway 22 in 2021.

Collision analysis 2015-2019

Collision data is included in **Appendix B.**

The intersection at Highway 22 & Burnside Drive recorded an average of 2.0 collisions per year. The collision history showed there were no fatal collisions, four injury collisions, and six property damage only collisions from 2015-2019.

The intersection at Highway 22 & Balsam Avenue recorded an average of 1.4 collisions per year. The collision history showed there were no fatal collisions, two injury collision, and seven property damage only collisions from 2015-2019.

No collisions were recorded from 2015-2019 on Highway 758 /White Avenue from 3.300km to 23.165km (west of Highway 22 & White Avenue intersection to the Trading Post).

The intersection collision rate was calculated using the following formula:

$$CR = \frac{Collisions\ x\ 100{,}000{,}000}{(Number\ of\ Years)(365\frac{Days}{Year})(Average\ Entering\ Daily\ Traffic\ Volumes)}$$

Intersection collision rates are summarized in **Table 3.7**.

[12] Alberta Highway Data Online Database

Table 3.7: Collision Rates on Highway 22 from km 22.970 to km 23.031

INTERSECTION	ANNUAL COLLISIONS	COLLISION RATE PER 100 MILLION ENTERING VEHICLES	
		Low Range (Winter Weekday daily volumes)	High Range (100th Highest Hour daily volumes)
Hwy 22 & Burnside Dr	2 per year (10 total)	137	50
Hwy 22 & Balsam Ave	1.4 per year (7 total)	96	32

The rate threshold for acceptable intersection set out by TEC is 64.2 collisions per 100 million entering vehicles. However, the collision rate at both intersections fall below the threshold when using high range daily volume estimations, but above it when using high range daily volume estimations. Therefore, TEC requires mitigation measures be set in place for safety. This is likely one of the many reasons the intersection at Burnside Drive/White Avenue/Highway 22 was signalized in May 2021.

Updated collision analysis

As mentioned previously Bunt has been unable to acquire collision data after the intersection at Burnside Drive/White Avenue/Highway 22 was signalized. When the available 2015-2019 data was analysed and compared to the provincial threshold it did not meet guidelines. It is possible that the collision rate was a potential factor in the decision for the signalization of the intersection.

However, based on movement volumes and observations from a site visit conducted in February 2025 possible safety concerns have been flagged. Observations determined there could be safety issues at the left turn from Balsam Avenue onto Highway 22. Based on the sharp intersection geometry and volumes the turn has been flagged as a collision risk. Traffic data displays that there are low volumes/usage at this turn. Count volumes show that many vehicles are taking this turn instead of travelling down to White Avenue and using the signalized light. At this time there is no indication that the northbound left turn at Highway 22 & Balsam should not be permitted. Site visit observations have flagged pedestrian traffic along Balsam Avenue access into the shopping center and along White Avenue near the signalized intersection as a potential hazard. Although marked cross walks exist at the entrance to the shopping centers many vehicles have been observed using the parking lot to avoid wait times at intersection posing a risk to pedestrians. Additionally, there is only one crosswalk marked along Balsam Avenue and no crosswalks along White Avenue posing additional risks to pedestrians.

The identified risk of the eastbound left turning movement from Balsam Avenue to Highway 22 and risk to pedestrians along Balsam Avenue and White Avenue indicate that upgrades to infrastructure should be considered in the future. Turning risk could be reduced by signalization at Balsam and Highway 22 or a roundabout to replace trio of intersections at Highway 22/White Avenue/Balsam Avenue/Burnside Drive.

3.2 Active Transportation

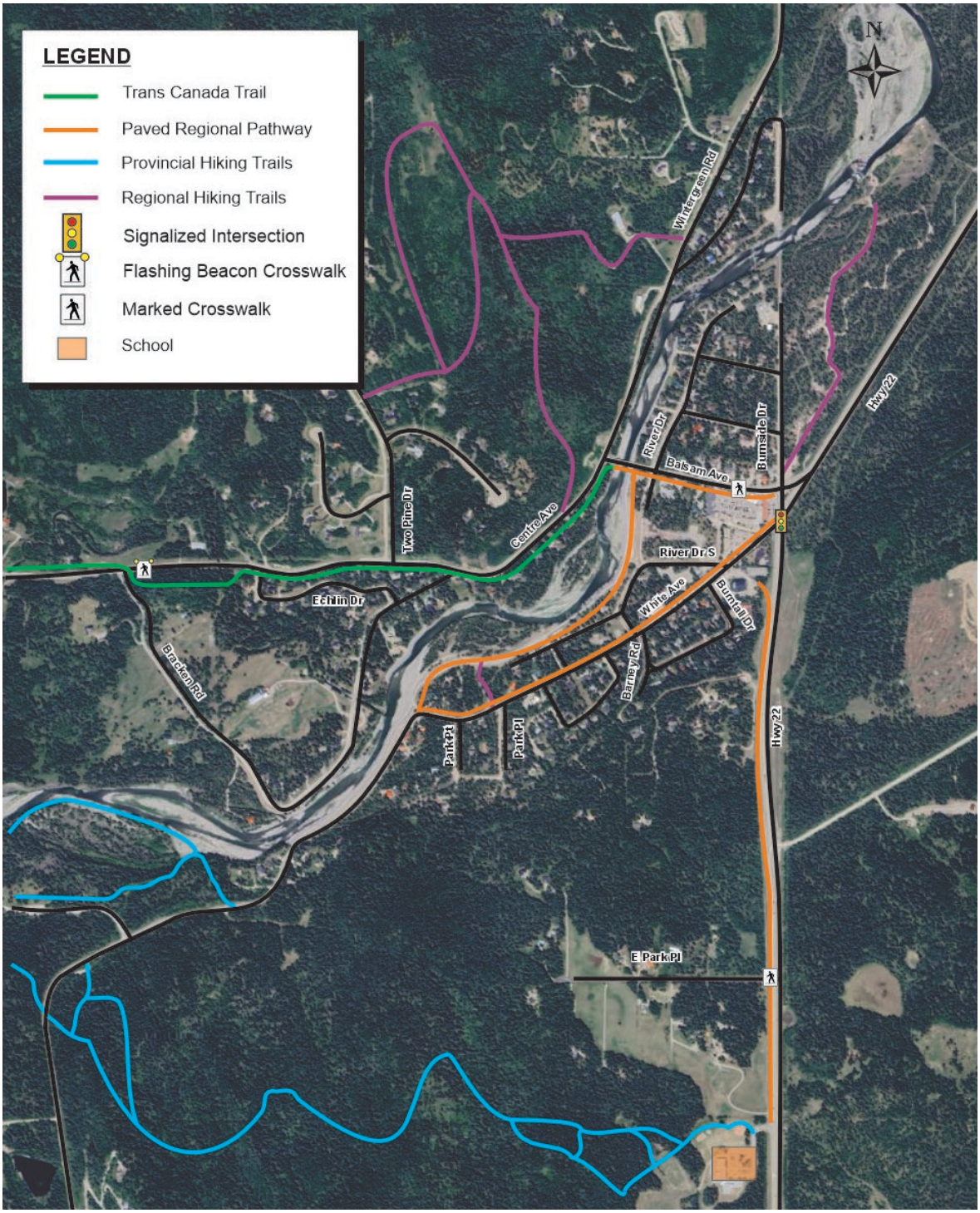
The existing active transportation network is illustrated in **Figure 3.1** and includes a variety of formal connections throughout the community. The most significant of these is the Trans Canada Trail that extends west of the Balsam Avenue bridge access along Centre Avenue/West Bragg Creek Road as far as

Range Road 54 before turning south and extending a short distance before turning again to an off-road connection to the West Bragg Creek trail network.

Other major network elements include the paved regional pathway along the north side of White Avenue from Burnside Drive in the Hamlet Core to the Trading Post, the trail along the recently completed dike that parallels White Avenue and the paved regional pathways that connects the Hamlet Core with Banded Peak school atop the hill to the south on Highway 22.

There are also multiple local hiking trails both regionally and connected to Bragg Creek Provincial Park. The most significant of these trails is Alder Trail and Banded Peak Connector Trail which connects the Bragg Creek Provincial Park Access along White Avenue to Banded Peak school. Although this connection exists it is not suitable for commuters. It is a seasonal hiking trail only and is not suitable for bikes or maintained in winter months.

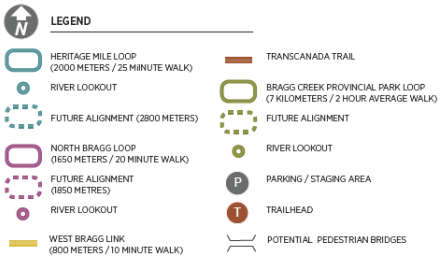
Figure 3.1: Active Transport Network

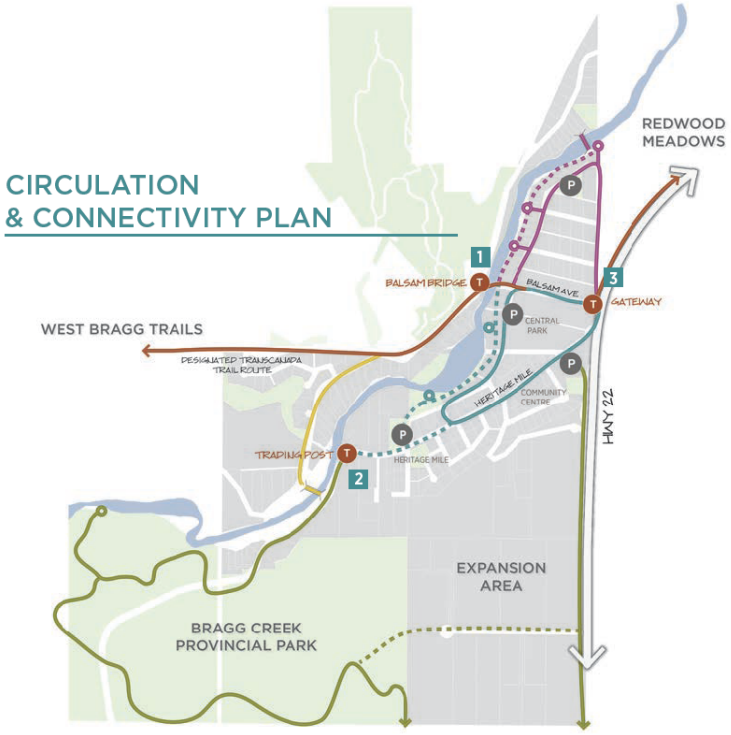


Proposed improvements to active transport have been recommended for the Hamlet in Bragg Creek in previous studies. Of note is the Bragg Creek Revitalization Plan 2015 which identified three pillars of action, including Connected Community through greater physical and social connectivity. An overview of the active transportation plan taken directly from the report is displayed in **Figure 3.2**.

Figure 3.2: Bragg Creek Active Transport Plan, MVH 2015

(Above) Potential wayfinding signage showcasing what is available in each area.





Trail connections and Trailhead designs are conceptual in nature and may be subject to change depending on future subdivision and development

Since 2015 sections of this plan have been implemented, specifically south of Balsam Avenue. This plan suggests a *Circulation & Connectivity* plan that connects West Bragg Creek to the Hamlet Core and Bragg Creek Provincial Park. Walking paths in West Bragg would be connected to the Hamlet Core via a pedestrian bridge near the Trading Post at the western end of the Heritage Mile on White Avenue, and a pedestrian bridge north of Burnside Drive. Paved pathways would be extended along the river north of Balsam Avenue and west of the Hamlet pedestrian link to the Trans Canada Trail. A full Heritage Mile and Hamlet Core improvement plan including a town square, Heritage Mile extended sidewalk, and increased recreational space would be added.

The ability to accommodate these future connections is linked to, but not dependent on, future decisions made by RVC regarding locations for secondary vehicle access of the Elbow River. This is discussed in more detail later in **section 4.3** of this report.

4. PRELIMINARY ASSESSMENT OF SECOND ACCESS OPTIONS

4.1 Overview

As noted earlier in this report, RVC and indeed the residents of Bragg Creek and the surrounding area are interested in the provision of a second access to the West Bragg Creek/Wintergreen side of the Elbow River. The Balsam Road bridge access of the Elbow River represents the only way to or from the entire area situated on the west/north side of the Elbow River (referred to as the West Bragg/Wintergreen area in this assessment). The goals of a second point of access are to create a positive impact by increasing community safety (in the event of an emergency evacuation or inability to cross the Balsam Avenue bridge), enhancing community connectivity, accommodation of possible future increases in tourist/recreational visitation levels, and improved management of traffic flows and traffic hazard locations.

Previous studies have reviewed options for the provision of this second connection. The most recent and comprehensive of these was the West Bragg Emergency Study, 2017[13]. That study identified a technically preferred route that connected Range Road 45 north of Bragg Creek to Wintergreen. The route is shown in orange in **Figure 4.1**. The 2017 study on the secondary access options was updated in 2023[14]. During the December 2023 RVC Council Meeting, Administration recommended Option 7B as the preferred option. This option included the bridge across the Elbow River upstream of the hamlet. This Option is shown in **Figure 4.2**.

Notwithstanding the recommendations in the 2017 and 2023 studies, an assessment of traffic impacts related to additional access opportunities was required as part of the scope of this ASP road transportation study. As such, the work program assessed two fundamental options: either west/upstream of the Trading Post at the end of the Heritage Mile in the vicinity of Bracken Road, or northeast/downstream of the Hamlet as an extension of Wintergreen Road. The former would require a new bridge access of the Elbow River while the latter generally matches the recommended route identified in the 2023 study that would require passage across lands not controlled by RVC. Both require funding and engagement, and at present, neither are firmly entrenched as confirmed capital projects.

The task identified for this study involved the manual redistribution of traffic volumes to assess the high-level impacts of providing a second point of access to the West Bragg Creek/Wintergreen area. This analysis was based on exiting conditions to provide a basis of understanding of the relative impacts of each option on key transportation infrastructure in the study area, and lays the foundation for assessing future traffic flow expectations based on the build out of the study area. The future analysis will be the subject of a future Work Paper.

High level plans for both options are displayed in **Figure 4.3**.

[13] West Bragg Creek Emergency Access Route Determination Functional Planning Study, Tetra Tech, December 2017.
[14] Update to West Bragg Creek Emergency Access Study, Tetra Tech, August 2023.

Figure 4.1: Second Connection Option #2

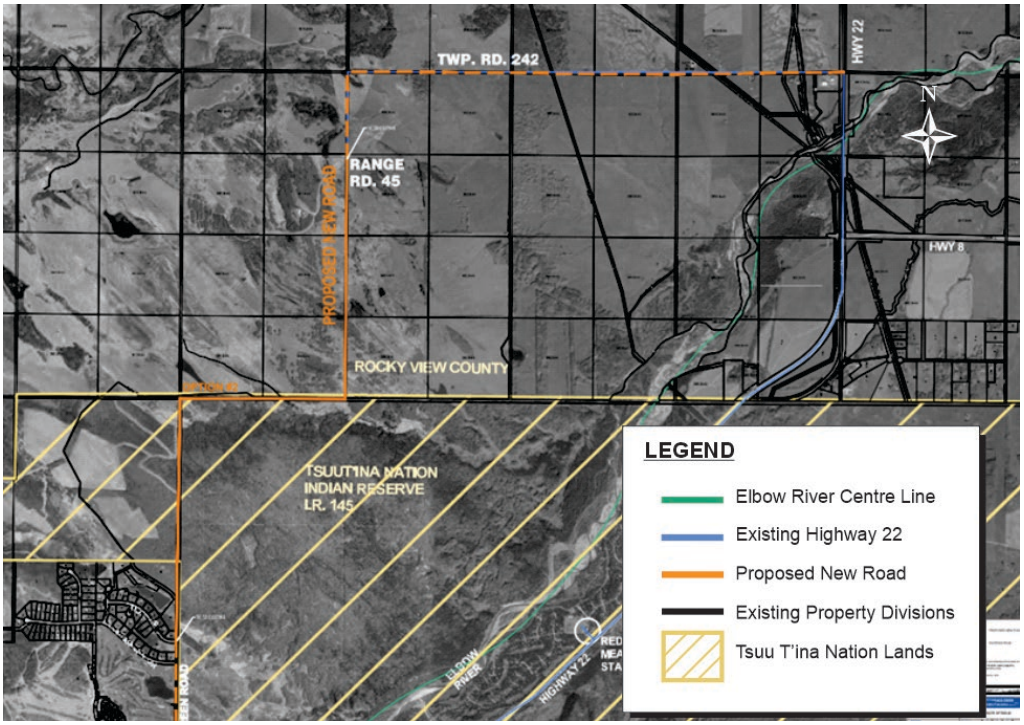


Figure 4.2: Second Connection Option #7B

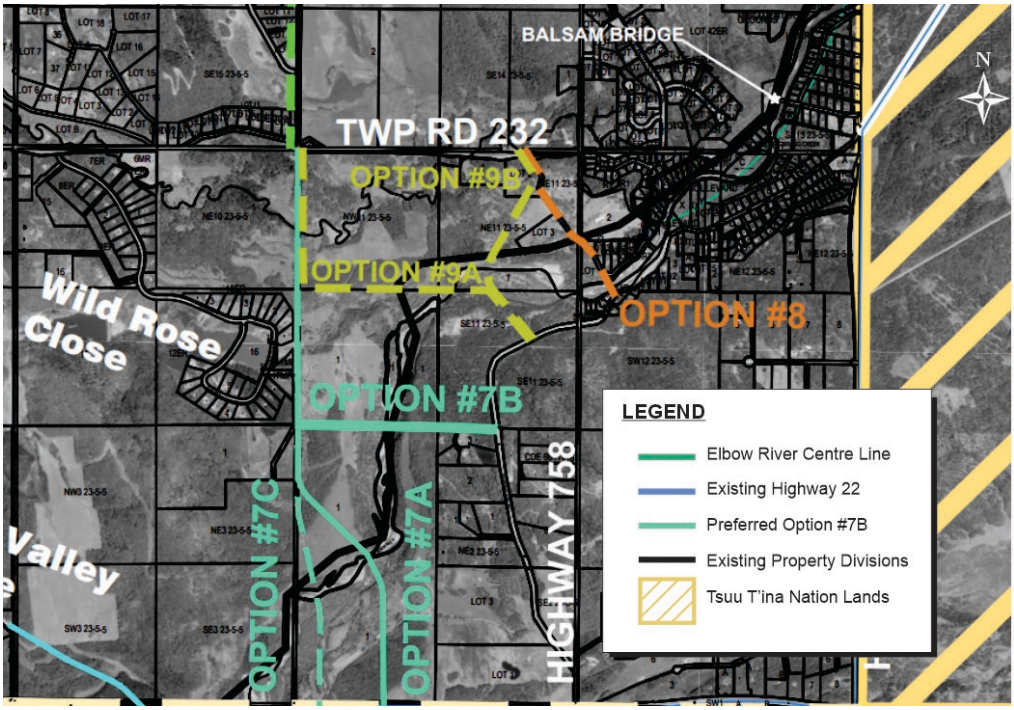
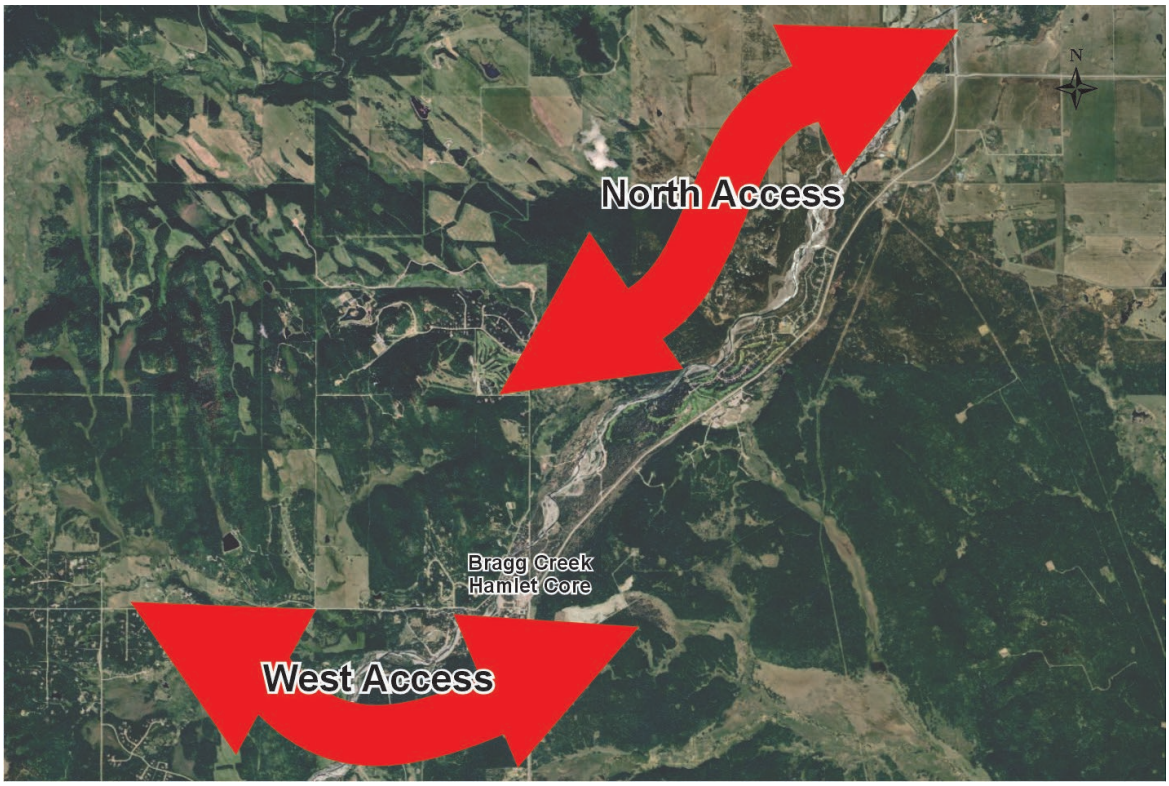


Figure 4.3: Proposed West Bragg Accesses



4.2 Reassignment of Traffic Volumes

To assess the impacts of providing a second point of access, traffic volumes travelling north/south along Highway 22 and east/west along Highway 22X were re-assigned. This was based on the likelihood of drivers choosing an alternative route to the Hamlet Core and the West Bragg Creek/Wintergreen area if such a route were available 24 hours a day and every day of the week as per a typical public road. The re-assignment was based in part on estimated travel times for the new routes compared with the existing route, with due consideration of delay and inconvenience applied based on engineering judgement. Focus was placed on tourist traffic currently traveling to and from Calgary via the trio of intersections at Highway 22/White Avenue/Balsam Avenue/Burnside Drive. This was admittedly coarse, but suitable for the purpose of establishing probable trends based on the information available. It should also be noted that to model worst case conditions (except for an emergency), the analysis was conducted using traffic volumes developed for the 100th highest hour as noted earlier in this report.

4.2.1 West (Upstream) Access Option

The west (upstream) access option would be expected to draw traffic primarily from south of Bragg Creek along Highway 22X and would primarily divert it at the Highway 22 & Balsam Avenue intersection. Some traffic travelling from north of Bragg Creek along Highway 22 would be drawn south past Balsam Avenue and White Avenue to the west access to avoid traffic at the Highway 22 & Balsam Avenue intersection. Some deflection via Highway 66 to White Avenue and through Bragg Creek Provincial Park would also be

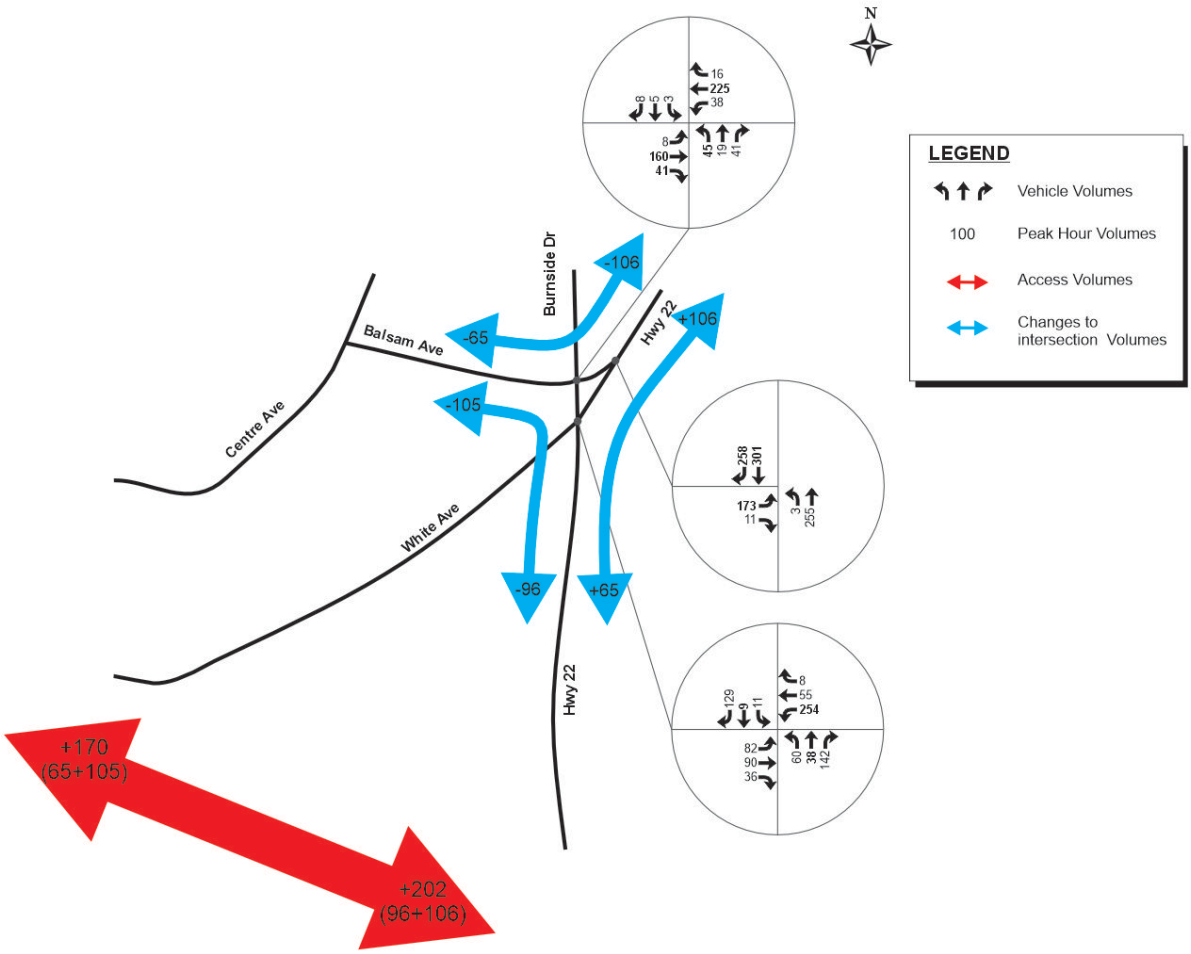
expected to occur. However, as part of the high-level design process this amount of diverted traffic was considered negligible. In essence, this option resulted in traffic travelling along Highway 22X south of Bragg Creek destined for West Bragg/Wintergreen to bypass Balsam Avenue. Obviously not all traffic travelling to these destinations would choose to deflect each time they made the trip, as there would be occasions where the trip required a stop in the Hamlet Core, for example. As discussed earlier in the report, re-assignment of traffic volumes is based on driver behaviour impacted by many factors. Estimations were made to assign assumed traffic distributions based on these factors

In the case of the west access analysis, the following changes to traffic distribution were assumed to occur:

- Highway 22 north of Bragg Creek
    - 20% of traffic travelling southbound on Highway 22 to the West Bragg Creek/Wintergreen area bypasses the existing access to take the new west access.
    - 40% of traffic travelling from the West Bragg Creek/Wintergreen area back to Highway 22 northbound assumed to choose the new west access.
- Highway 22 south of Bragg Creek
    - 70% of traffic travelling northbound on Highway 22 to the West Bragg Creek/Wintergreen area assumed to choose the new west access.
    - 70% of traffic travelling from the West Bragg Creek/Wintergreen area back to Highway 22 southbound assumed to choose the new west access.

Re-assignment of traffic with a west access for 100th Highest Hour volumes for the trio of intersections at Highway 22/White Avenue/Balsam Avenue/Burnside Drive are displayed in **Figure 4.4**.

Figure 4.4: West Access Volume distribution



4.2.2 North (Downstream) Option

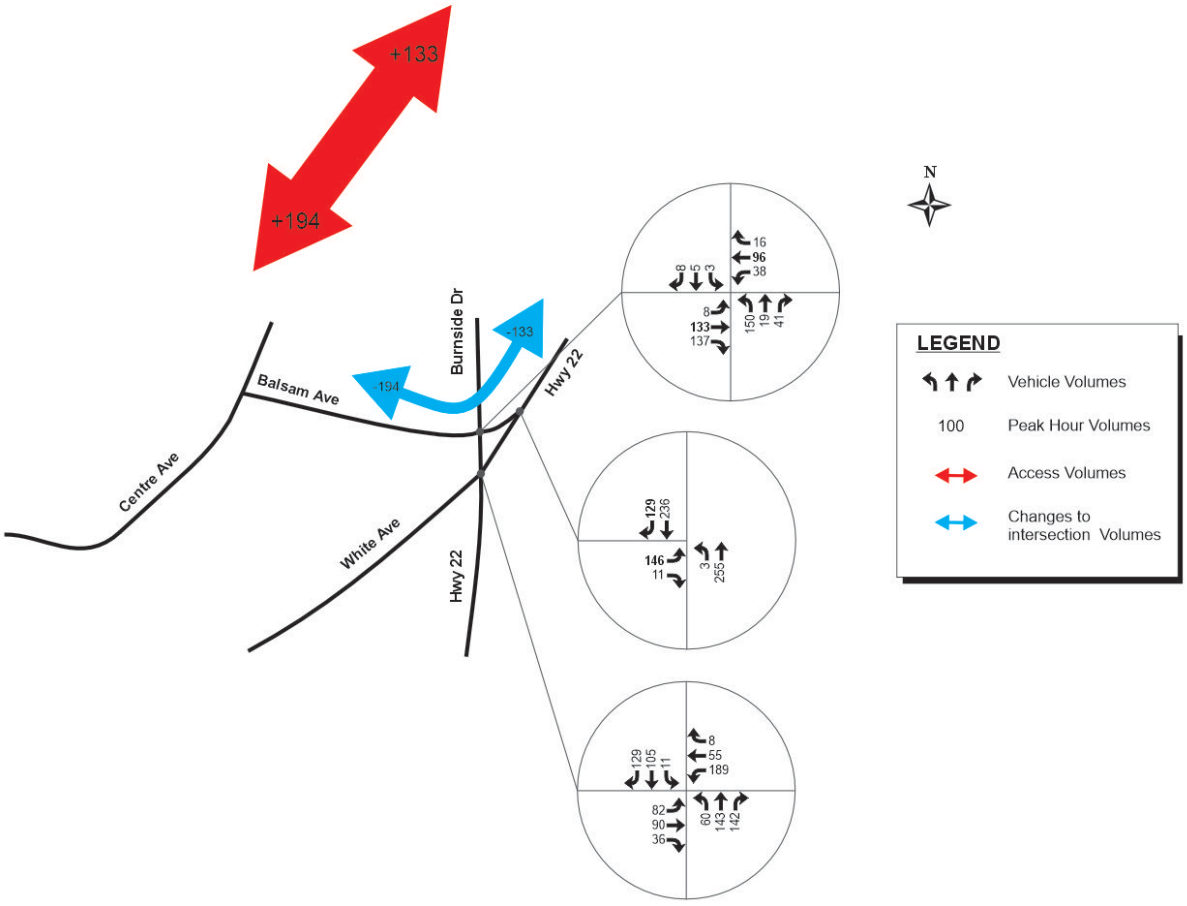
The north (downstream) access option would be expected to draw traffic primarily from north of Bragg Creek along Highway 22 and would divert them at a decision point well away from Bragg Creek, likely in the vicinity of the Highway 22/Highway 8 roundabout. The specific location of the decision would vary depending upon the ultimate end-state access connection. In essence, this option resulted in traffic travelling along Highway 22 north of Bragg Creek destined for West Bragg/Wintergreen area to bypass Balsam Avenue. Obviously not all traffic travelling to these destinations would choose to deflect each time they made the trip, as there would be occasions where the trip required a stop in the Hamlet Core, for example. As with the west access option, assumptions were made for traffic distribution with a north access for 100th highest hour volumes based on multiple factors impacting driver behaviour discussed earlier.

In the case of the north access analysis, the following changes to traffic distribution were assumed to occur:

- Highway 22 north of Bragg Creek
    - 60% of traffic travelling southbound on Highway 22 to the West Bragg Creek/Wintergreen area was assumed to choose the new north access.
    - 50% of traffic travelling from the West Bragg Creek/Wintergreen area back to Highway 22 northbound was assumed to choose the new north access.
- Highway 22 south of Bragg Creek
    - No changes to traffic south of Bragg Creek

Re-assignment of traffic with north access for 100th Highest Hour volumes for the trio of intersections at Highway 22/White Avenue/Balsam Avenue/Burnside Drive are displayed in **Figure 4.5**.

Figure 4.5: North Access Volume distribution



4.2.3 Re-Assessment of Traffic Analysis

Synchro 11 traffic analysis software was used to review intersection operational conditions based on the methods outlined in the Highway Capacity Manual. Synchro output reports are provided in **Appendix A**.

Intersection analysis for the west access and north access are summarized in **Table 4.1** and **Table 4.2** respectively.

Table 4.1: west (upstream) access analysis - 100th Highest Hour

INTERSECTION	MOVEMENT & LANES		WEEKEND PEAK HOUR			
			v/c	LOS	Delay	Queue
Burnside Dr/ Hwy 22 & White Ave / Hwy 22 *(Signalized)*	EB	1	0.62	D	36	60
	WBL	1	0.64	D	35	71
	WBT	1	0.06	A	7	9
	NBT/L	1	0.36	C	33	33
	NBR	1	0.32	A	7	14
	SB	1	0.49	D	35	47
	Overall		-	*C*	*29*	-
Hwy 22 & Balsam Ave *(NB Stop)*	EB	1	0.52	C	24	22
	NB	1	<0.02	A	1	<5
	SB	1	0.36	A	0	<5
	Overall		-	*A*	*5*	-
Burnside Dr & Balsam Ave / Hwy 22 *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	0.03	A	1	<5
	NB	1	0.23	B	14	7
	SB	1	0.04	B	13	<5
	Overall		-	*A*	*4*	-
West Access *(EB Stop)*	EB	1	0.54	C	24	24
	NB	1	0.10	A	3	<5
	SB	1	0.23	A	0	<5
	Overall		-	*A*	*7*	-

In comparing the existing 100th highest hour analysis to proposed west (upstream) access 100th highest hour analysis, there are limited changes to overall level of service (LOS) or delay for each intersection. However, significant changes can be seen for specific movements summarized as follows:

- Burnside Drive/Highway 22/White Avenue Intersection
    - Reduced queue length for northbound and southbound movements of 27 meters and 23 meters respectively.
- Highway 22 & Balsam Avenue
    - Reduced eastbound delay by 17 seconds.
    - Reduced queue length for eastbound movement of 30 meters.
- Burnside Drive & Balsam Avenue/Highway 22
    - Reduced northbound by 26 seconds.
    - Reduced queue length for northbound movement of 33 meters.

Based on findings there would be an overall positive impact to the trio of intersections at Highway 22/White Avenue/Balsam Avenue/Burnside Drive. The shorter southbound queue at Burnside Drive & Highway 22 would reduce impacts to the Burnside Drive & Balsam Avenue intersection. The queue would now fit within the available 47 metre storage length, north of the stop bar. This storage space was exceeded in the previous analysis. At Burnside Drive & Balsam Avenue, the shorter northbound queue would have a similar benefit to the queue not extending into the adjacent intersection to the south. The shorter eastbound queue at Highway 22 & Balsam Avenue would reduce impact to the adjacent

intersection to the west. As mentioned previously, in **Section 3.1.3** the eastbound left at Highway 22 & Balsam Avenue intersection has been flagged as a possible safety concern. The reduced volume and subsequent queue and delay would not only improve intersection capacity, but also safety.

Table 4.2: north (downstream) access analysis - 100th Highest Hour

INTERSECTION	MOVEMENT & LANES		WEEKEND PEAK HOUR			
			v/c	LOS	Delay	Queue
Burnside Dr/ Hwy 22 & White Ave / Hwy 22 *(Signalized)*	EB	1	0.66	D	38	57
	WBL	1	0.56	D	37	53
	WBT	1	0.06	A	10	9
	NBT/L	1	0.57	C	34	60
	NBR	1	0.36	A	8	15
	SB	1	0.57	C	33	70
	Overall		-	*C*	*30*	-
Hwy 22 & Balsam Ave *(NB Stop)*	EB	1	0.37	C	17	13
	NB	1	<0.02	A	1	<5
	SB	1	0.23	A	0	<5
	Overall		-	*A*	*4*	-
Burnside Dr & Balsam Ave / Hwy 22 *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	0.03	A	2	<5
	NB	1	0.43	C	17	16
	SB	1	0.03	B	11	<5
	Overall		-	*A*	*6*	-
North Access *(EB Stop)*	EB	1	0.52	D	30	21
	NB	1	<0.02	A	1	<5
	SB	1	0.36	A	0	<5
	Overall		-	*A*	*4*	-

Similarly to the west access analysis in comparing the existing 100th highest hour analysis to proposed north (downstream) access 100th highest hour analysis, there is limited changes to overall level of service (LOS) or delay for each intersection. However, as with the west access significant changes can be seen for specific movements summarized as follows:

- Burnside Drive/Highway 22/White Avenue Intersection
  - No significant changes.
- Highway 22 & Balsam Avenue Intersection
  - Reduced LOS, delay and queue length for eastbound movement from E to C, 24 seconds, and 39 meters.
- Burnside Drive & Balsam Avenue/Highway 22 Intersection
  - Reduced LOS, delay and queue length for northbound movement from E to C, 23 seconds, and 24 meters.

Based on findings there would be an overall positive impact to the trio of intersections at Highway 22/White Avenue/Balsam Avenue/Burnside Drive. As with the west (upstream) access, the reduced eastbound volume at Highway 22 & Balsam Avenue and subsequent reduction in queues and delay would not only improve intersection capacity, but also safety. The eastbound queue length would also reduce impacts to the adjacent intersection to the west. At Burnside Drive & Balsam Avenue, the shorter northbound queue would reduce impacts to the adjacent intersection to the south.

A re-assessment of link capacity was also performed using the 100th highest hour daily volumes for each of the two new access scenarios. To review roadway classifications and capacities, daily vehicle traffic volumes were calculated and compared to TEC Classification and RVC Standards guidelines. The west access analysis and north access analysis are summarized in **Table 4.3** and **Table 4.4** respectively.

Table 4.3: West Access Daily Volume Analysis

ROADWAY	TYPE	SECTION	DAILY VOLUME GUIDELINE	DAILY VOLUMES**
Highway 22	Level 2 TEC Hwy	North of Bragg Creek	10,000-15,000*	10,000
Highway 22	Level 2 TEC Hwy	South of Bragg Creek to Access	10,000-15,000*	7,000
Highway 22	Level 2 TEC Hwy	South of Access	10,000-15,000*	8,000
White Ave (Highway 758)	Level 4 TEC Hwy	Highway 22 to Highway 66	10,000-15,000*	5,000
Balsam Ave	Rural Primary Collector	Hwy 22 to Centre Ave	2,500-5,000	5,000

**Indicative volume when twinning should be considered*

***Existing daily volumes are determined by applying a standard factor of 10 to PM peak-hour volumes.*

Table 4.4: North Access Daily Volume Analysis

ROADWAY	TYPE	SECTION	DAILY VOLUME GUIDELINE	DAILY VOLUMES**
Highway 22	Level 2 TEC Hwy	North of Bragg Creek to Access	10,000-15,000*	8,000
Highway 22	Level 2 TEC Hwy	North Access	10,000-15,000*	11,000
Highway 22	Level 2 TEC Hwy	South of Bragg Creek	10,000-15,000*	7,000
White Ave (Highway 758)	Level 4 TEC Hwy	Highway 22 to Highway 66	10,000-15,000*	5,000
Balsam Ave	Rural Primary Collector	Hwy 22 to Centre Ave	2,500-5,000	6,000

**Indicative volume when twinning should be considered*

***Existing daily volumes are determined by applying a standard factor of 10 to PM peak-hour volumes.*

Based on link capacity analysis, not all the study roadways fall within the typical daily capacity listed in the TEC Highway Design Guide 2018 / daily capacity listed in the RVC design standards. However as mentioned in **Section 3.1.2** the existing 100th highest hour roadway volumes do not meet recommended guidelines prior to additional access analysis. This will need to be addressed by the Province and RVC and will be considered in future phases of this study.

Future road network expansion plans, RVC Bylaw C-8549-2024, identify that some of these roadways will be expanded. This includes Centre Avenue/West Bragg Creek Road west of Balsam Avenue, and Balsam Avenue between Highway 22 and Centre Avenue. Additional details listed in **Section 3.1.2**.

4.2.4 Summary of Revised Traffic Analysis

The analysis of the two alternative access options resulted in the findings noted below. It should be noted that these are not intended to provide any specific recommendations and are instead intended to provide factual representations of changes in overall traffic conditions, based on existing design hour volumes. Additional analysis of future traffic conditions will be undertaken as part of a subsequent Work Paper. This analysis provides the foundation upon which that future analysis can be undertaken.

West (Upstream) Access Option:

The provision of an additional access west (upstream) of the Balsam Avenue bridge access will result in the following general changes:

- Operating conditions will be improved for traffic travelling from Highway 22 to Balsam Avenue.
- Operating conditions will deteriorate for traffic travelling from Highway 22 (north leg) to Highway 22 (south leg) and from White Avenue to Highway 22 (north leg).

In general, the west (upstream) option will re-direct traffic at the key Burnside Drive/Highway 22 & White Avenue/Highway 22 intersection such that volumes on White Avenue increase while those on Balsam Avenue decrease. Unlike the north access option, the west option will provide an alternate route for traffic travelling from both the north and south legs of Highway 22. In terms of driver experience, drivers travelling from the south would be expected to take the west access to the West Bragg Creek/Wintergreen area unless opting to also visit the Hamlet Core. Some drivers may opt to take the existing Balsam Avenue bridge access with plans to visit Hamlet Core attractions such as the Bragg Creek Provincial Park, shops, or restaurants when entering or exiting West Bragg Creek/Wintergreen from the north or south. Drivers traveling from the north (likely Calgary) to West Bragg Creek/Wintergreen will have the option of taking the existing Balsam Avenue bridge access or bypassing and diverting to the west access. Factors such as travel times, current traffic volumes (at peak time or off peak), and likelihood of travel into the Hamlet Core will impact driver behaviour.

North (Downstream) Access Option:

The provision of an additional access north (downstream) of the Balsam Avenue bridge access will result in the following general changes:

- Operating conditions will be improved for traffic travelling from Highway 22 (north leg) to Balsam Avenue and within the Hamlet of Bragg Creek and at the trio of intersections at Highway 22/White Avenue/Balsam Avenue/Burnside Drive.
- Operating conditions will remain generally unchanged for traffic travelling from Highway 22 (south leg) to Bragg Creek.

In general, the north (downstream) option will have a greater impact on the key Burnside Drive/Highway 22 & White Avenue/Highway 22 intersection than the west (upstream) option. In this option, traffic volumes on both White Avenue and Balsam Avenue would be expected to decrease. In terms of driver experience, drivers traveling from the north (likely Calgary) to West Bragg Creek/Wintergreen will have the option of taking the north access or continuing to the existing Balsam Avenue bridge access. Factors such as travel times, current traffic volumes (at peak time or off peak), and likelihood of travel into the Hamlet

Core will impact driver behaviour. Some drivers may opt to take the existing Balsam Avenue bridge access with plans to visit Hamlet Core attractions. Overall drivers diverting to the north access will significantly reduce delays and queuing at the trio of intersections at Highway 22/White Avenue/Balsam Avenue/Burnside Drive and congestion within the Hamlet Core. It is unlikely that drivers travelling from south of Bragg Creek would divert to the north access. However, these drivers would feel the positive impacts of reduced congestion, delays, and queuing.

4.3 Active Transportation

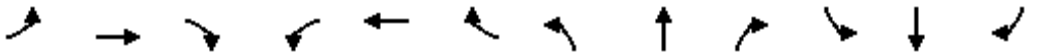
The overall goal of a new active transportation plan is to develop a more robust active transportation network that creates connections between key areas of Bragg Creek. Key elements of this plan follow:

- Include separate walking/cycling lanes on the west access river crossing (if west option is selected).
- Sidewalks along the road links connecting the west access river crossing (if west option is selected) to the Hamlet Core or separate walking paths connecting to the Hamlet Core and existing West Bragg paths.
- Active transportation links connecting Highway 22 near Banded Peak School to White Avenue.
- Completion of trail along Elbow River north of Balsam Avenue.
- Improvements to sidewalks and roadway access through Hamlet Core along Balsam Avenue and White Avenue creating separate biking and walking lanes.

A west access would have a greater positive impact on active transportation connectivity compared to a north access. This is due primarily to the location and shape of the current active transportation network that exists almost exclusively west (upstream) of the Balsam Avenue bridge access. A west access would allow for a second river crossing connecting the active links in West Bragg Creek/ Wintergreen to the Hamlet Core. An active transportation link along a west river crossing would connect the existing paths increasing community connectivity.

APPENDIX A

SYNCHRO REPORTS

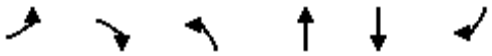


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	19	16	43	21	0	21	47	61	5	50	13
Future Volume (vph)	5	19	16	43	21	0	21	47	61	5	50	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	1		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.947							0.850		0.974	
Flt Protected		0.994		0.950				0.985			0.997	
Satd. Flow (prot)	0	1730	0	1738	1883	0	0	1776	1471	0	1729	0
Flt Permitted		0.955		0.950				0.869			0.968	
Satd. Flow (perm)	0	1662	0	1738	1883	0	0	1567	1471	0	1678	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		17							151			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			322.9			85.9	
Travel Time (s)		18.4			12.4			23.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	2%	6%	5%	2%	2%	10%	5%	11%	2%	10%	2%
Adj. Flow (vph)	5	21	17	47	23	0	23	51	66	5	54	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	47	23	0	0	74	66	0	73	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	32.0	32.0		38.0	70.0		30.0	30.0	38.0	30.0	30.0	
Total Split (%)	32.0%	32.0%		38.0%	70.0%		30.0%	30.0%	38.0%	30.0%	30.0%	
Maximum Green (s)	23.0	23.0		29.8	61.0		22.2	22.2	29.8	22.2	22.2	
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		16.7		28.3	34.9			16.7	28.3		16.7	
Actuated g/C Ratio		0.33		0.55	0.68			0.33	0.55		0.33	
v/c Ratio		0.08		0.05	0.02			0.14	0.07		0.13	
Control Delay		15.4		19.3	8.1			20.0	0.2		19.8	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		15.4		19.3	8.1			20.0	0.2		19.8	
LOS		B		B	A			C	A		B	
Approach Delay		15.4			15.7			10.7			19.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			B			B	
Queue Length 50th (m)		1.5		2.6	1.3			4.2	0.0		4.2	
Queue Length 95th (m)		10.0		12.7	4.1			18.2	0.0		17.9	
Internal Link Dist (m)		180.0			148.2			298.9			61.9	
Turn Bay Length (m)												
Base Capacity (vph)		841		1210	1883			839	1070		898	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.05		0.04	0.01			0.09	0.06		0.08	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 51.2			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.14			
Intersection Signal Delay: 14.4		Intersection LOS: B	
Intersection Capacity Utilization 58.3%		ICU Level of Service B	
Analysis Period (min) 15			

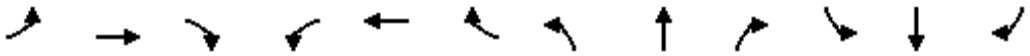
Splits and Phases: 1: Hwy 22 & White Ave & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	100	0	0	80	65	51
Future Volume (Veh/h)	100	0	0	80	65	51
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	109	0	0	87	71	55
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	186	98	126			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	186	98	126			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	100	100			
cM capacity (veh/h)	801	957	1460			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	109	87	126
Volume Left	109	0	0
Volume Right	0	0	55
cSH	801	1460	1700
Volume to Capacity	0.14	0.00	0.07
Queue Length 95th (m)	3.6	0.0	0.0
Control Delay (s)	10.2	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.2	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	18.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	80	53	7	41	5	32	5	14	5	5	5
Future Volume (Veh/h)	5	80	53	7	41	5	32	5	14	5	5	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	87	58	8	45	5	35	5	15	5	5	5
Pedestrians		5									5	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	55			145			202	197	116	212	224	58
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	55			145			202	197	116	212	224	58
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			95	99	98	99	99	99
cM capacity (veh/h)	1543			1437			729	689	936	718	666	991

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	150	58	55	15
Volume Left	5	8	35	5
Volume Right	58	5	15	5
cSH	1543	1437	771	769
Volume to Capacity	0.00	0.01	0.07	0.02
Queue Length 95th (m)	0.1	0.1	1.7	0.5
Control Delay (s)	0.3	1.1	10.0	9.8
Lane LOS	A	A	B	A
Approach Delay (s)	0.3	1.1	10.0	9.8
Approach LOS			B	A

Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	20.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	39	23	5	108	35	5
Future Volume (vph)	39	23	5	108	35	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	25	5	117	38	5

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	67	122	43
Volume Left (vph)	42	0	38
Volume Right (vph)	25	117	0
Hadj (s)	-0.06	-0.54	0.27
Departure Headway (s)	4.2	3.6	4.4
Degree Utilization, x	0.08	0.12	0.05
Capacity (veh/h)	830	983	794
Control Delay (s)	7.5	7.0	7.7
Approach Delay (s)	7.5	7.0	7.7
Approach LOS	A	A	A

Intersection Summary			
Delay	7.3		
Level of Service	A		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	90	5	5	30
Future Volume (Veh/h)	5	5	90	5	5	30
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	98	5	5	33
Pedestrians						5
Lane Width (m)						3.7
Walking Speed (m/s)						1.1
Percent Blockage						0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	144	106			103	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	144	106			103	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	846	944			1489	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	103	38
Volume Left	5	0	5
Volume Right	5	5	0
cSH	893	1700	1489
Volume to Capacity	0.01	0.06	0.00
Queue Length 95th (m)	0.3	0.0	0.1
Control Delay (s)	9.1	0.0	1.0
Lane LOS	A		A
Approach Delay (s)	9.1	0.0	1.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	17.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	25	5	6	16	5	5
Future Volume (Veh/h)	25	5	6	16	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	5	7	17	5	5
Pedestrians	5			5	5	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				284		
pX, platoon unblocked						
vC, conflicting volume			37		70	40
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			37		70	40
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1566		921	1022

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	32	24	10
Volume Left	0	7	5
Volume Right	5	0	5
cSH	1700	1566	969
Volume to Capacity	0.02	0.00	0.01
Queue Length 95th (m)	0.0	0.1	0.2
Control Delay (s)	0.0	2.2	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	2.2	8.8
Approach LOS			A

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	17.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	5	5	9	5	5
Future Volume (Veh/h)	10	5	5	9	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	5	5	10	5	5
Pedestrians	5				5	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			21		44	18
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			21		44	18
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1587		955	1046

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	16	15	10
Volume Left	0	5	5
Volume Right	5	0	5
cSH	1700	1587	999
Volume to Capacity	0.01	0.00	0.01
Queue Length 95th (m)	0.0	0.1	0.2
Control Delay (s)	0.0	2.4	8.6
Lane LOS		A	A
Approach Delay (s)	0.0	2.4	8.6
Approach LOS			A

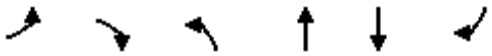
Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	14.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	32	17	63	35	0	17	35	43	5	34	22
Future Volume (vph)	27	32	17	63	35	0	17	35	43	5	34	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	1		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.970							0.850		0.951	
Flt Protected		0.983		0.950				0.984			0.996	
Satd. Flow (prot)	0	1768	0	1738	1865	0	0	1783	1526	0	1774	0
Flt Permitted		0.867		0.950				0.867			0.966	
Satd. Flow (perm)	0	1560	0	1738	1865	0	0	1571	1526	0	1721	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		13							151			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			322.9			85.9	
Travel Time (s)		18.4			12.4			23.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	6%	5%	3%	2%	6%	6%	7%	2%	3%	2%
Adj. Flow (vph)	29	35	18	68	38	0	18	38	47	5	37	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	82	0	68	38	0	0	56	47	0	66	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	29.0	29.0		41.0	70.0		30.0	30.0	41.0	30.0	30.0	
Total Split (%)	29.0%	29.0%		41.0%	70.0%		30.0%	30.0%	41.0%	30.0%	30.0%	
Maximum Green (s)	20.0	20.0		32.8	61.0		22.2	22.2	32.8	22.2	22.2	
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		15.9		23.3	43.1			15.9	23.3		15.9	
Actuated g/C Ratio		0.27		0.39	0.73			0.27	0.39		0.27	
v/c Ratio		0.19		0.10	0.03			0.13	0.07		0.14	
Control Delay		20.5		22.3	7.2			22.8	0.2		22.7	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		20.5		22.3	7.2			22.8	0.2		22.7	
LOS		C		C	A			C	A		C	
Approach Delay		20.5			16.9			12.5			22.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			B			C	
Queue Length 50th (m)		7.5		7.3	2.1			6.0	0.0		7.1	
Queue Length 95th (m)		18.1		16.9	5.8			14.7	0.0		16.5	
Internal Link Dist (m)		180.0			148.2			298.9			61.9	
Turn Bay Length (m)												
Base Capacity (vph)		566		1020	1865			624	958		683	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.14		0.07	0.02			0.09	0.05		0.10	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 59.3			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.19			
Intersection Signal Delay: 17.5		Intersection LOS: B	
Intersection Capacity Utilization 58.3%		ICU Level of Service B	
Analysis Period (min) 15			

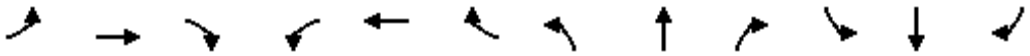
Splits and Phases: 1: Hwy 22 & White Ave & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	78	5	5	76	108	124
Future Volume (Veh/h)	78	5	5	76	108	124
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	85	5	5	83	117	135
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	278	184	252			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	278	184	252			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	88	99	100			
cM capacity (veh/h)	695	858	1313			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	90	88	252
Volume Left	85	5	0
Volume Right	5	0	135
cSH	702	1313	1700
Volume to Capacity	0.13	0.00	0.15
Queue Length 95th (m)	3.3	0.1	0.0
Control Delay (s)	10.9	0.5	0.0
Lane LOS	B	A	
Approach Delay (s)	10.9	0.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	24.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	78	43	5	122	5	47	5	6	5	5	5
Future Volume (Veh/h)	5	78	43	5	122	5	47	5	6	5	5	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	85	47	5	133	5	51	5	7	5	5	5
Pedestrians		5									5	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	143			132			276	272	108	278	292	146
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	143			132			276	272	108	278	292	146
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			92	99	99	99	99	99
cM capacity (veh/h)	1433			1453			655	628	945	656	611	893

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	137	143	63	15
Volume Left	5	5	51	5
Volume Right	47	5	7	5
cSH	1433	1453	676	701
Volume to Capacity	0.00	0.00	0.09	0.02
Queue Length 95th (m)	0.1	0.1	2.3	0.5
Control Delay (s)	0.3	0.3	10.9	10.2
Lane LOS	A	A	B	B
Approach Delay (s)	0.3	0.3	10.9	10.2
Approach LOS			B	B

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	23.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	105	43	5	64	32	5
Future Volume (vph)	105	43	5	64	32	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	47	5	70	35	5

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	161	75	40
Volume Left (vph)	114	0	35
Volume Right (vph)	47	70	0
Hadj (s)	0.00	-0.51	0.27
Departure Headway (s)	4.1	3.8	4.6
Degree Utilization, x	0.19	0.08	0.05
Capacity (veh/h)	844	901	751
Control Delay (s)	8.1	7.1	7.8
Approach Delay (s)	8.1	7.1	7.8
Approach LOS	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	23.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	54	5	5	80
Future Volume (Veh/h)	5	5	54	5	5	80
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	59	5	5	87
Pedestrians						5
Lane Width (m)						3.7
Walking Speed (m/s)						1.1
Percent Blockage						0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	158	66			64	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	158	66			64	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	830	993			1538	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	64	92
Volume Left	5	0	5
Volume Right	5	5	0
cSH	904	1700	1538
Volume to Capacity	0.01	0.04	0.00
Queue Length 95th (m)	0.3	0.0	0.1
Control Delay (s)	9.0	0.0	0.4
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	0.4
Approach LOS	A		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	19.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	51	5	8	32	5	5
Future Volume (Veh/h)	51	5	8	32	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	5	9	35	5	5
Pedestrians	5			5	5	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				284		
pX, platoon unblocked						
vC, conflicting volume			65		120	68
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			65		120	68
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	99
cM capacity (veh/h)			1530		862	978

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	60	44	10
Volume Left	0	9	5
Volume Right	5	0	5
cSH	1700	1530	916
Volume to Capacity	0.04	0.01	0.01
Queue Length 95th (m)	0.0	0.1	0.3
Control Delay (s)	0.0	1.5	9.0
Lane LOS		A	A
Approach Delay (s)	0.0	1.5	9.0
Approach LOS			A

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	37	5	5	31	5	5
Future Volume (Veh/h)	37	5	5	31	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	40	5	5	34	5	5
Pedestrians	5				5	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			50		96	48
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			50		96	48
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1549		891	1008

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	45	39	10
Volume Left	0	5	5
Volume Right	5	0	5
cSH	1700	1549	946
Volume to Capacity	0.03	0.00	0.01
Queue Length 95th (m)	0.0	0.1	0.2
Control Delay (s)	0.0	1.0	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	1.0	8.8
Approach LOS			A

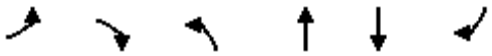
Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	15.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	38	32	86	42	0	42	71	122	5	75	26
Future Volume (vph)	10	38	32	86	42	0	42	71	122	5	75	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	1		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.946							0.850		0.967	
Flt Protected		0.994		0.950				0.982			0.998	
Satd. Flow (prot)	0	1727	0	1738	1883	0	0	1765	1471	0	1721	0
Flt Permitted		0.947		0.950				0.828			0.979	
Satd. Flow (perm)	0	1645	0	1738	1883	0	0	1488	1471	0	1689	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		31							151			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			322.9			85.9	
Travel Time (s)		18.4			12.4			23.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	2%	6%	5%	2%	5%	10%	5%	11%	2%	10%	2%
Adj. Flow (vph)	11	41	35	93	46	0	46	77	133	5	82	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	87	0	93	46	0	0	123	133	0	115	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	32.0	32.0		38.0	70.0		30.0	30.0	38.0	30.0	30.0	
Total Split (%)	32.0%	32.0%		38.0%	70.0%		30.0%	30.0%	38.0%	30.0%	30.0%	
Maximum Green (s)	23.0	23.0		29.8	61.0		22.2	22.2	29.8	22.2	22.2	
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		16.0		23.6	40.4			16.0	23.6		16.0	
Actuated g/C Ratio		0.25		0.37	0.64			0.25	0.37		0.25	
v/c Ratio		0.20		0.14	0.04			0.33	0.21		0.27	
Control Delay		17.5		23.9	7.6			26.7	4.8		25.4	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		17.5		23.9	7.6			26.7	4.8		25.4	
LOS		B		C	A			C	A		C	
Approach Delay		17.5			18.5			15.3			25.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			B			C	
Queue Length 50th (m)		6.0		10.2	2.6			13.9	0.0		12.8	
Queue Length 95th (m)		16.6		21.6	6.6			28.0	10.1		25.9	
Internal Link Dist (m)		180.0			148.2			298.9			61.9	
Turn Bay Length (m)												
Base Capacity (vph)		654		869	1883			554	811		629	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.13		0.11	0.02			0.22	0.16		0.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 63.5			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.33			
Intersection Signal Delay: 18.3		Intersection LOS: B	
Intersection Capacity Utilization 58.3%		ICU Level of Service B	
Analysis Period (min) 15			

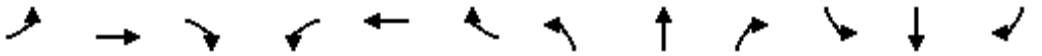
Splits and Phases: 1: Hwy 22 & White Ave & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	150	5	5	160	130	77
Future Volume (Veh/h)	150	5	5	160	130	77
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	163	5	5	174	141	84
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	367	183	225			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	367	183	225			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	74	99	100			
cM capacity (veh/h)	629	859	1344			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	168	179	225
Volume Left	163	5	0
Volume Right	5	0	84
cSH	634	1344	1700
Volume to Capacity	0.27	0.00	0.13
Queue Length 95th (m)	8.1	0.1	0.0
Control Delay (s)	12.7	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	12.7	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	27.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	120	80	14	62	6	48	6	28	10	5	5
Future Volume (Veh/h)	5	120	80	14	62	6	48	6	28	10	5	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	130	87	15	67	7	52	7	30	11	5	5
Pedestrians		5									5	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	79			217			296	292	174	322	332	80
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	79			217			296	292	174	322	332	80
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			92	99	97	98	99	99
cM capacity (veh/h)	1512			1353			628	607	870	592	576	970

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	222	89	89	21
Volume Left	5	15	52	11
Volume Right	87	7	30	5
cSH	1512	1353	691	648
Volume to Capacity	0.00	0.01	0.13	0.03
Queue Length 95th (m)	0.1	0.3	3.4	0.8
Control Delay (s)	0.2	1.4	11.0	10.7
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	1.4	11.0	10.7
Approach LOS			B	B

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	24.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	59	46	5	162	70	5
Future Volume (vph)	59	46	5	162	70	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	50	5	176	76	5

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	114	181	81
Volume Left (vph)	64	0	76
Volume Right (vph)	50	176	0
Hadj (s)	-0.12	-0.55	0.29
Departure Headway (s)	4.3	3.7	4.6
Degree Utilization, x	0.14	0.19	0.10
Capacity (veh/h)	777	935	744
Control Delay (s)	8.0	7.5	8.1
Approach Delay (s)	8.0	7.5	8.1
Approach LOS	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	31.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	135	5	5	45
Future Volume (Veh/h)	5	5	135	5	5	45
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	147	5	5	49
Pedestrians						5
Lane Width (m)						3.7
Walking Speed (m/s)						1.1
Percent Blockage						0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	208	154			152	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	208	154			152	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	777	887			1429	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	152	54
Volume Left	5	0	5
Volume Right	5	5	0
cSH	829	1700	1429
Volume to Capacity	0.01	0.09	0.00
Queue Length 95th (m)	0.3	0.0	0.1
Control Delay (s)	9.4	0.0	0.7
Lane LOS	A		A
Approach Delay (s)	9.4	0.0	0.7
Approach LOS	A		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	18.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	50	5	12	32	5	5
Future Volume (Veh/h)	50	5	12	32	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	5	13	35	5	5
Pedestrians	5			5	5	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				284		
pX, platoon unblocked						
vC, conflicting volume			64		128	66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			64		128	66
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	99
cM capacity (veh/h)			1531		852	980

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	59	48	10
Volume Left	0	13	5
Volume Right	5	0	5
cSH	1700	1531	911
Volume to Capacity	0.03	0.01	0.01
Queue Length 95th (m)	0.0	0.2	0.3
Control Delay (s)	0.0	2.0	9.0
Lane LOS		A	A
Approach Delay (s)	0.0	2.0	9.0
Approach LOS			A

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	20.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	20	5	0	18	5	5
Future Volume (Veh/h)	20	5	0	18	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	5	0	20	5	5
Pedestrians	5				5	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			32		54	30
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			32		54	30
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1573		945	1032

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	27	20	10
Volume Left	0	0	5
Volume Right	5	0	5
cSH	1700	1573	986
Volume to Capacity	0.02	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.2
Control Delay (s)	0.0	0.0	8.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.7
Approach LOS			A

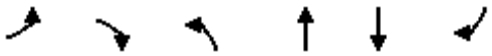
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	14.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	64	34	126	70	0	34	53	86	5	51	44
Future Volume (vph)	54	64	34	126	70	0	34	53	86	5	51	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	1		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.970							0.850		0.940	
Flt Protected		0.983		0.950				0.981			0.998	
Satd. Flow (prot)	0	1768	0	1738	1865	0	0	1778	1526	0	1758	0
Flt Permitted		0.851		0.950				0.825			0.979	
Satd. Flow (perm)	0	1531	0	1738	1865	0	0	1495	1526	0	1725	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		13							151			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			322.9			85.9	
Travel Time (s)		18.4			12.4			23.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	6%	5%	3%	2%	6%	6%	7%	2%	3%	2%
Adj. Flow (vph)	59	70	37	137	76	0	37	58	93	5	55	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	166	0	137	76	0	0	95	93	0	108	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	29.0	29.0		41.0	70.0		30.0	30.0	41.0	30.0	30.0	
Total Split (%)	29.0%	29.0%		41.0%	70.0%		30.0%	30.0%	41.0%	30.0%	30.0%	
Maximum Green (s)	20.0	20.0		32.8	61.0		22.2	22.2	32.8	22.2	22.2	
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		17.3		23.1	39.8			17.0	23.1		17.0	
Actuated g/C Ratio		0.28		0.37	0.64			0.27	0.37		0.27	
v/c Ratio		0.38		0.21	0.06			0.23	0.14		0.23	
Control Delay		25.3		25.4	7.7			25.6	1.9		25.3	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		25.3		25.4	7.7			25.6	1.9		25.3	
LOS		C		C	A			C	A		C	
Approach Delay		25.3			19.1			13.9			25.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			B			C	
Queue Length 50th (m)		17.6		15.4	4.3			10.5	0.0		11.9	
Queue Length 95th (m)		34.3		31.0	9.5			23.1	3.8		25.3	
Internal Link Dist (m)		180.0			148.2			298.9			61.9	
Turn Bay Length (m)												
Base Capacity (vph)		563		994	1807			602	937		695	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.29		0.14	0.04			0.16	0.10		0.16	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 62.3			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 20.1		Intersection LOS: C	
Intersection Capacity Utilization 58.3%		ICU Level of Service B	
Analysis Period (min) 15			

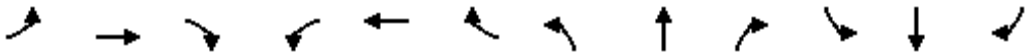
Splits and Phases: 1: Hwy 22 & White Ave & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	117	5	5	152	216	186
Future Volume (Veh/h)	117	5	5	152	216	186
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	127	5	5	165	235	202
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	511	336	437			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	511	336	437			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	75	99	100			
cM capacity (veh/h)	508	706	1123			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	132	170	437
Volume Left	127	5	0
Volume Right	5	0	202
cSH	514	1123	1700
Volume to Capacity	0.26	0.00	0.26
Queue Length 95th (m)	7.7	0.1	0.0
Control Delay (s)	14.4	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	14.4	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	36.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	117	65	5	183	6	71	5	12	5	5	5
Future Volume (Veh/h)	5	117	65	5	183	6	71	5	12	5	5	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	127	71	5	199	7	77	5	13	5	5	5
Pedestrians		5									5	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	211			198			398	394	162	406	426	212
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	211			198			398	394	162	406	426	212
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			86	99	99	99	99	99
cM capacity (veh/h)	1353			1375			544	536	882	536	515	820

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	203	211	95	15
Volume Left	5	5	77	5
Volume Right	71	7	13	5
cSH	1353	1375	574	597
Volume to Capacity	0.00	0.00	0.17	0.03
Queue Length 95th (m)	0.1	0.1	4.5	0.6
Control Delay (s)	0.2	0.2	12.5	11.2
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.2	12.5	11.2
Approach LOS			B	B

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	29.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	158	86	5	96	64	8
Future Volume (vph)	158	86	5	96	64	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	172	93	5	104	70	9

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	265	109	79
Volume Left (vph)	172	0	70
Volume Right (vph)	93	104	0
Hadj (s)	-0.05	-0.52	0.27
Departure Headway (s)	4.3	4.1	4.9
Degree Utilization, x	0.32	0.12	0.11
Capacity (veh/h)	802	820	684
Control Delay (s)	9.3	7.7	8.5
Approach Delay (s)	9.3	7.7	8.5
Approach LOS	A	A	A

Intersection Summary			
Delay	8.7		
Level of Service	A		
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	81	5	5	120
Future Volume (Veh/h)	5	5	81	5	5	120
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	88	5	5	130
Pedestrians						5
Lane Width (m)						3.7
Walking Speed (m/s)						1.1
Percent Blockage						0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	230	96			93	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	230	96			93	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	755	957			1501	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	93	135
Volume Left	5	0	5
Volume Right	5	5	0
cSH	844	1700	1501
Volume to Capacity	0.01	0.05	0.00
Queue Length 95th (m)	0.3	0.0	0.1
Control Delay (s)	9.3	0.0	0.3
Lane LOS	A		A
Approach Delay (s)	9.3	0.0	0.3
Approach LOS	A		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	21.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	102	5	16	64	5	8
Future Volume (Veh/h)	102	5	16	64	5	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	111	5	17	70	5	9
Pedestrians	5			5	5	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				284		
pX, platoon unblocked						
vC, conflicting volume			121		228	124
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			121		228	124
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	99
cM capacity (veh/h)			1460		745	919

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	116	87	14
Volume Left	0	17	5
Volume Right	5	0	9
cSH	1700	1460	848
Volume to Capacity	0.07	0.01	0.02
Queue Length 95th (m)	0.0	0.3	0.4
Control Delay (s)	0.0	1.5	9.3
Lane LOS		A	A
Approach Delay (s)	0.0	1.5	9.3
Approach LOS			A

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization		22.5%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	74	5	5	62	5	5
Future Volume (Veh/h)	74	5	5	62	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	80	5	5	67	5	5
Pedestrians	5				5	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			90		170	88
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			90		170	88
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	99
cM capacity (veh/h)			1498		810	958

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	85	72	10
Volume Left	0	5	5
Volume Right	5	0	5
cSH	1700	1498	878
Volume to Capacity	0.05	0.00	0.01
Queue Length 95th (m)	0.0	0.1	0.3
Control Delay (s)	0.0	0.5	9.1
Lane LOS		A	A
Approach Delay (s)	0.0	0.5	9.1
Approach LOS			A

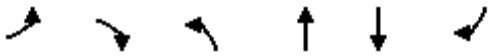
Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	17.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	33	13	69	20	0	22	95	52	4	70	47
Future Volume (vph)	30	33	13	69	20	0	22	95	52	4	70	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	1		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977							0.850		0.947	
Flt Protected		0.981		0.950				0.991			0.998	
Satd. Flow (prot)	0	1805	0	1789	1883	0	0	1866	1512	0	1770	0
Flt Permitted		0.860		0.950				0.909			0.985	
Satd. Flow (perm)	0	1583	0	1789	1883	0	0	1712	1512	0	1747	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		9							151			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			322.9			85.9	
Travel Time (s)		18.4			12.4			23.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	8%	2%	3%	2%
Adj. Flow (vph)	33	36	14	75	22	0	24	103	57	4	76	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	83	0	75	22	0	0	127	57	0	131	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	32.0	32.0		38.0	70.0		30.0	30.0	38.0	30.0	30.0	
Total Split (%)	32.0%	32.0%		38.0%	70.0%		30.0%	30.0%	38.0%	30.0%	30.0%	
Maximum Green (s)	23.0	23.0		29.8	61.0		22.2	22.2	29.8	22.2	22.2	
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		16.3		23.4	40.0			16.3	23.4		16.3	
Actuated g/C Ratio		0.26		0.37	0.64			0.26	0.37		0.26	
v/c Ratio		0.20		0.11	0.02			0.29	0.09		0.29	
Control Delay		22.4		23.4	7.5			25.7	0.3		25.7	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		22.4		23.4	7.5			25.7	0.3		25.7	
LOS		C		C	A			C	A		C	
Approach Delay		22.4			19.8			17.8			25.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			B			C	
Queue Length 50th (m)		8.1		8.1	1.2			14.2	0.0		14.7	
Queue Length 95th (m)		18.7		18.0	3.9			28.1	0.0		28.7	
Internal Link Dist (m)		180.0			148.2			298.9			61.9	
Turn Bay Length (m)												
Base Capacity (vph)		634		920	1883			655	851		669	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.13		0.08	0.01			0.19	0.07		0.20	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 62.9			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.29			
Intersection Signal Delay: 21.0		Intersection LOS: C	
Intersection Capacity Utilization 58.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Hwy 22 & White Ave & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	186	5	5	93	86	215
Future Volume (Veh/h)	186	5	5	93	86	215
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	202	5	5	101	93	234
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	321	210	327			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	321	210	327			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	70	99	100			
cM capacity (veh/h)	670	830	1233			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	207	106	327
Volume Left	202	5	0
Volume Right	5	0	234
cSH	673	1233	1700
Volume to Capacity	0.31	0.00	0.19
Queue Length 95th (m)	9.9	0.1	0.0
Control Delay (s)	12.7	0.4	0.0
Lane LOS	B	A	
Approach Delay (s)	12.7	0.4	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	177	91	14	193	6	100	7	15	5	5	5
Future Volume (Veh/h)	5	177	91	14	193	6	100	7	15	5	5	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	192	99	15	210	7	109	8	16	5	5	5
Pedestrians		5									5	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	222			291			508	504	242	520	550	224
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	222			291			508	504	242	520	550	224
tC, single (s)	4.2			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	100			99			76	98	98	99	99	99
cM capacity (veh/h)	1295			1271			459	445	797	442	434	801

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	296	232	133	15
Volume Left	5	15	109	5
Volume Right	99	7	16	5
cSH	1295	1271	483	516
Volume to Capacity	0.00	0.01	0.28	0.03
Queue Length 95th (m)	0.1	0.3	8.5	0.7
Control Delay (s)	0.2	0.6	15.3	12.2
Lane LOS	A	A	C	B
Approach Delay (s)	0.2	0.6	15.3	12.2
Approach LOS			C	B

Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	38.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	178	46	21	195	48	20
Future Volume (vph)	178	46	21	195	48	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	193	50	23	212	52	22

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	243	235	74
Volume Left (vph)	193	0	52
Volume Right (vph)	50	212	0
Hadj (s)	0.07	-0.51	0.17
Departure Headway (s)	4.7	4.1	4.9
Degree Utilization, x	0.31	0.27	0.10
Capacity (veh/h)	728	831	677
Control Delay (s)	9.8	8.6	8.5
Approach Delay (s)	9.8	8.6	8.5
Approach LOS	A	A	A

Intersection Summary			
Delay	9.1		
Level of Service	A		
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	199	5	5	184
Future Volume (Veh/h)	5	5	199	5	5	184
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	216	5	5	200
Pedestrians						5
Lane Width (m)						3.7
Walking Speed (m/s)						1.1
Percent Blockage						0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	428	224			221	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	428	224			221	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	581	812			1348	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	221	205
Volume Left	5	0	5
Volume Right	5	5	0
cSH	678	1700	1348
Volume to Capacity	0.01	0.13	0.00
Queue Length 95th (m)	0.3	0.0	0.1
Control Delay (s)	10.4	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	10.4	0.0	0.2
Approach LOS	B		

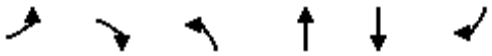
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	25.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	66	26	138	40	0	44	143	104	8	105	94
Future Volume (vph)	60	66	26	138	40	0	44	143	104	8	105	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	1		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977							0.850		0.939	
Flt Protected		0.981		0.950				0.988			0.998	
Satd. Flow (prot)	0	1805	0	1789	1883	0	0	1861	1512	0	1756	0
Flt Permitted		0.852		0.950				0.871			0.983	
Satd. Flow (perm)	0	1568	0	1789	1883	0	0	1640	1512	0	1730	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		8							114			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			322.9			85.9	
Travel Time (s)		18.4			12.4			23.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	8%	2%	3%	2%
Adj. Flow (vph)	65	72	28	150	43	0	48	155	113	9	114	102
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	165	0	150	43	0	0	203	113	0	225	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	47.0	47.0		55.0	102.0		30.0	30.0	55.0	30.0	30.0	
Total Split (%)	35.6%	35.6%		41.7%	77.3%		22.7%	22.7%	41.7%	22.7%	22.7%	
Maximum Green (s)	38.0	38.0		46.8	93.0		22.2	22.2	46.8	22.2	22.2	
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		15.6		15.3	39.1			22.2	15.3		22.2	
Actuated g/C Ratio		0.20		0.20	0.50			0.28	0.20		0.28	
v/c Ratio		0.52		0.43	0.05			0.44	0.29		0.46	
Control Delay		33.0		32.2	10.1			26.7	8.0		26.9	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		33.0		32.2	10.1			26.7	8.0		26.9	
LOS		C		C	B			C	A		C	
Approach Delay		33.0			27.3			20.0			26.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C			C	
Queue Length 50th (m)		20.7		19.4	3.1			24.0	0.0		26.8	
Queue Length 95th (m)		39.2		37.3	7.7			45.3	12.3		49.4	
Internal Link Dist (m)		180.0			148.2			298.9			61.9	
Turn Bay Length (m)												
Base Capacity (vph)		767		1073	1883			466	952		492	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.22		0.14	0.02			0.44	0.12		0.46	

Intersection Summary			
Area Type:	Other		
Cycle Length: 132			
Actuated Cycle Length: 78.1			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 25.7		Intersection LOS: C	
Intersection Capacity Utilization 58.3%		ICU Level of Service B	
Analysis Period (min) 15			

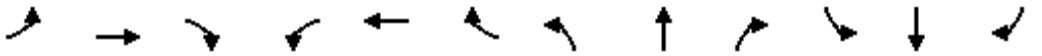
Splits and Phases: 1: Hwy 22 & White Ave & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	279	8	5	186	172	323
Future Volume (Veh/h)	279	8	5	186	172	323
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	303	9	5	202	187	351
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	574	362	538			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	574	362	538			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	37	99	100			
cM capacity (veh/h)	478	682	1030			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	312	207	538
Volume Left	303	5	0
Volume Right	9	0	351
cSH	482	1030	1700
Volume to Capacity	0.65	0.00	0.32
Queue Length 95th (m)	34.5	0.1	0.0
Control Delay (s)	25.2	0.3	0.0
Lane LOS	D	A	
Approach Delay (s)	25.2	0.3	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	266	137	28	290	12	150	14	30	2	4	6
Future Volume (Veh/h)	6	266	137	28	290	12	150	14	30	2	4	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	289	149	30	315	13	163	15	33	2	4	7
Pedestrians		5									5	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	333			438			773	770	364	804	838	332
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	333			438			773	770	364	804	838	332
tC, single (s)	4.2			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	99			97			46	95	95	99	99	99
cM capacity (veh/h)	1177			1122			300	305	681	267	291	704

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	445	358	211	13
Volume Left	7	30	163	2
Volume Right	149	13	33	7
cSH	1177	1122	329	417
Volume to Capacity	0.01	0.03	0.64	0.03
Queue Length 95th (m)	0.1	0.6	31.8	0.7
Control Delay (s)	0.2	0.9	33.6	13.9
Lane LOS	A	A	D	B
Approach Delay (s)	0.2	0.9	33.6	13.9
Approach LOS			D	B

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	267	92	42	293	96	40
Future Volume (vph)	267	92	42	293	96	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	290	100	46	318	104	43

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	390	364	147
Volume Left (vph)	290	0	104
Volume Right (vph)	100	318	0
Hadj (s)	0.03	-0.49	0.18
Departure Headway (s)	5.2	4.8	5.7
Degree Utilization, x	0.57	0.48	0.23
Capacity (veh/h)	657	710	581
Control Delay (s)	14.8	12.1	10.4
Approach Delay (s)	14.8	12.1	10.4
Approach LOS	B	B	B

Intersection Summary			
Delay	13.0		
Level of Service	B		
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	299	5	5	276
Future Volume (Veh/h)	5	5	299	5	5	276
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	325	5	5	300
Pedestrians						5
Lane Width (m)						3.7
Walking Speed (m/s)						1.1
Percent Blockage						0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	638	332			330	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	638	332			330	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	439	706			1229	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	330	305
Volume Left	5	0	5
Volume Right	5	5	0
cSH	542	1700	1229
Volume to Capacity	0.02	0.19	0.00
Queue Length 95th (m)	0.4	0.0	0.1
Control Delay (s)	11.8	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	11.8	0.0	0.2
Approach LOS	B		

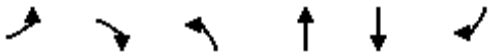
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	90	36	189	55	0	60	143	142	11	105	129
Future Volume (vph)	82	90	36	189	55	0	60	143	142	11	105	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	1		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977							0.850		0.929	
Flt Protected		0.981		0.950				0.985			0.998	
Satd. Flow (prot)	0	1805	0	1789	1883	0	0	1855	1512	0	1739	0
Flt Permitted		0.845		0.950				0.760			0.979	
Satd. Flow (perm)	0	1555	0	1789	1883	0	0	1431	1512	0	1706	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		8							154			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			322.9			85.9	
Travel Time (s)		18.4			12.4			23.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	8%	2%	3%	2%
Adj. Flow (vph)	89	98	39	205	60	0	65	155	154	12	114	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	226	0	205	60	0	0	220	154	0	266	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	47.0	47.0		55.0	102.0		30.0	30.0	55.0	30.0	30.0	
Total Split (%)	35.6%	35.6%		41.7%	77.3%		22.7%	22.7%	41.7%	22.7%	22.7%	
Maximum Green (s)	38.0	38.0		46.8	93.0		22.2	22.2	46.8	22.2	22.2	
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		17.9		16.7	42.8			22.3	16.7		22.3	
Actuated g/C Ratio		0.22		0.20	0.52			0.27	0.20		0.27	
v/c Ratio		0.66		0.56	0.06			0.57	0.36		0.57	
Control Delay		38.3		36.6	9.5			33.8	7.7		32.9	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		38.3		36.6	9.5			33.8	7.7		32.9	
LOS		D		D	A			C	A		C	
Approach Delay		38.3			30.4			23.1			32.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			C			C	
Queue Length 50th (m)		30.2		28.2	4.3			27.7	0.0		33.6	
Queue Length 95th (m)		56.7		53.1	9.3			60.2	14.7		69.5	
Internal Link Dist (m)		180.0			148.2			298.9			61.9	
Turn Bay Length (m)												
Base Capacity (vph)		728		1026	1882			389	933		464	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.31		0.20	0.03			0.57	0.17		0.57	

Intersection Summary			
Area Type:	Other		
Cycle Length: 132			
Actuated Cycle Length: 82			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 30.1		Intersection LOS: C	
Intersection Capacity Utilization 69.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Hwy 22 & White Ave & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	279	11	5	255	236	323
Future Volume (Veh/h)	279	11	5	255	236	323
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	303	12	5	277	257	351
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	720	432	608			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	720	432	608			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	23	98	99			
cM capacity (veh/h)	393	623	970			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	315	282	608
Volume Left	303	5	0
Volume Right	12	0	351
cSH	399	970	1700
Volume to Capacity	0.79	0.01	0.36
Queue Length 95th (m)	52.0	0.1	0.0
Control Delay (s)	40.6	0.2	0.0
Lane LOS	E	A	
Approach Delay (s)	40.6	0.2	0.0
Approach LOS	E		

Intersection Summary			
Average Delay	10.7		
Intersection Capacity Utilization	55.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	266	137	38	290	16	150	19	41	5	5	8
Future Volume (Veh/h)	8	266	137	38	290	16	150	19	41	5	5	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	289	149	41	315	17	163	21	45	5	5	9
Pedestrians		5									5	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	337			438			804	800	364	848	866	334
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	337			438			804	800	364	848	866	334
tC, single (s)	4.2			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	99			96			42	93	93	98	98	99
cM capacity (veh/h)	1173			1122			281	290	681	238	274	695

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	447	373	229	19
Volume Left	9	41	163	5
Volume Right	149	17	45	9
cSH	1173	1122	319	364
Volume to Capacity	0.01	0.04	0.72	0.05
Queue Length 95th (m)	0.2	0.9	39.6	1.3
Control Delay (s)	0.2	1.3	40.4	15.4
Lane LOS	A	A	E	C
Approach Delay (s)	0.2	1.3	40.4	15.4
Approach LOS			E	C

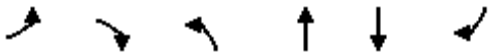
Intersection Summary			
Average Delay	9.5		
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	90	36	254	55	0	60	38	142	11	9	129
Future Volume (vph)	82	90	36	254	55	0	60	38	142	11	9	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	1		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977							0.850		0.883	
Flt Protected		0.981		0.950				0.970			0.996	
Satd. Flow (prot)	0	1805	0	1789	1883	0	0	1827	1512	0	1655	0
Flt Permitted		0.845		0.950				0.747			0.970	
Satd. Flow (perm)	0	1555	0	1789	1883	0	0	1407	1512	0	1612	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		8							154			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			993.7			85.9	
Travel Time (s)		18.4			12.4			71.5			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	8%	2%	3%	2%
Adj. Flow (vph)	89	98	39	276	60	0	65	41	154	12	10	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	226	0	276	60	0	0	106	154	0	162	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	47.0	47.0		55.0	102.0		30.0	30.0	55.0	30.0	30.0	
Total Split (%)	35.6%	35.6%		41.7%	77.3%		22.7%	22.7%	41.7%	22.7%	22.7%	
Maximum Green (s)	38.0	38.0		46.8	93.0		22.2	22.2	46.8	22.2	22.2	
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		18.3		19.1	45.7			16.5	19.1		16.5	
Actuated g/C Ratio		0.23		0.24	0.58			0.21	0.24		0.21	
v/c Ratio		0.62		0.64	0.06			0.36	0.32		0.49	
Control Delay		35.6		35.4	7.4			33.4	6.7		35.2	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		35.6		35.4	7.4			33.4	6.7		35.2	
LOS		D		D	A			C	A		D	
Approach Delay		35.6			30.4			17.6			35.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			B			D	
Queue Length 50th (m)		27.7		34.7	3.4			12.8	0.0		20.1	
Queue Length 95th (m)		60.1		71.3	8.9			33.1	14.1		47.4	
Internal Link Dist (m)		180.0			148.2			969.7			61.9	
Turn Bay Length (m)												
Base Capacity (vph)		762		1075	1857			401	969		459	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.30		0.26	0.03			0.26	0.16		0.35	

Intersection Summary			
Area Type:	Other		
Cycle Length: 132			
Actuated Cycle Length: 79.3			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 29.0		Intersection LOS: C	
Intersection Capacity Utilization 69.0%		ICU Level of Service C	
Analysis Period (min) 15			

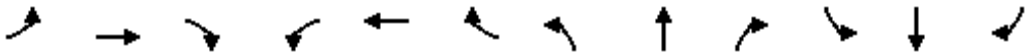
Splits and Phases: 1: Hwy 22 & White Ave & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	173	11	5	255	301	258
Future Volume (Veh/h)	173	11	5	255	301	258
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	188	12	5	277	327	280
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	754	467	607			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	754	467	607			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	50	98	99			
cM capacity (veh/h)	375	596	971			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	200	282	607
Volume Left	188	5	0
Volume Right	12	0	280
cSH	384	971	1700
Volume to Capacity	0.52	0.01	0.36
Queue Length 95th (m)	22.1	0.1	0.0
Control Delay (s)	24.2	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	24.2	0.2	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	160	41	38	225	16	45	19	41	5	5	8
Future Volume (Veh/h)	8	160	41	38	225	16	45	19	41	5	5	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	174	45	41	245	17	49	21	45	5	5	9
Pedestrians		5									5	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	267			219			566	564	196	610	578	264
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	267			219			566	564	196	610	578	264
tC, single (s)	4.2			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	99			97			88	95	95	99	99	99
cM capacity (veh/h)	1246			1350			410	401	845	356	405	761

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	228	303	115	19
Volume Left	9	41	49	5
Volume Right	45	17	45	9
cSH	1246	1350	511	497
Volume to Capacity	0.01	0.03	0.23	0.04
Queue Length 95th (m)	0.2	0.7	6.5	0.9
Control Delay (s)	0.4	1.3	14.1	12.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.4	1.3	14.1	12.5
Approach LOS			B	B

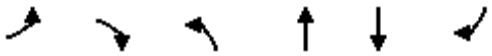
Intersection Summary				
Average Delay	3.5			
Intersection Capacity Utilization	45.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	90	36	189	55	0	60	143	142	11	105	129
Future Volume (vph)	82	90	36	189	55	0	60	143	142	11	105	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	120.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	1		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977							0.850		0.929	
Flt Protected		0.981		0.950				0.985			0.998	
Satd. Flow (prot)	0	1805	0	1789	1883	0	0	1855	1512	0	1739	0
Flt Permitted		0.845		0.950				0.760			0.979	
Satd. Flow (perm)	0	1555	0	1789	1883	0	0	1431	1512	0	1706	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		8							154			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			322.9			85.9	
Travel Time (s)		18.4			12.4			23.2			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	8%	2%	3%	2%
Adj. Flow (vph)	89	98	39	205	60	0	65	155	154	12	114	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	226	0	205	60	0	0	220	154	0	266	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	47.0	47.0		55.0	102.0		30.0	30.0	55.0	30.0	30.0	
Total Split (%)	35.6%	35.6%		41.7%	77.3%		22.7%	22.7%	41.7%	22.7%	22.7%	
Maximum Green (s)	38.0	38.0		46.8	93.0		22.2	22.2	46.8	22.2	22.2	
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		17.9		16.7	42.8			22.3	16.7		22.3	
Actuated g/C Ratio		0.22		0.20	0.52			0.27	0.20		0.27	
v/c Ratio		0.66		0.56	0.06			0.57	0.36		0.57	
Control Delay		38.3		36.6	9.5			33.8	7.7		32.9	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		38.3		36.6	9.5			33.8	7.7		32.9	
LOS		D		D	A			C	A		C	
Approach Delay		38.3			30.4			23.1			32.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			C			C	
Queue Length 50th (m)		30.2		28.2	4.3			27.7	0.0		33.6	
Queue Length 95th (m)		56.7		53.1	9.3			60.2	14.7		69.5	
Internal Link Dist (m)		180.0			148.2			298.9			61.9	
Turn Bay Length (m)												
Base Capacity (vph)		728		1026	1882			389	933		464	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.31		0.20	0.03			0.57	0.17		0.57	

Intersection Summary			
Area Type:	Other		
Cycle Length: 132			
Actuated Cycle Length: 82			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 30.1		Intersection LOS: C	
Intersection Capacity Utilization 69.8%		ICU Level of Service C	
Analysis Period (min) 15			

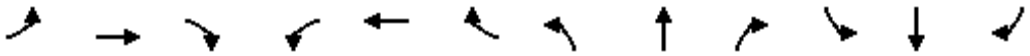
Splits and Phases: 1: Hwy 22 & White Ave & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	146	11	5	255	236	129
Future Volume (Veh/h)	146	11	5	255	236	129
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	159	12	5	277	257	140
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	614	327	397			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	614	327	397			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	65	98	100			
cM capacity (veh/h)	453	714	1162			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	171	282	397
Volume Left	159	5	0
Volume Right	12	0	140
cSH	465	1162	1700
Volume to Capacity	0.37	0.00	0.23
Queue Length 95th (m)	12.7	0.1	0.0
Control Delay (s)	17.2	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	17.2	0.2	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	133	137	38	96	16	150	19	41	5	5	8
Future Volume (Veh/h)	8	133	137	38	96	16	150	19	41	5	5	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	145	149	41	104	17	163	21	45	5	5	9
Pedestrians		5									5	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	126			294			448	446	220	492	512	122
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	126			294			448	446	220	492	512	122
tC, single (s)	4.2			4.1			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	99			97			67	96	95	99	99	99
cM capacity (veh/h)	1406			1268			492	469	820	428	442	912

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	303	162	229	19
Volume Left	9	41	163	5
Volume Right	149	17	45	9
cSH	1406	1268	531	578
Volume to Capacity	0.01	0.03	0.43	0.03
Queue Length 95th (m)	0.1	0.8	16.3	0.8
Control Delay (s)	0.3	2.2	16.8	11.4
Lane LOS	A	A	C	B
Approach Delay (s)	0.3	2.2	16.8	11.4
Approach LOS			C	B

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX B

COLLISION DATA

Collision Data - Alberta Transportation
Location: Hwy 22 (19-34.5Km) - Highway 22 & Balsam Avenue
Years: 2015-2019

Date	Occurrence Hour	Location	Collision	Collision Type	Km Post	Collision Description
7/19/2015	4:30:00 PM	BALSAM AVENUE	Injury	Angle	23.144	MOTORCYCLIST WAS NORTHBOUND ON HWY. 22. VEHICLE #2 PULLED ONTO HWY. 22 FROM BALSAM AVENUE AND WAS STRUCK BY THE NORTHBOUND MOTORCYCLIST PUSHING VEHICLE #2 INTO VEHICLE #3.
7/1/2016	12:00:00 AM	50.95292, 114.55871	PDO	Rear-end	23.148	SOUTH ON HWY 22, V1 REAR ENDED V2. NO INJURIES.
12/13/2016	7:15:00 PM	150M FROM 4 WAY STOP	PDO	Run-off-road a	23.158	911 Complaint of a single vehicle collision with a pole. V1 struck a utility pole, and was intoxicated. D1 charged with impaired.
10/21/2018	3:20:00 PM	BALSAM AVE AND HWY 22	PDO	Rear-end	23.135	V1 was checking traffic on hwy 22 and rear ended a GMC Sierra who was stopped in front at a stop sign. V1 forgot to get the info on the second driver/vehicle. Cochrane RCMP was unable to locate any more info.
6/9/2019	5:15:00 AM	BALSAM AVENUE	PDO	Rear-end	23.141	Vehicle 1 rear-ended vehicle 2 while it was waiting to turn left at stop sign
8/4/2019	2:11:00 AM	BALSAM AVENUE	PDO	Rear-end	23.139	Object 1 rear ended Object 2
10/19/2019	4:00:00 AM	BALSAM AV	Injury	Rear-end	23.144	V1 was second car at the stop sign. Thought car in front had gone while he was looking for traffic and rear ended V2

Collision Data - Alberta Transportation
Location: Hwy 22 (19-34.5Km) - Highway 22 & Burnside Drive
Years: 2015-2019

Date	Occurrence Hour	Location	Collision	Collision Type	Km Post	Collision Description
5/1/2015	3:29:00 PM	FOUR WAY STOP AT INTERSECTION OF HIGHWAY 22 AND WHITE AVENUE	PDO	Miscellaneous	22.997	2 VEHICLE COLLISION AT 4-WAY STOP. DISAGREEMENT AS TO WHOSE TURN IT WAS TO GO.
11/14/2015	1:45:00 PM	1 WHITE AVE	PDO	Rear-end	22.989	VEHICLE 1 TRAVELING WESTBOUND STOPPED AT 4 WAY STOP TO PROCEED NORTH WAS REAR ENDED BY VEHICLE 2. DAMAGE STICKER ISSUED TO VEHICLE 1.
1/19/2017	4:30:00 PM	WHITE AVENUE	PDO	Rear-end	22.978	Vehicle #1 stopped at stop sign behind vehicle #2. Vehicle #2 began to advance forward and vehicle #1 followed. When vehicle #2 stopped abruptly it was rear ended by vehicle #1. No damage to vehicle #2. Dri
7/30/2017	4:00:00 PM	NEAR THE 4-WAY STOP	Injury	Rear-end	22.914	Vehicle #1 rear ended vehicle #2 which stopped suddenly when the vehicle in front it stopped abrubtly.
8/6/2017	1:45:00 PM	NEAR WHITE AVENUE INTERSECTION	Injury	Rear-end	22.979	Vehicle #1 rear ended vehicle #2.
5/21/2018	2:30:00 AM	CLOSE TO THE 4 WAY STOP	PDO	Rear-end	22.977	Driver 1 was stopped at the stop sign and got rear ended by Driver 2
5/21/2018	4:40:00 PM	WHITE AVENUE	Injury	Rear-end	22.986	Vehicle #2 rear ended vehicle #1.
6/3/2019	4:50:00 AM	BRAGG CREEK	PDO	Miscellaneous	22.978	Driver 1 hit a deer
7/2/2019	1:00:00 AM	WHITE AVENUE	PDO	Rear-end	23.031	D1 rear ended D2 while heading west on Highway 22
7/28/2019	1:13:00 AM	WHITE AV	Injury	Miscellaneous	22.983	Driver 1 braked hard to avoid Vehicle 2 that did not give right away at 4 way stop and in doing so fell over and motorbike fell on top of him. At no point was there contact between the 2 vehicles.

APPENDIX C

Workpaper 1 Response to Comments

September 2025
02-24-0168

Kyle Hamilton
Rocky View County
262075 Rocky View Point
Rocky View County, AB T4A 0X2

Dear Kyle,

Re: Bragg Creek Transportation Network Analysis
Response to Work Paper 1 Comments

Comments were provided by Rocky View County (RVC) on June 9, 2025, in relation to Bunt & Associates' Greater Bragg Creek Transportation Network Analysis (April 17, 2025). Our responses are outlined below. RVC comments are identified in blue.

General Comments – General note: RVC servicing standards were recently updated. The updated version did see changes made to the transportation section. Please see here for updated standards.

Based on further conversation with RVC it was determined that new counts will undertaken to be used in Workpaper 2 (WP 2). New RVC servicing standards will be used in analysis for WP 2 as all analysis was updated to include newly counted data.

Section 1.1 – What is meant by hot spots and permeability? Note: direction from Council has been to pursue discussions with the Tsuut'ina First Nations to determine viability of a secondary access through their land north of West Bragg Creek/Wintergreen.

Hot spots refer to intersections or small stretches of roadway in which there is concern regarding a vehicles ability to pass through safely and effectively. Hot spots are identified using historical collision data, observed vehicle movements, and informed observation of intersection or roadway geometry. In future versions of this study the term 'Hot Spot' will be replaced with 'Key Location'.

Permeability refers to a vehicles ability to pass through an intersection or section of roadway effectively. High permeability indicates that vehicles can pass through without any delays, low permeability indicates that vehicles cannot pass through easily as the result of various factors including delays, queuing, and difficulty of maneuver.

Direction from Council has been noted by Bunt & Associates and will be referenced, if necessary, in Final Report.

Section 1.2 – Are there interim solutions available to improve safety at the Highway 22 intersections until the ultimate designed intersection is constructed?

A traffic light was installed at Highway 22/Burnside Drive & Highway 22/White Avenue in May 2021 to improve safety and accommodate traffic volumes at the Highway 22 intersections.

The possibility of interim safety improvements has been noted by Bunt and, if necessary, will be reviewed in WP 2. During data collection Bunt employees will attempt movements, if deemed safe, and observe driver behaviour at this intersection. A summary of observations and potential interim solutions will be addressed in WP2.

Exhibit 1.1 – Should left turns off of Hwy 22 NB to Balsam Avenue WB be permitted? Any indication if this is an issue or not?

There is no indication that the northbound left turn at Highway 22 & Balsam should not be permitted. Traffic data displays that there are low volumes/usage at this turn. Additionally, based on available data there is no history of collision for northbound left turns at this intersection.

Section 2.1.1 – Figure numbers in text do not match Figure labels

Figure numbering will be corrected in Final Report. Reference to Figure 2.1.1 in text will be corrected to refer to Figure 2.1, and reference to Figure 2.1.2 in text will be corrected to refer to Figure 2.2

Section 2.1.2 – What is the basis for assuming "half of the traffic will enter the Hamlet Core, and the other half will continue to West Bragg"?

The conversions used to convert winter data to summer data are moot with the completion of summer counts used in further analysis of this study.

A conversion factor of 1.5 was selected to maintain a conservative analysis and to not indicate bias to traffic travelling to the West Bragg Recreation Area compared to other destinations within the West Bragg Area. It has been noted that the statement above does not convey this effectively and may confuse readers.

Figure 2.3 - I (RVC representative) understand the rationale behind the 2.0 conversion factor in general. However, why would it apply to traffic dominated by Bragg Creek residents? Namely: Entering or exiting Bracken Road off of Centre Ave. Entering or exiting Burnside Drive. With the Wintergreen Golf Course traffic using Wintergreen Road in the summer, is a 2.0 conversion factor sufficient?

The conversions used to convert winter data to summer data are moot with the completion of summer counts used in further analysis of this study.

Seasonal conversion factors used account for increase in tourist volumes during the summer months but have also been applied to movements assumed to be dominated by Bragg Creek residents for report simplicity. This concern has been noted by Bunt & Associates, but will not be relevant in completion of WP2 or the Final Report.

Section 2.1.5 – Can you explain how the 2.74 conversion factor was calculated?

The conversions used to convert winter data to summer data are moot with the completion of summer counts used in further analysis of this study.

The conversion factor of 2.74 was calculated using the overall difference in vehicle volumes between Bunt 2025 winter weekend highest hour counts and TEC 100th highest hour data at Highway 22/Burnside Drive & Highway 22/White Avenue. For each count/data set a sum of total hourly vehicles entering the intersection was calculated. The difference in total hourly entering volumes was found to be 2.74 times greater for 100th highest hour volumes. Therefore, the conversion factor of 2.74 was used throughout the study area.

It has been noted that in Workpaper 1, the explanation and selection of this conversion factor may not be clear to readers. However, this will not be relevant in will not be relevant in completion of WP2 or the Final Report.

Figure 2.4 – Similar to the comment for Figure 2.3, why would the seasonal conversion factor apply to traffic entering or exiting Burnside Drive?

Please refer to response provided for Figure 2.3 above.

Section 2.2 - Would it be worth doing an active transportation count in the summer?

Pedestrian and cyclist counts will completed at study intersections during summer data collection. This data will be used in the Final Report.

Section 3.1.1 – RVC servicing standards state the rural accepted v/c ratio is 0.90 with a minimum LOS of D. RVC servicing standards refer to City of Calgary guidelines for model parameters. Specifically: peak hour factor: 0.94 (am) or 0.95 (pm), saturation flow rate: default (with ideal sat flow at 1,850). Most intersections meet V/C ratio and LOS rating requirements. Hwy 22/Balsam and Burnside/Balsam have a LOS of E for the 100th highest hour.

The 100th highest hour volumes were used in WP1 for high level analysis, however, new counted volumes will be used in WP 2 and the Final Report. New RVC servicing standards will be used in analysis for WP 2 as all analysis was updated to include newly counted data.

Section 3.2.1/Table 3.1.6 – To confirm, the classifications for Balsam, Wintergreen, Centre Ave and West Bragg Creek Road were based on the road widths? FYI, Network A equate to a "Rural Primary Collector" classification in the 2025 Servicing Standards. VPD of 2,500-5,000. Network B equate to a "Rural Collector" classification, with a VPD of 501-2,500.

Yes, the classification of roadways was based on width when not specified by TEC (Highway 22, and White Avenue). The updated to 2025 Servicing Standards has been noted by Bunt & Associates and will be corrected in Final Report.

Section 4.1 – Tetra Tech updated the 2017 study on secondary access in 2023. Link. Note that in the December 5, 2023 Council Meeting (7:26:00 in the video if you're interested), Administration recommended Option 7B, one of the options to bridge across the Elbow River upstream of the hamlet. As per the Council minutes, Administration was directed to work with the Reeve and Deputy Reeve to "discuss the Bragg Creek Emergency access route options with Tsuut'ina Nation.", which would connect to Hwy 68 to the northwest or Hwy 22 to the northeast. To my knowledge, this has not progressed much further.

This has been noted by Bunt & Associates and will be referenced, if necessary, in Final Report.

Figure 4.1 – I know this is taken directly from the Tetra Tech report, but please clarify what the different linework represents, as the existing legend is not legible.

This has been noted by Bunt & Associates and will be corrected in Final Report. A figure legend will be provided as follows:

- Yellow hashing – Tsuu T'ina Nation Lands
- Teal line – Elbow River center line
- Blue line – Existing Highway 22
- Orange line – Proposed new road
- Black lines – Existing property divisions

Figure 4.1 #2 – Mislabeled as Figure 4.1

This has been noted by Bunt & Associates and will be corrected in Final Report.

Yours truly,
Bunt & Associates

Jason Dunn, P.Eng.
Reginal Manager Prairies

PROFESSIONAL ENGINEER ALBERTA
JASON DUNN
LICENSED TO PRACTICE
29 September 2025
APEGA ID #133242

PERMIT TO PRACTICE
Bunt & Associates Engineering Ltd.
Signature
Date 29 September 2025
PERMIT NUMBER: P13898
The Association of Professional Engineers
Geologists and Geophysicists of Alberta
APEGA ID# 58048

APPENDIX D

Workpaper 2

TRANSPORTATION PLANNERS AND ENGINEERS

Greater Bragg Creek Transportation Network Analysis

Work Paper 2

Final Version 2

Prepared for

Rocky View County

Date

September 29, 2025

Project Number

02-24-0168

Bunt & Associates acknowledges and respects the Traditional Territories upon which our work spans, and from which we benefit. We are grateful for the unique cultures and histories of Indigenous Peoples that enrich our understanding and connection to the lands we call home. We honour learning, listening, and truth in our journey to reconciliation.

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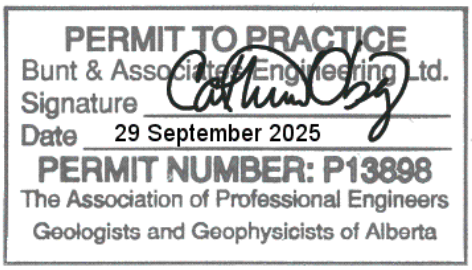

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Engineer's Stamp

Written with respect and gratitude for the Traditional Territories upon which we work and live.

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This document entitled "Greater Bragg Creek Transportation Network Analysis – Work Paper 2" was prepared by Bunt & Associates for the benefit of Rocky View County in support of the Area Structure Plan amendment to the Hamlet Grow Area. The analysis and conclusions/recommendations in the report reflect Bunt & Associates' best professional judgment in light of the knowledge and information available to Bunt & Associates at the time of preparation.

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1. EXECUTIVE SUMMARY

1.1 Overview

Bunt & Associates Engineering Ltd. (Bunt) was engaged by Rocky View County (RVC) to undertake a review of the Greater Bragg Creek transportation network. This analysis will be used by RVC as part of an amendment to the Area Structure Plan (ASP) for the Bragg Creek Hamlet Growth Area, which encompasses the Hamlet Core and Hamlet Expansion lands.

It is noted that while the approved work program outlined in the original proposal separated these tasks into two Workpapers (2 and 3), the evolution of the analysis resulted in a single combined Workpaper 2. The analysis and logic suggested this to be appropriate given the adjusted timeline that provided the opportunity for the collection of summer traffic count data.

This document represents the final Workpaper and provides a summary and assessment of the following:

- Completion and summary of Summer Peak Hour Traffic Volume counts at key intersections identified in Work Paper 1.
- Estimated traffic volumes for 5, 10 and 20-year horizons using Summer Peak Hour Traffic Volumes.
- Assignment of the proposed development site traffic volumes to the network with due consideration of access locations road network limitations, capacity constraints and any other factors likely to affect directional flow.
- Combination of the forecast volumes and estimated development site traffic volumes to create total After Development traffic volumes for the design period.
- Completion of capacity analysis for After Development traffic volumes given existing network configuration. To manage that effort and streamline it to the extent possible, the 20-year scenarios were analyzed first, followed by the shorter term or less intense scenarios.
- Review of the end-state 20-year forecasts and analysis results of existing conditions.
- Application of a manual adjustment to the 2045 After Development Volumes to create adjusted data sets inclusive of network improvements to key pinch points, and completion of capacity analysis for these volumes with various network improvements.
- Application of a manual adjustment to the 2045 After Development Volumes to create adjusted data sets for the network with a provision of a second point of access to the West Bragg Creek Area, and completion of capacity analysis for these volumes with the provision of a second access.
- Application of a manual adjustment to the 2045 After Development Volumes to create adjusted data sets for the network with combinations of improvements to key pinch points and a second point of access to West Bragg Creek; and completion of capacity analysis for these volumes with the various combined improvements.

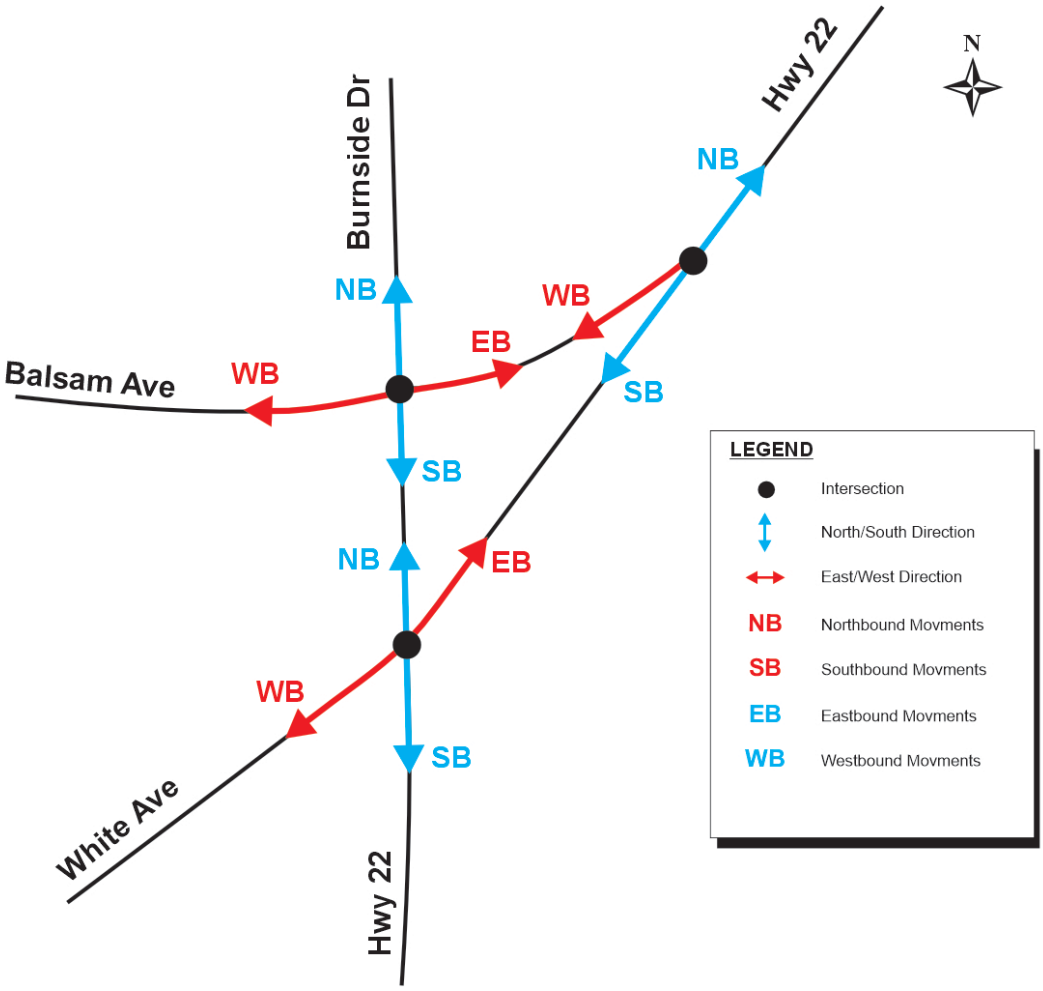
- Identification of gaps in the network, locations where improvements would differ between all analyzed improvement options. Undertaking additional spot analysis where necessary to assess any specific mitigations needed in addition to recommended improvements.
- Review of the end-state 20-year forecasts and analysis results of all 20-year horizon conditions analyzed.
- Completion of capacity analysis for After Development traffic volumes given existing network configuration for a 10 -year horizon.
- Repeated volume adjustments and capacity analysis for 10-year forecasts. Completion of repeated analysis for existing network conditions, improvements to key pinch points, and provision of a second access.
- Utilization of the outputs and findings of the 10-year and 20-year analysis to identify the best and most appropriate road network, and to identify necessary improvements required to accommodate partial and full development.
- Development of a schedule of improvements necessary to be implemented to accommodate growth at the 5, 10 and 20-year horizons.

2. 2025 DESIGN VOLUMES

2.1 Traffic Directions

Existing roads within Bragg Creek are offset from a North/South and East/West axis. However, for the sake of intersection analysis movements must be assigned to a traffic direction that aligns with one of these axes. **Figure 2.1** below displays how movements directions have been assigned to the trio of Intersections at Highway 22.

Figure 2.1: Movement Directions at Trio of Intersections at Highway 22



These movement directions have been displayed to assist readers in understanding analysis findings. Later in this report improvement options are presented for these intersections. However, these directions are used as the basis for directions assigned to the improvement options and will assist reader in understanding analysis finding given varying network geometry.

2.2 Overview

Workpaper 1 concluded that the Summer Weekend Peak Hour represented the busiest and therefore best peak hour to be used in analysis. The Summer Weekend Volumes used in Workpaper 1 were developed based on multiple counts including Bunt weekend counts undertaken during peak winter conditions (given the timing of the project schedule) and available RVC weekday counts to develop the most reasonable baseline volumes. As well, Alberta Transportation and Economic Corridors (TEC) 100th Highest Hour Volumes were sourced to validate the data sets and for use in estimating high-level intersection and road

laning and controls. However, the 100th Highest Hour Volumes are only available for the intersection at Highway 22/Burnside Drive & White Avenue. To address this, RVC provided the opportunity for Bunt to collect 2025 Summer Weekend Peak Hour Volumes. These volumes were cross-checked against the TEC 100th Highest Hour Volumes at Highway 22/Burnside Drive & White Avenue. This was deemed suitable for use in providing the basis for the development of future volumes and were therefore utilized as the baseline data set. A full count summary can be found in **Appendix A**.

The 2025 Summer Weekend Peak Hour Volumes represented the only complete network-wide data set with all study intersections counted during the same period. Additionally, this data represented the most recent and most relevant data. To eliminate possible outliers, the movements from each intersection from the new 2025 Summer Weekend Peak Hour counts were compared to volume data sets used in Workpaper 1 to ensure accurate analysis. Summer Weekend Peak Hour Volumes are illustrated in **Exhibit 2.1.**

It is noted that parts of the 2025 summer period experienced a considerable amount of rain that could have reduced the number of visitors to Bragg Creek during those periods. The traffic counts completed by Bunt were delayed several times to ensure they were collected during good weather. The data was ultimately collected on Saturday August 23, 2025. The week prior to this date had experienced drier weather and so the volumes experienced on this date were considered representative of a typical summer weekend day at Bragg Creek.

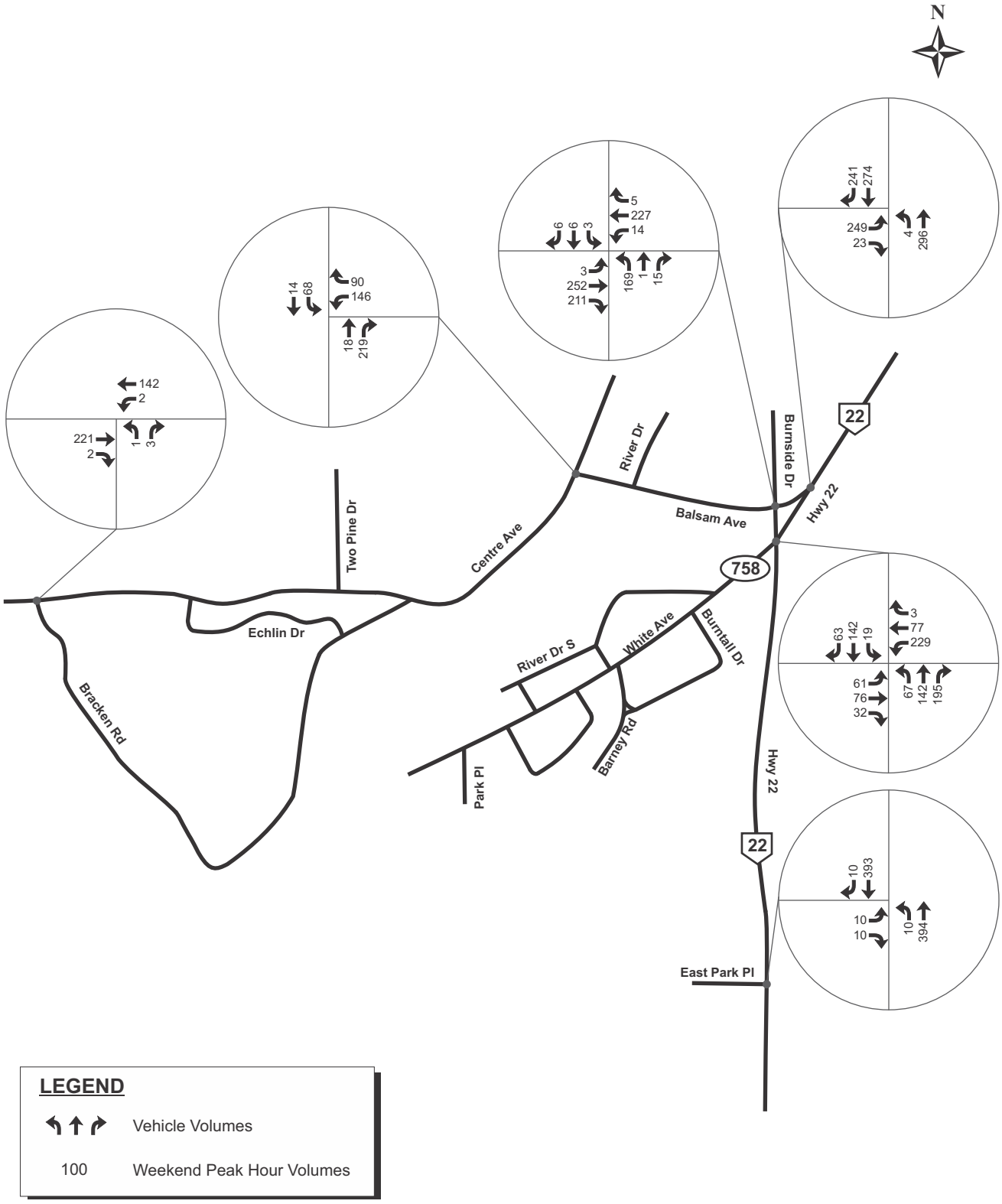


Exhibit 2.1

2025 Summer Weekend Peak Hour Volumes

2.3 Future Horizon Background Volumes

To develop future horizon background volumes, a yearly growth factor was required to convert 2025 Summer Weekend Peak Hour Volumes to future volumes.

Based on the rates used in the *Bragg Creek Transportation Master Plan*[1], a linear growth rate of 2% per year was applied to all movements for 2030 (5 years), 2035 (10 years), and 2045 (20 years) Background Volumes. In the case of this study, Background Volumes account for existing residential traffic as well as existing tourist/recreational volumes plus assumed tourist/recreation growth and growth due to unspecified future development in the region. Excluded from the 2% figure were the four main development sites for which specific trip generation data was available. This was added separately as described in Section 2.2.

The forecasted 2030, 2035, and 2045 Horizon Background Volumes are displayed in **Exhibit 2.2**, **Exhibit 2.3**, and **Exhibit 2.4** respectively.

[1] Bragg Creek Transportation Master Plan, Work Paper 1, Bunt & Associates, June 2025.

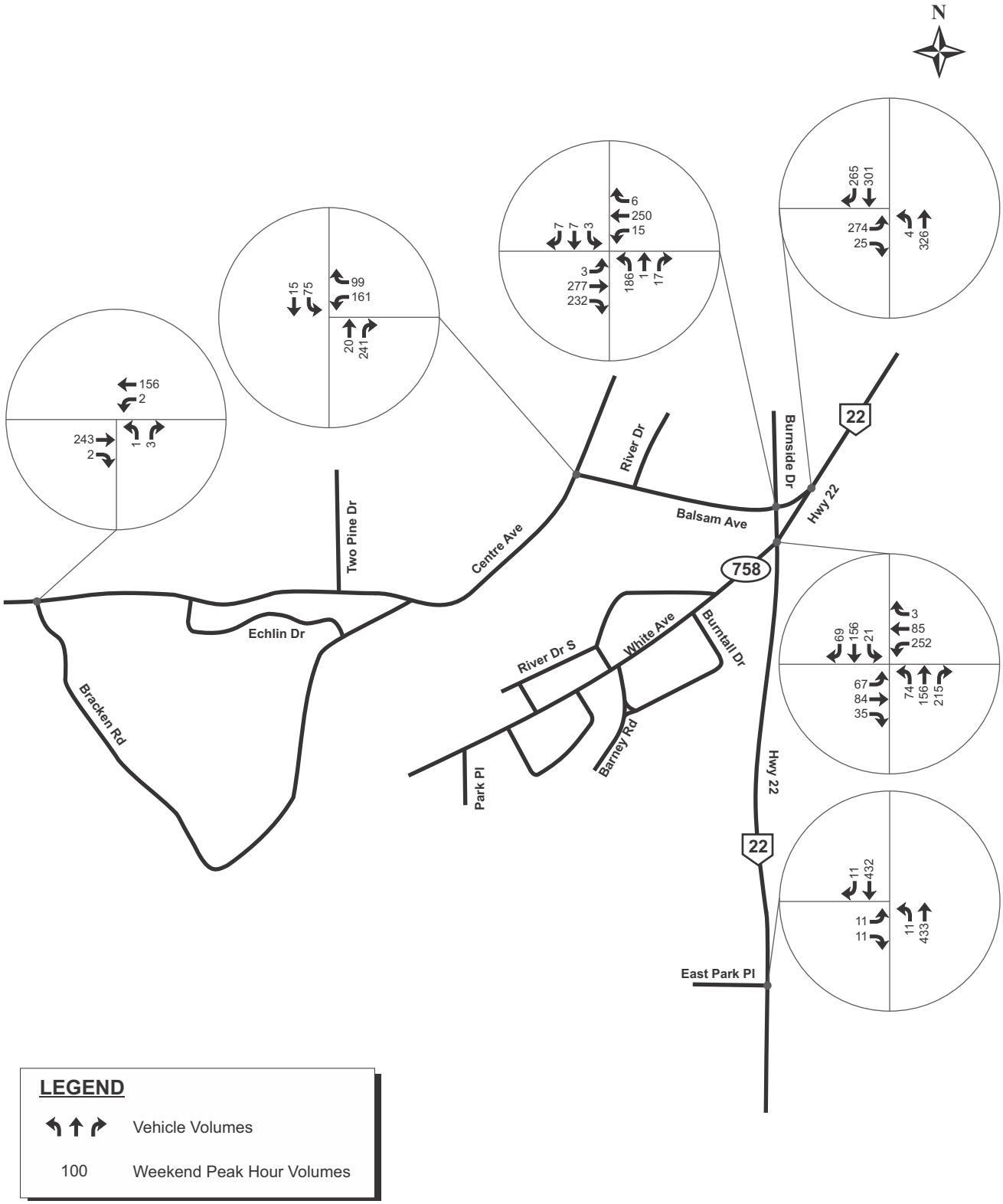


Exhibit 2.2

2030 Horizon Background Volumes

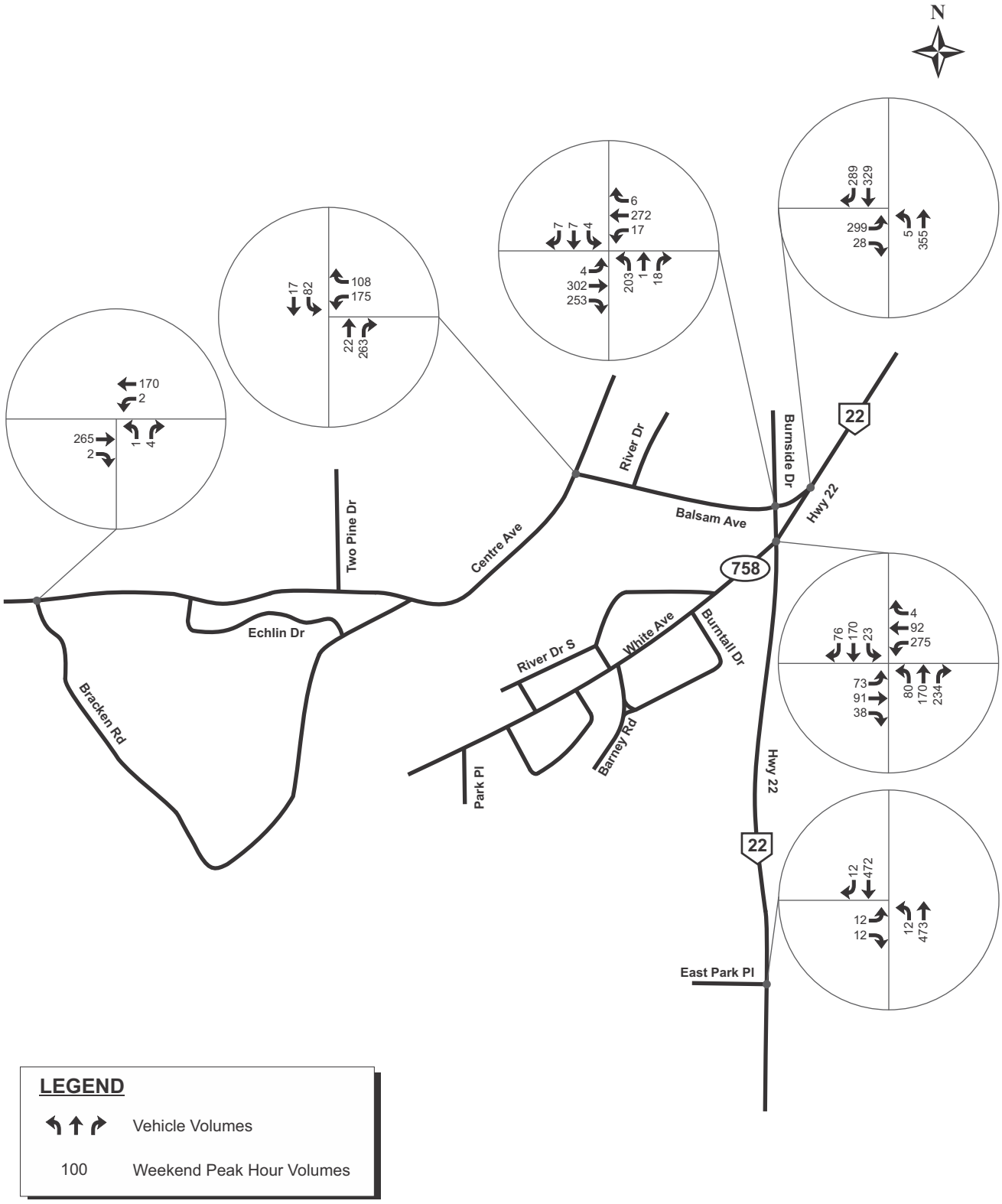


Exhibit 2.3

2035 Horizon Background Volumes

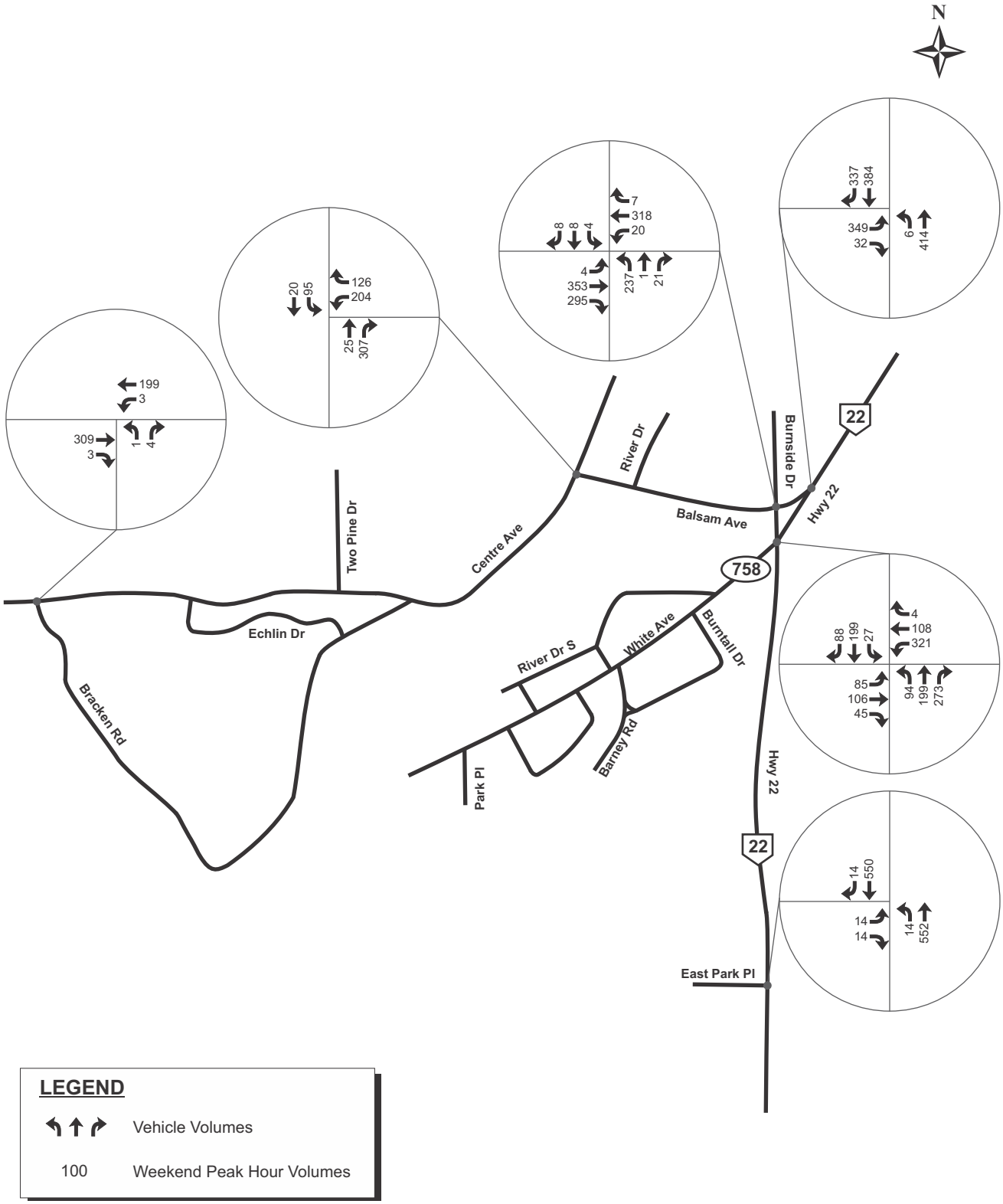


Exhibit 2.4

2045 Horizon Background Volumes

2.4 Development Traffic

2.4.1 Trip Generation

Within the Hamlet of Bragg Creek there are currently four proposed development sites, displayed in **Figure 2.1.** These are listed as Sites 2 through 5 as 'Site 1' was allocated to the existing developments within the Hamlet. The uses and densities are summarized in **Table 2.1**.

Table 2.1: Development Sites Uses and Densities

DEVELOPMENT SITE	LAND USE	DENSITY
Site 2 – Gateway Development	Medical Facility	15,500 ft²
	Commercial	70,000 ft²
	Restaurant	6,200 ft²
	Multi-Family Residential	174 units
	Hotel	120 units
Site 3 – RVC Foundation	Senior Adult Housing	43 units
Site 4 – Balsam Avenue	Single Family Attached Housing	121 units
Site 5 – Expansion Lands	Single Family Detached Housing	302 units

Traffic generated by these sites was estimated using proposed development densities, site location, and trip distribution. The trip generation rates used in this analysis are summarized in **Table 2.2**. The trip generation rates are based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual (11th Edition)*. Development generated vehicle trips are summarized in **Table 2.3**.

Table 2.2: Trip Generation Rates

SITE	USE	TRIP GENERATION (VEHICLE) Saturday Peak Hour	DATA SOURCE
Site 2	Medical Facility	3.10 per 1,000 ft² *(57% In, 43% Out)*	*ITE 720
	Commercial	4.66 per 1,000 ft² *(52% In, 48% Out)*	BUNT
	Restaurant	10.68 per 1,000 ft² *(59% In, 41% Out)*	*ITE 931
	Multi-Family Residential	0.70 per unit *(54% In,46% Out)*	*ITE 220
	Hotel	1.01 per unit *(56% In, 44% Out)*	*ITE 310
Site 3	Senior Adult Housing	0.24 per unit *(50% In, 50% Out)*	ITE 251
Site 4	Single Family Attached Housing	0.57 per unit *(48% In, 52% Out)*	ITE 215
Site 5	Single Family Detached Housing	0.92 per unit *(54% In, 46% Out)*	ITE 210

** Transportation Engineers (ITE) Trip Generation Manual (10th Edition) rates used in original report completed in 2020.*

Table 2.3: Vehicle Trip Generation

SITE	USE	DENSITY	WEEKEND PEAK HOUR		
			Total	In	Out
Site 2	Medical Facility	15,500 ft²	48	27	21
	Commercial	70,000 ft²	326	170	156
	Restaurant	6,200 ft²	66	39	27
	Multi-Family Residential	174 units	122	66	56
	Hotel	120 units	132	74	58
	Internal Capture		-126	-63	-63
	Total		568	313	255
Site 3	Senior Adult Housing	43 units	10	5	5
Site 4	Single Family Attached Housing	121 units	69	33	36
Site 5	Single Family Detached Housing	302 units	278	150	128
		TOTAL	925	501	424

Development generated vehicle trips for Site 2 and Site 3 were sourced directly from their respective Transportation Impact Assessment (TIA) reports. These TIAs were both completed by Bunt. The Hamlet Core TIA for Site 2[2] was completed in 2020, and the Senior Villas TIA for Site 3[3] was completed in 2025.

It is noted that the development densities from the Hamlet Core TIA differ from the Gateway Village Bragg Creek Master Site Development Plan (MSDP)[4]. The development densities used in the TIA were higher than those in the MSDP. The densities from the TIA were used to ensure a conservative analysis.

For Site 3 and Site 4, 100% of the development generated trips were assumed to be "new" to the network. No internal trip capture was applied to reduce trips, nor was any intra-Hamlet traffic assumed to be present. All traffic was assumed to have one trip start/end outside of the Hamlet area. This resulted in a conservative outcome but was deemed appropriate for the purpose of an ASP level analysis.

[2] Bragg Creek Hamlet Core Transportation Impact Assessment Revised Final, Bunt & Associates, pg. 12. November 2020.

[3] Bragg Creek Senior Villas Transportation Impact Assessment, Bunt & Associates, September 2025.

[4] Gateway Village Bragg Creel Master Site Development Plan, Gateway Developments, May 2021.

Figure 2.2: Proposed Development Sites

2.4.2 Trip Distribution

Vehicle trips from each of the four proposed development sites were distributed based on ratios used in similar projects within the Hamlet of Bragg Creek. Specifically, based on the distribution used in the Site 2 TIA which was established based on existing traffic patterns, forecast data and expected draws. The Site 2 distributions from that TIA are as follows:

- 68% inbound and outbound traffic via Highway 22 north of Bragg Creek.
- 28% inbound and outbound traffic via Highway 22 south of Bragg Creek.
- 2% inbound and outbound traffic via White Avenue South/West of the Hamlet Core.
- 2% inbound and outbound traffic via West Bragg / Wintergreen.

This distribution was compared to 2025 Summer Weekend Peak Hour Volumes with the knowledge that development traffic will be primarily residential. Therefore, engineering judgment was used to compare distribution rates to 2025 Summer Weekend Peak Hour Volumes as a high-level accuracy test. Additionally, it was checked that this distribution represented expected draws given anticipated site uses.

As noted earlier, 100% of this new traffic was assumed to be external, with one trip start/end outside of the study area. No internal trips or other trip reductions were applied to this new traffic volume. The results are expected to be conservative, but appropriate for analysis purposes.

Applying this distribution to all of Sites 2, 3, 4 and 5 generated Site Traffic Volumes as illustrated in **Exhibit 2.5** through **Exhibit 2.8** respectively.

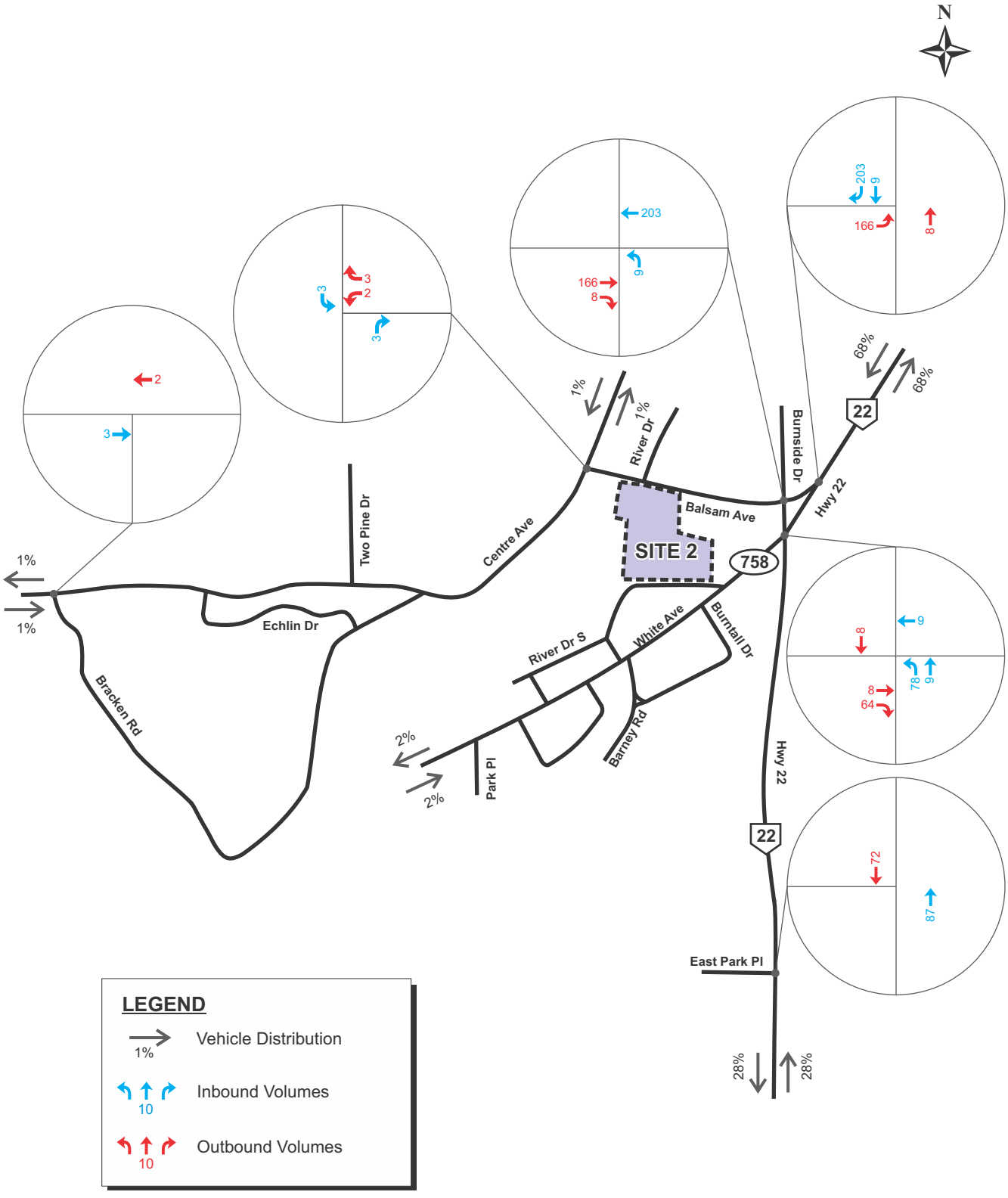


Exhibit 2.5

Site 2 Traffic Distribution & Volumes

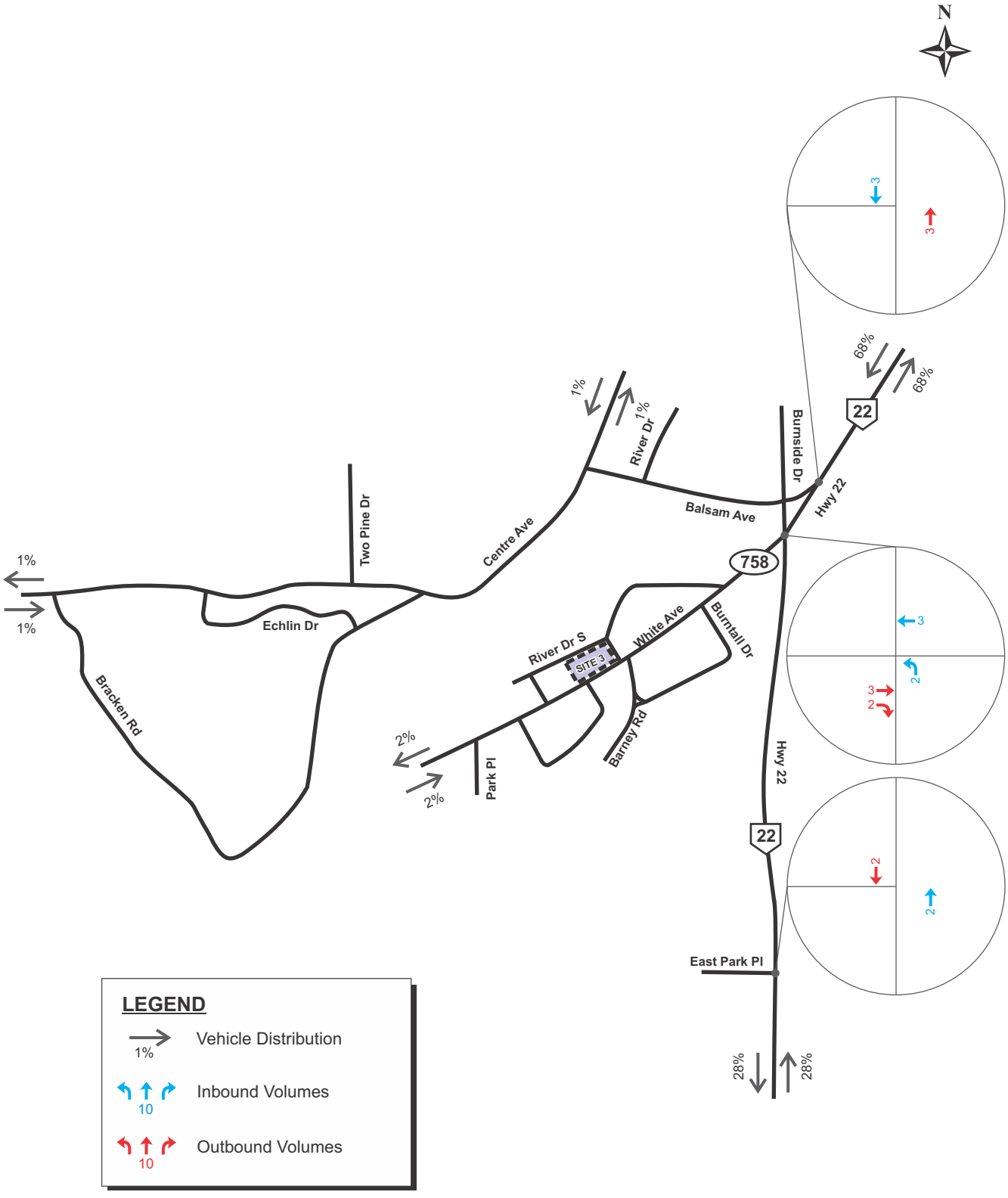


Exhibit 2.6

Site 3 Traffic Distribution & Volumes

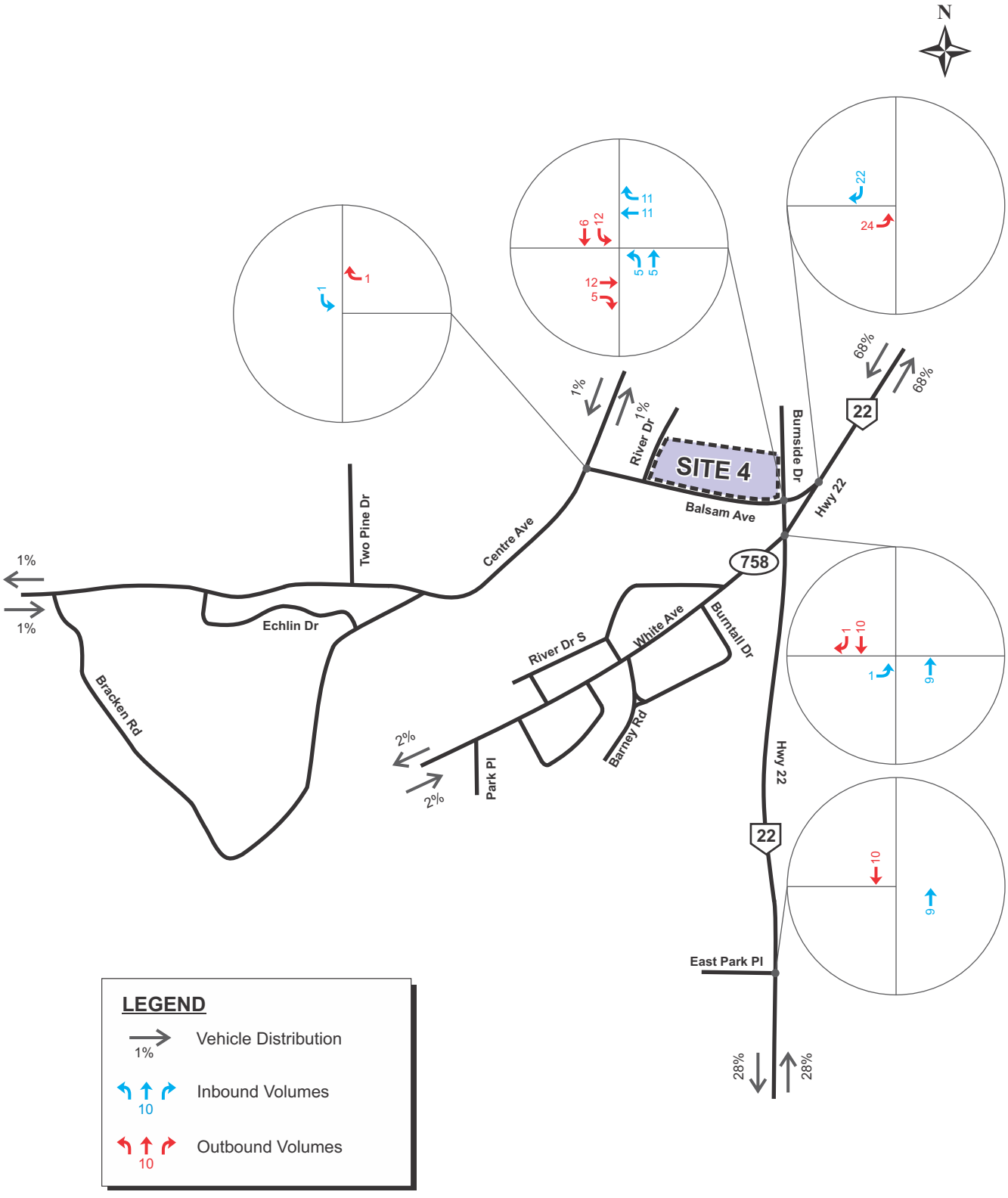


Exhibit 2.7

Site 4 Traffic Distribution & Volumes

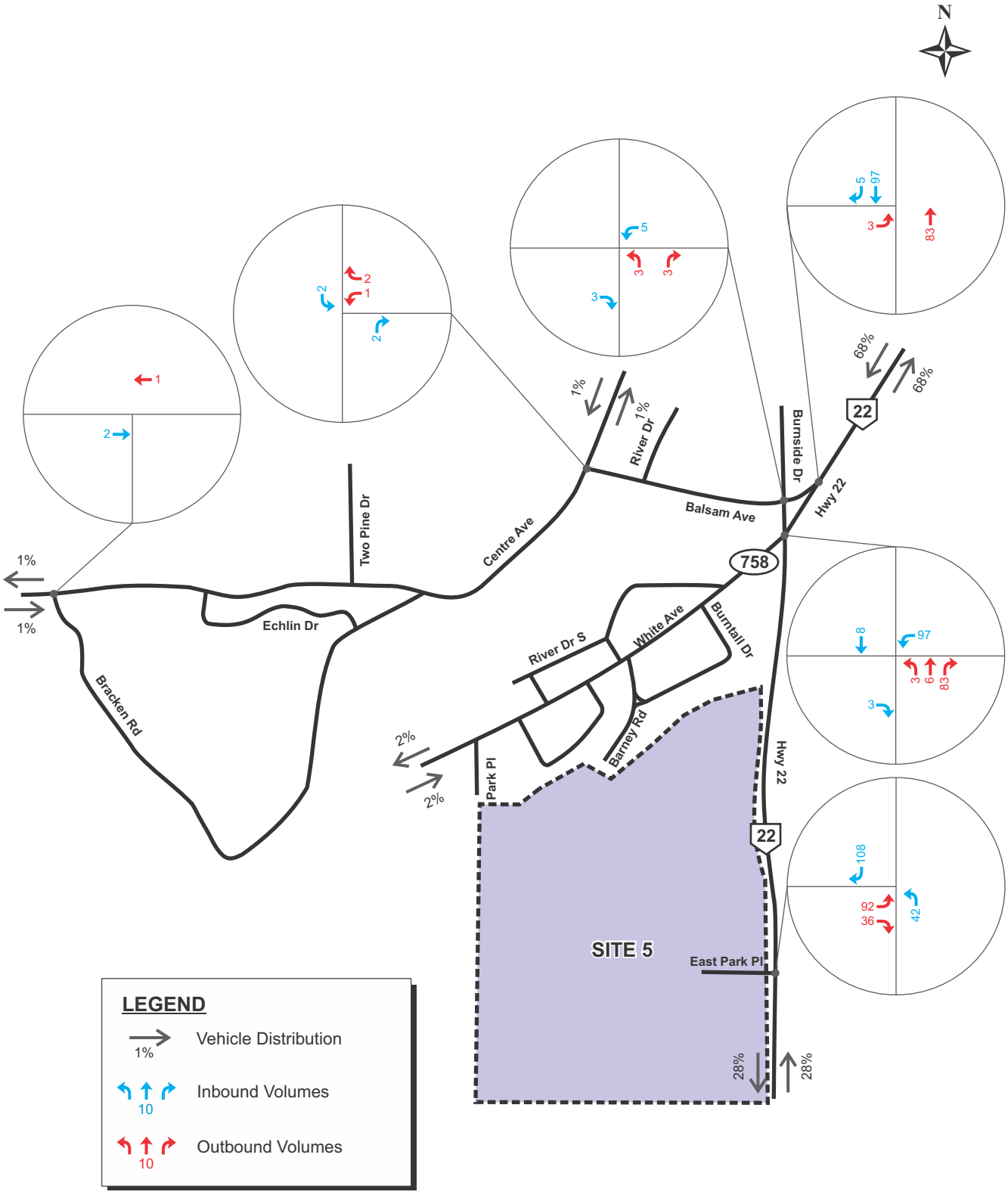


Exhibit 2.8

Site 5 Traffic Distribution & Volumes

2.5 2045 Post-Development Traffic Volumes

To streamline the analysis process, the 20-year horizon end state scenario using 2045 After Development Volumes was analyzed first. If intersections were found to operate at or beyond capacity at the 20-year horizon, then the 10-year followed by 5-year scenarios were analyzed to determine the approximate threshold capacity horizon. To ensure a conservative analysis it was assumed that the four proposed development sites would be fully developed by 2045, 20 years in the future. Trip assignments were compiled to develop total vehicle trip volumes for the four sites and the resulting traffic volumes were summed up to create 2045 Total Site Development Volumes illustrated in **Exhibit 2.9**. To create 2045 After Development Volumes, the 2045 Total Site Development Volumes were added to 2045 Horizon Background Volumes. The resulting 2045 After Development Volumes are illustrated in **Exhibit 2.10**.

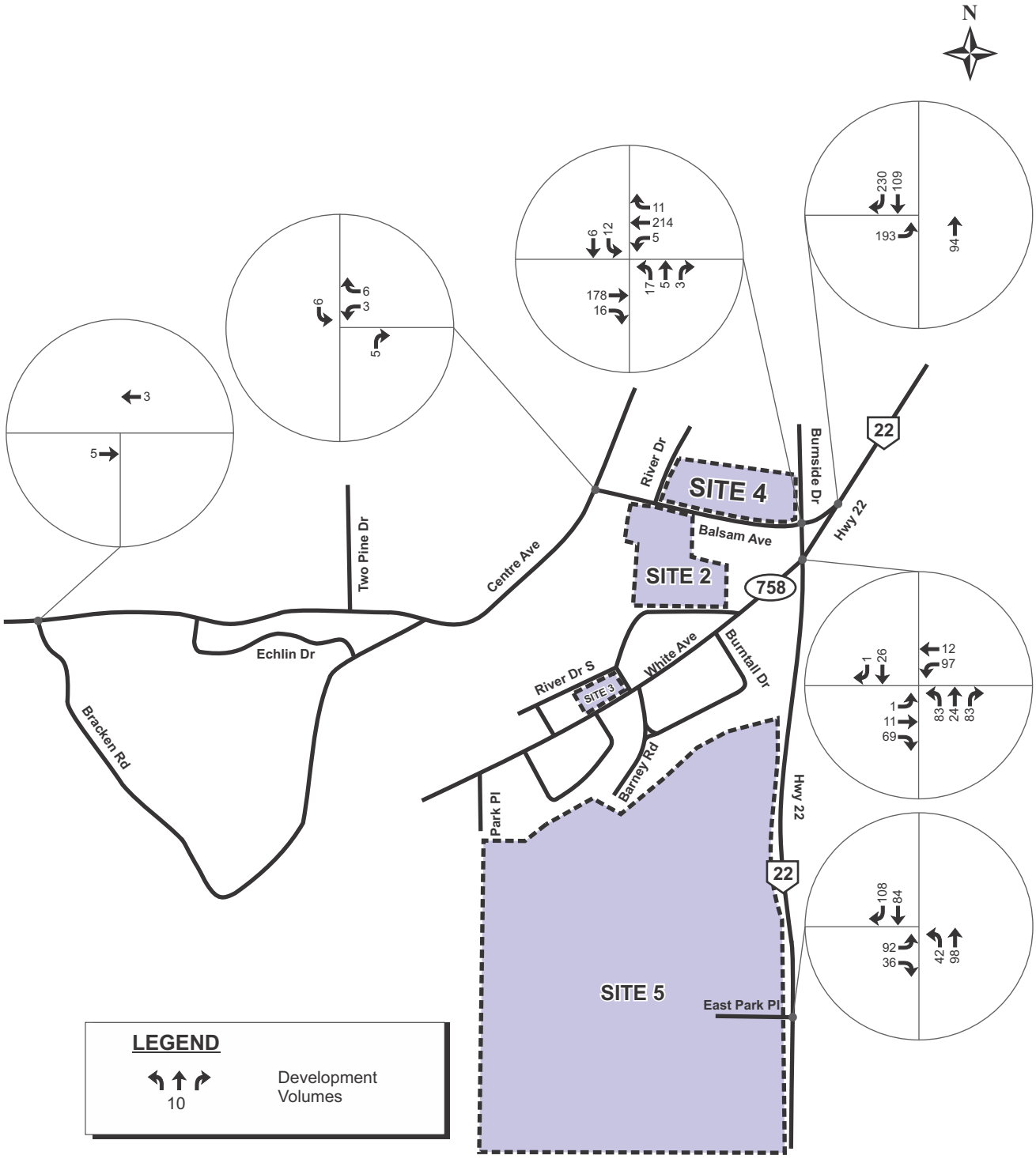


Exhibit 2.9

2045 Total Site Volumes

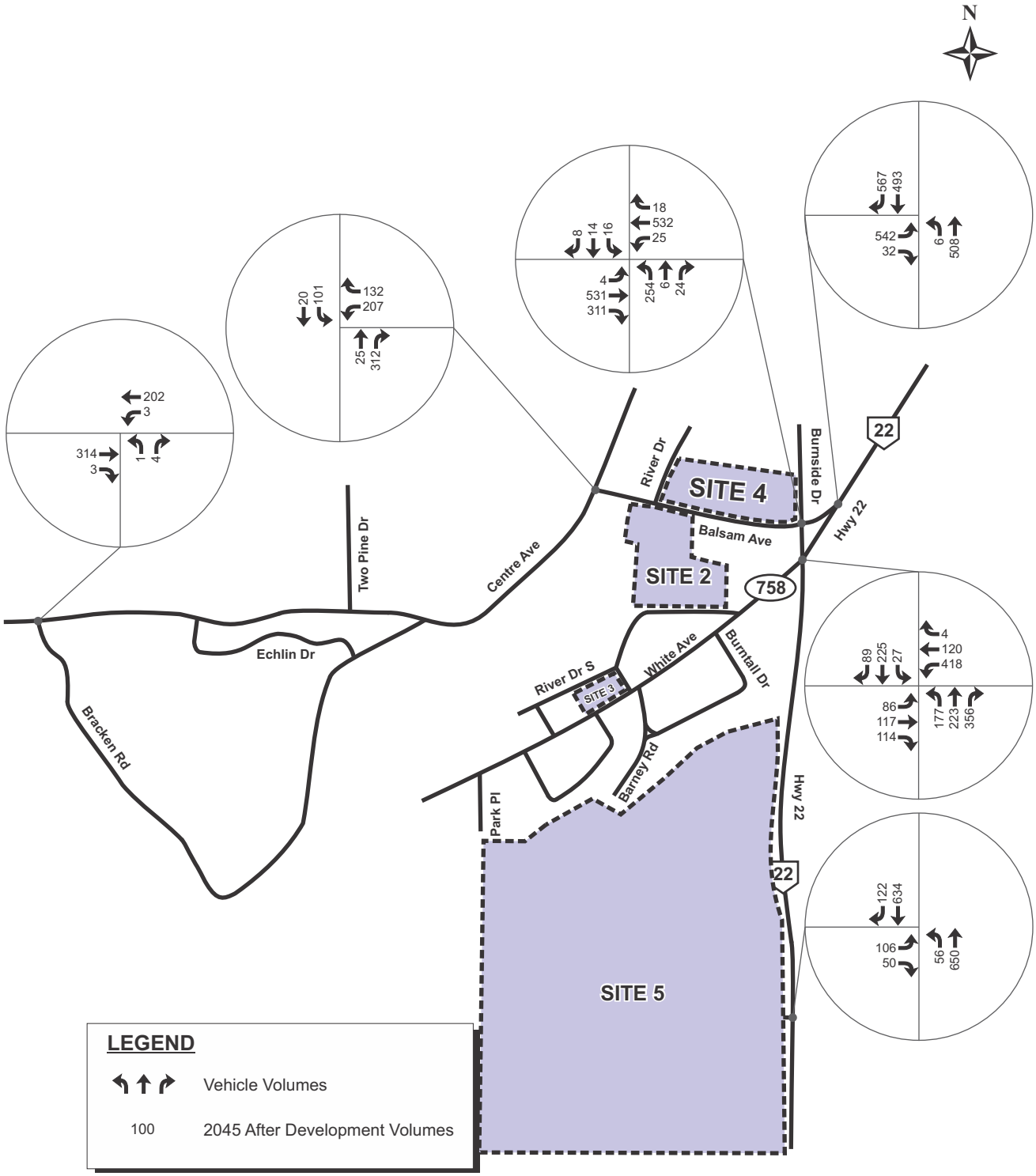


Exhibit 2.10

2045 After Development Volumes

3. 2045 AFTER DEVELOPMENT TRAFFIC ANALYSIS

3.1 Intersection Capacity Analysis

As with Workpaper 1, Synchro 11 traffic analysis software was used to review intersection operational conditions based on the methods outlined in the *Highway Capacity Manual*. Traffic operations were assessed using the performance measures of volume-to-capacity (v/c) and Level of Service (LOS).

The volume-to-capacity (v/c) ratio of an intersection movement represents the ratio between the demand volume and available capacity. The Level of Service (LOS) rating is based on average vehicle delays ranging from LOS A (minimal delay) to LOS F (significant delay).

Analysis was completed per City of Calgary TIA guidelines as outlined as standard practice by RVC. Volume to capacity (v/c) ratios, levels of service, average control delays (seconds), and 95th percentile queues (metres) are summarized in tables in the following sections.

To maintain a conservative yet realistic approach in the analysis, a minimum of 5 vehicles per hour was applied to each movement. Additionally, the minimum number of pedestrians at each crossing was set to 10 pedestrians per hour and the minimum number of cyclists was set to 5 cyclists per direction. Note that these adjustments were made during the Synchro analysis and are therefore reflected in the Synchro tables and analysis but are not shown in the base volume exhibits.

Initial analysis was completed based on existing intersection geometry, laning and control with no improvements beyond basic signal phase length optimization through Synchro. The output reports are provided in **Appendix B** and summarized in **Table 3.1**.

Table 3.1: 2045 After Development Conditions – Existing Geometry, Laning and Control

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Burnside Dr/ Hwy 22 & White Ave / Hwy 22 *(Signalised)*	EB	1	0.84	E	57	111
	WBL	1	0.84	D	51	137
	WBT	1	0.11	A	7	16
	NBT/L	**1**	**>1.2**	**F**	**>120**	**255**
	NBR	1	0.51	A	6	20
	SB	**1**	**>1.2**	**F**	***Error**	**231**
	Overall		-	***F***	***>120***	-
Hwy 22 & Balsam Ave *(EB Stop)*	**EB**	**1**	**>1.2**	**F**	**Error**	**Error**
	NB	1	<0.02	A	1	<5
	SB	1	0.66	A	0	<5
	Overall		-	***F***	***>120***	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	0.03	A	1	<5
	NB	**1**	**>1.2**	**F**	**>120**	**210**
	SB	1	0.32	E	47	10
	Overall		-	***F***	***>120***	-
Hwy 22 & E Park Pl *(EB Stop)*	**EB**	**1**	**1.09**	**F**	**>120**	**69**
	NB	1	0.07	A	2	<5
	SB	1	0.47	A	0	<5
	Overall		-	*C*	*16*	-
Centre Ave / Wintergreen Rd & Balsam Ave *(All-Way Stop)*	WB	1	0.49	B	13	-
	NB	1	0.44	B	11	-
	SB	1	0.19	A	10	-
	Overall		-	*B*	*12*	-
Centre Ave / W Bragg Creek Rd & Bracken Rd (West) *(WB Stop)*	WB	1	0.02	B	12	<5
	NB	1	0.20	A	0	<5
	SB	1	<0.02	A	1	<5
	Overall		-	*A*	*1*	-

*Error indicates that the volumes inputted for the intersection greatly exceed the theoretical capacity for the intersection and as such the software is unable to process these volumes. This is an indication that severe congestion would occur at the intersection.

A summary of findings from the 2045 After Development intersection analysis indicated that most intersections within the Hamlet can be expected to operate at capacity by 2045 based on the current road configuration and controls. Unsurprisingly, the primary area of concern is the trio of intersections at Highway 22/Balsam Avenue/White Avenue/Burnside Drive (the trio of intersections at Highway 22) due to both delays and queuing. The intersection of Highway 22 at East Park Place is also expected to operate at capacity by the 2045 horizon due to high eastbound turning volumes. These volumes come directly from development Site 5, and so improvements to this intersection should be completed in tandem with the development of that site.

Specific locations and issues of concern are as follows:

- **Highway 22/Burnside Drive & Highway 22/ White Avenue** – Delays and queuing for north and southbound traffic. It is anticipated that the northbound left/through combined lane will reach

capacity limits due to high northbound vehicle volumes. The anticipated capacity failure for southbound traffic is so great that software cannot calculate exact delay times and will experience queue lengths beyond actual lane storage length.

- **Highway 22 & Balsam Avenue** - Delays and queuing for eastbound traffic due to high number of vehicles turning left onto Highway 22.
- **Burnside Drive & Balsam Avenue** - Significant delays and queuing for northbound traffic. Northbound combined lane is expected to reach capacity limit due to the high volume east/westbound vehicles.
- **Highway 22 & East Park Place** – Delays and queuing for eastbound traffic due to significant increase in eastbound volumes created by the proposed development, Site 5.

Based on observations, knowledge of the existing Hamlet Core traffic conditions, and analysis of existing conditions performed in Workpaper 1, it was anticipated that the 2045 analysis would display significant issues at the trio of intersections at Highway 22. It was understood at the time of preparing Workpaper 2 that options for improvements at the trio of Highway 22 intersections were under review by TEC, though design specifics and timelines for approval and construction were not available. While detail was limited, it was assumed for the purpose of analysis that the options included, but may not be limited to, both a Roundabout design and a Modified Signalised design. As well, options for a second regional access to West Bragg Creek (West Bragg) are being considered by RVC. Individually or collectively, these changes will have some bearing on how traffic flows through the key pinch point locations identified above, and this is discussed later in Sections 4, 5 and 6 of this report.

3.2 Signal Warrant Analysis

Signal warrant analysis was completed for Highway 22 & East Park Place based on the Transportation Association of Canada (TAC) *Traffic Signal and Pedestrian Signal Head Warrant Handbook* (2014). A score of 100 points or more indicates a traffic signal is warranted. The warrant analysis is summarized in **Table 3.2** and included in **Appendix C**.

Table 3.2: Signal Warrant Analysis

INTERSECTION	HORIZON	SIGNAL WARRANT SCORE	COMMENT
Highway 22 & East Park Place	2045 After Development	110	Warranted

*6-hour volume used in analysis determined using calculated factor of 5.07.

The calculated factor used in signal warrant analysis used to determine 6-hour volumes was determined to be 5.07. This was calculated using counted volumes at Highway 22/Burnside Drive & Highway 22/White Avenue to find sum of vehicles travelling along Hwy 22 south of White Avenue over the 6-hour total and over the Peak-hour. The total 6-hour volume was divided by the Peak-hour volume to get 5.07.

The signal warrant analysis indicated that a traffic signal would be warranted for 2045 After Development Volumes at Highway 22 & East Park Place. This warrant analysis assumed no changes to network infrastructure between present day and 2045. As noted previously, improvements to this intersection

should be completed in tandem with the proposed development of Site 5. Therefore, it is recommended that signalisation at Highway 22 & East Park Place is added when capacity limits are reached by traffic generated by Site 5.

3.3 Interim Safety Concerns

In addition to a signal warrant at Highway 22 & East Park Place, improvements to the existing signal at Highway 22/Burnside Drive & Highway 22/White Avenue are recommended with or without the implementation of any future geometric improvements. These improvements would address existing safety and operational concerns in the interim until improvements are made to the trio of intersections at Highway 22. The following concerns should be addressed as soon as possible and are based on observations made by Bunt during site visits and data review for this study. Observed interim safety concerns and potential solutions are as follows:

- **Highway 22/Burnside Drive & Highway 22/ White Avenue Eastbound** – Observations were noted of driver confusion due to the proximity of eastbound and northbound signals. Potential interim solutions include adding blinders to northbound signal heads and/or separating signal posts.
- **Highway 22/Burnside Drive & Highway 22/ White Avenue Southbound** – Observations were noted of driver confusion travelling southbound on Burnside Drive. Additionally, Bunt staff visiting the site had trouble completing southbound movements during the data collection period. Many vehicles were observed stopped at the intersection during the green light due to limited visibility and confusion. Bunt noted difficulty in drivers seeing changes in signal phases travelling southbound due to the angle of post in combination with sun glare. A potential interim solution could be to separate signal posts for west/southbound movements to better adjust signal head positioning.

These improvements do not relate directly to capacity increases and were not reflected in the analysis. Additional specific recommendations fall beyond the scope of this study. However, engineering judgment recommends that improvements be considered here by TEC and RVC for the interim period until the trio of intersections are ultimately upgraded in the future.

4. 2045 ANALYSIS - HIGHWAY 22 INTERSECTION IMPROVEMENTS

4.1 Overview

The previous section established that the 2045 After Development conditions will fully saturate the network and necessitate improvements. The first set of improvement options explored in this study addressed capacity concerns at the trio of intersections at Highway 22.

As noted, two preliminary options were explored to improve the intersections at Highway 22. An overview of each option is as follows:

- **Roundabout Option**: The three intersections at Highway 22 would be converted into a single multi-leg roundabout.
- **Modified Signalised Option**: The three intersections at Highway 22 would be converted into four intersections, and the intersection of Highway 22 & Balsam Avenue would be signalised.

For purposes of analysis, the specific parameters such as laning, alignment, road width, etc. pertaining to each design option were assumed based on general standard industry practice and TEC design metrics. All existing intersections not impacted by improvements were left as-is for baseline analysis. If deemed a viable option to accommodate anticipated capacity for end-state (20-year) conditions, design specifics would need to be further refined through the design process for the intersections. Refinement of design specifics will be the responsibility of TEC.

This section assessed the expected operational conditions with the inclusion of the two potential Highway 22 intersection improvements, but without consideration of a second point of access to the West Bragg area. For the purpose of this study, the assessments in this section have been referred to as the Roundabout or the Modified Signalised Option in isolation. The impact of a second point of access to West Bragg is discussed in Section 5.

4.2 Highway 22 Intersection Improvement Option Volumes

Capacity analysis of the Roundabout Option and the Modified Signalised Option in isolation required re-distribution of the 2045 After Development Volumes to account for changes in driver routing/behaviour and network geometry. It was assumed that implementation of the Roundabout or Modified Signalised Option would impact both the Background and Development related traffic volumes. Therefore, a re-distribution of the traffic was applied to 2045 Post-Development Volumes with due consideration of delay, based on engineering judgement. The revised traffic volumes used in the analysis of the Roundabout Option in isolation are displayed in **Exhibit 4.1** and of the Modified Signalised Option in isolation are displayed in **Exhibit 4.2**. It should be noted that in both cases the total traffic present remained unchanged from the original 2045 After Development Volumes. The differences were strictly related to redistribution of that traffic amongst the various revised turning movement opportunities.

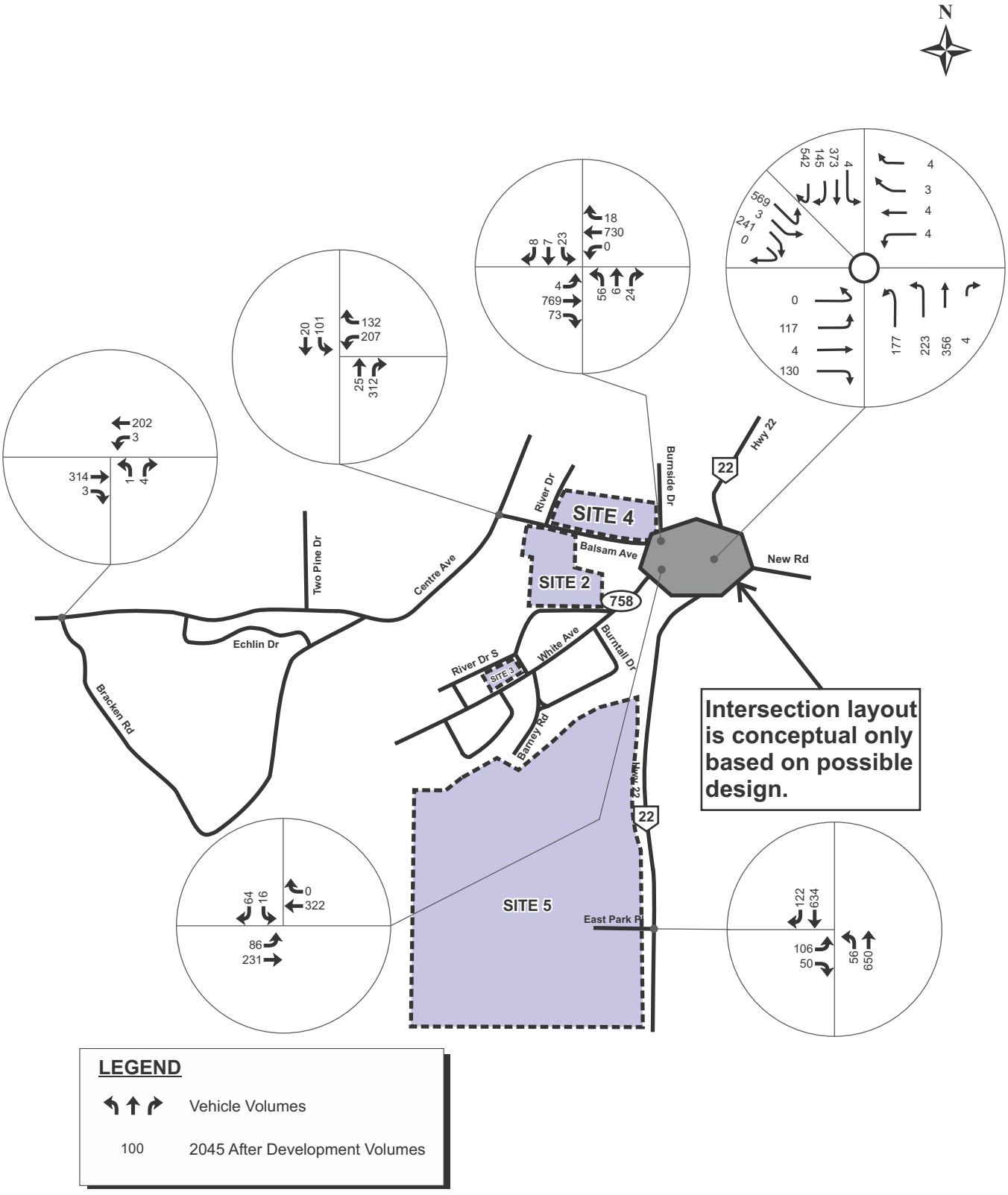


Exhibit 4.1

2045 After Development Volumes - Roundabout Option in Isolation

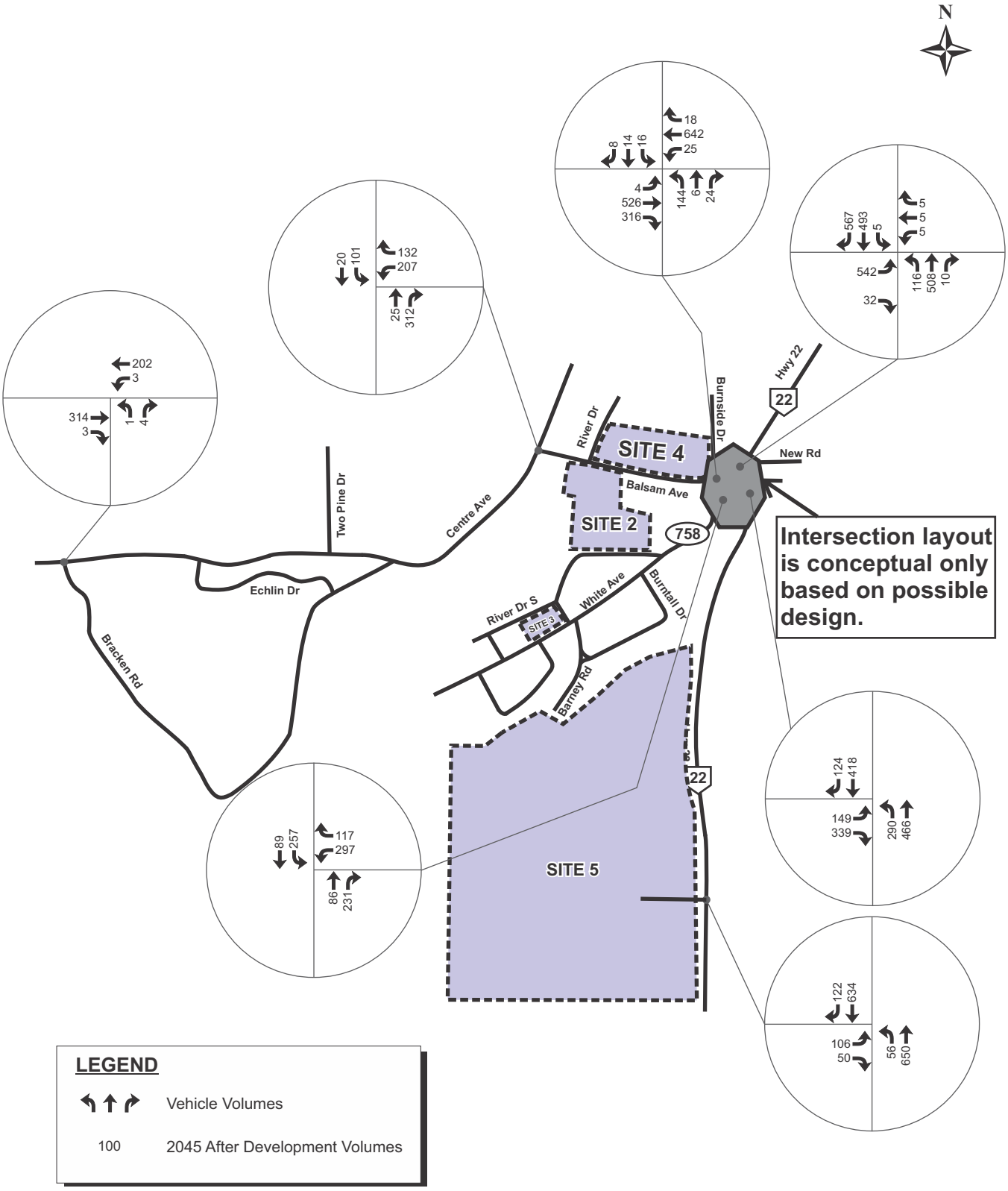


Exhibit 4.2

2045 After Development Volumes - Signalised Option in Isolation

4.3 Intersection Analysis

Synchro 11 traffic analysis software was again used to review intersection operational conditions of all non-roundabout intersections for the Roundabout and the Modified Signalised Options in isolation. The same Synchro 11 parameters outlined in **Section 3.1** were used to complete the analysis.

SIDRA 9.0 traffic analysis software was used to review the roundabout intersection operational conditions of based on the methods outlined in the Highway Capacity Manual. Traffic operations were assessed using the performance measures of volume-to-capacity (v/c) and Level of Service (LOS). The analysis was completed as per SIDRA Standard Roundabout Capacity Model methodology with a saturation flow rate of 1850 vehicles per hour, peak hour factor of 0.95, and environmental factor of 1.1. The volume to capacity (v/c) ratio, level of service, average control delay (in seconds), and 95th percentile queue (in metres) are summarized in this report.

As noted earlier, to maintain a conservative yet realistic approach in the analysis, a minimum of 5 vehicles per hour was applied to each movement. Additionally, the minimum number of pedestrians at each crossing was set to 10 pedestrians per hour and the minimum number of cyclists was set to 5 cyclists per direction. Note again that these adjustments are reflected in the Synchro tables and analysis but not in the base volume exhibits.

The 2045 After Development Roundabout Option and Modified Signalised Option in isolation analysis outputs are provided in **Appendix C** and summarized in **Table 4.1** and **Table 4.2**.

Table 4.1: 2045 After Development - Roundabout Option in Isolation

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Hwy 22 & Balsam Ave & White Ave & New Road *(Roundabout)*	NB	4	0.49	A	9	36
	WB	4	0.03	B	13	<5
	SB	4	0.62	A	4	51
	EB	4	0.65	A	4	38
	NEB	4	0.54	B	16	28
	Overall		-	*A*	*6*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	<0.02	A	1	<5
	NB	**1**	**1.00**	**F**	**>120**	**44**
	SB	**1**	**0.48**	**F**	**84**	**15**
	Overall		-	*B*	*11*	-
Burnside Dr & White Ave *(WB Stop)*	EBL	1	0.08	A	1	<5
	EBT		0.08	A	3	<5
	WBT/R	1	0.20	A	0	<5
	SBL/R	1	0.15	B	13	<5
	Overall		-	*A*	*3*	-
Hwy 22 & E Park Pl *(EB Stop)*	**EB**	**1**	**1.09**	**F**	**>120**	**67**
	NB	1	0.07	A	2	<5
	SB	1	0.47	A	0	<5
	Overall	-	-	*C*	*16*	-
Centre Ave / Wintergreen Rd & Balsam Ave *(All-Way Stop)*	WB	1	0.49	B	13	-
	NB	1	0.44	B	11	-
	SB	1	0.19	A	10	-
	Overall	-	-	*B*	*12*	-
Centre Ave / W Bragg Creek Rd & Bracken Rd (West) *(WB Stop)*	WB	1	0.02	B	12	<5
	NB	1	0.20	A	0	<5
	SB	1	<0.02	A	1	<5
	Overall	-		*A*	*1*	-

For purposes of analysis, the specific design parameters of the Roundabout Option were assigned using engineering judgment based on most general and likely design layout. These design parameters were maintained throughout the rest of this study and carried over to all other analysis of the Roundabout Option, unless otherwise specified, for consistency in findings.

A summary of findings from the 2045 After Development Roundabout Option in isolation analysis indicated that most of the intersections and critical movements within the study area would be adequately accommodated. The two exceptions to this were found to be the northbound and southbound movements at the Burnside Drive/Balsam Avenue intersection and the eastbound movement at the Highway 22 & East Park Place intersection. Opportunities to improve the operation of these movements were explored further later in this section of the report.

Table 4.2: 2045 After Development – Modified Signalised Option in Isolation

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Hwy 22 & Balsam Ave *(Signalised)*	EBL	1	0.77	B	20	86
	EBR	1	0.05	A	4	<5
	WB	1	0.02	A	7	<5
	NBL	1	0.43	B	17	18
	NBT	1	0.45	B	12	27
	NBR	1	0.02	A	2	<5
	SBL	1	0.02	A	10	<5
	SBT	1	0.44	B	12	26
	SBR	1	0.65	A	5	15
	Overall		-	*B*	*12*	-
Hwy 22 & White Ave *(EB Stop)*	**EBL**	**1**	**>1.2**	**F**	**>120**	**84**
	EBR	1	0.46	B	13	18
	NBL	1	0.27	A	9	9
	NBT	1	0.14	A	0	<5
	SBT	1	0.13	A	0	<5
	SBRT	1	0.08	A	0	<5
	Overall		-	*D*	*29*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EBL/T	1	<0.02	A	1	<5
	EBR	1	0.20	A	1	<5
	WBL/T	1	0.03	A	1	<5
	WBR	1	<0.02	A	1	<5
	NBL/T	**1**	**>1.2**	**F**	**>120**	**96**
	NBR	**1**	**>1.2**	**F**	**>120**	**96**
	SB	1	0.32	E	47	10
	Overall		-	D	32	-
Burnside Dr & White Ave *(WB Stop)*	**WBL**	**1**	**1.05**	**F**	**103**	**89**
	WBR	1	0.13	A	9	<5
	NBT	1	0.05	A	0	<5
	NBR	1	0.14	A	0	<5
	SBL	1	0.22	A	2	7
	SBT	1	0.22	A	3	7
	Overall		-	*D*	*32*	-
Hwy 22 & E Park Pl *(EB Stop)*	**EB**	**1**	**1.09**	**F**	**>120**	**69**
	NB	1	0.07	A	2	<5
	SB	1	0.47	A	0	<5
	Overall		-	*C*	*16*	-
Centre Ave / Wintergreen Rd & Balsam Ave *(All-Way Stop)*	WB	1	0.49	B	13	-
	NB	1	0.44	B	11	-
	SB	1	0.19	A	10	-
	Overall		-	B	*12*	-
Centre Ave / W Bragg Creek Rd & Bracken Rd (West) *(WB Stop)*	WB	1	0.02	B	12	<5
	NB	1	0.20	A	0	<5
	SB	1	<0.02	A	1	<5
	Overall		-	*A*	*1*	-

For the purpose of analysis, the specific laning and organizational parameters of the Modified Signalised Option were developed using engineering judgment based on a likely design layout given the geometric limitations of the area. These design parameters were maintained throughout the rest of this study and have been carried over to all other analysis of the Modified Signalised Option, unless otherwise specified, for consistency in findings.

A summary of findings from the 2045 After Development Modified Signalised Option in isolation analysis indicated a mixed result. Some of the intersections and critical movements would be adequately accommodated by this option. However, other intersections would remain fully saturated. Unsurprisingly, the primary areas of concern remained the trio (turned quad) of intersections at Highway 22, and the intersection of Highway 22 at East Park. Specific locations and issues of concern are as follows:

- **Highway 22 & White Avenue** – Delays and queuing for eastbound traffic due to high volume of vehicles turning left onto Highway 22. It is anticipated that the eastbound left lane will experience queue lengths exceeding actual storage length and will impact the function of Burnside Drive & White Avenue. This impact is not detected by Synchro 11 software.
- **Burnside Drive & Balsam Avenue** – Delay and queuing for northbound traffic due to high volumes of free flow east/westbound volumes, and a high volume of northbound left turns. Similarly to queue lengths at Highway 22 & White Avenue, the northbound queue lengths are expected to exceed actual storage length, impacting the function of Burnside Drive & White Avenue. This impact is not detected by Synchro 11 software.
- **Burnside Drive & White Avenue** – Delays and queuing for westbound traffic. It is anticipated that the westbound left lane will experience queue lengths exceeding actual storage length and will impact the function of Highway 22 & White Avenue. As noted above, the intersection at Burnside Drive & White Avenue will face capacity issues beyond what has been identified by Synchro 11 software due to back-up of queues at surrounding intersections.
- **Highway 22 & East Park Place** – Delays and queuing for eastbound traffic due to significant increase in eastbound volumes created by the proposed development of Site 5.

The movements where the anticipated queue length exceeds the anticipated available storage are summarized in the **Table 4.3**.

Table 4.3: Excessive Queue Length Summary

INTERSECTION	MOVEMENT	95% QUEUE LENGTH	ANTICIPATED STORAGE
Highway 22 & White Avenue	EBL	84 m	50 m
Burnside Dr & Balsam Ave	NB	96 m	60 m
Burnside Dr & White Ave	WBL	89 m	50 m

The Modified Signalised Option may be constrained by geometry and as noted, for the purpose of analysis it was assumed that the redesign of these intersections for the Modified Signalised Option would result in a close proximity of four intersections. In all likelihood only one of the four intersections would be able to

be signalised. High traffic volumes make undertaking turning movements at unsignalised intersections very difficult, leading to high delays and queue lengths. While mitigation measures may exist further design development would be required to establish options, which fell outside of the scope of this study. It should be noted that this does not eliminate the Modified Signalised Option as a possible solution for improvements. This option continued to be considered in further analysis in this study.

4.4 Additional Mitigation Opportunities

Opportunities to improve the operation of critical movements for the Roundabout Option were explored by applying various mitigation measures summarized below.

A mitigation option was considered for the roundabout option, specifically for the adjacent intersection of Burnside Drive at Balsam Avenue. This included limiting northbound movements to right turns only and eliminating the northbound left and through options (northbound right-only). This would force northbound left and through volumes to travel through the roundabout and minimize delays.

The results of the updated analysis with this mitigation option included is summarized below in **Table 4.4**.

Table 4.4: 2045 After Development – Roundabout Option with Minor Mitigations

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Hwy 22 & Balsam Ave & White Ave & New Road *(Roundabout)*	NB	4	0.52	B	10	41
	WB	4	0.02	B	14	<5
	SB	4	0.64	A	5	57
	EB	4	0.66	A	4	39
	NEB	4	0.67	C	21	41
	Overall		-	*A*	*8*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	<0.02	A	1	<5
	NBR	1	0.07	C	16	<5
	SB	**1**	**0.50**	**F**	**91**	**16**
	Overall		-	*A*	*2*	-
Burnside Dr & White Ave *(WB Stop)*	EBL	1	<0.02	A	0	<5
	EBT		<0.02	A	1	<5
	WBT/R	1	0.20	A	0	<5
	SBL/R	1	0.14	B	12	<5
	Overall		-	*A*	*2*	-

The analysis indicated that most of the intersections and critical movements within the study area would be adequately accommodated. The only exception would be the significant delays for southbound traffic at Burnside Drive & Balsam Avenue due to high west/eastbound volumes. It is anticipated that the small number of vehicles travelling southbound will divert to the intersection at Riverside Drive North & Balsam Avenue, resolving this issue.

4.5 Summary

Overall, the results of analysis suggested that the Roundabout Option would have the greatest positive impact on the forecast volumes at the Highway 22/Burnside Dr/Balsam Ave intersections. The anticipated constraints at the intersection of Burnside Dr/Balsam Ave could be further enhanced through limiting northbound movements to right turns only and eliminating the northbound left and through movements (northbound right-only). As well, signalisation of Highway 22 & East Park Place is recommended.

5. 2045 TRAFFIC ANALYSIS - SECOND ACCESS TO WEST BRAGG

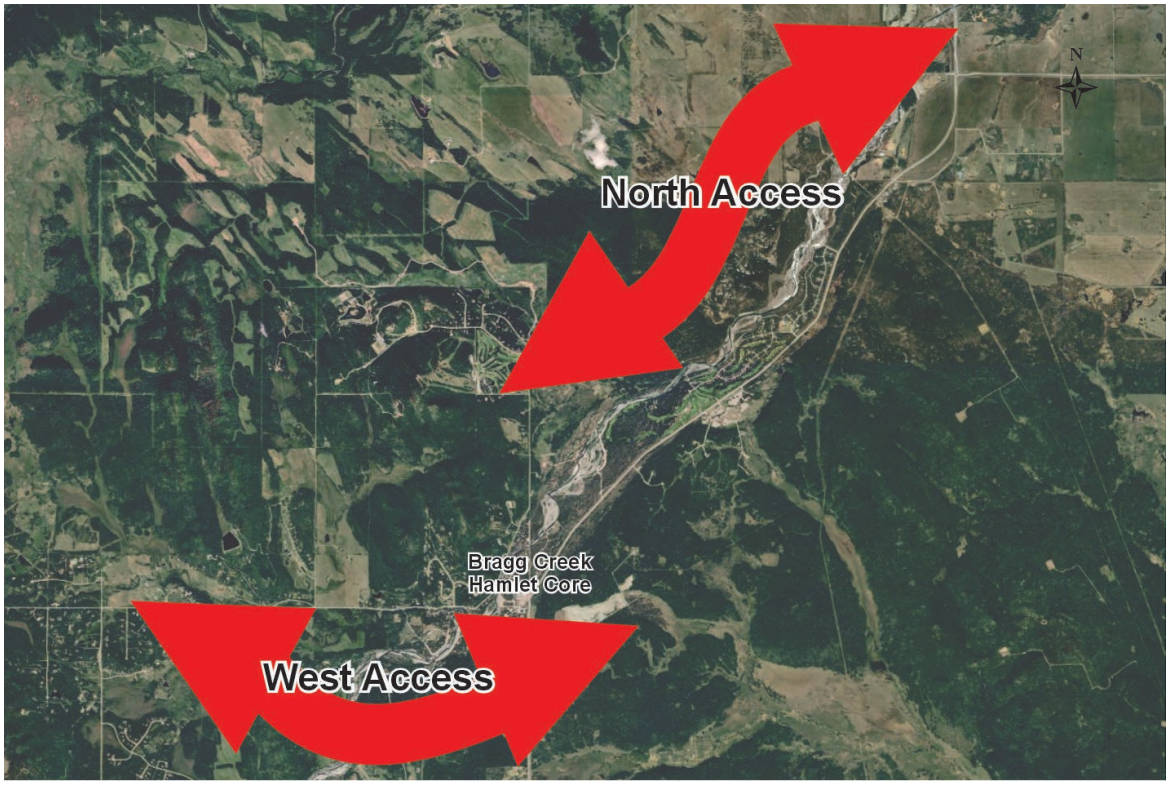
The previous section assessed the impact of implementing improvements to the intersections at Highway 22 for 2045 After Development conditions. This section reviews those same 2045 After Development Volumes with the provision of a second point of access to the West Bragg area, but without consideration of the Highway 22 intersection improvements. For the purpose of this study, these conditions are referred to as the Access in Isolation.

Workpaper 1 discussed the possible impact of providing a second access to the West Bragg Creek/Wintergreen side of the Elbow River, referred to as West Bragg within this document. This interest comes from both RVC and the residents of Bragg Creek and the surrounding area. The Balsam Road bridge access across the Elbow River currently represents the point of access to or from the West Bragg area. As a result, issues exist related to emergency accessibility for residents and rescue vehicles, as well as network completeness and permeability for Active Transportation modes. Workpaper 1 also confirmed that road capacity is not a factor in terms of the current need for a second point of access.

Two fundamental options for a second point of access were reviewed in Workpaper 1. One option referred to as the West Access was assumed to be located west/upstream of the Trading Post in the vicinity of Bracken Road and would include a new bridge access over the Elbow River. A second option referred to as the North Access was assumed to be located to the northeast/downstream of the Hamlet as an extension of Wintergreen Road. It is understood that this latter connection is currently the preferred option for RVC.

High level conceptual plans showing the general location of the two access options are displayed in **Figure 5.1**.

Figure 5.1: Potential Second West Bragg / Wintergreen Access Options



5.1 Second Access Volumes

Analysis of a second access to West Bragg required re-distribution of volumes to account for changes in driver routing/behaviour, route choice and network geometry. Re-assignment of volumes completed in Workpaper 1 used 100th Highest Hour Volumes and was limited to the trio of intersections at Highway 22. For the more detailed analysis in Workpaper 2, the re-distribution was applied to the new 2045 Horizon Background Volumes and was expanded to all study intersections. However, the re-distribution was applied using the same methodology and traffic diversion methodology as in Workpaper 1.

It was assumed that the implementation of a second point of access would minimally impact proposed development traffic volumes (2045 Total Site Traffic Volumes) because the locations of the secondary access options are external to the Hamlet Core. Therefore, re-distribution of traffic was applied to the 2045 Horizon Background Volumes but not to 2045 Total Site Traffic Volumes.

The West Access option would be expected to draw traffic primarily from south of Bragg Creek along Highway 22 and would divert that traffic from the trio of intersections at Highway 22. Some traffic travelling from north of Bragg Creek along Highway 22 would be drawn south past Balsam Avenue to the West Access to avoid traffic at the Highway 22 & Balsam Avenue intersection.

The re-assignment is noted as being high-level in nature and there could be variances in each of the assumptions, but the principles remain sound and the actual diverted traffic volumes are small compared to total volumes within the network. As such, significant variances in the assumption percentages would result in modest differences in traffic volumes that would be unlikely to materially affect road classifications and intersection operations. If necessary, a sensitivity analysis of key critical locations could be undertaken applying higher or lower percentages to test the impact of different assumptions. However, this was not determined to be necessary as part of this analysis.

For the West Access option, the re-distribution of 2045 Horizon Background Volumes was applied as follows:

- 20% of traffic travelling southbound on Highway 22 to West Bragg was assumed to bypass the existing access to take the new West Access.
- 40% of traffic travelling from West Bragg back to Highway 22 northbound was assumed to choose the new West Access.
- 70% of traffic travelling northbound on Highway 22 to West Bragg was assumed to choose the new West Access.
- 70% of traffic travelling from West Bragg back to Highway 22 southbound was assumed to choose the new West Access.

The North Access option would be expected to draw traffic primarily from north of Bragg Creek along Highway 22 and that traffic would be expected to divert at a decision point well away from Bragg Creek, likely in the vicinity of the Highway 22 & Highway 8 roundabout.

For the North Access option, the re-distribution to 2045 Horizon Background Volumes was applied as follows:

- 60% of traffic travelling southbound on Highway 22 to West Bragg was assumed to choose the new North Access.
- 50% of traffic travelling from West Bragg back to Highway 22 northbound was assumed to choose the new North Access.

As noted earlier, these redistributions are deliberately general and are based on engineering judgment and local knowledge of the study area. Given the scale of volumes involved, modest variances in these assumptions are not expected to impact the conclusions or recommendations identified in this study.

Once the 2045 Horizon Background Volumes had been redistributed, they were re-combined with the 2045 Total Site Traffic Volumes to create revised 2045 After Development West Access Volumes displayed in **Exhibit 5.1**, and 2045 After Development North Access Volumes displayed in **Exhibit 5.2**.

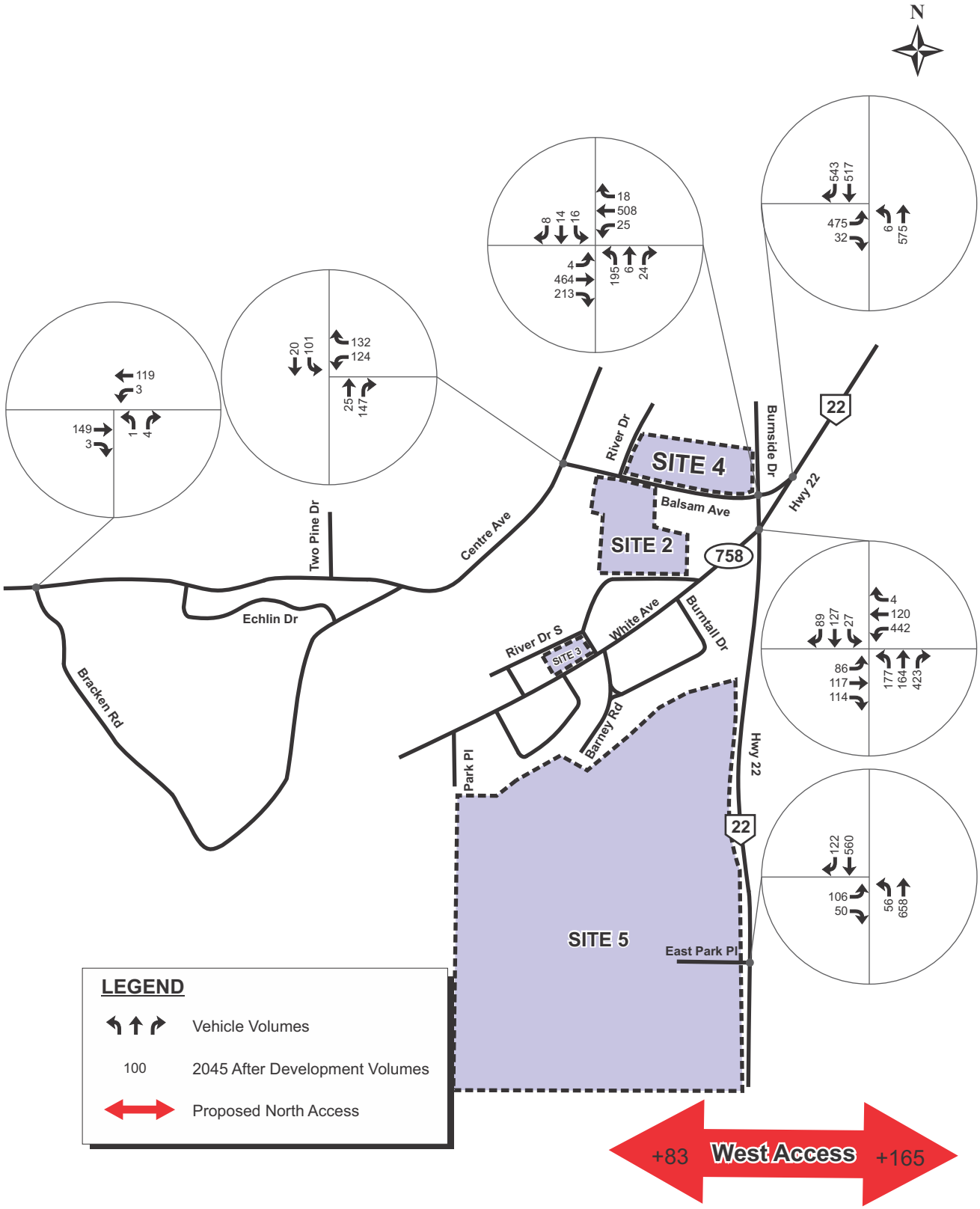


Exhibit 5.1

2045 After Development Volumes - West Access in Isolation

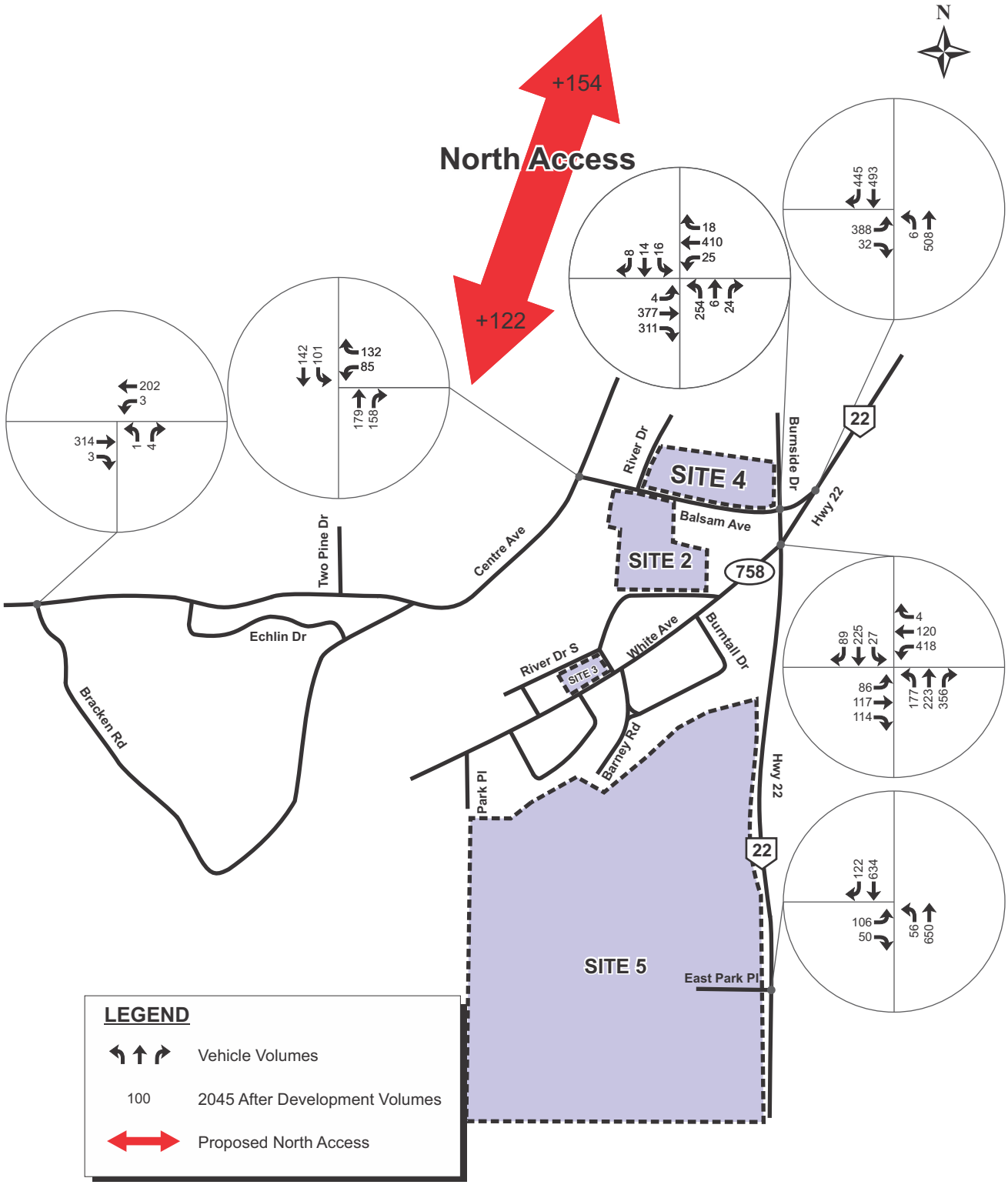


Exhibit 5.2

2045 After Development Volumes - North Access in Isolation

5.2 Intersection Analysis

Synchro 11 traffic analysis software was again used to review intersection operational conditions with the addition of a second access in isolation. The same Synchro 11 parameters outlined in **Section 3.1** were used to complete the analysis.

To maintain a conservative yet realistic approach in the analysis, a minimum of 5 vehicles per hour was again applied to each movement. Additionally, the minimum number of pedestrians at each crossing continued to be set to 10 pedestrians per hour and the minimum number of cyclists was set to 5 cyclists per direction. As noted earlier, these adjustments are reflected in the Synchro tables and analysis but not in the base volume exhibits.

The 2045 After Development West Access and North Access in isolation analysis outputs are provided in **Appendix B** and summarized in **Table 5.1** and **Table 5.2**.

Table 5.1: 2045 After Development - West Access in Isolation

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Burnside Dr/ Hwy 22 & White Ave / Hwy 22 *(Signalised)*	EB	1	0.85	E	58	111
	WBL	1	0.86	D	53	147
	WBT	1	0.11	A	7	16
	NBT/L	**1**	**>1.2**	**F**	**>120**	**209**
	NBR	1	0.56	A	6	22
	SB	**1**	**>1.2**	**F**	**>120**	**156**
	Overall		-	***F***	***137***	-
Hwy 22 & Balsam Ave *(EB Stop)*	**EB**	**1**	**>1.2**	**F**	**Error**	**Error**
	NB	1	<0.02	A	1	<5
	SB	1	0.66	A	0	<5
	Overall		-	***F***	***>120***	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	0.03	A	1	<5
	NB	**1**	**>1.2**	**F**	**>120**	**127**
	SB	1	0.25	D	34	7
	Overall		-	*F*	*56*	-
Hwy 22 & E Park Pl *(EB Stop)*	**EB**	**1**	**0.99**	**F**	**121**	**59**
	NB	1	0.07	A	2	<5
	SB	1	0.42	A	0	<5
	Overall		-	*B*	*13*	-
Centre Ave / Wintergreen Rd & Balsam Ave *(All-Way Stop)*	WB	1	0.33	A	10	-
	NB	1	0.21	A	8	-
	SB	1	0.17	A	9	-
	Overall		-	*A*	*9*	-
Centre Ave / W Bragg Creek Rd & Bracken Rd (West) *(WB Stop)*	WB	1	<0.02	A	10	<5
	NB	1	0.10	A	0	<5
	SB	1	<0.02	A	1	<5
	Overall		-	A	1	-

Table 5.2: 2045 After Development - North Access in Isolation

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Burnside Dr/ Hwy 22 & White Ave / Hwy 22 *(Signalised)*	EB	1	0.84	E	57	111
	WBL	1	0.84	D	51	137
	WBT	1	0.11	A	7	16
	NBT/L	**1**	**>1.2**	**F**	**>120**	**255**
	NBR	1	0.51	A	6	20
	SB	**1**	**>1.2**	**F**	**Error**	**231**
	Overall		-	*F*	**>120**	-
Hwy 22 & Balsam Ave *(EB Stop)*	**EB**	**1**	**>1.2**	**F**	**>120**	**279**
	NB	1	<0.02	A	1	<5
	SB	1	0.58	A	0	<5
	Overall		-	*F*	*154*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	0.03	A	1	<5
	NB	**1**	**>1.2**	**F**	**>120**	**155**
	SB	1	0.21	D	28	6
	Overall		-	F	72	-
Hwy 22 & E Park Pl *(EB Stop)*	**EB**	**1**	**1.09**	**F**	**>120**	**67**
	NB	1	0.07	A	2	<5
	SB	1	0.47	A	0	<5
	Overall		-	*C*	*16*	-
Centre Ave / Wintergreen Rd & Balsam Ave *(All-Way Stop)*	WB	1	0.32	B	11	-
	NB	1	0.45	B	11	-
	SB	1	0.36	B	11	-
	Overall		-	*B*	*11*	-
Centre Ave / W Bragg Creek Rd & Bracken Rd (West) *(WB Stop)*	WB	1	0.02	B	12	<5
	NB	1	0.20	A	0	<5
	SB	1	<0.02	A	1	<5
	Overall		-	A	1	-

The analysis indicated that the provision of a second point of access does not significantly impact overall intersection operating conditions. Unsurprisingly, the primary areas of concern remain the trio of intersections at Highway 22, and the intersection of Highway 22 & East Park Place. Due to the diversion of traffic volumes some movements are worsened with the addition of a West Access. This makes clear the conclusion that provision of a second point of access alone will not provide any material relief to traffic congestion at the key pinch point on Highway 22 at the trio or intersections.

5.3 Additional Mitigation Opportunities

Capacity analysis established that the 2045 After Development conditions would be expected to fully saturate the network even with the provision of a second point of access to West Bragg. Pinch points have been identified as the trio of intersections at Highway 22, and the intersection at Highway 22 & East Park Place.

As noted earlier, signalisation at Highway 22 & East Park Place will be warranted and will adequately accommodate future traffic volumes at that intersection. However, there are no readily apparent mitigation measures to adequately accommodate 2045 After Development Volume capacity without full redesign in an isolated second access scenario. This necessitates the inclusion of improvements to the trio of intersections at Highway 22 as provided in the Roundabout Option or the Modified Signalised Option.

6. 2045 ANALYSIS - COMBINED OPTION

Analysis preformed in Section 4 of this report determined that implementation of the Roundabout Option or the Modified Signalised Option alone would not fully accommodate the anticipated 2045 After Development Volumes. However, with minor mitigations the Roundabout Option would provide a higher level of overall service than would the Modified Signalised option.

The analysis performed in Section 5 determined that the provision of a second access to West Bragg alone (without the implementation of improvements to the trio of intersections on Highway 22) would not be sufficient to manage 2045 conditions.

With those facts in mind, the analysis was repeated to test the combined impact of the Roundabout or Modified Signalised intersection improvements to the intersections at Highway 22 with the inclusion of a second point of access to West Bragg. Four options were considered, as follows:

- Roundabout Option + West Access
- Roundabout Option + North Access
- Modified Signalised Option + West Access
- Modified Signalised Option + North Access

It should be noted that these combined options are not intended to provide specific empirical recommendations. They are instead intended to provide comparative representations of possible improvement considerations within the Hamlet. All analysis was completed based on 2045 After Development Volumes.

6.1 Combined Volumes

The implementation of a combined solution involving both improvements to the intersections at Highway 22 and a second point of access to West Bragg required an additional re-distribution of traffic volumes to account for changes in driver routing/behaviour and network geometry. The 2045 After Development West Access and North Access in Isolation Volumes were used as starting points for this final re-distribution exercise. The same distribution percentages applied to the Roundabout Option and the Modified Signalised Option in isolation in **Section 4.1** of this report were applied to the 2045 After Development Access Volumes. This resulted in four unique volume data sets representing distributions for each combined solution scenario.

Volumes used in the analysis of the Roundabout Option with a West Access are displayed in **Exhibit 6.1** and the Roundabout Option with a North Access are displayed in **Exhibit 6.2**. Volumes used in the analysis of the Modified Signalised Option with a West Access are displayed in **Exhibit 6.3** and the Modified Signalised Option with a North Access are displayed in **Exhibit 6.4**.

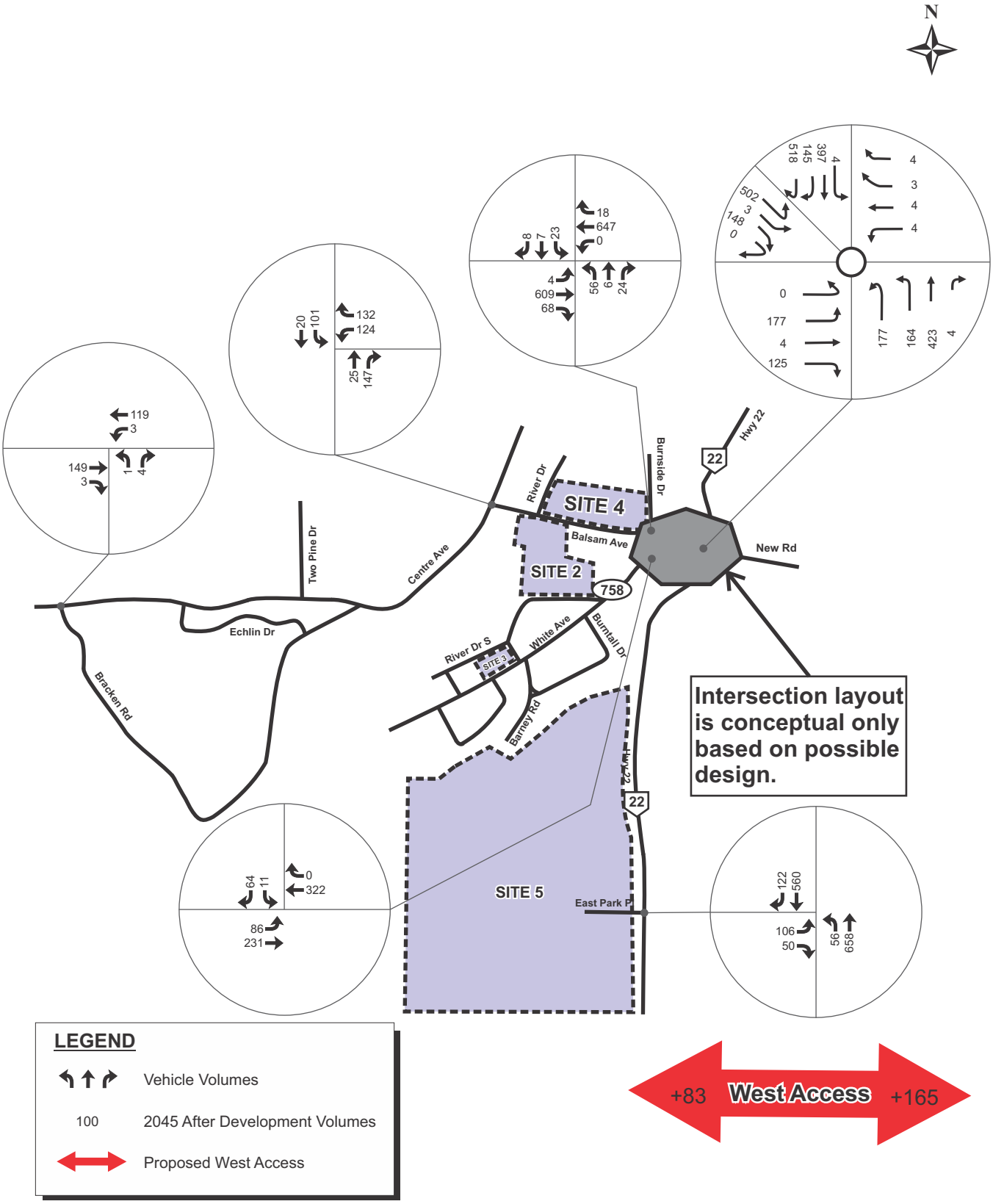


Exhibit 6.1

2045 After Development Volumes - Roundabout Option with West Access

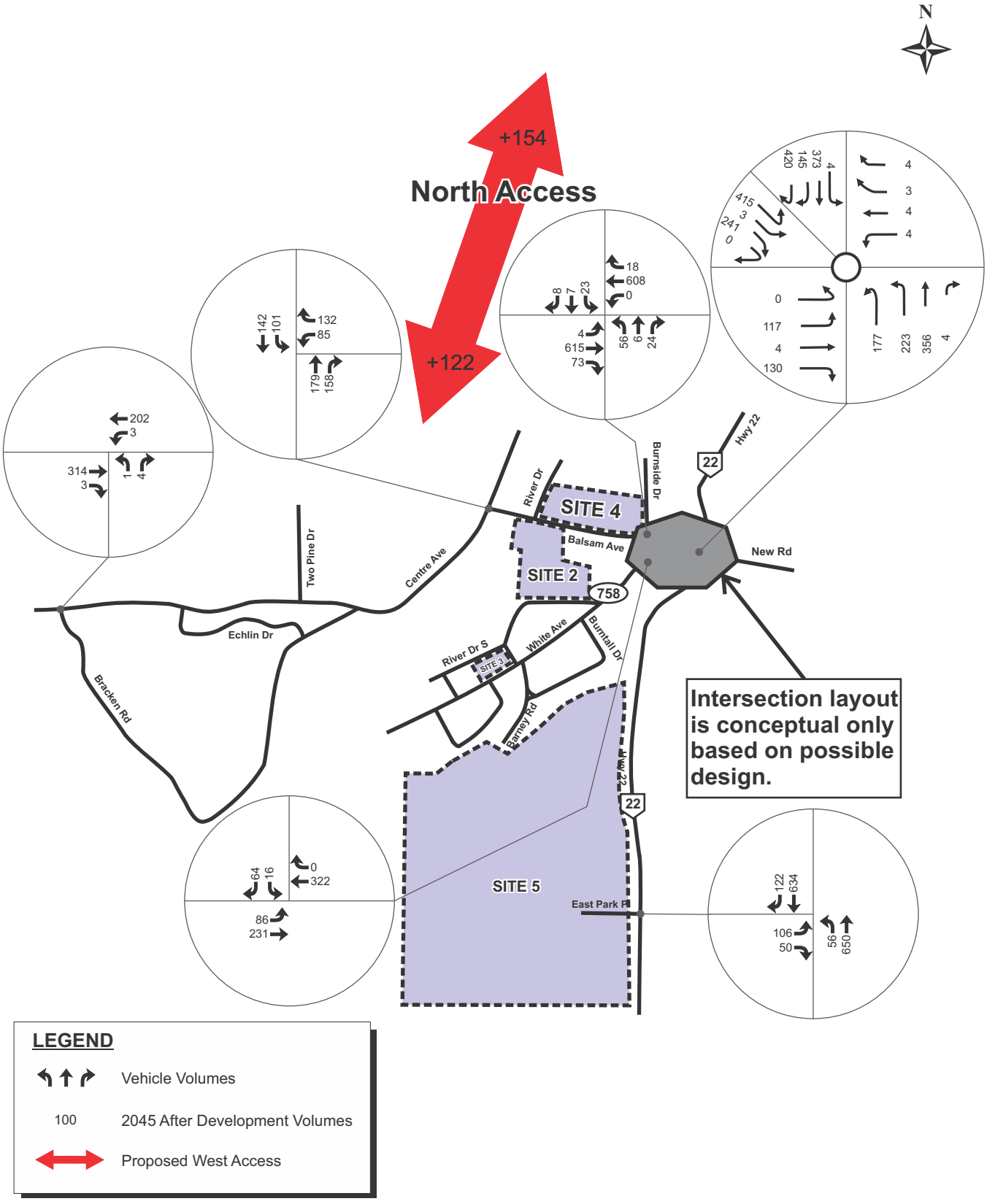


Exhibit 6.2

2045 After Development Volumes - Roundabout Option with North Access

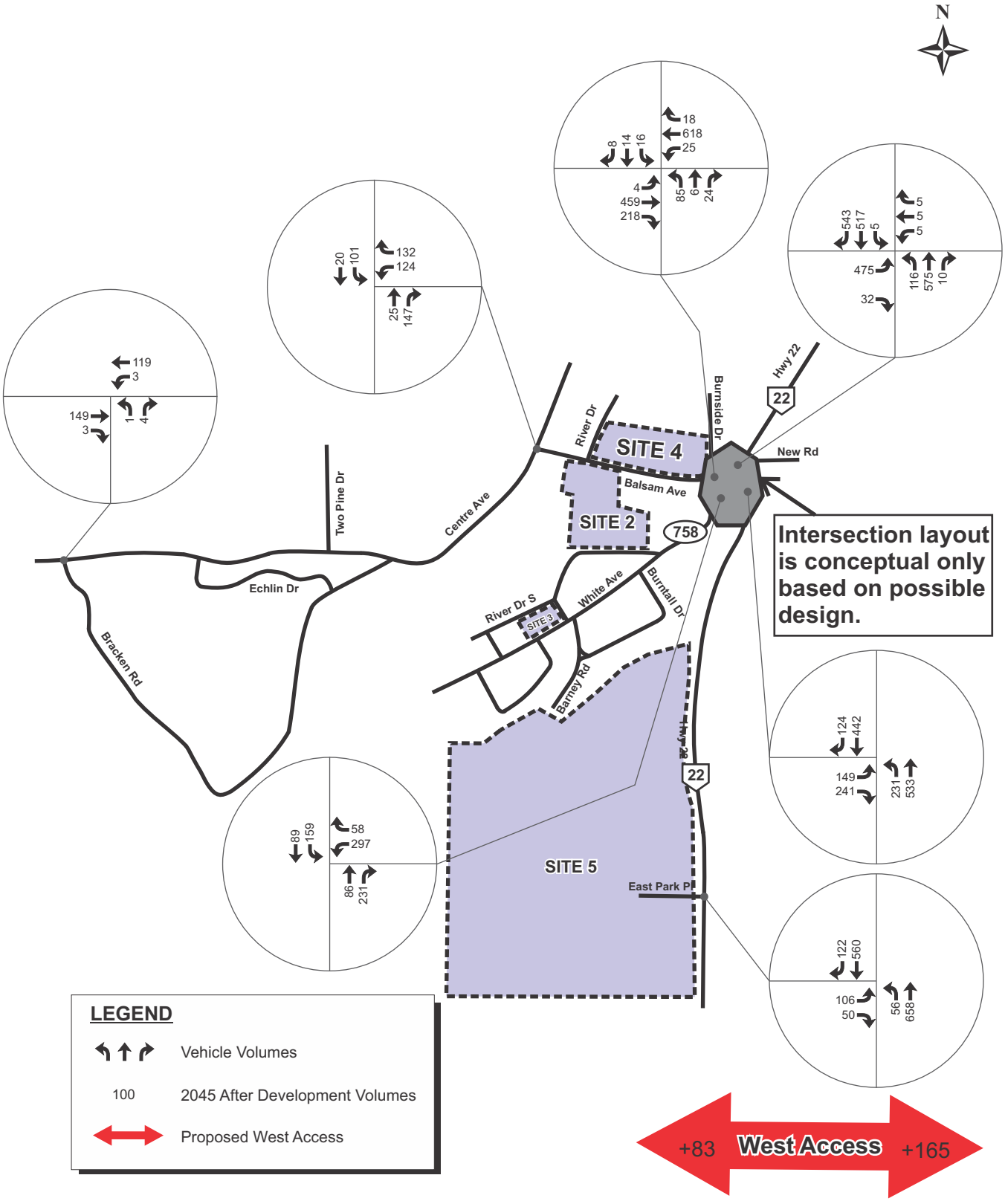


Exhibit 6.3

2045 After Development Volumes - Signalised Option with West Access

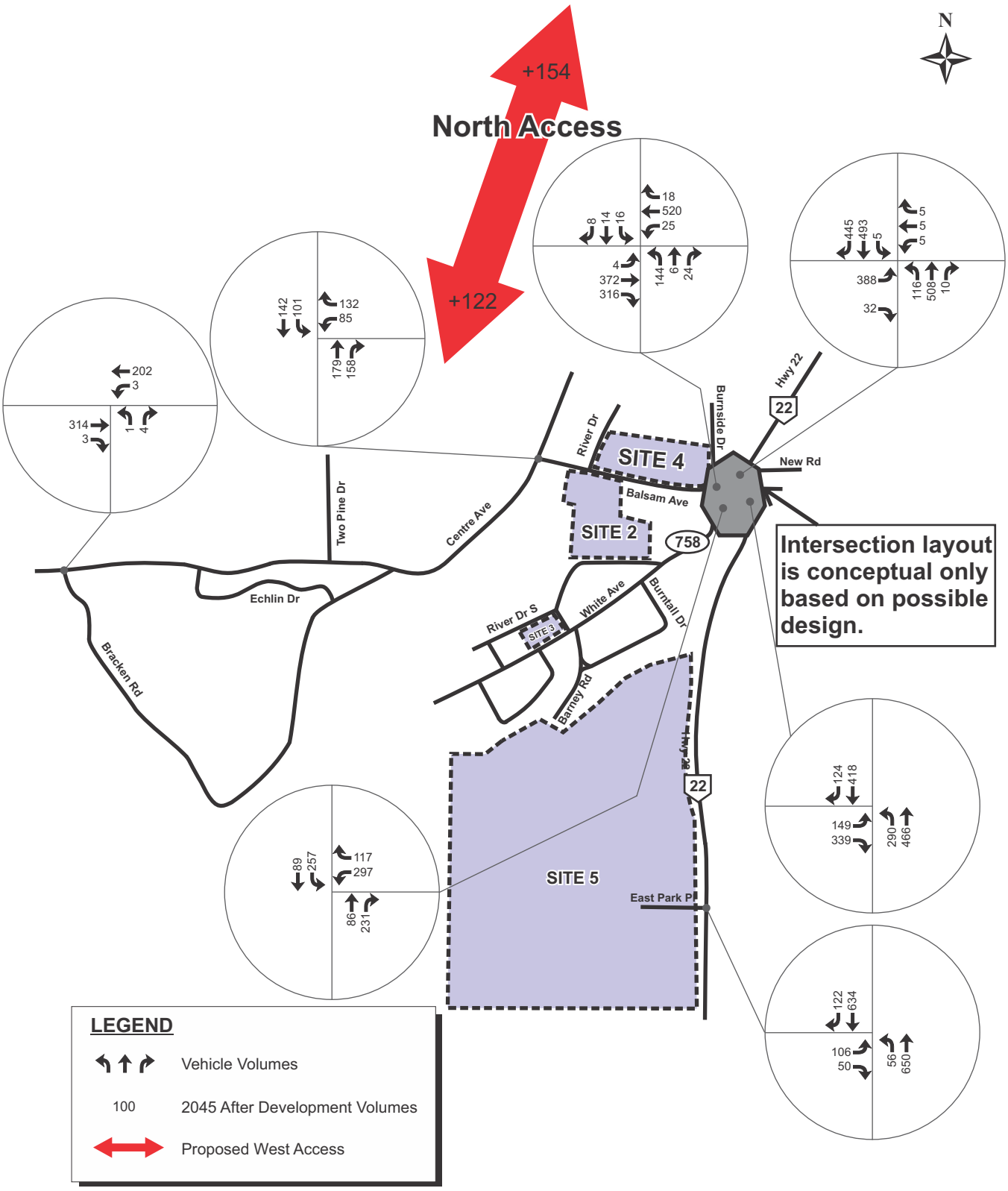


Exhibit 6.4

2045 After Development Volumes - Signalised Option with North Access

6.2 Intersection Analysis

Synchro 11 traffic analysis software was again used to review intersection operational conditions of all non-roundabout intersections. The same Synchro 11 parameters outlined in **Section 3.1** were used to complete analysis.

SIDRA 9.0 traffic analysis software was again used to review roundabout intersection operational conditions. The same SIDRA 9.0 parameters outlined in **Section 4.2** were used to complete analysis.

To maintain a conservative yet realistic approach in the analysis, a minimum of 5 vehicles per hour was again applied to each movement. Additionally, the minimum number of pedestrians at each crossing was set to 10 pedestrians per hour and the minimum number of cyclists was set to 5 cyclists per direction. Note that these adjustments were reflected in the Synchro tables and analysis but not in the base volume exhibits.

To streamline the process, analysis was performed at the key pinch points determined in the previous analysis as the trio of intersections at Highway 22 (or the re-design of these intersections) and the Highway 22 & East Park Place intersection.

The respective 2045 After Development Combined Volumes were used in analysis. Synchro output reports and SIDRA Output Reports are provided in **Appendix B** and summarized in **Table 6.1** through **Table 6.4.**

Table 6.1: 2045 After Development - Roundabout Option with West Access

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Hwy 22 & Balsam Ave & White Ave & New Road *(Roundabout)*	NB	4	0.47	A	7	29
	WB	4	<0.02	B	12	<5
	SB	4	0.56	A	3	39
	EB	4	0.58	A	4	30
	NEB	4	0.48	B	14	24
	Overall		-	*A*	*5*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	<0.02	A	1	<5
	NB	**1**	**0.66**	**F**	**72**	**27**
	SB	1	0.31	E	47	9
	Overall		-	*A*	*6*	-
Burnside Dr & White Ave *(WB Stop)*	EBL	1	0.08	A	1	<5
	EBT	1	0.08	A	3	<5
	WBT/R	1	0.20	A	0	<5
	SBL/R	1	0.13	B	12	<5
	Overall		-	*A*	*3*	-
Hwy 22 & E Park Pl *(EB Stop)*	**EB**	**1**	**0.99**	**F**	**121**	**59**
	NB	1	0.07	A	2	<5
	SB	1	0.42	A	0	<5
	Overall		-	*B*	*13*	-

Table 6.2: 2045 After Development - Roundabout Option with North Access

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Hwy 22 & Balsam Ave & White Ave & New Road *(Roundabout)*	NB	4	0.41	A	6	25
	WB	4	<0.02	B	12	<5
	SB	4	0.50	A	3	32
	EB	4	0.47	A	3	21
	NEB	4	0.46	B	13	21
	Overall		-	*A*	*5*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	<0.02	A	1	<5
	NB	**1**	**0.63**	**F**	**65**	**26**
	SB	1	0.30	E	44	9
	Overall		-	*A*	*5*	-
Burnside Dr & White Ave *(WB Stop)*	EBL	1	0.08	A	1	<5
	EBT	1	0.08	A	3	<5
	WBT/R	1	0.20	A	0	<5
	SBL/R	1	0.15	B	13	<5
	Overall		-	*A*	*3*	-
Hwy 22 & E Park Pl *(EB Stop)*	**EB**	**1**	**1.09**	**F**	**>120**	**67**
	NB	1	0.07	A	2	<5
	SB	1	0.47	A	0	<5
	Overall		-	*C*	*16*	-

The analysis of the Roundabout Option with West Access, and the Roundabout Option with North Access indicated that some of the intersections and critical movements would be adequately accommodated. However, other intersections would remain fully saturated. Unsurprisingly the movements of concern are consistent with the Roundabout Option in isolation analysis. Therefore, the mitigations applied previously in **Section 4.3** were applied in these scenarios. This included a northbound right-only limitation to Burnside Drive & Balsam Avenue, and signalisation at Highway 22 & East Park Place discussed further below.

Table 6.3: 2045 After Development – Modified Signalised Option with West Access

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Hwy 22 & Balsam Ave *(Signalised)*	EBL	1	0.72	B	17	64
	EBR	1	0.05	A	4	<5
	WB	1	0.02	A	7	<5
	NBL	1	0.42	B	16	18
	NBT	1	0.49	B	12	30
	NBR	1	0.02	A	2	<5
	SBL	1	0.02	A	9	<5
	SBT	1	0.44	B	11	27
	SBR	1	0.62	A	5	14
	Overall		-	*B*	*11*	-
Hwy 22 & White Ave *(EB Stop)*	**EBL**	**1**	**1.19**	**F**	**>120**	**72**
	EBR	1	0.33	B	12	11
	NBL	1	0.22	A	9	7
	NBT	1	0.17	A	0	<5
	SBT	1	0.14	A	0	<5
	SBRT	1	0.08	A	0	<5
	Overall		-	*C*	*21*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EBL/T	1	<0.02	A	1	<5
	EBR	1	0.13	A	1	<5
	WBL/T	1	0.03	A	1	<5
	WBR	1	<0.02	A	1	<5
	NBL/T	**1**	**0.70**	**F**	**65**	**51**
	NBR		**0.70**	**F**	**65**	**51**
	SB	1	0.26	E	36	6
	Overall		-	*A*	*6*	-
Burnside Dr & White Ave *(WB Stop)*	WBL	1	0.70	D	29	40
	WBR	1	0.07	A	9	<5
	NBT	1	0.05	A	0	<5
	NBR	1	0.14	A	0	<5
	SBL	1	0.14	A	1	<5
	SBT	1	0.14	A	2	<5
	Overall		-	*B*	*12*	-
Hwy 22 & E Park Pl *(EB Stop)*	**EB**	**1**	***0.99***	***F***	***121***	**59**
	NB	1	0.07	A	2	<5
	SB	1	0.42	A	0	<5
	Overall		-	*B*	*13*	-

Table 6.4: 2045 After Development – Modified Signalised Option with North Access

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Hwy 22 & Balsam Ave *(Signalised)*	EBL	1	0.62	B	15	48
	EBR	1	0.06	A	4	<5
	WB	1	0.02	A	7	<5
	NBL	1	0.40	B	14	18
	NBT	1	0.42	B	10	26
	NBR	1	0.06	A	4	<5
	SBL	1	0.02	A	9	<5
	SBT	1	0.41	B	10	25
	SBR	1	0.55	A	4	13
	Overall		-	*A*	*10*	-
Hwy 22 & White Ave *(EB Stop)*	EBL	1	>1.20	F	>120	84
	EBR	1	0.46	B	13	18
	NBL	1	0.27	A	9	9
	NBT	1	0.14	A	0	<5
	SBT	1	0.13	A	0	<5
	SBRT	1	0.08	A	0	<5
	Overall		-	*A*	*29*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EBL/T	1	<0.02	A	1	<5
	EBR	1	<0.02	A	0	<5
	WBL/T	1	0.03	A	1	<5
	WBR	1	<0.02	A	0	<5
	NBL/T	1	0.86	F	78	51
	NBR	1	0.86	F	78	51
	SB	1	0.21	D	29	6
	Overall		-	*B*	*10*	-
Burnside Dr & White Ave *(WB Stop)*	**WBL**	**1**	**1.05**	**F**	**103**	**89**
	WBR	1	0.13	A	10	<5
	NBT	1	0.05	A	0	<5
	NBR	1	0.14	A	0	<5
	SBL	1	0.22	A	2	7
	SBT	1	0.22	A	3	7
	Overall		-	*D*	*32*	-
Hwy 22 & E Park Pl *(EB Stop)*	**EB**	**1**	***1.09***	***F***	***160***	**67**
	NB	1	0.07	A	2	<5
	SB	1	0.47	A	0	<5
	Overall		-	*C*	*16*	-

The analysis of the Modified Signalised Option with West Access, and Modified Signalised Option with North Access indicated that some of the intersections and critical movements would be adequately accommodated. However, other intersections would remain fully saturated. Key areas of concern remained the trio turned quad of intersections at Highway 22, and the intersection at Highway 22 & East Park Place. As mentioned previously, mitigation measures that could be applied to that the Modified Signalised Option at Highway 22 fall beyond the scope of this report.

6.3 Combined Options with Mitigations Intersection Analysis

6.3.1 Roundabout Option Mitigations

Movements requiring improvements in addition to the Roundabout Option with a second point of access to West Bragg are the north/southbound movements at Burnside Drive & Balsam Avenue, and the eastbound movement at Highway 22 & East Park Place. Additional minor mitigation options to help improve pinch point operations were plied as noted below, and as referenced in previous analysis:

- **Burnside Drive & Balsam Avenue** - Limiting northbound movements to right turns only and eliminating the northbound left and through options (northbound right-only). This would force northbound left and through volumes to travel through the roundabout and minimize delays.
- **Highway 22 & East Park Place** - Signalisation at this intersection is warranted.

The results of the updated analysis with these mitigation considerations added are summarized below in **Table 6.5** and **Table 6.6**.

Table 6.5: 2045 After Development – Roundabout Option with West Access and Minor Mitigations

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Hwy 22 & Balsam Ave & White Ave & New Road *(Roundabout)*	NB	4	0.51	A	9	34
	WB	4	0.02	B	12	<5
	SB	4	0.59	A	4	46
	EB	4	0.58	A	4	31
	NEB	4	0.62	B	18	36
	Overall		-	*A*	*7*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	<0.02	A	1	<5
	NBR	1	0.06	B	14	<5
	SB	**1**	**0.33**	**F**	**51**	**10**
	Overall		-	*A*	*1*	-
Burnside Dr & White Ave *(WB Stop)*	EBL	1	0.02	A	1	<5
	EBT		0.02	A	1	<5
	WBT/R	1	0.20	A	0	<5
	SBL/R	1	0.13	B	12	<5
	Overall		-	*A*	*2*	-
Hwy 22 & E Park Pl *(Signalised)*	EB	1	0.43	B	18	23
	NB	1	0.64	B	10	91
	SB	1	0.57	A	8	71
	Overall	-	-	*B*	*10*	-

Table 6.6: 2045 After Development – Roundabout Option with North Access and Minor Mitigations

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Hwy 22 & Balsam Ave & White Ave & New Road *(Roundabout)*	NB	4	0.43	A	7	26
	WB	4	<0.02	B	12	<5
	SB	4	0.52	A	4	35
	EB	4	0.48	A	3	22
	NEB	4	0.57	B	16	30
	Overall		-	*A*	*6*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	<0.02	A	1	<5
	NBR	1	0.06	B	14	<5
	SB	1	0.32	E	48	10
	Overall		-	*A*	*2*	-
Burnside Dr & White Ave *(WB Stop)*	EBL	1	0.02	A	1	<5
	EBT		0.02	A	1	<5
	WBT/R	1	0.20	A	0	<5
	SBL/R	1	0.14	B	12	<5
	Overall		-	*A*	*2*	-
Hwy 22 & E Park Pl *(Signalised)*	EB	1	0.41	C	21	29
	NB	1	0.63	A	9	88
	SB	1	0.62	A	9	89
	Overall	-	-	*B*	*10*	-

The revised analysis of the Roundabout Option with West Access and with North Access with Minor Mitigations intersection analysis included, indicated that most study area intersections would be adequately accommodated given these scenarios, though of the two, the North Access option would provide superior results. The only exception in either case would be the delays for southbound traffic at Burnside Drive & Balsam Avenue. As mentioned previously, this may resolve itself organically as the small number of vehicles travelling southbound will likely divert to the intersection at Riverside Drive North & Balsam Avenue.

It can therefore be concluded that the combination of the Roundabout Option with minor mitigation options and a second point of access (preferably the North option) would result in generally acceptable overall 2045 After Development operating conditions.

6.3.2 Modified Signalised Option Mitigation

Analysis determined that in addition to the Signalised Option with a second access to West Bragg, mitigation measures are required by 2045. Pinch points were identified as the trio (turned quad) of intersections at Highway 22, and the intersection at Highway 22 & East Park Place. Signalisation at Highway 22 & East Park Place was noted earlier in this report to be warranted and will adequately accommodate forecast traffic flows at this intersection.

As mentioned previously, the Modified Signalised Option may be geometrically constrained, resulting in close proximity of the four intersections no matter how they are positioned. This means that only one of the four intersections can likely be signalised. Even with the addition of a second point of access to West Bragg, high traffic volumes remain at these intersections leading to high delays and queue lengths that exceed storage lengths. Changes to the design of these intersections cannot be easily applied and therefore fall outside of the scope of this study. It should be noted that this does not eliminate the Modified Signalised Option as a possible solution for improvements within the Hamlet of Bragg Creek. It simply notes that when compared, the Roundabout option combined with a second West Bragg access represents a more favourable solution in terms of overall traffic accommodation.

7. END STATE ANALYSIS SUMMARY

The analysis determined that the existing network geometry within the Hamlet of Bragg Creek would not adequately accommodate anticipated 2045 After Development Volumes. Analysis of the same horizon, but with improvements to the trio of intersections at Highway 22 concluded that the analyzed Roundabout or Modified Signalised Option in isolation would improve overall operating conditions, but that multiple movements would continue to operate at-capacity; and that of the two options available, the Roundabout option appeared to represent the most favourable outcome in terms of overall operating conditions, with inclusion of additional minor mitigation opportunities.

Analysis for the same horizon combining the existing road network with a second point of access to West Bragg concluded that the addition of a second access alone also would not address the 2045 traffic capacity constraints.

Combining the Roundabout option (with additional mitigation measures) and the provision of a second access to West Bragg was found to be the most effective in accommodating the majority of the 2045 After Development Volumes. It was also found that for all combined solutions, signalisation of Highway 22 at East Park Place would be warranted by 2045 and would resolve operating conditions at that location.

In summary, then, the overall End State conclusions arising from the assessment of the identified scenarios at the 2045 After Development Volumes confirmed the following:

- The implementation of the Roundabout Option (with the northbound right-only limitation at Burnside Drive & Balsam Avenue), plus signalization of Highway 22 at East Park Place would be expected to generally accommodate most traffic at most locations during peak periods.
- Adding either a North or West access to West Bragg to the Roundabout option further expands capacity and would be expected to provide a better level of traffic service with the general accommodation of volumes across the entire network.

As noted previously, the assessment of the combined solution options is not intended to provide specific recommendations and is instead intended to provide comparative representations of possible improvement considerations within the Hamlet.

8. STAGING ANALYSIS

The end-state 20-year (2045) analysis was completed prior to undertaking a 10-year (2035) analysis to simplify findings and determine appropriate end state goals for overall network improvements. The 2045 After Development analysis concluded that multiple end state solutions exist to accommodate the majority or all of the anticipated traffic conditions.

However, the timeline for these improvements needed to be identified to allow TEC and RVC to plan for implementation in an appropriate manner. The following sections therefore reviewed the 10-year (2035) capacity analysis to determine the proposed network improvements required by the 10-year (2035) horizon.

The findings of in this section were then complied to determine a two-phase plan, as follows:

- *Phase 1*: Refers to improvements required prior to 2035.
- *Phase 2*: Refers to improvements required prior to 2045. These improvements are not restricted to being implemented after Phase 1, though they are not required prior to 2035.

8.1 2035 Volumes

The 2035 Partial Development Volumes used in the following capacity analysis were developed using the same methodology as 2045 After Development Volumes.

The 2035 Horizon Background Volumes developed in **Section 2.2** were used. Additionally, it was assumed that the proposed known four-site developments would be partially completed but not fully built-out by 2035. To maintain a realistic yet conservative analysis, the 2035 partial development assessment assumed that in 2035, Site 3 would be fully built and that Sites 2, 4, and 5 would be 50% built out.

The resulting 2035 Partial Development Site Volumes are summarized in **Exhibit 8.1**. The 2035 Partial Development Volumes (2035 Horizon Background + 2035 Partial Development Site Volumes) used in analysis are summarized in **Exhibit 8.2**.

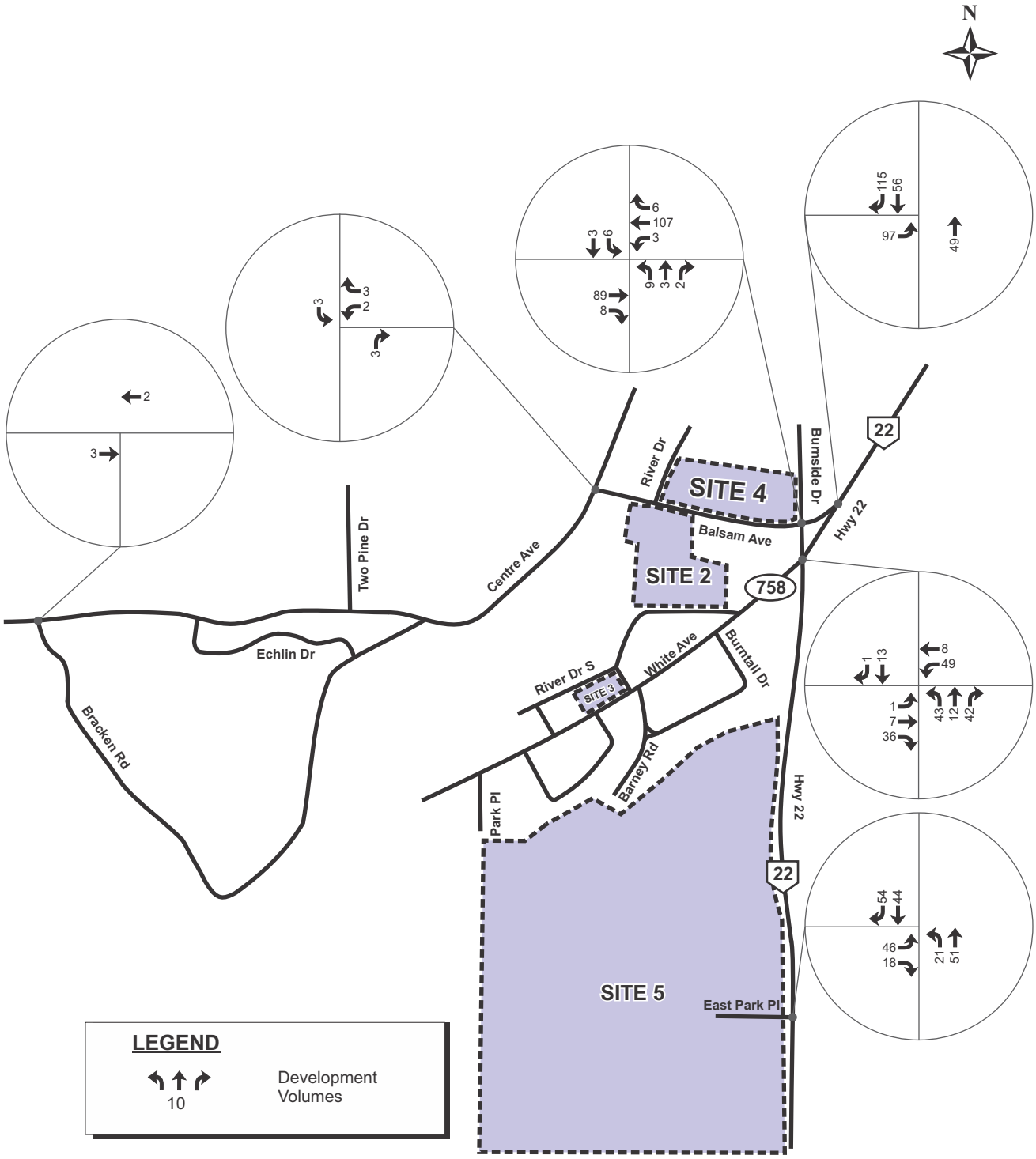


Exhibit 8.1

2035 Partial Development Site Volumes

Exhibit 8.2

2035 Partial Development Volumes

8.2 2035 Traffic Analysis – Existing Network

Synchro 11 traffic analysis software was again used to review intersection operational conditions of 2035 existing network conditions. The same Synchro 11 parameters outlined in **Section 3.1** were used to complete analysis. 2035 Partial Development Volumes were used in the analysis.

To maintain a conservative yet realistic approach in the analysis, a minimum of 5 vehicles per hour was again applied to each movement. Additionally, the minimum number of pedestrians at each crossing was set to 10 pedestrians per hour and the minimum number of cyclists was set to 5 cyclists per direction. Note that these adjustments are reflected in the Synchro tables and analysis but not in the base volume exhibits.

Synchro output reports are provided in **Appendix B** and are summarized in **Table 8.1.**

Table 8.1: 2035 Partial Development Conditions – Existing Geometry, Laning and Control

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Burnside Dr/ Hwy 22 & White Ave / Hwy 22 *(Signalised)*	EB	1	0.78	D	49	73
	WBL	1	0.87	E	58	106
	WBT	1	0.11	B	11	17
	NBT/L	1	0.92	E	66	110
	NBR	1	0.51	A	7	20
	SB	1	0.62	D	36	76
	Overall		-	*D*	*42*	-
Hwy 22 & Balsam Ave *(EB Stop)*	**EB**	**1**	**>1.20**	**F**	**379**	**223**
	NB	1	<0.02	A	1	<5
	SB	1	0.49	A	0	<5
	Overall		-	*F*	*99*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	0.02	A	1	<5
	NB	**1**	**>1.20**	**F**	**>120**	**99**
	SB	1	0.13	C	23	<5
	Overall		-	D		-
Hwy 22 & E Park Pl *(EB Stop)*	EB	1	0.38	D	29	13
	NB	1	0.04	A	1	<5
	SB	1	0.36	A	0	<5
	Overall		-	*A*	*3*	-
Centre Ave / Wintergreen Rd & Balsam Ave *(All-Way Stop)*	WB	1	0.40	B	11	-
	NB	1	0.36	A	10	-
	SB	1	0.16	A	9	-
	Overall		-	*B*	*10*	-
Centre Ave / W Bragg Creek Rd & Bracken Rd (West) *(WB Stop)*	WB	1	0.02	B	11	<5
	NB	1	0.17	A	0	<5
	SB	1	<0.02	A	1	<5
	Overall		-	*A*	*1*	-

The 2035 Partial Development analysis indicated that the trio of intersections at Highway 22 would be expected to operate at capacity by 2035 based on the current road configuration and controls. The intersections external to this area are expected to operate within acceptable capacity parameters. However, the intersection of Highway 22 at East Park Place should be signalised in tandem with the adjacent proposed development of Site 5.

Specific locations and issues of concern are as follows:

- **Highway 22 & Balsam Avenue** - Delays and queuing for eastbound traffic due to high number of vehicles turning left onto Highway 22.
- **Burnside Drive & Balsam Avenue** - Significant delays and queuing for northbound traffic. Northbound combined lane is expected to reach capacity due to the high volume of east/westbound vehicles.

Therefore, it can be concluded that the implementation of major improvements for the trio of Highway 22 intersections would be warranted prior to 2035, together with the signalization of the Highway 22/East Park Place intersection.

8.3 2035 Analysis – With Highway 22 Improvements

The 10-year, 2035, capacity analysis of the Roundabout Option and the Modified Signalised Option were undertaken to determine if implementation either option would address the capacity limitations expected at the 2035 horizon. No second access options were considered in this step of the analysis.

8.3.1 2035 Volumes

Volumes used in the analysis of the 2035 Roundabout Option in isolation, and the 2035 Modified Signalised Option in isolation were developed with the consideration of 10-year growth, partial development volumes, and changes in intersection geometry. The assumption was maintained that the implementation of either of these options will impact driver behaviour within the Hamlet of Bragg Creek including the proposed development properties. Therefore, re-distribution of traffic to account for these options was applied to 2035 Partial Development Volumes.

Re-distribution was applied to 2035 Partial Development Volumes using the same methodology and expected traffic diversion rates as in 2045 listed in **Section 4.1**. Traffic volumes used in the analysis of the 2035 Partial Development Roundabout Option in isolation are displayed in **Exhibit 8.3** and of the 2035 Partial Development Modified Signalised Option in isolation are displayed in **Exhibit 8.4**.

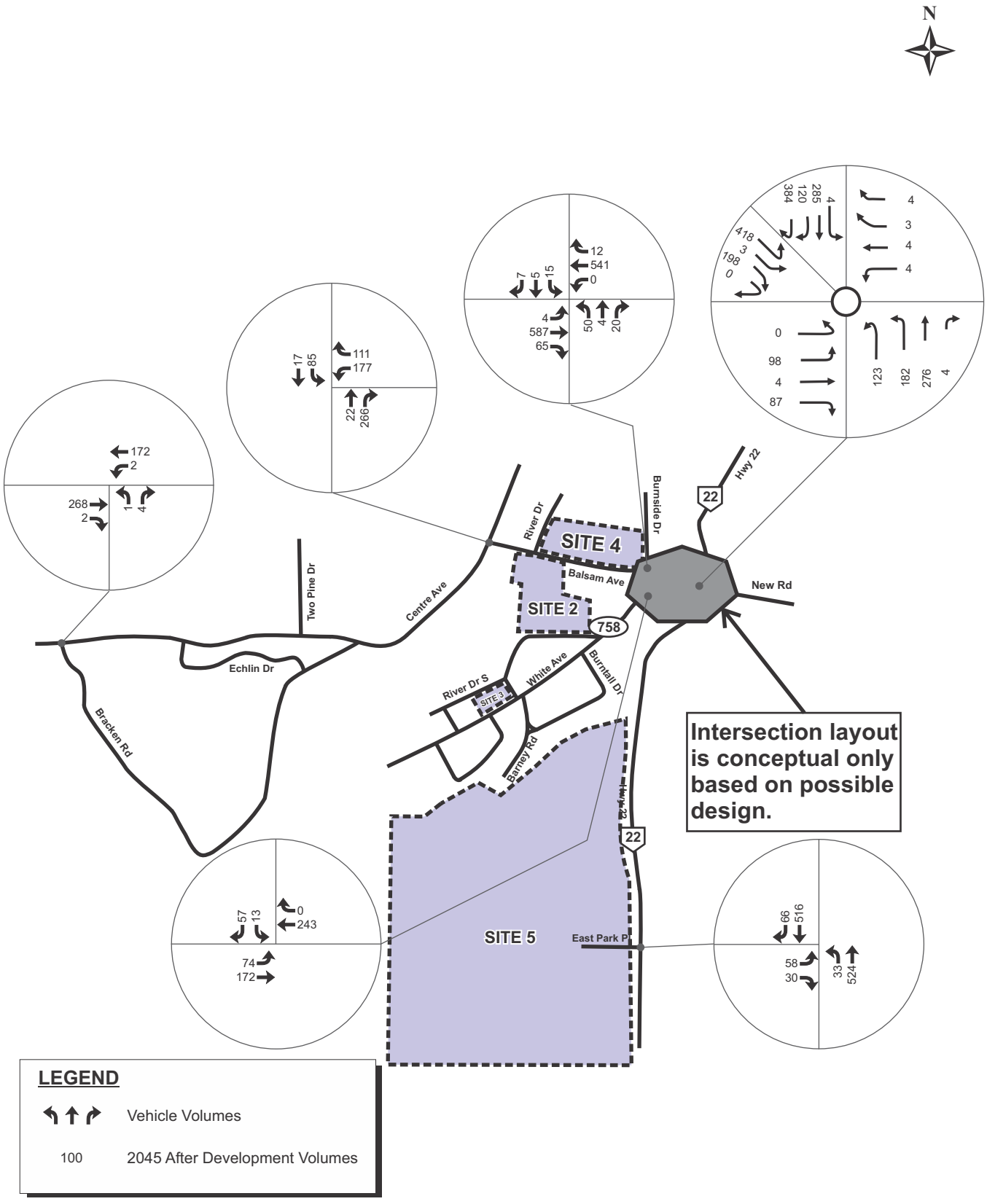


Exhibit 8.3

2035 Partial Development Volumes - Roundabout Option in Isolation

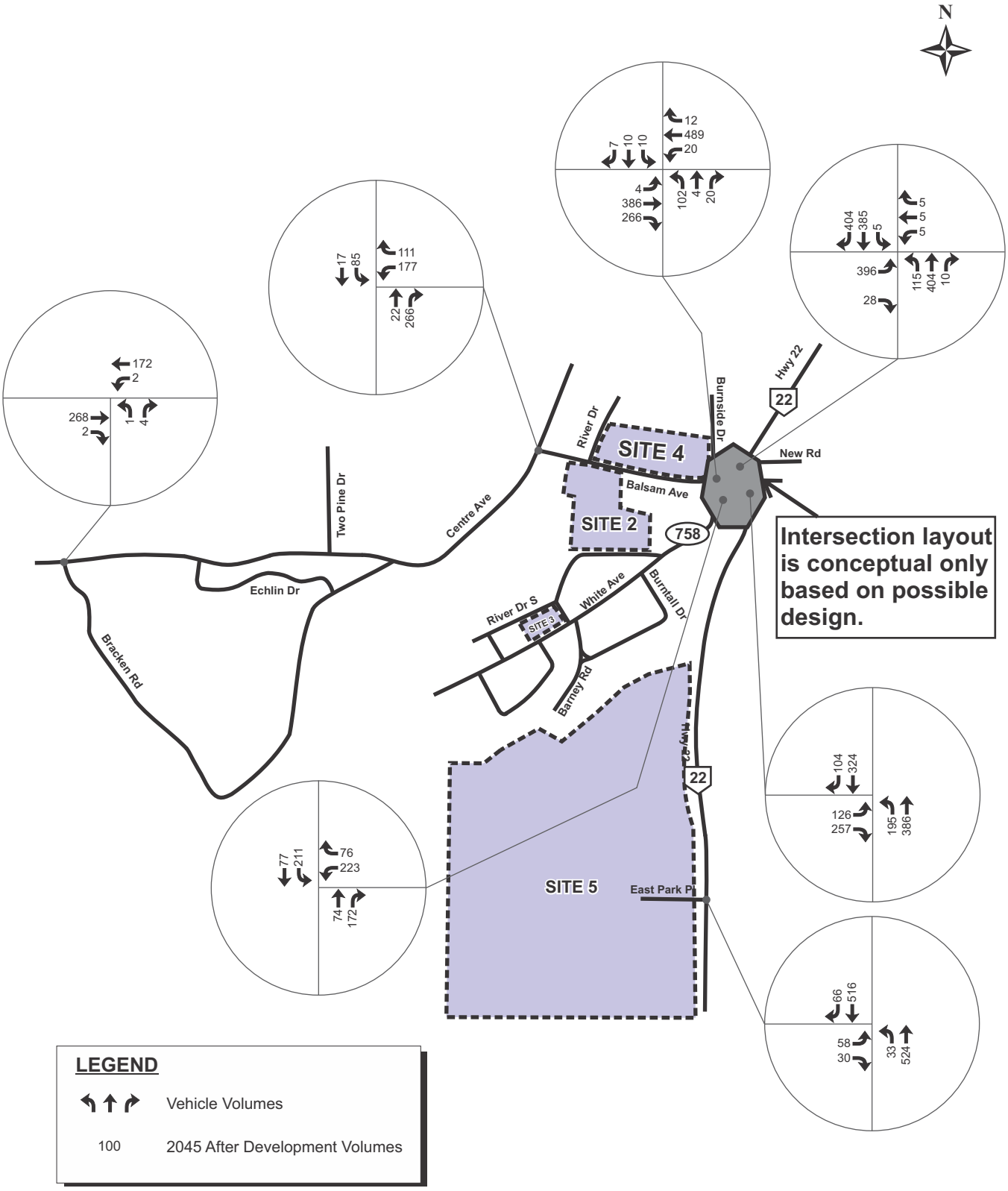


Exhibit 8.4

2035 Partial Development Volumes - Signalised Option in Isolation

8.3.2 2035 Analysis with Highway 22 Intersection Improvements

Synchro 11 traffic analysis software was used to review intersection operational conditions of all non-roundabout intersections. The same Synchro 11 parameters used throughout this report and outlined in **Section 3.1** were used to complete analysis.

SIDRA 9.0 traffic analysis software was used to review roundabout intersection operational conditions. The same SIDRA 9.0 parameters used throughout this report and outlined in **Section 4.2** were used to complete analysis.

To maintain a conservative yet realistic approach in the analysis, a minimum of 5 vehicles per hour was applied to each movement. Additionally, the minimum number of pedestrians at each crossing was set to 10 pedestrians per hour and the minimum number of cyclists was set to 5 cyclists per direction. Note that these adjustments are reflected in the Synchro tables and analysis but not in the base volume exhibits.

The 2035 Partial Development Roundabout Option and Modified Signalised Option in Isolation Volumes were used in intersection analysis. Synchro output reports and SIDRA Output Reports are provided in **Appendix B** and summarized in **Table 8.2** and **Table 8.3.**

Table 8.2: 2035 Partial Development - Roundabout Option in Isolation

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Hwy 22 & Balsam Ave & White Ave & New Road *(Roundabout)*	NB	4	0.31	A	6	17
	WB	4	<0.02	B	11	<5
	SB	4	0.41	A	2	24
	EB	4	0.43	A	2	18
	NEB	4	0.31	B	11	12
	Overall		-	*A*	*4*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	<0.02	A	1	<5
	NB	1	0.46	E	43	16
	SB	1	0.18	D	31	<5
	Overall		-	*A*	*3*	-
Burnside Dr & White Ave *(WB Stop)*	EBL	1	0.06	A	1	<5
	EBT	1	0.06	A	3	<5
	WBT/R	1	0.15	A	0	<5
	SBL/R	1	0.11	B	11	<5
	Overall		-	*A*	*3*	-
Hwy 22 & E Park Pl *(EB Stop)*	EB	1	0.38	D	29	9
	NB	1	0.04	A	1	<5
	SB	1	0.36	A	0	<5
	Overall		-	*A*	*3*	-
Centre Ave / Wintergreen Rd & Balsam Ave *(All-Way Stop)*	WB	1	0.27	A	10	-
	NB	1	0.34	A	9	-
	SB	1	0.15	A	9	-
	Overall		-	*A*	*9*	-
Centre Ave / W Bragg Creek Rd & Bracken Rd (West) *(WB Stop)*	WB	1	0.02	B	11	<5
	NB	1	0.17	A	0	<5
	SB	1	<0.02	A	1	<5
	Overall		-	*A*	*1*	-

Table 8.3: 2035 Partial Development – Modified Signalised Option in Isolation

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Hwy 22 & Balsam Ave *(Signalised)*	EBL	1	0.62	B	14	46
	EBR	1	0.05	A	4	<5
	WB	1	0.02	A	6	<5
	NBL	1	0.37	B	14	17
	NBT	1	0.35	B	10	21
	NBR	1	0.02	A	2	<5
	SBL	1	0.02	A	9	<5
	SBT	1	0.34	A	10	20
	SBR	1	0.53	A	4	13
	Overall		-	*A*	*10*	-
Hwy 22 & White Ave *(EB Stop)*	EBL	1	0.62	E	46	28
	EBR	1	0.32	B	11	11
	NBL	1	0.17	A	9	<5
	NBT	1	0.12	A	0	<5
	SBT	1	0.10	A	0	<5
	SBRT	1	0.06	A	0	<5
	Overall		-	*A*	*8*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EBL/T	1	0.02	A	1	<5
	EBR	1	<0.02	A	0	<5
	WBL/T	1	0.07	A	1	<5
	WBR	1	<0.02	A	0	<5
	NBL/T	1	0.56	E	38	23
	NBR		0.56	E	38	23
	SB	1	0.14	C	24	<5
	Overall		-	*A*	*4*	-
Burnside Dr & White Ave *(WB Stop)*	WBL	1	0.62	D	29	30
	WBR	1	0.08	A	9	<5
	NBT	1	0.05	A	0	<5
	NBR	1	0.11	A	0	<5
	SBL	1	0.17	A	1	<5
	SBT	1	0.17	A	3	<5
	Overall		-	*B*	*11*	-
Hwy 22 & E Park Pl *(EB Stop)*	EB	1	0.41	D	32	14
	NB	1	0.04	A	1	<5
	SB	1	0.21	A	0	<5
	Overall		-	*A*	*3*	-
Centre Ave / Wintergreen Rd & Balsam Ave *(All-Way Stop)*	WB	1	0.40	B	11	-
	NB	1	0.36	A	10	-
	SB	1	0.16	A	9	-
	Overall		-	*B*	*10*	-
Centre Ave / W Bragg Creek Rd & Bracken Rd (West) *(WB Stop)*	WB	1	0.02	B	11	<5
	NB	1	0.17	A	0	<5
	SB	1	<0.02	A	1	<5
	Overall			*A*	*1*	-

The findings from 2035 Partial Development Roundabout Option and Modified Signalised Option intersection analysis confirmed that most of the intersections and critical movements within the study area would be adequately accommodated by the implementation of either option.

It should be noted that the previous 2045 analysis determined that the Modified Signalised Option would not be expected to adequately accommodate capacity by 2045 without redesigning the Highway 22 intersections. This is still the case, even with the addition of a second access to West Bragg. Therefore, if a Modified Signalised Option is selected to be implemented by 2035 it may need to serve as an interim solution rather than a long-term solution.

8.4 2035 with Secondary Access Conditions

8.4.1 2035 Secondary Access Volumes

The 2035 Partial Development Volumes used in the following capacity analysis were developed using the same methodology as 2045 After Development Volumes.

Volumes used in the analysis of the 2035 West Access in isolation, and 2035 North Access in isolation conditions were developed with the consideration of 10-year growth, partial development volumes, and the implementation of a second access to West Bragg. The assumption remained that the implementation of a second river crossing will minimally impact proposed development traffic volumes (2035 Partial Development Site Volumes) because the location of the secondary accesses are external to the Hamlet Core. Therefore, re-distribution of traffic was applied only to 2035 Horizon Background Traffic Volumes with 2035 Partial Site Development Volumes added after the re-distribution was complete.

The 2035 Horizon Background Traffic Volumes were completed in **Section 2.2**. Re-distribution was applied to 2035 Horizon Background Volumes using the same methodology and expected traffic diversion rates as in 2045 listed in **Section 5.1**. The 2035 Partial Development Site Volumes were then added to re-distributed 2035 Volumes for both the West Access and North Access options.

Traffic volumes used in the analysis of the 2035 West Access option in isolation are displayed in **Exhibit 8.5** and of the 2035 North Access option in isolation are displayed in **Exhibit 8.6**.

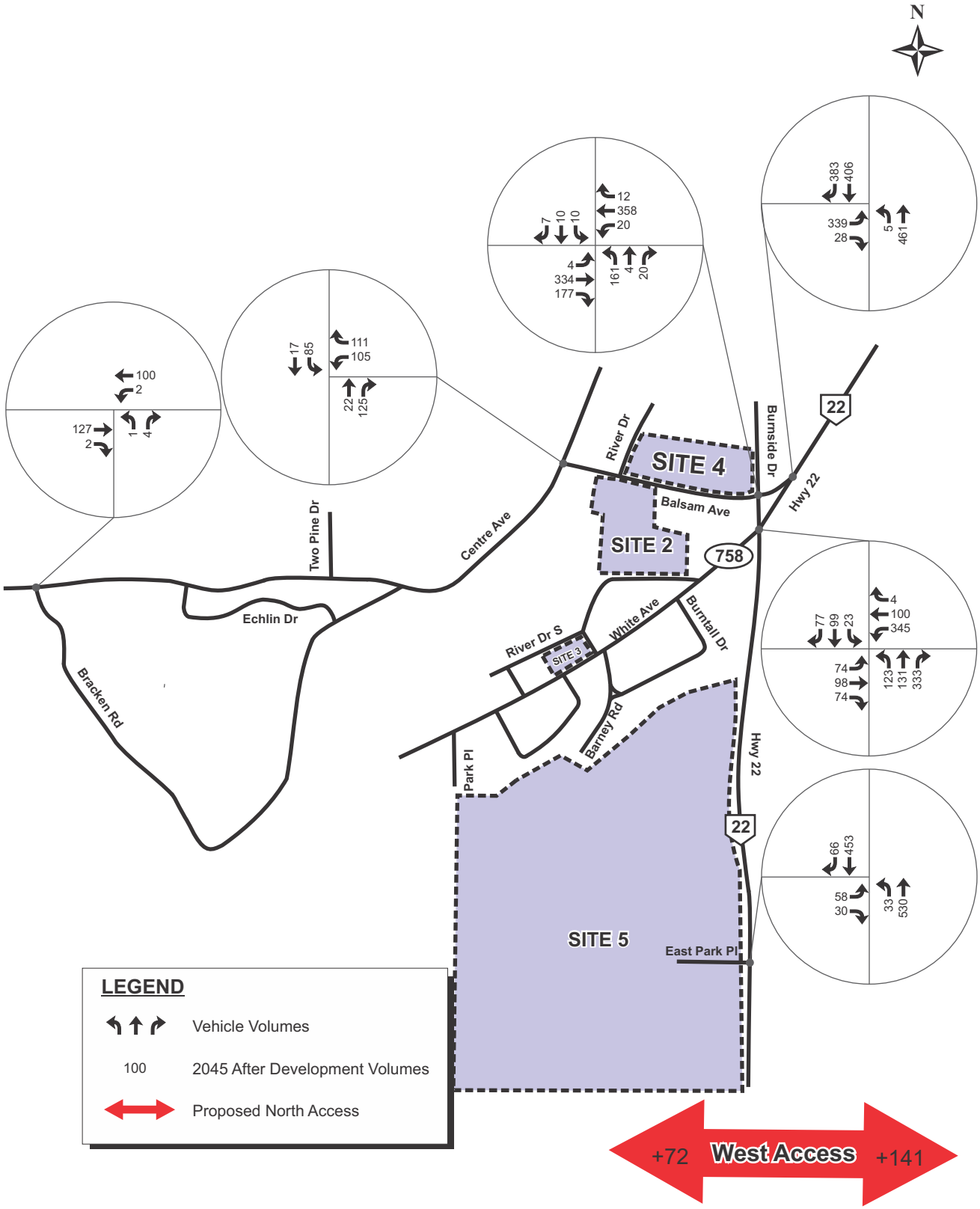


Exhibit 8.5

2035 Partial Development Volumes - West Access in Isolation

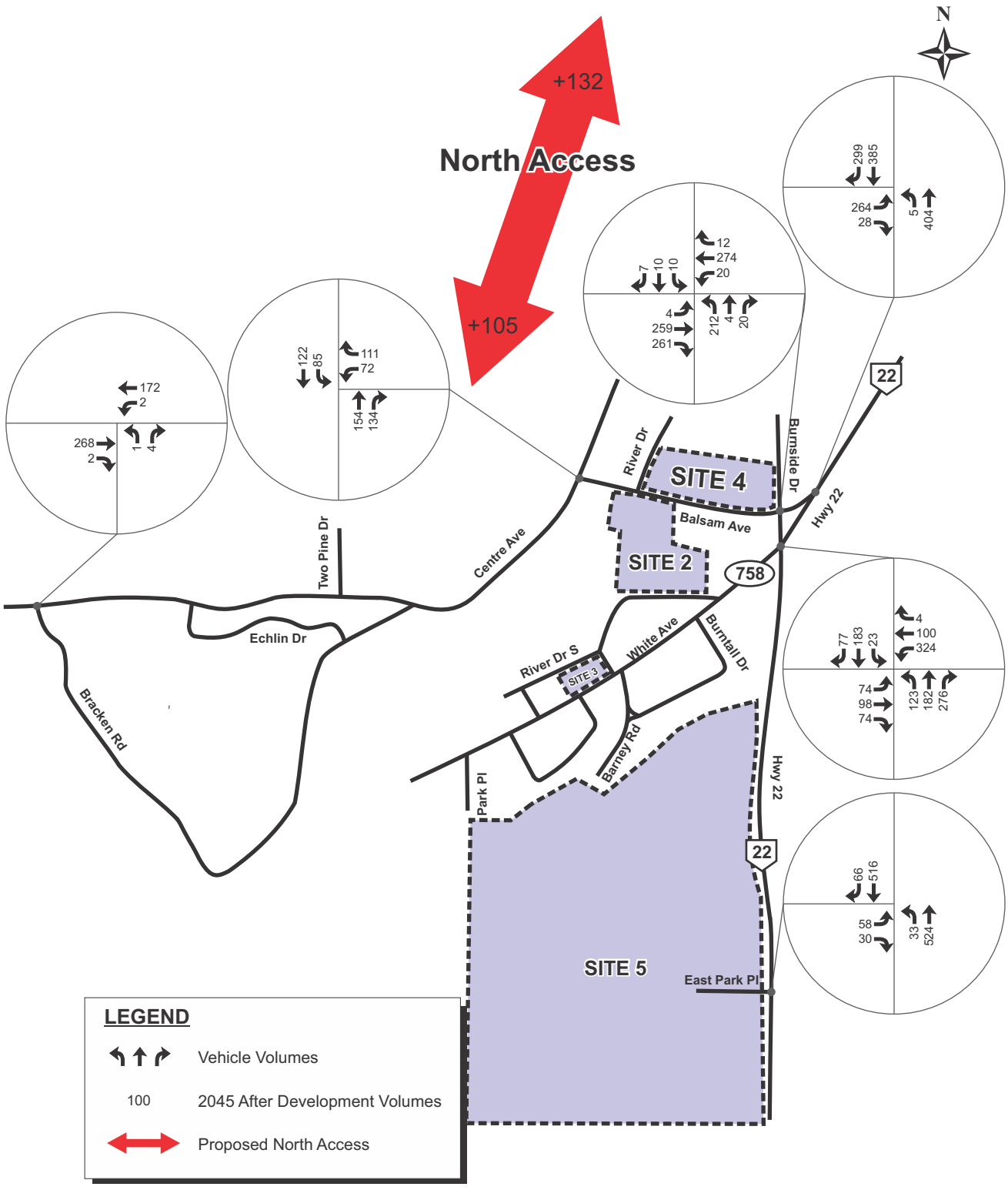


Exhibit 8.6

2035 Partial Development Volumes - North Access in Isolation

8.4.2 2035 Secondary Access Analysis

Synchro 11 traffic analysis software was again used to review intersection operational conditions with the addition of a second access to West Bragg. The same Synchro 11 parameters used throughout this report and outlined in **Section 3.1** were used to complete analysis.

To maintain a conservative yet realistic approach in the analysis, a minimum of 5 vehicles per hour was again applied to each movement. Additionally, the minimum number of pedestrians at each crossing was set to 10 pedestrians per hour and the minimum number of cyclists was set to 5 cyclists per direction. Note that these adjustments are reflected in the Synchro tables and analysis but not in the base volume exhibits.

Synchro output reports are provided in **Appendix B**. and are summarized in **Table 8.5** and **Table 8.6**.

Table 8.4: 2035 Partial Development Intersection Analysis – West Access in Isolation

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Burnside Dr/ Hwy 22 & White Ave / Hwy 22 *(Signalised)*	EB	1	0.73	D	46	78
	WBL	1	0.78	D	45	105
	WBT	1	0.10	A	8	14
	NBT/L	1	0.88	E	69	126
	NBR	1	0.52	A	6	20
	SB	1	0.57	D	43	80
	Overall		-	*D*	*38*	-
Hwy 22 & Balsam Ave *(EB Stop)*	**EB**	**1**	**>1.2**	**F**	**>120**	**188**
	NB	1	<0.02	A	1	<5
	SB	1	0.49	A	0	<5
	Overall		-	*F*	*78*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	0.02	A	1	<5
	NB	**1**	**0.77**	**F**	**55**	**43**
	SB	1	0.11	C	20	<5
	Overall		-	*A*	*10*	-
Hwy 22 & E Park Pl *(EB Stop)*	EB	1	0.35	D	26	11
	NB	1	0.03	A	1	<5
	SB	1	0.32	A	0	<5
	Overall		-	*A*	*2*	-
Centre Ave / Wintergreen Rd & Balsam Ave *(All-Way Stop)*	WB	1	0.27	A	9	-
	NB	1	0.18	A	8	-
	SB	1	0.14	A	9	-
	Overall		-	*A*	*9*	-
Centre Ave / W Bragg Creek Rd & Bracken Rd (West) *(WB Stop)*	WB	1	<0.02	A	10	<5
	NB	1	0.08	A	0	<5
	SB	1	<0.02	A	1	<5
	Overall		-	*A*	*1*	-

Table 8.5: 2035 Partial Development – North Access in Isolation

INTERSECTION	MOVEMENT & LANES		DESIGN HOUR			
			v/c	LOS	Delay	Queue
Burnside Dr/ Hwy 22 & White Ave / Hwy 22 *(Signalised)*	EB	1	0.73	D	45	76
	WBL	1	0.76	D	44	97
	WBT	1	0.10	A	8	14
	NBT/L	**1**	**1.18**	**F**	**>120**	**160**
	NBR	1	0.47	A	6	19
	SB	1	0.88	E	64	132
	Overall		-	*E*	*60*	
Hwy 22 & Balsam Ave *(EB Stop)*	**EB**	**1**	**1.09**	**F**	**119**	**94**
	NB	1	<0.02	A	1	<5
	SB	1	0.42	A	0	<5
	Overall		-	*D*	*25*	-
Burnside Dr & Balsam Ave *(NB and SB Stop)*	EB	1	<0.02	A	1	<5
	WB	1	0.02	A	1	<5
	NB	**1**	**0.83**	**F**	**55**	**53**
	SB	1	0.09	C	17	<5
	Overall		-	B	13	-
Hwy 22 & E Park Pl *(EB Stop)*	EB	1	0.38	D	29	13
	NB	1	0.04	A	1	<5
	SB	1	0.36	A	0	<5
	Overall		-	*A*	*3*	*0*
Centre Ave / Wintergreen Rd & Balsam Ave *(All-Way Stop)*	WB	1	0.26	A	10	-
	NB	1	0.37	B	10	-
	SB	1	0.29	A	10	-
	Overall		-	*A*	*10*	-
Centre Ave / W Bragg Creek Rd & Bracken Rd (West) *(WB Stop)*	WB	1	0.02	B	11	<5
	NB	1	0.17	A	0	<5
	SB	1	<0.02	A	1	<5
	Overall		-	*A*	*1*	-

The analysis indicated that the provision of a second point of access alone would not adequately accommodate 2035 Volumes. Unsurprisingly, the primary area of concern remains the trio of intersections at Highway 22. As was established for 2045 conditions, there are no mitigation measures that are expected to adequately accommodate anticipated 2035 capacity without full redesign of the trio of intersections at Highway 22.

This makes clear the conclusion that provision of a second point of access alone will not adequately resolve the anticipated traffic congestion issues in and of itself. Improvements to the trio of intersections at Highway 22 will therefore be required even with the inclusion of a second point of access to the West Bragg area by 2035.

8.5 Phasing Recommendations

The results of analysis determined that improvements to the intersections at Highway 22 should be implemented by 2035 for the adequate operation of the network at that horizon. Additionally, it was

found that a second point of access to West Bragg alone will not adequately resolve the function of the network by 2035. The key improvements are the upgrades to the trio of Highway 22 intersections based on the Roundabout option, and the signalization of the Highway 22/East Park Place intersection.

Each improvement option was analyzed individually under 2035 partial development conditions. The results of analysis determined the following:

- Signalisation at Highway 22 & East Park Place is not warranted based on 2035 Partial Development conditions but is warranted for 2045 After Development conditions. However, volumes at this intersection will be increased significantly with the addition of the adjacent proposed development, Site 5. Therefore, it is recommended that this intersection be monitored and that signalisation be implemented in tandem with Site 5 rather than being assigned to Phase 1 or 2.
- The implementation of either the Roundabout Option or Modified Signalised Option to provide improvements to the trio of intersections at Highway 22 will address network capacity thresholds through to 2035. However, the Modified Signalised Option will be less effective in managing 2045 conditions than the roundabout option.
- The implementation of a second access to West Bragg alone will not be sufficient to offset network congestion through to 2035. The improvements to the intersections at Highway 22 are required to be in place at that time.

A summary of the specific improvements and their allocation to Phase 1 or Phase 2 are summarized in **Table 8.6**.

Table 8.6: Summary of Phasing Recommendations

IMPROVEMENT	PHASE	OPTION	COMMENTS
Improvements to Intersections at Highway 22	Phase 1	Roundabout Option	Roundabout Option would have the greatest positive impact on the forecast volumes at the Highway 22/Burnside/Balsam intersections. Northbound right-only limitation at Burnside Drive & Balsam Avenue to be implemented in tandem with roundabout.
		Signalised Option	Signalised Option would have positive impact on the forecast volumes at the Highway 22/Burnside/Balsam intersection. However, capacity would not be met after Phase 1 even with the provision of second access to West Brag.
Second Access to West Bragg	Phase 2	West Access	The West Access would provide a better level of traffic service across the entire network. A West Access cannot be implemented in isolation and must be implemented in combination with improvements to the intersections at Highway 22.
		North Access	The North Access would have the greatest impact on the level of traffic service across the entire network compared to the West Access. A North Access cannot be implemented in isolation and must be implemented in combination with improvements to the intersections at Highway 22.
		No Access	Based on capacity analysis alone it is possible to not add a second access to West Bragg. This assumes intersection improvements to Highway 22 are implemented in Phase 1.
Signal Warrant	Phase 2*	Signalisation at Highway 22 & East Park Place	Signalization warranted upon the completion of Development Site 5.

*Falls withing Phase 2 timeline, but it is recommended to be implemented in tandem with Proposed Development Site 5

It is also recommended that all decisions made related to the selection of improvements be undertaken with due consideration of non-traffic factors such as community connectivity, active transportation accommodation, and emergency access.

9. CONCLUSIONS

Workpaper 2 included consideration of additional data collection via summer peak period traffic counts, estimation of future horizon volumes, analysis of the traffic network under various horizons and improvement conditions, and development of a potential improvement phasing plan. The following

conclusions have been made regarding the future conditions of the transportation network within the Hamlet of Bragg Creek:

- The Summer Weekend period represents the general busiest time of the week and year and should be used as a basis for planning and design. The analysis in this report reflected that condition.
- Observations made by Bunt during site visits and data review for this study identified safety and operational concerns at the Highway 22/Burnside Drive & Highway 22/White Avenue intersections. These improvements do not relate directly to this study; however, it is recommended that TEC and RVC review these conditions and consider the possible short-term minor adjustments to the intersection hardware if possible.
- The analysis of 2045 After Development Volumes assuming the retention of the existing base road network confirmed full saturation of the network and the necessity for improvements. Key pinch points were confirmed to be the trio of intersections at Highway 22/Balsam Avenue/Burnside Drive, and the intersection of Highway 22 at East Park Place.
- Improvements at the trio of intersections at Highway 22 are unquestionably required to accommodate 2035 volumes as well as 2045 volumes. While both a Roundabout and a Modified Signalised intersection were found to support volumes at the 2035 horizon, neither were able to do so for 2045. However, with the inclusion of minor mitigation improvements, the Roundabout option would be expected to accommodate the majority of the 2045 traffic volumes.
- The provision of a second access to West Bragg would not in and of itself provide sufficient improvement to the overall network at 2035 or 2045.
- Combining the Roundabout option (with additional mitigation options) plus the provision of a second access to West Bragg would improve overall conditions and allow the network to essentially operate within acceptable capacity thresholds. This is more workable with the North access option than with the West access option.
- It was determined that signalisation is warranted at the Highway 22/East Park Place intersection by 2045 and would resolve capacity failure. Although not expected to be warranted by 2035, it is recommended that it be monitored and potentially implemented in tandem with the development of Site 5.
- It is recommended that design options and phasing be considered based on both the technical findings listed above, but also based on external factors such as community connectivity, active transportation, and emergency access.

APPENDIX A

Traffic Data

Intersection Turning Movement Count Summary — Burnside Drive & Balsam Avenue

N/S Road: Burnside Drive
E/W Road: Balsam Avenue
Count Date: August 23, 2025 Saturday
Weather: Sunny
Road Condition: Clear
Project #: 02-24-0168

Peak Hour: 1:45 PM to 2:45 PM **Peak Hour Factor:** 0.83

Time Starting	Burnside Drive Northbound (South Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Burnside Drive Southbound (North Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Balsam Avenue Westbound (East Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Balsam Avenue Eastbound (West Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Total Vehicle 5 Min	Total Vehicle Hourly	Pedestrians West Side	Pedestrians East Side	Pedestrians North Side	Pedestrians South Side	Cyclists NB	Cyclists SB	Cyclists WB	Cyclists EB
10:00	29	0	0	0	6	0	0	0	1	0	1	0	2	0	53	3	1	0	0	0	12	0	32	0	140		0	0	0	0	0	0	5	0
10:15	34	0	0	0	3	0	0	0	0	0	0	0	0	0	49	1	1	0	0	0	26	0	26	0	140		0	0	0	0	0	0	9	2
10:30	18	0	1	0	5	0	1	0	0	0	0	0	6	0	40	0	0	0	0	0	20	0	29	0	120		0	0	0	0	3	0	2	1
10:45	43	0	1	0	4	0	1	0	1	0	2	0	3	0	39	0	0	0	3	0	23	2	28	0	150	550	0	0	0	0	2	1	3	4
11:00	28	0	0	0	5	0	0	0	0	0	0	0	4	0	55	0	1	0	1	0	34	1	30	1	160	570	0	0	0	0	0	1	2	11
11:15	37	0	2	0	3	0	0	0	0	0	1	0	3	0	56	0	0	0	1	0	27	1	35	0	166	596	0	0	0	0	2	1	0	1
11:30	32	0	0	0	1	0	1	0	1	0	0	0	4	0	46	0	2	0	1	0	39	0	26	0	153	629	0	0	0	0	0	0	1	1
11:45	33	0	1	0	2	0	0	0	0	0	3	0	3	0	52	0	2	0	1	0	39	0	25	0	161	640	0	0	3	0	0	0	0	2
12:00	42	0	0	0	3	0	0	0	0	0	0	0	3	0	60	1	1	0	0	0	35	0	23	0	168	648	0	0	0	0	0	0	0	0
12:15	48	0	0	0	7	0	0	0	1	0	0	0	1	0	38	1	0	0	1	0	52	0	41	0	190	672	3	0	0	0	0	0	2	0
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13:00	39	0	0	0	3	0	0	0	1	0	3	0	1	0	44	0	2	0	1	0	50	0	49	0	193	778	0	0	0	0	2	0	7	0
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13:45	39	0	0	0	3	0	1	0	1	0	2	0	6	0	54	0	2	0	1	0	68	0	49	1	227	809	0	0	0	0	0	0	0	0
14:00	47	1	0	0	4	0	0	0	0	0	1	0	2	0	49	0	1	0	0	0	53	0	48	0	206	822	0	0	0	0	1	0	0	3
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14:30	30	0	0	0	4	0	1	0	3	0	1	0	3	0	50	0	1	0	1	0	60	0	50	1	205	912	0	0	2	0	0	0	2	0
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15:00	29	1	2	0	3	0	2	0	1	0	0	0	1	0	41	0	1	0	0	0	76	1	41	1	200	901	0	0	0	0	1	0	0	0
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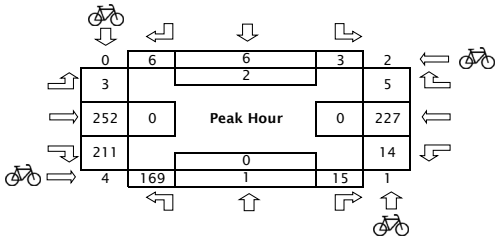
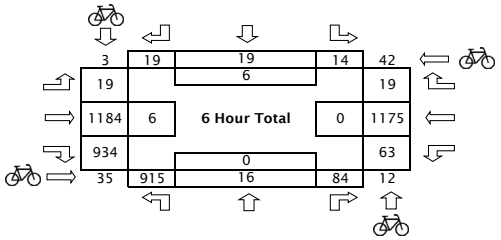
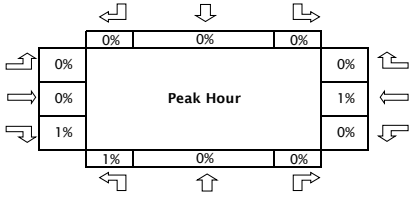
6 Hour Total	**909**	**6**	**15**	**1**	**83**	**1**	**14**	**0**	**18**	**1**	**19**	**0**	**63**	**0**	**1161**	**14**	**19**	**0**	**19**	**0**	**1172**	**12**	**929**	**5**			**6**	**0**	**6**	**0**	**12**	**3**	**42**	**35**
	915		**16**		**84**		**14**		**19**		**19**		**63**		**1175**		**19**		**19**		**1184**		**934**		**4461**									
Peak Hour Total	**168**	**1**	**1**	**0**	**15**	**0**	**3**	**0**	**6**	**0**	**6**	**0**	**14**	**0**	**224**	**3**	**5**	**0**	**3**	**0**	**252**	**0**	**208**	**3**			**0**	**0**	**2**	**0**	**1**	**0**	**2**	**4**
	169		**1**		**15**		**3**		**6**		**6**		**14**		**227**		**5**		**3**		**252**		**211**			**912**								

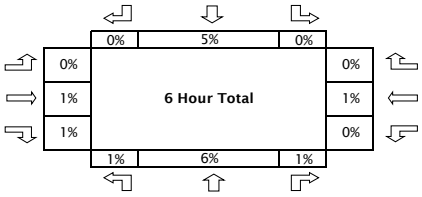
Volume Summaries





Heavy Vehicle Percentage





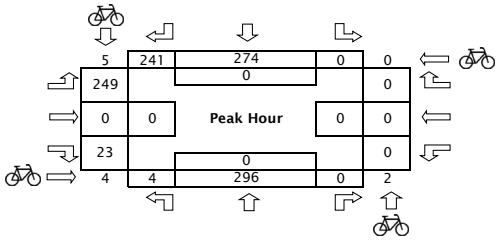
Intersection Turning Movement Count Summary — Cowboy Trail & Balsam Avenue

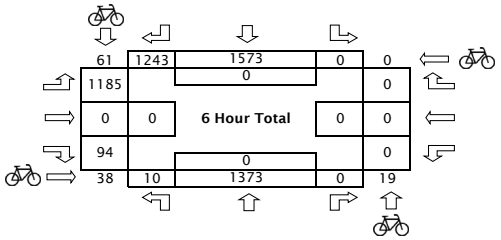
N/S Road: Cowboy Trail
E/W Road: Balsam Avenue
Count Date: August 23, 2025 Saturday
Weather: Sunny
Road Condition: Clear
Project #: 02-24-0168

Peak Hour: 1:45 PM to 2:45 PM **Peak Hour Factor:** 0.97

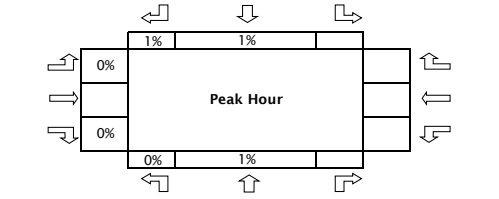
Time Starting	Cowboy Trail Northbound (South Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Cowboy Trail Southbound (North Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Balsam Avenue Westbound (East Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Eastbound (West Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Total Vehicle 5 Min	Total Vehicle Hourly	Pedestrians West Side	Pedestrians East Side	Pedestrians North Side	Pedestrians South Side	Cyclists NB	Cyclists SB	Cyclists WB	Cyclists EB
10:00	0	0	26	0	0	0	0	0	69	0	55	3	0	0	0	0	0	0	21	0	0	0	0	0	174		0	0	0	0	0	7	0	0
10:15	0	0	43	1	0	0	0	0	71	1	48	1	0	0	0	0	0	0	24	0	0	0	3	0	192		0	0	0	0	0	11	0	1
10:30	0	0	32	0	0	0	0	0	64	0	46	0	0	0	0	0	0	0	23	0	0	0	4	0	169		0	0	0	0	0	2	0	4
10:45	0	0	20	1	0	0	0	0	72	2	42	0	0	0	0	0	0	0	26	2	0	0	2	0	167	702	0	0	0	0	0	4	0	6
11:00	0	0	35	0	0	0	0	0	65	0	59	0	0	0	0	0	0	0	33	1	0	0	5	0	198	726	0	0	0	0	2	2	0	11
11:15	0	0	30	1	0	0	0	0	80	0	60	0	0	0	0	0	0	0	33	1	0	0	0	0	205	739	0	0	0	0	0	6	0	2
11:30	0	0	45	0	0	0	0	0	72	0	51	0	0	0	0	0	0	0	36	0	0	0	1	0	205	775	0	0	0	0	0	1	0	1
11:45	0	0	41	0	0	0	0	0	66	0	56	0	0	0	0	0	0	0	43	0	0	0	2	0	208	816	0	0	0	0	4	1	0	2
12:00	0	0	58	0	0	0	0	0	68	0	64	1	0	0	0	0	0	0	33	0	0	0	3	0	227	845	0	0	0	0	0	0	0	0
12:15	0	0	63	1	0	0	0	0	71	0	39	1	0	0	0	0	0	0	48	0	0	0	4	0	227	867	0	0	0	0	0	3	0	0
12:30	0	0	51	0	0	0	0	0	65	1	46	2	0	0	0	0	0	0	63	0	0	0	3	0	231	893	0	0	0	0	0	1	0	1
12:45	1	0	60	0	0	0	0	0	62	0	62	1	0	0	0	0	0	0	46	0	0	0	6	0	238	923	0	0	0	0	0	4	0	0
13:00	1	0	53	1	0	0	0	0	58	0	46	0	0	0	0	0	0	0	48	0	0	0	5	0	212	908	0	0	0	0	2	7	0	0
13:15	1	0	56	1	0	0	0	0	69	1	40	0	0	0	0	0	0	0	57	3	0	0	1	1	230	911	0	0	0	0	2	2	0	3
13:30	1	0	73	0	0	0	0	0	69	2	46	0	0	0	0	0	0	0	48	0	0	0	6	0	245	925	0	0	0	0	0	1	0	1
13:45	1	0	58	0	0	0	0	0	76	1	62	0	0	0	0	0	0	0	64	0	0	0	8	0	270	957	0	0	0	0	1	0	0	0
14:00	2	0	81	1	0	0	0	0	86	1	49	0	0	0	0	0	0	0	52	0	0	0	5	0	277	1022	0	0	0	0	0	2	0	3
14:15	1	0	73	1	0	0	0	0	52	0	73	3	0	0	0	0	0	0	73	0	0	0	4	0	280	1072	0	0	0	0	1	0	0	1
14:30	0	0	82	0	0	0	0	0	58	0	54	0	0	0	0	0	0	0	60	0	0	0	6	0	260	1087	0	0	0	0	0	3	0	0
14:45	0	0	75	1	0	0	0	0	55	0	48	1	0	0	0	0	0	0	73	0	0	0	3	0	256	1073	0	0	0	0	2	2	0	0
15:00	1	0	82	1	0	0	0	0	59	0	43	0	0	0	0	0	0	0	74	1	0	0	9	0	270	1066	0	0	0	0	2	0	0	0
15:15	0	0	78	1	0	0	0	0	54	0	38	0	0	0	0	0	0	0	76	1	0	0	7	0	255	1041	0	0	0	0	0	1	0	1
15:30	0	0	68	0	0	0	0	0	60	0	57	1	0	0	0	0	0	0	52	2	0	0	3	1	244	1025	0	0	0	0	2	0	0	0
15:45	1	0	79	0	0	0	0	0	43	0	45	0	0	0	0	0	0	0	68	0	0	0	2	0	238	1007	0	0	0	0	1	1	0	1
6 Hour Total	**10**	**0**	**1362**	**11**	**0**	**0**	**0**	**0**	**1564**	**9**	**1229**	**14**	**0**	**0**	**0**	**0**	**0**	**0**	**1174**	**11**	**0**	**0**	**92**	**2**	**5478**		**0**	**0**	**0**	**0**	**19**	**61**	**0**	**38**
	10		**1373**		**0**		**0**		**1573**		**1243**		**0**		**0**		**0**		**1185**		**0**		**94**											
Peak Hour Total	**4**	**0**	**294**	**2**	**0**	**0**	**0**	**0**	**272**	**2**	**238**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**249**	**0**	**0**	**0**	**23**	**0**			**0**	**0**	**0**	**0**	**2**	**5**	**0**	**4**
	4		**296**		**0**		**0**		**274**		**241**		**0**		**0**		**0**		**249**		**0**		**23**			**1087**								

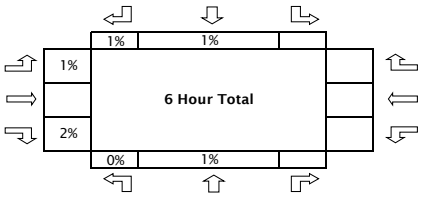
Volume Summaries





Heavy Vehicle Percentage



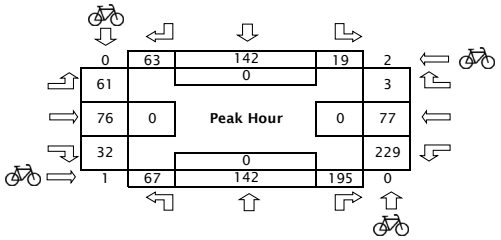


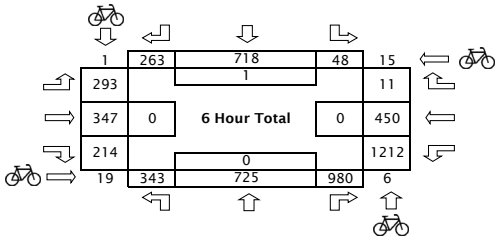
Intersection Turning Movement Count Summary — Cowboy Trail/Burnside Drive & White Avenue/Cowboy Trail

N/S Road: Cowboy Trail/Burnside Drive **Peak Hour:** 1:30 PM to 2:30 PM **Peak Hour Factor:** 0.92
E/W Road: White Avenue/Cowboy Trail
Count Date: August 23, 2025 Saturday
Weather: Sunny
Road Condition: Clear
Project #: 02-24-0168

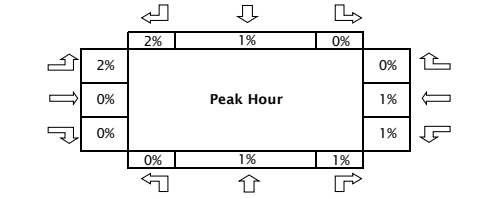
	Cowboy Trail/Burnside Drive												White Avenue/Cowboy Trail														Pedestrians				Cyclists			
	Northbound (South Leg)						Southbound (North Leg)						Westbound (East Leg)						Eastbound (West Leg)															
	Left		Through		Right		Left		Through		Right		Left		Through		Right		Left		Through		Right											
Time Starting	Car	HV	Car	HV	Car	HV	Car	HV	Car	HV	Car	HV	Car	HV	Car	HV	Car	HV	Car	HV	Car	HV	Car	HV	Total Vehicle 5 Min	Total Vehicle Hourly	West Side	East Side	North Side	South Side	NB	SB	WB	EB
10:00	9	0	27	0	23	0	1	0	22	0	8	0	49	0	22	0	0	0	7	0	1	0	3	0	172		0	0	0	0	0	0	2	0
10:15	9	0	28	1	27	0	2	0	28	0	2	0	62	0	14	0	2	0	8	0	11	0	3	0	197		0	0	0	0	2	0	0	1
10:30	8	0	18	0	22	0	0	0	22	0	14	0	52	0	17	0	1	0	6	0	9	0	7	0	176		0	0	1	0	0	0	0	0
10:45	11	0	48	0	20	0	0	0	18	0	10	0	52	1	20	1	0	0	7	0	0	1	11	0	200	745	0	0	0	0	0	0	1	0
11:00	12	0	21	0	29	0	0	0	30	1	7	0	45	0	20	0	1	0	5	0	6	0	4	0	181	754	0	0	0	0	0	1	0	2
11:15	11	0	28	0	22	1	1	0	40	0	2	0	61	0	17	0	0	0	14	0	9	0	6	0	212	769	0	0	0	0	0	0	5	0
11:30	9	0	32	0	35	0	0	0	28	0	6	0	52	0	22	0	0	0	6	0	9	0	13	0	212	805	0	0	0	0	0	0	0	0
11:45	12	0	21	0	36	0	1	0	20	0	7	0	52	0	22	0	0	0	11	0	6	0	9	0	197	802	0	0	0	0	0	0	1	4
12:00	18	0	32	0	41	0	2	0	23	0	6	0	50	0	23	0	0	0	18	0	13	0	8	0	234	855	0	0	0	0	0	0	0	0
12:15	21	0	36	0	48	0	2	0	35	0	5	0	53	0	20	0	0	0	17	0	13	1	9	0	260	903	0	0	0	0	0	0	2	0
12:30	14	0	41	0	40	0	3	0	23	0	15	0	43	1	21	0	1	0	16	1	8	0	10	0	237	928	0	0	0	0	0	0	0	0
12:45	14	0	32	0	51	0	1	0	23	0	14	0	47	0	27	0	0	0	15	0	11	0	11	0	246	977	0	0	0	0	0	0	2	0
13:00	16	0	32	1	43	0	0	0	32	0	23	0	47	0	17	0	0	0	10	0	12	0	9	0	242	985	0	0	0	0	1	0	0	3
13:15	20	0	27	0	43	0	2	0	33	0	8	0	39	2	25	0	0	0	18	0	15	0	14	0	246	971	0	0	0	0	0	0	0	2
13:30	18	0	39	1	52	0	2	0	32	0	9	0	60	0	20	1	2	0	17	1	17	0	5	0	276	1010	0	0	0	0	0	0	0	0
13:45	14	0	38	0	43	0	8	0	33	0	16	1	54	1	23	0	1	0	9	0	11	0	6	0	258	1022	0	0	0	0	0	0	0	0
14:00	24	0	32	1	47	1	7	0	30	0	14	0	75	1	18	0	0	0	15	0	26	0	8	0	299	1079	0	0	0	0	0	0	2	0
14:15	11	0	31	0	51	1	2	0	46	1	23	0	38	0	15	0	0	0	19	0	22	0	13	0	273	1106	0	0	0	0	0	0	0	1
14:30	15	0	26	0	51	0	3	0	36	0	10	1	55	0	13	0	1	0	8	0	27	0	12	0	258	1088	0	0	0	0	0	0	0	0
14:45	13	0	28	0	44	0	2	0	39	0	16	0	43	0	15	0	1	0	11	1	27	0	13	0	253	1083	0	0	0	0	1	0	0	2
15:00	15	0	30	1	61	1	5	0	34	1	9	0	58	0	11	0	1	0	9	0	17	0	8	0	261	1045	0	0	0	0	2	0	0	1
15:15	18	0	33	1	54	1	1	0	27	0	13	0	37	0	21	0	0	0	9	0	23	0	15	0	253	1025	0	0	0	0	0	0	0	0
15:30	15	0	22	0	41	0	1	0	25	0	15	0	47	1	13	0	0	0	17	0	26	0	9	0	232	999	0	0	0	0	0	0	0	2
15:45	16	0	17	0	51	0	2	0	36	0	9	0	34	0	12	0	0	0	18	0	26	0	8	0	229	975	0	0	0	0	0	0	0	1
6 Hour Total	**343**	**0**	**719**	**6**	**975**	**5**	**48**	**0**	**715**	**3**	**261**	**2**	**1205**	**7**	**448**	**2**	**11**	**0**	**290**	**3**	**345**	**2**	**214**	**0**			**0**	**0**	**1**	**0**	**6**	**1**	**15**	**19**
	343		**725**		**980**		**48**		**718**		**263**		**1212**		**450**		**11**		**293**		**347**		**214**		**5604**									
Peak Hour Total	**67**	**0**	**140**	**2**	**193**	**2**	**19**	**0**	**141**	**1**	**62**	**1**	**227**	**2**	**76**	**1**	**3**	**0**	**60**	**1**	**76**	**0**	**32**	**0**			**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**
	67		**142**		**195**		**19**		**142**		**63**		**229**		**77**		**3**		**61**		**76**		**32**		**1106**									

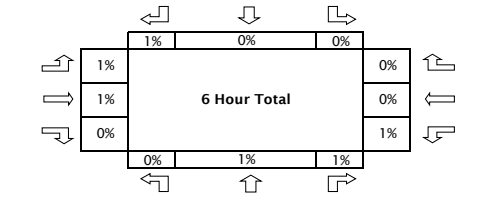
Volume Summaries





Heavy Vehicle Percentage





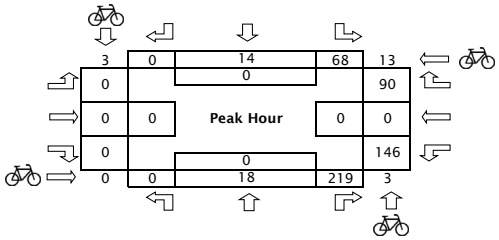
Intersection Turning Movement Count Summary — Centre Avenue & Balsam Avenue

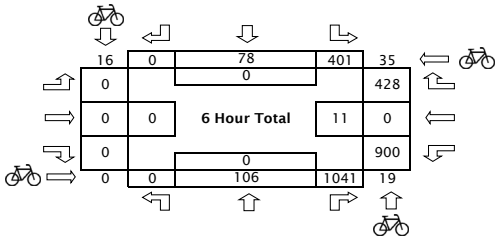
N/S Road: Centre Avenue
E/W Road: Balsam Avenue
Count Date: August 23, 2025 Saturday
Weather: Sunny
Road Condition: Clear
Project #: 02-24-0168

Peak Hour: 1:45 PM to 2:45 PM **Peak Hour Factor:** 0.87

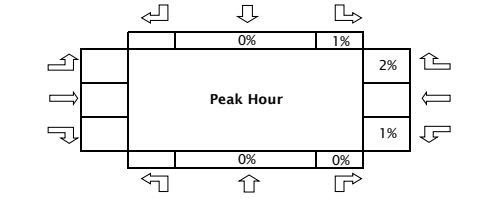
Time Starting	Centre Avenue Northbound (South Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Centre Avenue Southbound (North Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Balsam Avenue Westbound (East Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Balsam Avenue Eastbound (West Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Total Vehicle 5 Min	Total Vehicle Hourly	Pedestrians West Side	Pedestrians East Side	Pedestrians North Side	Pedestrians South Side	Cyclists NB	Cyclists SB	Cyclists WB	Cyclists EB
10:00	0	0	2	0	24	0	14	0	0	0	0	0	46	1	0	0	13	0	0	0	0	0	0	0	100		0	0	0	0	0	4	4	0
10:15	0	0	7	0	22	0	15	0	3	0	0	0	45	1	0	0	16	1	0	0	0	0	0	0	110		0	0	0	0	0	2	3	0
10:30	0	0	4	0	25	0	15	0	4	0	0	0	30	0	0	0	13	0	0	0	0	0	0	0	91		0	0	0	0	0	1	1	0
10:45	0	0	5	0	36	2	10	0	4	0	0	0	42	0	0	0	15	0	0	0	0	0	0	0	114	415	0	2	0	0	4	0	3	0
11:00	0	0	2	0	30	1	17	1	3	0	0	0	50	0	0	0	11	0	0	0	0	0	0	0	115	430	0	0	0	0	1	0	0	0
11:15	0	0	1	0	32	0	18	0	4	0	0	0	31	0	0	0	26	0	0	0	0	0	0	0	112	432	0	0	0	0	2	0	1	0
11:30	0	0	5	0	35	0	16	0	1	0	0	0	32	0	0	0	19	0	0	0	0	0	0	0	108	449	0	0	0	0	0	0	0	0
11:45	0	0	3	0	35	0	16	0	3	0	0	0	38	0	0	0	15	0	0	0	0	0	0	0	110	445	0	0	0	0	0	1	0	0
12:00	0	0	4	0	27	0	18	0	1	0	0	0	40	1	0	0	14	0	0	0	0	0	0	0	105	435	0	2	0	0	0	0	0	0
12:15	0	0	2	0	42	0	22	0	4	0	0	0	60	0	0	0	22	0	0	0	0	0	0	0	152	475	0	0	0	0	1	0	2	0
12:30	0	0	5	0	54	0	12	0	5	0	0	0	30	1	0	0	20	0	0	0	0	0	0	0	127	494	0	0	0	0	0	0	0	0
12:45	0	0	5	0	45	0	18	0	4	0	0	0	43	2	0	0	20	0	0	0	0	0	0	0	137	521	0	0	0	0	0	0	2	0
13:00	0	0	7	0	59	0	16	0	4	0	0	0	36	0	0	0	10	0	0	0	0	0	0	0	132	548	0	1	0	0	2	0	2	0
13:15	0	0	8	0	52	3	12	0	3	0	0	0	35	0	0	0	15	0	0	0	0	0	0	0	128	524	0	0	0	0	0	2	0	0
13:30	0	0	4	0	47	0	13	0	5	0	0	0	32	0	0	0	14	1	0	0	0	0	0	0	116	513	0	0	0	0	1	0	1	0
13:45	0	0	7	0	75	0	14	0	3	0	0	0	35	0	0	0	25	0	0	0	0	0	0	0	159	535	0	0	0	0	0	0	0	0
14:00	0	0	6	0	47	0	14	1	7	0	0	0	36	1	0	0	22	0	0	0	0	0	0	0	134	537	0	0	0	0	0	0	0	0
14:15	0	0	4	0	44	0	15	0	3	0	0	0	38	1	0	0	21	2	0	0	0	0	0	0	128	537	0	0	0	0	2	2	8	0
14:30	0	0	1	0	52	1	24	0	1	0	0	0	35	0	0	0	20	0	0	0	0	0	0	0	134	555	0	0	0	0	1	1	5	0
14:45	0	0	5	0	62	0	16	0	4	0	0	0	40	1	0	0	17	1	0	0	0	0	0	0	146	542	0	1	0	0	0	0	0	0
15:00	0	0	1	0	45	0	16	3	3	0	0	0	38	0	0	0	15	1	0	0	0	0	0	0	122	530	0	0	0	0	0	0	0	0
15:15	0	0	5	0	49	0	19	0	1	0	0	0	23	0	0	0	16	1	0	0	0	0	0	0	114	516	0	2	0	0	2	3	0	0
15:30	0	0	5	0	34	1	23	2	3	0	0	0	30	1	0	0	18	0	0	0	0	0	0	0	117	499	0	0	0	0	0	0	0	0
15:45	0	0	8	0	60	0	21	0	5	0	0	0	25	0	0	0	24	0	0	0	0	0	0	0	143	496	0	3	0	0	3	0	3	0
6 Hour Total	**0**	**0**	**106**	**0**	**1033**	**8**	**394**	**7**	**78**	**0**	**0**	**0**	**890**	**10**	**0**	**0**	**421**	**7**	**0**	**0**	**0**	**0**	**0**	**0**			**0**	**11**	**0**	**0**	**19**	**16**	**35**	**0**
		0		**106**		**1041**		**401**		**78**		**0**		**900**		**0**		**428**		**0**		**0**		**0**	**2954**									
Peak Hour Total	**0**	**0**	**18**	**0**	**218**	**1**	**67**	**1**	**14**	**0**	**0**	**0**	**144**	**2**	**0**	**0**	**88**	**2**	**0**	**0**	**0**	**0**	**0**	**0**			**0**	**0**	**0**	**0**	**3**	**3**	**13**	**0**
		0		**18**		**219**		**68**		**14**		**0**		**146**		**0**		**90**		**0**		**0**		**0**		**555**								

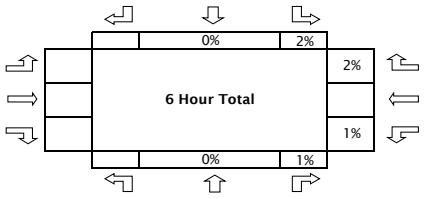
Volume Summaries





Heavy Vehicle Percentage





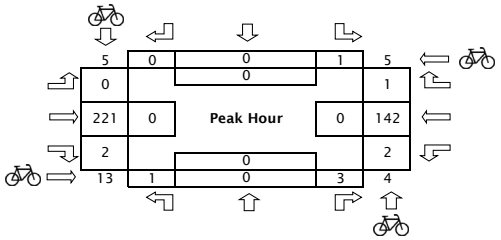
Intersection Turning Movement Count Summary Bracken Road & West Bragg Creek Road

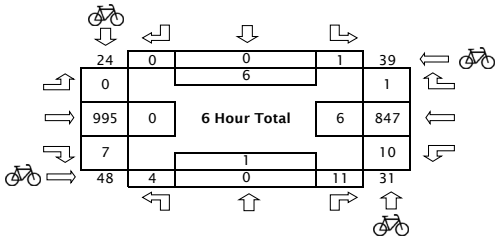
N/S Road: Bracken Road
E/W Road: West Bragg Creek Road
Count Date: August 23, 2025 Saturday
Weather: Sunny
Road Condition: Clear
Project #: 02-24-0168

Peak Hour: 1:45 PM to 2:45 PM **Peak Hour Factor:** 0.83

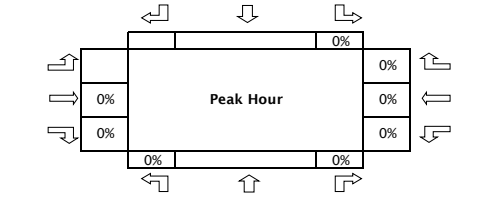
Time Starting	Bracken Road Northbound (South Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Southbound (North Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	West Bragg Creek Road Westbound (East Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Eastbound (West Leg) Left Car	Left HV	Through Car	Through HV	Right Car	Right HV	Total Vehicle 5 Min	Total Vehicle Hourly	Pedestrians West Side	Pedestrians East Side	Pedestrians North Side	Pedestrians South Side	Cyclists NB	Cyclists SB	Cyclists WB	Cyclists EB
10:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	38	0	0	0	0	0	19	0	0	0	58		0	0	0	0	8	0	8	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	2	0	0	0	0	21	0	0	0	68		0	0	0	0	4	0	4	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	21	0	0	0	49		0	0	0	0	0	0	1	0
10:45	0	0	0	0	1	0	0	0	0	0	0	0	1	0	43	2	0	0	0	0	33	0	0	0	80	255	0	0	0	0	3	0	5	4
11:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	44	0	0	0	0	0	35	1	0	0	81	278	0	0	0	0	0	2	0	3
11:15	0	0	0	0	1	0	0	0	0	0	0	0	0	0	34	0	0	0	0	0	24	0	0	0	59	269	0	0	0	1	0	0	0	2
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	0	0	0	0	0	34	0	0	0	65	285	0	1	1	0	0	1	0	1
11:45	0	0	0	0	0	0	0	0	0	0	0	0	1	0	32	0	0	0	0	0	33	0	0	0	66	271	0	0	0	0	0	0	1	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	1	0	0	0	0	30	0	0	0	64	254	0	0	0	0	0	3	0	3
12:15	1	0	0	0	0	0	0	0	0	0	0	0	1	0	53	0	0	0	0	0	37	0	1	0	93	288	0	1	1	0	2	0	4	1
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	1	0	0	0	0	52	0	0	0	93	316	0	0	0	0	1	1	1	1
12:45	0	0	0	0	1	0	0	0	0	0	0	0	0	0	40	2	0	0	0	0	40	0	0	0	83	333	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	58	1	1	0	92	361	0	0	0	0	0	1	0	3
13:15	0	0	0	0	1	0	0	0	0	0	0	0	1	0	31	0	0	0	0	0	49	2	1	0	85	353	0	0	0	0	0	2	0	2
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	47	0	0	0	76	336	0	0	0	0	3	3	3	3
13:45	1	0	0	0	1	0	0	0	0	0	0	0	0	0	33	0	0	0	0	0	77	0	0	0	112	365	0	0	0	0	0	0	1	0
14:00	0	0	0	0	1	0	0	0	0	0	0	0	1	0	41	0	1	0	0	0	48	0	0	0	92	365	0	0	0	0	0	5	0	9
14:15	0	0	0	0	0	0	1	0	0	0	0	0	1	0	32	0	0	0	0	0	47	0	1	0	82	362	0	0	0	0	2	0	2	2
14:30	0	0	0	0	1	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0	48	1	1	0	87	373	0	0	0	0	2	0	2	2
14:45	0	0	0	0	1	0	0	0	0	0	0	0	2	0	33	1	0	0	0	0	65	0	1	0	103	364	0	0	0	0	1	2	3	3
15:00	1	0	0	0	1	0	0	0	0	0	0	0	1	0	32	0	0	0	0	0	42	0	0	0	77	349	0	4	4	0	0	3	0	4
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	40	0	0	0	63	330	0	0	0	0	4	0	2	0
15:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	27	1	0	0	0	0	36	1	1	0	67	310	0	0	0	0	1	0	1	0
15:45	0	0	0	0	1	0	0	0	0	0	0	0	0	0	27	0	0	0	0	0	53	0	0	0	81	288	0	0	0	0	0	1	1	5
6 Hour Total	**4**	**0**	**0**	**0**	**11**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**837**	**10**	**1**	**0**	**0**	**0**	**989**	**6**	**7**	**0**			**0**	**6**	**6**	**1**	**31**	**24**	**39**	**48**
	4		**0**		**11**		**1**		**0**		**0**		**10**		**847**		**1**		**0**		**995**		**7**		**1876**									
Peak Hour Total	**1**	**0**	**0**	**0**	**3**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**142**	**0**	**1**	**0**	**0**	**0**	**220**	**1**	**2**	**0**			**0**	**0**	**0**	**0**	**4**	**5**	**5**	**13**
	1		**0**		**3**		**1**		**0**		**0**		**2**		**142**		**1**		**0**		**221**		**2**			**373**								

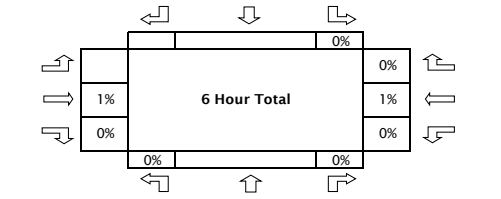
Volume Summaries





Heavy Vehicle Percentage





APPENDIX B

Synchro & SIDRA Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	117	114	418	120	5	177	223	356	27	225	89
Future Volume (vph)	86	117	114	418	120	5	177	223	356	27	225	89
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		120.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00						0.99	
Frt		0.951			0.994				0.850		0.965	
Flt Protected		0.987		0.950				0.978			0.996	
Satd. Flow (prot)	0	1705	0	1742	1821	0	0	1794	1559	0	1748	0
Flt Permitted		0.863		0.950				0.423			0.290	
Satd. Flow (perm)	0	1491	0	1742	1821	0	0	776	1559	0	509	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		21			4				375			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			1199.9			85.9	
Travel Time (s)		18.4			12.4			86.4			6.2	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	91	123	120	440	126	5	186	235	375	28	237	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	334	0	440	131	0	0	421	375	0	359	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		10.0	10.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	47.0	47.0		55.0	102.0		30.0	30.0	55.0	30.0	30.0	
Total Split (%)	35.6%	35.6%		41.7%	77.3%		22.7%	22.7%	41.7%	22.7%	22.7%	
Maximum Green (s)	38.0	38.0		46.8	93.0		22.2	22.2	46.8	22.2	22.2	
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		27.9		33.1	69.4			22.8	33.1		22.8	
Actuated g/C Ratio		0.25		0.30	0.63			0.21	0.30		0.21	
v/c Ratio		0.84		0.84	0.11			2.61	0.51		3.42	
Control Delay		56.9		51.0	7.1			763.2	5.6		1122.4	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		56.9		51.0	7.1			763.2	5.6		1122.4	

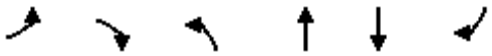
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E		D	A			F	A		F	
Approach Delay		56.9			40.9			406.3			1122.4	
Approach LOS		E			D			F			F	
Queue Length 50th (m)		63.7		87.3	9.5			~153.8	0.0		~138.1	
Queue Length 95th (m)		110.8		137.3	15.8			#255.1	20.4		#231.0	
Internal Link Dist (m)		180.0			148.2			1175.9			61.9	
Turn Bay Length (m)									120.0			
Base Capacity (vph)		544		764	1549			161	894		105	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.61		0.58	0.08			2.61	0.42		3.42	

Intersection Summary			
Area Type:	Other		
Cycle Length: 132			
Actuated Cycle Length: 109.5			
Natural Cycle: 145			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 3.42			
Intersection Signal Delay: 373.2		Intersection LOS: F	
Intersection Capacity Utilization 111.5%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 1: White Ave/Hwy 22 & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	542	32	6	508	493	567
Future Volume (Veh/h)	542	32	6	508	493	567
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	571	34	6	535	519	597
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	1364	818	1116			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1364	818	1116			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	91	99			
cM capacity (veh/h)	161	376	626			

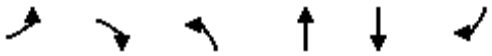
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	605	541	1116
Volume Left	571	6	0
Volume Right	34	0	597
cSH	166	626	1700
Volume to Capacity	3.64	0.01	0.66
Queue Length 95th (m)	Err	0.2	0.0
Control Delay (s)	Err	0.3	0.0
Lane LOS	F	A	
Approach Delay (s)	Err	0.3	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	2674.4		
Intersection Capacity Utilization	101.8%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	531	311	25	532	18	254	6	24	16	14	8
Future Volume (Veh/h)	5	531	311	25	532	18	254	6	24	16	14	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	559	327	26	560	19	267	6	25	17	15	8
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	589			896			1380	1384	732	1392	1538	580
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	589			896			1380	1384	732	1392	1538	580
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			0	96	94	83	86	98
cM capacity (veh/h)	977			750			102	135	417	103	109	510

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	891	605	298	40
Volume Left	5	26	267	17
Volume Right	327	19	25	8
cSH	977	750	109	126
Volume to Capacity	0.01	0.03	2.73	0.32
Queue Length 95th (m)	0.1	0.8	210.2	9.5
Control Delay (s)	0.1	0.9	866.0	46.6
Lane LOS	A	A	F	E
Approach Delay (s)	0.1	0.9	866.0	46.6
Approach LOS			F	E

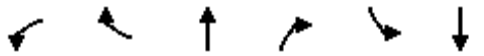
Intersection Summary				
Average Delay	142.1			
Intersection Capacity Utilization	80.0%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	106	50	56	650	634	122
Future Volume (Veh/h)	106	50	56	650	634	122
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	112	53	59	684	667	128
Pedestrians	10					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1543	741	805			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1543	741	805			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	4	87	93			
cM capacity (veh/h)	116	412	812			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	165	743	795
Volume Left	112	59	0
Volume Right	53	0	128
cSH	151	812	1700
Volume to Capacity	1.09	0.07	0.47
Queue Length 95th (m)	66.8	1.8	0.0
Control Delay (s)	159.9	1.9	0.0
Lane LOS	F	A	
Approach Delay (s)	159.9	1.9	0.0
Approach LOS	F		

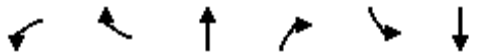
Intersection Summary			
Average Delay	16.3		
Intersection Capacity Utilization	98.5%	ICU Level of Service	F
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	207	132	25	312	101	20
Future Volume (vph)	207	132	25	312	101	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	218	139	26	328	106	21

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	357	354	127
Volume Left (vph)	218	0	106
Volume Right (vph)	139	328	0
Hadj (s)	-0.08	-0.52	0.20
Departure Headway (s)	5.0	4.5	5.5
Degree Utilization, x	0.49	0.44	0.19
Capacity (veh/h)	682	752	598
Control Delay (s)	12.7	11.1	9.8
Approach Delay (s)	12.7	11.1	9.8
Approach LOS	B	B	A

Intersection Summary			
Delay	11.6		
Level of Service	B		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	314	5	5	202
Future Volume (Veh/h)	5	5	314	5	5	202
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	5	331	5	5	213
Pedestrians	10					10
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	1					1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	566	354			346	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	566	354			346	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	479	677			1202	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	336	218
Volume Left	5	0	5
Volume Right	5	5	0
cSH	561	1700	1202
Volume to Capacity	0.02	0.20	0.00
Queue Length 95th (m)	0.4	0.0	0.1
Control Delay (s)	11.5	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	11.5	0.0	0.2
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

MOVEMENT SUMMARY

Site: [2045 Roundabout Option (Site Folder: General)]

Hwy 22/ White Ave & Hwy 22/Burnside Drive
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hwy 22														
3b	L3	177	2.0	186	2.0	0.494	16.9	LOS B	4.6	35.8	0.92	0.88	1.00	44.5
3	L2	223	2.0	235	2.0	0.494	5.2	LOS A	4.6	35.8	0.92	0.88	1.00	35.2
8	T1	356	2.0	375	2.0	0.494	6.7	LOS A	4.6	35.8	0.91	0.95	1.03	28.8
18	R2	4	2.0	4	2.0	0.494	10.3	LOS B	4.2	32.7	0.91	0.96	1.04	37.7
Approach		760	2.0	800	2.0	0.494	8.7	LOS A	4.6	35.8	0.92	0.92	1.01	33.5
East: New Road														
1	L2	4	2.0	4	2.0	0.021	16.5	LOS B	0.1	0.9	0.82	0.76	0.82	55.8
1a	L1	4	2.0	4	2.0	0.021	15.0	LOS B	0.1	0.9	0.82	0.76	0.82	54.9
6	T1	3	2.0	3	2.0	0.021	8.8	LOS A	0.1	0.9	0.82	0.76	0.82	55.0
16	R2	4	2.0	4	2.0	0.011	11.3	LOS B	0.1	0.4	0.79	0.73	0.79	54.3
Approach		15	2.0	16	2.0	0.021	13.2	LOS B	0.1	0.9	0.81	0.75	0.81	55.0
North: Hwy 22														
7	L2	4	2.0	4	2.0	0.438	13.4	LOS B	3.3	25.6	0.76	0.53	0.76	40.2
4	T1	373	2.0	393	2.0	0.438	2.9	LOS A	3.3	25.6	0.76	0.53	0.76	29.1
14a	R1	145	2.0	153	2.0	0.615	5.8	LOS A	6.6	50.8	0.85	0.70	0.92	42.6
14	R2	542	2.0	571	2.0	0.615	3.3	LOS A	6.6	50.8	0.85	0.70	0.92	30.6
Approach		1064	2.0	1120	2.0	0.615	3.6	LOS A	6.6	50.8	0.81	0.64	0.86	31.2
West: Balsam Ave														
5	L2	569	2.0	599	2.0	0.652	4.5	LOS A	5.0	38.3	0.78	0.93	0.99	32.1
2	T1	3	2.0	3	2.0	0.652	7.1	LOS A	5.0	38.3	0.78	0.93	0.99	39.1
12	R2	241	2.0	254	2.0	0.380	3.6	LOS A	1.9	14.3	0.67	0.70	0.72	29.2
12b	R3	1	2.0	1	2.0	0.380	7.2	LOS A	1.9	14.3	0.67	0.70	0.72	38.8
Approach		814	2.0	857	2.0	0.652	4.3	LOS A	5.0	38.3	0.75	0.86	0.91	31.2
SouthWest: White Ave														
5bx	L3	1	2.0	1	2.0	0.541	22.0	LOS C	3.6	27.8	0.87	1.03	1.15	54.3
5ax	L1	117	2.0	123	2.0	0.541	19.1	LOS B	3.6	27.8	0.87	1.03	1.15	52.8
12ax	R1	4	2.0	4	2.0	0.541	12.6	LOS B	3.6	27.8	0.87	1.03	1.15	52.3
12bx	R3	130	2.0	137	2.0	0.541	13.5	LOS B	3.6	27.8	0.87	1.03	1.15	50.3
Approach		252	2.0	265	2.0	0.541	16.1	LOS B	3.6	27.8	0.87	1.03	1.15	51.5
All Vehicles		2905	2.0	3058	2.0	0.652	6.2	LOS A	6.6	50.8	0.83	0.81	0.94	33.0

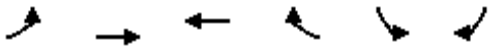
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	769	73	5	730	18	56	6	24	23	7	8
Future Volume (Veh/h)	5	769	73	5	730	18	56	6	24	23	7	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	809	77	5	768	19	59	6	25	24	7	8
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	797			896			1666	1674	858	1683	1704	788
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	797			896			1666	1674	858	1683	1704	788
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			14	94	93	62	92	98
cM capacity (veh/h)	817			750			68	92	353	64	89	388

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	891	792	90	39
Volume Left	5	5	59	24
Volume Right	77	19	25	8
cSH	817	750	90	82
Volume to Capacity	0.01	0.01	1.00	0.48
Queue Length 95th (m)	0.1	0.2	44.1	15.1
Control Delay (s)	0.2	0.2	178.7	83.5
Lane LOS	A	A	F	F
Approach Delay (s)	0.2	0.2	178.7	83.5
Approach LOS			F	F

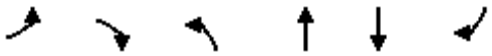
Intersection Summary				
Average Delay	10.8			
Intersection Capacity Utilization	62.5%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	86	231	322	5	16	64
Future Volume (Veh/h)	86	231	322	5	16	64
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	91	243	339	5	17	67
Pedestrians					10	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	354				776	352
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354				776	352
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				95	90
cM capacity (veh/h)	1193				335	686

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	334	344	84
Volume Left	91	0	17
Volume Right	0	5	67
cSH	1193	1700	566
Volume to Capacity	0.08	0.20	0.15
Queue Length 95th (m)	1.9	0.0	3.9
Control Delay (s)	2.8	0.0	12.5
Lane LOS	A		B
Approach Delay (s)	2.8	0.0	12.5
Approach LOS			B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	106	50	56	650	634	122
Future Volume (Veh/h)	106	50	56	650	634	122
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	112	53	59	684	667	128
Pedestrians	10					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1543	741	805			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1543	741	805			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	4	87	93			
cM capacity (veh/h)	116	412	812			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	165	743	795
Volume Left	112	59	0
Volume Right	53	0	128
cSH	151	812	1700
Volume to Capacity	1.09	0.07	0.47
Queue Length 95th (m)	66.8	1.8	0.0
Control Delay (s)	159.9	1.9	0.0
Lane LOS	F	A	
Approach Delay (s)	159.9	1.9	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	16.3		
Intersection Capacity Utilization	98.5%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	207	132	25	312	101	20
Future Volume (vph)	207	132	25	312	101	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	218	139	26	328	106	21

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	357	354	127
Volume Left (vph)	218	0	106
Volume Right (vph)	139	328	0
Hadj (s)	-0.08	-0.52	0.20
Departure Headway (s)	5.0	4.5	5.5
Degree Utilization, x	0.49	0.44	0.19
Capacity (veh/h)	682	752	598
Control Delay (s)	12.7	11.1	9.8
Approach Delay (s)	12.7	11.1	9.8
Approach LOS	B	B	A

Intersection Summary			
Delay	11.6		
Level of Service	B		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	314	5	5	202
Future Volume (Veh/h)	5	5	314	5	5	202
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	5	331	5	5	213
Pedestrians	10					10
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	1					1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	566	354			346	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	566	354			346	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	479	677			1202	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	336	218
Volume Left	5	0	5
Volume Right	5	5	0
cSH	561	1700	1202
Volume to Capacity	0.02	0.20	0.00
Queue Length 95th (m)	0.4	0.0	0.1
Control Delay (s)	11.5	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	11.5	0.0	0.2
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

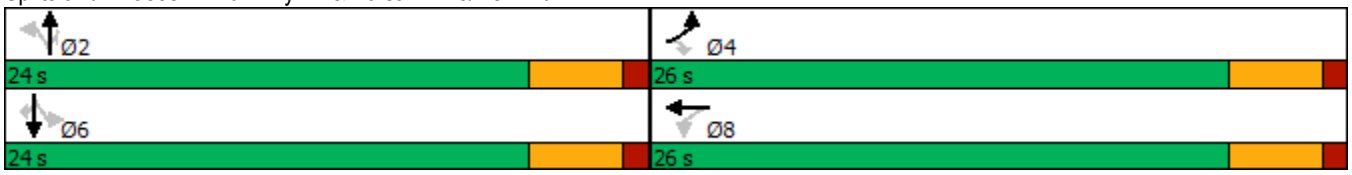
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	542	0	32	5	5	5	116	508	10	5	493	567
Future Volume (vph)	542	0	32	5	5	5	116	508	10	5	493	567
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		60.0	0.0		0.0
Storage Lanes	1		1	0		0	1		1	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.99		1.00				0.98			0.99
Frt			0.850		0.955				0.850			0.850
Flt Protected	0.950				0.984		0.950			0.950		
Satd. Flow (prot)	1742	0	1559	0	1715	0	1742	3484	1559	1742	3484	1559
Flt Permitted	0.950				0.984		0.454			0.442		
Satd. Flow (perm)	1742	0	1536	0	1715	0	833	3484	1520	811	3484	1536
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			34		5				33			597
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		147.6			74.5			222.0			411.2	
Travel Time (s)		10.6			5.4			16.0			29.6	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	571	0	34	5	5	5	122	535	11	5	519	597
Shared Lane Traffic (%)												
Lane Group Flow (vph)	571	0	34	0	15	0	122	535	11	5	519	597
Turn Type	Prot		Perm	Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4!				8!			2			6	
Permitted Phases			4	8			2		2	6		6
Detector Phase	4		4	8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.5		23.5	23.5	23.5		23.5	23.5	23.5	23.5	23.5	23.5
Total Split (s)	26.0		26.0	26.0	26.0		24.0	24.0	24.0	24.0	24.0	24.0
Total Split (%)	52.0%		52.0%	52.0%	52.0%		48.0%	48.0%	48.0%	48.0%	48.0%	48.0%
Maximum Green (s)	21.5		21.5	21.5	21.5		19.5	19.5	19.5	19.5	19.5	19.5
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5		4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)	8.0		8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0		0	0	0	0	0	0
Act Effct Green (s)	17.2		17.2		17.2		13.8	13.8	13.8	13.8	13.8	13.8
Actuated g/C Ratio	0.43		0.43		0.43		0.34	0.34	0.34	0.34	0.34	0.34
v/c Ratio	0.77		0.05		0.02		0.43	0.45	0.02	0.02	0.44	0.65

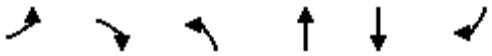
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	19.6		3.8		6.6		16.6	12.1	1.6	9.8	12.0	5.2
Queue Delay	0.0		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.6		3.8		6.6		16.6	12.1	1.6	9.8	12.0	5.2
LOS	B		A		A		B	B	A	A	B	A
Approach Delay		18.7			6.6			12.8			8.3	
Approach LOS		B			A			B			A	
Queue Length 50th (m)	29.1		0.0		0.4		6.5	15.0	0.0	0.2	14.5	0.0
Queue Length 95th (m)	#85.7		3.5		2.8		18.3	27.0	1.0	1.7	26.2	15.3
Internal Link Dist (m)		123.6			50.5			198.0			387.2	
Turn Bay Length (m)									60.0			
Base Capacity (vph)	966		867		953		419	1752	781	407	1752	1069
Starvation Cap Reductn	0		0		0		0	0	0	0	0	0
Spillback Cap Reductn	0		0		0		0	0	0	0	0	0
Storage Cap Reductn	0		0		0		0	0	0	0	0	0
Reduced v/c Ratio	0.59		0.04		0.02		0.29	0.31	0.01	0.01	0.30	0.56

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 40.3			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 12.2		Intersection LOS: B	
Intersection Capacity Utilization 71.1%		ICU Level of Service C	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 10: Hwy 22 & Balsam Ave/New Rd





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	149	339	290	466	418	124
Future Volume (Veh/h)	149	339	290	466	418	124
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	157	357	305	491	440	131
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					222	
pX, platoon unblocked						
vC, conflicting volume	1296	220	440			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1296	220	440			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	54	73			
cM capacity (veh/h)	112	784	1116			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	157	357	305	246	246	220	220	131
Volume Left	157	0	305	0	0	0	0	0
Volume Right	0	357	0	0	0	0	0	131
cSH	112	784	1116	1700	1700	1700	1700	1700
Volume to Capacity	1.40	0.46	0.27	0.14	0.14	0.13	0.13	0.08
Queue Length 95th (m)	83.6	18.2	8.5	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	297.2	13.4	9.4	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	B	A					
Approach Delay (s)	100.1		3.6			0.0		
Approach LOS	F							

Intersection Summary			
Average Delay	28.9		
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	526	316	25	642	18	144	6	24	16	14	8
Future Volume (Veh/h)	5	526	316	25	642	18	144	6	24	16	14	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	554	333	26	676	19	152	6	25	17	15	8
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)									4			
Median type		None			None							
Median storage veh)												
Upstream signal (m)					148							
pX, platoon unblocked												
vC, conflicting volume	705			897			1318	1331	564	1305	1645	686
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	705			897			1318	1331	564	1305	1645	686
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			0	96	95	86	84	98
cM capacity (veh/h)	885			750			110	145	520	120	94	443

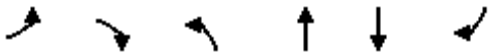
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	559	333	702	19	183	40
Volume Left	5	0	26	0	152	17
Volume Right	0	333	0	19	25	8
cSH	885	1700	750	1700	125	125
Volume to Capacity	0.01	0.20	0.03	0.01	1.46	0.32
Queue Length 95th (m)	0.1	0.0	0.8	0.0	96.0	9.6
Control Delay (s)	0.2	0.0	0.9	0.0	308.9	46.8
Lane LOS	A		A		F	E
Approach Delay (s)	0.1		0.9		308.9	46.8
Approach LOS					F	E

Intersection Summary				
Average Delay	32.2			
Intersection Capacity Utilization	77.4%	ICU Level of Service	D	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	297	117	86	231	257	89
Future Volume (Veh/h)	297	117	86	231	257	89
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	313	123	91	243	271	94
Pedestrians						10
Lane Width (m)						3.7
Walking Speed (m/s)						1.1
Percent Blockage						1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	680	101			334	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	680	101			334	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	87			78	
cM capacity (veh/h)	299	926			1222	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	313	123	91	243	302	63
Volume Left	313	0	0	0	271	0
Volume Right	0	123	0	243	0	0
cSH	299	926	1700	1700	1222	1700
Volume to Capacity	1.05	0.13	0.05	0.14	0.22	0.04
Queue Length 95th (m)	89.1	3.5	0.0	0.0	6.5	0.0
Control Delay (s)	103.2	9.5	0.0	0.0	8.1	0.0
Lane LOS	F	A			A	
Approach Delay (s)	76.8		0.0		6.7	
Approach LOS	F					

Intersection Summary			
Average Delay	31.6		
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	106	50	56	650	634	122
Future Volume (Veh/h)	106	50	56	650	634	122
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	112	53	59	684	667	128
Pedestrians	10					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1543	741	805			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1543	741	805			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	4	87	93			
cM capacity (veh/h)	116	412	812			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	165	743	795
Volume Left	112	59	0
Volume Right	53	0	128
cSH	151	812	1700
Volume to Capacity	1.09	0.07	0.47
Queue Length 95th (m)	66.8	1.8	0.0
Control Delay (s)	159.9	1.9	0.0
Lane LOS	F	A	
Approach Delay (s)	159.9	1.9	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	16.3		
Intersection Capacity Utilization	98.5%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	207	132	25	312	101	20
Future Volume (vph)	207	132	25	312	101	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	218	139	26	328	106	21

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	357	354	127
Volume Left (vph)	218	0	106
Volume Right (vph)	139	328	0
Hadj (s)	-0.08	-0.52	0.20
Departure Headway (s)	5.0	4.5	5.5
Degree Utilization, x	0.49	0.44	0.19
Capacity (veh/h)	682	752	598
Control Delay (s)	12.7	11.1	9.8
Approach Delay (s)	12.7	11.1	9.8
Approach LOS	B	B	A

Intersection Summary			
Delay	11.6		
Level of Service	B		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	314	5	5	202
Future Volume (Veh/h)	5	5	314	5	5	202
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	5	331	5	5	213
Pedestrians	10					10
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	1					1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	566	354			346	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	566	354			346	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	479	677			1202	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	336	218
Volume Left	5	0	5
Volume Right	5	5	0
cSH	561	1700	1202
Volume to Capacity	0.02	0.20	0.00
Queue Length 95th (m)	0.4	0.0	0.1
Control Delay (s)	11.5	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	11.5	0.0	0.2
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

MOVEMENT SUMMARY

Site: [2045 Roundabout Option w Mitigations (Site Folder: General)]

Hwy 22/ White Ave & Hwy 22/Burnside Drive
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hwy 22														
3b	L3	177	2.0	186	2.0	0.524	18.4	LOS B	5.3	40.8	0.96	0.96	1.10	43.8
3	L2	223	2.0	235	2.0	0.524	6.6	LOS A	5.3	40.8	0.96	0.96	1.10	34.7
8	T1	356	2.0	375	2.0	0.524	8.4	LOS A	5.3	40.8	0.94	1.04	1.13	28.5
18	R2	4	2.0	4	2.0	0.524	12.0	LOS B	4.7	36.6	0.94	1.05	1.13	37.0
Approach		760	2.0	800	2.0	0.524	10.2	LOS B	5.3	40.8	0.95	1.00	1.11	33.0
East: New Road														
1	L2	4	2.0	4	2.0	0.023	17.3	LOS B	0.1	1.0	0.84	0.77	0.84	55.1
1a	L1	4	2.0	4	2.0	0.023	15.9	LOS B	0.1	1.0	0.84	0.77	0.84	54.2
6	T1	3	2.0	3	2.0	0.023	9.6	LOS A	0.1	1.0	0.84	0.77	0.84	54.3
16	R2	4	2.0	4	2.0	0.012	12.3	LOS B	0.1	0.5	0.81	0.74	0.81	53.5
Approach		15	2.0	16	2.0	0.023	14.1	LOS B	0.1	1.0	0.83	0.76	0.83	54.3
North: Hwy 22														
7	L2	4	2.0	4	2.0	0.463	14.0	LOS B	3.6	27.7	0.80	0.66	0.82	40.1
4	T1	373	2.0	393	2.0	0.463	3.6	LOS A	3.6	27.7	0.80	0.66	0.82	29.1
14a	R1	145	2.0	153	2.0	0.643	7.0	LOS A	7.4	57.3	0.89	0.86	1.03	42.5
14	R2	542	2.0	571	2.0	0.643	4.5	LOS A	7.4	57.3	0.89	0.86	1.03	30.5
Approach		1064	2.0	1120	2.0	0.643	4.5	LOS A	7.4	57.3	0.86	0.79	0.95	31.2
West: Balsam Ave														
5	L2	569	2.0	599	2.0	0.657	4.6	LOS A	5.1	39.0	0.79	0.94	1.00	32.1
2	T1	3	2.0	3	2.0	0.657	7.2	LOS A	5.1	39.0	0.79	0.94	1.00	39.0
12	R2	241	2.0	254	2.0	0.383	3.7	LOS A	1.9	14.5	0.68	0.71	0.73	29.2
12b	R3	1	2.0	1	2.0	0.383	7.2	LOS A	1.9	14.5	0.68	0.71	0.73	38.8
Approach		814	2.0	857	2.0	0.657	4.3	LOS A	5.1	39.0	0.76	0.87	0.92	31.2
SouthWest: White Ave														
5bx	L3	62	2.0	65	2.0	0.673	25.2	LOS C	5.3	40.6	0.91	1.11	1.38	51.3
5ax	L1	117	2.0	123	2.0	0.673	22.3	LOS C	5.3	40.6	0.91	1.11	1.38	50.0
12ax	R1	4	2.0	4	2.0	0.673	15.8	LOS B	5.3	40.6	0.91	1.11	1.38	49.5
12bx	R3	130	2.0	137	2.0	0.673	16.7	LOS B	5.3	40.6	0.91	1.11	1.38	47.7
Approach		313	2.0	329	2.0	0.673	20.5	LOS C	5.3	40.6	0.91	1.11	1.38	49.2
All Vehicles		2966	2.0	3122	2.0	0.673	7.7	LOS A	7.4	57.3	0.86	0.90	1.03	33.0

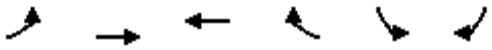
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	769	73	5	786	24	0	0	24	23	7	8
Future Volume (Veh/h)	5	769	73	5	786	24	0	0	24	23	7	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	809	77	5	827	25	0	0	25	24	7	8
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	862			896			1728	1740	858	1742	1766	850
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	862			896			1728	1740	858	1742	1766	850
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			100	100	93	61	91	98
cM capacity (veh/h)	773			750			61	84	353	61	81	357

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	891	857	25	39
Volume Left	5	5	0	24
Volume Right	77	25	25	8
cSH	773	750	353	78
Volume to Capacity	0.01	0.01	0.07	0.50
Queue Length 95th (m)	0.1	0.2	1.7	16.0
Control Delay (s)	0.2	0.2	16.0	90.9
Lane LOS	A	A	C	F
Approach Delay (s)	0.2	0.2	16.0	90.9
Approach LOS			C	F

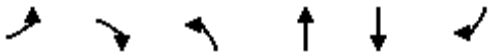
Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		



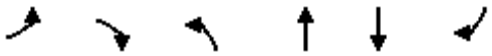
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	293	322	5	16	64
Future Volume (Veh/h)	24	293	322	5	16	64
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	25	308	339	5	17	67
Pedestrians					10	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	354				710	352
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354				710	352
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				96	90
cM capacity (veh/h)	1193				388	686

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	333	344	84
Volume Left	25	0	17
Volume Right	0	5	67
cSH	1193	1700	594
Volume to Capacity	0.02	0.20	0.14
Queue Length 95th (m)	0.5	0.0	3.7
Control Delay (s)	0.8	0.0	12.1
Lane LOS	A		B
Approach Delay (s)	0.8	0.0	12.1
Approach LOS			B

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	106	50	56	650	634	122
Future Volume (vph)	106	50	56	650	634	122
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99			1.00	0.99	
Frt	0.957				0.978	
Flt Protected	0.967			0.996		
Satd. Flow (prot)	1682	0	0	1827	1782	0
Flt Permitted	0.967			0.905		
Satd. Flow (perm)	1682	0	0	1659	1782	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	33				25	
Link Speed (k/h)	50			50	50	
Link Distance (m)	533.1			54.6	357.1	
Travel Time (s)	38.4			3.9	25.7	
Confl. Peds. (#/hr)			10			10
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	112	53	59	684	667	128
Shared Lane Traffic (%)						
Lane Group Flow (vph)	165	0	0	743	795	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	23.5		23.5	23.5	23.5	
Total Split (s)	23.5		46.5	46.5	46.5	
Total Split (%)	33.6%		66.4%	66.4%	66.4%	
Maximum Green (s)	19.0		42.0	42.0	42.0	
Yellow Time (s)	3.5		3.5	3.5	3.5	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	4.5			4.5	4.5	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		Min	Min	Min	
Walk Time (s)	8.0		8.0	8.0	8.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	11.8			38.1	38.1	
Actuated g/C Ratio	0.22			0.72	0.72	
v/c Ratio	0.41			0.63	0.62	
Control Delay	21.0			9.4	8.8	
Queue Delay	0.0			0.0	0.0	



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	21.0			9.4	8.8	
LOS	C			A	A	
Approach Delay	21.0			9.4	8.8	
Approach LOS	C			A	A	
Queue Length 50th (m)	11.2			37.3	38.0	
Queue Length 95th (m)	28.9			88.3	88.8	
Internal Link Dist (m)	509.1			30.6	333.1	
Turn Bay Length (m)						
Base Capacity (vph)	661			1294	1396	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.25			0.57	0.57	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 53.2			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 10.3		Intersection LOS: B	
Intersection Capacity Utilization 99.4%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 16: Hwy 22 & E Park Pl

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	117	114	442	120	5	177	164	423	27	127	89
Future Volume (vph)	86	117	114	442	120	5	177	164	423	27	127	89
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		120.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00						0.99	
Frt		0.951			0.994				0.850		0.950	
Flt Protected		0.987		0.950				0.975			0.995	
Satd. Flow (prot)	0	1705	0	1742	1821	0	0	1788	1559	0	1714	0
Flt Permitted		0.863		0.950				0.546			0.454	
Satd. Flow (perm)	0	1491	0	1742	1821	0	0	1001	1559	0	782	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		21			4				445			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			1199.9			85.9	
Travel Time (s)		18.4			12.4			86.4			6.2	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	91	123	120	465	126	5	186	173	445	28	134	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	334	0	465	131	0	0	359	445	0	256	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		10.0	10.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	47.0	47.0		55.0	102.0		30.0	30.0	55.0	30.0	30.0	
Total Split (%)	35.6%	35.6%		41.7%	77.3%		22.7%	22.7%	41.7%	22.7%	22.7%	
Maximum Green (s)	38.0	38.0		46.8	93.0		22.2	22.2	46.8	22.2	22.2	
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		28.4		34.7	71.5			22.8	34.7		22.8	
Actuated g/C Ratio		0.25		0.31	0.64			0.20	0.31		0.20	
v/c Ratio		0.85		0.86	0.11			1.76	0.56		1.61	
Control Delay		57.8		53.0	7.0			390.2	5.7		332.3	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		57.8		53.0	7.0			390.2	5.7		332.3	
LOS		E		D	A			F	A		F	

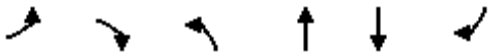
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		57.8			42.9			177.4			332.3	
Approach LOS		E			D			F			F	
Queue Length 50th (m)		65.6		94.9	9.5			~120.0	0.0		~82.5	
Queue Length 95th (m)		110.8		147.3	15.8			#208.6	22.1		#155.9	
Internal Link Dist (m)		180.0			148.2			1175.9			61.9	
Turn Bay Length (m)									120.0			
Base Capacity (vph)		535		750	1526			204	924		159	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.62		0.62	0.09			1.76	0.48		1.61	

Intersection Summary			
Area Type:	Other		
Cycle Length: 132			
Actuated Cycle Length: 111.5			
Natural Cycle: 115			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.76			
Intersection Signal Delay: 137.0		Intersection LOS: F	
Intersection Capacity Utilization 104.4%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 1: White Ave/Hwy 22 & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	475	32	6	575	517	543
Future Volume (Veh/h)	475	32	6	575	517	543
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	500	34	6	605	544	572
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	1447	830	1116			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1447	830	1116			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	91	99			
cM capacity (veh/h)	143	370	626			

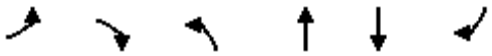
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	534	611	1116
Volume Left	500	6	0
Volume Right	34	0	572
cSH	149	626	1700
Volume to Capacity	3.58	0.01	0.66
Queue Length 95th (m)	Err	0.2	0.0
Control Delay (s)	Err	0.3	0.0
Lane LOS	F	A	
Approach Delay (s)	Err	0.3	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	2361.6		
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	464	213	25	508	18	195	6	24	16	14	8
Future Volume (Veh/h)	5	464	213	25	508	18	195	6	24	16	14	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	488	224	26	535	19	205	6	25	17	15	8
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	564			722			1232	1236	610	1244	1338	554
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	564			722			1232	1236	610	1244	1338	554
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			0	96	95	87	90	98
cM capacity (veh/h)	998			872			133	167	490	132	145	527

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	717	580	236	40
Volume Left	5	26	205	17
Volume Right	224	19	25	8
cSH	998	872	145	162
Volume to Capacity	0.01	0.03	1.63	0.25
Queue Length 95th (m)	0.1	0.7	127.0	7.1
Control Delay (s)	0.1	0.8	367.7	34.4
Lane LOS	A	A	F	D
Approach Delay (s)	0.1	0.8	367.7	34.4
Approach LOS			F	D

Intersection Summary			
Average Delay	56.4		
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	106	50	56	658	560	122
Future Volume (Veh/h)	106	50	56	658	560	122
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	112	53	59	693	589	128
Pedestrians	10					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1474	663	727			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1474	663	727			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	13	88	93			
cM capacity (veh/h)	129	457	868			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	165	752	717
Volume Left	112	59	0
Volume Right	53	0	128
cSH	167	868	1700
Volume to Capacity	0.99	0.07	0.42
Queue Length 95th (m)	58.7	1.7	0.0
Control Delay (s)	121.2	1.7	0.0
Lane LOS	F	A	
Approach Delay (s)	121.2	1.7	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	13.0		
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	124	132	25	147	101	20
Future Volume (vph)	124	132	25	147	101	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	131	139	26	155	106	21

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	270	181	127
Volume Left (vph)	131	0	106
Volume Right (vph)	139	155	0
Hadj (s)	-0.18	-0.48	0.20
Departure Headway (s)	4.4	4.2	5.0
Degree Utilization, x	0.33	0.21	0.17
Capacity (veh/h)	764	797	678
Control Delay (s)	9.6	8.4	9.0
Approach Delay (s)	9.6	8.4	9.0
Approach LOS	A	A	A

Intersection Summary			
Delay	9.1		
Level of Service	A		
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	149	5	5	119
Future Volume (Veh/h)	5	5	149	5	5	119
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	5	157	5	5	125
Pedestrians	10					10
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	1					1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	304	180			172	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	304	180			172	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	678	847			1392	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	162	130
Volume Left	5	0	5
Volume Right	5	5	0
cSH	754	1700	1392
Volume to Capacity	0.01	0.10	0.00
Queue Length 95th (m)	0.3	0.0	0.1
Control Delay (s)	9.8	0.0	0.3
Lane LOS	A		A
Approach Delay (s)	9.8	0.0	0.3
Approach LOS	A		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	23.4%	ICU Level of Service	A
Analysis Period (min)	15		

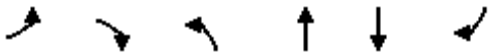
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	117	114	418	120	5	177	223	356	27	225	89
Future Volume (vph)	86	117	114	418	120	5	177	223	356	27	225	89
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		120.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00						0.99	
Frt		0.951			0.994				0.850		0.965	
Flt Protected		0.987		0.950				0.978			0.996	
Satd. Flow (prot)	0	1705	0	1742	1821	0	0	1794	1559	0	1748	0
Flt Permitted		0.863		0.950				0.423			0.290	
Satd. Flow (perm)	0	1491	0	1742	1821	0	0	776	1559	0	509	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		21			4				375			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			1199.9			85.9	
Travel Time (s)		18.4			12.4			86.4			6.2	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	334	0	440	131	0	0	421	375	0	359	0
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	6.1	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	6.1	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		10.0	10.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	47.0	47.0		55.0	102.0		30.0	30.0	55.0	30.0	30.0	
Total Split (%)	35.6%	35.6%		41.7%	77.3%		22.7%	22.7%	41.7%	22.7%	22.7%	
Maximum Green (s)	38.0	38.0		46.8	93.0		22.2	22.2	46.8	22.2	22.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		27.9		33.1	69.4			22.8	33.1		22.8	
Actuated g/C Ratio		0.25		0.30	0.63			0.21	0.30		0.21	
v/c Ratio		0.84		0.84	0.11			2.61	0.51		3.42	
Control Delay		56.9		51.0	7.1			763.2	5.6		1122.4	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		56.9		51.0	7.1			763.2	5.6		1122.4	
LOS		E		D	A			F	A		F	
Approach Delay		56.9			40.9			406.3			1122.4	
Approach LOS		E			D			F			F	
Queue Length 50th (m)		63.7		87.3	9.5			~153.8	0.0		~138.1	
Queue Length 95th (m)		110.8		137.3	15.8			#255.1	20.4		#231.0	
Internal Link Dist (m)		180.0			148.2			1175.9			61.9	
Turn Bay Length (m)									120.0			
Base Capacity (vph)		544		764	1549			161	894		105	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.61		0.58	0.08			2.61	0.42		3.42	

Intersection Summary

Area Type: Other
Cycle Length: 132
Actuated Cycle Length: 109.5
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 3.42
Intersection Signal Delay: 373.2 Intersection LOS: F
Intersection Capacity Utilization 111.5% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: White Ave/Hwy 22 & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	388	32	6	508	493	445
Future Volume (Veh/h)	388	32	6	508	493	445
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	408	34	6	535	519	468
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	1300	753	987			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1300	753	987			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	92	99			
cM capacity (veh/h)	176	410	700			

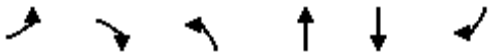
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	442	541	987
Volume Left	408	6	0
Volume Right	34	0	468
cSH	184	700	1700
Volume to Capacity	2.40	0.01	0.58
Queue Length 95th (m)	279.0	0.2	0.0
Control Delay (s)	684.6	0.2	0.0
Lane LOS	F	A	
Approach Delay (s)	684.6	0.2	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	153.7		
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	377	311	25	410	18	254	6	24	16	14	8
Future Volume (Veh/h)	5	377	311	25	410	18	254	6	24	16	14	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	397	327	26	432	19	267	6	25	17	15	8
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	461			734			1090	1094	570	1102	1248	452
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	461			734			1090	1094	570	1102	1248	452
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			0	97	95	90	91	99
cM capacity (veh/h)	1090			863			168	203	516	167	164	602

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	729	477	298	40
Volume Left	5	26	267	17
Volume Right	327	19	25	8
cSH	1090	863	179	194
Volume to Capacity	0.00	0.03	1.66	0.21
Queue Length 95th (m)	0.1	0.7	154.7	5.7
Control Delay (s)	0.1	0.9	367.9	28.3
Lane LOS	A	A	F	D
Approach Delay (s)	0.1	0.9	367.9	28.3
Approach LOS			F	D

Intersection Summary				
Average Delay	72.1			
Intersection Capacity Utilization	71.6%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	106	50	56	650	634	122
Future Volume (Veh/h)	106	50	56	650	634	122
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	112	53	59	684	667	128
Pedestrians	10					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1543	741	805			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1543	741	805			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	4	87	93			
cM capacity (veh/h)	116	412	812			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	165	743	795
Volume Left	112	59	0
Volume Right	53	0	128
cSH	151	812	1700
Volume to Capacity	1.09	0.07	0.47
Queue Length 95th (m)	66.8	1.8	0.0
Control Delay (s)	159.9	1.9	0.0
Lane LOS	F	A	
Approach Delay (s)	159.9	1.9	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	16.3		
Intersection Capacity Utilization	98.5%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	85	132	179	158	101	142
Future Volume (vph)	85	132	179	158	101	142
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	89	139	188	166	106	149

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	228	354	255
Volume Left (vph)	89	0	106
Volume Right (vph)	139	166	0
Hadj (s)	-0.25	-0.25	0.12
Departure Headway (s)	5.1	4.6	5.1
Degree Utilization, x	0.32	0.45	0.36
Capacity (veh/h)	646	747	672
Control Delay (s)	10.5	11.4	10.9
Approach Delay (s)	10.5	11.4	10.9
Approach LOS	B	B	B

Intersection Summary			
Delay	11.0		
Level of Service	B		
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	314	5	5	202
Future Volume (Veh/h)	5	5	314	5	5	202
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	5	331	5	5	213
Pedestrians	10					10
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	1					1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	566	354			346	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	566	354			346	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	479	677			1202	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	336	218
Volume Left	5	0	5
Volume Right	5	5	0
cSH	561	1700	1202
Volume to Capacity	0.02	0.20	0.00
Queue Length 95th (m)	0.4	0.0	0.1
Control Delay (s)	11.5	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	11.5	0.0	0.2
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

MOVEMENT SUMMARY

Site: [2045 Roundabout Option West (Site Folder: General)]

Hwy 22/ White Ave & Hwy 22/Burnside Drive
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hwy 22														
3b	L3	177	2.0	186	2.0	0.467	17.3	LOS B	3.8	29.1	0.86	0.89	0.93	45.8
3	L2	164	2.0	173	2.0	0.467	5.6	LOS A	3.8	29.1	0.86	0.89	0.93	36.0
8	T1	423	2.0	445	2.0	0.446	3.7	LOS A	3.7	28.7	0.85	0.67	0.85	29.0
18	R2	4	2.0	4	2.0	0.446	7.0	LOS A	3.7	28.7	0.85	0.67	0.85	38.5
Approach		768	2.0	808	2.0	0.467	7.2	LOS A	3.8	29.1	0.86	0.77	0.89	33.4
East: New Road														
1	L2	4	2.0	4	2.0	0.019	14.9	LOS B	0.1	0.7	0.76	0.75	0.76	56.8
1a	L1	4	2.0	4	2.0	0.019	13.5	LOS B	0.1	0.7	0.76	0.75	0.76	55.8
6	T1	3	2.0	3	2.0	0.019	7.2	LOS A	0.1	0.7	0.76	0.75	0.76	56.0
16	R2	4	2.0	4	2.0	0.010	9.5	LOS A	0.0	0.3	0.75	0.70	0.75	55.8
Approach		15	2.0	16	2.0	0.019	11.6	LOS B	0.1	0.7	0.76	0.73	0.76	56.1
North: Hwy 22														
7	L2	4	2.0	4	2.0	0.430	12.9	LOS B	3.2	24.9	0.70	0.44	0.70	40.3
4	T1	397	2.0	418	2.0	0.430	2.4	LOS A	3.2	24.9	0.70	0.44	0.70	29.2
14a	R1	145	2.0	153	2.0	0.558	4.6	LOS A	5.1	39.2	0.76	0.43	0.76	43.0
14	R2	518	2.0	545	2.0	0.558	2.1	LOS A	5.1	39.2	0.76	0.43	0.76	30.8
Approach		1064	2.0	1120	2.0	0.558	2.6	LOS A	5.1	39.2	0.73	0.43	0.74	31.3
West: Balsam Ave														
5	L2	502	2.0	528	2.0	0.576	3.9	LOS A	3.9	30.3	0.75	0.81	0.90	32.2
2	T1	3	2.0	3	2.0	0.576	6.6	LOS A	3.9	30.3	0.75	0.81	0.90	39.2
12	R2	148	2.0	156	2.0	0.268	3.8	LOS A	1.1	8.8	0.65	0.65	0.65	29.1
12b	R3	1	2.0	1	2.0	0.268	7.3	LOS A	1.1	8.8	0.65	0.65	0.65	38.7
Approach		654	2.0	688	2.0	0.576	3.9	LOS A	3.9	30.3	0.72	0.77	0.84	31.5
SouthWest: White Ave														
5bx	L3	1	2.0	1	2.0	0.477	20.1	LOS C	3.0	23.5	0.83	0.99	1.03	55.7
5ax	L1	117	2.0	123	2.0	0.477	17.3	LOS B	3.0	23.5	0.83	0.99	1.03	54.2
12ax	R1	4	2.0	4	2.0	0.477	10.7	LOS B	3.0	23.5	0.83	0.99	1.03	53.6
12bx	R3	125	2.0	132	2.0	0.477	11.7	LOS B	3.0	23.5	0.83	0.99	1.03	51.5
Approach		247	2.0	260	2.0	0.477	14.3	LOS B	3.0	23.5	0.83	0.99	1.03	52.8
All Vehicles		2748	2.0	2893	2.0	0.576	5.3	LOS A	5.1	39.2	0.78	0.66	0.83	33.2

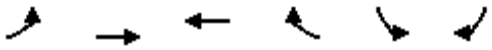
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	609	68	5	647	18	56	6	24	23	7	8
Future Volume (Veh/h)	5	609	68	5	647	18	56	6	24	23	7	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	641	72	5	681	19	59	6	25	24	7	8
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	710			723			1409	1417	687	1426	1444	700
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	710			723			1409	1417	687	1426	1444	700
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			44	95	94	76	95	98
cM capacity (veh/h)	881			871			106	133	443	100	128	435

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	718	705	90	39
Volume Left	5	5	59	24
Volume Right	72	19	25	8
cSH	881	871	137	124
Volume to Capacity	0.01	0.01	0.66	0.31
Queue Length 95th (m)	0.1	0.1	27.3	9.3
Control Delay (s)	0.2	0.2	71.8	46.6
Lane LOS	A	A	F	E
Approach Delay (s)	0.2	0.2	71.8	46.6
Approach LOS			F	E

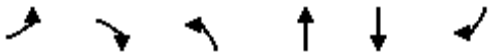
Intersection Summary				
Average Delay	5.5			
Intersection Capacity Utilization	53.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	86	231	322	5	11	64
Future Volume (Veh/h)	86	231	322	5	11	64
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	91	243	339	5	12	67
Pedestrians					10	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	354				776	352
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354				776	352
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				96	90
cM capacity (veh/h)	1193				335	686

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	334	344	79
Volume Left	91	0	12
Volume Right	0	5	67
cSH	1193	1700	591
Volume to Capacity	0.08	0.20	0.13
Queue Length 95th (m)	1.9	0.0	3.5
Control Delay (s)	2.8	0.0	12.0
Lane LOS	A		B
Approach Delay (s)	2.8	0.0	12.0
Approach LOS			B

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	106	50	56	658	560	122
Future Volume (Veh/h)	106	50	56	658	560	122
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	112	53	59	693	589	128
Pedestrians	10					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1474	663	727			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1474	663	727			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	13	88	93			
cM capacity (veh/h)	129	457	868			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	165	752	717
Volume Left	112	59	0
Volume Right	53	0	128
cSH	167	868	1700
Volume to Capacity	0.99	0.07	0.42
Queue Length 95th (m)	58.7	1.7	0.0
Control Delay (s)	121.2	1.7	0.0
Lane LOS	F	A	
Approach Delay (s)	121.2	1.7	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	13.0		
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		

MOVEMENT SUMMARY

Site: [2045 Roundabout Option North (Site Folder: General)]

Hwy 22/ White Ave & Hwy 22/Burnside Drive
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hwy 22														
3b	L3	177	2.0	186	2.0	0.407	14.8	LOS B	3.2	24.6	0.77	0.65	0.77	45.0
3	L2	223	2.0	235	2.0	0.407	3.1	LOS A	3.2	24.6	0.77	0.65	0.77	35.5
8	T1	356	2.0	375	2.0	0.407	3.7	LOS A	3.2	24.6	0.78	0.68	0.78	29.3
18	R2	4	2.0	4	2.0	0.407	7.2	LOS A	2.9	22.3	0.78	0.69	0.78	38.7
Approach		760	2.0	800	2.0	0.407	6.1	LOS A	3.2	24.6	0.77	0.67	0.77	33.9
East: New Road														
1	L2	4	2.0	4	2.0	0.018	14.8	LOS B	0.1	0.7	0.75	0.73	0.75	56.9
1a	L1	4	2.0	4	2.0	0.018	13.4	LOS B	0.1	0.7	0.75	0.73	0.75	55.9
6	T1	3	2.0	3	2.0	0.018	7.1	LOS A	0.1	0.7	0.75	0.73	0.75	56.1
16	R2	4	2.0	4	2.0	0.010	9.4	LOS A	0.0	0.3	0.74	0.69	0.74	55.9
Approach		15	2.0	16	2.0	0.018	11.5	LOS B	0.1	0.7	0.75	0.72	0.75	56.2
North: Hwy 22														
7	L2	4	2.0	4	2.0	0.421	13.3	LOS B	3.1	23.9	0.73	0.51	0.73	40.3
4	T1	373	2.0	393	2.0	0.421	2.8	LOS A	3.1	23.9	0.73	0.51	0.73	29.2
14a	R1	145	2.0	153	2.0	0.495	4.8	LOS A	4.2	32.4	0.75	0.46	0.75	43.6
14	R2	420	2.0	442	2.0	0.495	2.3	LOS A	4.2	32.4	0.75	0.46	0.75	31.1
Approach		942	2.0	992	2.0	0.495	2.9	LOS A	4.2	32.4	0.74	0.48	0.74	31.6
West: Balsam Ave														
5	L2	415	2.0	437	2.0	0.472	3.1	LOS A	2.8	21.3	0.69	0.60	0.76	32.3
2	T1	3	2.0	3	2.0	0.472	5.7	LOS A	2.8	21.3	0.69	0.60	0.76	39.3
12	R2	241	2.0	254	2.0	0.346	3.0	LOS A	1.6	12.6	0.65	0.58	0.66	29.2
12b	R3	1	2.0	1	2.0	0.346	6.6	LOS A	1.6	12.6	0.65	0.58	0.66	38.9
Approach		660	2.0	695	2.0	0.472	3.1	LOS A	2.8	21.3	0.68	0.59	0.73	31.2
SouthWest: White Ave														
5bx	L3	1	2.0	1	2.0	0.456	18.6	LOS B	2.7	20.8	0.80	0.96	0.95	57.0
5ax	L1	117	2.0	123	2.0	0.456	15.8	LOS B	2.7	20.8	0.80	0.96	0.95	55.4
12ax	R1	4	2.0	4	2.0	0.456	9.2	LOS A	2.7	20.8	0.80	0.96	0.95	54.8
12bx	R3	130	2.0	137	2.0	0.456	10.2	LOS B	2.7	20.8	0.80	0.96	0.95	52.6
Approach		252	2.0	265	2.0	0.456	12.8	LOS B	2.7	20.8	0.80	0.96	0.95	53.9
All Vehicles		2629	2.0	2767	2.0	0.495	4.9	LOS A	4.2	32.4	0.74	0.61	0.77	33.6

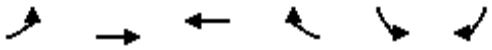
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	615	73	5	608	18	56	6	24	23	7	8
Future Volume (Veh/h)	5	615	73	5	608	18	56	6	24	23	7	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	647	77	5	640	19	59	6	25	24	7	8
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	669			734			1376	1384	696	1393	1414	660
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	669			734			1376	1384	696	1393	1414	660
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			47	96	94	77	95	98
cM capacity (veh/h)	912			863			112	139	438	105	134	459

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	729	664	90	39
Volume Left	5	5	59	24
Volume Right	77	19	25	8
cSH	912	863	143	131
Volume to Capacity	0.01	0.01	0.63	0.30
Queue Length 95th (m)	0.1	0.1	25.6	8.8
Control Delay (s)	0.1	0.2	65.2	43.8
Lane LOS	A	A	F	E
Approach Delay (s)	0.1	0.2	65.2	43.8
Approach LOS			F	E

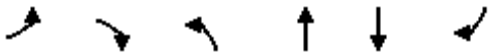
Intersection Summary				
Average Delay	5.1			
Intersection Capacity Utilization	54.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	86	231	322	5	16	64
Future Volume (Veh/h)	86	231	322	5	16	64
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	91	243	339	5	17	67
Pedestrians					10	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	354				776	352
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354				776	352
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				95	90
cM capacity (veh/h)	1193				335	686

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	334	344	84
Volume Left	91	0	17
Volume Right	0	5	67
cSH	1193	1700	566
Volume to Capacity	0.08	0.20	0.15
Queue Length 95th (m)	1.9	0.0	3.9
Control Delay (s)	2.8	0.0	12.5
Lane LOS	A		B
Approach Delay (s)	2.8	0.0	12.5
Approach LOS			B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	106	50	56	650	634	122
Future Volume (Veh/h)	106	50	56	650	634	122
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	112	53	59	684	667	128
Pedestrians	10					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1543	741	805			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1543	741	805			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	4	87	93			
cM capacity (veh/h)	116	412	812			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	165	743	795
Volume Left	112	59	0
Volume Right	53	0	128
cSH	151	812	1700
Volume to Capacity	1.09	0.07	0.47
Queue Length 95th (m)	66.8	1.8	0.0
Control Delay (s)	159.9	1.9	0.0
Lane LOS	F	A	
Approach Delay (s)	159.9	1.9	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	16.3		
Intersection Capacity Utilization	98.5%	ICU Level of Service	F
Analysis Period (min)	15		

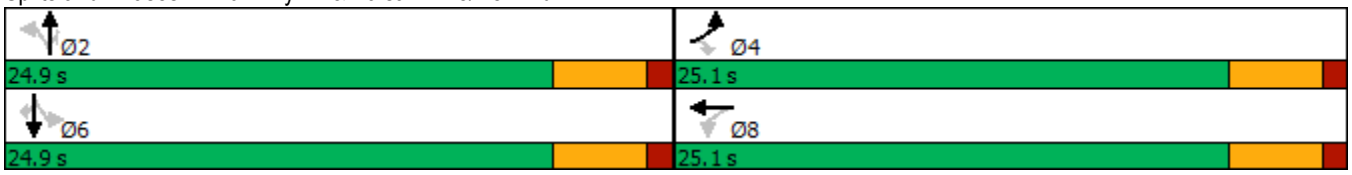
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	475	0	32	5	5	5	116	575	10	5	517	543
Future Volume (vph)	475	0	32	5	5	5	116	575	10	5	517	543
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		60.0	0.0		0.0
Storage Lanes	1		1	0		0	1		1	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.99		1.00				0.98			0.99
Frt			0.850		0.955				0.850			0.850
Flt Protected	0.950				0.984		0.950			0.950		
Satd. Flow (prot)	1742	0	1559	0	1715	0	1742	3484	1559	1742	3484	1559
Flt Permitted	0.950				0.984		0.444			0.399		
Satd. Flow (perm)	1742	0	1536	0	1715	0	814	3484	1521	732	3484	1536
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			34		5				33			572
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		147.6			74.5			222.0			411.2	
Travel Time (s)		10.6			5.4			16.0			29.6	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	500	0	34	5	5	5	122	605	11	5	544	572
Shared Lane Traffic (%)												
Lane Group Flow (vph)	500	0	34	0	15	0	122	605	11	5	544	572
Turn Type	Prot		Perm	Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4!				8!			2			6	
Permitted Phases			4	8			2		2	6		6
Detector Phase	4		4	8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.5		23.5	23.5	23.5		23.5	23.5	23.5	23.5	23.5	23.5
Total Split (s)	25.1		25.1	25.1	25.1		24.9	24.9	24.9	24.9	24.9	24.9
Total Split (%)	50.2%		50.2%	50.2%	50.2%		49.8%	49.8%	49.8%	49.8%	49.8%	49.8%
Maximum Green (s)	20.6		20.6	20.6	20.6		20.4	20.4	20.4	20.4	20.4	20.4
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5		4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)	8.0		8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0		0	0	0	0	0	0
Act Effct Green (s)	15.7		15.7		15.7		13.9	13.9	13.9	13.9	13.9	13.9
Actuated g/C Ratio	0.40		0.40		0.40		0.36	0.36	0.36	0.36	0.36	0.36
v/c Ratio	0.72		0.05		0.02		0.42	0.49	0.02	0.02	0.44	0.62

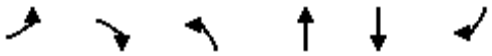
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	17.4		4.0		7.0		15.6	11.7	1.5	9.2	11.2	4.7
Queue Delay	0.0		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4		4.0		7.0		15.6	11.7	1.5	9.2	11.2	4.7
LOS	B		A		A		B	B	A	A	B	A
Approach Delay		16.6			7.0			12.2			7.9	
Approach LOS		B			A			B			A	
Queue Length 50th (m)	23.7		0.0		0.4		5.7	15.2	0.0	0.2	13.3	0.0
Queue Length 95th (m)	#64.4		3.6		2.9		17.8	29.6	0.9	1.7	26.5	14.4
Internal Link Dist (m)		123.6			50.5			198.0			387.2	
Turn Bay Length (m)									60.0			
Base Capacity (vph)	962		863		949		445	1906	847	400	1906	1099
Starvation Cap Reductn	0		0		0		0	0	0	0	0	0
Spillback Cap Reductn	0		0		0		0	0	0	0	0	0
Storage Cap Reductn	0		0		0		0	0	0	0	0	0
Reduced v/c Ratio	0.52		0.04		0.02		0.27	0.32	0.01	0.01	0.29	0.52

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 39			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 11.1		Intersection LOS: B	
Intersection Capacity Utilization 69.2%		ICU Level of Service C	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 10: Hwy 22 & Balsam Ave/New Rd

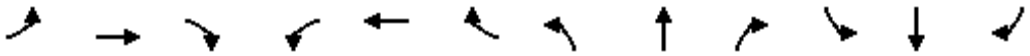




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	149	241	231	533	442	124
Future Volume (Veh/h)	149	241	231	533	442	124
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	157	254	243	561	465	131
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					222	
pX, platoon unblocked						
vC, conflicting volume	1232	232	465			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1232	232	465			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	67	78			
cM capacity (veh/h)	132	770	1093			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	157	254	243	280	280	232	232	131
Volume Left	157	0	243	0	0	0	0	0
Volume Right	0	254	0	0	0	0	0	131
cSH	132	770	1093	1700	1700	1700	1700	1700
Volume to Capacity	1.19	0.33	0.22	0.17	0.17	0.14	0.14	0.08
Queue Length 95th (m)	71.5	11.0	6.5	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	203.8	12.0	9.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	B	A					
Approach Delay (s)	85.2		2.8			0.0		
Approach LOS	F							

Intersection Summary				
Average Delay	20.6			
Intersection Capacity Utilization	44.2%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	459	218	25	618	18	85	6	24	16	14	8
Future Volume (Veh/h)	5	459	218	25	618	18	85	6	24	16	14	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	483	229	26	651	19	89	6	25	17	15	8
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)									4			
Median type		None			None							
Median storage veh)												
Upstream signal (m)					148							
pX, platoon unblocked												
vC, conflicting volume	680			722			1222	1235	493	1209	1445	661
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	680			722			1222	1235	493	1209	1445	661
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			33	96	96	88	88	98
cM capacity (veh/h)	904			872			133	167	571	141	125	458

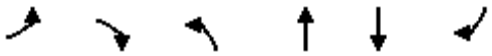
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	488	229	677	19	120	40
Volume Left	5	0	26	0	89	17
Volume Right	0	229	0	19	25	8
cSH	904	1700	872	1700	170	155
Volume to Capacity	0.01	0.13	0.03	0.01	0.70	0.26
Queue Length 95th (m)	0.1	0.0	0.7	0.0	32.4	7.4
Control Delay (s)	0.2	0.0	0.8	0.0	64.6	36.1
Lane LOS	A		A		F	E
Approach Delay (s)	0.1		0.8		64.6	36.1
Approach LOS					F	E

Intersection Summary				
Average Delay	6.2			
Intersection Capacity Utilization	71.0%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	297	58	86	231	159	89
Future Volume (Veh/h)	297	58	86	231	159	89
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	313	61	91	243	167	94
Pedestrians						10
Lane Width (m)						3.7
Walking Speed (m/s)						1.1
Percent Blockage						1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	472	101			334	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	472	101			334	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	30	93			86	
cM capacity (veh/h)	450	926			1222	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	313	61	91	243	198	63
Volume Left	313	0	0	0	167	0
Volume Right	0	61	0	243	0	0
cSH	450	926	1700	1700	1222	1700
Volume to Capacity	0.70	0.07	0.05	0.14	0.14	0.04
Queue Length 95th (m)	39.9	1.6	0.0	0.0	3.6	0.0
Control Delay (s)	29.4	9.2	0.0	0.0	7.3	0.0
Lane LOS	D	A			A	
Approach Delay (s)	26.1		0.0		5.5	
Approach LOS	D					

Intersection Summary			
Average Delay	11.6		
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	106	50	56	658	560	122
Future Volume (Veh/h)	106	50	56	658	560	122
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	112	53	59	693	589	128
Pedestrians	10					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1474	663	727			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1474	663	727			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	13	88	93			
cM capacity (veh/h)	129	457	868			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	165	752	717
Volume Left	112	59	0
Volume Right	53	0	128
cSH	167	868	1700
Volume to Capacity	0.99	0.07	0.42
Queue Length 95th (m)	58.7	1.7	0.0
Control Delay (s)	121.2	1.7	0.0
Lane LOS	F	A	
Approach Delay (s)	121.2	1.7	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	13.0		
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		

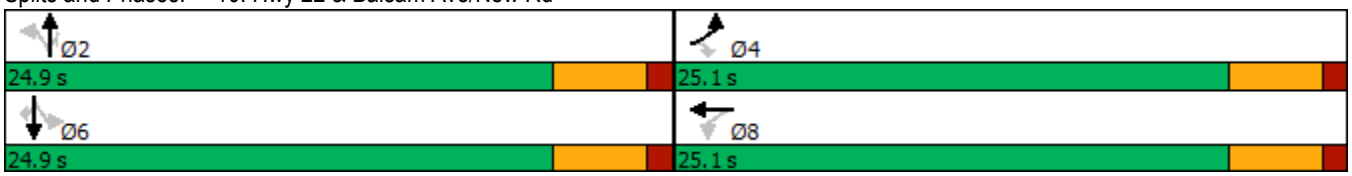
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	388	0	32	5	5	5	116	508	32	5	493	445
Future Volume (vph)	388	0	32	5	5	5	116	508	32	5	493	445
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		60.0	0.0		0.0
Storage Lanes	1		1	0		0	1		1	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.99		1.00				0.98			0.99
Frt			0.850		0.955				0.850			0.850
Flt Protected	0.950				0.984		0.950			0.950		
Satd. Flow (prot)	1742	0	1559	0	1715	0	1742	3484	1559	1742	3484	1559
Flt Permitted	0.950				0.984		0.460			0.453		
Satd. Flow (perm)	1742	0	1536	0	1715	0	844	3484	1521	831	3484	1536
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			34		5				34			468
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		147.6			74.5			222.0			411.2	
Travel Time (s)		10.6			5.4			16.0			29.6	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	408	0	34	5	5	5	122	535	34	5	519	468
Shared Lane Traffic (%)												
Lane Group Flow (vph)	408	0	34	0	15	0	122	535	34	5	519	468
Turn Type	Prot		Perm	Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4!				8!			2			6	
Permitted Phases			4	8			2		2	6		6
Detector Phase	4		4	8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.5		23.5	23.5	23.5		23.5	23.5	23.5	23.5	23.5	23.5
Total Split (s)	25.1		25.1	25.1	25.1		24.9	24.9	24.9	24.9	24.9	24.9
Total Split (%)	50.2%		50.2%	50.2%	50.2%		49.8%	49.8%	49.8%	49.8%	49.8%	49.8%
Maximum Green (s)	20.6		20.6	20.6	20.6		20.4	20.4	20.4	20.4	20.4	20.4
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5		4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)	8.0		8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0		0	0	0	0	0	0
Act Effct Green (s)	13.8		13.8		13.8		13.3	13.3	13.3	13.3	13.3	13.3
Actuated g/C Ratio	0.38		0.38		0.38		0.36	0.36	0.36	0.36	0.36	0.36
v/c Ratio	0.62		0.06		0.02		0.40	0.42	0.06	0.02	0.41	0.55

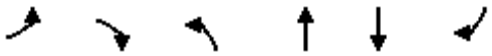
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	14.5		4.1		7.1		14.0	10.3	4.3	8.6	10.2	4.1
Queue Delay	0.0		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5		4.1		7.1		14.0	10.3	4.3	8.6	10.2	4.1
LOS	B		A		A		B	B	A	A	B	A
Approach Delay		13.7			7.1			10.6			7.3	
Approach LOS		B			A			B			A	
Queue Length 50th (m)	17.0		0.0		0.3		4.8	11.2	0.0	0.2	10.8	0.0
Queue Length 95th (m)	47.7		3.6		2.9		17.5	26.0	3.7	1.7	25.2	13.2
Internal Link Dist (m)		123.6			50.5			198.0			387.2	
Turn Bay Length (m)									60.0			
Base Capacity (vph)	1024		917		1010		491	2029	900	484	2029	1090
Starvation Cap Reductn	0		0		0		0	0	0	0	0	0
Spillback Cap Reductn	0		0		0		0	0	0	0	0	0
Storage Cap Reductn	0		0		0		0	0	0	0	0	0
Reduced v/c Ratio	0.40		0.04		0.01		0.25	0.26	0.04	0.01	0.26	0.43

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 36.5			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 9.7		Intersection LOS: A	
Intersection Capacity Utilization 62.3%		ICU Level of Service B	
Analysis Period (min) 15			

! Phase conflict between lane groups.

Splits and Phases: 10: Hwy 22 & Balsam Ave/New Rd

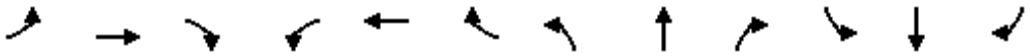




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	149	339	290	466	418	124
Future Volume (Veh/h)	149	339	290	466	418	124
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	157	357	305	491	440	131
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					222	
pX, platoon unblocked						
vC, conflicting volume	1296	220	440			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1296	220	440			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	54	73			
cM capacity (veh/h)	112	784	1116			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	157	357	305	246	246	220	220	131
Volume Left	157	0	305	0	0	0	0	0
Volume Right	0	357	0	0	0	0	0	131
cSH	112	784	1116	1700	1700	1700	1700	1700
Volume to Capacity	1.40	0.46	0.27	0.14	0.14	0.13	0.13	0.08
Queue Length 95th (m)	83.6	18.2	8.5	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	297.2	13.4	9.4	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	B	A					
Approach Delay (s)	100.1		3.6			0.0		
Approach LOS	F							

Intersection Summary				
Average Delay	28.9			
Intersection Capacity Utilization	46.8%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	372	316	25	520	18	144	6	24	16	14	8
Future Volume (Veh/h)	5	372	316	25	520	18	144	6	24	16	14	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	392	333	26	547	19	152	6	25	17	15	8
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)									4			
Median type		None			None							
Median storage veh)												
Upstream signal (m)					148							
pX, platoon unblocked												
vC, conflicting volume	576			735			1026	1040	402	1014	1354	557
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	576			735			1026	1040	402	1014	1354	557
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			17	97	96	91	89	98
cM capacity (veh/h)	988			862			183	218	642	194	142	525

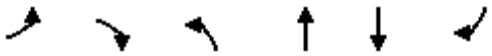
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	397	333	573	19	183	40
Volume Left	5	0	26	0	152	17
Volume Right	0	333	0	19	25	8
cSH	988	1700	862	1700	212	192
Volume to Capacity	0.01	0.20	0.03	0.01	0.86	0.21
Queue Length 95th (m)	0.1	0.0	0.7	0.0	50.7	5.8
Control Delay (s)	0.2	0.0	0.8	0.0	78.2	28.7
Lane LOS	A		A		F	D
Approach Delay (s)	0.1		0.8		78.2	28.7
Approach LOS					F	D

Intersection Summary				
Average Delay	10.4			
Intersection Capacity Utilization	70.8%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	297	117	86	231	257	89
Future Volume (Veh/h)	297	117	86	231	257	89
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	313	123	91	243	271	94
Pedestrians						10
Lane Width (m)						3.7
Walking Speed (m/s)						1.1
Percent Blockage						1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	680	101			334	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	680	101			334	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	87			78	
cM capacity (veh/h)	299	926			1222	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	313	123	91	243	302	63
Volume Left	313	0	0	0	271	0
Volume Right	0	123	0	243	0	0
cSH	299	926	1700	1700	1222	1700
Volume to Capacity	1.05	0.13	0.05	0.14	0.22	0.04
Queue Length 95th (m)	89.1	3.5	0.0	0.0	6.5	0.0
Control Delay (s)	103.2	9.5	0.0	0.0	8.1	0.0
Lane LOS	F	A			A	
Approach Delay (s)	76.8		0.0		6.7	
Approach LOS	F					

Intersection Summary			
Average Delay	31.6		
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	106	50	56	650	634	122
Future Volume (Veh/h)	106	50	56	650	634	122
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	112	53	59	684	667	128
Pedestrians	10					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1543	741	805			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1543	741	805			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	4	87	93			
cM capacity (veh/h)	116	412	812			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	165	743	795
Volume Left	112	59	0
Volume Right	53	0	128
cSH	151	812	1700
Volume to Capacity	1.09	0.07	0.47
Queue Length 95th (m)	66.8	1.8	0.0
Control Delay (s)	159.9	1.9	0.0
Lane LOS	F	A	
Approach Delay (s)	159.9	1.9	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	16.3		
Intersection Capacity Utilization	98.5%	ICU Level of Service	F
Analysis Period (min)	15		

MOVEMENT SUMMARY

Site: [2045 Roundabout Option West with Mitigations (Site Folder: General)]

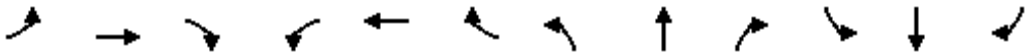
Hwy 22/ White Ave & Hwy 22/Burnside Drive
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hwy 22														
3b	L3	177	2.0	192	2.0	0.509	19.1	LOS B	4.4	34.3	0.90	0.98	1.05	45.1
3	L2	164	2.0	173	2.0	0.509	7.3	LOS A	4.4	34.3	0.90	0.98	1.05	35.5
8	T1	423	2.0	445	2.0	0.472	4.7	LOS A	4.2	32.4	0.90	0.82	0.94	28.9
18	R2	4	2.0	4	2.0	0.472	8.1	LOS A	4.2	32.4	0.90	0.82	0.94	38.4
Approach		768	2.0	815	2.0	0.509	8.7	LOS A	4.4	34.3	0.90	0.89	0.99	33.2
East: New Road														
1	L2	4	2.0	4	2.0	0.021	15.6	LOS B	0.1	0.8	0.79	0.76	0.79	56.4
1a	L1	4	2.0	4	2.0	0.021	14.2	LOS B	0.1	0.8	0.79	0.76	0.79	55.4
6	T1	3	2.0	3	2.0	0.021	7.9	LOS A	0.1	0.8	0.79	0.76	0.79	55.6
16	R2	4	2.0	4	2.0	0.011	10.3	LOS B	0.1	0.4	0.77	0.72	0.77	55.1
Approach		15	2.0	16	2.0	0.021	12.3	LOS B	0.1	0.8	0.78	0.75	0.78	55.6
North: Hwy 22														
7	L2	4	2.0	4	2.0	0.457	13.5	LOS B	3.4	26.5	0.75	0.55	0.75	40.2
4	T1	397	2.0	418	2.0	0.457	3.0	LOS A	3.4	26.5	0.75	0.55	0.75	29.1
14a	R1	145	2.0	158	2.0	0.590	5.7	LOS A	5.9	45.7	0.82	0.66	0.87	42.9
14	R2	518	2.0	545	2.0	0.590	3.2	LOS A	5.9	45.7	0.82	0.66	0.87	30.7
Approach		1064	2.0	1125	2.0	0.590	3.5	LOS A	5.9	45.7	0.79	0.62	0.83	31.3
West: Balsam Ave														
5	L2	502	2.0	528	2.0	0.584	4.0	LOS A	4.0	31.1	0.76	0.82	0.91	32.2
2	T1	3	2.0	3	2.0	0.584	6.6	LOS A	4.0	31.1	0.76	0.82	0.91	39.2
12	R2	148	2.0	156	2.0	0.271	3.8	LOS A	1.2	9.0	0.65	0.65	0.65	29.1
12b	R3	1	2.0	1	2.0	0.271	7.4	LOS A	1.2	9.0	0.65	0.65	0.65	38.7
Approach		654	2.0	689	2.0	0.584	4.0	LOS A	4.0	31.1	0.73	0.79	0.85	31.5
SouthWest: White Ave														
5bx	L3	62	2.0	67	2.0	0.616	22.8	LOS C	4.7	36.0	0.88	1.07	1.25	52.9
5ax	L1	117	2.0	127	2.0	0.616	19.9	LOS B	4.7	36.0	0.88	1.07	1.25	51.5
12ax	R1	4	2.0	4	2.0	0.616	13.4	LOS B	4.7	36.0	0.88	1.07	1.25	51.1
12bx	R3	125	2.0	136	2.0	0.616	14.3	LOS B	4.7	36.0	0.88	1.07	1.25	49.2
Approach		308	2.0	335	2.0	0.616	18.1	LOS B	4.7	36.0	0.88	1.07	1.25	50.8
All Vehicles		2809	2.0	2979	2.0	0.616	6.7	LOS A	5.9	45.7	0.82	0.78	0.93	33.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).

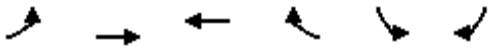
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	609	68	5	703	24	0	0	24	23	7	8
Future Volume (Veh/h)	5	609	68	5	703	24	0	0	24	23	7	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	641	72	5	740	25	0	0	25	24	7	8
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	775			723			1471	1482	687	1484	1506	762
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	775			723			1471	1482	687	1484	1506	762
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			100	100	94	74	94	98
cM capacity (veh/h)	833			871			95	121	443	94	117	401

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	718	770	25	39
Volume Left	5	5	0	24
Volume Right	72	25	25	8
cSH	833	871	443	116
Volume to Capacity	0.01	0.01	0.06	0.33
Queue Length 95th (m)	0.1	0.1	1.4	10.1
Control Delay (s)	0.2	0.2	13.6	50.7
Lane LOS	A	A	B	F
Approach Delay (s)	0.2	0.2	13.6	50.7
Approach LOS			B	F

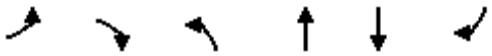
Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	54.2%	ICU Level of Service	A	
Analysis Period (min)	15			



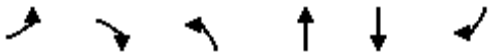
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	293	322	5	11	64
Future Volume (Veh/h)	24	293	322	5	11	64
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	25	308	339	5	12	67
Pedestrians					10	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	354				710	352
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354				710	352
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				97	90
cM capacity (veh/h)	1193				388	686

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	333	344	79
Volume Left	25	0	12
Volume Right	0	5	67
cSH	1193	1700	614
Volume to Capacity	0.02	0.20	0.13
Queue Length 95th (m)	0.5	0.0	3.3
Control Delay (s)	0.8	0.0	11.7
Lane LOS	A		B
Approach Delay (s)	0.8	0.0	11.7
Approach LOS			B

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		



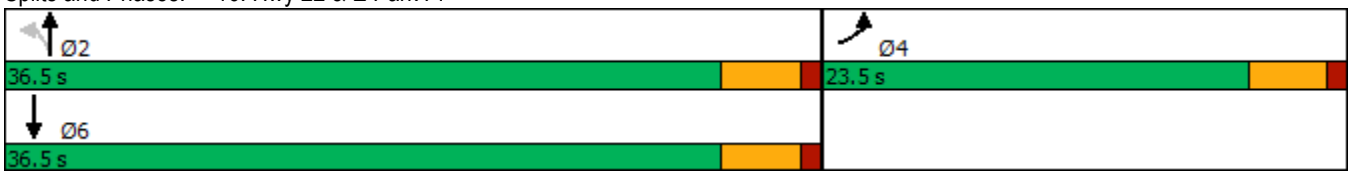
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	106	50	56	658	560	122
Future Volume (vph)	106	50	56	658	560	122
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99			1.00	0.99	
Frt	0.957				0.976	
Flt Protected	0.967			0.996		
Satd. Flow (prot)	1683	0	0	1827	1777	0
Flt Permitted	0.967			0.915		
Satd. Flow (perm)	1683	0	0	1678	1777	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	42				28	
Link Speed (k/h)	50			50	50	
Link Distance (m)	533.1			54.6	357.1	
Travel Time (s)	38.4			3.9	25.7	
Confl. Peds. (#/hr)			10			10
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	112	53	59	693	589	128
Shared Lane Traffic (%)						
Lane Group Flow (vph)	165	0	0	752	717	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	23.5		23.5	23.5	23.5	
Total Split (s)	23.5		36.5	36.5	36.5	
Total Split (%)	39.2%		60.8%	60.8%	60.8%	
Maximum Green (s)	19.0		32.0	32.0	32.0	
Yellow Time (s)	3.5		3.5	3.5	3.5	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	4.5			4.5	4.5	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		Min	Min	Min	
Walk Time (s)	8.0		8.0	8.0	8.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	10.8			36.5	36.5	
Actuated g/C Ratio	0.21			0.70	0.70	
v/c Ratio	0.43			0.64	0.57	
Control Delay	17.8			10.3	8.1	
Queue Delay	0.0			0.0	0.0	



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	17.8			10.3	8.1	
LOS	B			B	A	
Approach Delay	17.8			10.3	8.1	
Approach LOS	B			B	A	
Queue Length 50th (m)	9.9			37.6	31.2	
Queue Length 95th (m)	22.9			#91.0	70.5	
Internal Link Dist (m)	509.1			30.6	333.1	
Turn Bay Length (m)						
Base Capacity (vph)	646			1179	1257	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.26			0.64	0.57	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 52			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 10.1		Intersection LOS: B	
Intersection Capacity Utilization 97.2%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 16: Hwy 22 & E Park Pl



MOVEMENT SUMMARY

Site: [2045 Roundabout Option North with Mitigations (Site Folder: General)]

Hwy 22/ White Ave & Hwy 22/Burnside Drive
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hwy 22														
3b	L3	177	2.0	186	2.0	0.429	15.3	LOS B	3.4	26.4	0.81	0.71	0.81	44.9
3	L2	223	2.0	235	2.0	0.429	3.6	LOS A	3.4	26.4	0.81	0.71	0.81	35.4
8	T1	356	2.0	375	2.0	0.429	4.5	LOS A	3.4	26.4	0.81	0.75	0.83	29.3
18	R2	4	2.0	4	2.0	0.429	8.0	LOS A	3.1	24.2	0.81	0.75	0.83	38.5
Approach		760	2.0	800	2.0	0.429	6.8	LOS A	3.4	26.4	0.81	0.73	0.82	33.9
East: New Road														
1	L2	4	2.0	4	2.0	0.019	15.4	LOS B	0.1	0.8	0.78	0.74	0.78	56.5
1a	L1	4	2.0	4	2.0	0.019	14.0	LOS B	0.1	0.8	0.78	0.74	0.78	55.6
6	T1	3	2.0	3	2.0	0.019	7.7	LOS A	0.1	0.8	0.78	0.74	0.78	55.7
16	R2	4	2.0	4	2.0	0.010	10.1	LOS B	0.0	0.4	0.76	0.70	0.76	55.3
Approach		15	2.0	16	2.0	0.019	12.1	LOS B	0.1	0.8	0.77	0.73	0.77	55.8
North: Hwy 22														
7	L2	4	2.0	4	2.0	0.446	13.8	LOS B	3.3	25.5	0.77	0.61	0.77	40.2
4	T1	373	2.0	393	2.0	0.446	3.3	LOS A	3.3	25.5	0.77	0.61	0.77	29.1
14a	R1	145	2.0	153	2.0	0.519	5.4	LOS A	4.6	35.3	0.80	0.58	0.82	43.5
14	R2	420	2.0	442	2.0	0.519	2.9	LOS A	4.6	35.3	0.80	0.58	0.82	31.0
Approach		942	2.0	992	2.0	0.519	3.5	LOS A	4.6	35.3	0.79	0.59	0.80	31.6
West: Balsam Ave														
5	L2	415	2.0	437	2.0	0.476	3.1	LOS A	2.8	21.7	0.70	0.60	0.77	32.3
2	T1	3	2.0	3	2.0	0.476	5.7	LOS A	2.8	21.7	0.70	0.60	0.77	39.3
12	R2	241	2.0	254	2.0	0.349	3.0	LOS A	1.7	12.8	0.66	0.58	0.67	29.2
12b	R3	1	2.0	1	2.0	0.349	6.6	LOS A	1.7	12.8	0.66	0.58	0.67	38.8
Approach		660	2.0	695	2.0	0.476	3.1	LOS A	2.8	21.7	0.68	0.60	0.74	31.2
SouthWest: White Ave														
5bx	L3	62	2.0	65	2.0	0.569	20.2	LOS C	3.8	29.5	0.84	1.02	1.11	54.9
5ax	L1	117	2.0	123	2.0	0.569	17.4	LOS B	3.8	29.5	0.84	1.02	1.11	53.4
12ax	R1	4	2.0	4	2.0	0.569	10.8	LOS B	3.8	29.5	0.84	1.02	1.11	52.9
12bx	R3	130	2.0	137	2.0	0.569	11.8	LOS B	3.8	29.5	0.84	1.02	1.11	50.9
Approach		313	2.0	329	2.0	0.569	15.5	LOS B	3.8	29.5	0.84	1.02	1.11	52.6
All Vehicles		2690	2.0	2832	2.0	0.569	5.8	LOS A	4.6	35.3	0.77	0.68	0.83	33.8

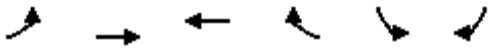
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	615	73	5	664	24	0	0	24	23	7	8
Future Volume (Veh/h)	5	615	73	5	664	24	0	0	24	23	7	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	647	77	5	699	25	0	0	25	24	7	8
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	734			734			1438	1450	696	1452	1476	722
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	734			734			1438	1450	696	1452	1476	722
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			100	100	94	76	94	98
cM capacity (veh/h)	863			863			101	127	438	99	122	423

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	729	729	25	39
Volume Left	5	5	0	24
Volume Right	77	25	25	8
cSH	863	863	438	122
Volume to Capacity	0.01	0.01	0.06	0.32
Queue Length 95th (m)	0.1	0.1	1.4	9.5
Control Delay (s)	0.2	0.2	13.7	47.6
Lane LOS	A	A	B	E
Approach Delay (s)	0.2	0.2	13.7	47.6
Approach LOS			B	E

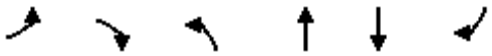
Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	54.9%	ICU Level of Service	A	
Analysis Period (min)	15			



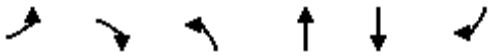
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	293	322	5	16	64
Future Volume (Veh/h)	24	293	322	5	16	64
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	25	308	339	5	17	67
Pedestrians					10	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	354				710	352
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354				710	352
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				96	90
cM capacity (veh/h)	1193				388	686

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	333	344	84
Volume Left	25	0	17
Volume Right	0	5	67
cSH	1193	1700	594
Volume to Capacity	0.02	0.20	0.14
Queue Length 95th (m)	0.5	0.0	3.7
Control Delay (s)	0.8	0.0	12.1
Lane LOS	A		B
Approach Delay (s)	0.8	0.0	12.1
Approach LOS			B

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	106	50	56	650	634	122
Future Volume (vph)	106	50	56	650	634	122
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99			1.00	0.99	
Frt	0.957				0.978	
Flt Protected	0.967			0.996		
Satd. Flow (prot)	1682	0	0	1827	1782	0
Flt Permitted	0.967			0.905		
Satd. Flow (perm)	1682	0	0	1659	1782	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	33				25	
Link Speed (k/h)	50			50	50	
Link Distance (m)	533.1			54.6	357.1	
Travel Time (s)	38.4			3.9	25.7	
Confl. Peds. (#/hr)			10			10
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	112	53	59	684	667	128
Shared Lane Traffic (%)						
Lane Group Flow (vph)	165	0	0	743	795	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	23.5		23.5	23.5	23.5	
Total Split (s)	23.5		46.5	46.5	46.5	
Total Split (%)	33.6%		66.4%	66.4%	66.4%	
Maximum Green (s)	19.0		42.0	42.0	42.0	
Yellow Time (s)	3.5		3.5	3.5	3.5	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	4.5			4.5	4.5	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		Min	Min	Min	
Walk Time (s)	8.0		8.0	8.0	8.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	11.8			38.1	38.1	
Actuated g/C Ratio	0.22			0.72	0.72	
v/c Ratio	0.41			0.63	0.62	
Control Delay	21.0			9.4	8.8	
Queue Delay	0.0			0.0	0.0	



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	21.0			9.4	8.8	
LOS	C			A	A	
Approach Delay	21.0			9.4	8.8	
Approach LOS	C			A	A	
Queue Length 50th (m)	11.2			37.3	38.0	
Queue Length 95th (m)	28.9			88.3	88.8	
Internal Link Dist (m)	509.1			30.6	333.1	
Turn Bay Length (m)						
Base Capacity (vph)	661			1294	1396	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.25			0.57	0.57	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 53.2			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 10.3		Intersection LOS: B	
Intersection Capacity Utilization 99.4%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 16: Hwy 22 & E Park Pl

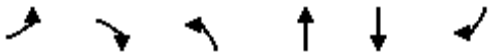
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	98	74	324	100	5	123	182	276	23	183	77
Future Volume (vph)	74	98	74	324	100	5	123	182	276	23	183	77
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		120.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00						0.99	
Frt		0.959			0.993				0.850		0.963	
Flt Protected		0.985		0.950				0.980			0.996	
Satd. Flow (prot)	0	1718	0	1742	1819	0	0	1797	1559	0	1746	0
Flt Permitted		0.859		0.950				0.660			0.947	
Satd. Flow (perm)	0	1498	0	1742	1819	0	0	1210	1559	0	1660	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		21			4				291			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			1199.9			85.9	
Travel Time (s)		18.4			12.4			86.4			6.2	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	78	103	78	341	105	5	129	192	291	24	193	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	259	0	341	110	0	0	321	291	0	298	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		10.0	10.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	31.0	31.0		30.0	61.0		34.0	34.0	30.0	34.0	34.0	
Total Split (%)	32.6%	32.6%		31.6%	64.2%		35.8%	35.8%	31.6%	35.8%	35.8%	
Maximum Green (s)	22.0	22.0		21.8	52.0		26.2	26.2	21.8	26.2	26.2	
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		19.1		20.4	47.8			26.3	20.4		26.3	
Actuated g/C Ratio		0.21		0.22	0.53			0.29	0.22		0.29	
v/c Ratio		0.78		0.87	0.11			0.92	0.51		0.62	
Control Delay		48.7		58.3	10.5			66.0	7.2		35.7	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		48.7		58.3	10.5			66.0	7.2		35.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D		E	B			E	A		D	
Approach Delay		48.7			46.6			38.1			35.7	
Approach LOS		D			D			D			D	
Queue Length 50th (m)		40.4		58.8	8.8			56.5	0.0		47.0	
Queue Length 95th (m)		#73.2		#105.8	16.6			#109.6	19.6		76.1	
Internal Link Dist (m)		180.0			148.2			1175.9			61.9	
Turn Bay Length (m)									120.0			
Base Capacity (vph)		379		418	1045			349	595		479	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.68		0.82	0.11			0.92	0.49		0.62	

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 90.9			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 41.7		Intersection LOS: D	
Intersection Capacity Utilization 93.4%		ICU Level of Service F	
Analysis Period (min) 15			

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

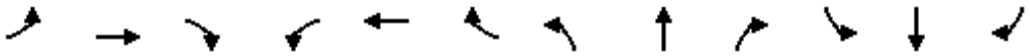
Splits and Phases: 1: White Ave/Hwy 22 & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	396	28	5	404	385	404
Future Volume (Veh/h)	396	28	5	404	385	404
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	417	29	5	425	405	425
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	1052	618	830			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1052	618	830			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	94	99			
cM capacity (veh/h)	249	490	802			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	446	430	830
Volume Left	417	5	0
Volume Right	29	0	425
cSH	257	802	1700
Volume to Capacity	1.73	0.01	0.49
Queue Length 95th (m)	222.6	0.1	0.0
Control Delay (s)	379.0	0.2	0.0
Lane LOS	F	A	
Approach Delay (s)	379.0	0.2	0.0
Approach LOS	F		

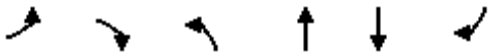
Intersection Summary			
Average Delay	99.1		
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	391	261	20	379	12	212	5	20	10	10	7
Future Volume (Veh/h)	5	391	261	20	379	12	212	5	20	10	10	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	412	275	21	399	13	223	5	21	11	11	7
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	422			697			1030	1034	560	1040	1164	416
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	422			697			1030	1034	560	1040	1164	416
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			0	98	96	94	94	99
cM capacity (veh/h)	1127			891			191	222	523	188	185	631

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	692	433	249	29
Volume Left	5	21	223	11
Volume Right	275	13	21	7
cSH	1127	891	203	225
Volume to Capacity	0.00	0.02	1.23	0.13
Queue Length 95th (m)	0.1	0.6	98.7	3.3
Control Delay (s)	0.1	0.7	185.9	23.4
Lane LOS	A	A	F	C
Approach Delay (s)	0.1	0.7	185.9	23.4
Approach LOS			F	C

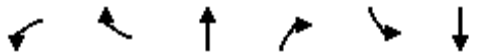
Intersection Summary			
Average Delay	33.8		
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	58	30	33	524	516	66
Future Volume (Veh/h)	58	30	33	524	516	66
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	61	32	35	552	543	69
Pedestrians	10					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1210	588	622			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1210	588	622			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	68	94	96			
cM capacity (veh/h)	193	504	950			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	93	587	612
Volume Left	61	35	0
Volume Right	32	0	69
cSH	245	950	1700
Volume to Capacity	0.38	0.04	0.36
Queue Length 95th (m)	12.8	0.9	0.0
Control Delay (s)	28.5	1.0	0.0
Lane LOS	D	A	
Approach Delay (s)	28.5	1.0	0.0
Approach LOS	D		

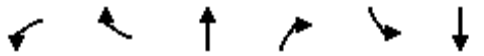
Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	177	111	22	266	85	17
Future Volume (vph)	177	111	22	266	85	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	186	117	23	280	89	18

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	303	303	107
Volume Left (vph)	186	0	89
Volume Right (vph)	117	280	0
Hadj (s)	-0.07	-0.52	0.20
Departure Headway (s)	4.8	4.3	5.2
Degree Utilization, x	0.40	0.36	0.16
Capacity (veh/h)	708	789	635
Control Delay (s)	10.9	9.7	9.2
Approach Delay (s)	10.9	9.7	9.2
Approach LOS	B	A	A

Intersection Summary			
Delay	10.2		
Level of Service	B		
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	268	5	5	172
Future Volume (Veh/h)	5	5	268	5	5	172
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	5	282	5	5	181
Pedestrians	10					10
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	1					1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	486	304			297	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	486	304			297	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	534	722			1252	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	287	186
Volume Left	5	0	5
Volume Right	5	5	0
cSH	613	1700	1252
Volume to Capacity	0.02	0.17	0.00
Queue Length 95th (m)	0.4	0.0	0.1
Control Delay (s)	11.0	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	11.0	0.0	0.2
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	27.7%	ICU Level of Service	A
Analysis Period (min)	15		

MOVEMENT SUMMARY

Site: [2035 Roundabout Option (Site Folder: General)]

Hwy 22/ White Ave & Hwy 22/Burnside Drive
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hwy 22														
3b	L3	123	2.0	129	2.0	0.306	14.5	LOS B	2.2	17.1	0.71	0.59	0.71	44.6
3	L2	182	2.0	192	2.0	0.306	2.8	LOS A	2.2	17.1	0.71	0.59	0.71	35.2
8	T1	276	2.0	291	2.0	0.306	3.3	LOS A	2.2	17.1	0.72	0.61	0.72	29.4
18	R2	4	2.0	4	2.0	0.306	6.8	LOS A	2.0	15.6	0.72	0.61	0.72	38.8
Approach		585	2.0	616	2.0	0.306	5.5	LOS A	2.2	17.1	0.71	0.60	0.71	33.7
East: New Road														
1	L2	4	2.0	4	2.0	0.016	13.9	LOS B	0.1	0.6	0.69	0.70	0.69	57.5
1a	L1	4	2.0	4	2.0	0.016	12.5	LOS B	0.1	0.6	0.69	0.70	0.69	56.5
6	T1	3	2.0	3	2.0	0.016	6.3	LOS A	0.1	0.6	0.69	0.70	0.69	56.7
16	R2	4	2.0	4	2.0	0.008	8.3	LOS A	0.0	0.3	0.68	0.65	0.68	56.8
Approach		15	2.0	16	2.0	0.016	10.5	LOS B	0.1	0.6	0.69	0.69	0.69	56.9
North: Hwy 22														
7	L2	4	2.0	4	2.0	0.297	12.4	LOS B	2.0	15.1	0.59	0.36	0.59	40.6
4	T1	285	2.0	300	2.0	0.297	1.9	LOS A	2.0	15.1	0.59	0.36	0.59	29.3
14a	R1	120	2.0	126	2.0	0.406	4.1	LOS A	3.1	24.2	0.62	0.34	0.62	43.7
14	R2	384	2.0	404	2.0	0.406	1.6	LOS A	3.1	24.2	0.62	0.34	0.62	31.1
Approach		793	2.0	835	2.0	0.406	2.1	LOS A	3.1	24.2	0.61	0.34	0.61	31.8
West: Balsam Ave														
5	L2	419	2.0	441	2.0	0.433	2.3	LOS A	2.3	17.8	0.61	0.42	0.63	32.4
2	T1	3	2.0	3	2.0	0.433	4.9	LOS A	2.3	17.8	0.61	0.42	0.63	39.5
12	R2	198	2.0	208	2.0	0.268	2.5	LOS A	1.2	9.0	0.57	0.47	0.57	29.3
12b	R3	1	2.0	1	2.0	0.268	6.0	LOS A	1.2	9.0	0.57	0.47	0.57	39.1
Approach		621	2.0	654	2.0	0.433	2.4	LOS A	2.3	17.8	0.59	0.44	0.61	31.4
SouthWest: White Ave														
5bx	L3	1	2.0	1	2.0	0.313	16.3	LOS B	1.5	11.9	0.72	0.87	0.72	58.8
5ax	L1	98	2.0	103	2.0	0.313	13.5	LOS B	1.5	11.9	0.72	0.87	0.72	57.1
12ax	R1	4	2.0	4	2.0	0.313	6.9	LOS A	1.5	11.9	0.72	0.87	0.72	56.5
12bx	R3	87	2.0	92	2.0	0.313	7.9	LOS A	1.5	11.9	0.72	0.87	0.72	54.2
Approach		190	2.0	200	2.0	0.313	10.8	LOS B	1.5	11.9	0.72	0.87	0.72	55.7
All Vehicles		2204	2.0	2320	2.0	0.433	3.9	LOS A	3.1	24.2	0.64	0.49	0.65	33.5

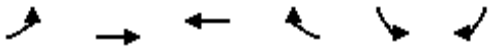
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	587	65	5	541	12	50	4	20	15	5	7
Future Volume (Veh/h)	5	587	65	5	541	12	50	4	20	15	5	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	618	68	5	569	13	53	4	21	16	5	7
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	592			696			1267	1274	662	1280	1302	586
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	592			696			1267	1274	662	1280	1302	586
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			61	98	95	88	97	99
cM capacity (veh/h)	975			892			136	162	457	129	156	506

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	691	587	78	28
Volume Left	5	5	53	16
Volume Right	68	13	21	7
cSH	975	892	169	165
Volume to Capacity	0.01	0.01	0.46	0.17
Queue Length 95th (m)	0.1	0.1	16.4	4.5
Control Delay (s)	0.1	0.2	43.3	31.2
Lane LOS	A	A	E	D
Approach Delay (s)	0.1	0.2	43.3	31.2
Approach LOS			E	D

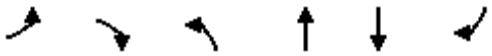
Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	74	172	243	5	13	57
Future Volume (Veh/h)	74	172	243	5	13	57
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	78	181	256	5	14	60
Pedestrians					10	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	271				606	268
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	271				606	268
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				97	92
cM capacity (veh/h)	1280				428	763

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	259	261	74
Volume Left	78	0	14
Volume Right	0	5	60
cSH	1280	1700	665
Volume to Capacity	0.06	0.15	0.11
Queue Length 95th (m)	1.5	0.0	2.8
Control Delay (s)	2.8	0.0	11.1
Lane LOS	A		B
Approach Delay (s)	2.8	0.0	11.1
Approach LOS			B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	58	30	33	524	516	66
Future Volume (Veh/h)	58	30	33	524	516	66
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	61	32	35	552	543	69
Pedestrians	10					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1210	588	622			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1210	588	622			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	68	94	96			
cM capacity (veh/h)	193	504	950			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	93	587	612
Volume Left	61	35	0
Volume Right	32	0	69
cSH	245	950	1700
Volume to Capacity	0.38	0.04	0.36
Queue Length 95th (m)	12.8	0.9	0.0
Control Delay (s)	28.5	1.0	0.0
Lane LOS	D	A	
Approach Delay (s)	28.5	1.0	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	177	11	22	266	85	17
Future Volume (vph)	177	11	22	266	85	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	186	12	23	280	89	18

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	198	303	107
Volume Left (vph)	186	0	89
Volume Right (vph)	12	280	0
Hadj (s)	0.19	-0.52	0.20
Departure Headway (s)	5.0	4.0	5.0
Degree Utilization, x	0.27	0.34	0.15
Capacity (veh/h)	672	850	682
Control Delay (s)	9.9	9.1	8.8
Approach Delay (s)	9.9	9.1	8.8
Approach LOS	A	A	A

Intersection Summary			
Delay	9.3		
Level of Service	A		
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	268	5	5	172
Future Volume (Veh/h)	5	5	268	5	5	172
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	5	282	5	5	181
Pedestrians	10					10
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	1					1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	486	304			297	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	486	304			297	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	534	722			1252	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	287	186
Volume Left	5	0	5
Volume Right	5	5	0
cSH	613	1700	1252
Volume to Capacity	0.02	0.17	0.00
Queue Length 95th (m)	0.4	0.0	0.1
Control Delay (s)	11.0	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	11.0	0.0	0.2
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	27.7%	ICU Level of Service	A
Analysis Period (min)	15		

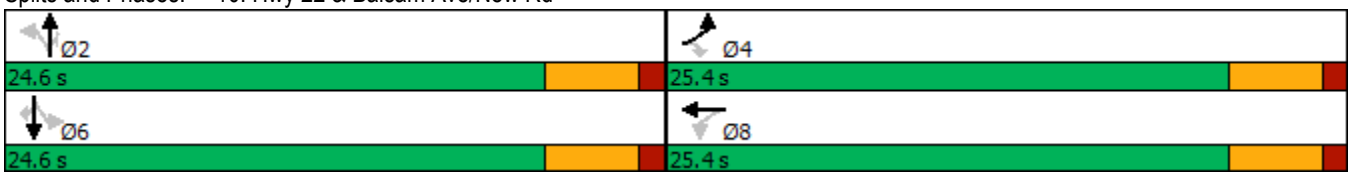
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	396	0	28	5	5	5	115	404	10	5	385	404
Future Volume (vph)	396	0	28	5	5	5	115	404	10	5	385	404
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		60.0	0.0		0.0
Storage Lanes	1		1	0		0	1		1	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.99		1.00				0.98			0.99
Frt			0.850		0.955				0.850			0.850
Flt Protected	0.950				0.984		0.950			0.950		
Satd. Flow (prot)	1742	0	1559	0	1715	0	1742	3484	1559	1742	3484	1559
Flt Permitted	0.950				0.984		0.514			0.504		
Satd. Flow (perm)	1742	0	1536	0	1715	0	943	3484	1520	924	3484	1536
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			33		5				33			425
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		147.6			74.5			222.0			411.2	
Travel Time (s)		10.6			5.4			16.0			29.6	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	417	0	29	5	5	5	121	425	11	5	405	425
Shared Lane Traffic (%)												
Lane Group Flow (vph)	417	0	29	0	15	0	121	425	11	5	405	425
Turn Type	Prot		Perm	Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4!				8!			2			6	
Permitted Phases			4	8			2		2	6		6
Detector Phase	4		4	8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0		10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.5		23.5	23.5	23.5		23.5	23.5	23.5	23.5	23.5	23.5
Total Split (s)	25.4		25.4	25.4	25.4		24.6	24.6	24.6	24.6	24.6	24.6
Total Split (%)	50.8%		50.8%	50.8%	50.8%		49.2%	49.2%	49.2%	49.2%	49.2%	49.2%
Maximum Green (s)	20.9		20.9	20.9	20.9		20.1	20.1	20.1	20.1	20.1	20.1
Yellow Time (s)	3.5		3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5		4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)	8.0		8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0		0	0	0	0	0	0
Act Effct Green (s)	13.7		13.7		13.7		12.2	12.2	12.2	12.2	12.2	12.2
Actuated g/C Ratio	0.39		0.39		0.39		0.35	0.35	0.35	0.35	0.35	0.35
v/c Ratio	0.62		0.05		0.02		0.37	0.35	0.02	0.02	0.34	0.53

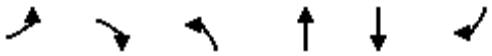
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	13.6		3.6		6.4		13.5	10.0	1.7	9.0	9.9	4.1
Queue Delay	0.0		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6		3.6		6.4		13.5	10.0	1.7	9.0	9.9	4.1
LOS	B		A		A		B	B	A	A	A	A
Approach Delay		12.9			6.4			10.6			7.0	
Approach LOS		B			A			B			A	
Queue Length 50th (m)	15.1		0.0		0.3		4.5	8.3	0.0	0.2	7.8	0.0
Queue Length 95th (m)	45.7		2.9		2.7		17.1	21.0	1.0	1.7	20.0	13.0
Internal Link Dist (m)		123.6			50.5			198.0			387.2	
Turn Bay Length (m)									60.0			
Base Capacity (vph)	1073		959		1058		558	2064	914	547	2064	1083
Starvation Cap Reductn	0		0		0		0	0	0	0	0	0
Spillback Cap Reductn	0		0		0		0	0	0	0	0	0
Storage Cap Reductn	0		0		0		0	0	0	0	0	0
Reduced v/c Ratio	0.39		0.03		0.01		0.22	0.21	0.01	0.01	0.20	0.39

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 35.2			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 9.5		Intersection LOS: A	
Intersection Capacity Utilization 59.8%		ICU Level of Service B	
Analysis Period (min) 15			

! Phase conflict between lane groups.

Splits and Phases: 10: Hwy 22 & Balsam Ave/New Rd





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	126	257	195	386	324	104
Future Volume (Veh/h)	126	257	195	386	324	104
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	133	271	205	406	341	109
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					222	
pX, platoon unblocked						
vC, conflicting volume	954	170	341			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	954	170	341			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	38	68	83			
cM capacity (veh/h)	213	844	1215			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	133	271	205	203	203	170	170	109
Volume Left	133	0	205	0	0	0	0	0
Volume Right	0	271	0	0	0	0	0	109
cSH	213	844	1215	1700	1700	1700	1700	1700
Volume to Capacity	0.62	0.32	0.17	0.12	0.12	0.10	0.10	0.06
Queue Length 95th (m)	27.7	10.6	4.6	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	46.3	11.3	8.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	B	A					
Approach Delay (s)	22.8		2.9			0.0		
Approach LOS	C							

Intersection Summary				
Average Delay	7.5			
Intersection Capacity Utilization	37.5%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	386	266	20	489	12	102	5	20	10	10	7
Future Volume (Veh/h)	5	386	266	20	489	12	102	5	20	10	10	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	406	280	21	515	13	107	5	21	11	11	7
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)									4			
Median type		None			None							
Median storage veh)												
Upstream signal (m)					148							
pX, platoon unblocked												
vC, conflicting volume	538			696			996	1006	416	986	1273	525
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	538			696			996	1006	416	986	1273	525
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			46	98	97	95	93	99
cM capacity (veh/h)	1021			892			200	230	631	206	160	547

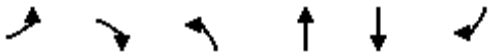
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	411	280	536	13	133	29
Volume Left	5	0	21	0	107	11
Volume Right	0	280	0	13	21	7
cSH	1021	1700	892	1700	239	215
Volume to Capacity	0.00	0.16	0.02	0.01	0.56	0.14
Queue Length 95th (m)	0.1	0.0	0.5	0.0	23.3	3.5
Control Delay (s)	0.2	0.0	0.7	0.0	38.2	24.4
Lane LOS	A		A		E	C
Approach Delay (s)	0.1		0.6		38.2	24.4
Approach LOS					E	C

Intersection Summary				
Average Delay	4.4			
Intersection Capacity Utilization	62.5%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	223	76	74	172	211	77
Future Volume (Veh/h)	223	76	74	172	211	77
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	235	80	78	181	222	81
Pedestrians						10
Lane Width (m)						3.7
Walking Speed (m/s)						1.1
Percent Blockage						1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	562	88			259	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	562	88			259	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	38	92			83	
cM capacity (veh/h)	379	944			1303	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	235	80	78	181	249	54
Volume Left	235	0	0	0	222	0
Volume Right	0	80	0	181	0	0
cSH	379	944	1700	1700	1303	1700
Volume to Capacity	0.62	0.08	0.05	0.11	0.17	0.03
Queue Length 95th (m)	30.5	2.1	0.0	0.0	4.7	0.0
Control Delay (s)	28.8	9.2	0.0	0.0	7.6	0.0
Lane LOS	D	A			A	
Approach Delay (s)	23.8		0.0		6.2	
Approach LOS	C					

Intersection Summary			
Average Delay	10.7		
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	58	30	33	524	516	66
Future Volume (Veh/h)	58	30	33	524	516	66
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	61	32	35	552	543	69
Pedestrians	10					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1210	588	622			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1210	588	622			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	68	94	96			
cM capacity (veh/h)	193	504	950			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	93	587	612
Volume Left	61	35	0
Volume Right	32	0	69
cSH	245	950	1700
Volume to Capacity	0.38	0.04	0.36
Queue Length 95th (m)	12.8	0.9	0.0
Control Delay (s)	28.5	1.0	0.0
Lane LOS	D	A	
Approach Delay (s)	28.5	1.0	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	177	111	22	266	85	17
Future Volume (vph)	177	111	22	266	85	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	186	117	23	280	89	18

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	303	303	107
Volume Left (vph)	186	0	89
Volume Right (vph)	117	280	0
Hadj (s)	-0.07	-0.52	0.20
Departure Headway (s)	4.8	4.3	5.2
Degree Utilization, x	0.40	0.36	0.16
Capacity (veh/h)	708	789	635
Control Delay (s)	10.9	9.7	9.2
Approach Delay (s)	10.9	9.7	9.2
Approach LOS	B	A	A

Intersection Summary			
Delay	10.2		
Level of Service	B		
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	268	5	5	172
Future Volume (Veh/h)	5	5	268	5	5	172
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	5	282	5	5	181
Pedestrians	10					10
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	1					1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	486	304			297	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	486	304			297	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	534	722			1252	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	287	186
Volume Left	5	0	5
Volume Right	5	5	0
cSH	613	1700	1252
Volume to Capacity	0.02	0.17	0.00
Queue Length 95th (m)	0.4	0.0	0.1
Control Delay (s)	11.0	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	11.0	0.0	0.2
Approach LOS	B		

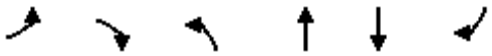
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	27.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	98	74	345	100	5	123	131	333	23	99	77
Future Volume (vph)	74	98	74	345	100	5	123	131	333	23	99	77
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		120.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00						0.99	
Frt		0.959			0.993				0.850		0.948	
Flt Protected		0.985		0.950				0.976			0.994	
Satd. Flow (prot)	0	1719	0	1742	1819	0	0	1790	1559	0	1707	0
Flt Permitted		0.859		0.950				0.697			0.898	
Satd. Flow (perm)	0	1499	0	1742	1819	0	0	1278	1559	0	1542	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		17			4				351			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			1199.9			85.9	
Travel Time (s)		18.4			12.4			86.4			6.2	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	78	103	78	363	105	5	129	138	351	24	104	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	259	0	363	110	0	0	267	351	0	209	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		10.0	10.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	47.0	47.0		55.0	102.0		30.0	30.0	55.0	30.0	30.0	
Total Split (%)	35.6%	35.6%		41.7%	77.3%		22.7%	22.7%	41.7%	22.7%	22.7%	
Maximum Green (s)	38.0	38.0		46.8	93.0		22.2	22.2	46.8	22.2	22.2	
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		21.8		25.7	56.0			22.7	25.7		22.7	
Actuated g/C Ratio		0.23		0.27	0.58			0.24	0.27		0.24	
v/c Ratio		0.73		0.78	0.10			0.88	0.52		0.57	
Control Delay		45.8		45.0	7.9			68.6	6.1		43.4	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		45.8		45.0	7.9			68.6	6.1		43.4	
LOS		D		D	A			E	A		D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		45.8			36.4			33.1			43.4	
Approach LOS		D			D			C			D	
Queue Length 50th (m)		40.6		59.9	7.8			46.0	0.0		33.0	
Queue Length 95th (m)		78.1		104.8	13.9			#125.6	19.8		#80.2	
Internal Link Dist (m)		180.0			148.2			1175.9			61.9	
Turn Bay Length (m)									120.0			
Base Capacity (vph)		618		870	1699			303	954		365	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.42		0.42	0.06			0.88	0.37		0.57	

Intersection Summary			
Area Type:	Other		
Cycle Length: 132			
Actuated Cycle Length: 95.9			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 37.6		Intersection LOS: D	
Intersection Capacity Utilization 88.3%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: White Ave/Hwy 22 & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	339	28	5	461	406	383
Future Volume (Veh/h)	339	28	5	461	406	383
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	357	29	5	485	427	403
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	1124	628	830			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1124	628	830			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	94	99			
cM capacity (veh/h)	226	483	802			

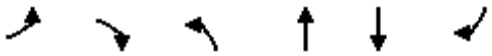
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	386	490	830
Volume Left	357	5	0
Volume Right	29	0	403
cSH	235	802	1700
Volume to Capacity	1.64	0.01	0.49
Queue Length 95th (m)	187.7	0.1	0.0
Control Delay (s)	343.4	0.2	0.0
Lane LOS	F	A	
Approach Delay (s)	343.4	0.2	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	77.7		
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	334	177	20	358	12	161	5	20	10	10	7
Future Volume (Veh/h)	5	334	177	20	358	12	161	5	20	10	10	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	352	186	21	377	13	169	5	21	11	11	7
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	400			548			903	907	455	914	994	394
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	400			548			903	907	455	914	994	394
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			28	98	96	95	95	99
cM capacity (veh/h)	1148			1012			236	264	600	231	235	649

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	543	411	195	29
Volume Left	5	21	169	11
Volume Right	186	13	21	7
cSH	1148	1012	253	276
Volume to Capacity	0.00	0.02	0.77	0.11
Queue Length 95th (m)	0.1	0.5	43.0	2.7
Control Delay (s)	0.1	0.7	54.7	19.6
Lane LOS	A	A	F	C
Approach Delay (s)	0.1	0.7	54.7	19.6
Approach LOS			F	C

Intersection Summary			
Average Delay	9.8		
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	58	30	33	530	453	66
Future Volume (Veh/h)	58	30	33	530	453	66
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	61	32	35	558	477	69
Pedestrians	10					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1150	522	556			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1150	522	556			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	71	94	97			
cM capacity (veh/h)	210	550	1005			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	93	593	546
Volume Left	61	35	0
Volume Right	32	0	69
cSH	266	1005	1700
Volume to Capacity	0.35	0.03	0.32
Queue Length 95th (m)	11.4	0.8	0.0
Control Delay (s)	25.6	0.9	0.0
Lane LOS	D	A	
Approach Delay (s)	25.6	0.9	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	105	111	22	125	85	17
Future Volume (vph)	105	111	22	125	85	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	111	117	23	132	89	18

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	228	155	107
Volume Left (vph)	111	0	89
Volume Right (vph)	117	132	0
Hadj (s)	-0.18	-0.48	0.20
Departure Headway (s)	4.3	4.1	4.8
Degree Utilization, x	0.27	0.18	0.14
Capacity (veh/h)	786	829	704
Control Delay (s)	8.9	8.0	8.6
Approach Delay (s)	8.9	8.0	8.6
Approach LOS	A	A	A

Intersection Summary			
Delay	8.6		
Level of Service	A		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	127	5	5	100
Future Volume (Veh/h)	5	5	127	5	5	100
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	5	134	5	5	105
Pedestrians	10					10
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	1					1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	262	156			149	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	262	156			149	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	718	873			1419	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	139	110
Volume Left	5	0	5
Volume Right	5	5	0
cSH	788	1700	1419
Volume to Capacity	0.01	0.08	0.00
Queue Length 95th (m)	0.3	0.0	0.1
Control Delay (s)	9.6	0.0	0.4
Lane LOS	A		A
Approach Delay (s)	9.6	0.0	0.4
Approach LOS	A		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	22.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	98	74	324	100	5	123	182	276	23	183	77
Future Volume (vph)	74	98	74	324	100	5	123	182	276	23	183	77
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		120.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00						0.99	
Frt		0.959			0.993				0.850		0.963	
Flt Protected		0.985		0.950				0.980			0.996	
Satd. Flow (prot)	0	1719	0	1742	1819	0	0	1797	1559	0	1744	0
Flt Permitted		0.859		0.950				0.612			0.805	
Satd. Flow (perm)	0	1499	0	1742	1819	0	0	1122	1559	0	1410	0
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		17			4				291			
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		204.0			172.2			1199.9			85.9	
Travel Time (s)		18.4			12.4			86.4			6.2	
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	78	103	78	341	105	5	129	192	291	24	193	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	259	0	341	110	0	0	321	291	0	298	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	Over	Perm	NA	
Protected Phases		8		7	4			6	7		2	
Permitted Phases	8						6			2		
Detector Phase	8	8		7	4		6	6	7	2	2	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		10.0	10.0	15.0	15.0	15.0	
Minimum Split (s)	24.0	24.0		30.0	61.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	47.0	47.0		55.0	102.0		30.0	30.0	55.0	30.0	30.0	
Total Split (%)	35.6%	35.6%		41.7%	77.3%		22.7%	22.7%	41.7%	22.7%	22.7%	
Maximum Green (s)	38.0	38.0		46.8	93.0		22.2	22.2	46.8	22.2	22.2	
Yellow Time (s)	3.4	3.4		4.2	3.9		4.5	4.5	4.2	3.4	3.4	
All-Red Time (s)	5.6	5.6		4.0	5.1		3.3	3.3	4.0	4.4	4.4	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)		9.0		8.2	9.0			7.8	8.2		7.8	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		Min	Min		None	None	Min	None	None	
Act Effct Green (s)		21.5		24.1	54.0			22.7	24.1		22.7	
Actuated g/C Ratio		0.23		0.26	0.58			0.24	0.26		0.24	
v/c Ratio		0.73		0.76	0.10			1.18	0.47		0.88	
Control Delay		44.8		44.4	8.1			149.5	6.2		64.0	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		44.8		44.4	8.1			149.5	6.2		64.0	
LOS		D		D	A			F	A		E	

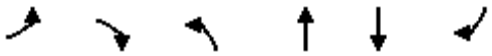
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		44.8			35.5			81.3			64.0	
Approach LOS		D			D			F			E	
Queue Length 50th (m)		39.7		55.2	7.8			~67.8	0.0		50.2	
Queue Length 95th (m)		76.1		97.0	14.0			#157.9	18.5		#132.4	
Internal Link Dist (m)		180.0			148.2			1175.9			61.9	
Turn Bay Length (m)									120.0			
Base Capacity (vph)		630		887	1718			271	937		340	
Starvation Cap Reductn		0		0	0			0	0		0	
Spillback Cap Reductn		0		0	0			0	0		0	
Storage Cap Reductn		0		0	0			0	0		0	
Reduced v/c Ratio		0.41		0.38	0.06			1.18	0.31		0.88	

Intersection Summary			
Area Type:	Other		
Cycle Length: 132			
Actuated Cycle Length: 93.8			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.18			
Intersection Signal Delay: 59.6		Intersection LOS: E	
Intersection Capacity Utilization 93.4%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 1: White Ave/Hwy 22 & Burnside Dr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	264	28	5	404	385	299
Future Volume (Veh/h)	264	28	5	404	385	299
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	278	29	5	425	405	315
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				172		
pX, platoon unblocked						
vC, conflicting volume	998	562	720			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	998	562	720			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	94	99			
cM capacity (veh/h)	269	526	882			

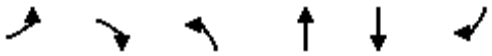
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	307	430	720
Volume Left	278	5	0
Volume Right	29	0	315
cSH	282	882	1700
Volume to Capacity	1.09	0.01	0.42
Queue Length 95th (m)	94.3	0.1	0.0
Control Delay (s)	119.4	0.2	0.0
Lane LOS	F	A	
Approach Delay (s)	119.4	0.2	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	25.2		
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	259	261	20	274	12	212	5	20	10	10	7
Future Volume (Veh/h)	5	259	261	20	274	12	212	5	20	10	10	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	273	275	21	288	13	223	5	21	11	11	7
Pedestrians								10			10	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	311			558			780	784	420	790	914	304
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	311			558			780	784	420	790	914	304
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			22	98	97	96	96	99
cM capacity (veh/h)	1238			1003			287	311	627	281	261	728

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	553	322	249	29
Volume Left	5	21	223	11
Volume Right	275	13	21	7
cSH	1238	1003	302	319
Volume to Capacity	0.00	0.02	0.83	0.09
Queue Length 95th (m)	0.1	0.5	52.6	2.3
Control Delay (s)	0.1	0.8	54.9	17.4
Lane LOS	A	A	F	C
Approach Delay (s)	0.1	0.8	54.9	17.4
Approach LOS			F	C

Intersection Summary				
Average Delay	12.6			
Intersection Capacity Utilization	59.3%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	58	30	33	524	516	66
Future Volume (Veh/h)	58	30	33	524	516	66
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	61	32	35	552	543	69
Pedestrians	10					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1210	588	622			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1210	588	622			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	68	94	96			
cM capacity (veh/h)	193	504	950			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	93	587	612
Volume Left	61	35	0
Volume Right	32	0	69
cSH	245	950	1700
Volume to Capacity	0.38	0.04	0.36
Queue Length 95th (m)	12.8	0.9	0.0
Control Delay (s)	28.5	1.0	0.0
Lane LOS	D	A	
Approach Delay (s)	28.5	1.0	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	72	111	154	134	85	122
Future Volume (vph)	72	111	154	134	85	122
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	76	117	162	141	89	128

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	193	303	217
Volume Left (vph)	76	0	89
Volume Right (vph)	117	141	0
Hadj (s)	-0.25	-0.25	0.12
Departure Headway (s)	4.8	4.4	4.9
Degree Utilization, x	0.26	0.37	0.29
Capacity (veh/h)	681	778	701
Control Delay (s)	9.5	10.0	9.9
Approach Delay (s)	9.5	10.0	9.9
Approach LOS	A	B	A

Intersection Summary			
Delay	9.9		
Level of Service	A		
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	268	5	5	172
Future Volume (Veh/h)	5	5	268	5	5	172
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	5	282	5	5	181
Pedestrians	10					10
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	1					1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	486	304			297	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	486	304			297	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	534	722			1252	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	287	186
Volume Left	5	0	5
Volume Right	5	5	0
cSH	613	1700	1252
Volume to Capacity	0.02	0.17	0.00
Queue Length 95th (m)	0.4	0.0	0.1
Control Delay (s)	11.0	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	11.0	0.0	0.2
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	27.7%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX C

Signal Warrant

RVC - Traffic Signal Warrant Analysis

Main Street (name)	Highway 22
Side Street (name)	East Park Place
Quadrant / Int #	

for Warrant Calculation Results, please hit 'Page Down'

CHECK SHEET

Direction (EW or NS)	NS
Direction (EW or NS)	EW
Comments	2045 AD

Road Authority:	RVC
City:	Bragg Creek
Analysis Date:	2025 Sep 04, Thu
Count Date:	N/A
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Highway 22	NB		1						1
Highway 22	SB					1			1
East Park Place	WB								
East Park Place	EB				1				

Are the East Park Place WB right turns significantly impeded by through movements? (y/n)	n
Are the East Park Place EB right turns significantly impeded by through movements? (y/n)	n

Demographics		
Elem. School/Mobility Challenged	(y/n)	y
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	y
Metro Area Population	(#)	5,000
Central Business District	(y/n)	n

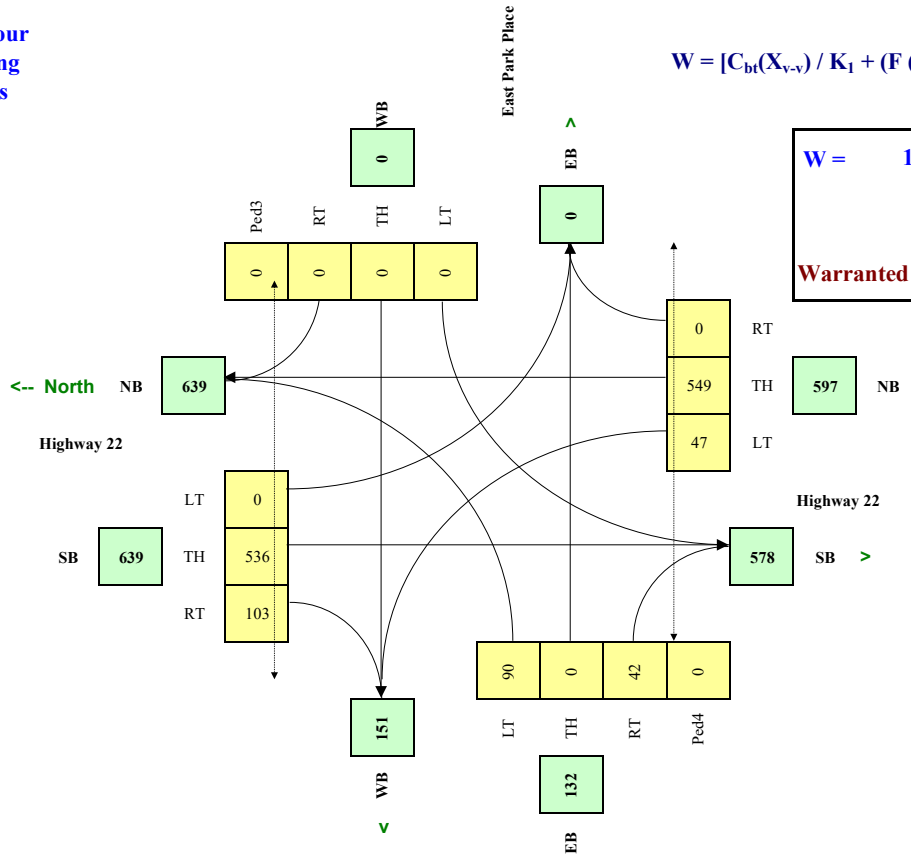
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Highway 22	NS	50	2.0%	n	0.0
East Park Place	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
Existing (6-Hour)	284	3296			3214	619				537		254	10			
Total (6-hour peak)	284	3,296	0	0	3,214	619	0	0	0	537	0	254	10	0	0	0
Average (6-hour peak)	47	549	0	0	536	103	0	0	0	90	0	42	2	0	0	0

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	110	110	0
		Veh	Ped

Warranted

RESET SHEET