



192 & 196 Bronson Avenue / 31 Cambridge Street

• TRANSPORTATION BRIEF •

TB Check List

prepared for: Bronson Inc.
789 King Street West
Toronto, ON M5V 1M6

OUR REF: TO3131TOI00

Report Context

- ☒ Municipal address;
No inclusion rational: _____
- ☒ Location relative to major elements of the existing transportation system (e.g., the site is located in the southwest quadrant of the intersection of Main Street/ First Street, 600metres from the Maple Street Rapid Transit Station);
No inclusion rational: _____
- ☒ Existing land uses or permitted use provisions in the Official Plan, Zoning By-law, etc.;
No inclusion rational: _____
- ☒ Proposed land uses and relevant planning regulations to be used in the analysis;
No inclusion rational: _____
- ☒ Proposed development size (building size, number of residential units, etc.) and location on site;
No inclusion rational: _____
- ☐ Estimated date of occupancy;
No inclusion rational: Unknown _____
- ☒ Planned phasing of development;
No inclusion rational: _____
- ☒ Proposed number of parking spaces (not relevant for Draft Plans of Subdivision);
No inclusion rational: _____
- ☒ Proposed access points and type of access (full turns, right-in/ right-out, turning restrictions, etc.
No inclusion rational: _____
- ☒ Study area;
No inclusion rational: _____

Existing Conditions

- ☒ Existing roads and ramps in the study area, including jurisdiction, classification, number of lanes, and posted speed limit;

No inclusion rational: _____

- ☒ Existing intersections, indicating type of control, lane configurations, turning restrictions, and any other relevant data (e.g., extraordinary lane widths, grades, etc.);

No inclusion rational: _____

- ☒ Existing access points to adjacent developments (both sides of all roads bordering the site);

No inclusion rational: _____

- ☒ Existing transit system, including stations and stops;

No inclusion rational: _____

- ☒ Existing on- and off-road bicycle facilities and pedestrian sidewalks and pathway networks;

No inclusion rational: _____

- ☒ Existing system operations (V/C, LOS);

No inclusion rational: _____

- ☒ Major trip generators/ attractors within the Study Area should be indicated.

No inclusion rational: _____

Demand Forecasting

- ☐ General background growth;

No inclusion rational: Not required for Transportation Brief

- ☐ Other study area developments;

No inclusion rational: Not required for Transportation Brief

- ☐ Changes to the study area road network;

No inclusion rational: Not required for Transportation Brief

- ☐ Future background system operations (V/C, LOS, queue lengths):

No inclusion rational: Not required for Transportation Brief

- ☒ Trip generation rates;

No inclusion rational: _____

- ☒ Trip distribution and assignment.

No inclusion rational: _____

Impact Analysis

- ☒ Total future system operations (V/C, LOS, queue lengths);
No inclusion rational: _____
- ☒ Signal and auxiliary lane (device) warrants;
No inclusion rational: _____
- ☒ Operational/ safety assessment (e.g., sight line assessment where grades are an issue);
No inclusion rational: _____
- ☒ Storage analysis for closely spaced intersections;
No inclusion rational: _____
- ☒ Pedestrian and bicycle network connections and continuity;
No inclusion rational: _____
- ☒ On-site circulation and design;
No inclusion rational: _____
- ☒ Potential for neighbourhood impacts; and TDM.
No inclusion rational: _____
- ☒ Synchro Files
No inclusion rational: _____

CTS

Impact Analysis

- ☐ Network Capacity Analysis;
No inclusion rational: _____
- ☐ Non-auto network connections and continuity;
No inclusion rational: _____
- ☐ Potential for community impacts, and TDM.
No inclusion rational: _____
- ☐ Synchro Files
No inclusion rational: _____
- ☐ Screenline Analysis
No inclusion rational: _____

**192 & 196 Bronson Avenue/
31 Cambridge Street**

Transportation Brief

prepared for:

Bronson Inc.

786 King Street West
Toronto, ON M5V 1M6

prepared by:



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22 July 2013

TO3131TOI00

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- Appendix C – SYNCHRO Capacity Analysis: Projected Conditions
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1. INTRODUCTION

From the information provided, a mixed-use 18 storey residential condominium building (218 units) with ground floor retail (9,379 ft²), with access to/from Cambridge Street North, is being proposed for a site located on the west side of Bronson Avenue approximately 75 m north of the Bronson/Primrose intersection. The site, which is municipally known as 192 and 196 Bronson Avenue/31 Cambridge Street, is currently occupied by an office building and an approximate 40 space parking lot. The site's local context is depicted as Figure 1 and the preliminary Site Plan is depicted as Figure 2.

Figure 1: Local Context

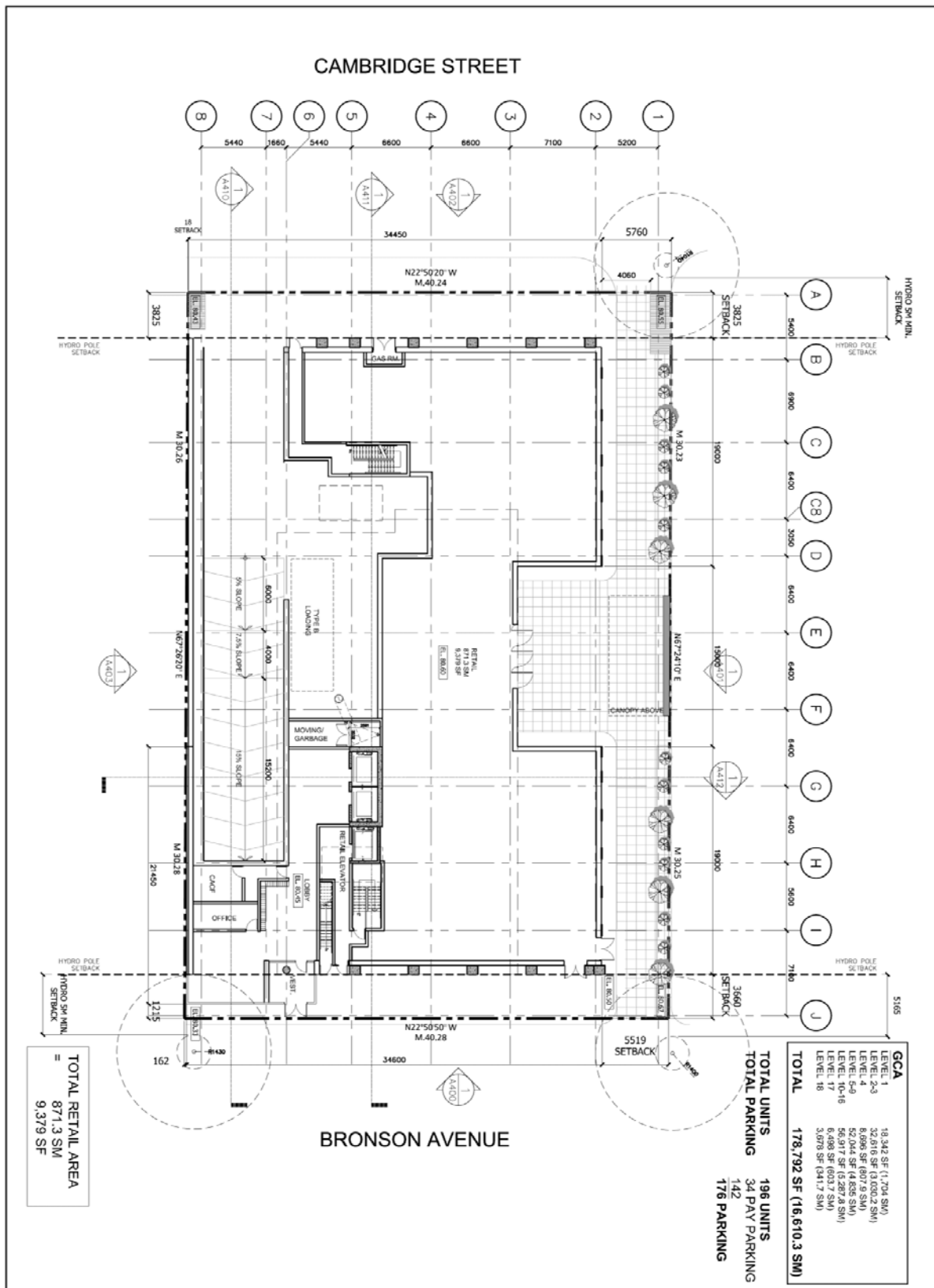


2. SCOPE OF WORK

Based on the ensuing trip generation and our review of the City's Transportation Impact Assessment Guidelines (TIA), the proposed development is projected to generate less than the City's threshold for requiring a transportation impact assessment. As such, no further traffic analysis is required. However, this modified Transportation Brief has been prepared to assist in the application/review process. Following discussions with City Staff we have prepared this report that captures only the relevant transportation issues, which are as follows:

- existing traffic conditions at adjacent intersections;
- future site trip generation; and
- Site Plan issues, including pedestrian access, proposed vehicle access, parking, loading and circulation layout.

Figure 2: Preliminary Site Plan



3. EXISTING CONDITIONS

3.1 Study Area

At the preconsultation meeting, it was agreed with City Staff that the study area should consist of the signalized intersections of Bronson/Slater, Bronson/Laurier, Bronson/Gloucester, Bronson/Primrose, Bronson/Somerset and the unsignalized Cambridge/Primrose intersections.

3.2 Area Road Network

Bronson Avenue is a north-south arterial roadway with a four lane cross-section. The unposted speed limit is understood to be 50 km/h. Within the study area, on-street parking is permitted in certain areas during evenings and weekends only (parking not permitted from 7 AM to 6 PM).

Slater Street is an arterial roadway, which operates as a one-way in the eastbound direction. Its cross-section consists of two passenger vehicle travel lane and one transit/taxi only travel lane. On-street parking, located along the north side of the road, is permitted during evenings and weekends only (parking is not permitted from 7 AM to 6 PM). Its unposted speed limit is understood to be 50 km/h.

Laurier Avenue is an east-west arterial roadway with a two lane cross-section. Within the study area, there are no auxiliary turn lanes, and on-street parking is not permitted. Its unposted speed limit is understood to be 50 km/h.

Gloucester Street is a local roadway, which operates as a one-way in the westbound direction. Its cross-section consists of a single travel lane with on-street parking located along the south side of the road. Its unposted speed limit is understood to be 50 km/h.

Primrose Avenue is a local roadway with an unposted speed limit of 50 km/h. Its cross-section consists of a single travel lane in each direction with on-street parking located along the north side of the road.

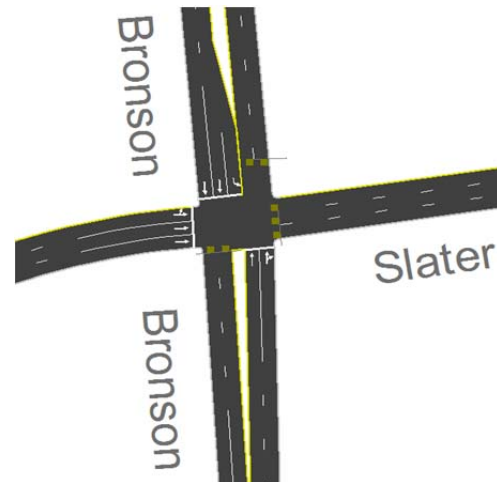
Cambridge Street N is a local roadway with an unposted speed limit of 50 km/h. Its cross-section consists of a single travel lane in each direction with on-street parking located along both sides of the road.

Somerset Street W is an east-west arterial roadway with an unposted speed limit of 50 km/h. It has a four lane cross-section with on-street parking provided along both sides of the road. With the completion of the Bronson Reconstruction, auxiliary left-turn lanes will be provided at the Bronson/Somerset intersection.

3.3 Existing Study Area Intersections

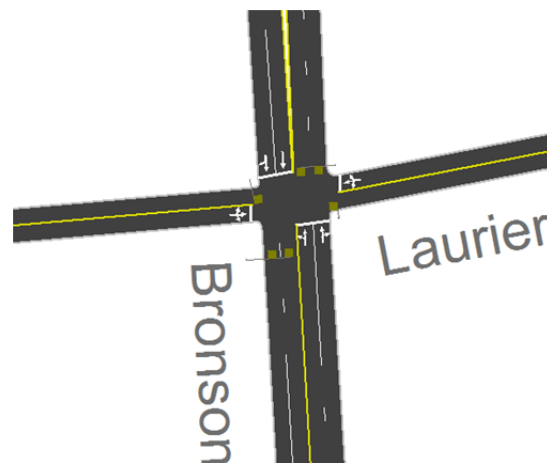
Bronson/Slater

The Bronson/Slater intersection is a signalized four-legged intersection. The northbound approach consists of a single through lane and a shared through/right-turn lane. The southbound approach consists of two through lanes and a left-turn lane. The eastbound approach consists of a shared through/left-turn lane and two through lanes (one through lane is for transit only). Eastbound right-turns are not permitted, however traffic counts reveal that approximately 30 vehicles turn right in an 8 hour period. As Slater Street operates as a one-way roadway in the eastbound direction, the northbound left-turn and southbound right-turn movements are not permitted.



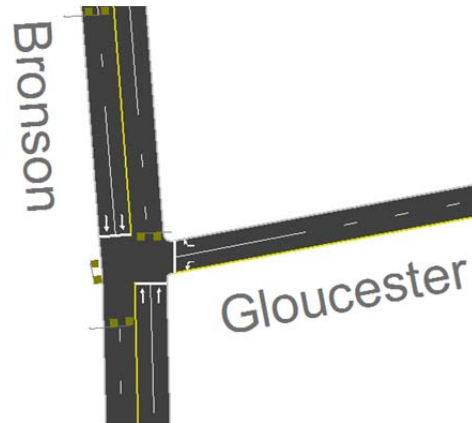
Bronson/Laurier

The Bronson/Laurier intersection is a signalized four-legged intersection. The northbound approach consists of a shared through/left-turn lane and a shared through/right-turn lane. The southbound approach consists of a single through lane and a shared through/right-turn lane. The eastbound approach consists of a single shared left-turn/right-turn lane. The westbound approach consists of a single full-movement lane. The southbound left-turn and the eastbound through movements are not permitted at this location. However, traffic counts reveal that approximately 20 vehicles turn southbound left and approximately 40 vehicles go eastbound through during an 8-hour period.



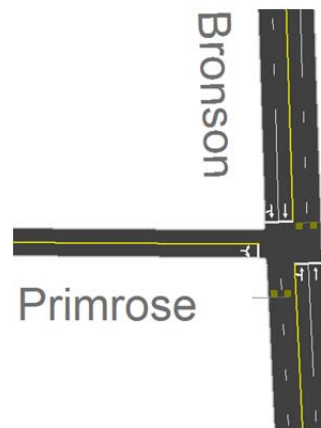
Bronson/Gloucester

The Bronson/Gloucester intersection is a signalized three-legged intersection. The northbound and southbound approaches consist of two through lanes. The westbound approach consists of a right-turn lane and a left-turn lane. As Gloucester Street operates as a one-way roadway in the westbound direction, the southbound left-turn and northbound right-turn movements are not permitted at this location.



Bronson/Primrose

The Bronson/Primrose intersection is a signalized three-legged intersection. The northbound approach consists of a single through lane and a shared through/left-turn lane. The southbound approach consists of a single through lane and a shared through/right-turn lane. The eastbound approach consists of a single full movement lane. All movements are permitted at this location.



Cambridge/Primrose

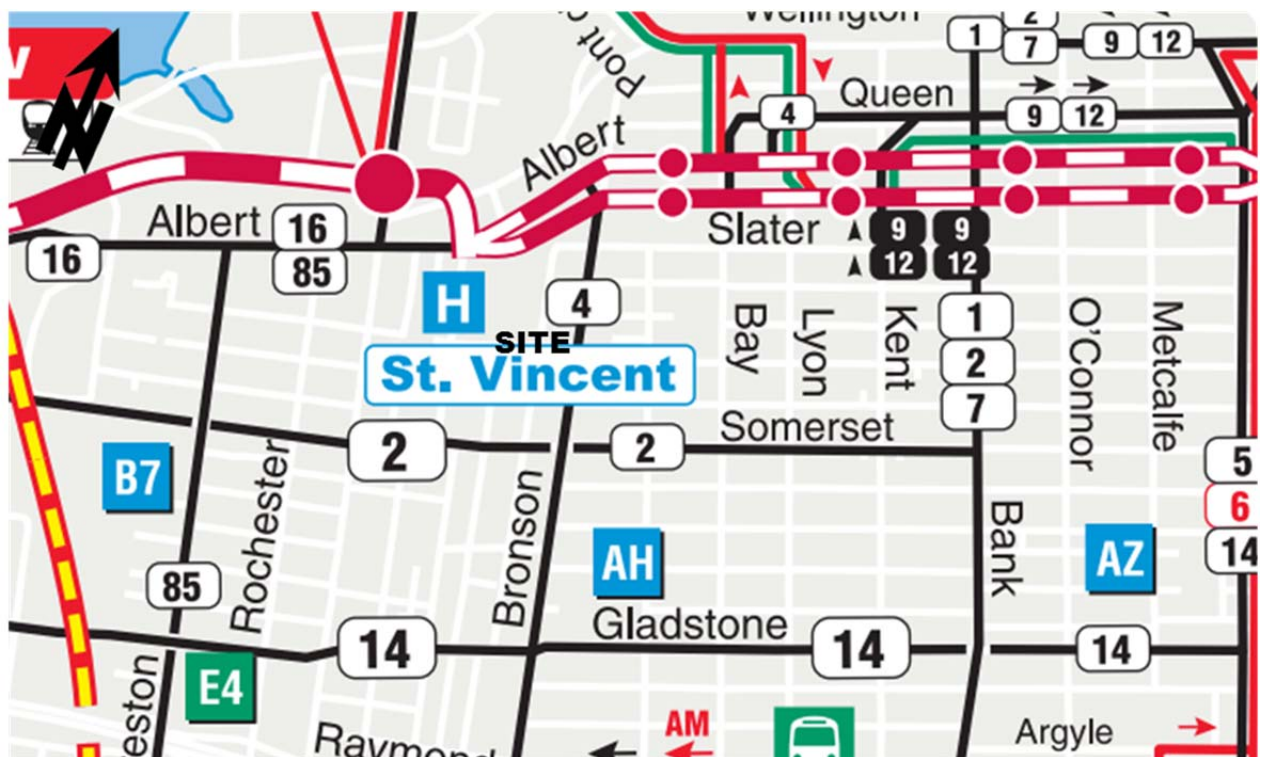
The Cambridge/Primrose intersection is an unsignalized four-legged intersection with STOP control at all four approaches. All approaches consist of single full-movement lanes. The south leg of the intersection has a narrow cross-section, with caution signs indicating the narrow roadway and a recommended speed of 20 km/h. All movements are permitted at this location.



3.4 Transit Network

The proposed development is in close proximity (approximately 300 m) from the existing rapid transit corridor along Slater Street/Albert Street. The rapid transit corridor provides easy access to employment in both the east and west directions and to the downtown core. In the future, this Transitway will be replaced by the Confederation Line LRT project, which will have a station located approximately 600 m walking distance from the site. Bus stops for regular (Black) Route #4 located on Bronson Avenue approximately 75 m walking distance north of the site. Figure 3 depicts the existing transit within the vicinity of the site.

Figure 3: Area Transit Network



3.5 Bicycle and Pedestrian Facilities

According to the City's 2008 Official Cycling Plan (OCP), Slater Street, Laurier Avenue/Cambridge Street and Somerset Street are classified as "Spine or City-wide" cycling routes. Within the study area, shared use lanes currently exist along Slater Street and Cambridge Street and bicycle lanes are provided along Laurier Avenue. The bike lanes along Laurier Avenue are to be made permanent with potential additional links to create a segregated cross-town cycling spine. In the future, shared-use lanes are proposed along Somerset Street by 2018.

Connecting pedestrians to transit service and other adjacent development, sidewalks are currently provided along both sides of all study area roadways.

3.6 Existing Intersection Operations

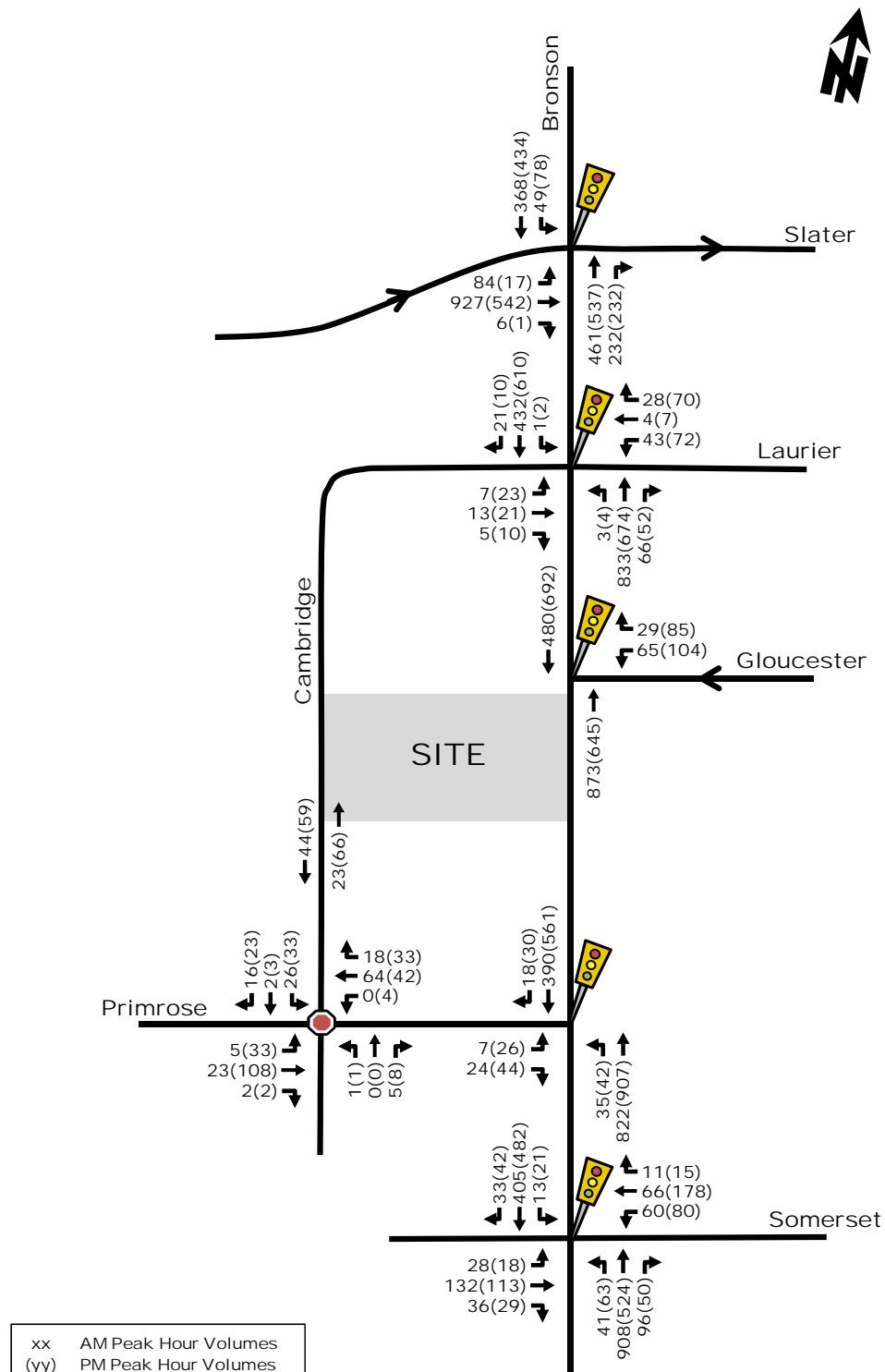
Illustrated in Figure 4, and included as Appendix A, are the most recent weekday morning and afternoon peak hour traffic volumes obtained from the City of Ottawa for the Bronson/Slater, Bronson/Laurier, Bronson/Gloucester, Bronson/Primrose, Bronson/Somerset and Cambridge/Primrose intersections.

Table 1 provides a summary of existing traffic operations at key study area intersections, based on the Synchro (V8) traffic analysis software. The subject intersections were assessed in terms of the volume-to-capacity (v/c) ratio and the corresponding Level of Service (LoS) for the 'critical movement(s)'. The intersections 'as a whole' were assessed based on a weighted v/c ratio. The Synchro model output of existing conditions is provided within Appendix B.

Table 1: Existing Performance at Study Area Intersections

| Intersection | Weekday AM Peak (PM Peak) | | | | | |
|---|---------------------------|----------------------------------|----------|---------------------------|------|------------|
| | Critical Movement | | | Intersection 'as a whole' | | |
| | LoS | max. v/c or avg. delay (s) | Movement | Delay (s) | LoS | v/c |
| Bronson/Slater | E(B) | 0.96(0.67) | EBT(NBT) | 25.4(14.0) | C(A) | 0.79(0.60) |
| Bronson/Laurier | A(A) | 0.43(0.57) | NBT(WBT) | 4.5(6.8) | A(A) | 0.35(0.40) |
| Bronson/Gloucester | A(A) | 0.39(0.35) | NBT(SBT) | 2.7(3.3) | A(A) | 0.38(0.35) |
| Bronson/Primrose | A(A) | 0.38(0.49) | NBT(NBT) | 4.8(7.9) | A(A) | 0.37(0.47) |
| Bronson/Somerset | D(A) | 0.82(0.55) | NBT(NBT) | 24.7(21.7) | B(A) | 0.64(0.49) |
| Cambridge/Primrose | A(A) | 7.3(8.1) | EBT(EBT) | 7.3(7.8) | - | - |
| Note: Analysis of signalized intersections assumes a PHF of 0.95, a saturation flow rate of 1800 veh/h/lane, and a CBD type area. | | | | | | |

Figure 4: Existing Peak Hour Traffic Volumes



As shown in Table 1, study area intersections 'as a whole' are operating at an acceptable LoS 'C' or better during the weekday morning and afternoon peak hours, with respect to the City of Ottawa operating standards of LoS 'D' or better ($0.90 > v/c > 0.00$).

With regard to 'critical movements' at study area intersections, they are operating at an acceptable LoS 'D' or better during the weekday morning and afternoon peak hours, with the exception of the eastbound through movement at the Bronson/Slater intersection during the morning peak hour, which is operating at capacity (LoS 'E').

4. DEMAND FORECASTING

4.1 Site Vehicle Trip Generation

Summarized in Table 2, are the appropriate vehicle trip generation rates for the proposed land uses obtained from the 9th Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.

Table 2: ITE Trip Generation Rates

| Land Use | Data Source | Trip Rates | |
|---|-------------|---|---|
| | | AM Peak | PM Peak |
| High-Rise Condominium | ITE 232 | $T = 0.34(du);$ $T = 0.29(du) + 28.86$ | $T = 0.38(du);$ $T = 0.34(du) + 15.47$ |
| Specialty Retail Centre | ITE 826 | $T = 1.36(X);$ $T = 1.20(X) + 10.74$ | $T = 2.71(X);$ $T = 2.40(X) + 21.48$ |
| <i>Notes: T = Average Vehicle Trip Ends X = 1,000 ft² Gross Floor Area du = dwelling units Specialty Retail AM Peak is assumed to be 50% of the PM Peak</i> | | | |

As ITE trip generation surveys only record vehicle trips and typically reflect highly suburban locations (with little to no access by travel modes other than private automobiles), adjustment factors appropriate to the more urban study area context were applied to attain estimates of person trips for the proposed development. This approach is considered appropriate within the industry for urban infill developments.

To convert ITE vehicle trip rates to person trips, an auto occupancy factor and a non-auto trip factor were applied to the ITE vehicle trip rates. Our review of available literature suggests that a combined factor of approximately 1.3 is considered reasonable to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10%. As such, the person trip generation for the proposed site is summarized in Table 3.

Table 3: Modified Person Trip Generation

| Land Use | Data Source | Area | AM Peak (persons) | | | PM Peak (persons) | | |
|---|-------------|-----------------------|-------------------|------------|------------|-------------------|-----------|------------|
| | | | In | Out | Total | In | Out | Total |
| High-Rise Condominium | ITE 232 | 218 Units | 22 | 98 | 120 | 71 | 45 | 116 |
| Specialty Retail | ITE 826 | 9,379 ft ² | 16 | 13 | 29 | 25 | 32 | 57 |
| Total Person Trips | | | 38 | 111 | 149 | 96 | 77 | 173 |
| Note: 1.3 factor to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10% | | | | | | | | |

The person trips shown in Table 3 for the proposed site were then reduced by modal share values based on the 2011 TRANS O-D survey to reflect the site's location and proximity to employment, shopping uses and transit availability. As the site is located in the urban area, close to the downtown core, a high non-auto modal split has been applied, although it is noteworthy that higher non-auto mode splits are likely being realized in highly urban areas of the City such as the location of the proposed development. Modal share values for the proposed uses are summarized in Table 4 and 5, with the total site vehicle trip generation summarized in Table 6.

Table 4: High-Rise Condominium Site Trip Generation

| Travel Mode | Mode Share | AM Peak (Persons/hr) | | | PM Peak (Persons/hr) | | |
|-------------------------------|------------|----------------------|-----------|-----------|----------------------|-----------|-----------|
| | | In | Out | Total | In | Out | Total |
| Auto Driver | 50% | 11 | 49 | 60 | 36 | 23 | 59 |
| Auto Passenger | 10% | 2 | 9 | 11 | 7 | 4 | 11 |
| Transit | 25% | 5 | 25 | 30 | 18 | 11 | 29 |
| Non-motorized | 15% | 4 | 15 | 19 | 10 | 7 | 17 |
| Total Person Trips | 100% | 22 | 98 | 120 | 71 | 45 | 116 |
| Total 'New' Auto Trips | | 11 | 49 | 60 | 36 | 23 | 59 |

Table 5: Retail Site Trip Generation

| Travel Mode | Mode Share | AM Peak (Persons/hr) | | | PM Peak (Persons/hr) | | |
|-------------------------------|------------|----------------------|----------|-----------|----------------------|-----------|-----------|
| | | In | Out | Total | In | Out | Total |
| Auto Driver | 50% | 8 | 7 | 15 | 13 | 16 | 29 |
| Auto Passenger | 10% | 1 | 1 | 2 | 2 | 3 | 5 |
| Transit | 25% | 4 | 4 | 8 | 7 | 8 | 15 |
| Non-motorized | 15% | 3 | 1 | 4 | 3 | 5 | 8 |
| Total Person Trips | 100% | 16 | 13 | 29 | 25 | 32 | 57 |
| Less Retail Pass-by (30%) | | -2 | -2 | -4 | -4 | -4 | -8 |
| Total 'New' Auto Trips | | 6 | 5 | 11 | 9 | 12 | 21 |

Table 6: Total Site Vehicle Trip Generation

| Land Use | AM Peak (veh/h) | | | PM Peak (veh/h) | | |
|-------------------------------|-----------------|-----------|-----------|-----------------|-----------|-----------|
| | In | Out | Total | In | Out | Total |
| High-Rise Condominiums | 11 | 49 | 60 | 36 | 23 | 59 |
| Specialty Retail | 8 | 7 | 15 | 13 | 16 | 29 |
| Retail Pass-By (30%) | -2 | -2 | -4 | -4 | -4 | -8 |
| Total 'New' Auto Trips | 17 | 54 | 71 | 45 | 35 | 80 |

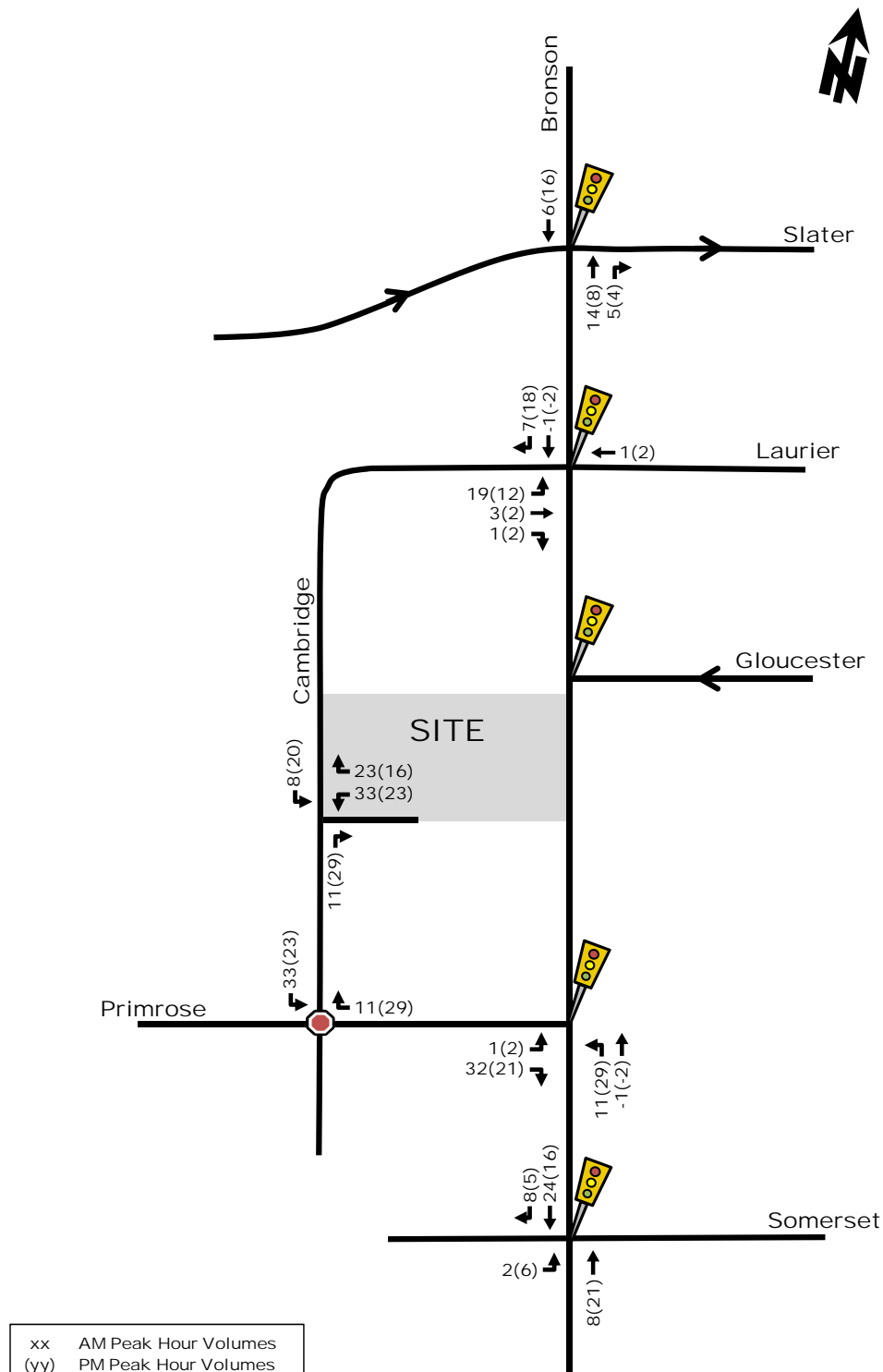
As shown in Table 6, the resulting number of potential 'new' two-way vehicle trips for the proposed development is approximately 71 and 80 veh/h during the weekday morning and afternoon peak hours, respectively. However, the 'net' increase in site traffic generation will be less than this, as the site is currently occupied by an approximate 40 space parking lot. For this size of parking lot, an estimated 20 veh/h two-way can be assumed during both the morning and afternoon peak hours. Therefore the 'net' two-way vehicle trip generation for the proposed development is approximately 50 and 60 veh/h during the weekday morning and afternoon peak hours, respectively. This projected number of two-way vehicle trips is less than the City's 75 veh/h threshold for requiring a transportation impact assessment.

Given the existing site driveway connection is to Bronson Avenue, and in an abundance of caution, the ensuing analysis assumes the total vehicle trips of 71 and 80 veh/h. These 'new' trips were then distributed based on the site's connectivity to the existing road network and our knowledge of the surrounding area. The resultant distribution is assumed to be:

- 45% to/from the south via Bronson Avenue towards HWY 417;
 - 25% to/from the north via Bronson;
 - 15% to/from the west via Somerset Street; and
 - 15% to/from the east Albert Street/Slater Street and Laurier Avenue;
- 100%

'New' and 'Pass-by' site-generated trips are illustrated in Figure 5.

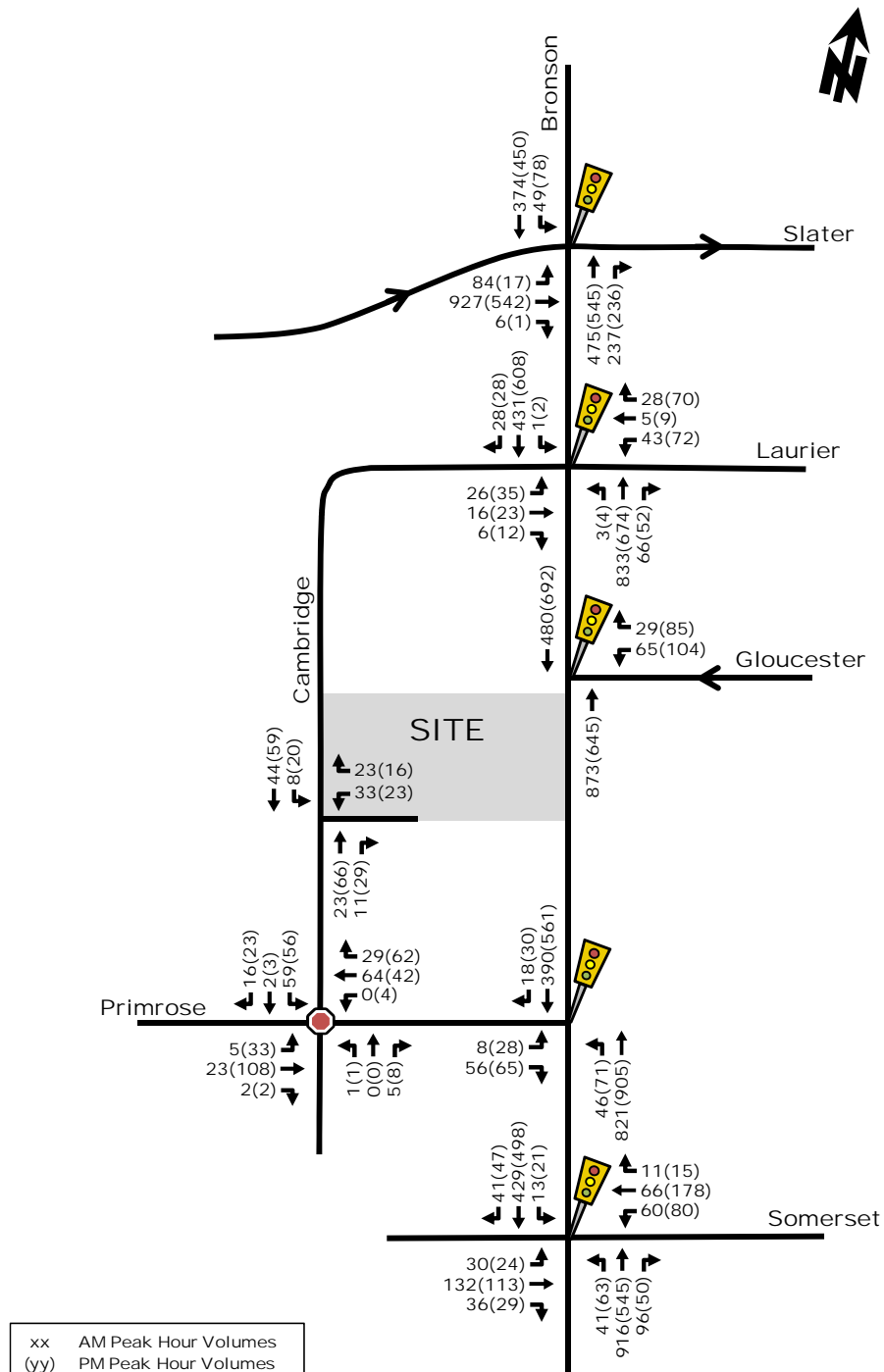
Figure 5: 'New' and 'Pass-by' Site-Generated Vehicle Trips



5. FUTURE TRAFFIC OPERATIONS

For the purpose of this study, the total projected traffic volumes were derived by superimposing 'new' and 'pass-by' site-generated traffic volumes (Figure 5) onto existing volumes (Figure 4). The resulting total projected traffic volumes are illustrated as Figure 6.

Figure 6: Projected Traffic Volumes



With no signal timing plan or roadway modifications, the signalized study area intersections 'as a whole' are projected to operate similar to existing conditions summarized in Table 1. The Synchro model output of projected conditions without roadway or signal modifications are provided within Appendix C.

Table 7: Projected Performance at Study Area Intersections

| Intersection | Weekday AM Peak (PM Peak) | | | | | |
|---|---------------------------|----------------------------------|----------|---------------------------|------|------------|
| | Critical Movement | | | Intersection 'as a whole' | | |
| | LoS | max. v/c or avg. delay (s) | Movement | Delay (s) | LoS | v/c |
| Bronson/Slater | E(B) | 0.96(0.68) | EBT(NBT) | 25.3(14.4) | C(B) | 0.80(0.61) |
| Bronson/Laurier | A(A) | 0.43(0.57) | NBT(WBT) | 4.8(6.9) | A(A) | 0.35(0.40) |
| Bronson/Gloucester | A(A) | 0.39(0.35) | NBT(SBT) | 2.2(3.0) | A(A) | 0.38(0.35) |
| Bronson/Primrose | A(A) | 0.43(0.59) | NBT(NBT) | 5.8(9.8) | A(A) | 0.41(0.56) |
| Bronson/Somerset | D(A) | 0.83(0.57) | NBT(NBT) | 24.9(21.8) | B(A) | 0.65(0.50) |
| Cambridge/Primrose | A(A) | 7.7(8.3) | SBT(EBT) | 7.5(8.0) | - | - |
| Cambridge/Site | A(A) | 9.0(9.4) | WBL(WBL) | 4.0(2.5) | - | - |
| Note: Analysis of signalized intersections assumes a PHF of 0.95, a saturation flow rate of 1800 veh/h/lane, and a CBD type area. | | | | | | |

As the proposed development is projected to contribute approximately 1 to 2 new vehicles a minute to the area road network during the weekday morning and afternoon peak hours, it has no off-site transportation impacts or requirements. As previously mentioned, this projected impact is the 'worst case scenario' as the existing site's traffic has not been removed from the area road network.

The proposed site driveway connection to Cambridge Street is projected to operate with acceptable delays of approximately 9 seconds with 95th percentile queues of approximately 1.5 metres (no more than 1 vehicle in queue) during peak hours.

Possible mitigative measures to improve performance at the Bronson/Slater intersection during the morning peak hour include optimizing splits in Synchro. This will result in an LoS 'D' or better for all movements. The Synchro model output of this modification is included as Appendix D.

5.1 Neighbourhood Impacts

With regard to Primrose Avenue and Cambridge Street south of the proposed site driveway, which are classified as local roadways, the proposed development is projected to add approximately 44 and 52 veh/h to current two-way traffic volumes during the weekday morning and afternoon peak hours, which equates to approximately 1 new vehicle every minute. The total amount of two-way vehicle traffic (existing plus site-generated traffic)

equates to approximately 2 to 3 vehicles every minute travelling along Cambridge Street and 3 to 5 vehicles every minute travelling along Primrose Avenue during peak hours.

With regard to Cambridge Street north of the site, the proposed development is projected to add approximately 31 and 36 veh/h to current two-way traffic volumes during the weekday morning and afternoon peak hours, which equates to approximately 1 new vehicle every 2 minutes. The total amount of two-way vehicle traffic along Cambridge Street north of the site equates to approximately 2 to 3 vehicles every minute. The current volumes along these local streets are relatively low and the increase in vehicle volumes along these roads from the proposed development is considered negligible.

The site driveway has been proposed to Cambridge Street in part based on the recommendation of the City's Urban Design Review Panel. As a result of the site driveway connection to Cambridge Street, traffic along Cambridge Street and Primrose Avenue will increase as outlined above. However, it is our opinion that the total expected two-way traffic volumes along these two roads are acceptable for local roadways.

With respect to neighbourhood transit, the site is projected to generate an approximate total of 38 and 44 'new' two-way person transit trips during the weekday morning and afternoon peak hours, respectively. This amount of demand will be spread between local bus routes and rapid transit facilities (both existing and proposed) and can be easily accommodated.

6. TRANSPORTATION DEMAND MANAGEMENT

Depending on the nature of a development, Transportation Demand Management (TDM) strategies have the potential to be an integral part of a planned development in order to address and support the City of Ottawa policies with regard to TDM. For this particular site, its proximity to the existing transit service is considered very advantageous in lessening the reliance on the private automobile. A number of TDM measures could also be considered, including:

- improving the quality and safety of pedestrian facilities, such as enhanced sidewalks/lighting;
- improving bicycle facilities, such as provision of secure on-site bicycle storage;
- provide change/shower area for any on-site staff; and
- inclusion of dedicated car-sharing parking spaces.

These are important TDM strategies to encourage active modes of transportation to/from the site.

7. SITE PLAN REVIEW

This section provides an overview of site access, parking requirements, pedestrian circulation and transit accessibility. The Site Plan was previously illustrated in Figure 2.

Parking

A total of 142 residential parking spaces and 34 retail/visitor parking spaces are proposed to serve the subject site. This amount of residential parking is sufficient with respect to the

City's Zoning By-Law requirements for Area B, identified in Schedule 1 of the City's Zoning By-Law. The proponent will be seeking a blended parking space rate for the 34 parking spaces proposed for the retail land use and visitor parking.

With regard to parking space dimensioning, they are noted as being a 2.6 m in width and 5.2 m in length which meets the City's By-Law requirements.

Site Circulation

With regard to on-site circulation, the proposed drive aisle widths are noted as 6.7 m in width which meets the City's By-Law requirements.

The ramp providing access to the lower level parking is noted as having a 5% to 15% grade. The City's Private Approach By-Law states that a private approach may be greater than 6% but shall not exceed 12% provided that a subsurface melting device sufficient to keep the private approach free of ice at all times is installed and properly maintained. In addition, our review of the available industry literature indicates that ramp grades should ideally not exceed 12%, however, up to 15% is acceptable if pedestrians are specifically excluded from using the ramp, and appropriate transition grades are utilized. We have also observed ramps in the 15% to 20% range working acceptably indoors with low vehicular volumes. Given the low amount of projected vehicles entering/exiting the proposed development and provided appropriate pedestrian signage is installed, the ramp grade is considered acceptable.

Access Requirements

Based on projected volumes and proximity to adjacent intersections, additional traffic control/auxiliary turn lanes are not required at the proposed driveway connection.

The proposed width of the site driveway is noted as approximately 6.7 m which meets the City's By-Law requirements.

With regard to the proposed location of the site driveway, it is noted as being less than 3.0 metres from the adjacent property line, which does not meet the City's Private Approach By-Law requirements. The adjacent site (an approximate 30 space parking lot) and the proposed site are both expected to generate low vehicular volumes, Cambridge Street is relatively flat with good visibility for drivers to/from the proposed site and the existing two-way vehicle volumes along Cambridge Street are relatively low. In addition, the site driveway consists of approximately 20 m of roadway with 0% grade which will provide good visibility for drivers of the sidewalk, on-coming traffic along Cambridge Road and vehicles exiting the adjacent site. Therefore, based on the above, the proposed location of the site driveway is considered to be both safe and acceptable.

As for heavy vehicles, sufficient turning radii should be provided to accommodate garbage/recycling collection vehicles.

Pedestrians/Transit

An east-west pedestrian pathway is proposed from Bronson Avenue to Cambridge Street along the north side of the site connecting pedestrians to transit service and other adjacent development. This connection will be publicly accessible and allow pedestrian movement through the site between Cambridge Street and Bronson Avenue.

Based on the projected site-generated transit person trips to/from the proposed site, the current area transit service will be able to accommodate the additional person traffic.

Bicycles

A total of 202 below grade bicycle parking spaces and 24 above grade bicycle parking spaces are proposed to serve the development, which is sufficient with respect to the City's By-Law requirement. The location of the above grade bicycle parking stalls is not identified on the attached Site Plan, however, with respect to the City's By-Law requirements, bicycle parking should be located in well-lit areas, close to main building entrances.

8. FINDINGS AND RECOMMENDATIONS

Based on the foregoing analysis of the proposed site, the following transportation-related conclusions are offered:

- Study area intersections are currently operating at an acceptable Level of Service during the weekday morning and afternoon peak hours with the exception of the 'critical movement' at the Bronson/Slater intersection during the morning peak hour;
- The proposed development is projected to generate approximately 71 and 80 veh/h during the weekday morning and afternoon peak hours, respectively. These volumes equate to approximately 1 to 2 new vehicles every minute, and this amount of new traffic is considered relatively insignificant with no measureable impact on the operations of adjacent intersections;
- Future traffic conditions at study area intersections are projected to operate similar to existing conditions;
- A mitigative measure to improve both the existing and projected performance of the Bronson/Slater intersection during the morning peak hour is to optimize splits in Synchro;
- The site's on-site circulation and parking layout is well arranged and meets By-Law requirements;
- The proposed location of the site driveway is noted as being less than 3.0 m from the adjacent property line, which does not meet the City's minimum requirement. However, the proposed driveway is flat for approximately 20 m which provides good visibility for drivers of the sidewalk, the roadway and the adjacent site driveway. Therefore, there will be no vehicular conflicts as a result of driveways being too close in proximity;

- The vehicle residential parking supply meets By-Law requirements and the proponent will be seeking a blended rate for the retail and visitor parking requirements. The parking stalls are noted as meeting By-Law requirements in terms of dimensioning; and
- The parking garage access/egress ramp grades are noted as 15% (with transitions), which is acceptable provided appropriate signage is installed.

The proposed development fits well into the context of the surrounding area, and its location and design serves to promote use of walking, cycling, and transit modes, thus supporting City of Ottawa policies, goals and objectives with respect to redevelopment, intensification and modal share.

Therefore, based on the foregoing, approval of the proposed 192 Bronson Avenue residential development is recommended from a transportation perspective.

Prepared By:



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Reviewed By:



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Ottawa Operations



Appendix A
Current Peak Hour Volumes

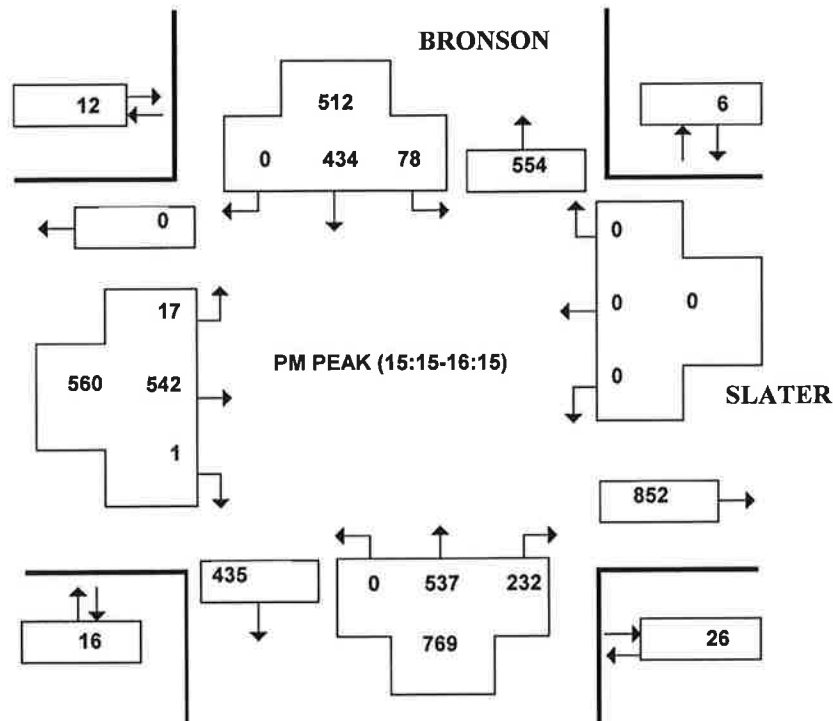
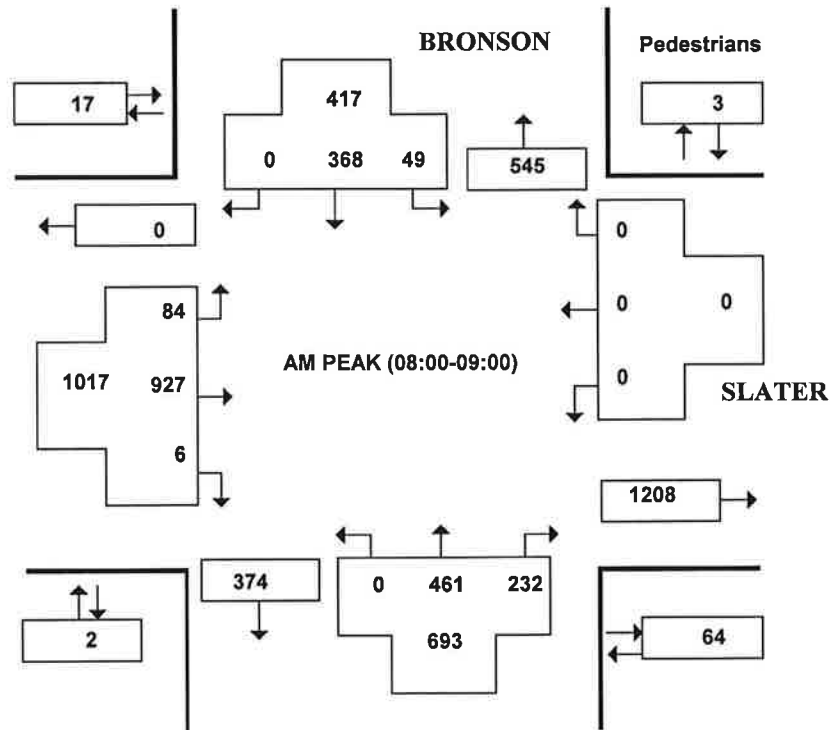
BRONSON AVE and SLATER ST

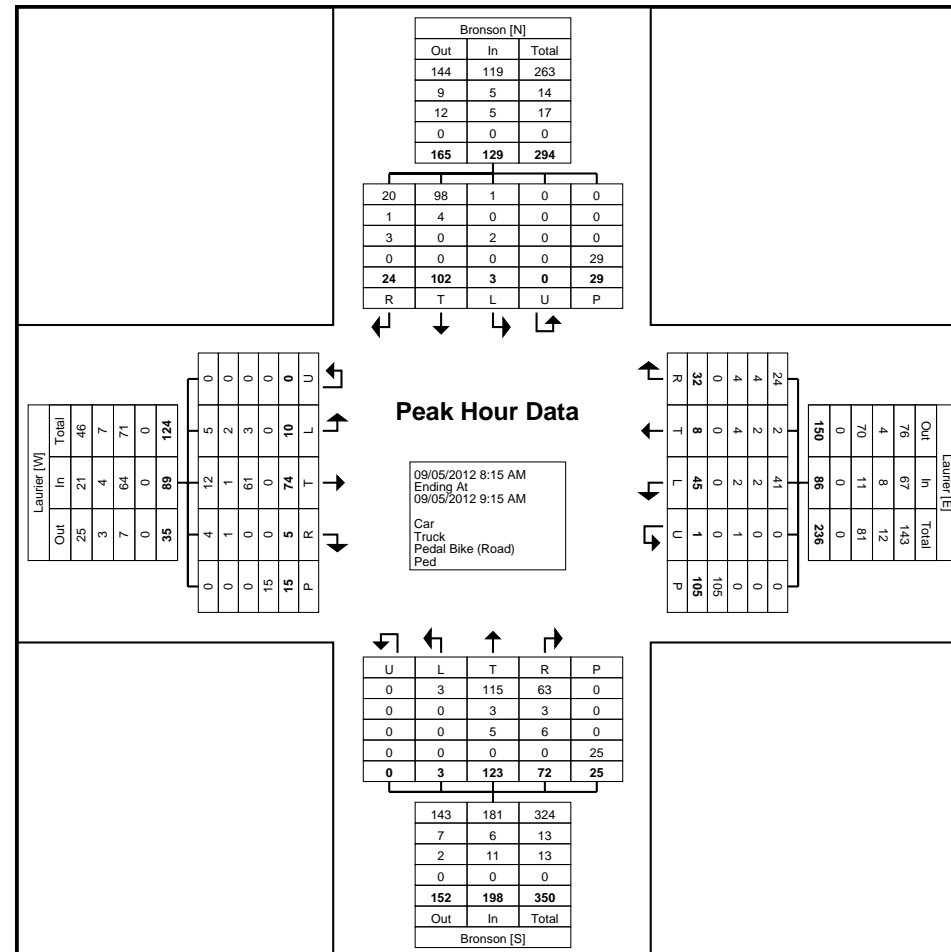
(ULRS Listing BRONSON & SLATER)

Survey Date: Friday 27 May 2011
Conditions: wet
Start Time: 0700

Total Observed U-Turns
 Northbound: 0 Southbound: 0
 Eastbound: 0 Westbound: 0

AADT Factor
 Friday in May is
 8





Turning Movement Peak Hour Data Plot (8:15 AM)

Ottawa, Ontario, Canada K1P 1J1
613-580-2424 ashley.viau@ottawa.ca

Peak Hour Data

09/05/2012 4:00 PM
Ending At
09/05/2012 5:00 PM

Car
Truck
Pedal Bike (Road)
Ped

Bronson [N]

| Out | In | Total |
|------------|------------|------------|
| 241 | 150 | 391 |
| 3 | 2 | 5 |
| 25 | 17 | 42 |
| 0 | 0 | 0 |
| 269 | 169 | 438 |

Laurier [W]

| Out | In | Total |
|-----------|-----------|------------|
| 78 | 53 | 78 |
| 1 | 1 | 1 |
| 68 | 18 | 68 |
| 0 | 0 | 0 |
| 0 | 0 | 0 |
| 75 | 72 | 147 |

Bronson [S]

| Out | In | Total |
|------------|------------|------------|
| 214 | 204 | 418 |
| 4 | 3 | 7 |
| 17 | 16 | 33 |
| 0 | 0 | 0 |
| 235 | 223 | 458 |

Laurier [E]

| Out | In | Total |
|-----|-----|-------|
| 73 | 146 | 219 |
| 2 | 3 | 5 |
| 14 | 55 | 69 |
| 0 | 0 | 0 |
| 89 | 204 | 293 |

Intersection Traffic Flow Data

| From | To | Count |
|------|----|-------|
| N | S | 14 |
| S | N | 134 |
| E | W | 2 |
| W | E | 0 |
| N | W | 0 |
| W | N | 2 |
| S | E | 0 |
| E | S | 12 |
| N | E | 1 |
| E | N | 0 |
| S | W | 0 |
| W | S | 0 |
| N | P | 36 |
| P | N | 18 |
| S | P | 3 |
| P | S | 148 |
| E | P | 0 |
| P | E | 85 |

Turning Movement Peak Hour Data Plot (4:00 PM)

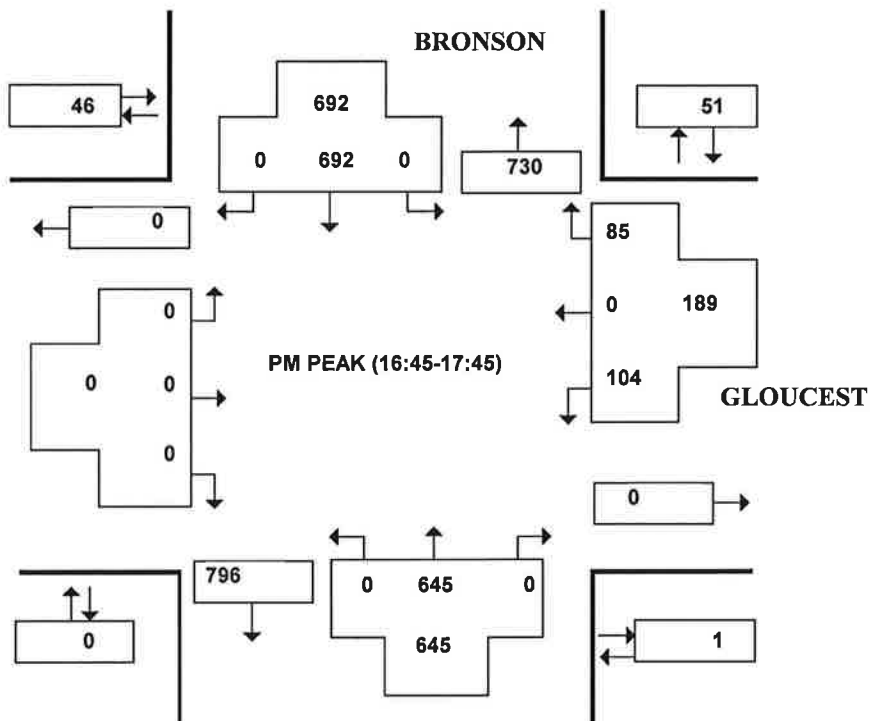
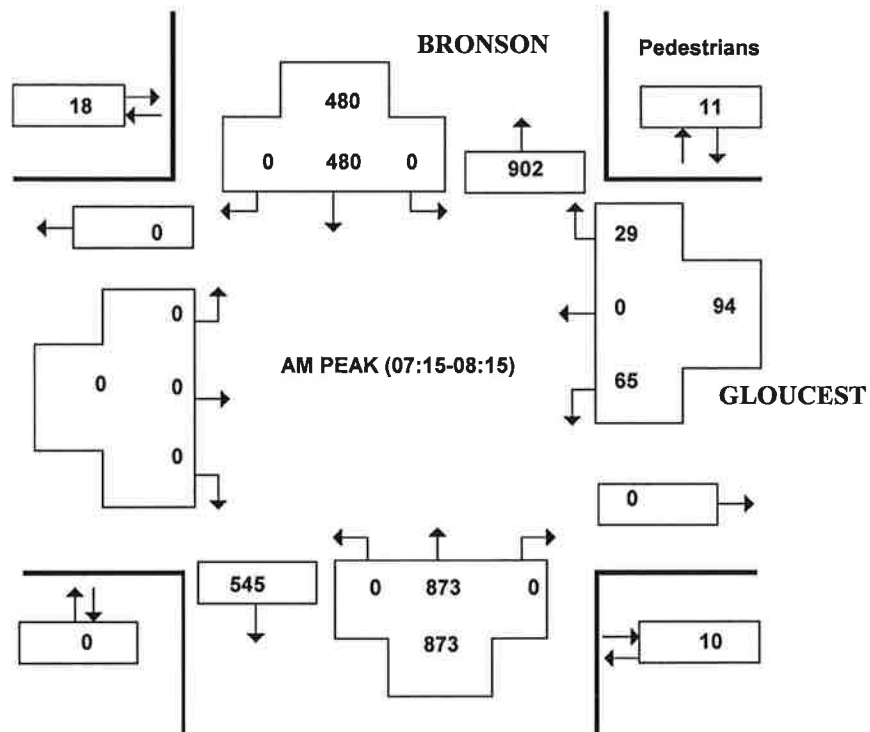
BRONSON AVE and GLOUCESTER ST

(ULRS Listing BRONSON & GLOUCEST)

Survey Date: Friday 10 June 2011
Conditions: dry
Start Time: 0700

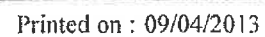
Total Observed U-Turns
 Northbound: 0 Southbound: 0
 Eastbound: 0 Westbound: 0

AADT Factor
 Friday in June is
 8



(ULRS Listing BRONSON & PRIMROSE)

AADT Factor
Friday in June is
8



CAMBRIDGE ST and PRIMROSE AVE

(ULRS Listing CAMBRIDGE & PRIMROSE)

Survey Date: Tuesday 19 May 1998

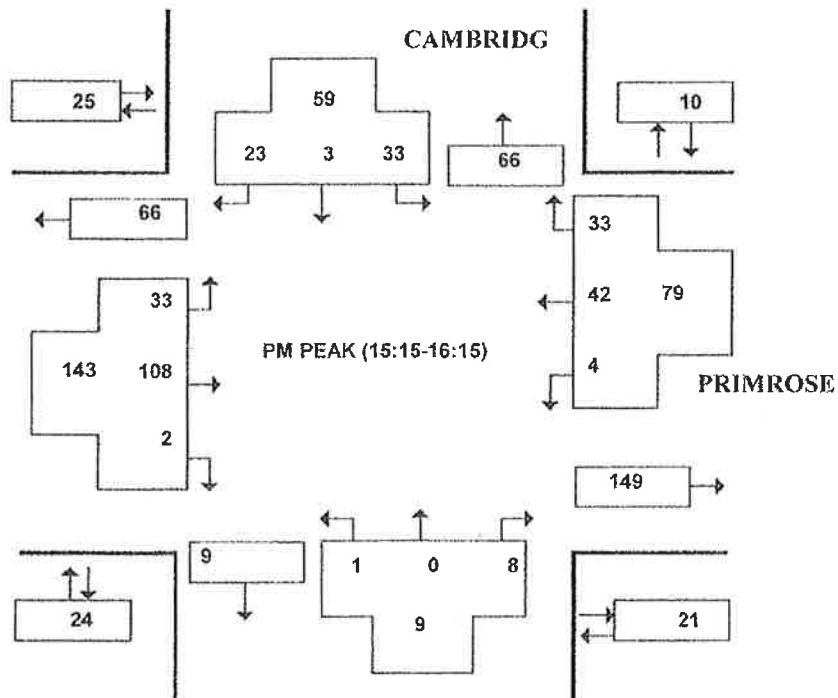
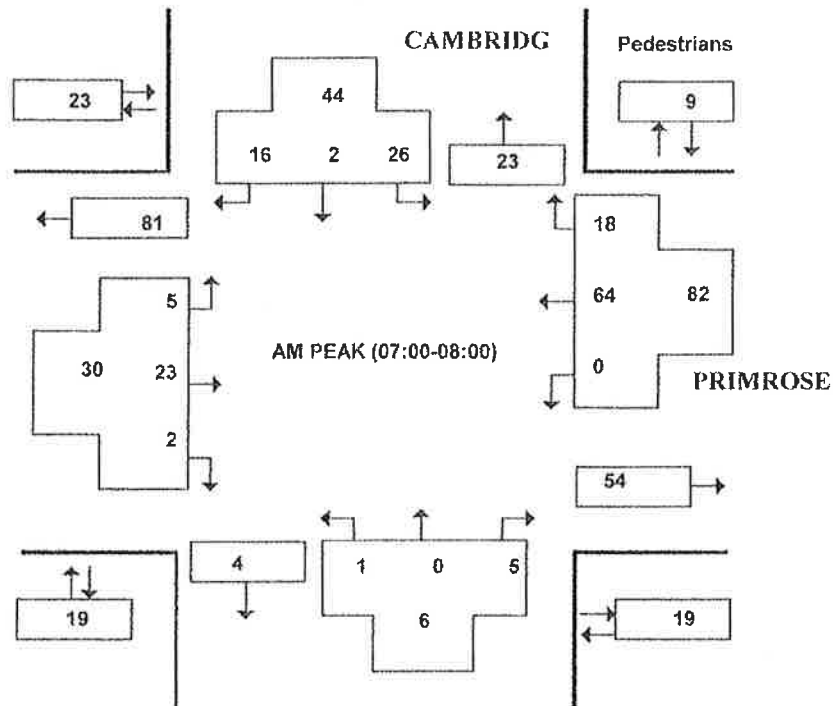
Conditions: Dry

Start Time: 0700

Total Observed U-Turns

Northbound: 0 Southbound: 2
Eastbound: 4 Westbound: 2

AADT Factor

Tuesday in May is
9


Appendix B
SYNCHRO Capacity Analysis:
Existing Conditions

Existing AM

1: Bronson & Slater

| | → | ↑ | ↘ | ↓ |
|------------------------|-------|-------|-------|-------|
| Lane Group | EBT | NBT | SBL | SBT |
| Lane Configurations | ↕↕ | ↕↕ | ↘ | ↕↕ |
| Volume (vph) | 927 | 461 | 49 | 368 |
| Lane Group Flow (vph) | 1070 | 729 | 52 | 387 |
| Turn Type | NA | NA | Perm | NA |
| Protected Phases | 4 | 2 | | 6 |
| Permitted Phases | | | 6 | |
| Detector Phase | 4 | 2 | 6 | 6 |
| Switch Phase | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 19.9 | 26.0 | 26.0 | 26.0 |
| Total Split (s) | 28.0 | 32.0 | 32.0 | 32.0 |
| Total Split (%) | 46.7% | 53.3% | 53.3% | 53.3% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 2.6 | 2.7 | 2.7 | 2.7 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.9 | 6.0 | 6.0 | 6.0 |
| Lead/Lag | | | | |
| Lead-Lag Optimize? | | | | |
| Recall Mode | Max | C-Max | C-Max | C-Max |
| Act Effect Green (s) | 22.1 | 26.0 | 26.0 | 26.0 |
| Actuated g/C Ratio | 0.37 | 0.43 | 0.43 | 0.43 |
| v/c Ratio | 0.96 | 0.58 | 0.23 | 0.29 |
| Control Delay | 39.6 | 12.4 | 14.0 | 11.8 |
| Queue Delay | 0.0 | 0.1 | 0.0 | 0.0 |
| Total Delay | 39.6 | 12.5 | 14.0 | 11.8 |
| LOS | D | B | B | B |
| Approach Delay | 39.6 | 12.5 | | 12.1 |
| Approach LOS | D | B | | B |
| Queue Length 50th (m) | 58.6 | 10.8 | 3.4 | 13.7 |
| Queue Length 95th (m) | #98.0 | 28.5 | 10.2 | 22.0 |
| Internal Link Dist (m) | 157.6 | 69.3 | | 35.9 |
| Turn Bay Length (m) | | | 17.0 | |
| Base Capacity (vph) | 1116 | 1249 | 227 | 1322 |
| Starvation Cap Reductn | 0 | 43 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.96 | 0.60 | 0.23 | 0.29 |

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 13 (22%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 25.4

Intersection LOS: C

Intersection Capacity Utilization 83.5%

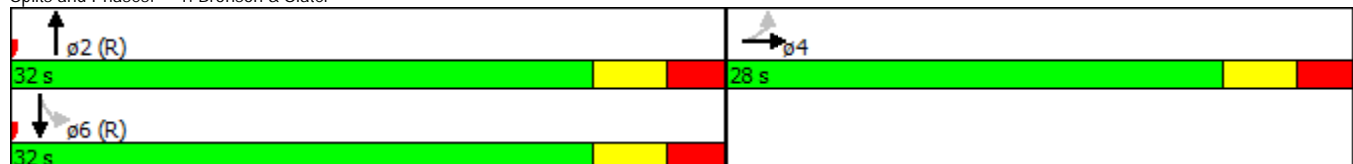
ICU Level of Service E

Analysis Period (min) 15













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

Queue shown is maximum after two cycles.

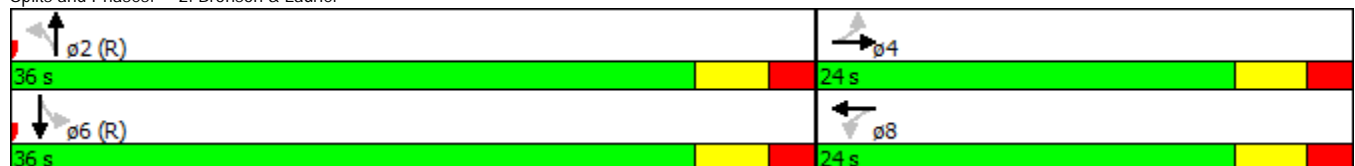
Splits and Phases: 1: Bronson & Slater











Existing AM
2: Bronson & Laurier

| |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
| Lane Configurations | |  | |  | |  | |  |
| Volume (vph) | 7 | 13 | 43 | 4 | 3 | 833 | 1 | 432 |
| Lane Group Flow (vph) | 0 | 26 | 0 | 78 | 0 | 949 | 0 | 478 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 23.4 | 23.4 | 23.4 | 23.4 | 30.5 | 30.5 | 30.5 | 30.5 |
| Total Split (s) | 24.0 | 24.0 | 24.0 | 24.0 | 36.0 | 36.0 | 36.0 | 36.0 |
| Total Split (%) | 40.0% | 40.0% | 40.0% | 40.0% | 60.0% | 60.0% | 60.0% | 60.0% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 |
| Lost Time Adjust (s) | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Total Lost Time (s) | | 5.4 | | 5.4 | | 5.5 | | 5.5 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | C-Max | C-Max | C-Max | C-Max |
| Act Effct Green (s) | | 11.8 | | 11.8 | | 45.7 | | 45.7 |
| Actuated g/C Ratio | | 0.20 | | 0.20 | | 0.76 | | 0.76 |
| v/c Ratio | | 0.10 | | 0.34 | | 0.43 | | 0.22 |
| Control Delay | | 16.4 | | 24.2 | | 4.0 | | 1.6 |
| Queue Delay | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Total Delay | | 16.4 | | 24.2 | | 4.0 | | 1.6 |
| LOS | | B | | C | | A | | A |
| Approach Delay | | 16.4 | | 24.2 | | 4.0 | | 1.6 |
| Approach LOS | | B | | C | | A | | A |
| Queue Length 50th (m) | | 2.0 | | 7.8 | | 10.9 | | 2.3 |
| Queue Length 95th (m) | | 6.2 | | 15.4 | | 22.4 | | m4.7 |
| Internal Link Dist (m) | | 67.7 | | 479.7 | | 47.5 | | 69.3 |
| Turn Bay Length (m) | | | | | | | | |
| Base Capacity (vph) | | 425 | | 359 | | 2188 | | 2198 |
| Starvation Cap Reductn | | 0 | | 0 | | 26 | | 0 |
| Spillback Cap Reductn | | 0 | | 0 | | 0 | | 0 |
| Storage Cap Reductn | | 0 | | 0 | | 0 | | 0 |
| Reduced v/c Ratio | | 0.06 | | 0.22 | | 0.44 | | 0.22 |
| Intersection Summary | | | | | | | | |
| Cycle Length: 60 | | | | | | | | |
| Actuated Cycle Length: 60 | | | | | | | | |
| Offset: 13 (22%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green | | | | | | | | |
| Natural Cycle: 55 | | | | | | | | |
| Control Type: Actuated-Coordinated | | | | | | | | |
| Maximum v/c Ratio: 0.43 | | | | | | | | |
| Intersection Signal Delay: 4.5 | | | | | Intersection LOS: A | | | |
| Intersection Capacity Utilization 55.7% | | | | | ICU Level of Service B | | | |
| Analysis Period (min) 15 | | | | | | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | | | | | | |

Splits and Phases: 2: Bronson & Laurier



Existing AM
3: Bronson & Gloucester

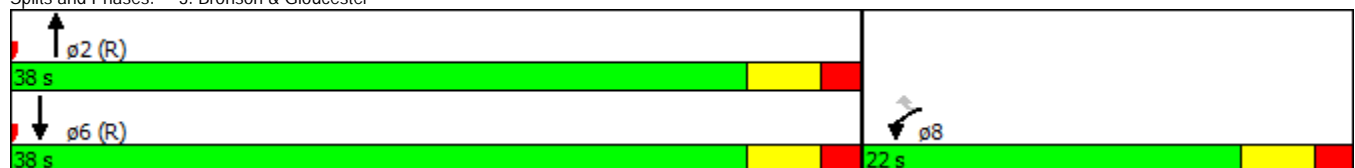
| |  |  |  |  |
|------------------------|---|---|---|---|
| Lane Group | WBL | WBR | NBT | SBT |
| Lane Configurations |  |  |  |  |
| Volume (vph) | 65 | 29 | 873 | 480 |
| Lane Group Flow (vph) | 68 | 31 | 919 | 505 |
| Turn Type | NA | Perm | NA | NA |
| Protected Phases | 8 | | 2 | 6 |
| Permitted Phases | | 8 | | |
| Detector Phase | 8 | 8 | 2 | 6 |
| Switch Phase | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 25.1 | 25.1 | 25.1 | 22.1 |
| Total Split (s) | 22.0 | 22.0 | 38.0 | 38.0 |
| Total Split (%) | 36.7% | 36.7% | 63.3% | 63.3% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 1.8 | 1.8 | 1.8 | 1.8 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.1 | 5.1 | 5.1 | 5.1 |
| Lead/Lag | | | | |
| Lead-Lag Optimize? | | | | |
| Recall Mode | None | None | C-Max | C-Max |
| Act Effect Green (s) | 11.4 | 11.4 | 46.5 | 46.5 |
| Actuated g/C Ratio | 0.19 | 0.19 | 0.78 | 0.78 |
| v/c Ratio | 0.24 | 0.11 | 0.39 | 0.21 |
| Control Delay | 21.8 | 8.5 | 1.8 | 1.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.1 |
| Total Delay | 21.8 | 8.5 | 1.8 | 1.3 |
| LOS | C | A | A | A |
| Approach Delay | 17.7 | | 1.8 | 1.3 |
| Approach LOS | B | | A | A |
| Queue Length 50th (m) | 6.6 | 0.0 | 20.7 | 3.3 |
| Queue Length 95th (m) | 13.6 | 5.0 | 3.0 | 4.6 |
| Internal Link Dist (m) | 364.2 | | 104.0 | 47.5 |
| Turn Bay Length (m) | | | | |
| Base Capacity (vph) | 429 | 396 | 2364 | 2364 |
| Starvation Cap Reductn | 0 | 0 | 0 | 613 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.16 | 0.08 | 0.39 | 0.29 |

Intersection Summary








Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 16 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.39
 Intersection Signal Delay: 2.7
 Intersection Capacity Utilization 48.9%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 3: Bronson & Gloucester



Existing AM
4: Bronson & Primrose

| |  |  |  |  |
|------------------------|---|---|---|---|
| Lane Group | EBL | NBL | NBT | SBT |
| Lane Configurations |  | |  |  |
| Volume (vph) | 7 | 35 | 822 | 390 |
| Lane Group Flow (vph) | 32 | 0 | 902 | 430 |
| Turn Type | NA | 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) | 25.2 | 23.2 | 23.2 | 23.2 |
| Total Split (s) | 26.0 | 34.0 | 34.0 | 34.0 |
| Total Split (%) | 43.3% | 56.7% | 56.7% | 56.7% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 1.9 | 1.9 | 1.9 | 1.9 |
| Lost Time Adjust (s) | 0.0 | | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | | 5.2 | 5.2 |
| Lead/Lag | | | | |
| Lead-Lag Optimize? | | | | |
| Recall Mode | None | C-Max | C-Max | C-Max |
| Act Effect Green (s) | 12.0 | | 49.8 | 49.8 |
| Actuated g/C Ratio | 0.20 | | 0.83 | 0.83 |
| v/c Ratio | 0.11 | | 0.38 | 0.17 |
| Control Delay | 9.8 | | 5.3 | 3.4 |
| Queue Delay | 0.0 | | 0.0 | 0.0 |
| Total Delay | 9.8 | | 5.3 | 3.4 |
| LOS | A | | A | A |
| Approach Delay | 9.8 | | 5.3 | 3.4 |
| Approach LOS | A | | A | A |
| Queue Length 50th (m) | 0.7 | | 0.0 | 0.0 |
| Queue Length 95th (m) | 5.2 | | 53.1 | 16.5 |
| Internal Link Dist (m) | 71.5 | | 171.7 | 104.0 |
| Turn Bay Length (m) | | | | |
| Base Capacity (vph) | 490 | | 2346 | 2513 |
| Starvation Cap Reductn | 0 | | 0 | 0 |
| Spillback Cap Reductn | 0 | | 0 | 0 |
| Storage Cap Reductn | 0 | | 0 | 0 |
| Reduced v/c Ratio | 0.07 | | 0.38 | 0.17 |

Intersection Summary















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 12 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.38
 Intersection Signal Delay: 4.8
 Intersection Capacity Utilization 70.5%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 4: Bronson & Primrose



Existing AM
6: Bronson & Somerset W

| |  |  |  |  |  |  |  |  | | | | |
|------------------------|---|---|---|---|---|---|--|---|------|------|------|------|
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT | ø1 | ø3 | ø5 | ø7 |
| Lane Configurations |  |  |  |  | |  | |  | | | | |
| Volume (vph) | 28 | 132 | 60 | 66 | 41 | 908 | 13 | 405 | | | | |
| Lane Group Flow (vph) | 29 | 177 | 63 | 81 | 0 | 1100 | 0 | 475 | | | | |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA | | | | |
| Protected Phases | | 4 | | 8 | | 2 | | 6 | 1 | 3 | 5 | 7 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | | | | | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 | | | | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Minimum Split (s) | 18.9 | 18.9 | 18.9 | 18.9 | 18.8 | 18.8 | 18.8 | 18.8 | 7.0 | 20.0 | 7.0 | 20.0 |
| Total Split (s) | 32.0 | 32.0 | 32.0 | 32.0 | 53.0 | 53.0 | 53.0 | 53.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Total Split (%) | 33.7% | 33.7% | 33.7% | 33.7% | 55.8% | 55.8% | 55.8% | 55.8% | 5% | 5% | 5% | 5% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 2.0 | 2.0 | 2.0 | 2.0 |
| All-Red Time (s) | 2.6 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | | 0.0 | | | | |
| Total Lost Time (s) | 5.9 | 5.9 | 5.9 | 5.9 | | 5.8 | | 5.8 | | | | |
| Lead/Lag | Lag | Lag | Lag | Lag | Lag | Lag | Lag | Lag | Lead | Lead | Lead | Lead |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | Max | Max | Max | Max | C-Max | C-Max | C-Max | C-Max | Min | Min | Min | Min |
| Act Effct Green (s) | 26.1 | 26.1 | 26.1 | 26.1 | | 47.2 | | 47.2 | | | | |
| Actuated g/C Ratio | 0.27 | 0.27 | 0.27 | 0.27 | | 0.50 | | 0.50 | | | | |
| v/c Ratio | 0.10 | 0.43 | 0.27 | 0.19 | | 0.82 | | 0.35 | | | | |
| Control Delay | 27.0 | 32.3 | 30.8 | 27.9 | | 26.8 | | 15.5 | | | | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | | 0.0 | | | | |
| Total Delay | 27.0 | 32.3 | 30.8 | 27.9 | | 26.8 | | 15.5 | | | | |
| LOS | C | C | C | C | | C | | B | | | | |
| Approach Delay | | 31.6 | | 29.2 | | 26.8 | | 15.5 | | | | |
| Approach LOS | | C | | C | | C | | B | | | | |
| Queue Length 50th (m) | 4.0 | 26.7 | 9.0 | 11.4 | | 86.3 | | 26.7 | | | | |
| Queue Length 95th (m) | 10.9 | 46.0 | 20.2 | 22.9 | | 115.3 | | 37.7 | | | | |
| Internal Link Dist (m) | | 306.8 | | 381.0 | | 115.2 | | 171.7 | | | | |
| Turn Bay Length (m) | | | | | | | | | | | | |
| Base Capacity (vph) | 281 | 411 | 235 | 424 | | 1339 | | 1347 | | | | |
| 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 | 0.10 | 0.43 | 0.27 | 0.19 | | 0.82 | | 0.35 | | | | |

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 22 (23%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 24.7







Intersection LOS: C

Intersection Capacity Utilization 89.4%

















ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 6: Bronson & Somerset W

| | | | | | | | | | | | | | | |
|---|--|------|--|--|---|--|------|--|--|---|--|------|--|--|
| Lanes and Phases: 1. Drönsen & Gomersel W. | | | | | | | | | | | | | | |
|  ø2 (R) | | | | |  ø3 | | | | |  ø4 | | | | |
| 5 s | | 53 s | | | 5 s | | 32 s | | | 5 s | | 32 s | | |
|  ø6 (R) | | | | |  ø7 | | | | |  ø8 | | | | |
| 5 s | | 53 s | | | 5 s | | 32 s | | | 5 s | | 32 s | | |

Existing AM
5: Cambridge & Primrose

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 5 | 23 | 2 | 0 | 64 | 18 | 1 | 0 | 5 | 26 | 2 | 16 |
| 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 | 24 | 2 | 0 | 67 | 19 | 1 | 0 | 5 | 27 | 2 | 17 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 32 | 86 | 6 | 46 | | | | | | | | |
| Volume Left (vph) | 5 | 0 | 1 | 27 | | | | | | | | |
| Volume Right (vph) | 2 | 19 | 5 | 17 | | | | | | | | |
| Hadj (s) | 0.03 | -0.10 | -0.43 | -0.07 | | | | | | | | |
| Departure Headway (s) | 4.1 | 3.9 | 3.8 | 4.1 | | | | | | | | |
| Degree Utilization, x | 0.04 | 0.09 | 0.01 | 0.05 | | | | | | | | |
| Capacity (veh/h) | 854 | 895 | 915 | 853 | | | | | | | | |
| Control Delay (s) | 7.3 | 7.4 | 6.8 | 7.3 | | | | | | | | |
| Approach Delay (s) | 7.3 | 7.4 | 6.8 | 7.3 | | | | | | | | |
| Approach LOS | A | A | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | | 7.3 | | | | | | | | |
| Level of Service | | | | A | | | | | | | | |
| Intersection Capacity Utilization | | | | 26.7% | ICU Level of Service | | | | A | | | |
| Analysis Period (min) | | | | 15 | | | | | | | | |

Existing PM

1: Bronson & Slater

| | → | ↑ | ↘ | ↓ |
|------------------------|-------|-------|-------|-------|
| Lane Group | EBT | NBT | SBL | SBT |
| Lane Configurations | ↕↕ | ↕↕ | ↘ | ↕↕ |
| Volume (vph) | 542 | 537 | 78 | 434 |
| Lane Group Flow (vph) | 590 | 809 | 82 | 457 |
| Turn Type | NA | NA | Perm | NA |
| Protected Phases | 4 | 2 | | 6 |
| Permitted Phases | | | 6 | |
| Detector Phase | 4 | 2 | 6 | 6 |
| Switch Phase | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 19.9 | 26.0 | 26.0 | 26.0 |
| Total Split (s) | 26.0 | 29.0 | 29.0 | 29.0 |
| Total Split (%) | 47.3% | 52.7% | 52.7% | 52.7% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 2.6 | 2.7 | 2.7 | 2.7 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.9 | 6.0 | 6.0 | 6.0 |
| Lead/Lag | | | | |
| Lead-Lag Optimize? | | | | |
| Recall Mode | Max | C-Max | C-Max | C-Max |
| Act Effct Green (s) | 20.1 | 23.0 | 23.0 | 23.0 |
| Actuated g/C Ratio | 0.37 | 0.42 | 0.42 | 0.42 |
| v/c Ratio | 0.53 | 0.67 | 0.43 | 0.36 |
| Control Delay | 15.9 | 13.3 | 19.9 | 12.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 15.9 | 13.3 | 19.9 | 12.0 |
| LOS | B | B | B | B |
| Approach Delay | 15.9 | 13.3 | | 13.2 |
| Approach LOS | B | B | | B |
| Queue Length 50th (m) | 23.5 | 16.6 | 5.5 | 15.5 |
| Queue Length 95th (m) | 36.2 | 35.9 | 16.7 | 24.7 |
| Internal Link Dist (m) | 157.6 | 69.3 | | 35.9 |
| Turn Bay Length (m) | | | 17.0 | |
| Base Capacity (vph) | 1112 | 1212 | 192 | 1275 |
| Starvation Cap Reductn | 0 | 4 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.53 | 0.67 | 0.43 | 0.36 |

Intersection Summary

Cycle Length: 55

Actuated Cycle Length: 55

Offset: 48 (87%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 14.0




Intersection LOS: B

Intersection Capacity Utilization 71.1%













ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Bronson & Slater

| | |
|---|---|
|  <p>ø2 (R)</p> <p>29 s</p> |  <p>ø4</p> <p>26 s</p> |
|  <p>ø6 (R)</p> <p>29 s</p> | |









Existing PM
2: Bronson & Laurier

| |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
| Lane Configurations | |  | |  | |  | |  |
| Volume (vph) | 23 | 21 | 72 | 7 | 4 | 674 | 2 | 610 |
| Lane Group Flow (vph) | 0 | 57 | 0 | 157 | 0 | 768 | 0 | 655 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 23.4 | 23.4 | 23.4 | 23.4 | 30.5 | 30.5 | 30.5 | 30.5 |
| Total Split (s) | 24.0 | 24.0 | 24.0 | 24.0 | 31.0 | 31.0 | 31.0 | 31.0 |
| Total Split (%) | 43.6% | 43.6% | 43.6% | 43.6% | 56.4% | 56.4% | 56.4% | 56.4% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 |
| Lost Time Adjust (s) | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Total Lost Time (s) | | 5.4 | | 5.4 | | 5.5 | | 5.5 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | C-Max | C-Max | C-Max | C-Max |
| Act Effect Green (s) | | 13.1 | | 13.1 | | 35.2 | | 35.2 |
| Actuated g/C Ratio | | 0.24 | | 0.24 | | 0.64 | | 0.64 |
| v/c Ratio | | 0.18 | | 0.57 | | 0.42 | | 0.35 |
| Control Delay | | 14.2 | | 26.3 | | 5.9 | | 2.5 |
| Queue Delay | | 0.0 | | 0.0 | | 0.1 | | 0.0 |
| Total Delay | | 14.2 | | 26.3 | | 5.9 | | 2.5 |
| LOS | | B | | C | | A | | A |
| Approach Delay | | 14.2 | | 26.3 | | 5.9 | | 2.5 |
| Approach LOS | | B | | C | | A | | A |
| Queue Length 50th (m) | | 3.7 | | 14.0 | | 8.6 | | 4.1 |
| Queue Length 95th (m) | | 9.5 | | 25.6 | | 26.1 | | 7.6 |
| Internal Link Dist (m) | | 67.7 | | 479.7 | | 47.5 | | 69.3 |
| Turn Bay Length (m) | | | | | | | | |
| Base Capacity (vph) | | 444 | | 392 | | 1838 | | 1856 |
| Starvation Cap Reductn | | 0 | | 0 | | 146 | | 0 |
| Spillback Cap Reductn | | 0 | | 0 | | 0 | | 0 |
| Storage Cap Reductn | | 0 | | 0 | | 0 | | 0 |
| Reduced v/c Ratio | | 0.13 | | 0.40 | | 0.45 | | 0.35 |
| Intersection Summary | | | | | | | | |
| Cycle Length: 55 | | | | | | | | |
| Actuated Cycle Length: 55 | | | | | | | | |
| Offset: 52 (95%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green | | | | | | | | |
| Natural Cycle: 55 | | | | | | | | |
| Control Type: Actuated-Coordinated | | | | | | | | |
| Maximum v/c Ratio: 0.57 | | | | | | | | |
| Intersection Signal Delay: 6.8 | | | | | Intersection LOS: A | | | |
| Intersection Capacity Utilization 52.2% | | | | | ICU Level of Service A | | | |
| Analysis Period (min) 15 | | | | | | | | |

Splits and Phases: 2: Bronson & Laurier

| | | |
|---|---|---|
|  |  |  |
| ø2 (R) | | ø4 |
| 31 s | | 24 s |
|  |  |  |
| ø6 (R) | | ø8 |
| 31 s | | 24 s |

Existing PM
3: Bronson & Gloucester

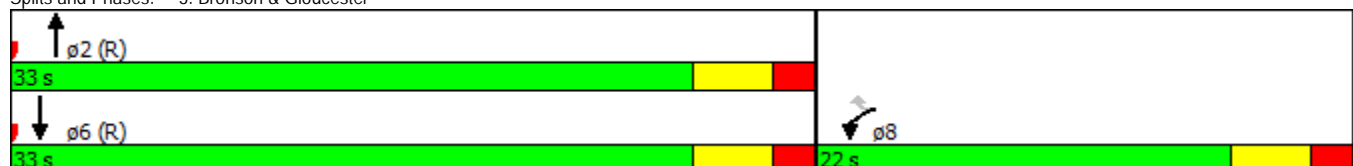
| |  |  |  |  |
|------------------------|---|---|---|---|
| Lane Group | WBL | WBR | NBT | SBT |
| Lane Configurations |  |  |  |  |
| Volume (vph) | 104 | 85 | 645 | 692 |
| Lane Group Flow (vph) | 109 | 89 | 679 | 728 |
| Turn Type | NA | Perm | NA | NA |
| Protected Phases | 8 | | 2 | 6 |
| Permitted Phases | | 8 | | |
| Detector Phase | 8 | 8 | 2 | 6 |
| Switch Phase | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 25.1 | 25.1 | 25.1 | 22.1 |
| Total Split (s) | 22.0 | 22.0 | 33.0 | 33.0 |
| Total Split (%) | 40.0% | 40.0% | 60.0% | 60.0% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 1.8 | 1.8 | 1.8 | 1.8 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.1 | 5.1 | 5.1 | 5.1 |
| Lead/Lag | | | | |
| Lead-Lag Optimize? | | | | |
| Recall Mode | None | None | C-Max | C-Max |
| Act Effect Green (s) | 11.5 | 11.5 | 37.3 | 37.3 |
| Actuated g/C Ratio | 0.21 | 0.21 | 0.68 | 0.68 |
| v/c Ratio | 0.34 | 0.26 | 0.33 | 0.35 |
| Control Delay | 20.9 | 6.6 | 1.4 | 2.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.1 |
| Total Delay | 20.9 | 6.6 | 1.4 | 2.0 |
| LOS | C | A | A | A |
| Approach Delay | 14.4 | | 1.4 | 2.0 |
| Approach LOS | B | | A | A |
| Queue Length 50th (m) | 9.7 | 0.0 | 0.6 | 5.5 |
| Queue Length 95th (m) | 17.7 | 7.8 | 1.3 | 7.7 |
| Internal Link Dist (m) | 364.2 | | 104.0 | 47.5 |
| Turn Bay Length (m) | | | | |
| Base Capacity (vph) | 468 | 460 | 2070 | 2070 |
| Starvation Cap Reductn | 0 | 0 | 0 | 237 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.23 | 0.19 | 0.33 | 0.40 |

Intersection Summary

Cycle Length: 55
 Actuated Cycle Length: 55
 Offset: 54 (98%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.35
 Intersection Signal Delay: 3.3
 Intersection Capacity Utilization 45.8%
 Analysis Period (min) 15








Intersection LOS: A
ICU Level of Service A

Splits and Phases: 3: Bronson & Gloucester



Existing PM

4: Bronson & Primrose

| |  |  |  |  |
|------------------------|---|---|---|---|
| Lane Group | EBL | NBL | NBT | SBT |
| Lane Configurations |  | |  |  |
| Volume (vph) | 26 | 42 | 907 | 561 |
| Lane Group Flow (vph) | 73 | 0 | 999 | 623 |
| Turn Type | NA | 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) | 25.2 | 23.2 | 23.2 | 23.2 |
| Total Split (s) | 26.0 | 29.0 | 29.0 | 29.0 |
| Total Split (%) | 47.3% | 52.7% | 52.7% | 52.7% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 1.9 | 1.9 | 1.9 | 1.9 |
| Lost Time Adjust (s) | 0.0 | | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | | 5.2 | 5.2 |
| Lead/Lag | | | | |
| Lead-Lag Optimize? | | | | |
| Recall Mode | None | C-Max | C-Max | C-Max |
| Act Effect Green (s) | 12.0 | | 40.8 | 40.8 |
| Actuated g/C Ratio | 0.22 | | 0.74 | 0.74 |
| v/c Ratio | 0.21 | | 0.49 | 0.28 |
| Control Delay | 9.6 | | 8.3 | 7.0 |
| Queue Delay | 0.0 | | 0.0 | 0.0 |
| Total Delay | 9.6 | | 8.3 | 7.0 |
| LOS | A | | A | A |
| Approach Delay | 9.6 | | 8.3 | 7.0 |
| Approach LOS | A | | A | A |
| Queue Length 50th (m) | 2.3 | | 25.1 | 13.4 |
| Queue Length 95th (m) | 8.2 | | #68.3 | 29.4 |
| Internal Link Dist (m) | 71.5 | | 171.7 | 104.0 |
| Turn Bay Length (m) | | | | |
| Base Capacity (vph) | 561 | | 2052 | 2240 |
| Starvation Cap Reductn | 0 | | 0 | 0 |
| Spillback Cap Reductn | 0 | | 0 | 0 |
| Storage Cap Reductn | 0 | | 0 | 0 |
| Reduced v/c Ratio | 0.13 | | 0.49 | 0.28 |

Intersection Summary

Cycle Length: 55

Actuated Cycle Length: 55

Offset: 49 (89%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 7.9

Intersection LOS: A

Intersection Capacity Utilization 77.0%




ICU Level of Service D

Analysis Period (min) 15















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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Bronson & Primrose

| | |
|--|--|
|  p2 (R) |  p4 |
| 29 s | 26 s |
|  p6 (R) | |
| 29 s | |

Existing PM
6: Bronson & Somerset W

| |  |  |  |  |  |  |  |  | | | | |
|------------------------|---|---|---|---|---|---|---|---|------|------|------|------|
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT | ø1 | ø3 | ø5 | ø7 |
| Lane Configurations |  |  |  |  | |  | |  | | | | |
| Volume (vph) | 18 | 113 | 80 | 178 | 63 | 524 | 21 | 482 | | | | |
| Lane Group Flow (vph) | 19 | 150 | 84 | 203 | 0 | 671 | 0 | 573 | | | | |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA | | | | |
| Protected Phases | | 4 | | 8 | | 2 | | 6 | 1 | 3 | 5 | 7 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | | | | | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 | | | | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Minimum Split (s) | 18.9 | 18.9 | 18.9 | 18.9 | 18.8 | 18.8 | 18.8 | 18.8 | 7.0 | 7.0 | 7.0 | 7.0 |
| Total Split (s) | 32.0 | 32.0 | 32.0 | 32.0 | 53.0 | 53.0 | 53.0 | 53.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Total Split (%) | 33.7% | 33.7% | 33.7% | 33.7% | 55.8% | 55.8% | 55.8% | 55.8% | 5% | 5% | 5% | 5% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 2.0 | 2.0 | 2.0 | 2.0 |
| All-Red Time (s) | 2.6 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | | 0.0 | | | | |
| Total Lost Time (s) | 5.9 | 5.9 | 5.9 | 5.9 | | 5.8 | | 5.8 | | | | |
| Lead/Lag | Lag | Lag | Lag | Lag | Lag | Lag | Lag | Lag | Lead | Lead | Lead | Lead |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | Max | Max | Max | Max | C-Max | C-Max | C-Max | C-Max | Min | Min | Min | Min |
| Act Effct Green (s) | 26.1 | 26.1 | 26.1 | 26.1 | | 47.2 | | 47.2 | | | | |
| Actuated g/C Ratio | 0.27 | 0.27 | 0.27 | 0.27 | | 0.50 | | 0.50 | | | | |
| v/c Ratio | 0.08 | 0.38 | 0.39 | 0.47 | | 0.55 | | 0.43 | | | | |
| Control Delay | 26.9 | 31.2 | 34.5 | 33.0 | | 18.8 | | 16.5 | | | | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | | 0.0 | | | | |
| Total Delay | 26.9 | 31.2 | 34.5 | 33.0 | | 18.8 | | 16.5 | | | | |
| LOS | C | C | C | C | | B | | B | | | | |
| Approach Delay | | 30.8 | | 33.4 | | 18.8 | | 16.5 | | | | |
| Approach LOS | | C | | C | | B | | B | | | | |
| Queue Length 50th (m) | 2.6 | 22.2 | 12.5 | 31.0 | | 43.0 | | 33.7 | | | | |
| Queue Length 95th (m) | 8.1 | 39.5 | 26.4 | 51.7 | | 59.5 | | 46.7 | | | | |
| Internal Link Dist (m) | | 306.8 | | 381.0 | | 115.2 | | 171.7 | | | | |
| Turn Bay Length (m) | | | | | | | | | | | | |
| Base Capacity (vph) | 228 | 399 | 216 | 431 | | 1212 | | 1346 | | | | |
| 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 | 0.08 | 0.38 | 0.39 | 0.47 | | 0.55 | | 0.43 | | | | |

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 24 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 21.7































Intersection LOS: C

Intersection Capacity Utilization 79.7%

















ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 6: Bronson & Somerset W

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|--|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 s | 53 s | | | | | 5 s | 32 s | | | | | 5 s | 32 s | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 s | 53 s | | | | | 5 s | 32 s | | | | | 5 s | 32 s | |

Existing PM
5: Cambridge & Primrose

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 33 | 108 | 2 | 4 | 42 | 33 | 1 | 0 | 8 | 33 | 3 | 23 |
| 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) | 35 | 114 | 2 | 4 | 44 | 35 | 1 | 0 | 8 | 35 | 3 | 24 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 151 | 83 | 9 | 62 | | | | | | | | |
| Volume Left (vph) | 35 | 4 | 1 | 35 | | | | | | | | |
| Volume Right (vph) | 2 | 35 | 8 | 24 | | | | | | | | |
| Hadj (s) | 0.07 | -0.21 | -0.48 | -0.09 | | | | | | | | |
| Departure Headway (s) | 4.2 | 4.0 | 4.0 | 4.3 | | | | | | | | |
| Degree Utilization, x | 0.18 | 0.09 | 0.01 | 0.07 | | | | | | | | |
| Capacity (veh/h) | 835 | 874 | 837 | 777 | | | | | | | | |
| Control Delay (s) | 8.1 | 7.4 | 7.0 | 7.7 | | | | | | | | |
| Approach Delay (s) | 8.1 | 7.4 | 7.0 | 7.7 | | | | | | | | |
| Approach LOS | A | A | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 7.8 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 33.8% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

Appendix C
SYNCHRO Capacity Analysis:
Projected Conditions

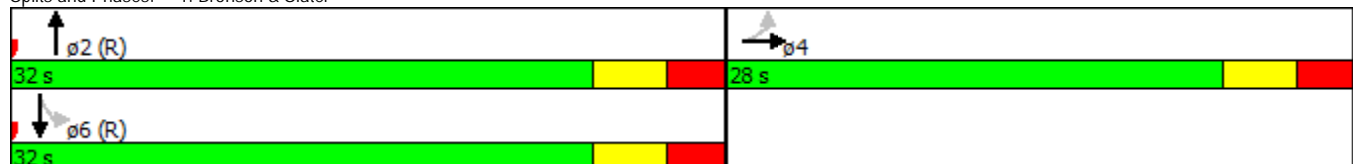
Projected AM
1: Bronson & Slater

| | → | ↑ | ↘ | ↓ |
|------------------------|-------|-------|-------|-------|
| Lane Group | EBT | NBT | SBL | SBT |
| Lane Configurations | ↕↕ | ↕↕ | ↘ | ↕↕ |
| Volume (vph) | 927 | 475 | 49 | 374 |
| Lane Group Flow (vph) | 1070 | 749 | 52 | 394 |
| Turn Type | NA | NA | Perm | NA |
| Protected Phases | 4 | 2 | | 6 |
| Permitted Phases | | | 6 | |
| Detector Phase | 4 | 2 | 6 | 6 |
| Switch Phase | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 19.9 | 26.0 | 26.0 | 26.0 |
| Total Split (s) | 28.0 | 32.0 | 32.0 | 32.0 |
| Total Split (%) | 46.7% | 53.3% | 53.3% | 53.3% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 2.6 | 2.7 | 2.7 | 2.7 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.9 | 6.0 | 6.0 | 6.0 |
| Lead/Lag | | | | |
| Lead-Lag Optimize? | | | | |
| Recall Mode | Max | C-Max | C-Max | C-Max |
| Act Effct Green (s) | 22.1 | 26.0 | 26.0 | 26.0 |
| Actuated g/C Ratio | 0.37 | 0.43 | 0.43 | 0.43 |
| v/c Ratio | 0.96 | 0.60 | 0.24 | 0.30 |
| Control Delay | 39.6 | 12.7 | 14.3 | 11.8 |
| Queue Delay | 0.0 | 0.1 | 0.0 | 0.0 |
| Total Delay | 39.6 | 12.8 | 14.3 | 11.8 |
| LOS | D | B | B | B |
| Approach Delay | 39.6 | 12.8 | | 12.1 |
| Approach LOS | D | B | | B |
| Queue Length 50th (m) | 58.6 | 12.1 | 3.4 | 14.1 |
| Queue Length 95th (m) | #98.0 | 29.5 | 10.3 | 22.4 |
| Internal Link Dist (m) | 157.6 | 69.3 | | 35.9 |
| Turn Bay Length (m) | | | 17.0 | |
| Base Capacity (vph) | 1116 | 1250 | 220 | 1322 |
| Starvation Cap Reductn | 0 | 43 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.96 | 0.62 | 0.24 | 0.30 |













Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 13 (22%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 25.3
 Intersection Capacity Utilization 84.1%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

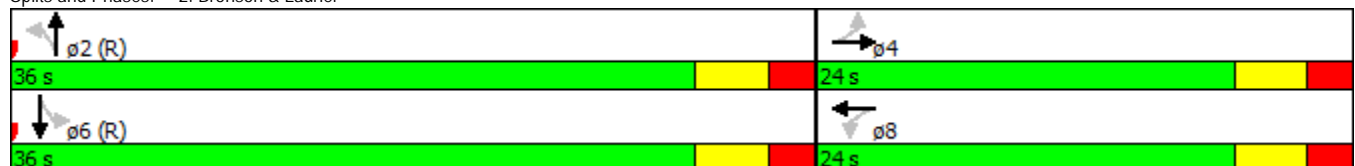
Splits and Phases: 1: Bronson & Slater











Projected AM
2: Bronson & Laurier

| |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
| Lane Configurations | |  | |  | |  | |  |
| Volume (vph) | 26 | 16 | 43 | 5 | 3 | 833 | 1 | 431 |
| Lane Group Flow (vph) | 0 | 50 | 0 | 79 | 0 | 949 | 0 | 484 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 23.4 | 23.4 | 23.4 | 23.4 | 30.5 | 30.5 | 30.5 | 30.5 |
| Total Split (s) | 24.0 | 24.0 | 24.0 | 24.0 | 36.0 | 36.0 | 36.0 | 36.0 |
| Total Split (%) | 40.0% | 40.0% | 40.0% | 40.0% | 60.0% | 60.0% | 60.0% | 60.0% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 |
| Lost Time Adjust (s) | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Total Lost Time (s) | | 5.4 | | 5.4 | | 5.5 | | 5.5 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | C-Max | C-Max | C-Max | C-Max |
| Act Effct Green (s) | | 11.8 | | 11.8 | | 45.7 | | 45.7 |
| Actuated g/C Ratio | | 0.20 | | 0.20 | | 0.76 | | 0.76 |
| v/c Ratio | | 0.21 | | 0.35 | | 0.43 | | 0.22 |
| Control Delay | | 19.2 | | 24.4 | | 4.1 | | 1.5 |
| Queue Delay | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Total Delay | | 19.2 | | 24.4 | | 4.1 | | 1.5 |
| LOS | | B | | C | | A | | A |
| Approach Delay | | 19.3 | | 24.4 | | 4.1 | | 1.5 |
| Approach LOS | | B | | C | | A | | A |
| Queue Length 50th (m) | | 4.3 | | 7.9 | | 11.0 | | 2.3 |
| Queue Length 95th (m) | | 10.1 | | 15.5 | | 23.7 | | m4.5 |
| Internal Link Dist (m) | | 67.7 | | 479.7 | | 47.5 | | 69.3 |
| Turn Bay Length (m) | | | | | | | | |
| Base Capacity (vph) | | 376 | | 354 | | 2187 | | 2192 |
| Starvation Cap Reductn | | 0 | | 0 | | 26 | | 0 |
| Spillback Cap Reductn | | 0 | | 0 | | 0 | | 0 |
| Storage Cap Reductn | | 0 | | 0 | | 0 | | 0 |
| Reduced v/c Ratio | | 0.13 | | 0.22 | | 0.44 | | 0.22 |
| Intersection Summary | | | | | | | | |
| Cycle Length: 60 | | | | | | | | |
| Actuated Cycle Length: 60 | | | | | | | | |
| Offset: 13 (22%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green | | | | | | | | |
| Natural Cycle: 55 | | | | | | | | |
| Control Type: Actuated-Coordinated | | | | | | | | |
| Maximum v/c Ratio: 0.43 | | | | | | | | |
| Intersection Signal Delay: 4.8 | | | | | Intersection LOS: A | | | |
| Intersection Capacity Utilization 55.3% | | | | | ICU Level of Service B | | | |
| Analysis Period (min) 15 | | | | | | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | | | | | | |

Splits and Phases: 2: Bronson & Laurier



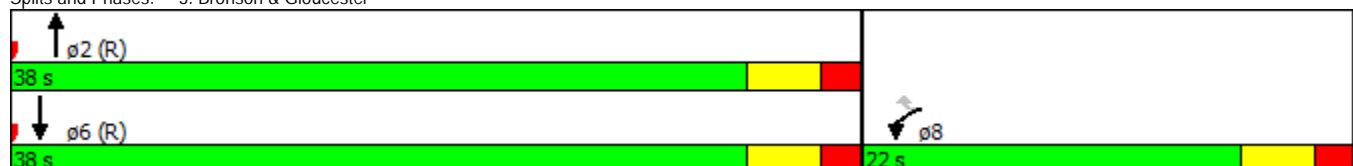
Projected AM
3: Bronson & Gloucester

| |  |  |  |  |
|------------------------|---|---|---|---|
| Lane Group | WBL | WBR | NBT | SBT |
| Lane Configurations |  |  |  |  |
| Volume (vph) | 65 | 29 | 873 | 480 |
| Lane Group Flow (vph) | 68 | 31 | 919 | 505 |
| Turn Type | NA | Perm | NA | NA |
| Protected Phases | 8 | | 2 | 6 |
| Permitted Phases | | 8 | | |
| Detector Phase | 8 | 8 | 2 | 6 |
| Switch Phase | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 25.1 | 25.1 | 25.1 | 22.1 |
| Total Split (s) | 22.0 | 22.0 | 38.0 | 38.0 |
| Total Split (%) | 36.7% | 36.7% | 63.3% | 63.3% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 1.8 | 1.8 | 1.8 | 1.8 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.1 | 5.1 | 5.1 | 5.1 |
| Lead/Lag | | | | |
| Lead-Lag Optimize? | | | | |
| Recall Mode | None | None | C-Max | C-Max |
| Act Effect Green (s) | 11.4 | 11.4 | 46.5 | 46.5 |
| Actuated g/C Ratio | 0.19 | 0.19 | 0.78 | 0.78 |
| v/c Ratio | 0.24 | 0.11 | 0.39 | 0.21 |
| Control Delay | 21.8 | 8.5 | 0.9 | 1.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.1 |
| Total Delay | 21.8 | 8.5 | 0.9 | 1.4 |
| LOS | C | A | A | A |
| Approach Delay | 17.7 | | 0.9 | 1.4 |
| Approach LOS | B | | A | A |
| Queue Length 50th (m) | 6.6 | 0.0 | 1.9 | 3.6 |
| Queue Length 95th (m) | 13.6 | 5.0 | 3.0 | 5.1 |
| Internal Link Dist (m) | 364.2 | | 104.0 | 47.5 |
| Turn Bay Length (m) | | | | |
| Base Capacity (vph) | 429 | 396 | 2364 | 2364 |
| Starvation Cap Reductn | 0 | 0 | 0 | 616 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.16 | 0.08 | 0.39 | 0.29 |








Intersection Summary

| | |
|---|------------------------|
| Cycle Length: 60 | |
| Actuated Cycle Length: 60 | |
| Offset: 16 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green | |
| Natural Cycle: 55 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.39 | |
| Intersection Signal Delay: 2.2 | Intersection LOS: A |
| Intersection Capacity Utilization 48.9% | ICU Level of Service A |
| Analysis Period (min) 15 | |

Splits and Phases: 3: Bronson & Gloucester



Projected AM
4: Bronson & Primrose

| |  |  |  |  |
|------------------------|---|---|---|---|
| Lane Group | EBL | NBL | NBT | SBT |
| Lane Configurations |  | |  |  |
| Volume (vph) | 8 | 46 | 821 | 390 |
| Lane Group Flow (vph) | 67 | 0 | 912 | 430 |
| Turn Type | NA | 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) | 25.2 | 23.2 | 23.2 | 23.2 |
| Total Split (s) | 26.0 | 34.0 | 34.0 | 34.0 |
| Total Split (%) | 43.3% | 56.7% | 56.7% | 56.7% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 1.9 | 1.9 | 1.9 | 1.9 |
| Lost Time Adjust (s) | 0.0 | | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | | 5.2 | 5.2 |
| Lead/Lag | | | | |
| Lead-Lag Optimize? | | | | |
| Recall Mode | None | C-Max | C-Max | C-Max |
| Act Effect Green (s) | 12.0 | | 45.8 | 45.8 |
| Actuated g/C Ratio | 0.20 | | 0.76 | 0.76 |
| v/c Ratio | 0.21 | | 0.43 | 0.19 |
| Control Delay | 8.2 | | 6.5 | 4.0 |
| Queue Delay | 0.0 | | 0.0 | 0.0 |
| Total Delay | 8.2 | | 6.5 | 4.0 |
| LOS | A | | A | A |
| Approach Delay | 8.2 | | 6.5 | 4.0 |
| Approach LOS | A | | A | A |
| Queue Length 50th (m) | 0.8 | | 21.7 | 4.6 |
| Queue Length 95th (m) | 7.3 | | 54.5 | 16.6 |
| Internal Link Dist (m) | 71.5 | | 171.7 | 104.0 |
| Turn Bay Length (m) | | | | |
| Base Capacity (vph) | 505 | | 2122 | 2308 |
| Starvation Cap Reductn | 0 | | 0 | 0 |
| Spillback Cap Reductn | 0 | | 0 | 0 |
| Storage Cap Reductn | 0 | | 0 | 0 |
| Reduced v/c Ratio | 0.13 | | 0.43 | 0.19 |

Intersection Summary
















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 12 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.43
 Intersection Signal Delay: 5.8
 Intersection Capacity Utilization 70.8%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 4: Bronson & Primrose



Projected AM
6: Bronson & Somerset W

| |  |  |  |  |  |  |  |  | | | | |
|------------------------|---|---|---|---|---|---|--|---|------|------|------|------|
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT | ø1 | ø3 | ø5 | ø7 |
| Lane Configurations |  |  |  |  | |  |  |  | | | | |
| Volume (vph) | 30 | 132 | 60 | 66 | 41 | 916 | 13 | 429 | | | | |
| Lane Group Flow (vph) | 32 | 177 | 63 | 81 | 0 | 1108 | 0 | 509 | | | | |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA | | | | |
| Protected Phases | | 4 | | 8 | | 2 | | 6 | 1 | 3 | 5 | 7 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | | | | | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 | | | | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Minimum Split (s) | 18.9 | 18.9 | 18.9 | 18.9 | 18.8 | 18.8 | 18.8 | 18.8 | 7.0 | 20.0 | 7.0 | 20.0 |
| Total Split (s) | 32.0 | 32.0 | 32.0 | 32.0 | 53.0 | 53.0 | 53.0 | 53.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Total Split (%) | 33.7% | 33.7% | 33.7% | 33.7% | 55.8% | 55.8% | 55.8% | 55.8% | 5% | 5% | 5% | 5% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 2.0 | 2.0 | 2.0 | 2.0 |
| All-Red Time (s) | 2.6 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | | 0.0 | | | | |
| Total Lost Time (s) | 5.9 | 5.9 | 5.9 | 5.9 | | 5.8 | | 5.8 | | | | |
| Lead/Lag | Lag | Lag | Lag | Lag | Lag | Lag | Lag | Lag | Lead | Lead | Lead | Lead |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | Max | Max | Max | Max | C-Max | C-Max | C-Max | C-Max | Min | Min | Min | Min |
| Act Effct Green (s) | 26.1 | 26.1 | 26.1 | 26.1 | | 47.2 | | 47.2 | | | | |
| Actuated g/C Ratio | 0.27 | 0.27 | 0.27 | 0.27 | | 0.50 | | 0.50 | | | | |
| v/c Ratio | 0.11 | 0.43 | 0.27 | 0.19 | | 0.83 | | 0.38 | | | | |
| Control Delay | 27.2 | 32.3 | 30.8 | 27.9 | | 27.2 | | 15.8 | | | | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | | 0.0 | | | | |
| Total Delay | 27.2 | 32.3 | 30.8 | 27.9 | | 27.2 | | 15.8 | | | | |
| LOS | C | C | C | C | | C | | B | | | | |
| Approach Delay | | 31.5 | | 29.2 | | 27.2 | | 15.8 | | | | |
| Approach LOS | | C | | C | | C | | B | | | | |
| Queue Length 50th (m) | 4.4 | 26.7 | 9.0 | 11.4 | | 87.4 | | 29.1 | | | | |
| Queue Length 95th (m) | 11.5 | 46.0 | 20.2 | 22.9 | | 117.0 | | 40.7 | | | | |
| Internal Link Dist (m) | | 306.8 | | 381.0 | | 115.2 | | 171.7 | | | | |
| Turn Bay Length (m) | | | | | | | | | | | | |
| Base Capacity (vph) | 281 | 411 | 235 | 424 | | 1337 | | 1345 | | | | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | | 0 | | 0 | | | | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | | 0 | | 0 | | | | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | | 0 | | 0 | | | | |
| Reduced v/c Ratio | 0.11 | 0.43 | 0.27 | 0.19 | | 0.83 | | 0.38 | | | | |

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 22 (23%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 24.9













Intersection LOS: C

Intersection Capacity Utilization 90.8%

















ICU Level of Service E

Analysis Period (min) 15










Splits and Phases: 6: Bronson & Somerset W

| | | | | | | | |
|---|---|---|--------|--|---|---|----|
|  |  |  | ø2 (R) |  |  |  | ø4 |
| 5 s | 53 s | | | 5 s | 32 s | | |
|  |  |  | ø6 (R) |  |  |  | ø8 |
| 5 s | 53 s | | | 5 s | 32 s | | |

Projected AM
5: Cambridge & Primrose

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 5 | 23 | 2 | 0 | 64 | 29 | 1 | 0 | 5 | 59 | 2 | 16 |
| 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 | 24 | 2 | 0 | 67 | 31 | 1 | 0 | 5 | 62 | 2 | 17 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 32 | 98 | 6 | 81 | | | | | | | | |
| Volume Left (vph) | 5 | 0 | 1 | 62 | | | | | | | | |
| Volume Right (vph) | 2 | 31 | 5 | 17 | | | | | | | | |
| Hadj (s) | 0.03 | -0.15 | -0.43 | 0.06 | | | | | | | | |
| Departure Headway (s) | 4.2 | 4.0 | 3.8 | 4.2 | | | | | | | | |
| Degree Utilization, x | 0.04 | 0.11 | 0.01 | 0.10 | | | | | | | | |
| Capacity (veh/h) | 828 | 883 | 894 | 821 | | | | | | | | |
| Control Delay (s) | 7.4 | 7.5 | 6.9 | 7.7 | | | | | | | | |
| Approach Delay (s) | 7.4 | 7.5 | 6.9 | 7.7 | | | | | | | | |
| Approach LOS | A | A | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 7.5 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 29.1% | ICU Level of Service | | A | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

Projected AM
7: Cambridge & Site

| | | | | | | |
|-----------------------------------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations |  | |  | | |  |
| Volume (veh/h) | 33 | 23 | 23 | 11 | 8 | 44 |
| 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) | 35 | 24 | 24 | 12 | 8 | 46 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh | | | | | | |
| Upstream signal (m) | | | | | | 203 |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 93 | 30 | | | 36 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 93 | 30 | | | 36 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 96 | 98 | | | 99 | |
| cM capacity (veh/h) | 902 | 1044 | | | 1575 | |
| Direction, Lane # | WB 1 | NB 1 | SB 1 | | | |
| Volume Total | 59 | 36 | 55 | | | |
| Volume Left | 35 | 0 | 8 | | | |
| Volume Right | 24 | 12 | 0 | | | |
| cSH | 955 | 1700 | 1575 | | | |
| Volume to Capacity | 0.06 | 0.02 | 0.01 | | | |
| Queue Length 95th (m) | 1.5 | 0.0 | 0.1 | | | |
| Control Delay (s) | 9.0 | 0.0 | 1.2 | | | |
| Lane LOS | A | | A | | | |
| Approach Delay (s) | 9.0 | 0.0 | 1.2 | | | |
| Approach LOS | A | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 4.0 | | | |
| Intersection Capacity Utilization | | | 19.7% | ICU Level of Service | | A |
| Analysis Period (min) | | | 15 | | | |

Projected PM
1: Bronson & Slater




| | → | ↑ | ↘ | ↓ |
|------------------------|-------|-------|-------|-------|
| Lane Group | EBT | NBT | SBL | SBT |
| Lane Configurations | ↕↕ | ↕↕ | ↘ | ↕↕ |
| Volume (vph) | 542 | 545 | 78 | 450 |
| Lane Group Flow (vph) | 590 | 822 | 82 | 474 |
| Turn Type | NA | NA | Perm | NA |
| Protected Phases | 4 | 2 | | 6 |
| Permitted Phases | | | 6 | |
| Detector Phase | 4 | 2 | 6 | 6 |
| Switch Phase | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 19.9 | 26.0 | 26.0 | 26.0 |
| Total Split (s) | 26.0 | 29.0 | 29.0 | 29.0 |
| Total Split (%) | 47.3% | 52.7% | 52.7% | 52.7% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 2.6 | 2.7 | 2.7 | 2.7 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.9 | 6.0 | 6.0 | 6.0 |
| Lead/Lag | | | | |
| Lead-Lag Optimize? | | | | |
| Recall Mode | Max | C-Max | C-Max | C-Max |
| Act Effct Green (s) | 20.1 | 23.0 | 23.0 | 23.0 |
| Actuated g/C Ratio | 0.37 | 0.42 | 0.42 | 0.42 |
| v/c Ratio | 0.53 | 0.68 | 0.44 | 0.37 |
| Control Delay | 15.9 | 13.9 | 20.4 | 12.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 15.9 | 14.0 | 20.4 | 12.1 |
| LOS | B | B | C | B |
| Approach Delay | 15.9 | 14.0 | | 13.3 |
| Approach LOS | B | B | | B |
| Queue Length 50th (m) | 23.5 | 18.7 | 5.5 | 16.2 |
| Queue Length 95th (m) | 36.2 | 36.8 | 16.9 | 25.7 |
| Internal Link Dist (m) | 157.6 | 69.3 | | 35.9 |
| Turn Bay Length (m) | | | 17.0 | |
| Base Capacity (vph) | 1112 | 1212 | 188 | 1275 |
| Starvation Cap Reductn | 0 | 4 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.53 | 0.68 | 0.44 | 0.37 |

Intersection Summary













Cycle Length: 55
 Actuated Cycle Length: 55
 Offset: 48 (87%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 14.4
 Intersection Capacity Utilization 71.5%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 1: Bronson & Slater

| | |
|---|---|
|  <p>ø2 (R)</p> <p>29 s</p> |  <p>ø4</p> <p>26 s</p> |
|  <p>ø6 (R)</p> <p>29 s</p> | |









Projected PM
2: Bronson & Laurier

| |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
| Lane Configurations | |  | |  | |  | |  |
| Volume (vph) | 35 | 23 | 72 | 9 | 4 | 674 | 2 | 608 |
| Lane Group Flow (vph) | 0 | 74 | 0 | 159 | 0 | 768 | 0 | 671 |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA |
| Protected Phases | | 4 | | 8 | | 2 | | 6 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 |
| Switch Phase | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 23.4 | 23.4 | 23.4 | 23.4 | 30.5 | 30.5 | 30.5 | 30.5 |
| Total Split (s) | 24.0 | 24.0 | 24.0 | 24.0 | 31.0 | 31.0 | 31.0 | 31.0 |
| Total Split (%) | 43.6% | 43.6% | 43.6% | 43.6% | 56.4% | 56.4% | 56.4% | 56.4% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 |
| Lost Time Adjust (s) | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Total Lost Time (s) | | 5.4 | | 5.4 | | 5.5 | | 5.5 |
| Lead/Lag | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | None | None | None | None | C-Max | C-Max | C-Max | C-Max |
| Act Effect Green (s) | | 13.2 | | 13.2 | | 35.1 | | 35.1 |
| Actuated g/C Ratio | | 0.24 | | 0.24 | | 0.64 | | 0.64 |
| v/c Ratio | | 0.24 | | 0.57 | | 0.42 | | 0.36 |
| Control Delay | | 15.2 | | 26.2 | | 5.9 | | 2.4 |
| Queue Delay | | 0.0 | | 0.0 | | 0.1 | | 0.0 |
| Total Delay | | 15.2 | | 26.2 | | 6.0 | | 2.4 |
| LOS | | B | | C | | A | | A |
| Approach Delay | | 15.2 | | 26.2 | | 6.0 | | 2.4 |
| Approach LOS | | B | | C | | A | | A |
| Queue Length 50th (m) | | 5.0 | | 14.2 | | 8.7 | | 4.0 |
| Queue Length 95th (m) | | 11.6 | | 25.6 | | 26.1 | | 7.4 |
| Internal Link Dist (m) | | 66.2 | | 479.7 | | 47.5 | | 69.3 |
| Turn Bay Length (m) | | | | | | | | |
| Base Capacity (vph) | | 430 | | 390 | | 1831 | | 1844 |
| Starvation Cap Reductn | | 0 | | 0 | | 144 | | 0 |
| Spillback Cap Reductn | | 0 | | 0 | | 0 | | 0 |
| Storage Cap Reductn | | 0 | | 0 | | 0 | | 0 |
| Reduced v/c Ratio | | 0.17 | | 0.41 | | 0.46 | | 0.36 |
| Intersection Summary | | | | | | | | |
| Cycle Length: 55 | | | | | | | | |
| Actuated Cycle Length: 55 | | | | | | | | |
| Offset: 52 (95%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green | | | | | | | | |
| Natural Cycle: 55 | | | | | | | | |
| Control Type: Actuated-Coordinated | | | | | | | | |
| Maximum v/c Ratio: 0.57 | | | | | | | | |
| Intersection Signal Delay: 6.9 | | | | | Intersection LOS: A | | | |
| Intersection Capacity Utilization 51.4% | | | | | ICU Level of Service A | | | |
| Analysis Period (min) 15 | | | | | | | | |

Splits and Phases: 2: Bronson & Laurier

| | |
|--|---|
|  $\phi 2$ (R) |  |
| 31 s | 24 s |
|  $\phi 6$ (R) |  |
| 31 s | 24 s |

Projected PM
3: Bronson & Gloucester

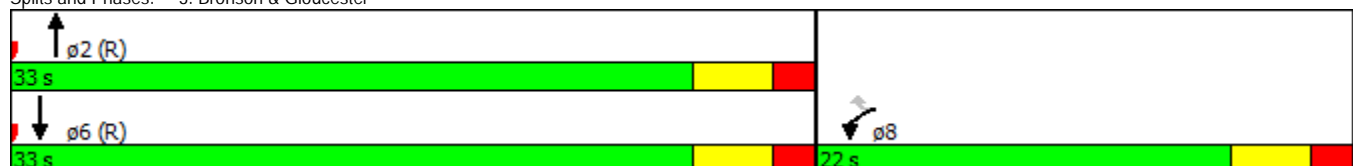
| |  |  |  |  |
|------------------------|---|---|---|---|
| Lane Group | WBL | WBR | NBT | SBT |
| Lane Configurations |  |  |  |  |
| Volume (vph) | 104 | 85 | 645 | 692 |
| Lane Group Flow (vph) | 109 | 89 | 679 | 728 |
| Turn Type | NA | Perm | NA | NA |
| Protected Phases | 8 | | 2 | 6 |
| Permitted Phases | | 8 | | |
| Detector Phase | 8 | 8 | 2 | 6 |
| Switch Phase | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 25.1 | 25.1 | 25.1 | 22.1 |
| Total Split (s) | 22.0 | 22.0 | 33.0 | 33.0 |
| Total Split (%) | 40.0% | 40.0% | 60.0% | 60.0% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 1.8 | 1.8 | 1.8 | 1.8 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.1 | 5.1 | 5.1 | 5.1 |
| Lead/Lag | | | | |
| Lead-Lag Optimize? | | | | |
| Recall Mode | None | None | C-Max | C-Max |
| Act Effect Green (s) | 11.5 | 11.5 | 37.3 | 37.3 |
| Actuated g/C Ratio | 0.21 | 0.21 | 0.68 | 0.68 |
| v/c Ratio | 0.34 | 0.26 | 0.33 | 0.35 |
| Control Delay | 20.9 | 6.6 | 0.6 | 2.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.1 |
| Total Delay | 20.9 | 6.6 | 0.6 | 2.1 |
| LOS | C | A | A | A |
| Approach Delay | 14.4 | | 0.6 | 2.1 |
| Approach LOS | B | | A | A |
| Queue Length 50th (m) | 9.7 | 0.0 | 0.6 | 5.7 |
| Queue Length 95th (m) | 17.7 | 7.8 | 1.3 | 8.0 |
| Internal Link Dist (m) | 364.2 | | 104.0 | 47.5 |
| Turn Bay Length (m) | | | | |
| Base Capacity (vph) | 468 | 460 | 2070 | 2070 |
| Starvation Cap Reductn | 0 | 0 | 0 | 235 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.23 | 0.19 | 0.33 | 0.40 |

Intersection Summary








Cycle Length: 55
 Actuated Cycle Length: 55
 Offset: 54 (98%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.35
 Intersection Signal Delay: 3.0
 Intersection Capacity Utilization 45.8%
 Analysis Period (min) 15

Intersection LOS: A
ICU Level of Service A

Splits and Phases: 3: Bronson & Gloucester



Projected PM
4: Bronson & Primrose

| |  |  |  |  |
|------------------------|---|---|---|---|
| Lane Group | EBL | NBL | NBT | SBT |
| Lane Configurations |  | |  |  |
| Volume (vph) | 28 | 71 | 905 | 561 |
| Lane Group Flow (vph) | 97 | 0 | 1028 | 623 |
| Turn Type | NA | 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) | 25.2 | 23.2 | 23.2 | 23.2 |
| Total Split (s) | 26.0 | 29.0 | 29.0 | 29.0 |
| Total Split (%) | 47.3% | 52.7% | 52.7% | 52.7% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 1.9 | 1.9 | 1.9 | 1.9 |
| Lost Time Adjust (s) | 0.0 | | 0.0 | 0.0 |
| Total Lost Time (s) | 5.2 | | 5.2 | 5.2 |
| Lead/Lag | | | | |
| Lead-Lag Optimize? | | | | |
| Recall Mode | None | C-Max | C-Max | C-Max |
| Act Effect Green (s) | 12.0 | | 36.7 | 36.7 |
| Actuated g/C Ratio | 0.22 | | 0.67 | 0.67 |
| v/c Ratio | 0.27 | | 0.59 | 0.31 |
| Control Delay | 9.1 | | 10.8 | 8.1 |
| Queue Delay | 0.0 | | 0.0 | 0.0 |
| Total Delay | 9.1 | | 10.8 | 8.1 |
| LOS | A | | B | A |
| Approach Delay | 9.1 | | 10.8 | 8.1 |
| Approach LOS | A | | B | A |
| Queue Length 50th (m) | 2.5 | | 27.0 | 13.8 |
| Queue Length 95th (m) | 9.3 | | #81.8 | 29.7 |
| Internal Link Dist (m) | 71.5 | | 171.7 | 104.0 |
| Turn Bay Length (m) | | | | |
| Base Capacity (vph) | 569 | | 1754 | 2017 |
| Starvation Cap Reductn | 0 | | 0 | 0 |
| Spillback Cap Reductn | 0 | | 0 | 0 |
| Storage Cap Reductn | 0 | | 0 | 0 |
| Reduced v/c Ratio | 0.17 | | 0.59 | 0.31 |

Intersection Summary

Cycle Length: 55

Actuated Cycle Length: 55

Offset: 49 (89%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 9.8

Intersection LOS: A

Intersection Capacity Utilization 77.9%







ICU Level of Service D

Analysis Period (min) 15















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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Bronson & Primrose

| | |
|---|---|
|  |  |
|  |  |
| 29 s | 26 s |
|  | |
|  | |
| 29 s | |

Projected PM
6: Bronson & Somerset W

| |  |  |  |  |  |  |  |  | | | | |
|------------------------|---|---|---|---|---|---|--|---|------|------|------|------|
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT | ø1 | ø3 | ø5 | ø7 |
| Lane Configurations |  |  |  |  | |  | |  | | | | |
| Volume (vph) | 24 | 113 | 80 | 178 | 63 | 545 | 21 | 498 | | | | |
| Lane Group Flow (vph) | 25 | 150 | 84 | 203 | 0 | 693 | 0 | 595 | | | | |
| Turn Type | Perm | NA | Perm | NA | Perm | NA | Perm | NA | | | | |
| Protected Phases | | 4 | | 8 | | 2 | | 6 | 1 | 3 | 5 | 7 |
| Permitted Phases | 4 | | 8 | | 2 | | 6 | | | | | |
| Detector Phase | 4 | 4 | 8 | 8 | 2 | 2 | 6 | 6 | | | | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Minimum Split (s) | 18.9 | 18.9 | 18.9 | 18.9 | 18.8 | 18.8 | 18.8 | 18.8 | 7.0 | 7.0 | 7.0 | 7.0 |
| Total Split (s) | 32.0 | 32.0 | 32.0 | 32.0 | 53.0 | 53.0 | 53.0 | 53.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Total Split (%) | 33.7% | 33.7% | 33.7% | 33.7% | 55.8% | 55.8% | 55.8% | 55.8% | 5% | 5% | 5% | 5% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 2.0 | 2.0 | 2.0 | 2.0 |
| All-Red Time (s) | 2.6 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | | 0.0 | | | | |
| Total Lost Time (s) | 5.9 | 5.9 | 5.9 | 5.9 | | 5.8 | | 5.8 | | | | |
| Lead/Lag | Lag | Lag | Lag | Lag | Lag | Lag | Lag | Lag | Lead | Lead | Lead | Lead |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Recall Mode | Max | Max | Max | Max | C-Max | C-Max | C-Max | C-Max | Min | Min | Min | Min |
| Act Effct Green (s) | 26.1 | 26.1 | 26.1 | 26.1 | | 47.2 | | 47.2 | | | | |
| Actuated g/C Ratio | 0.27 | 0.27 | 0.27 | 0.27 | | 0.50 | | 0.50 | | | | |
| v/c Ratio | 0.11 | 0.38 | 0.39 | 0.47 | | 0.57 | | 0.44 | | | | |
| Control Delay | 27.4 | 31.2 | 34.5 | 33.0 | | 19.1 | | 16.7 | | | | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | | 0.0 | | | | |
| Total Delay | 27.4 | 31.2 | 34.5 | 33.0 | | 19.1 | | 16.7 | | | | |
| LOS | C | C | C | C | | B | | B | | | | |
| Approach Delay | | 30.7 | | 33.4 | | 19.1 | | 16.7 | | | | |
| Approach LOS | | C | | C | | B | | B | | | | |
| Queue Length 50th (m) | 3.4 | 22.2 | 12.5 | 31.0 | | 44.9 | | 35.4 | | | | |
| Queue Length 95th (m) | 9.9 | 39.5 | 26.4 | 51.7 | | 62.1 | | 48.8 | | | | |
| Internal Link Dist (m) | | 306.8 | | 381.0 | | 115.2 | | 171.7 | | | | |
| Turn Bay Length (m) | | | | | | | | | | | | |
| Base Capacity (vph) | 228 | 399 | 216 | 431 | | 1213 | | 1345 | | | | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | | 0 | | 0 | | | | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | | 0 | | 0 | | | | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | | 0 | | 0 | | | | |
| Reduced v/c Ratio | 0.11 | 0.38 | 0.39 | 0.47 | | 0.57 | | 0.44 | | | | |

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 24 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 21.8































Intersection LOS: C

Intersection Capacity Utilization 81.1%

















ICU Level of Service D

Analysis Period (min) 15










Splits and Phases: 6: Bronson & Somerset W

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|--|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 s | 53 s | | | | | 5 s | 32 s | | | | | 5 s | 32 s | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 s | 53 s | | | | | 5 s | 32 s | | | | | 5 s | 32 s | |

Projected PM
5: Cambridge & Primrose

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 33 | 108 | 2 | 4 | 42 | 62 | 1 | 0 | 8 | 56 | 3 | 23 |
| 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) | 35 | 114 | 2 | 4 | 44 | 65 | 1 | 0 | 8 | 59 | 3 | 24 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total (vph) | 151 | 114 | 9 | 86 | | | | | | | | |
| Volume Left (vph) | 35 | 4 | 1 | 59 | | | | | | | | |
| Volume Right (vph) | 2 | 65 | 8 | 24 | | | | | | | | |
| Hadj (s) | 0.07 | -0.30 | -0.48 | 0.00 | | | | | | | | |
| Departure Headway (s) | 4.3 | 4.0 | 4.1 | 4.5 | | | | | | | | |
| Degree Utilization, x | 0.18 | 0.13 | 0.01 | 0.11 | | | | | | | | |
| Capacity (veh/h) | 812 | 874 | 810 | 749 | | | | | | | | |
| Control Delay (s) | 8.3 | 7.6 | 7.1 | 8.0 | | | | | | | | |
| Approach Delay (s) | 8.3 | 7.6 | 7.1 | 8.0 | | | | | | | | |
| Approach LOS | A | A | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Delay | | | 8.0 | | | | | | | | | |
| Level of Service | | | A | | | | | | | | | |
| Intersection Capacity Utilization | | | 34.2% | ICU Level of Service | A | | | | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

Projected PM
7: Cambridge & Site

| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations |  | |  | | |  |
| Volume (veh/h) | 23 | 16 | 66 | 29 | 20 | 59 |
| 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) | 24 | 17 | 69 | 31 | 21 | 62 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | 198 |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 189 | 85 | | | 100 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 189 | 85 | | | 100 | |
| IC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| IC, 2 stage (s) | | | | | | |
| IF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 97 | 98 | | | 99 | |
| cMI capacity (veh/h) | 789 | 974 | | | 1493 | |
| Direction, Lane # | WB 1 | NB 1 | SB 1 | | | |
| Volume Total | 41 | 100 | 83 | | | |
| Volume Left | 24 | 0 | 21 | | | |
| Volume Right | 17 | 31 | 0 | | | |
| cSH | 856 | 1700 | 1493 | | | |
| Volume to Capacity | 0.05 | 0.06 | 0.01 | | | |
| Queue Length 95th (m) | 1.1 | 0.0 | 0.3 | | | |
| Control Delay (s) | 9.4 | 0.0 | 2.0 | | | |
| Lane LOS | A | | A | | | |
| Approach Delay (s) | 9.4 | 0.0 | 2.0 | | | |
| Approach LOS | A | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 2.5 | | | |
| Intersection Capacity Utilization | | 21.1% | | ICU Level of Service | | A |
| Analysis Period (min) | | 15 | | | | |

Appendix D

SYNCHRO Capacity Analysis:

Modified Bronson/Slater Intersection

Projected AM (Modified)
1: Bronson & Slater

| | → | ↑ | ↘ | ↓ |
|------------------------|-------|-------|-------|-------|
| Lane Group | EBT | NBT | SBL | SBT |
| Lane Configurations | ↕↕ | ↕↕ | ↘ | ↕↕ |
| Volume (vph) | 927 | 475 | 49 | 374 |
| Lane Group Flow (vph) | 1070 | 749 | 52 | 394 |
| Turn Type | NA | NA | Perm | NA |
| Protected Phases | 4 | 2 | | 6 |
| Permitted Phases | | | 6 | |
| Detector Phase | 4 | 2 | 6 | 6 |
| Switch Phase | | | | |
| Minimum Initial (s) | 10.0 | 10.0 | 10.0 | 10.0 |
| Minimum Split (s) | 19.9 | 26.0 | 26.0 | 26.0 |
| Total Split (s) | 32.0 | 28.0 | 28.0 | 28.0 |
| Total Split (%) | 53.3% | 46.7% | 46.7% | 46.7% |
| Yellow Time (s) | 3.3 | 3.3 | 3.3 | 3.3 |
| All-Red Time (s) | 2.6 | 2.7 | 2.7 | 2.7 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 5.9 | 6.0 | 6.0 | 6.0 |
| Lead/Lag | | | | |
| Lead-Lag Optimize? | | | | |
| Recall Mode | Max | C-Max | C-Max | C-Max |
| Act Effct Green (s) | 26.1 | 22.0 | 22.0 | 22.0 |
| Actuated g/C Ratio | 0.44 | 0.37 | 0.37 | 0.37 |
| v/c Ratio | 0.81 | 0.71 | 0.31 | 0.35 |
| Control Delay | 21.3 | 18.5 | 19.6 | 15.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 21.3 | 18.5 | 19.6 | 15.0 |
| LOS | C | B | B | B |
| Approach Delay | 21.3 | 18.5 | | 15.5 |
| Approach LOS | C | B | | B |
| Queue Length 50th (m) | 51.2 | 21.8 | 4.0 | 16.1 |
| Queue Length 95th (m) | #76.7 | 38.5 | 12.2 | 25.5 |
| Internal Link Dist (m) | 157.6 | 69.3 | | 35.9 |
| Turn Bay Length (m) | | | 17.0 | |
| Base Capacity (vph) | 1318 | 1057 | 170 | 1118 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.81 | 0.71 | 0.31 | 0.35 |

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 13 (22%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 19.2

Intersection LOS: B

Intersection Capacity Utilization 84.1%

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: Bronson & Slater

| | |
|--|--|
| | |
|--|--|