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# Sequoia Church 35 Highbury Park Drive

**Transportation Impact Assessment** 

Sequoia Church

**35 Highbury Park Drive** 

**Transportation Impact Assessment** 

Prepared By:

NOVATECH Suite 200, 240 Michael Cowpland Drive Ottawa, Ontario K2M 1P6

> Dated: May 27, 2019 Revised: December 5, 2019

Novatech File: 118187 Ref: R-2018-166



December 5, 2019

City of Ottawa Planning and Growth Management Department 110 Laurier Ave. W., 4<sup>th</sup> Floor, Ottawa, Ontario K1P 1J1

#### Attention: Kelby Lodoen Unseth Planner II

Dear Sir:

#### Reference: Sequoia Church, 35 Highbury Park Drive Revised Transportation Impact Assessment Report Novatech File No. 118187

We are pleased to submit the following Revised Transportation Impact Assessment (TIA) report in support of Site Plan Control and Zoning By-Law Amendment applications for the above address. The structure and format of this report is in accordance with the City of Ottawa Transportation Impact Assessment Guidelines (June 2017).

A TIA report was submitted to the City of Ottawa in May 2019 in support of Site Plan Control and Zoning By-Law Amendment applications. This revised TIA has been prepared to respond to comments received from the City in October 2019.

If you have any questions or comments regarding this report, please feel free to contact Brad Byvelds, or the undersigned.

Yours truly,

NOVATECH

Kochellefert

Rochelle Fortier, B.Eng. E.I.T. | Transportation/Traffic

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# **TIA Plan Reports**

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

#### CERTIFICATION

- 1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
- 2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
- 3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
- 4. I am either a licensed<sup>1</sup> or registered<sup>2</sup> professional in good standing, whose field of expertise [check √ appropriate field(s)] is either transportation engineering or transportation planning □.

<sup>1,2</sup> License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.

City Of Ottawa Infrastructure Services and Community Sustainability Planning and Growth Management 110 Laurier Avenue West, 4th fl. Ottawa, ON K1P 1J1 Tel.: 613-580-2424 Fax: 613-560-6006 Ville d'Ottawa Services d'infrastructure et Viabilité des collectivités Urbanisme et Gestion de la croissance 110, avenue Laurier Ouest Ottawa (Ontario) K1P 1J1 Tél.: 613-580-2424 Télécopieur: 613-560-6006 Dated at <u>Ottawa</u> this <u>05</u> day of <u>DECEMBER</u>, 201<u>9</u>. (City)

Name:

Brad Byvelds, P.Eng. (Please Print)

Professional Title:

Project Coordinator, Transportation/Traffic\_\_\_\_\_

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Signature of Individual certifier that s/he meets the above four criteria

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#### EXECUTIVE SUMMARY

This Revised Transportation Impact Assessment (TIA) report has been prepared in support of Site Plan Control and Zoning By-Law Amendment applications for 35 Highbury Park Drive. The subject site is currently vacant.

The subject site is designated as 'General Urban Area' on Schedule 'B' of The City of Ottawa's Official Plan. It is currently zoned I1B – Minor Institutional Zone.

The proposed development consists of a new church with a café to be leased out to a local coffee shop. The Sequoia Church currently holds Sunday service at the Ottawa Christian School (255 Tartan Drive). Based on current attendance records, on average approximately 300 people (adults and children) attend Sunday service. The proposed coffee shop will provide approximately 1,700 square feet of Gross Floor Area (GFA).

Activities at the church will consist of a Sunday morning service (and Sunday School) from 10:10-11:30am, Sunday afternoon meetings (Church Plant), Tuesday night youth groups from 7-9pm and occasional weekday evening meetings from 7-9pm. Ministry offices will be open Monday to Saturday from 9am to 7pm. The café is anticipated to be open all week, from 8am to 8pm.

A parking lot containing 125 parking spaces (and an additional 17 tandem parking spaces) will be provided with a full movement access on Highbury Park Drive. The proposed development is anticipated to be completed in one phase, with full occupancy by the year 2020.

The majority of trips generated by the church will either occur on a Sunday, or outside the weekday AM and PM peak hours. The café is anticipated to generate the most trips during the weekday AM and Saturday peak hours. As Sunday service is anticipated to be the overall peak hour for the site, it has been analyzed. The background traffic along Greenbank Road and site traffic generation is higher during the Saturday peak hour compared to the weekday peak hours, therefore the Saturday peak hour has also been analyzed.

For the purpose of this analysis, a projected attendance of 400 people for Sunday Service and Sunday School has been assumed in order to account for the worst-case scenario. However, it is anticipated that the attendance will be significantly lower when the site first develops (approximately 300 people) and may grow over time. Should the attendance reach 400 people, church staff have confirmed that two separate Sunday services will be offered.

The development is anticipated to generate a total of 71 trips (39 in, 32 out) during the Saturday peak, 246 trips (190 in, 56 out) during the Sunday arrival peak, and 246 trips (54 in, 192 out) during the Sunday departure period.

The main conclusions and recommendations of this TIA can be summarized as follows:

#### Development Design and Parking

- Pedestrian facilities will be provided between the main building entrance and the parking lot. A connection to the sidewalk along Highbury Park Drive will be provided, as shown on the site plan. Sidewalks will be continuous and depressed across all accesses.
- OC Transpo stops #7218, #7217, #4634, #4635, #2835, and #2834 are all located within a 400m walking distance (measured using legal crosswalks) of the proposed development.

- A MUP is provided along the east side of the Transitway. The MUP crosses under the Highbury Park/Transitway overpass as well as connects to the sidewalks on either side of Highbury Park Drive. As pedestrians have the opportunity to cross under the Highbury Park Drive/Transitway overpass, and the MUP connections to the sidewalk on Highway Park Drive are located 200m from the signalized intersection with Greenbank Road, a pedestrian crossover (PXO) is not recommended at this location.
- All required TDM-supportive design and infrastructure measures in the TDM checklist are met.
- A lay-by is proposed along the south edge of the development. It is 2.6m wide, and approximately 22m in length. This would provide enough storage for approximately three vehicles.
- The 125 proposed vehicular parking spaces will not meet the requirements of the ZBL. As
  it is anticipated that the church, community centre, and café uses will generally be used
  by the same individuals, relief from the minimum parking requirements of the ZBL is being
  sought. It is noteworthy that an additional 17 tandem parking spaces will be provided near
  the northern limits of the parking lot, however these spaces do not count towards the
  parking count.

#### Boundary Street MMLOS

 Highbury Park Drive meets the target segment PLOS, BLOS, and Auto LOS. No improvements are recommended along Highbury Park Drive based on the segment MMLOS analysis.

#### Access Design

- The proposed development will be served by one all-movement access along Highbury Park Drive. This access will be approximately 8.5m in width and will meet all requirements of the City's *Private Approach By-Law*.
- Available sightlines are within recommended guidelines to allow safe all directional access to the development.

#### <u>Transit</u>

• It is anticipated that the proposed development will generate an additional 6 transit trips (3 in, 3 out) during the Saturday peak hour, 25 transit trips (22 in, 3 out) during the Sunday arrival peak, and 25 transit trips (2 in, 23 out) during the Sunday departure peak.

#### Intersection MMLOS

- The Greenbank Road/Highbury Park Drive intersection currently achieves the target BLOS and Auto LOS, however does not meet the target PLOS or TkLOS for the policy area. As this intersection was recently constructed, no changes are recommended.
- The Greenbank Road/Berrigan Drive/Wessex Road intersection currently achieves the target Auto LOS, however does not meet the target PLOS, BLOS, or TkLOS. However, as this intersection was recently reconstructed, and the current configuration was deemed appropriate by the City, no changes are recommended.

#### Background Traffic

• Under 2020 and 2025 background traffic conditions, all intersections are anticipated to operate with a LOS B or better.

#### <u>Total Traffic</u>

- Under 2020 total traffic conditions, all intersections are anticipated to operate with a LOS B or better. The site access is anticipated to operate with a LOS A, and a maximum delay of approximately 10 seconds.
- Under 2025 total traffic conditions, all intersections are anticipated to operate with a LOS C or better. The site access is anticipated to operate with a LOS A, and a maximum delay of approximately 10 seconds.
- The westbound left turn movement at the Greenbank Road/Highbury Park Drive intersection is anticipated to have a 95<sup>th</sup> percentile queue length of approximately 55m during the Sunday departure peak. The queuing during the departure period is not anticipated to extend past the nearest access to 30 Highbury Park Drive.
- The addition of site traffic is not anticipated to have any major impacts on operating conditions of the study area intersections.

# 1.0 INTRODUCTION

This Revised Transportation Impact Assessment (TIA) report has been prepared in support of Site Plan Control and Zoning By-Law Amendment applications for 35 Highbury Park Drive. The subject site is currently vacant. The subject site is surrounded by the following:

- Vacant land to the north;
- The Transitway and residential properties to the east;
- Highbury Park Drive and commercial properties to the south; and
- Greenbank Road and residential properties to the west.

A view of the subject site is provided in **Figure 1**.

# Figure 1: View of the Subject Site



# 2.0 PROPOSED DEVELOPMENT

The subject site is designated as 'General Urban Area' on Schedule 'B' of The City of Ottawa's Official Plan. It is currently zoned I1B – Minor Institutional Zone.

The proposed development consists of a new church with a café to be leased out to a local coffee shop. The Sequoia Church currently holds Sunday service at the Ottawa Christian School (255 Tartan Drive). Based on current attendance records, on average approximately 325 people (adults and children) attend Sunday service. The proposed coffee shop will provide approximately 1,700 square feet of Gross Floor Area (GFA).

Activities at the church will consist of a Sunday morning service (and Sunday School) from 10:10-11:30am, Sunday afternoon meetings (Church Plant), Tuesday night youth groups from 7-9pm and occasional weekday evening meetings from 7-9pm. Ministry offices will be open Monday to Saturday from 9am to 7pm. The café is anticipated to be open all week, from 8am to 8pm.

A parking lot containing 125 parking spaces (and an additional 17 tandem parking spaces) will be provided with a full movement access on Highbury Park Drive. The proposed development is anticipated to be completed in one phase, with full occupancy by the year 2020.

A copy of the proposed site plan is included in **Appendix A**. The site plan context is shown in **Figure 2**.

#### 3.0 SCREENING

#### 3.1 Screening Form

The City's 2017 TIA Guidelines identify three triggers for completing a TIA report, including trip generation, location, and safety. The criteria for each trigger are outlined in the City's TIA Screening Form.

The trigger results are as follows:

- Trip Generation Triggers The proposed church is anticipated to generate over 60 person trips/peak hour; further assessment is required based on this trigger. The proposed café is also anticipated to generate more than 60 person trips/peak hour.
- Location Triggers The proposed development is not located along a boundary street that is designated as part of the City's Transit Priority, Rapid Transit, or Spine Bicycle Networks; further assessment is not required based on this trigger.
- Safety Triggers The proposed development is located within the area of influence of an adjacent traffic signal; further assessment is required based on this trigger.

The proposed development satisfies the trip generation and the safety triggers for completing a TIA. A copy of the TIA screening form is included in **Appendix B**.





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FIGURE 2

SITE PLAN CONTEXT

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#### 4.0 SCOPING

#### 4.1 Existing Conditions

#### 4.1.1 Roadways

All roadways within the study area fall under the jurisdiction of the City of Ottawa.

Highbury Park Drive is an east-west collector roadway with a two-lane undivided urban cross section. It extends from Longfields Drive in the east, to Greenbank Road in the west. Highbury Park Drive has a posted speed limit of 40km/h, and street parking is permitted along both sides of the roadway. Annex 1 of the City of Ottawa's Official Plan identifies a right-of-way (ROW) protection of 24m for Highbury Park Drive between Greenbank Road and Longfields Drive.

Greenbank Road is a north-south arterial roadway, which extends from Prince of Wales in the south, to Highway 417 in the north, where it continues as Pinecrest Road. Within the study area, Greenbank Road has a four-lane divided urban cross section with a posted speed limit of 60km/h. Parking is not permitted along Greenbank Road. It is classified as a truck route, allowing full loads. Annex 1 of the City of Ottawa's Official Plan identifies a right-of-way (ROW) protection of 44.5m for Greenbank Road between Fallowfield Road to Strandherd Drive.

Berrigan Drive is an east-west collector roadway which extends from Beatrice Drive in the east to Greenbank Road in the west, where it continues as Wessex Road. Berrigan Drive has a two-lane urban undivided cross section with a posted speed limit of 40km/h.

Wessex Road is an east-west collector roadway which extends from Exeter Drive in the west, to Greenbank Road in the east, where it continues as Berrigan Drive. It has a two-lane urban undivided cross section with a posted speed limit of 40km/h.

Via San Marino Street is a north-south local roadway which extends from Highbury Park Drive in the south to Via Verona Avenue in the north. It has a two-lane undivided cross section with a regulatory speed limit of 50km/h.

# 4.1.2 Intersections

#### Greenbank Road/Highbury Park Drive

- Signalized intersection
- Southbound: one left turn lane, two through lanes
- Northbound: one through lane, one shared through/right lane
- Westbound: one left turn lane, one right turn lane
- Standard crosswalks are provided on all legs
- A pedestrian refuge area is provided within the median on the north and south legs
- A two-stage left turn bike box is provided on the east leg
- Bicycle signals are provided to facilitate southbound left turn movements for cyclists

#### <u>Greenbank Road//Berrigan</u> <u>Drive/Wessex Road</u>

- Signalized intersection
- Northbound/Southbound: one left turn lane, two through lanes, one right turn lane
- Westbound: one left turn lane, one through lane, one right turn lane
- Eastbound: one left turn lane, one shared through/right turn lane
- Standard crosswalks are provided on all legs
- Bike lanes are provided on the north and south legs





#### <u>Highbury Park Drive/Via San Marino</u> <u>Street</u>

- Stop controlled T intersection, with free flow on Highbury Park Drive
- One travel lane on all approaches



# 4.1.3 Driveways

In accordance with the City's 2017 TIA guidelines, a review of adjacent driveways along the boundary road is provided as follows:

Along the south side of Highbury Park Drive, approximately 80m east of the Greenbank Road/Highbury Park Drive intersection: one driveway to the plaza at 30 Highbury Park Drive. Land uses include retail, fast-food restaurant, medical office and pharmacy.

# 4.1.4 Pedestrian and Cycling Facilities

Greenbank Road is classified as a Spine Route in the City's Ultimate Cycling Network. Bike lanes are currently provided along Greenbank Road within the vicinity of the subject site, and a Multi-Use Pathway (MUP) is located along the west side of Greenbank Road. A sidewalk is provided along the east side of Greenbank Road.

Highbury Park Drive, between Greenbank Road and the Transitway is classified as a Pathway Link in the City's Ultimate Cycling Network. Bike lanes are provided along this stretch of Highbury Park Drive. Sidewalks are provided along both sides of Highbury Park Drive.

There is a MUP that runs along the east side of the transitway which ties into the sidewalks on either side of Highbury Park Drive. Pedestrians may cross underneath the Highbury Park Drive/Transitway overpass.

Berrigan Drive and Wessex Road are classified as local routes in the City's Ultimate Cycling Network. There are no dedicated cycling facilities along Berrigan Drive, Wessex Road or Via San Marino Street. Sidewalks are provided along both sides of Berrigan Drive, along the north side of Wessex Road, and along the west side of Via San Marino Street.

# 4.1.5 Transit

The nearest bus stops to the subject site are stop #7218 (serving OC Transpo Route 170, located on the east side of Greenbank Road, north of Highbury Park Drive), stop #7217 (serving OC Transpo Route 170, located on the west side of Greenbank Road, south of Highbury Park Drive), stop #4634 (serving OC Transpo Route 170 and 273, located on the north side of Berrigan Drive, east of Greenbank Road), stop #4635 (serving OC Transpo Route 170 and 273, located on the south side of Berrigan Drive, east of Greenbank Road), stop #2835 (serving OC Transpo Route 273, located on the north side of Wessex Road, west of Greenbank Road), and stop #2834 (serving OC Transpo Route 273, located on the south side of Wessex Road, west of Greenbank Road).

These bus stop locations are shown in Figure 3.



Figure 3: OC Transpo Bus Stop Locations

Rapid transit service is also provided via the Strandherd Transit Station, located at a walking distance of approximately 750m from the proposed development. This station provides convenient access to multiple routes along the north/south Transitway.

OC Transpo Route 170 travels from Fallowfield Transit Station to Barrhaven Centre Transit Station. It's offered all week, with all day service.

OC Transpo Route 273 travels from Mackenzie King Transit Station to Strandherd Drive/Jockvale Road. It's offered Monday to Friday, with peak period service only.

OC Transpo Route information is included in Appendix C.

#### 4.1.6 Existing Area Traffic Management Measures

A red light camera exists at the Greenbank Road/Berrigan Drive/Wessex Road intersection.

Currently, there are no other existing Area Traffic Management (ATM) measures within the study area.

#### 4.1.7 Existing Traffic Volumes

Traffic counts were coordinated by Novatech at the study area intersections in order to determine the existing pedestrian, cyclist and vehicular traffic volumes. Sunday counts were performed between the hours of 8:00-14:00, which would capture the peak hours of the church. Saturday counts were performed between the hours of 10:00-14:00, which would capture the peak hours of the capture the peak hours of the café.

The traffic counts were completed on the following dates:

- Greenbank Road/Highbury Park Drive
- Greenbank Road/Highbury Park Drive
- Greenbank Road/Berrigan Drive/Wessex Road
- Greenbank Road/Berrigan Drive/Wessex Road

November 4, 2018 (Sunday) December 1, 2018 (Saturday) November 4, 2018 (Sunday) December 1, 2018 (Saturday)

Existing traffic volumes along the study area roadways are shown in **Figure 4**. Peak hour summary sheets of the above traffic counts are included in **Appendix D**.

#### Figure 4: Existing Traffic Volumes



#### 4.1.8 Collision Records

Historical collision data from the last five years was obtained from the City's Public Works and Service Department for the study area intersections. Copies of the collision summary report are included in **Appendix E**.

The collision data has been evaluated to determine if there are any identifiable collision patterns. The following summarizes the number of collisions at each intersection from January 1, 2013 to December 31, 2017.

Intersection/Segment	Number of Reported Collisions
Greenbank Road/Highbury Park Drive	2
Greenbank Road between Highbury Park Drive & Wessex Road	7
Greenbank Road/Berrigan Drive/Wessex Road	65

It is important to note that Greenbank Road was under construction from 2015 to 2016, while it was widened to its current divided four-lane cross section. Prior to this, Greenbank Road had a two-lane, undivided cross section along the study area intersections. Construction along Greenbank Road was completed in November 2016.

#### Greenbank Road/Highbury Park Drive

A total of two collisions were reported at this intersection over the last five years. This intersection was recently constructed and both collisions occurred in 2017. Both collisions were rear end collisions that occurred on the northbound approach. One occurred in icy conditions, and one occurred in clear conditions. No injuries were reported.

#### Greenbank Road between Highbury Park Drive & Wessex Road

A total of seven collisions were reported at this location over the last five years. Of these, there were five rear end collisions, and two approaching collisions. Three of the collisions caused injuries, but none caused fatalities. No collisions were reported in 2016 or 2017, following the Greenbank Road construction.

#### Greenbank Road/Berrigan Drive/Wessex Road

A total of 65 collisions were reported at this intersection over the last five years. Of these, there were 38 rear end impacts, nine turning movement impacts, seven angle impacts, five sideswipe impacts, four single vehicle/other impacts, and one approaching impact.

It is important to note that this intersection was under construction from 2015 to 2016, while Greenbank Road was widened to a four-lane cross section. Prior to this, the northbound and southbound approaches comprised of one left turn lane, one through lane and one right turn lane. Construction along Greenbank Road was completed in November 2016. Of the total 65 collisions reported at this intersection over the last 5 years, 27 occurred pre-construction (2013-2014), 29 occurred during construction (2015-2016), and 8 collisions were reported after construction (2017). Of the 8 collisions that occurred after construction on Greenbank Road was complete there were three turning movement impacts, two rear end collisions, two angle impacts, and one single vehicle impact.

Of the total 38 rear end impacts, 15 occurred on the northbound approach, 21 on the southbound approach, and two on the westbound approach. Of the total 38 rear end impacts, 28 were classified as having property damage only, 9 caused injuries, but none were fatal, and one rear end impact was classified as non-reportable. Four of the collisions occurred under snowy/icy conditions, 8 under wet conditions, and 26 under clear conditions.

The high volume of rear end collisions could be attributed to the construction in the area, and to the previous two-lane cross section of Greenbank Road. Twenty of the rear end collisions occurred pre-construction (2013-2014), sixteen during construction (2015-2016), and two after construction (2017).

Of the nine turning movement impacts, six involved southbound left turning vehicles colliding with northbound through vehicles, two involved northbound left turning vehicles colliding with southbound through vehicles, and one involved a northbound right turning vehicle colliding with a northbound through vehicle. Of the total nine turning movement impacts, two occurred in snowy conditions, two in rainy conditions, and five in clear conditions. One of the turning movement impacts occurred pre-construction (2013-2014), three during construction (2016), and three after construction (2017).

Of the seven angle impacts, three occurred between westbound vehicles and northbound vehicles, two occurred between westbound vehicles and southbound vehicles, and two occurred between southbound vehicles and eastbound vehicles. Of the total seven angle impacts, two

occurred in snowy conditions, one in rainy conditions, and four in clear conditions. One of the angle impacts caused an injury, but none caused fatalities. Two of the angle impacts occurred pre-construction (2014), three during construction (2015-2016), and two after construction (2017).

Based on the collision history post-construction on Greenbank Road, no relevant collision patterns are identified. It is recommended that the City monitor the collision history in the future to determine any collision patterns post Greenbank construction.

#### 4.2 Planned Conditions

Currently, there are no planned improvements to the study area road network.

The City of Ottawa's Development Application Tool identifies a new development located at 30 Highbury Park Drive. Currently, some of this development has been built out and is occupied. The remainder of this development is currently under construction and will provide 1,200 square metres of ground floor retail/pharmacy use and 740 square metres of second floor office/medical uses.

#### 4.3 Study Area and Time Periods

A boundary street review was conducted for Highbury Park Drive. The study area intersections include the proposed access and the signalized intersections at Greenbank Road/Highbury Park Drive and Greenbank Road/Berrigan Drive/Wessex Road.

As per discussions with the church, the majority of trips generated by the church will either occur on a Sunday, or outside the weekday AM and PM peak hours. As such, the peak period for analysis for the church will be the Sunday peak hour.

The café (which will be leased out to a local coffee shop) is anticipated to generate trips during the weekday and Saturday peak hours. The café will have approximately 160 square metres of GFA. As the ITE Land Use Code 936 for a Coffee/Donut Shop without Drive Through Window relies on data from larger chain coffee shops (i.e. Tim Hortons, Starbucks, etc.), this is considered unrepresentative of the anticipated trips generated by the café. As such, local surveys were conducted at the Bridgehead coffee shop at 2140 Carling Avenue. This location was chosen as it has a similar size, clientele and walkability as the proposed café. The findings of the weekday and Saturday person trip generation surveys are summarized as follows:

- Weekday AM peak: 96 person trips (63 in, 33 out)
- Weekday PM peak: 52 person trips (26 in, 26 out)
- Saturday peak: 112 person trips (54 in, 58 out)

A review of the adjacent street traffic along Greenbank Road was conducted. Based on a weekday count and a Saturday count at the Greenbank Road/Wessex Road/Berrigan Drive intersection, it was found that traffic along Greenbank Road is highest during the Saturday peak hour. The twoway totals on Greenbank Road based on the traffic counts are as follows:

- Weekday AM peak: 1553 vehicles per hour
- Weekday PM peak: 1910 vehicles per hour
- Saturday peak: 2449 vehicles per hour

The results of the Bridgehead trip generation surveys and the peak hour summary sheets of the above traffic counts can be found in **Appendix D**.

The selected period for analysis for the café is the Saturday peak hour, as this represents the 'worst case' combination of site generated traffic and adjacent street traffic. Based on the foregoing, the analysis in this report will be completed for the Saturday peak and Sunday peak hours, for the 2020 build-out year and 2025 horizon year.

#### 4.4 Exemptions Review

This module reviews possible exemptions from the final TIA, as outlined in the TIA Guidelines. The applicable exemptions for this site are shown in **Table 2**.

Module	Element	Exemption Criteria	Exemption Applies
<b>Design Review</b>	Component		
4.1	<i>4.1.2</i> Circulation and Access	Only required for site plans	Not Exempt
Design	4.1.3 New Street Networks	<ul> <li>Only required for plans of subdivision</li> </ul>	Exempt
4.2	<i>4.2.1</i> Parking Supply	<ul> <li>Only required for site plans</li> </ul>	Not Exempt
<b>4.2</b> Parking	<i>4.2.2</i> Spillover Parking	<ul> <li>Only required for site plans where parking supply is 15% below unconstrained demand</li> </ul>	Exempt
Network Impact	t Component		
<b>4.5</b> Transportation Demand Management	All elements	<ul> <li>Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time</li> </ul>	Exempt
<b>4.6</b> Neighbourhood Traffic Management	<i>4.6.1</i> Adjacent Neighbourhoods	<ul> <li>Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds</li> </ul>	Exempt
<b>4.8</b> Network Concept	All elements	<ul> <li>Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by the established zoning</li> </ul>	Exempt

#### Table 2: TIA Exemptions

The traffic volumes at the Greenbank Road/Highbury Park Drive intersection indicate a two-way total of approximately 375 vehicles use Highbury Park Drive during the Saturday peak hour and 170 during the Sunday peak hour. The TIA guidelines identify an Area Traffic Management (ATM) threshold of 300 vehicles during the peak hour for a collector roadway.

The Saturday peak directional traffic volume along Highbury Park Drive is approximately 190 vehicles (westbound) and the Sunday peak directional traffic volume is approximately 100 vehicles (westbound). The lane capacity along Highbury Park Drive is estimated at 600 vehicles per hour per lane based on the City's TRANS Long Range Transportation Model. Based on the foregoing, the v/c ratio is 0.32 during the Saturday peak and 0.17 during the Sunday peak hour.

The majority of the traffic being generated by the proposed development is expected to arrive/depart to the west along Highbury Park Drive, using the Greenbank Road/Highbury Park Drive intersection. Based on the foregoing, the added traffic generated by the proposed development is not anticipated to have a significant impact on the existing vehicular operations along Highbury Park Drive east of the site and will not change the classification of Highbury Park Drive from a collector to a major collector. Despite existing traffic volumes of 375 vehicles per hour during the Saturday peak hour on Highbury Park Drive exceeding ATM thresholds of 300 vehicles per hour for a collector roadway, the Neighbourhood Traffic Management module should be exempt from the required analysis in the TIA.

#### 5.0 FORECASTING

#### 5.1 Development-Generated Traffic

#### 5.1.1 Trip Generation

The proposed development will have several uses which have been reviewed independently. The approximate time periods associated with each program or facility are identified in **Table 3**.

Activities at the church will consist of a Sunday morning service (and Sunday School) between 10:10-11:30am, Sunday afternoon meetings (Church Plant), Tuesday night youth groups from 7-9pm, and occasional weekday evening meetings from 7-9pm. Ministry offices are anticipated to be open Monday to Saturday from 9am to 7pm. The café is anticipated to be open 8am to 8pm, Monday to Sunday.

	Weekday		Saturday		Sunday				
Use/Program	AM	Md	Evening	MA	Mid-Day	Evening	MA	Mid-Day	Evening
Church Service							>		
Sunday School							>		
Church Plant								>	
Youth Group			>						
Ministry Offices	<b>~</b>		>	•		>			
Café	~	~	<	~	~	<	~	~	~

#### Table 3: Typical Facility Uses by Day and Time Period

The vehicle trips for the proposed church have been estimated based on discussions with church staff. High proportions of carpooling are anticipated, and estimated vehicle occupancies are identified for each trip generator. Person trips have been estimated for the coffee shop based on data that was collected by Novatech at a local coffee shop on the 17<sup>th</sup> and 20<sup>th</sup> of November 2018, as discussed in Section 4.3.

#### Church & Sunday School

The Church Service and Sunday School run from 10:10-11:30am on Sundays. Based on the existing Sequoia Church operations, approximately 300 people attend on average. This number is anticipated to grow up to 450-500 people over time following the development of the new facility at 35 Highbury Park Drive. Once the congregation reaches 400 attendees, the intent is to offer two separate Sunday services.

It is anticipated that 20% of attendees will take transit or walk/bike to the site, based on data collected from the 2011 *TRANS O-D Survey Report* for trips within the South Nepean district.

Existing attendance statistics, including adults and children, have been obtained from the Church. Currently an average of 200 adults and 90 children are attending Sunday service. A vehicle occupancy survey was conducted on May 5, 2019 (Sunday) at the existing church located at 255 Tartan Drive. The results suggest an average of 2.0 parishioners per vehicle. Vehicle occupancy data collected by Novatech is included in **Appendix D**. Approximately 15% of vehicle trips were observed to be drop-off trips.

Parishioners typically arrive/depart Sunday service gradually over multiple hours. However, for the purpose of this analysis, it has been conservatively assumed that all persons will arrive during a one-hour period before service and depart during a one-hour period after the service.

A breakdown of trips generated by the Church and Sunday School can be found in **Table 4**.

	Current Attendance	Maximum Attendance (per service)
Persons	300	400
Transit (5%)	15	20
Non-Auto (15%)	45	60
Vehicle Occupancy	2.0	2.0
Vehicles	120	160
Sunday Peak Hour Vehicle Trips (in/out)		
- Arrival (100% in, 15% out)	120/18	160/24
- Departure (15% in, 100% out)	18/120	24/160

#### Table 4: Church/Sunday School Trips

#### Church Plant

The Sunday afternoon Church Plant, from 1-4pm, is anticipated to host approximately 100 people. Consistent with the Church and Sunday School trips, it is anticipated that 20% of attendees will take transit or walk/bike to the Church Plant. A vehicle occupancy factor of 1.4 was assumed, based on the 2011 *TRANS O-D Survey Report* for trips within the South Nepean district. It is

anticipated that most vehicles will arrive between 12:30-1pm and depart from 4-4:30pm. It has also been assumed that 15% of the trips will be drop-off trips.

A breakdown of trips generated by the Church Plant can be found in **Table 5**.

#### Table 5: Church Plant Trips

	Projected Attendance
Persons	100
Transit (5%)	5
Non-Auto (15%)	15
Vehicle Occupancy	1.4
Vehicles	57
Sunday PM Vehicle Trips	
- In (100%)	57
- Out (15%)	9

#### Youth Group

A youth group will be hosted on Tuesday nights beginning at approximately 7:00pm and ending at 9:00pm. The youth groups are anticipated to host approximately 50 youths. Consistent with the above, it has been assumed that 20% of attendees will take transit or bike/walk. A vehicle occupancy factor of 1.4 was assumed, based on the 2011 *TRANS O-D Survey Report* for trips within the South Nepean district. One third of the vehicles are expected to remain on-site while drivers attend the youth group, while the other two thirds return at the end of each session to pick-up the youth.

A breakdown of trips generated by the youth group can be found in **Table 6**.

#### Table 6: Youth Group Trips

	Projected Attendance
Persons	50
Transit (5%)	2
Non-Auto (15%)	8
Vehicle Occupancy	1.4
Vehicles	36
Weekday Evening Vehicle Trips	
- In (100%)	36
- Out (67%)	24

#### Ministry Offices

Ministry offices are anticipated to be open Monday to Saturday from 9am to 7pm. Ministry office space will be used by Church staff, as well as staff from other ministries and not-for-profit/charity organizations. As the congregation grows, a maximum of approximately 35 people are anticipated to use this office space. Users of this space generally work flex hours and as such are not anticipated to arrive/depart the site during peak hours. However, for the purpose of this analysis,

it has been conservatively assumed that 15 people arrive during the AM peak hour and depart during the PM peak hour. A non-auto mode of 20% and a vehicle occupancy factor of 1.4 was assumed, based on the 2011 *TRANS O-D Survey Report* for trips within the South Nepean district.

A breakdown of trips generated by the ministry offices can be found in **Table 7**.

#### Table 7: Ministry Office Trips

	Projected Attendance
Persons	15
Transit (5%)	1
Non-Auto (15%)	2
Vehicle Occupancy	1.4
Vehicles	9
Weekday and Saturday Vehicle Trips (jn/out)	
- Arrival (AM Peak)	9/0
- Departure (PM Peak)	0/9

<u>Café</u>

The café is intended to be leased out to a local coffee shop. It is anticipated to be open 8am-8pm Monday-Sunday. The café will have approximately 160 square metres of GFA.

As the ITE Land Use Code 936 for a Coffee/Donut Shop without Drive Through Window relies on data from larger chain coffee shops (i.e. Tim Hortons, Starbucks, etc.), this is considered unrepresentative of the anticipated trips generated by the café. As such, local surveys were conducted at the Bridgehead coffee shop at 2140 Carling Avenue. This location was chosen as it has a similar size, clientele and walkability as the proposed café. The findings of the weekday and Saturday person trip generation surveys are summarized as follows:

- Weekday AM peak: 96 person trips (63 in, 33 out)
- Weekday PM peak: 52 person trips (26 in, 26 out)
- Saturday peak: 112 person trips (54 in, 58 out)

As Sunday surveys were not collected, it has been assumed that the Saturday and Sunday café trip generation will be equivalent for the purpose of this analysis.

Modal shares for the café have been assumed to be consistent with the modal shares as outlined in the 2011 *TRANS O-D Survey Report* for trips within the South Nepean district.

A full breakdown of trips generated by the café by modal share can be found in **Table 8**.

Travel Mode		AM Pea (pph)	k	PM Peak (pph)			SAT/SUN Peak (pph)		
	IN	OUT	тот	IN	OUT	ΤΟΤ	IN	OUT	тот
Total Person Trips	63	33	96	26	26	52	54	58	112
Auto Driver (55%)	35	18	53	14	14	28	30	32	62
Auto Passenger (25%)	16	8	24	7	7	14	13	15	28
Transit (5%)	3	2	5	1	1	2	2	3	5
Non-Auto (15%)	8	5	13	4	4	8	8	8	16

#### Table 8: Café Trips

The café is also anticipated to generate trips during the evening as it will be open until 8pm. For the purpose of this analysis, it was assumed that the weekday evening trips generated by the café are approximately equal to the trips generated by the café during the weekday PM peak. The peak hours on a Saturday/Sunday are during the AM. Based on a ratio of AM to PM trips during the weekday, it was assumed that the café trip generation for the off-peak hours on Saturday and Sunday is approximately half of the peak hour trips.

The café is expected to generate two types of external peak hour trips: primary and pass-by trips. Primary trips are made for the specific purpose of visiting the site, and pass-by trips are made as intermediate stops on the way to another destination. Peak hour pass-by trips have been estimated based on a pass-by rate of 43%. The *ITE Trip Generation Handbook* identifies this percentage as an average rate for the High Turnover Restaurant (land use 932). The pass-by trips were estimated using this land use code as there was no data available for the Coffee/Donut Shop without Drive Through Window, and this data set was chosen as the most representative of the café (i.e. no drive-through and has indoor seating). The pass-by trips generated by the café are part of the observed background traffic and do not constitute new trips on the adjacent road network. The primary and pass-by trip generation for the development is summarized in **Table 9**.

Travel Mode		AM Peal (pph)	k	F	PM Peal (pph)	k	SAT/SUN Peak (pph)		
	IN	OUT	ΤΟΤ	IN	OUT	ΤΟΤ	IN	OUT	ΤΟΤ
Total Auto Driver Trips	35	18	53	14	14	28	30	32	62
Pass-By (43%)	11	11	22	6	6	12	13	13	26
Primary (57%)	24	7	31	8	8	16	17	19	36

# Table 9: Primary and Pass-By Café Trips

As the café and the Church are both anticipated to generate trips during the Sunday peak hour, it is anticipated that there would be some internally captured trips (i.e., parishioners frequenting the café). With respect to the adjacent road network, this would result in only a single vehicle entering and leaving the site. However, in the interests of making a conservative estimate of the likely traffic impact associated with this development, the possibility of traffic being internally captured within the site has been ignored.

# <u>Summary</u>

The overall trip generation for the site, as identified in **Tables 2** to **8** above, is summarized in **Table 10**.

Table	10:	Summary	/ of	Peak	Hour	Vehicle	Tri	bs
IUNIC		Gammary	,	i cun	noui	101010		20

WEEKDAYS									
Use or Program	AM Peak (in/out)	PM Peak (in/out)	Evening Peak (in/out)						
Youth Group	-	-	36/24						
Ministry Offices	9/0	0/9	-						
Café	35/18	14/14	14/14						
Sub-Total	44/18	14/23	50/38						
S	ATURDAY	-							
Use/Program	AM Peak (in/out)	Mid-Day Peak (in/out)	Evening Peak (in/out)						
Ministry Offices	9/0	-	0/9						
Café	30/32	15/16	15/16						
Sub-Total	39/32	15/16	15/25						
	SUNDAY								
Use/Program	AM Peak (in/out)	Mid-Day Peak (in/out)	Evening Peak (in/out)						
Church Service & Sunday School	160/24 <sup>1</sup>	-	-						
Church Plant	-	57/9	9/57						
Café	30/32	15/16	15/16						
Sub-Total	190/56	72/25	24/73						

1 - Departure period occurs during separate peak hour, and will be opposite arrival period

Based on the foregoing, the proposed development is anticipated to generate:

- 62 vehicle trips (44 in, 18 out) during the AM peak hour;
- 37 vehicle trips (14 in, 23 out) during the PM peak hour;
- 71 vehicle trips (39 in, 32 out) during the Saturday peak hour;
- 246 vehicle trips (190 in, 56 out) during the Sunday arrival peak; and
- 246 vehicle trips (54 in, 192 out) during the Sunday departure period.

As Sunday service is anticipated to be the overall peak hour for the site, it has been analyzed. The background traffic along Greenbank Road and site traffic generation is higher during the Saturday peak hour compared to the weekday peak hours, therefore the Saturday peak hour has also been analyzed.

For the purpose of this analysis, a projected attendance of 400 people for Sunday Service and Sunday School has been assumed in order to account for the worst-case scenario. However, it is anticipated that the attendance will be significantly lower when the site first develops (approximately 300 people) and may grow over time. Should the attendance reach 400 people, church staff have confirmed that two separate Sunday services will be offered.

Based on the foregoing, the development is anticipated to generate a total of 71 trips (39 in, 32 out) during the Saturday peak, 246 trips (190 in, 56 out) during the Sunday arrival peak, and 246 trips (54 in, 192 out) during the Sunday departure period.

### 5.1.2 Trip Distribution

The assumed distribution of trips generated by the proposed development has been derived from existing traffic patterns on the roadways within the study area. The distribution can be described as follows:

- 40% to/from the north via Greenbank Road
- 35% to/from the south via Greenbank Road
- 10% to/from the west via Wessex Road
- 15% to/from the east via Highbury Park Drive

Pass-by trips for the café have been distributed based on existing traffic patterns along the area roadways. As Sunday will have separate arrival and departure peak hours, they have been reviewed separately.

Primary trips generated by the proposed development can be found in **Figure 5**. Pass-by trips can be found in **Figure 6**. Total site generated traffic figures can be found in **Figure 7**.

#### Figure 5: Primary Site Generated Trips



#### Figure 6: Pass-By Trips



**Figure 7: Total Site Generated Traffic Volumes** 



# 5.2 Background Traffic

#### 5.2.1 General Background Growth Rate

A review of the City of Ottawa's Long-Range TRANS model was conducted in order to determine a general background growth rate in the area. It was found that in general traffic along Greenbank Road (between Highbury Park Drive and Berrigan Drive/Wessex Road) increases at a rate of approximately 2.5% per year, traffic along Berrigan Drive and along Highbury Park Drive in the vicinity of Greenbank Road increases at a rate of approximately 1.5% per year, and traffic along Wessex Road does not increase significantly. The 2031 TRANS model accounts for the widening of Greenbank Road from two to four lanes between Cambrian Road and Foxfield Drive, in addition to a relatively high projected population growth (2.5% annual growth) and employment growth (3.5% annual growth) in the adjacent area.

The March 2016 TIS prepared by Parsons in support of the development at 30 Highbury Park identified an annual background growth rate of 2% along Greenbank Road, based on historical traffic count data (years 2005, 2007, 2008, 2010, and 2015).

For the purpose of this analysis, a 2% annual growth rate was assumed along Greenbank Road, in order to remain consistent with the Parsons 2016 TIS. An annual growth rate of 1.5% was applied to Berrigan Drive and to Highbury Park Drive. No background growth rate was applied to Wessex Road.

Long Range Model Snapshots and Background Traffic Growth analysis from the 2016 TIS are provided in **Appendix F**.

#### 5.2.2 Other Area Development

The development at 30 Highbury Park Drive is currently under construction. At the time of writing this TIA, two of the three buildings have been constructed and are occupied. As the traffic counts at the study area intersections are recent, they will have captured the traffic generated by these two buildings. The third building is currently under construction and is anticipated to have 1,200 square metres of ground floor retail and 740 square metres of medical office uses. The trips generated by this building for the Saturday and Sunday peak hours have been estimated using recommended rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual*. Person Trips were calculated using an ITE Trip to Person Trip factor of 1.28, consistent with the TIA Guidelines. The Person Trips generated by the development of the third building at 30 Highbury Park Drive are summarized in **Table 11**.

l and lise	ITE	GEA	SAT	Peak (F	PPH)	SUN Peak (PPH)		
	Code		IN	OUT	ΤΟΤ	IN	OUT	тот
Medical-Dental Office Building	720	8,000 ft <sup>2</sup>	18	14	32	1	3	4
Shopping Centre	820	12,900 ft <sup>2</sup>	38	36	74	23	23	46

The modal shares for the development at 30 Highbury Park Drive were assumed to be consistent with the modal shares as outlined in the Parsons 2016 TIS for this development. A breakdown of the projected trips by modal share for the third building at 30 Highbury Park Drive are shown in **Table 12**. Consistent with the Parsons TIS for 30 Highbury Park Drive, a 30% retail pass-by was assumed, and a 10% reduction was applied to the total vehicle trip generation to account for multipurpose trips within the development.

Travel Mode		SAT Peak (pph)	(	SUN Peak (pph)			
	IN	OUT	ТОТ	IN	OUT	ТОТ	
Medical-Dental Office Building Trips	S						
Total Person Trips	18	14	32	1	3	4	
Auto Driver (60%)	11	8	19	1	1	2	
Auto Passenger (10%)	2	1	3	0	0	0	
Transit (15%)	2	3	5	0	1	1	
Non-Auto (15%)	3	2	5	0	1	1	
Shopping Centre Trips							
Total Person Trips	38	36	74	23	23	46	
Auto Driver (60%)	23	22	45	14	14	28	
Auto Passenger (10%)	4	4	8	2	2	4	
Transit (15%)	5	5	10	4	3	7	
Non-Auto (15%)	6	5	11	3	4	7	
30 Highbury Park Drive Sub-Tota	d I						
Auto Driver Trips	23	22	45	15	15	30	
Less 30% Retail Pass-By Trips	-7	-7	-14	-7	-7	-14	
Less 10% Multi-Purpose Trips	-2	-2	-4	-1	-1	-2	
Total 'New" Auto Trips	14	13	27	7	7	14	

As shown in **Table 12**, the resulting number of new trips generated by the third building at 30 Highbury Park Drive is 27 trips (14 in, 13 out) during the Saturday peak and 14 trips (7 in, 7 out) during the Sunday peak hour.

Traffic distribution for the third building at 30 Highbury Park Drive was assumed to be consistent with the assumptions as outlined in the Parsons 2016 TIS. Relevant excerpts from the Parsons 2016 TIS for 30 Highbury Park Drive can be found in **Appendix G**. Traffic generated by the third building at 30 Highbury Park Drive has been added to the 2020 and 2025 background traffic.

For the purposes of this analysis, background traffic for both the arrival and departure periods on Sunday have been assumed to be the same. Background traffic figures for the 2020 build out and 2025 horizon year can be found in **Figures 8** and 9. Total traffic volumes for the 2020 build out and 2025 horizon year can be found in **Figures 10** and **11**.





#### Figure 9: 2025 Background Traffic Volumes



#### Figure 10: 2020 Total Traffic Volumes



#### 6.0 ANALYSIS

#### 6.1 Development Design

#### 6.1.1 Design for Sustainable Modes

Pedestrian facilities will be provided between the main building entrance and the parking lot. A connection to the sidewalk along Highbury Park Drive will be provided, as shown on the site plan. Sidewalks will be continuous and depressed across all accesses.

A MUP is provided along the east side of the Transitway. The MUP crosses under the Highbury Park/Transitway overpass as well as connects to the sidewalks on either side of Highbury Park Drive. As pedestrians have the opportunity to cross under the overpass, and the MUP connections to the sidewalk on Highbury Park Drive are located 200m from the signalized intersection with Greenbank Road, a pedestrian crossover (PXO) is not recommended at this location.

The nearest bus stops to the subject site are described in Section 4.1.5.

OC Transpo's service design guideline for peak period service is to provide service within a five minute (400m) walk of the home, school and work location of 95% of urban residents. Stops #7218, #7217, #4634, #4635, #2835, and #2834 are all located within 400m actual walking distance (measured using legal crosswalks) of the proposed development.

Bicycle parking for the proposed development will be located at the southwest corner of the proposed building and will be in accordance with the minimum requirement of the City's Zoning By-law (ZBL), as described in Section 6.2.

A review of the Transportation Demand Management (TDM) – *Supportive Development Design and Infrastructure Checklist* has been conducted. A copy of the TDM checklist is included in **Appendix H**. All required TDM-supportive design and infrastructure measures in the TDM checklist are met.

#### 6.1.2 Circulation and Access

The proposed fire route is shown on the site plan.

Snow storage will be located at the north end of the parking lot. A garbage/recycling enclosure will be located at the southeast corner of the parking lot, as shown on the site plan.

A lay-by is proposed along the south edge of the development. It is 2.6m wide, and approximately 22m in length. This would provide enough storage for approximately three vehicles. Turning movements for a passenger vehicle making a u-turn maneuver on-site are shown in **Figure 12**.

As per the City of Ottawa's Zoning By-Law (ZBL), one loading space is required for the proposed church, but none are required for the café. One loading space is proposed, as shown on the site plan.





P - Passenger Car Overall Length Overall Width Overall Body Height Min Body Ground Clearance Track Width Lock-to-lock time Curb to Curb Turning Radius




# 6.2 Parking

The subject site is located in Area C on Schedule 1 and 1A of the City of Ottawa's ZBL. Minimum vehicular and bicycle parking rates for the proposed uses are identified in the ZBL and are summarized in the following table.

## Table 13: Parking Requirements

Land Use	Rate GFA		Requirement
Vehicle Parking		<u>.</u>	
Café (Calculated as Restaurant in the ZBL)	10 per 100m <sup>2</sup> of gross floor area	170m <sup>2</sup>	17
Place of Worship	10 per 100m <sup>2</sup> of gross floor area of assembly area <sup>1</sup>	732m <sup>2</sup>	73; 7 of which can be in tandem
Community Center	4 per 100m <sup>2</sup> of gross floor area	1,195m <sup>2</sup>	48
	Total Required Vehicle	e Parking	139
Bicycle Parking			
Café (Calculated as Restaurant in the ZBL)	1 per 250m <sup>2</sup> of gross floor area	170m <sup>2</sup>	1
All other non- residential uses	1 per 1500m <sup>2</sup> of gross floor area	1,927m <sup>2</sup>	1
	e Parking	2	

1 – Per ZBL Section 105(1)(a), where a place of worship is required to provide 50 or more motor vehicle parking spaces, 10% of those required motor vehicle parking spaces need not have direct, unobstructed access to a public street

Based on the foregoing, the 10 proposed bicycle parking spaces meet the requirements of the ZBL. A total of 125 vehicular parking spaces are proposed, seven of which are located in tandem. It is noteworthy that an additional 17 parking spaces will be provided in tandem (for a total of 24 tandem spaces) near the northern limits of the parking lot, however these spaces do not count towards the parking count. As it is anticipated that the church, community centre, and café uses will generally be used by the same individuals, relief from the minimum parking requirements of the ZBL is being sought.

The TIA guidelines identify the need to review spillover parking when the parking supply is 15% below demand. As the 125 proposed parking spaces are only 10% below the demand of 138 spaces, a review of spillover parking is not required for the TIA.

Minimum barrier-free parking was also reviewed for the subject site. A total of five accessible spaces are required for the site (two type A spaces and three type B spaces). Six barrier-free spaces are provided (three type A and three type B), as shown on the site plan.

# 6.3 Boundary Streets

This section provides a review of Highbury Park Drive using complete streets principles. The Multi-Modal Level of Service (MMLOS) guidelines produced by IBI Group in 2015 were used to

evaluate the LOS of Highbury Park Drive for each mode of transportation. Schedule 'B' of the City of Ottawa's Official Plan indicates Highbury Park Drive is located within the General Urban Area. This segment of Highbury Park Drive is also located within 600m of the Standherd Rapid Transit Station.

Targets for the Pedestrian Level of Service (PLOS), Bicycle Level of Service (BLOS), and Vehicular Level of Service (Auto LOS) for Highbury Park Drive are based on the targets for the collector roadways located within 600m of a rapid transit station, as identified in Exhibit 22 of the MMLOS guidelines. Since Highbury Park Drive is not a truck route and does not serve transit, the Truck Level of Service (TkLOS) and Transit Level of Service (TLOS) have not been evaluated.

**Table 14** summarizes the findings of the MMLOS segment analysis. Detailed segment MMLOScalculations can be found in **Appendix I**.

Segment	PLOS	BLOS	TLOS	TkLOS	Auto LOS
Highbury Park Drive	А	А	-	-	А
Target	Α	D	-	-	E

# Table 14: Segment MMLOS Summary

Highbury Park Drive meets the target segment PLOS, BLOS, and Auto LOS. No improvements are recommended along Highbury Park Drive based on the segment MMLOS analysis.

# 6.4 Access Intersections Design

The proposed development will be served by one all-movement access along Highbury Park Drive.

Section 25 (c) of the City of Ottawa's *Private Approach By-Law* identifies a requirement for twoway accesses to have a width no greater than 9m, as measured at the street line. Section 107 (1)(a) of the *Zoning By-Law* identifies a minimum width requirement of 6.7m for a two-way driveway to a parking lot. The proposed access on Highbury Park Drive is approximately 8.5m in width, measured at the property line, thereby meeting the requirements.

The turning movements for a Medium Single Unit (MSU) Truck entering and exiting the site access are shown in **Figures 13** and **14**. This was chosen as the design vehicle to represent the largest site vehicle. The proposed curb radii of 6m are required to accommodate the design vehicle movements.

Section 25 (o) of the *Private Approach By-Law* identifies a requirement to provide a minimum spacing of 3m between the nearest edge of the private approach and the property line, as measured at the street line. The access along Highbury Park Drive is located approximately 5m from the eastern property line. Due to the proximity of the site to the intersection of Greenbank Road and Highbury Park Drive, as well as access constraints to the neighbouring property, it was suggested that the access to the subject property be as far east of the Greenbank Road/Highbury Park Drive intersection as possible.





MSU — Medium Single Unit Truck Overall Length Overall Width Overall Body Height Min Body Ground Clearance Track Width Lock—to—lock time Curb to Curb Turning Radius









MSU - Medium Single Unit Truck Overall Length Overall Width Overall Body Height Min Body Ground Clearance Track Width Lock-to-lock time Curb to Curb Turning Redius





Intersection sight distance (ISD) at the proposed access has been determined using the TAC *Geometric Design Guide for Canadian Roads.* The ISD for the access, for a design speed of 50km/h (10km/h above the posted speed limit), is as follows:

- Left Turn from Minor Road
   105 metres
- Right Turn from Minor Road 95 metres

The required ISD for a passenger vehicle to turn left of right from the proposed access is shown in **Figure 15**.

Figure 15: Highbury Park Drive Access Intersection Sight Distance



Additionally, the stopping sight distance (SSD) requirement for a design speed of 50km/h is 65m for vehicles turning left or right at the access.

There is slight horizontal curvature along Highbury Park Drive west of the proposed site access, however, as demonstrated in **Figure 11**, the ISD is not impacted. A site visit was performed on March 26, 2019 in order to determine if the ISD looking east over the vertical curvature of the overpass, and SSD between a westbound vehicle and a vehicle entering the access would be achieved. It was found that the required ISD and SSD at the access are adequate.

Based on the foregoing, available sightlines are within recommended guidelines to allow safe all directional access to the development.

### 6.5 Transit

Based on the trip generation presented in Section 5.1, it is anticipated that the proposed development will generate an additional 6 transit trips (3 in, 3 out) during the Saturday peak hour, 25 transit trips (22 in, 3 out) during the Sunday arrival peak, and 25 transit trips (2 in, 23 out) during the Sunday departure peak.

It is anticipated that most transit trips will arrive/depart the subject site via OC Transpo route 170 or walk to/from Strandherd Transit Station.

# 6.6 Intersection Design

### 6.6.1 Existing Intersection MMLOS Analysis

This section provides a review of the study area intersections using the complete streets principles. The MMLOS guidelines produced by IBI Group in October 2015 were used to evaluate the LOS of all study area intersections for each mode of transportation. Schedule 'B' of the City of Ottawa's Official Plan indicates the Greenbank Road/Highbury Park Drive and the Greenbank Road/Berrigan Drive/Wessex Road intersections are located within the General Urban Area. All study area intersections are located within 600m of the Standherd Rapid Transit Station. Aerial photos of the study area intersections are provided in Section 4.1.2.

Target PLOS, BLOS, TLOS, TkLOS, and Auto LOS for the study area intersections are based on the General Urban Area designation, as identified in Exhibit 22 of the MMLOS guidelines. **Table 15** summarizes the findings of the intersection MMLOS analysis. Detailed intersection MMLOS calculations can be found in **Appendix K**.

Intersection	PLOS	BLOS	TLOS	TkLOS	Auto LOS
Greenbank Road/Highbury Park Drive	F	A	В	E	A
Target	Α	С	-	D	E
Greenbank Road/Berrigan Drive/Wessex Road	F	F	F	E	В
Target	Α	В	-	D	E

### Table 15: Intersection MMLOS Summary

# Greenbank Road/Highbury Park Drive

The Greenbank Road/Highbury Park Drive intersection currently achieves the target BLOS and Auto LOS, however does not meet the target PLOS or TkLOS for the policy area.

Based on the Pedestrian Exposure to Traffic (PETSI), the Greenbank Road/Highbury Park Drive intersection is currently operating with a PLOS F. A reduction in the crossing distance on all legs of the intersection would have the greatest improvement on the PETSI score and the Pedestrian Delay. However, based on the existing traffic volumes, the existing four lane cross section along Greenbank Road is appropriate. Pedestrian refuge is currently provided on the north and south legs at this intersection. As this intersection was recently constructed, no changes are recommended.

The Greenbank Road/Highbury Park Drive intersection is currently operating with a TkLOS E. The northbound right turn movement has only one receiving lane on Highbury Park Drive, which earns an E. Highbury Park Drive is not a truck route and is a collector road which means that there is no MMLOS target for this roadway. As this intersection was recently constructed, no changes are recommended. All other approaches earn a TkLOS B, exceeding the target TkLOS D for truck routes on an arterial roadway.

As this intersection was recently constructed, no changes are recommended.

## Greenbank Road/Berrigan Drive/Wessex Road

The Greenbank Road/Berrigan Drive/Wessex Road intersection currently achieves the target Auto LOS, however does not meet the target PLOS, BLOS, or TkLOS.

Based on the Pedestrian Exposure to Traffic (PETSI), the Greenbank Road/Berrigan Drive/Wessex Road intersection is currently operating with a PLOS F. A reduction in the crossing distance on all legs of the intersection would have the greatest improvement on the PETSI score and the Pedestrian Delay. However, based on the existing traffic volumes, the existing four lane cross section along Greenbank Road is appropriate. As this intersection was recently reconstructed, no changes are recommended.

In order to achieve the target BLOS, two-stage left turn bike boxes and cross-rides or a reduction in the operating speed along Greenbank Road along with a reduction in the length of the southbound right turn lane would be required. However, as this intersection was recently reconstructed, and the current configuration was deemed appropriate by the City, no changes are recommended.

The Greenbank Road/Berrigan Drive/Wessex Road intersection is currently operating with a TkLOS E. The northbound and southbound right turn movements have only one receiving lane on Berrigan Drive and Wessex Road, which earn a TkLOS E. Berrigan Drive and Wessex Road are not truck routes and are collector roads which means that there is no MMLOS target for these roadways. As this intersection was recently reconstructed, no changes are recommended. All other approaches earn a TkLOS B, exceeding the target TkLOS D for truck routes on an arterial roadway.

As this intersection was recently reconstructed, no changes are recommended.

### 6.6.2 Background Intersection Operations

Intersection capacity analysis has been completed for the 2020 and 2025 background traffic conditions. The intersection parameters used in the analysis are consistent with the TIA guidelines (saturation flow rate: 1800 vphpl, PHF: 1.0). The results of the synchro analysis are summarized in the following table for the Saturday and Sunday peak hours. Signal timing plans obtained from the City of Ottawa are included in **Appendix K**. Detailed Synchro reports are included in **Appendix L**.

Table 1	6: Ba	ickarou	nd Inter	section	Operations
	0. DC	iongi ou		00001011	operations

		SAT Peak		SUN Peak			
Intersection	Max. v/c	LOS	Mvmt	Max. v/c	LOS	Mvmt	
2020 Background Traffic							
Greenbank Road/Highbury Park Drive	0.51	А	WBR/ SBL	0.42	A	WBL	
Greenbank Road/Berrigan Drive/Wessex Road	0.63	В	WBL	0.47	А	WBR	
2025 Background Traffic							
Greenbank Road/Highbury Park Drive	0.65	В	SBL	0.44	A	WBL	
Greenbank Road/Berrigan Drive/Wessex Road	0.65	В	WBL	0.48	A	WBR	

Under 2020 and 2025 background traffic conditions, all intersections are anticipated to operate with a LOS B or better.

Note that some critical movements appear to operate slightly better under projected conditions than under existing conditions; this is a result of the PHF of 1.0 for future conditions as per the TIA guidelines.

# 6.6.3 Total Intersection Operations

Intersection capacity analysis has been completed for the 2020 and 2025 total traffic conditions. The intersection parameters used in the analysis are consistent with the TIA guidelines (saturation flow rate: 1800 vphpl, PHF: 1.0). The results of the synchro analysis are summarized in the following table for the Saturday and Sunday peak hours. Detailed Synchro reports are included in **Appendix L**.

Table	17:	Total	Intersection	Ο	perations
IUNIC		i otui		-	perations

	SAT Peak			SUN Arrival Peak			SUN Departure Peak		
Intersection	Max. v/c or delay	LOS	Mvmt	Max. v/c or delay	LOS	Mvmt	Max. v/c or delay	LOS	Mvmt
2020 Total Traffic									
Greenbank Road/Highbury Park Drive	0.58	A	SBL	0.50	A	WBL	0.65	В	WBL
Greenbank Road/Berrigan Drive/Wessex Road	0.63	В	WBL	0.51	А	EBL	0.46	A	EBL/ WBR
Highbury Park Drive Access	10 sec.	А	SB	10 sec.	А	SB	10 sec.	В	SB
2025 Total Traffic									
Greenbank Road/Highbury Park Drive	0.74	С	SBL	0.52	A	WBL	0.67	В	WBL
Greenbank Road/Berrigan Drive/Wessex Road	0.65	В	WBL	0.51	А	EBL	0.48	А	WBR
Highbury Park Drive Access	10 sec.	А	SB	10 sec.	А	SB	10 sec.	В	SB

Under 2020 and 2025 total traffic conditions, all intersections are anticipated to operate with a LOS C or better. The site access is anticipated to operate with a LOS B, and a maximum delay of approximately 10 seconds.

The westbound left turn movement at the Greenbank Road/Highbury Park Drive intersection is anticipated to have a 95<sup>th</sup> percentile queue length of approximately 55m during the Sunday departure peak. The queuing during the departure period is not anticipated to extend past the nearest access to 30 Highbury Park Drive.

The addition of site traffic is not anticipated to have any major impacts on operating conditions of the study area intersections.

# 7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the foregoing, the conclusions and recommendations of this TIA can be summarized as follows:

Development Design and Parking

• Pedestrian facilities will be provided between the main building entrance and the parking lot. A connection to the sidewalk along Highbury Park Drive will be provided, as shown on the site plan. Sidewalks will be continuous and depressed across all accesses.

- OC Transpo stops #7218, #7217, #4634, #4635, #2835, and #2834 are all located within a 400m walking distance (measured using legal crosswalks) of the proposed development.
- A MUP is provided along the east side of the Transitway. The MUP crosses under the Highbury Park/Transitway overpass as well as connects to the sidewalks on either side of Highbury Park Drive. As pedestrians have the opportunity to cross under the Highbury Park Drive/Transitway overpass, and the MUP connections to the sidewalk on Highway Park Drive are located 200m from the signalized intersection with Greenbank Road, a pedestrian crossover (PXO) is not recommended at this location.
- All required TDM-supportive design and infrastructure measures in the TDM checklist are met.
- A lay-by is proposed along the south edge of the development. It is 2.6m wide, and approximately 22m in length. This would provide enough storage for approximately three vehicles.
- The 125 proposed vehicular parking spaces will not meet the requirements of the ZBL. As
  it is anticipated that the church, community centre, and café uses will generally be used
  by the same individuals, relief from the minimum parking requirements of the ZBL is being
  sought. It is noteworthy that an additional 17 tandem parking spaces will be provided near
  the northern limits of the parking lot, however these spaces do not count towards the
  parking count.

# Boundary Street MMLOS

• Highbury Park Drive meets the target segment PLOS, BLOS, and Auto LOS. No improvements are recommended along Highbury Park Drive based on the segment MMLOS analysis.

### Access Design

- The proposed development will be served by one all-movement access along Highbury Park Drive. This access will be approximately 8.5m in width and will meet all requirements of the City's *Private Approach By-Law*.
- Available sightlines are within recommended guidelines to allow safe all directional access to the development.

### <u>Transit</u>

• It is anticipated that the proposed development will generate an additional 6 transit trips (3 in, 3 out) during the Saturday peak hour, 25 transit trips (22 in, 3 out) during the Sunday arrival peak, and 25 transit trips (2 in, 23 out) during the Sunday departure peak.

# Intersection MMLOS

- The Greenbank Road/Highbury Park Drive intersection currently achieves the target BLOS and Auto LOS, however does not meet the target PLOS or TkLOS for the policy area. As this intersection was recently constructed, no changes are recommended.
- The Greenbank Road/Berrigan Drive/Wessex Road intersection currently achieves the target Auto LOS, however does not meet the target PLOS, BLOS, or TkLOS. However, as this intersection was recently reconstructed, and the current configuration was deemed appropriate by the City, no changes are recommended.

### Background Traffic

• Under 2020 and 2025 background traffic conditions, all intersections are anticipated to operate with a LOS B or better.

### Total Traffic

- Under 2020 total traffic conditions, all intersections are anticipated to operate with a LOS B or better. The site access is anticipated to operate with a LOS A, and a maximum delay of approximately 10 seconds.
- Under 2025 total traffic conditions, all intersections are anticipated to operate with a LOS C or better. The site access is anticipated to operate with a LOS A, and a maximum delay of approximately 10 seconds.
- The westbound left turn movement at the Greenbank Road/Highbury Park Drive intersection is anticipated to have a 95<sup>th</sup> percentile queue length of approximately 55m during the Sunday departure peak. The queuing during the departure period is not anticipated to extend past the nearest access to 30 Highbury Park Drive.
- The addition of site traffic is not anticipated to have any major impacts on operating conditions of the study area intersections.

# NOVATECH

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Kochellefierte

Rochelle Fortier, B.Eng., Engineering Intern | Transportation/Traffic

Reviewed by:



Brad Byvelds, P.Eng., Project Coordinator | Transportation/Traffic

# **APPENDIX A**

Proposed Site Plan

Advanced     Revoluted     Producted     Produ					IS LIMITED TO WITHIN
MINLLOT WIDTH       300 m       GLAMMANITY CENTER         MINLLOT WIDTH       300 m       GLAMMANITY CENTER         MINL CATAREA       1000 m <sup>4</sup> 11751 m <sup>4</sup> (2.2.9 Acres)         MINL CATAREA       1000 m <sup>4</sup> 11751 m <sup>4</sup> (2.2.9 Acres)         MINL CATAREA       6 m       2 14.4 m         MINL CATAREA       7.5 m       2 614 m         MINL CONNER DEVADO FLAD SETBACK       7.5 m       2 114 m         MINL CONNER DEVAD SETBACK       7.5 m       2 117 m         MINL CONNER DEVAD SETBACK       7.5 m       2 117 m         MINL CONNER DEVAD SETBACK       7.5 m       2 117 m         MINL CONNER DEVAD SETBACK       7.5 m       -         MINL CONNER DEVAD SETBACK       7.5 m       -         MINL CONNER DEVAD SETBACK       7.6 m       -         MINL CONNER DEVAD SETBACK       -       -         DEVAD SETBACK       -<		I1B MINOR INSTITUTIONAL ZONE	PROVIDED PLACE OF WORSHIP /	PROPERTY EXCEPT WI OTHERWISE.	HERE NOTED
MINL LOT AREA       1000 m²       11751 m² (a 2.8 Acres)         MINL FRONT YARD SETBACK       6 m       2 14.4 m         MIN. FRONT YARD SETBACK       7.5 m       2 14.4 m         MINL CORRENCE STRUCK       7.5 m       2 14.4 m         MINL CORRESIDE YARD SETBACK       7.5 m       2 14.4 m         MINL CORRESIDE YARD SETBACK       7.5 m       2 113 m         MINL CORRESIDE YARD SETBACK       7.5 m       -         MINL CORRESIDE YARD SETBACK       7.5 m       -         MAX. FLOOR SPACE INDEX       -       -         MINL WOTH OF LANDSCAPED AREA       ABUTTING A STREET = 3 m       3 m         MINL WOTH OF LANDSCAPED AREA       ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m         MINL WOTH OF LANDSCAPED AREA       ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m         NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m         NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m         NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m         ACCESSIBLE PARKING SPACE       2.6m WOTH x 5.2m LENGTH       -> 30 m         CORE REAGAD PARKING SPACE       2.6m WOTH x 5.2m LENGTH       -> 00 m <td< td=""><td>MIN.LOT WIDTH</td><td>30.0 m</td><td>93.2 m</td><td>PARKING STALL SIZE: 2</td><td>2600 mm x 5200 mm</td></td<>	MIN.LOT WIDTH	30.0 m	93.2 m	PARKING STALL SIZE: 2	2600 mm x 5200 mm
MIN. FRONT VARD SETBACK       6 m       ± 14.4 m         MIN. REAR VARD SETBACK       7.5 m       ± 61.4 m         MIN. REAR VARD SETBACK       7.5 m       ± 61.4 m         MIN. NTERIOR SIDE VARD SETBACK       7.5 m       -         MIN. DORNER BDE VARD SETBACK       7.5 m       -         MAX. BUILDING HEIGHT       18.0 m       12 m         MAX. FLOOR SPACE INDEX       -       -         MIN. WOTH OF LANDSCAPED AREA       ABUTTING A STREET = 3 m       3 m         PARKING LANDSCAPE BUFFER       FOR A PARINIGLOT CONTAINING IOT CONTAINING IOT ABUTTING A STREET = 3 m       3 m         PARKING LANDSCAPE BUFFER       FOR A PARINIGLOT CONTAINING IOT CONTAINING ISPACES       >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>	MIN. LOT AREA	1000 m²	11751 m² (± 2.9 Acres)	B.F. PARKING STALL mm, 1500 mm AISLE	TYPE A: 3400 mm x 5200
MIN. REAR YARD SETBACK       7.5 m       ± 61.4 m         MIN. INTERIOR SIDE YARD SETBACK       7.5 m       ± 13 m         MIN. CORNER SIDE YARD SETBACK       7.5 m       ± 13 m         MIN. CORNER SIDE YARD SETBACK       7.5 m       ± 13 m         MIN. CORNER SIDE YARD SETBACK       7.5 m       .         MIN. CORNER SIDE YARD SETBACK       7.5 m       .         MIN. CORNER SIDE YARD SETBACK       7.5 m       .         MIN. MUTH OF LANDSCAPED AREA       ABUTTING A STREET = 3 m       3 m         PARKING LANDSCAPED AREA       ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m         NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m         NOT ABUTTING A STREET = 3 m       .       .       .         NOT ABUTTING A STREET = 3 m       .       .       .         NOT ABUTTING A STREET = 3 m       .       .       .         NOT ABUTTING A STREET = 3 m       .       .       .         PRIVATE APPROACH PROVISIONS:       .       .       .       .         DETANCE APPROACH PROVISIONS:       .       .       .       .         DETANCE APPROACH PROVISIONS:       .       .       .       .         DETANCE APPROACH PROVING SPAC	MIN. FRONT YARD SETBACK	6 m	± 14.4 m	B.F. PARKING STALL mm, 1500 mm AISLE	ГҮРЕ В: 2400 mm x 5200
MIN. INTERIOR SIDE YARD SETBACK       7.5 m       ± 13 m         MIN. CORNER SIDE YARD SETBACK       7.5 m       -         MAX. BUILDING HEIGHT       18.0 m       12 m         MAX. BUILDING HEIGHT       18.0 m       12 m         MAX. BUILDOR SPACE INDEX       -       -         MIN. WIDTH OF LANDSCAPED AREA       ABUTTING A STREET = 3 m       3 m         PARKING LANDSCAPE BUFFER       FOR A PARKING LOT CONTINUNG 100 FM ORE SPACES       3 m         PRIVATE APPROACH       FOR A PARKING LOT CONTINUNG 100 FM ORE SPACES       3 m         PRIVATE APPROACH PROVISIONS: DOI NO AS PER OTTAWA BY-LAW       200 m, AS PER OTTAWA BY-LAW       200 m         30.0 m, AS PER OTTAWA BY-LAW       200 m       -         30.0 m, AS PER OTTAWA BY-LAW       200 m       -         30.0 m, AS PER OTTAWA BY-LAW       200 m       -         30.0 m, AS PER OTTAWA BY-LAW       200 m       -         30.0 m, AS PER OTTAWA BY-LAW       2.0 m WIDTH x 5.2 m LENGTH       -         ACCESSIBLE PARKING SPACE       2.6 m WIDTH x 5.2 m LENGTH       -         ACCESSIBLE PARKING SPACE       2.6 m WIDTH x 5.2 m LENGTH       -         ACCESSIBLE PARKING SPACE       3.4 m WIDTH x 5.2 m LENGTH       -         ACCESSIBLE PARKING SPACES       3.4 m WIDTH x 5.2 m LENGTH       -	MIN. REAR YARD SETBACK	7.5 m	± 61.4 m	FOR SITE SERVICING F	PLAN SEE DRAWING C-1,
MINL CORNER SIDE YARD SETBACK       7.5 m       -         MAX, BUILDING HEIGHT       18.0 m       12 m         MAX, FLOOR SPACE INDEX       -       -         MINL WITH OF LANDSCAFED AREA       ABUTTING A STREET = 3 m       3 m         PARKING LANDSCAFED AREA       ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m         PARKING LANDSCAFE DAREA       FOR A PARKING LOT CONTAINING GOID HORE SPACES       ABUTTING A STREET = 3 m         PRIVATE APPROACH PROVISIONS:       300 m ASTREET = 3 m       NOT ABUTTING A STREET = 3 m         NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m         NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m         NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m         OTHER RINGARE A TWO WAY       200447, TIRUMUT       200447, TIRUMUT       CONSTRUCTION STRADOSS,         STANDARD PARKING SPACE       2.6m WIDTH x 5.2m LENGTH       -       -         ACCESSIBLE PARKING SPACE       3.4m WIDTH x 5.2m LENGTH       -       -         ACCESSIBLE PARKING SPACE       2.6m WIDTH x 5.2m LENGTH       -       -         COMMUNITY CENTER OCCURANCES, PARKING SPACES       TOTAL REGORES FOOLDS, TOTAL PROSELOD (200110), TIRUMOT SPACES, TOTAL PROVIDED 125       -	MIN. INTERIOR SIDE YARD SETBACK	7.5 m	± 13 m	FOR SITE GRADING PL	AN SEE DRAWING C-2.
MAX. BUILDING HEIGHT       18.0 m       12 m         MAX. BUILDING HEIGHT       18.0 m       12 m         MAX. FLOOR SPACE INDEX       -         MAX. FLOOR SPACE INDEX       -         MIN. WIDTH OF LANDSCAPED AREA       ABUTTING A STREET = 3 m       3 m         PARKING LANDSCAPE BUFFER       FOR A PARKING LOT CONTAINING 100 CR MORE SPACES: ABUTTING A STREET = 3 m       ABUTTING A STREET = 3 m       ABUTTING A STREET = 3 m         PRIVATE APPROACH PROVISION: DISTANCE BETWERN ATWO XMY       S00 m, AS PER OTTAWA BY LAW       >30 m         DETAILED EARTHEN AS TITLET HOUSE, INC.       20.0 m, AS PER OTTAWA BY LAW       >30 m         DETAILED EARTHEN ATWO XMY       PARKING LOT CONTAINING       >30 m         DETAILED EARTHEN ATWO XMY       20.0 m, AS PER OTTAWA BY LAW       >30 m         DETAILED EARTHEN ATWO XMY       20.0 m, AS PER OTTAWA BY LAW       >30 m         STANDARD PARKING SPACE       2.6 m WIDTH x 5.2 m LENGTH       -         ACCESSIBLE PARKING SPACE       2.6 m WIDTH x 5.2 m LENGTH       -         ACCESSIBLE PARKING SPACE       3.4 m WIDTH x 5.2 m LENGTH       -         PARKING REQUIREMENTS       WITHIN AREA C OF SCHEDULE 1A TO MARE REQUIREMENT POR THUR HAREA C OF SCHEDULE 1A TO MARE REQUIREMENT POR THUR       -         COMMUNITY CENTER OCLIPANCES       STANDARD PARCES FIC TO MAREA C OF ACCES SIGE CONTA       -	MIN. CORNER SIDE YARD SETBACK	7.5 m	-	AS PREPARED BY DB C	GRAY
MAX. FLOOR SPACE INDEX     -	MAX. BUILDING HEIGHT	18.0 m	12 m	FOR EROSION AND SE SEE DRAWING C-3, AS	DIMENT CONTROL PLAN PREPARED BY DB
MIN. WIDTH OF LANDSCAPED AREA       ABUTTING A STREET = 3m       3 m         PARKING LANDSCAPE BUFFER       FOR A PARKING LOT CONTAINING 100 OF MORE SPACES: ABUTTING A STREET = 3 m       ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m         MOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m       NOT ABUTTING A STREET = 3 m         PRIVATE APPROACH PROVISIONS: DISTANCE BETWEEN A TWO WAY OTHER PRIVATE APPROACH AND ANY OTHER PRIVATE APPROACH       >300 m         STANDARD PARKING SPACE       2.6m WIDTH x 5.2m LENGTH       2.6 m WIDTH x 5.2m LENGTH       SUPES OF PRIVING AT DEPRESSED CURB SIALL NOT EXCEED S%         STANDARD PRIVING SPACE       3.4m WIDTH x 5.2m LENGTH       3.4m WIDTH x 5.2m LENGTH       SUPES OF PRIVING AT DEPRESSED CURB SIALL NOT EXCEED S%         """PLACE OF WORSHIP AND COMMUNITY CENTER COCUPANCIES INTHE REQUIREMENT S       WITHIN HARE A OF SSHEDUE IS AT TOTAL PROVIDED 125 PRIVING SPACES       STANDARD SR SPACES (SEE ZONING SPACES (SEE ZONIN	MAX. FLOOR SPACE INDEX	-		GRAY	
PARKING LANDSCAPE BUFFER       FOR A PARKING LOT CONTAINING 100 OR MORE SPACES: ABUTTING A STREET = 3 m NOT ABUTTING A STREET = 3 m       ABUTTING A STREET = 3 m NOT ABUTTING A STREET = 3 m NOT ABUTTING A STREET = 3 m NOT ABUTTING A STREET = 3 m         PRIVATE APPROACH PROVISIONS: DISTANCE BETWEEN A TWO WW POINTS APPROACH AND ANY OTHER PRIVATE APPROACH DARKING SPACE       >30 m         STANDARD PARKING SPACE       2.6m WIDTH x 5.2m LENGTH       2.6 m WIDTH x 5.2m LENGTH	MIN. WIDTH OF LANDSCAPED AREA	ABUTTING A STREET = 3m	3 m	PREPARED BY DB GRA	DEE DRAWING C-5, AS Y
PRIVATE APPROACH PROVISIONS: DISTANCE BETWEENA TWO WAY PRKING DISTANCE BETWEENA TWO WAY PRKING LOT CONTAINING THER PRIVATE APPROACH       30.0 m, AS PER OTTAWA BY-LAW 2003-47, ITEM (WB, FOR A PARKING LOT CONTAINING 100-199 SPACES       >30.0 m, AS PER OTTAWA BY-LAW 2003-47, ITEM (WB, FOR A PARKING LOT CONTAINING 100-199 SPACES       >30.0 m, AS PER OTTAWA BY-LAW 2003-47, ITEM (WB, FOR A PARKING LOT CONTAINING 100-199 SPACES       >30.0 m, AS PER OTTAWA BY-LAW 2003-47, ITEM (WB, FOR A PARKING LOT CONTAINING 100-199 SPACES       >30.0 m         STANDARD PARKING SPACE       2.6m WIDTH x 5.2m LENGTH       2.6 m WIDTH x 5.2m LENGTH	PARKING LANDSCAPE BUFFER	FOR A PARKING LOT CONTAINING 100 OR MORE SPACES: ABUTTING A STREET = 3 m NOT ABUTTING A STREET = 3 m	ABUTTING A STREET > 3 m NOT ABUTTING A STREET 3 m	FOR GEOTECHNICAL IN REFER TO REPORT 18 <sup>7</sup> GOLDER ASSOCIATES 2019	NVESTIGATION REPORT 114424 PREPARED BY LTD., DATED JANUARY
STANDARD PARKING SPACE       2.6m WIDTH x 5.2m LENGTH       2.6m WIDTH x 5.2m LENGTH         PARALLEL PARKING SPACE       2.6m WIDTH x 5.2m LENGTH       -         ACCESSIBLE PARKING SPACE       3.4m WIDTH x 5.2m LENGTH       3.4m WIDTH x 5.2m LENGTH         PARKING REQUIREMENTS       WITHIN AREA C OF SCHEDULE 1A TO ZONING BY-LAW NO. 2008-250:       TO TAL PROVIDED: 125         PLACE OF WORSHIP GROSS FLOOR AREA (GFA): 732 m2 - 73 SPACES       TOTAL PROVIDED: 125       PARKING SPACES         Y**PLACE OF WORSHIP AND COMMUNITY CENTER OCCUPANCIES INTO OPERATING CONCURRENT I: PASSED ON THE REQUIREMENT FOR THE LARGER OF THE TWO (THE PLACE OF WORSHIP)       COMMUNITY CENTER GFA: 1195 m2 - 48 SPACES***)       118 SPACES         TOTAL REQUIREMENT FOR THE LARGER OF THE TWO (THE PLACE OF WORSHIP)       COMMUNITY CENTER GFA: 1195 m2 - SPACES       6 PARKING SPACES: 3 TYPE A       IL GB       CATCH BASIN- SEE C         ILAGRER OF THE TWO (THE PLACE OF WORSHIP)       AS PER OTTAWA TRAFFIC AND PERSON WITH DISABILITES: 2 SPACES       6 PARKING SPACES: 3 TYPE A       STMH       STORM MANHOLE. SI BICYCLE PARKING RATE       6 PARKING SPACES: 1 per 2.000 m² - 4.999 m² of GFA - 1 REQUIRED ALL OTHER NON-RESIDENTIAL USES: 1 per 150m² of GFA - 1 REQUIRED TOTAL REQUIRED: 2 SPACES       10 SPACE       PEOPERTY LINE	PRIVATE APPROACH PROVISIONS: DISTANCE BETWEEN A TWO WAY PRIVATE APPROACH AND ANY OTHER PRIVATE APPROACH	30.0 m, AS PER OTTAWA BY-LAW 2003-447, ITEM (I)(ii), FOR A PARKING LOT CONTAINING 100-199 SPACES	>30 m	ALL WORK OUTSIDE P CONSTRUCTED TO CIT CONSTRUCTION STAN	ROPERTY LINE TO BE Y OF OTTAWA DARDS. DEPRESSED CURB
PARALLEL PARKING SPACE       2.6m WIDTH x 6.7m LENGTH       -         ACCESSIBLE PARKING SPACE       3.4m WIDTH x 5.2m LENGTH       3.4m WIDTH x 5.2m LENGTH         ACCESSIBLE PARKING SPACE       3.4m WIDTH x 5.2m LENGTH       3.4m WIDTH x 5.2m LENGTH         PARKING REQUIREMENTS       WITHIN AREA C OF SCHEDULE 1A TO ZONING BY-LAW NO. 2008-250: PLACE OF WORSHIP AND COMMUNITY CENTER OF WORSHIP GROSS FLOOR AREA (GPA): 732 m <sup>2</sup> - 73 SPACES       118 SPACES SECONNG BY-LAW 2008-250 105(1)(A); 10 OF 73 SPACES       0       EXISTING LIGHT STAN O       REXIS         COMMUNITY CENTER OF WORSHIP AND COMMUNITY CENTER OF THE LARGED OF THE TWO (THE PLACE OF WORSHIP)       COMMUNITY CENTER GFA; 1195 m <sup>2</sup> - 48 SPACES       TOTAL REO'D = 73 + 17 = 90 PARKING SPACES       TOTAL REO'D = 73 + 17 = 90 PARKING SPACES       EXISTING CATCH BAS O EXISTING CATCH BAS SPACES         LOADING APACESSIBLE       AS PER OTTAWA TRAFFIC AND PARKING BY-LAW 2017-301, PART C, SECTION 111(2), FOR A PARKING SPACES       6 PARKING SPACES: 3 TYPE A       STMH       STOM MANHOLE - SI O SMHH CATCH BASIMMANHOL STYPE B         LOADING SPACES       1 per 2.000 m <sup>2</sup> - 4.999 m <sup>2</sup> of G.F.A 2.097 m <sup>2</sup> G.F.A = 1 SPACES       1 SPACE       MEW CURB         BICYCLE PARKING RATE       RESTAURANT: 1 per 250m <sup>2</sup> of GFA - 1 REQUIRED ALL OTHER NON-RESIDENTIAL USES: 1 per 1500m <sup>2</sup> of GFA - 1 REQUIRED       10 SPACE       MEW CURB	STANDARD PARKING SPACE	2.6m WIDTH x 5.2m LENGTH	2.6 m WIDTH x 5.2 m LENGTH		
ACCESSIBLE PARKING SPACE       3.4m WIDTH x 5.2m LENGTH       3.4m WIDTH x 5.2m LENGTH       3.4m WIDTH x 5.2m LENGTH         PARKING REQUIREMENTS       WITHIN AREA C OF SCHEDULE 1A TO ZONING BY-LAW NO. 2008-250: PLACE OF WORSHIP GROSS FLOOR AREA (GFA): 732 m2 - 73 SPACES       118 SPACES (SEE ZONING SPACES (SEE ZONING SPACES)       0 B       EXISTING BILLARD         ****PLACE OF WORSHIP AND COMMUNITY CENTER OCCUPANCIES NOT OPERATING CONCURRENTLY, PARKING REQUIREMENT FOR THE LARGER OF THE TWO (THE PLACE OF WORSHIP)       COMMUNITY CENTER GFA: 1195 m2- 48 SPACES***)       TOTAL PROVIDED: 125 PARKING SPACES       TOTAL PROVIDED: 125 PARKING SPACES         MANDICAP ACCESSIBLE       AS PER OTTAWA TRAFFIC AND PARKING BY-LAW 2017-301, PART C, SPACES       6 PARKING SPACES: 3 TYPE A       3 TYPE A         LOADING SPACES       1 per 2000 m² - 4,999 m² of GFA - 1 RESTAURANT: 1 per 250m² of GFA - 1 RESTAUR	PARALLEL PARKING SPACE	2.6m WIDTH x 6.7m LENGTH	-		_
PARKING REQUIREMENTS       WITHIN AREA C OF SCHEDULE 1A TO ZONING BY-LAW NO. 2008-250:       118 SPACES + 7 TANDEM SPACES (SEE ZONING BY-LAW 2008-250 IOS(1)(A); 10% OF 73 SPACES)       0       B       EXISTING FIRE HYDR/ SPACES         ****PLACE OF WORSHIP AND COMMUNITY CENTER OCCUPANCIES NOT OPERATING CONCURRENTLY. PARKING REQUIREMENT IS BASED OF WORSHIP)       RESTAURANT GFA: 170 m2 - 17 SPACES       TOTAL PROVIDED: 125 PARKING SPACES       TOTAL PROVIDED: 125 PARKING SPACES       EXISTING FIRE HYDR/ SPACES         MANDICAP ACCESSIBLE       AS PER OTTAWA TRAFFIC AND PARKING SPACES       6 PARKING SPACES: 3 TYPE A 3 TYPE B       TOTAL REQU       STMH       EXISTING STORM MAP EXISTING STORM MAPHOLE.SI STMH         LOADING SPACES       1 per 2000 m² - 4,999 m² of G.F.A. 2,097 m² G.F.A. = 1 SPACE       1 SPACE       1 SPACE       BUILDING ENTRANCE. 3 TYPE B       New CURB         BICYCLE PARKING RATE       RESTAURANT: 1 per 250m² of G.F.A. 2,097 m² G.F.A. = 1 SPACE       1 SPACE       1 SPACE       New CURB         BICYCLE PARKING RATE       RESTAURANT: 1 per 250m² of G.F.A. LL OTHER NON-RESIDENTIAL USES: 1 per 150m² of G.F.A. = 1 SPACE       10 SPACE       New CURB       PROPERTY LINE	ACCESSIBLE PARKING SPACE	3.4m WIDTH x 5.2m LENGTH	3.4m WIDTH x 5.2m LENGTH		D:
****PLACE OF WORSHIP AND COMMUNITY CENTER OCCUPANCIES NOT OPERATING CONCURRENTLY. PARKING REQUIREMENT IS BASED ON THE REQUIREMENT FOR THE LARGER OF THE TWO (THE PLACE       RESTAURANT GFA: 170 m2 - 17 SPACES       10% OF 73 SPACES       O EXLS       EXISTING LIGHT STAN- O R.EXLS         VICTOPERATING CONCURRENTLY. PARKING REQUIREMENT IS BASED ON THE REQUIREMENT FOR THE LARGER OF THE TWO (THE PLACE       IGM UNITY CENTER GFA: 1195 m2 - 48 SPACES***)       TOTAL REQ'D = 73 + 17 = 90 PARKING SPACES       D EXCS       EXISTING CATCH BAS         HANDICAP ACCESSIBLE       AS PER OTTAWA TRAFFIC AND PARKING BY-LAW 2017-301, PART C, SECTION 111(2), FOR A PARKING AREA WITH A CAPACITY OF 100-199 SPACES STMH       6 PARKING SPACES: 3 TYPE A       3 TYPE A         LOADING SPACES       1 per 2,000 m² - 4,999 m² of G.F.A. 2.097 m² G.F.A. = 1 SPACE       1 SPACE       0 SPACE         BICYCLE PARKING RATE       RESTAURANT: 1 per 250m² of GFA - 1 REQUIRED ALL OTHER NON-RESIDENTIAL USES: 1 per 1500m² of GFA - 1 REQUIRED TOTAL REQUIRED: 2 SPACES       10 SPACE       I SPACE	PARKING REQUIREMENTS	WITHIN AREA C OF SCHEDULE 1A TO ZONING BY-LAW NO. 2008-250:	118 SPACES + 7 TANDEM SPACES (SEE ZONING BY-I AW 2008-250 105(1)(A):	-ф- ехнур о в	EXISTING FIRE HYDRA
HANDICAP ACCESSIBLE       AS PER OTTAWA TRAFFIC AND PARKING BY-LAW 2017-301, PART C, SECTION 111(2), FOR A PARKING AREA WITH A CAPACITY OF 100-199 SPACES, MIN. REQ'D SPACES FOR PERSON WITH DISABILITIES: 2 SPACES       6 PARKING SPACES: 3 TYPE A       3 TYPE A         ILDADING SPACES       1 per 2,000 m² - 4,999 m² of G.F.A. 2,097 m² G.F.A. = 1 SPACE       1 SPACE       1 SPACE         BICYCLE PARKING RATE       RESTAURANT: 1 per 250m² of GFA - 1 REQUIRED ALL OTHER NON-RESIDENTIAL USES: 1 per 1500m² of GFA - 1 REQUIRED       10 SPACE       10 SPACE         TOTAL REQUIRED: 2 SPACES       TOTAL REQUIRED: 2 SPACES       10 SPACE       FIRE ROUTE	***PLACE OF WORSHIP AND COMMUNITY CENTER OCCUPANCIES NOT OPERATING CONCURRENTLY. PARKING REQUIREMENT IS BASED ON THE REQUIREMENT FOR THE LARGER OF THE TWO (THE PLACE OF WORSHIP)	PLACE OF WORSHIP GROSS FLOOR AREA (GFA): 732 m2 - 73 SPACES RESTAURANT GFA: 170 m2 - 17 SPACES (COMMUNITY CENTER GFA: 1195 m2 - 48 SPACES***) TOTAL REQ'D = 73 + 17 = 90 PARKING	10% OF 73 SPACES) TOTAL PROVIDED: 125 PARKING SPACES	O EXLS O R-EXLS 	EXISTING LIGHT STAN RELOCATED EXISTING LIGHT STANDARD - SE EXISTING CATCH BAS EXISTING CATCH BAS EXISTING STORM MAI
LOADING SPACES       1 per 2,000 m² - 4,999 m² of G.F.A.       1 SPACE       1 SPACE       NEW CURB         2,097 m² G.F.A. = 1 SPACE       1 SPACE        PROPERTY LINE         BICYCLE PARKING RATE       RESTAURANT: 1 per 250m² of GFA - 1 REQUIRED ALL OTHER NON-RESIDENTIAL USES: 1 per 1500m² of GFA - 1 REQUIRED       10 SPACE        SETBACK LINE         TOTAL REQUIRED: 2 SPACES       TOTAL REQUIRED: 2 SPACES       FIRE ROUTE       FIRE ROUTE	HANDICAP ACCESSIBLE	AS PER OTTAWA TRAFFIC AND PARKING BY-LAW 2017-301, PART C, SECTION 111(2), FOR A PARKING AREA WITH A CAPACITY OF 100-199 SPACES, MIN. REQ'D SPACES FOR PERSON WITH DISABILITIES: 2 SPACES	6 PARKING SPACES: 3 TYPE A 3 TYPE B 2	Ш СВМН © STMH ▲ DC	CATCH BASIN/MANHO STORM MANHOLE - SI BUILDING ENTRANCE, DEPRESSED CURB, SI ON SHEET A002.
BICYCLE PARKING RATE RESTAURANT: 1 per 250m <sup>2</sup> of GFA - 1 REQUIRED ALL OTHER NON-RESIDENTIAL USES: 1 per 1500m <sup>2</sup> of GFA - 1 REQUIRED TOTAL REQUIRED: 2 SPACES	LOADING SPACES	1 per 2,000 m² - 4,999 m² of G.F.A. 2,097 m² G.F.A. = 1 SPACE	1 SPACE		NEW CURB
BICYCLE PARKING RATE       RESTAURANT: The 250m² of GFA - 1       10 SPACE       SETBACK EINE         REQUIRED       ALL OTHER NON-RESIDENTIAL USES:       10 SPACE          1 per 1500m² of GFA - 1 REQUIRED        FENCE         TOTAL REQUIRED: 2 SPACES        FIRE ROUTE			10 00000		
TOTAL REQUIRED: 2 SPACES	BICYCLE PARKING RATE	RESTAURANT: 1 per 250m <sup>2</sup> of GFA - 1 REQUIRED ALL OTHER NON-RESIDENTIAL USES: 1 per 1500m <sup>2</sup> of GFA - 1 REQUIRED			FENCE
		TOTAL REQUIRED 2 SPACES			



<u>/S\</u>1  $\frac{s}{2}$ 







# **APPENDIX B**

**TIA Screening Form** 



Transportation Impact Assessment Screening Form

# City of Ottawa 2017 TIA Guidelines Screening Form

## **1. Description of Proposed Development**

Municipal Address	35 Highbury Park Drive
Description of Location	100m east of Greenbank Road/Highbury Park Drive
Land Use Classification	Church/Cafe
Development Size (units)	
Development Size (m <sup>2</sup> )	1830 m <sup>2</sup> total
Number of Accesses and Locations	1 full movement to Highbury Park Drive
Phase of Development	1
Buildout Year	2019

#### If available, please attach a sketch of the development or site plan to this form.

#### 2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m <sup>2</sup>
Industrial	5,000 m <sup>2</sup>
Fast-food restaurant or coffee shop	100 m <sup>2</sup>
Destination retail	1,000 m <sup>2</sup>
Gas station or convenience market	75 m <sup>2</sup>

\* If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.

#### If the proposed development size is greater than the sizes identified above, <u>the Trip Generation</u> <u>Trigger is satisfied.</u>



#### Transportation Impact Assessment Screening Form

#### **3. Location Triggers**

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?		х
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		х

\*DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).

#### If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

#### 4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street 80 km/hr or greater?		Х
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		x
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	х	
Is the proposed driveway within auxiliary lanes of an intersection?		х
Does the proposed driveway make use of an existing median break that serves an existing site?		x
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		х
Does the development include a drive-thru facility?		х

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

5. Summary		
	Yes	No
Does the development satisfy the Trip Generation Trigger?	х	
Does the development satisfy the Location Trigger?		Х
Does the development satisfy the Safety Trigger?	x	

If none of the triggers are satisfied, <u>the TIA Study is complete</u>. If one or more of the triggers is satisfied, <u>the TIA Study must continue into the next stage</u> (Screening and Scoping).

# **APPENDIX C**

OC Transpo System Information





# APPENDIX D

Traffic Count Data



# Turning Movement Count - Peak Hour Diagram GREENBANK RD @ BERRIGAN DR/WESSEX RD





# Turning Movement Count - Peak Hour Diagram GREENBANK RD @ BERRIGAN DR/WESSEX RD





# Turning Movement Count - Peak Hour Diagram GREENBANK RD @ 220 N OF STRANDHERD DR







# Summary Report Including AM, OFF Peak, PM,

Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

# Evening Peak Hours, and PHF

#### Berrigan Drive/Wessex Road & Greenbank Road Nepean, ON Survey Date: Saturday, 1 December 2018 Start Time: 1000 **AADT Factor:** 1.1 Weather: P. Cloudy -2°C/P. Cloudy +2°C 4 Hrs. Survey Hours: 1000-1400 Survey Duration: (AM/PM) Surveyor(s) Carmody Wessex Rd. Berrigan Dr. Greenbank Rd. Greenbank Rd. Northbound Southbound Eastbound Westbound Time W/B Street N/B S/B Street Grand E/B RT UT LT LT ST LT ST RT U1 ST RT UT ΙТ ST RT U Tot Tot Total Tot Tot Total Total Period 1000-1100 103 82 49 0 234 70 76 176 0 322 556 59 823 73 957 156 781 63 0 1000 1957 2513 2 1100-1200 101 76 65 0 242 92 73 213 0 378 620 76 878 82 1038 197 898 77 1 1173 2211 2831 1200-1300 84 48 0 198 98 88 225 0 411 609 61 89 1090 200 933 72 0 1205 2295 2904 66 936 4 1300-1400 80 84 40 204 77 64 170 0 311 515 68 84 1012 178 908 79 1165 2177 2692 0 855 0 Totals 350 326 202 0 878 337 301 784 0 1422 2300 264 3492 328 13 4097 731 3520 291 1 4543 8640 10940

# Expansion factors are applied exclusively to standard <u>weekday</u> 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

AM Peak Ho	our Fac	ctor <		N	/A									High	est I	lourly	Vehic	cle Vol	ume	Betw	een 07	700h &	1000h
AM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	тот	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OFF Peak H	lour Fa	octor	⇒	0.	93									High	est H	lourly	Vehio	cle Vol	ume l	Betw	een 10	000h &	1500h
OFF Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	тот	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
1115-1215	99	85	64	0	248	94	76	211	0	381	629	74	911	88	4	1077	206	944	78	1	1229	2306	2935
PM Peak Ho	our Fac	ctor 🗖		N	/A									High	est H	lourly	Vehio	cle Vol	ume l	Betw	een 1	500h &	1900h
PM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	тот	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

# Comments:

### Notes:

- 1. Includes all vehicle types except bicycles and electric scooters.
- 2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.





# Summary Report Including AM, OFF Peak, PM,

Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

# Evening Peak Hours, and PHF

#### Berrigan Drive/Wessex Road & Greenbank Road Nepean, ON Survey Date: Sunday, 4 November 2018 **AADT Factor:** Start Time: 1.5 Weather: Sunny +1°C/Sunny +5°C Survey Hours: 0800-1400 Survey Duration: 12 Hrs. (AM/PM) Surveyor(s) Carmody Wessex Rd. Berrigan Dr. Greenbank Rd. Greenbank Rd. Westbound Northbound Southbound Eastbound Time W/B N/B S/B Street Grand E/B Street RTUT LT ST LT ST RTIUT LT ST RT UT LT ST RT UT Total Tot Tot Tot Tot Total Total Period 0800-0900 0900-1000 1000-1100 1100-1200 1200-1300 1300-1400 ſ Totals 0 1207 301 832 0 1532 2739 324 3916 743 3695 354 4 4796 9418

# Expansion factors are applied exclusively to standard <u>weekday</u> 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

AM Peak Ho	our Fa	ctor <	•	0.	85									Highe	est H	ourly	Vehic	le Volu	ume E	Betwo	een 07	'00h &	1000h
AM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	тот	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
0900-1000	79	53	49	0	181	55	43	157	0	255	436	30	542	27	1	600	69	444	34	0	547	1147	1583
OFF Peak H	lour Fa	octor	⇒	0.	94									Highe	est H	ourly	Vehic	le Volu	ume E	Betwe	een 10	00h &	1500h
OFF Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	тот	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
1300-1400	83	80	57	0	220	68	65	142	0	275	495	81	816	102	0	999	197	884	94	1	1176	2175	2670
PM Peak Ho	our Fac	ctor ∎		N	/A									Highe	est H	ourly	Vehic	le Volu	ume E	Betwe	een 15	500h &	1900h
PM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	тот	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

# Comments:

Almost all cyclists do not use the bicycle lanes on Greenbank Road.

### Notes:

1. Includes all vehicle types except bicycles and electric scooters.

2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.





# Summary Report Including AM, OFF Peak, PM,

**Evening Peak Hours, and PHF** 

Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

Nepean, ON

# Greenbank Road & Highbury Park Drive

#### Survey Date: Saturday, 1 December 2018 Start Time: 1000 **AADT Factor:** 1.1 Weather: P. Cloudy -2°C/P. Cloudy +2°C Survey Hours: 1000-1400 Survey Duration: 4 Hrs. (AM/PM) Surveyor(s) Carmody N/A **Highbury Park Dr.** Greenbank Rd. Greenbank Rd. Northbound Southbound Eastbound Westbound Time W/B N/B S/B Street Grand E/B Street RT LT LT ST UT LT ST RTIUT ST RT UT ΙТ ST RT U Tot Tot Total Tot Tot Total Total Period 1000-1100 0 0 0 0 0 45 0 113 0 158 158 0 1060 42 1102 64 955 0 1020 2122 2280 0 1 0 0 1100-1200 0 0 0 0 54 0 122 0 176 176 0 1131 61 0 1192 111 1118 1 1230 2422 2598 1200-1300 0 0 0 0 0 56 0 142 0 198 198 0 76 0 1227 109 1149 0 1 1259 2684 1151 2486 1300-1400 0 0 55 0 124 179 179 0 44 1105 114 1110 0 3 1227 2332 2511 0 0 0 0 1061 ſ Totals 0 0 0 0 0 210 0 501 0 711 711 0 4403 223 0 4626 398 4332 0 6 4736 9362 10073

# Expansion factors are applied exclusively to standard <u>weekday</u> 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

AM Peak He	our Fac	tor •	•	N	/A									High	est H	lourly	Vehic	cle Vol	ume E	Betw	een 0	700h &	1000h
AM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	тот	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OFF Peak H	lour Fa	otor	⇒	0.	92									High	est H	lourly	Vehio	cle Vol	ume E	Betw	een 1	000h &	1500h
OFF Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	тот	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
1115-1215	0	0	0	0	0	65	0	123	0	188	188	0	1157	64	0	1221	125	1163	0	1	1289	2510	2698
PM Peak Ho	our Fac	tor 🗖	•	N	/A									High	est H	lourly	Vehio	cle Vol	ume E	Betw	een 1	500h &	1900h
PM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	тот	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

# Comments:

No bicycles observed during this survey on either the roadways or the sidewalks..

#### Notes:

1. Includes all vehicle types except bicycles and electric scooters.

2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.





# Summary Report Including AM, OFF Peak, PM,

Evening Peak Hours, and PHF

Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

Nepean, ON

# Greenbank Road & Highbury Park Drive

Survey Da Weather: (AM/PM)	i <b>te:</b> Sunn	Sund y +1⁰C	ay, 4 :/Sunr	Nov 1y +5	ember °C	ber 2018 Survey Duration: 12 Hrs. Highbury Park Dr.						Star Surv Surv	t Time vey Ho veyor(	e: ours: s)		0800 0800- Carm	-1400 ody		AAD	)T Fa	ctor:		1.5
		Fai	N/A	und		Hig	jhbu Wo	ry P	ark	Dr.		G	Freer	nban rthbou	k R	d.	G	reen	ban Ithhou	k R	d.		
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0800-0900	0	0	0	0	0	17	0	62	0	79	79	0	515	17	0	532	15	334	0	1	350	882	961
0900-1000	0	0	0	0	0	19	0	81	0	100	100	0	752	26	0	778	42	528	0	1	571	1349	1449
1000-1100	0	0	0	0	0	23	0	107	0	130	130	0	915	32	0	947	43	781	0	0	824	1771	1901
1100-1200	0	0	0	0	0	24	0	91	0	115	115	0	930	53	0	983	67	883	0	1	951	1934	2049
1200-1300	0	0	0	0	0	42	0	111	0	153	153	0	905	52	0	957	108	966	0	0	1074	2031	2184
1300-1400	0	0	0	0	0	49	0	110	0	159	159	0	993	48	0	1041	106	1126	0	1	1233	2274	2433
Totals	0	0	0	0	0	174	0	562	0	736	736	0	5010	228	0	5238	381	4618	0	4	5003	####	10977

# Expansion factors are applied exclusively to standard <u>weekday</u> 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

AM Peak He	our Fac	tor •	•	0.	85									High	est H	ourly	Vehic	le Volu	ume E	Betw	een 07	700h &	1000h
AM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	тот	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
0900-1000	0	0	0	0	0	19	0	81	0	100	100	0	752	26	0	778	42	528	0	1	571	1349	1449
OFF Peak H	lour Fa	ctor	•	0.	92									High	est H	ourly	Vehic	le Volu	ume E	Betw	een 10	)00h &	1500h
OFF Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	тот	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
1300-1400	0	0	0	0	0	49	0	110	0	159	159	0	993	48	0	1041	106	1126	0	1	1233	2274	2433
PM Peak Ho	our Fac	tor 🗖	•	N	/A									High	est H	ourly	Vehic	le Volu	ume E	Betw	een 15	500h &	1900h
PM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	тот	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

# Comments:

Almost all cyclists do not use the bicycle lanes on Greenbank Road.

#### Notes:

1. Includes all vehicle types except bicycles and electric scooters.

2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.

Interval	Tim	e pe	eriod	Location	in/out	Number of Vehicles	Number of Adults	Number of Children	Pedestrians
4	0.20		0.45	Driveway 1	in out				
	0.30	-	0.45	Driveway 2	in out				
				Driveway 1	in	1	1		
2	8:45	-	9:00	Driveway 2	in				
				Defense 4	out in	4	7	6	
3	9:00	-	9:15	Driveway	out	2	2	1	
				Driveway 2	out	2	2	2	
4	0.15		0.20	Driveway 1	in out	7	10	7	
4	9.15	-	9.30	Driveway 2	in out	1	1		
				Driveway 1	in	12	15	8	
5	9:30	-	9:45		out in	1	2	1	
				Dilveway 2	out in	2 29	3 39	1	1 adult
6	9:45	-	10:00	Driveway 1	out	1	1	-	
				Driveway 2	in out	5	4	5	8 adults, 3 children
				Driveway 1	in out	45	70	27	9 adults
7	10:00	-	10:15	Driveway 2	in	7	11	4	3 adults
				Driveway 1	out in	8	8 13	1 5	15 adults, 1 child
8	10:15	-	10:30	Direway	out in	1	1		6 adults, 2 children
				Driveway 2	out	2	3		,
				Driveway 1	in				
9	11:15	-	11:30	D. O	out in				
				Driveway 2	out	1	1		3 children
10	11:30	-	11:45	Driveway 1	out	8	9	5	4 adults, 4 children
				Driveway 2	in out	6	8	5	5 adults, 1 child
				Driveway 1	in	1	1	27	10 adults 5 children
11	11:45	-	12:00	Driveway 2	in		45	10	
				Drivowov 1	out in	11 3	15 4	10	2 adults, 1 child 1 adult
12	12:00	-	12:15	Dilveway i	out in	25	36	17	5 adults, 2 children
				Driveway 2	out	3	7	1	3 adults, 1 child
13	12.15	-	12:30	Driveway 1	out	4 16	4 23	3	3 adult
15	12.13		12.00	Driveway 2	in out	15	22	9	1 cyclist
				Driveway 1	in	2	3	A	1 odult 1 obild
14	12:30	-	12:45	Driveway ?	in	11	١ð	4	
<u> </u>				Daine i	out in	4	8	4	1 adult, 2 children
15	12:45	-	13:00	Driveway 1	out				
				Driveway 2	out				
10	12.00		12.15	Driveway 1	in out	1 2	1 3	1 1	
16	13:00	-	13:15	Driveway 2	in	1	1		1 adult 2 children
				Drivewav 1	in	1	1		
17	13:15	-	13:30	Drivovov	out in				
				Driveway 2	out				1

	vehicles	adults	children	occupants	occupancy
AM in	122	179	89	268	2.2
AM out	21	23	5	28	
On-site	101	156	84	240	1.95
PM out	130	192	86	278	2.15
PM in	16	18	1	19	
On-site	114	174	85	259	2

#### Date: May 5, 2019 Job No. 118187

Sequoia Church - 255 Tartan Dr

Date: Tuesday, November 20, 2018 118187

Bridgehead -	2140	Carling	Ave	(Fairlawn	Plaza)

Interval	Time P	eriod	In	Out	Tot
1	7:00 -	7:15	11	6	17
2	7:15 -	7:30	6	6	12
3	7:30 -	7:45	9	7	16
4	7:45 -	8:00	7	3	10
5	8:00 -	8:15	8	5	13
6	8:15 -	8:30	20	8	28
7	8:30 -	8:45	16	11	27
8	8:45 -	9:00	19	9	28
9	9:00 -	9:15	6	5	11
10	9:15 -	9:30	14	9	23
11	9:30 -	9:45	19	14	33
12	9:45 -	10:00	7	5	12
13	15:00 -	15:15	5	7	12
14	15:15 -	15:30	5	7	12
15	15:30 -	15:45	7	8	15
16	15:45 -	16:00	4	7	11
17	16:00 -	16:15	10	4	14
18	16:15 -	16:30	7	2	9
19	16:30 -	16:45	5	6	11
20	16:45 -	17:00	10	6	16
21	17:00 -	17:15	4	7	11
22	17:15 -	17:30	0	7	7
23	17:30 -	17:45	4	3	7
24	17:45 -	18:00	1	5	6

AM PEA	AK HOUR	8:00 - 9:00
in	out	tot

63	33	96

PM PEAK	HOUR 15:1	15 - 16:15
in	out	tot
26	26	52

Date: Saturday, Novemeber 17, 2018 118187

Interval	Time Period		in	out	tot
1	10:00 -	10:15	15	12	27
2	10:15 -	10:30	11	18	29
3	10:30 -	10:45	15	20	35
4	10:45 -	11:00	13	8	21
5	11:00 -	11:15	10	10	20
6	11:15 -	11:30	15	12	27
7	11:30 -	11:45	6	8	14
8	11:45 -	12:00	6	10	16
9	12:00 -	12:15	8	6	14
10	12:15 -	12:30	7	6	13
11	12:30 -	12:45	6	9	15
12	12:45 -	13:00	14	17	31
13	13:00 -	13:15	7	6	13
14	13:15 -	13:30	3	2	5
15	13:30 -	13:45	4	6	10
16	13:45 -	14:00	14	4	18

PEAK HOUR 10:00 - 11:00					
in	out	tot			
54	58	112			

# APPENDIX E

**Collision Records** 



# City Operations - Transportation Services Collision Details Report - Public Version

From: January 1, 2013 To: December 31, 2017

Location: GREEN	NBANK RD @	HIGHBURY PA	RK DR						
Traffic Control: Traffic signal       Total Collisions: 2									
Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuve	er Vehicle type	First Event	No. Ped
2017-Jul-14, Fri,22:40	Rain	Rear end	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Dec-20, Wed,18:21	Clear	Rear end	P.D. only	Ice	North	Slowing or stopping Pick-up truck		Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	


# City Operations - Transportation Services Collision Details Report - Public Version

From: January 1, 2013 To: December 31, 2017

Location: GREEN	NBANK RD @	BERRIGAN DR/W	ESSEX RD						
Traffic Control: Tra	ffic signal						Total Co	ollisions: 65	
Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	r Vehicle type	First Event	No. Ped
2013-Feb-26, Tue,18:19	Clear	Turning movement	Non-fatal injury	Dry	North	Going ahead	Passenger van	Other motor vehicle	
					South	Turning left	Automobile, station wagon	Other motor vehicle	
					West	Turning right	Automobile, station wagon	Other motor vehicle	
2013-Mar-18, Mon,15:20	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	g Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
2013-Mar-24, Sun,13:15	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2013-Jul-23, Tue,17:38	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	g Passenger van	Other motor vehicle	
					South	Slowing or stopping	g Pick-up truck	Other motor vehicle	
					South	Slowing or stopping	g Passenger van	Other motor vehicle	

2013-Aug-12, Mon,16:00	Clear	Turning movement	P.D. only	Dry	North	Turning left	Pick-up truck	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2013-Aug-17, Sat,17:30	Clear	Rear end	Non-reportable	Dry	West	Turning right	Police vehicle	Other motor vehicle
					West	Turning right	Automobile, station wagon	Other motor vehicle
2013-Sep-10, Tue,18:00	Clear	Rear end	P.D. only	Dry	North	Unknown	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2013-Oct-19, Sat,20:30	Clear	Sideswipe	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle
					South	Turning left	Automobile, station wagon	Other motor vehicle
2014-Jan-03, Fri,16:58	Clear	Rear end	Non-fatal injury	lce	South	Slowing or stopping	g Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	g Passenger van	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2014-Jan-16, Thu, 17:17	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Feb-01, Sat,15:41	Snow	Angle	P.D. only	Loose snow	West	Turning right	Pick-up truck	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle

2014-Feb-10, Mon,15:04	Clear	Angle	P.D. only	Dry	South	Turning right	Pick-up truck	Other motor vehicle
_					East	Turning left	Automobile, station wagon	Other motor vehicle
2014-Apr-05. Sat.12:26	Clear	Rear end	Non-fatal iniury	Drv	South	Going ahead	Pick-up truck	Other motor
- F				,				vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
_					South	Stopped	Automobile, station wagon	Other motor vehicle
2014-May-14, Wed,16:45	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	g Pick-up truck	Other motor vehicle
					North	Stopped	Delivery van	Other motor vehicle
					_			
2014-May-16, Fri,20:54	Rain	Turning movement	P.D. only	Wet	South	Turning left	Pick-up truck	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
0044 1 00 14 47 40	0			<b>D</b>	0 11			
2014-Jun-30, Mon,17:49	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2014-Jul-30, Wed,16:23	Rain	SMV other	P.D. only	Wet	North	Slowing or stopping	g Automobile, station wagon	Curb
2014-Aug-13, Wed,17:22	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	g Passenger van	Other motor vehicle
					North	Slowing or stopping	g Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	g Automobile, station wagon	Other motor vehicle

2014-Aug-17, Sun,14:34	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
2014-Aug-21, Thu,21:30	Rain	Rear end	P.D. only	Wet	North	Slowing or stopping	Pick-up truck	Other motor vehicle
					North	Stopped	Pick-up truck	Other motor vehicle
2014-Sep-25, Thu,08:10	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2014-Oct-15, Wed,15:03	Rain	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	Pick-up truck	Other motor vehicle
2014-Oct-18, Sat,14:22	Rain	Rear end	P.D. only	Wet	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
					South	Stopped	Passenger van	Other motor vehicle
2014-Oct-26, Sun,13:45	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Pick-up truck	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle

2014-Nov-19, Wed,15:00	Clear	Rear end	P.D. only	Wet	South	Turning right	Truck - closed	Other motor vehicle
					South	Turning right	Passenger van	Other motor vehicle
2014-Dec-13, Sat,18:50	Clear	Rear end	P.D. only	Wet	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
2014-Dec-26, Fri,13:29	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2015-Jan-10, Sat,17:30	Clear	Rear end	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle
					North	Turning right	Automobile, station wagon	Other motor vehicle
2015-Jan-16, Fri,14:03	Clear	Angle	P.D. only	Wet	West	Going ahead	Pick-up truck	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2015-Jan-18, Sun,19:49	Freezing Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Unknown	Other motor vehicle
2015-Jan-20, Tue,19:10	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle

2015-Feb-06, Fri,18:18	Clear	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2015-Feb-07, Sat,12:25	Clear	Sideswipe	P.D. only	Wet	South	Changing lanes	Automobile,	Other motor
					South	Turning left	Automobile, station wagon	Other motor vehicle
2015-Feb-19, Thu,11:43	Clear	Angle	Non-fatal injury	Wet	South	Going ahead	Pick-up truck	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2015-Feb-21, Sat,12:10	Snow	Approaching	P.D. only	Loose snow	South	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Mar-09, Mon,14:00	Clear	Rear end	Non-fatal injury	Dry	South	Unknown	Unknown	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2015-May-12, Tue,21:20	Clear	Rear end	Non-fatal injury	Dry	South	Slowing or stopping	g Automobile, station wagon	Other motor vehicle
					South	Stopped	Passenger van	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2015-May-19, Tue,14:57	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Unknown	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle

2015-Aug-31, Mon,13:00	Clear	Sideswipe	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	
					West	Turning left	Passenger van	Other motor vehicle	
2015-Sep-19, Sat,11:00	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	g Pick-up truck	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Oct-03, Sat,13:57	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	
2015-Dec-13, Sun,08:57	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Mar-01, Tue,19:55	Snow	Turning movement	P.D. only	Loose snow	South	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Mar-14, Mon,14:47	Rain	SMV other	Non-fatal injury	Wet	West	Turning left	Pick-up truck	Pedestrian	3
2016-May-13, Fri,15:25	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Pick-up truck	Other motor vehicle	
2016-May-26, Thu,08:51	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	

					North	Going ahead	Pick-up truck	Other motor vehicle
2016-Jun-24, Fri,17:24	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Pick-up truck	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2016-Jul-30, Sat,13:23	Clear	Turning movement	P.D. only	Dry	South	Turning left	Pick-up truck	Other motor vehicle
					North	Going ahead	Passenger van	Other motor vehicle
2016-Aug-27, Sat,11:46	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2016-Sep-05, Mon,16:13	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2016-Sep-09, Fri,15:39	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2016-Nov-14, Mon,17:22	Clear	Angle	P.D. only	Dry	West	Turning right	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Pick-up truck	Other motor vehicle
2016-Nov-17, Thu,16:19	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle

					South	Stopped	Pick-up truck	Other motor vehicle	
2016-Nov-21, Mon,19:28	Snow	Rear end	P.D. only	Loose snow	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Pick-up truck	Other motor vehicle	
2016-Nov-24, Thu,10:34	Snow	Rear end	P.D. only	Slush	North	Going ahead	Unknown	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Dec-11, Sun,10:30	Clear	SMV other	Non-fatal injury	Dry	West	Turning left	Passenger van	Pedestrian	1
2017-Jan-04, Wed,22:49	Clear	Rear end	P.D. only	Ice	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Jan-05, Thu,21:57	Clear	Turning movement	P.D. only	Wet	North	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Feb-14, Tue,22:27	Snow	Angle	P.D. only	Loose snow	North	Turning right	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Fire vehicle	Other motor vehicle	
2017-Feb-16, Thu,09:36	Snow	Turning movement	P.D. only	Loose snow	North	Turning right	Passenger van	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	

2017-Apr-04, Tue,18:00	Rain	Rear end	P.D. only	Wet	North	Going ahead	Unknown	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2017-May-18, Thu,20:29	Rain	SMV other	P.D. only	Wet	South	Going ahead	Pick-up truck	Curb
2017-Jun-05, Mon,21:02	Rain	Angle	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Turning left	Pick-up truck	Other motor vehicle
2017-Jul-24, Mon,13:00	Rain	Turning movement	P.D. only	Wet	South	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Aug-10, Thu,16:12	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	g Unknown	Other motor vehicle



# CITY OPERATIONS - PUBLIC WORKS

# **Collision Details Report - Public Version**

From: January 1, 2014 To: December 31, 2014

Traffic Control: No	Control: No control Total Collisions: 5 v/Time Environment Impact Type Classification Surface Veh. Dir Vehicle Manoeuver Vehicle type First Event No. Ped										
Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuve	r Vehicle type	First Event	No. Ped		
2014-Apr-15, Tue,18:08	Clear	Rear end	P.D. only	Wet	South	Slowing or stopping	g Automobile, station wagon	Other motor vehicle			
					South	Slowing or stopping	g Pick-up truck	Other motor vehicle			
2014-May-16, Fri,16:30	Rain	Rear end	P.D. only	Wet	South	Slowing or stopping	g Pick-up truck	Other motor vehicle			
					South	Slowing or stopping	g Automobile, station wagon	Other motor vehicle			
2014-Jun-11, Wed,19:09	Rain	Approaching	Non-fatal injury	Spilled liquid	South	Slowing or stopping	g Automobile, station wagon	Other motor vehicle			
					North	Going ahead	Pick-up truck	Other motor vehicle			
2014-Dec-06, Sat,13:15	Clear	Rear end	Non-fatal injury	Dry	South	Slowing or stopping	g Automobile, station wagon	Other motor vehicle			
					South	Stopped	Pick-up truck	Other motor vehicle			
					South	Stopped	Pick-up truck	Other motor vehicle			
2014-Jan-13, Mon,17:24	Clear	Rear end	Non-fatal injury	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle			
					South	Stopped	Automobile, station wagon	Other motor vehicle			

## APPENDIX F

Background Growth Analysis





#### Greenbank/Berrigan <u>8 hrs</u>

Veer	Data	Nort	North Leg		South Leg		East Leg		West Leg	
Year	Date	SB	NB	NB	SB	WB	EB	EB	WB	Total
2005	Thursday 4 August	4357	4752	3682	3857	1302	1458	1607	881	21896
2007	Tuesday 10 July	6170	6477	5058	5104	2133	2007	1757	1530	30236
2008	Wednesday 23 July	5305	6418	5187	4686	2159	1604	1383	1326	28068
2010	Thursday 12 August	6038	6924	5891	5121	2020	2064	1497	1337	30892
2015	Tuesday 8 December	5650	6414	4734	4475	2824	2509	1638	1448	29692
							•			
		Veen		Cou	nts			% Cł	nange	
	North Leg	rear	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
	-	2005	4752	4357	9109	21896				
		2007	6477	6170	12647	30236	36.3%	41.6%	38.8%	38.1%
		2008	6418	5305	11723	28068	-0.9%	-14.0%	-7.3%	-7.2%
		2010	6924	6038	12962	30892	7.9%	13.8%	10.6%	10.1%
		2015	6414	5650	12064	29692	-7.4%	-6.4%	-6.9%	-3.9%
	Regression Estimate	2005	5712	5168	10881					
	Regression Estimate	2015	6924	6007	12931					
	Average Annual Change		1.94%	1.52%	1.74%					
		Vear		Cou	nts			% Cł	nange	
	West Leg	Tear	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
		2005	1607	881	2488	21896				
		2007	1757	1530	3287	30236	9.3%	73.7%	32.1%	38.1%
		2008	1383	1326	2709	28068	-21.3%	-13.3%	-17.6%	-7.2%
		2010	1497	1337	2834	30892	8.2%	0.8%	4.6%	10.1%
		2015	1638	1448	3086	29692	9.4%	8.3%	8.9%	-3.9%
	Regression Estimate	2005	1576	1159	2735					
	Regression Estimate	2015	1576	1523	3100					
	Average Annual Change		0.00%	2.77%	1.26%					
			r				1			
		Year		Cou	nts			% Cr	nange	
	East Leg	0005	EB	WB	EB+WB	<u> </u>	EB	WB	EB+WB	1N1
		2005	1458	1302	2760	21896	07 70/	( 0.00)	50.00/	20.10/
		2007	2007	2133	4140	30236	37.7%	63.8%	50.0%	38.1%
		2008	1604	2159	3763	28068	-20.1%	1.2%	-9.1%	-7.2%
		2010	2064	2020	4084	30892	28.7%	-6.4%	8.5%	10.1%
		2015	2509	2824	5333	29692	21.6%	39.8%	30.6%	-3.9%
	Degraceion Estimate	2005	1520	1500	2120					
	Regression Estimate	2005	1000	1002	5120					
		2015	2010	2040	5301					
	Average Annual Change		5.04%	0.05%	5.50%					
			Counts					% ^	ange	
	South Lea	Year	NR	SR		INT	NR	SR	NR⊥SR	INT
	2021.1.209	2005	3682	3857	7539	21896	110	30	10700	,,,,,
		2003	5052	5104	10162	30236	37 1%	32.3%	34.8%	38.1%
		2008	5187	4686	9873	28068	2.6%	-8.2%	-2.8%	-7.2%
		2010	5891	5121	11012	30892	13.6%	9.3%	11.5%	10.1%
		2015	4734	4475	9209	29692	-19.6%	-12.6%	-16.4%	-3.9%
		2010	1701	11/0	1201	2,0,2	17.075	12.070	10.170	0.770

Average Annual Change		1.49%	0.61%	1.06%	
Regression Estimate	2015	5352	4819	10171	
Regression Estimate	2005	4616	4535	9151	
	0005				

#### Greenbank/Berrigan AM Peak

Voar	Year Date	Nort	h Leg	South	n Leg	East	Leg West Leg			Total
real	Date	SB	NB	NB	SB	WB	EB	EB	WB	Total
2005	Thursday 4 August	278	701	397	263	216	109	257	75	2296
2007	Tuesday 10 July	431	1042	532	368	400	159	304	98	3334
2008	Wednesday 23 July	398	979	562	381	341	149	282	74	3166
2010	Thursday 12 August	463	1081	699	429	358	183	253	80	3546
2015	Tuesday 8 December	482	951	574	371	519	367	273	159	3696
				•						
	Γ	Voar		Cou	nts			% Cł	nange	
	North Leg	real	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
		2005	701	278	979	2296				
		2007	1042	431	1473	3334	48.6%	55.0%	50.5%	45.2%
		2008	979	398	1377	3166	-6.0%	-7.7%	-6.5%	-5.0%
		2010	1081	463	1544	3546	10.4%	16.3%	12.1%	12.0%
		2015	951	482	1433	3696	-12.0%	4.1%	-7.2%	4.2%
	Regression Estimate	2005	887	343	1230					
	Regression Estimate	2015	1046	512	1558					
	Average Annual Change		1.66%	4.10%	2.39%					
	_									
		Voar		Cou	nts			% Cł	nange	
	West Leg	rear	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
		2005	257	75	332	2296				
		2007	304	98	402	3334	18.3%	30.7%	21.1%	45.2%
		2008	282	74	356	3166	-7.2%	-24.5%	-11.4%	-5.0%
		2010	253	80	333	3546	-10.3%	8.1%	-6.5%	12.0%
		2015	273	159	432	3696	7.9%	98.8%	29.7%	4.2%
	Regression Estimate	2005	276	65	341					
	Regression Estimate	2015	271	145	416					
	Average Annual Change		-0.17%	8.34%	2.02%					
	г		r							1
		Year		Cou	nts			% Cr	hange	
	East Leg	0005	EB	WB	EB+WB		EB	WB	EB+WB	INI
		2005	109	216	325	2296	15 00/	05 00/	70.00/	15 00/
		2007	159	400	559	3334	45.9%	85.2%	/2.0%	45.2%
		2008	149	341	490	3166	-6.3%	-14.8%	-12.3%	-5.0%
		2010	183	358	541	3546	22.8%	5.0%	10.4%	12.0%
	L	2015	367	519	886	3696	100.5%	45.0%	63.8%	4.2%
	Degraceion Estimate	2005	01	244	257					
	Regression Estimate	2005	247	200 E10	337					
		2015	34/	019 6 029	000					
	Average Annual Change		14.29%	0.92%	9.20%					
	F			Cou	nte			% (1	ande	
	South Lea	Year	NR	SB		INT	NR	SR	NR+SR	INT
	South Leg	2005	307	263	660	2206	ND	36	ND+3D	1101
		2003	522	203	900	2224	34.0%	30.0%	36 1%	15 2%
		2007	562	300	900	3334	5.6%	37.7/0	1 8%	-5 0%
		2008	699	129	1128	3546	21.0%	12.5%	4.0 /0 19.6%	-3.0%
		2010	574	371	9/5	3606	_17 0%	-13 5%	-16.0%	1 2.070
	L	2010	574	571	740	3070	-17.7/0	-13.370	-10.270	4.270
	Regression Estimate	2005	180	300	Q1Q					
	Regression Estimate	2015	6/0	۵ <u>۲</u> ۶	1062					
		2013	2 88%	2 30%	2 65%					
	Annual onalige		2.0070	2.3070	2.0070					

2.88%	2.309

#### Greenbank/Berrigan PM Peak

Voar	Vear Date		North Leg South Leg		East Leg		West Leg		Total	
ieai		SB	NB	NB	SB	WB	EB	EB	WB	TOTAL
2005	Thursday 4 August	753	680	644	653	191	371	313	197	3802
2007	Tuesday 10 July	1344	933	901	999	380	518	256	431	5762
2008	Wednesday 23 July	1082	829	829	896	383	377	179	371	4946
2010	Thursday 12 August	1192	815	863	961	259	497	218	259	5064
2015	Tuesday 8 December	1037	853	674	767	435	449	241	318	4774
	· · ·									
	Γ	Veer		Cou	nts			% Cł	nange	
	North Leg	rear	NB	SB	NB+SB	INT	NB	SB	NB+SB	INT
		2005	680	753	1433	3802				
		2007	933	1344	2277	5762	37.2%	78.5%	58.9%	51.6%
		2008	829	1082	1911	4946	-11.1%	-19.5%	-16.1%	-14.2%
		2010	815	1192	2007	5064	-1.7%	10.2%	5.0%	2.4%
		2015	853	1037	1890	4774	4.7%	-13.0%	-5.8%	-5.7%
	Regression Estimate	2005	786	1038	1824					
	Regression Estimate	2015	876	1147	2023					
	Average Annual Change		1.08%	1.00%	1.04%					
	-									
		Year		Cou	nts			% Cł	ange	
	West Leg	. oui	EB	WB	EB+WB	INT	EB	WB	EB+WB	INT
		2005	313	197	510	3802				
		2007	256	431	687	5762	-18.2%	118.8%	34.7%	51.6%
		2008	179	371	550	4946	-30.1%	-13.9%	-19.9%	-14.2%
		2010	218	259	477	5064	21.8%	-30.2%	-13.3%	2.4%
	L	2015	241	318	559	4774	10.6%	22.8%	17.2%	-5.7%
	Regression Estimate	2005	261	305	566					
	Regression Estimate	2015	213	330	543					
	Average Annual Change		-2.02%	0.80%	-0.41%					
	Г			0			1	04 Ch		
	Franklan	Year	50	Lou		1.1.1	50	% Ur		1.1.1
	East Leg	2005	271	101	EB+WB	2002	EB	WB	EB+WB	1/1/1
		2005	571	191	362	3602	20 ( 0(	00.00/	F0.00/	E1 (0)
		2007	518	380	898	5762	39.6%	99.0%	59.8% 1E 49/	51.0%
		2008	377	303	760	4940	-27.2%	0.0%	-15.4%	-14.270
		2010	497	209	750	3064	31.6%	-32.4%	-0.5%	Z.470 E 79/
	L	2015	449	435	004	4774	-9.170	08.076	10.970	-5.776
	Pearession Estimate	2005	122	263	685					
	Regression Estimate	2005	422	1205	902					
		2015	1 14%	5 01%	2 78%					
	Average Annual change		1.1470	5.0170	2.7070					
				Соц	nts			% Cł	nange	
	South Lea	Year	NB	SR	NR+SR	INT	NB	SR	NB+SB	INT
		2005	644	653	1297	3802				
		2007	901	999	1900	5762	39.9%	53.0%	46.5%	51.6%
		2008	829	896	1725	4946	-8.0%	-10.3%	-9.2%	-14 2%
		2010	863	961	1824	5064	4.1%	7.3%	5.7%	2.4%
		2015	674	767	1441	4774	-21.9%	-20.2%	-21.0%	-5.7%
	L	2010	0/1	, , ,			21.775	20.270	21.075	0.770
	Regression Estimate	2005	803	851	1654					

Regression Estimate Average Annual Change 751 -**0.66%** 1612 -0.26% 861 2015

0.11%

### **APPENDIX G**

Relevant Excerpts from Other Transportation Studies

*Comment 18f:* The size of developments (retail, medical office, pharmacy...) identified in the TIS which provides the basis for Impact Assessment differs from the Proposal Summary. Which one is correct?

**Response 18f:** The revised Site Plan identifies the following land use sizes: 213 m<sup>2</sup> of fast-food restaurant, 2,702 m<sup>2</sup> of retail and 740 m<sup>2</sup> of medical office. The pharmacy is not confirmed as a land use, however, for the purposes of our analysis, a 1,200 m<sup>2</sup> pharmacy was assumed as it has a higher trip-generation rate than 'specialty retail'. The total site trip generation based on these revised land use values is outlined in Table 1.

Travel Mode	AM Peak (veh/hr)			PM Peak (veh/hr)			
	In	Out	Total	In	Out	Total	
Medical Office Trip Generation	12	4	16	6	18	24	
Specialty Retail Trip Generation	13	11	24	21	27	48	
Fast-Food Restaurant Trip Generation	41	41	82	30	29	59	
Pharmacy Trip Generation	29	16	45	42	44	86	
Specialty Retail Pass-by (30%)	-4	-4	-8	-7	-7	-14	
Fast-Food Restaurant Pass-by (50%)	-21	-21	-42	-15	-15	-30	
Pharmacy Pass-by (30%)	-7	-7	-14	-13	-13	-26	
Multi-purpose Trips (10%)	-6	-4	-10	-7	-8	-15	
Total 'New' Auto Trips	57	36	93	57	75	132	

Following the same method outlined in the original TIS, the revised site is projected to generate approximately 95 and 135 veh/h during the morning and afternoon peak hours, respectively. This is less than the 150 to 175 veh/h projected in the original TIS. As such, the findings and recommendations outlined in the original TIS remain valid.

*Comment 18g:* City's OP identifies protection of 44.5 m right-of-way (ROW) along Greenbank Road between Fallowfield Rd and Strandherd Dr. Measurements taken from geoOttawa shows that the existing ROW is less than what is identified in the OP. Please ensure to protect 44.5 m ROW along the frontage (approx. 115 m) of proposed development site where it abuts the Greenbank Rd.

Response 18g: Noted and the proponent has been advised.

*Comment 18h:* Section 3.3 Background Traffic Growth (p-8): As mentioned in section 3.1, widening of Greenbank Road to 4-lane between Malvern Dr and Market Place is expected to complete in 2017. This widening has the potential to draw additional traffic (on top of weighted average annual background growth traffic) along Greenbank Road due to increased roadway capacity. Clarification is required if consideration has been given to this additional traffic in the analysis undertake as part of the TIS report?

**Response 18h:** The weighted annual background traffic growth assumptions outlined in the TIS account for future traffic along Greenbank Road. The widening of the roadway is not expected to affect this historical background traffic growth rate. As such, no additional assumptions for traffic growth based on road widening or "induced travel" have been included in the TIS.

As mentioned in section 3.1, some assumptions were made regarding travel patterns for local traffic travelling on roadways adjacent to the 'new' Highbury Park Drive (i.e. Berrigan Road and Longfields Drive). This diverted traffic is included in the Projected Baseline Traffic Volumes (Figures 6 and 7 in the original TIS) and is outlined in Figure 1 below.





### 3.4 Site Trip Generation

Appropriate trip generation rates for the proposed development consisting of approximate 8,880 ft<sup>2</sup> of retail, a 5,000 ft<sup>2</sup> fast-food restaurant, a 9,000 ft<sup>2</sup> medical office and a 16,416 ft<sup>2</sup> pharmacy were obtained from the 9<sup>th</sup> Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual, which are summarized in Table 3.

Land Lica	Data	Trip Rates					
Lanu Use	Source	AM Peak	PM Peak				
Medical Office	ITE 720	T = 2.39(X)	T = 3.57(X); ln(T) = 0.90 ln(X) +1.53				
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				
Fast Food Restaurant w/Drive-Through	ITE 934	T = 45.42(X)	T = 32.65(X)				
Pharmacy	ITE 880	T = 2.94(X); T = 10.22(X) - 75.80	T = 8.40(X)				
Notes: T = Average Vehicl X = 1000 ft <sup>2</sup> Gross I Specialty Retail AM I	e Trip Ends Floor Area Peak is assum	ed to be 50% of the PM Peak					

Table 3:	ITE Trip	o Generation	Rates
Table 5.		5 Ocheration	naico

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 4.

Land Lloo	Area	Area AM Peak (Person Trips/h)			PM Peak (Person Trips/h)			
Lanu Use	Area	In	Out	Total	In	Out	Total	
Medical Office	9,000 ft <sup>2</sup>	22	6	28	12	31	43	
Specialty Retail Centre	8,880 ft <sup>2</sup>	15	13	28	24	32	56	
Fast Food Restaurant w/Drive-Through	5,000 ft <sup>2</sup>	150	145	295	110	102	212	
Pharmacy	16,415 ft <sup>2</sup>	78	42	120	87	92	179	
Total P	265	206	471	233	257	490		
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%								

 Table 4: Modified Person Trip Generation

The person trips shown in Table 4 for the proposed site were then reduced by modal share values, including a reduction for 'pass-by' trips based on the site's location and proximity to adjacent communities, employment, other shopping uses and transit availability. Modal share and 'pass-by' values for medical office, specialty retail, fast food restaurant and pharmacy land uses within the proposed development are summarized in Tables 5, 6, 7, and 8 respectively, with the total site-generated vehicle traffic summarized in Table 9.

	Mode	AM Pea	ak (Person '	Trips/h)	PM Peak (Person Trips/h)		
	Share	In	Out	Total	In	Out	Total
Auto Driver	60%	14	4	18	8	19	27
Auto Passenger	10%	2	1	3	2	4	6
Transit	15%	3	1	4	1	4	5
Non-motorized	15%	3	0	3	1	4	5
Total Person Trips	100%	22	6	28	12	31	43
Total 'New' Auto Trips		14	4	18	8	19	27

 Table 5: Medical Office Modal Site Trip Generation

Travel Mede	Mode	AM Pea	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)			
Traver Mode	Share	In	Out	Total	In	Out	Total		
Auto Driver	60%	9	8	17	15	20	35		
Auto Passenger	10%	2	2	4	3	4	7		
Transit	15%	2	2	4	3	4	7		
Non-motorized	15%	2	1	3	3	4	7		
Total Person Trips	100%	15	13	28	24	32	56		
Less Retail 30% Pass-By		-3	-3	-6	-5	-5	-10		
Total 'New' Auto Trips		6	5	11	10	15	25		

### Table 6: Specialty Retail Centre Modal Site Trip Generation

### Table 7: Fast Food Restaurant w/Drive-Through Modal Site Trip Generation

	Mode	AM Pea	ak (Person ˈ	Trips/h)	PM Pea	ak (Person Trips/h)	
	Share	In	Out	Total	In	Out	Total
Auto Driver	60%	90	87	177	66	62	128
Auto Passenger	10%	15	15	30	11	10	21
Transit	15%	23	22	45	17	15	32
Non-motorized	15%	22	21	43	16	15	31
Total Person Trips	100%	150	145	295	110	102	212
Less Retail 50% Pass-By		-44	-44	-88	-32	-32	-64
Total 'New' Auto Trips		46	43	89	34	30	64

#### Table 8: Pharmacy Modal Site Trip Generation

	Mode	AM Pea	ak (Person	Trips/h)	PM Peak (Person Trips/h)		
	Share	In	Out	Total	In	Out	Total
Auto Driver	60%	47	26	73	53	56	109
Auto Passenger	10%	8	4	12	8	10	18
Transit	15%	12	6	18	13	13	26
Non-motorized	15%	11	6	17	13	13	26
Total Person Trips 100%		78	42	120	87	92	179
Less Retail 30% Pass-By		-11	-11	-22	-16	-16	-32
Total 'New' A	Total 'New' Auto Trips			51	37	40	77

The following Table 9 provides a summary of potential two-way vehicle trips to/from the proposed development. Given the land use types, a 10% reduction was applied to the total vehicle trip generation to account for multi-purpose trip within the development.



Land Lico	AM Peak (veh/h)			PM Peak (veh/h)		
Land Ose	In	Out	Total	In	Out	Total
Medical Office	14	4	18	8	19	27
Specialty Retail Centre	9	8	17	15	20	35
Fast Food Restaurant	90	87	177	66	62	128
Pharmacy	47	26	73	53	56	109
Specialty Retail Pass-by (30%)	-3	-3	-6	-5	-5	-10
Fast-Food Restaurant Pass-by (50%)	-44	-44	-88	-32	-32	-64
Pharmacy Pass-by (30%)	-11	-11	-22	-16	-16	-32
Less 10% Multi-purpose Trips	-10	-7	-17	-9	-10	-19
Total 'New' Auto Trips	92	60	152	80	94	174

#### Table 9: Total Site Vehicle Trip Generation

As shown in Table 9, the resulting number of potential 'new' two-way vehicle trips for the proposed development is approximately 150 and 175 veh/h during the weekday morning and afternoon peak hours, respectively.

#### 3.5 Vehicle Traffic Distribution and Assignment

Traffic distribution was based on the existing volume splits at study area intersections and our knowledge of the surrounding area. The resultant distribution is outlined as follows:

- 50% to/from the south via Greenbank Road and Longfields Drive;
- 35% to/from the north via Greenbank Road and Longfields Drive;
- 5% to/from the east via Berrigan Drive; and
- <u>10%</u> to/from the west via Wessex Road; 100%

Based on these distributions, 'new' and 'pass-by' site-generated trips were assigned to study area intersections, which are illustrated as Figures 8 and 9, respectively.

#### Figure 8: 'New' Site-Generated Traffic Volumes









### 4. Future Traffic Operations

### 4.1 Projected 2017 Conditions at Full Site Development

The total projected 2017 volumes associated with the proposed development were derived by superimposing 'new' site-generated traffic volumes (Figure 8) and 'pass-by' site-generated traffic volumes (Figure 9) onto projected 2017 background traffic volumes (Figure 6). The resulting total projected 2017 volumes are illustrated as Figure 10.

Figure 10: Total Projected 2017 Peak Hour Traffic Volumes



### **APPENDIX H**

TDM – Supportive Development Design Checklist

### **TDM-Supportive Development Design and Infrastructure Checklist:**

Non-Residential Developments (office, institutional, retail or industrial)

Legend				
REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed			
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users			
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance			

	TDM-s	supportive design & infrastructure measures: Non-residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	1.	WALKING & CYCLING: ROUTES	
	1.1	Building location & access points	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	
	1.2	Facilities for walking & cycling	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (see Official Plan policy 4.3.3)	
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible (see Official <i>Plan policy 4.3.12</i> )	

	TDM-s	supportive design & infrastructure measures: Non-residential developments	Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (see Official Plan policy 4.3.10)	
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (see Official Plan policy 4.3.10)	
REQUIRED	1.2.5	Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on- road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians (see Official Plan policy 4.3.11)	
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	
	1.3	Amenities for walking & cycling	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	

	TDM-s	supportive design & infrastructure measures: Non-residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	2.	WALKING & CYCLING: END-OF-TRIP FACILI	TIES
	2.1	Bicycle parking	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see Official Plan policy 4.3.6)	
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well- used areas (see Zoning By-law Section 111)	
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored <i>(see Zoning By-law Section 111)</i>	
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	
	2.2	Secure bicycle parking	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see Zoning By-law Section 111)	
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	
	2.3	Shower & change facilities	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	
	2.4	Bicycle repair station	
BETTER	2.4.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	

	TDM-s	supportive design & infrastructure measures: Non-residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	3.	TRANSIT	
	3.1	Customer amenities	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	
	4.	RIDESHARING	
	4.1	Pick-up & drop-off facilities	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	
	4.2	Carpool parking	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	
	5.	CARSHARING & BIKESHARING	
	5.1	Carshare parking spaces	
BETTER	5.1.1	Provide carshare parking spaces in permitted non- residential zones, occupying either required or provided parking spaces (see Zoning By-law Section 94)	
	5.2	Bikeshare station location	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	

	TDM-s	supportive design & infrastructure measures: Non-residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	6.	PARKING	
	6.1	Number of parking spaces	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (see Zoning By-law Section 104)	
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking <i>(see Zoning By-law Section 111)</i>	
	6.2	Separate long-term & short-term parking areas	
BETTER	6.2.1	Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	
	7.	OTHER	
	7.1	On-site amenities to minimize off-site trips	
BETTER	7.1.1	Provide on-site amenities to minimize mid-day or mid-commute errands	

# **APPENDIX I**

Segment MMLOS Analysis

### I.1 - Pedestrian Level of Service (PLOS)

Exhibit 4 of the MMLOS guidelines has been used to evaluate the segment PLOS of Highbury Park Drive. Exhibit 22 of the MMLOS guidelines suggests a target PLOS A for all road classes located within 600m of a rapid transit station. The results of the segment PLOS analysis are summarized in **Table 6**.

### Table 1: PLOS Segment Analysis

Sidewalk Width	Boulevard Width	Avg. Daily Curb Lane Traffic Volume	Presence of On-Street Parking	Operating Speed <sup>1</sup>	Segment PLOS
Highbury F	Park Drive				
2m	2m	< 3,000	Yes	50 km/h	А

1. Operating Speed identified as 10 km/h above the speed limit

### I.2 - Bicycle Level of Service (BLOS)

Exhibit 4 of the MMLOS guidelines has been used to evaluate the segment BLOS of Highbury Park Drive. Exhibit 22 of the MMLOS guidelines suggests a target BLOS D for other routes on collector roads located within 600m of a rapid transit station. The results of the BLOS analysis are summarized in **Table 7**.

### **BLOS Segment Analysis**

Road Class	Bike Route	Type of Bikeway	Travel Lanes	Operating Speed	Segment BLOS
Highbury Park Drive					
Collector	N/A	Bike Lane	2	50 km/h	А

### I.3 - Vehicular Level of Service (Auto LOS)

Exhibit 22 of the MMLOS guidelines suggest a target Auto LOS E for all roadways located within 600m of a rapid transit station. The typical lane capacity along Highbury Park Drive has been estimated based on roadway classification and general characteristics (i.e. suburban with limited access, urban with on-street parking, etc.). The results of the Auto LOS analysis are summarized in **Table 8**.

### Auto LOS Segment Analysis

	Directional	Traffic Volumes		V/C Ratio and LOS			
Direction	Directional	Saturday	Sunday	SAT	Peak	SUN	Peak
	Capacity	Peak	Peak	V/C	LOS	V/C	LOS
Highbury Park Drive							
EB	600	189	68	0.32	А	0.11	А
WB	600	188	100	0.31	А	0.17	А

### **APPENDIX J**

Intersection MMLOS Analysis

### K. 1 - Pedestrian Level of Service (PLOS)

Exhibit 5 of the Addendum to the MMLOS guidelines has been used to evaluate the existing PLOS at the Greenbank Road/Highbury Park Drive and Greenbank Road/Berrigan Drive/Wessex Road intersections. Exhibit 22 of the MMLOS guidelines suggests a target PLOS A for all roadways within 600m of a rapid transit station. The results of the intersection PLOS are summarized in the following tables.

PLOS Intersection Analysis -	Greenbank Road/Highbury Park Drive
------------------------------	------------------------------------

Criteria	North Approach		South Approac	:h	East Approach	
Greenbank Road/Highbur	y Park Drive					
	Р	ETSI S	CORE			
CROSSING DISTANCE CONDITION	5					
Median > 2.4m in Width	Yes	45	Yes	45	No	72
Lanes Crossed (3.5m Lane Width)	7	40	7	40	5	
SIGNAL FHASING AND TIMING						
Left Turn Conflict	No Left Turn/Prohibited	0	Permissive	-8	Permissive	-8
Right Turn Conflict	Permissive or Yield	-5	No Right Turn/Prohibited	0	Permissive or Yield	-5
Right Turn on Red	N/A	0	RTOR Allowed	-3	RTOR Allowed	-3
Leading Pedestrian Interval	No	-2	No	-2	No	-2
CORNER RADIUS						
Parallel Radius	> 10m to 15m	-6	No Right Turn	0	> 10m to 15m	-6
Parallel Right Turn Channel	No Right Turn Channel	-4	No Right Turn	0	No Right Turn Channel	-4
Perpendicular Radius	N/A	0	N/A	0	N/A	0
Perpendicular Right Turn Channel	Channel N/A		N/A	0	N/A	0
CROSSING TREATMENT						
Treatment	Standard	-7	Standard	-7	Standard	-7
	PETSI SCORE	21		25		37
	LOS	F		F		E
	DI	ELAY S	SCORE			
Cycle Length		120		120		120
Pedestrian Walk Time				6.8		68
	53.4		53.4		11.3	
	E		E		В	
	OVERALL	F		F		E

Criteria	North Approach		South Approach		East Approach		West Approach	
Greenbank Road/Berrigan Drive/Wessex Road								
PETSI SCORE								
CROSSING DISTANCE CONDITION	6							
Median > 2.4m in Width	No	0	No	6	No	72	No	70
Lanes Crossed (3.5m Lane Width)	9	0	9		5		5	12
SIGNAL RHASING AND TIMING								
Left Turn Conflict	Perm + Prot	-8	Permissive	-8	Perm + Prot	-8	Perm + Prot	-8
Right Turn Conflict	Permissive or Yield	-5	Permissive or Yield	-5	Permissive or Yield	-5	Permissive or Yield	-5
Right Turn on Red	RTOR Allowed	-3	RTOR Allowed	-3	RTOR Allowed	-3	RTOR Allowed	-3
Leading Pedestrian Interval	No	-2	No	-2	No	-2	No	-2
CORNER RADIUS			•				•	
Parallel Radius	> 10m to 15m	-6	> 10m to 15m	-6	> 10m to 15m	-6	> 10m to 15m	-6
Parallel Right Turn Channel	No Right Turn Channel	-4	No Right Turn Channel	-4	No Right Turn Channel	-4	No Right Turn Channel	-4
Perpendicular Radius	N/A	0	N/A	0	N/A	0	N/A	0
Perpendicular Right Turn Channel	N/A	0	N/A	0	N/A	0	N/A	0
CROSSING TREATMENT								
Treatment	Standard	-7	Standard	-7	Standard	-7	Standard	-7
PETSI SCORE -				-29		37		37
	LOS	F		F		E		E
			DELAY SCORE					
Cycle Length		120		120		120		120
Pedestrian Walk Time				20.5		20.1		31.1
DELAY SCORE				41.3		41.6		32.9
LOS				E		E		D
	OVERALL	F		F		Е		Е

### PLOS Intersection Analysis - Greenbank Road/Berrigan Drive/Wessex Road

### K.2 - Bicycle Level of Service (BLOS)

Exhibit 12 of the MMLOS guidelines has been used to evaluate the existing BLOS at the Greenbank Road/Highbury Park Drive and Greenbank Road/Berrigan Drive/Wessex Road intersections. Exhibit 22 of the MMLOS guidelines suggests a target C for a Spine Route (Greenbank Road), a target B for a local route (Berrigan Drive and Wessex Road), and a target D for all other routes (Highbury Park Drive) located within 600m of a rapid transit station. The results of the intersection BLOS are summarized in the following table.

Approach	Bikeway Facility Type	Criteria	Travel Lanes and/or Speed	BLOS		
Greenbank Road/Highbury Park Drive						
North Approach	Multi- Use	Right Turn Lane Characteristics	No Right Turn Lane	-		
	Pathway	Left Turn Accommodation	Two-stage Left Turn	Α		
	Bike Lane	Right Turn Lane Characteristics	No Right Turn Lane	-		
		Left Turn Accommodation	Two-stage Left Turn	А		
South Approach	Bike	Right Turn Lane Characteristics	No Right Turn Lane	-		
	Lane	Left Turn Accommodation	Two-stage Left Turn	Α		
East	Bike Lane	Right Turn Lane Characteristics	Cycling Facility Remains to the Right of Any Turn Lane	-		
Approach		Left Turn Accommodation	Two-stage Left Turn	Α		
Greenbank Re	oad/Berrig	an Drive/Wessex Road				
North Approach	Multi- Use Pathway	Right Turn Lane Characteristics	MUP Remains to the Right of Any Turn Lane	-		
		Left Turn Accommodation	2 Lanes Crossed; Operating Speed of Motorists >50 km/h	F		
	Pocket Bike Lane	Right Turn Lane Characteristics	Right Turn Lane Longer Than 50m	D		
		Left Turn Accommodation	2 Lanes Crossed; Operating Speed of Motorists >50 km/h	F		
South Approach	Pocket Bike Lane	Right Turn Lane Characteristics	Right Turn Lane Shorter Than 50m	В		
		Left Turn Accommodation	2 Lanes Crossed; Operating Speed of Motorists >50 km/h	F		
East Approach	Mixed Traffic	Right Turn Lane Characteristics	Right Turn Lane Shorter Than 50m	D		
		Left Turn Accommodation	One Lane Crossed, Operating Speed of Motorists 50km/h	D		
West Approach	Mixed Traffic	Right Turn Lane Characteristics	No Right Turn Lane	-		
		Left Turn Accommodation	One Lane Crossed, Operating Speed of Motorists 50km/h	D		

### **BLOS Intersection Analysis**
#### K.3 - Transit Level of Service (TLOS)

There are no TLOS targets identified in Exhibit 22 of the MMLOS guidelines for the study area intersections. However, the Greenbank Road/Highbury Park Drive and Greenbank Road/Berrigan Drive/Wessex Road intersections have bus routes. These intersections have been evaluated for TLOS despite having no target. The results of the intersection TLOS are summarized in the following table.

#### **TLOS Intersection Analysis**

Approach	Delay (sec.)	TLOS
Greenbank Road/Highbury	Park Drive	
East Approach	N/A <sup>1</sup>	-
North Approach	7.6	В
South Approach	4.1	В
Greenbank Road/Berrigan I	Drive/Wessex Road	k
East Approach	34.6	E
West Approach	50.7	F
North Approach	13.1	С
South Approach	14.3	С

1 – No transit service provided on Highbury Park Drive

#### K.4 - Truck Level of Service (TkLOS)

Exhibit 21 of the MMLOS guidelines has been used to evaluate the existing TkLOS at the Greenbank Road/Highbury Park Drive and Greenbank Road/Berrigan Drive/Wessex Road intersections. Exhibit 22 of the MMLOS guidelines suggest a target TkLOS D for arterial truck routes (Greenbank Road) located within 600m of a rapid transit station. There is no target TkLOS for local or collector non-truck routes (Highbury Park Drive, Berrigan Drive, and Wessex Road) in a General Urban Area. The results of the intersection TkLOS are summarized in the following table.

Approach	Effective Corner Radius	Number of Receiving Lanes on Departure from Intersection	LOS
Greenbank R	oad/Highbury Park	Drive	
South	10 to 15m	One	E
East	10 to 15m	Two	В
Greenbank R	oad/Berrigan Drive/	Wessex Road	
North	10 to 15m	One	Е
South	10 to 15m	One	Е
East	10 to 15m	Two	В
West	10 to 15m	Two	В

#### TkLOS Intersection Analysis

#### K.5 - Vehicular Level of Service (Auto LOS)

The MMLOS guidelines have been used to evaluate the existing Auto LOS at the Greenbank Road/Highbury Park Drive and Greenbank Road/Berrigan Drive/Wessex Road intersections. Exhibit 22 of the MMLOS guidelines suggests a target Auto LOS E for all roadways within 600m of a rapid transit station. The intersection parameters used in the analysis are consistent with the TIA guidelines (saturation flow rate: 1800 vphpl, PHF: 0.9). Signal timing plans obtained from the City of Ottawa can be found in **Appendix I**. Detailed reports are included in **Appendix J**. The results of the intersection Auto LOS are summarized in the following table.

#### Auto LOS Intersection Analysis

		SAT Peak			SUN Peak			
Intersection	Max V/C or Delay	LOS	Mvmt	Max V/C or Delay	LOS	Mvmt		
Existing Traffic	-	-		-	-			
Greenbank Road/Highbury Park Drive	0.58	А	SBL	0.41	А	WBL		
Greenbank Road/Berrigan Drive/Wessex Road	0.69	В	WBL	0.48	A	EBL/WBR		

## APPENDIX K

Signal Timing Data

#### **Traffic Signal Timing**

C	ity of Otta	wa, Transportation Se Traffic Signal Operatio	rvices Departmen ns Unit	ot
Intersection:	Main:	Greenbank	Side:	Berrigan/Wessex
Controller:	MS-320	0	TSD:	6210
Author:	Yassine	Bennani	Date:	01-Nov-2018

#### **Existing Timing Plans<sup>†</sup>**

	Plan					Ped Mi	nimum	Time	
	AM Peak	Off Peak	PM Peak	Night	Weekend	Weekend	Walk	DW	A+R
	1	2	3	4	5	15			
Cycle	120	110	120	80	110	120			
Offset	115	15	114	Х	0	1			
NB Thru	53	58	45	41	58	66	7	19	3.7+2.2
SB Thru	53	58	56	41	58	66	7	19	3.7+2.2
EB Left	16	-	13	-	-	-	-	-	3.0+3.8
EB Thru	55	39	52	39	39	39	7	24	3.0+4.5
WB Thru	39	39	39	39	39	39	7	24	3.0+4.5
NB Left	12	13	12	-	13	15	-	-	3.7+2.2
SB Left	12	13	23	-	13	15	-	-	3.7+2.2

#### Phasing Sequence<sup>\*</sup>

Plan:	1&3			
<b>▲</b> ↓	↑ ↓	*	*	*

#### Plan: 2, 5 & 15

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#### Plan: 4

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	*		$\rightarrow$
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#### Schedule

Weekday	y	Saturday	/		Sunday	/
Time	Plan	Time	Plan		Time	Plan
0:15	4	0:15	4		0:15	4
6:30	1	8:30	5		8:30	5
9:30	2	11:00	15		11:00	15
15:00	3	18:00	5	-	16:00	5
18:30	2	22:30	4		22:30	4
22:30	4					

#### Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (\*) Indicates actuated phase

(fp): Fully Protected Left Turn

Pedestrian signal

Cost is \$56.50 (\$50 + HST)

## **Traffic Signal Timing**

Ci	ty of Ottav	va, Transportation Se	ervices Departme	nt
		Traffic Signal Operation	ons Unit	
Intersection:	Main:	Greenbank	Side:	Higbury Park
Controller:	ATC-3		TSD:	6823
Author:	Yassine	e Bennani	Date:	31-Oct-2018

#### **Existing Timing Plans<sup>†</sup>**

	Plan					Ped Mini	mum T	ime	
	AM Peak	Off Peak	PM Peak	Night	Weekend	Weekend	Walk	DW	A+R
	1	2	3	4	5	15			
Cycle	120	110	120	80	110	120			
Offset	95	0	95	Х	0	0			
NB Thru	86	76	86	46	76	86	18	12	3.7+2.3
SB Thru	86	76	86	46	76	86	18	12	3.7+2.3
EB Thru (bike)	34	34	34	34	34	34	7	20	3.0+4.2
WB Thru	34	34	34	34	34	34	7	20	3.0+4.2

## Phasing Sequence<sup>‡</sup>



#### Schedule

Weekday		Saturda	Saturday			Sunday		
Time	Plan		Time	Plan		Time	Plan	
0:15	4		0:15	4	-	0:15	4	
6:30	1		8:30	5		8:30	5	
9:30	2		11:00	15		11:00	15	
15:00	3		18:00	5		16:00	5	
18:30	2		22:30	4		22:30	4	
22:30	4	-			-			

#### Notes

†: Time for each direction includes amber and all red intervals

 $\ddagger:$  Start of first phase should be used as reference point for offset

Asterisk (\*) Indicates actuated phase

(fp): Fully Protected Left Turn

Pedestrian signal

Cost is \$56.50 (\$50 + HST)

## APPENDIX L

Synchro Reports

# 3: Greenbank & Wessex/Berrigan SAT Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	t.		5	*	1	5	**	1	5	**	7
Traffic Volume (vph)	99	85	64	94	76	211	74	911	88	208	944	78
Future Volume (vph)	99	85	64	94	76	211	74	911	88	208	944	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		45.0	50.0		45.0	100.0		90.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00		0.96	1.00		0.97
Frt		0.935				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1695	1652	0	1695	1784	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.702			0.555			0.237			0.215		
Satd. Flow (perm)	1240	1652	0	982	1784	1481	422	3390	1462	383	3390	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31				205			95			95
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		208.5			191.5			174.7			280.0	
Travel Time (s)		18.8			17.2			10.5			16.8	
Confl. Peds. (#/hr)	10		9	9		10	4		7	7		4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	110	94	71	104	84	234	82	1012	98	231	1049	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	110	165	0	104	84	234	82	1012	98	231	1049	87
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24	_	14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+EX	CI+Ex	CI+Ex
Detector 1 Channel	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector I Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		20.7			20.7			20.7			20.7	
Detector 2 Size(III)												
Detector 2 Channel		CI+EX										
Detector 2 Extend (c)		0.0			0.0			0.0			0.0	
	Dorm	0.0		Dorm	0.0	Dorm	nm+nt	0.0	Dorm	nm∔nt	0.0	Dorm
Protected Phases	Feim	11/4		Feilii	8	Feilii	pin+pi	2	Feilii	pin+pi 1	6	Feilii
Permitted Phases	1	-		8	0	8	2	2	2	6	0	6
Petrotor Phase	4	1		0 Q	Q	0 Q	5	2	2	1	6	6
Switch Phase	4	4		0	0	0	J	2	2	1	0	0
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Snlit (s)	28 5	38.5		38.5	38.5	38.5	10 9	31.0	31.0	10 0	31.0	31 0
Total Split (s)	30.0	30.0		30.0	30.0	30.0	15.0	66.0	66.0	15.0	66.0	6.10
Total Split (%)	32 5%	32 5%		32 5%	32.5%	32 5%	12 5%	55.0%	55.0%	12 5%	55 0%	55 0%
Maximum Green (s)	31.5	31.5		31.5	31.5	31.5	91	60.1	60.1	91	60.1	60.1
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	37	37	37	37	3.7	37
All-Red Time (s)	4.5	4.5		4.5	4.5	4.5	22	22	22	22	22	22
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rochelle Fortier, Novatech

#### 3: Greenbank & Wessex/Berrigan SAT Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	7.5	7.5		7.5	7.5	7.5	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	24.0	24.0		24.0	24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)	9	9		10	10	10		7	7		4	4
Act Effct Green (s)	18.4	18.4		18.4	18.4	18.4	79.4	72.1	72.1	86.0	77.3	77.3
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.66	0.60	0.60	0.72	0.64	0.64
v/c Ratio	0.58	0.59		0.69	0.31	0.58	0.23	0.50	0.11	0.60	0.48	0.09
Control Delay	57.6	45.4		69.6	45.6	14.3	7.8	16.0	3.4	19.4	10.3	1.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
l otal Delay	57.6	45.4		69.6	45.0	14.3	7.8	16.0	3.4	19.4	10.3	1.4
LUS Approach Dolou	E	E0.2		E	24.1	В	A	14 A	A	В	11 2	A
Approach LOS		50.5			34.1			14.4 D			II.3 D	
Approach LOS	21.0	21.0		21.0	21.0	21.0	0.6	60 1	60.1	0.6	Б 60 1	60.1
90th %ile Term Code	Bod	Dod		Dod	Dod	Dod	9.0 Max	Coord	Coord	9.0 Max	Coord	Coord
70th %ile Green (s)	20.7	20.7		20.7	20.7	20.7	7.8	67.1	67.1	12.9	72.2	72.2
70th %ile Term Code	Hold	Hold		Gan	Gan	Gan	Gan	Coord	Coord	Gan	Coord	Coord
50th %ile Green (s)	16.7	16.7		16 7	16 7	16 7	7.0	73.0	73.0	11 0	77 0	77 0
50th %ile Term Code	Hold	Hold		Gan	Gan	Gan	Gan	Coord	Coord	Gan	Coord	Coord
30th %ile Green (s)	13.5	13.5		13.5	13.5	13.5	64	77.6	77.6	9.6	80.8	80.8
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Gap	Coord	Coord	Gap	Coord	Coord
10th %ile Green (s)	10.0	10.0		10.0	10.0	10.0	0.0	82.7	82.7	8.0	96.6	96.6
10th %ile Term Code	Min	Min		Min	Min	Min	Skip	Coord	Coord	Gap	Coord	Coord
Stops (vph)	89	109		87	64	39	26	512	9	89	296	4
Fuel Used(I)	8	10		8	5	7	2	42	2	11	40	2
CO Emissions (g/hr)	146	186		152	95	133	45	774	35	205	744	39
NOx Emissions (g/hr)	28	36		29	18	26	9	149	7	40	144	8
VOC Emissions (g/hr)	34	43		35	22	31	10	178	8	47	172	9
Dilemma Vehicles (#)	0	0		0	0	0	0	38	0	0	37	0
Queue Length 50th (m)	24.8	30.2		23.9	18.1	6.1	4.4	65.8	0.3	12.9	46.5	0.1
Queue Length 95th (m)	37.9	45.5		37.6	28.7	26.1	13.2	106.9	8.8	#48.5	53.7	3.3
Internal Link Dist (m)		184.5			167.5			150.7			256.0	
Turn Bay Length (m)	30.0			35.0		45.0	50.0		45.0	100.0		90.0
Base Capacity (vph)	325	456		257	468	539	383	2036	916	388	2184	983
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.36		0.40	0.18	0.43	0.21	0.50	0.11	0.60	0.48	0.09
Intersection Summary	Other											
Area Type.	Other											
Actuated Cycle Length: 120												
Offset: 1 (1%), Referenced to phase	e 2:NBTL and	I 6:SBTL, S	tart of Greer	า								
Natural Cycle: 85												
Control Type: Actuated-Coordinate	ed											
Maximum v/c Ratio: 0.69												
Intersection Signal Delay: 18.7				Inte	ersection L(	DS: B						
Intersection Capacity Utilization 83	.0%			ICI	J Level of S	ervice E						
Analysis Period (min) 15												
# 95th percentile volume exceed	s capacity, que	eue may be	longer.									
Queue shown is maximum after	two cycles.		-									
Splits and Phases: 3: Greenban	k & Wessex/B	Berrigan										

Splits and Phases: 3: Greenbank & Wessex/Berrigan

	1	•	<b>†</b>	1	×	Ļ
	T M/DI				CDI	• CDT
	WBL	WBR	NB1	INBK	SBL	SBI
		100	1457	C 4	105	1402
Traffic Volume (vpn)	65	123	1157	64	125	1163
ruture volume (vph)	65	123	115/	64	125	1163
ideal Flow (vphpi)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	50.0		0.0	60.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	30.0				30.0	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor	1.00	0.98	1.00		1.00	
Frt		0.850	0.992			
Flt Protected	0.950				0.950	
Satd, Flow (prot)	1695	1517	3358	0	1695	3390
Flt Permitted	0,950				0.175	
Satd Flow (perm)	1688	1493	3358	0	312	3390
Right Turn on Red	1000	Vac	0000	Vac	012	0000
Sate Flow (RTOP)		Q0	10	103		
Jalu. Flow (KTOK)	40	02	10			00
LINK Speea (K/N)	40		60			60
Link Distance (m)	168.4		280.0			221.4
Travel Time (s)	15.2		16.8			13.3
Confl. Peds. (#/hr)	3	3		4	4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adi, Flow (vph)	72	137	1286	71	139	1292
Shared Lane Traffic (%)	12	107	1200		100	1202
Lane Group Flow (uph)	70	127	1257	٥	120	1202
Eater Blocked Intersection	12	137	1307	U	139	1292
	INO		INO	INO D: L (	INO	INO
Lane Alignment	Left	Right	Left	Right	Lett	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.9		4.9			4.9
Two way Left Turn Lane						
Headway Eactor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	1/	1.00	1/	2/	1.00
Number of Detectors	24	14	2	14	24	0
	1	D: 11	- Z		1	
Detector Template	Left	Right	Thru		Lett	Thru
Leading Detector (m)	6.1	6.1	30.5		6.1	30.5
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	6.1	1.8		6.1	1.8
Detector 1 Type	CI+Fx	CI+Fx	CI+Fx		CI+Fx	CI+Fx
Detector 1 Channel		01. EX	01. EX		OI. LA	01. EV
Detector 1 Extend (a)	0.0	0.0	0.0		0.0	0.0
	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			CI+Fx			CI+Fx
Detector 2 Channel						
Dotootor 2 Extend (a)			0.0			0.0
Ture Ture	D · · · · ·	D	0.0		D	0.0
	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	34.2	34.2	36.0		36.0	36.0
Total Split (c)	24.2	24.2	95.0 95.0		95.0 95 0	00.0 0E 0
Total Split (8)	04.Z	00 F0/	71 50/		74 50/	
	20.5%	20.5%	/1.5%		/1.5%	/1.5%
waximum Green (s)	27.0	27.0	79.8		79.8	79.8
Yellow Time (s)	3.0	3.0	3.7		3.7	3.7
All-Red Time (s)	4.2	4.2	2.3		2.3	2.3
	0.0	0.0	0.0		0.0	0.0

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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Total Lost Time (s)	7.2	7.2	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	18.0		18.0	18.0
Flash Dont Walk (s)	20.0	20.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)	3	3	4		0	0
Act Effct Green (s)	14.1	14.1	92.7		92.7	92.7
Actuated g/C Ratio	0.12	0.12	0.77		0.77	0.77
v/c Ratio	0.37	0.55	0.52		0.58	0.49
Control Delay	52.0	29.0	4.2		20.1	6.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	52.0	29.0	42		20.1	6.6
	02.0 D	20.0 C	4.2		20.1 C	0.0 A
Approach Delay	37.0	0	4 2			70
Approach LOS	D		4.2			ι.3
90th %ile Green (s)	27 O	27 0	70 Q		70.9	70 Q
Out Vile Term Cade	21.U	21.U	19.0		19.0	(9.0 Coord
70th % ile Croop (a)	10 O	12.0	02.0		02.0	02.0
	12.9	12.9	93.9		93.9	93.9
Four %ile Term Code	Gap	Gap	Coord		Coord	Coord
50th %ile Green (s)	10.5	10.5	96.3		96.3	96.3
50th %ile Term Code	Gap	Gap	Coord		Coord	Coord
30th %ile Green (s)	10.0	10.0	96.8		96.8	96.8
30th %ile Term Code	Min	Min	Coord		Coord	Coord
10th %ile Green (s)	10.0	10.0	96.8		96.8	96.8
10th %ile Term Code	Min	Min	Coord		Coord	Coord
Stops (vph)	57	49	212		63	408
Fuel Used(I)	5	7	40		6	41
CO Emissions (g/hr)	102	136	752		119	770
NOx Emissions (g/hr)	20	26	145		23	149
VOC Emissions (g/hr)	23	31	174		27	178
Dilemma Vehicles (#)	0	0	8		0	48
Queue Length 50th (m)	16.4	12.5	23.8		9.4	41.1
Queue Length 95th (m)	26.5	28.1	37.8		#57.5	96.8
Internal Link Dist (m)	144 4	_0.1	256.0			197.4
Turn Bay Length (m)		50.0	200.0		60.0	101.4
Base Canacity (vph)	370	300	2506		241	2610
Starvation Can Roductn	0	000	2000		- 0	2013
Spillback Can Reductr	0	0	0		0	0
Spiniback Cap Reductin	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.19	0.34	0.52		0.58	0.49
Intersection Summary	Other					
Area Type:	Other					
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 0 (0%), Referenced to pha	ase 2:NBT and 6	5:SBTL, Sta	art of Green			
Natural Cycle: 100						
Control Type: Actuated-Coordinat	ted					
Maximum v/c Ratio: 0.58						
Intersection Signal Delay: 8.2				Int	tersection L	OS: A
Intersection Capacity Utilization 6	9.9%			IC	U Level of S	Service C
Analysis Period (min) 15						
# 95th percentile volume exceed	ds capacity. que	eue mav be	longer.			
Queue shown is maximum after	er two cycles					



# 3: Greenbank & Wessex/Berrigan SUN Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	î,		5	*	1	5	**	7	5	**	7
Traffic Volume (vph)	79	53	49	55	43	157	30	542	27	69	444	34
Future Volume (vph)	79	53	49	55	43	157	30	542	27	69	444	34
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		45.0	50.0		45.0	100.0		90.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00		0.97	0.99		0.97
Frt		0.928				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1695	1639	0	1695	1784	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.726		_	0.684			0.472			0.398		
Satd. Flow (perm)	1283	1639	0	1210	1784	1483	839	3390	1464	706	3390	1474
Right Turn on Red		10	Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			40	1/4			103			103
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		208.5			191.5			174.7			280.0	
Travel Time (s)	10	18.8	•	•	17.2	10		10.5	_	_	16.8	
Confl. Peds. (#/hr)	10		9	9		10	4		/	/		4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	88	59	54	61	48	174	33	602	30	77	493	38
Shared Lane Traffic (%)			_									
Lane Group Flow (vph)	88	113	0	61	48	174	33	602	30	77	493	38
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
		4.9			4.9			4.9			4.9	
Two way Left Turn Lane	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Headway Factor	1.06	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.06	1.00
Turning Speed (K/n)	24	0	14	24	0	14	24	0	14	24	0	14
Number of Detectors	 	Z		   0 <sup>ff</sup>	Z	Diaht	   0 <sup>44</sup>	Z	Diaht	   0 <sup>#</sup>	Z	Diaht
Leading Detector (m)	Leit 6.1	20.5		Leit 6.1	20.5	Right 6.1	Leit 6 1	20.5	Right 6.1	Leit 6.1	20.5	Right 6 1
Trailing Detector (m)	0.1	30.5		0.1	30.5	0.1	0.1	30.5	0.1	0.1	30.5	0.1
Detector 1 Desition(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Sizo(m)	0.0	1.0		6.1	1.0	6.1	6.1	1.0	6.1	6.1	1.0	6.1
Detector 1 Type												
Detector 1 Channel					OI+LX			OI+LX			OFLX	
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	0.0	28.7		0.0	28.7	0.0	0.0	28.7	0.0	0.0	28.7	0.0
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Fx			CI+Ex			CI+Ex			CI+Fx	
Detector 2 Channel		0. 2.			0. 2.			0. 2.			0. 2.4	
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Detector Phase	4	4		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.5	38.5		38.5	38.5	38.5	10.9	31.9	31.9	10.9	31.9	31.9
Total Split (s)	39.0	39.0		39.0	39.0	39.0	13.0	58.0	58.0	13.0	58.0	58.0
Total Split (%)	35.5%	35.5%		35.5%	35.5%	35.5%	11.8%	52.7%	52.7%	11.8%	52.7%	52.7%
Maximum Green (s)	31.5	31.5		31.5	31.5	31.5	7.1	52.1	52.1	7.1	52.1	52.1
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.5	4.5		4.5	4.5	4.5	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rochelle Fortier, Novatech

# 3: Greenbank & Wessex/Berrigan SUN Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	7.5	7.5		7.5	7.5	7.5	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	24.0	24.0		24.0	24.0	24.0		19.0	19.0		19.0	19.0
Act Effet Groop (s)	15.0	15.0		15.0	15.0	15.0	75 5	70.4	70 /	77 5	73.0	73.0
Actuated a/C Ratio	0.14	0.14		0.14	0.14	0 14	0.69	0.4	0.4	0.70	0.67	0.67
v/c Ratio	0.14	0.14		0.14	0.14	0.14	0.05	0.04	0.04	0.70	0.07	0.07
Control Delay	<u>4</u> 94	29.6		45.0	39.6	9.40	6.4	11.0	0.00	54	77	0.04
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	29.6		45.0	39.6	9.8	6.4	11.0	0.1	5.4	7.7	0.1
LOS	D	С		D	D	A	A	В	A	A	A	A
Approach Delay		38.3			22.5			10.3			7.0	
Approach LOS		D			С			В			А	
90th %ile Green (s)	31.0	31.0		31.0	31.0	31.0	7.5	52.1	52.1	7.6	52.2	52.2
90th %ile Term Code	Ped	Ped		Ped	Ped	Ped	Gap	Coord	Coord	Max	Coord	Coord
70th %ile Green (s)	15.3	15.3		15.3	15.3	15.3	6.3	68.1	68.1	7.3	69.1	69.1
70th %ile Term Code	Gap	Gap		Hold	Hold	Hold	Gap	Coord	Coord	Gap	Coord	Coord
50th %ile Green (s)	12.9	12.9		12.9	12.9	12.9	6.0	71.1	71.1	6.7	71.8	71.8
50th %ile Term Code	Gap	Gap		Hold	Hold	Hold	Gap	Coord	Coord	Gap	Coord	Coord
30th %ile Green (s)	10.5	10.5		10.5	10.5	10.5	0.0	74.0	74.0	6.2	86.1	86.1
30th %ile Term Code	Gap	Gap		Hold	Hold	Hold	Skip	Coord	Coord	Gap	Coord	Coord
10th %ile Green (s)	10.0	10.0		10.0	10.0	10.0	0.0	86.6	86.6	0.0	86.6	86.6
10th %ile Ferm Code	Min	Min		Min	Min	Min	Skip	Coord	Coord	Skip	Coord	Coord
Stops (vpn)	60	50		47	30	20	1	239	0	1/	138	0
Fuel Used(I)	106	5 100		4	5	07	10	21	0	3	10	15
NOx Emissions (g/hl)	21	100		13	10	07 17	10	302 74	0	4/	555	10
VOC Emissions (g/hr)	21	19		15	10	20	1	88	2	9 11	77	1
Dilemma Vehicles (#)	23	23		0	12	20	4	25	0	0	17	4
Queue Length $50$ th (m)	18.2	14.3		12.4	95	0.0	15	26.7	0.0	3.0	16.4	0.0
Queue Length 95th (m)	27.8	25.6		20.7	16.7	15.5	6.6	55.5	0.0	9.3	30.6	0.0
Internal Link Dist (m)		184.5			167.5			150.7			256.0	
Turn Bay Length (m)	30.0			35.0		45.0	50.0		45.0	100.0		90.0
Base Capacity (vph)	367	499		346	510	548	636	2168	973	562	2254	1014
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.23		0.18	0.09	0.32	0.05	0.28	0.03	0.14	0.22	0.04
Intersection Summary												
Area Type: 0	Other											
Cycle Length: 110												
Actuated Cycle Length: 110	0.11071											
Offset: 0 (0%), Referenced to phase	e 2:NBTL and	a 6:SBTL, S	tart of Greei	n								
Natural Cycle: 85	4											
Movimum v/a Datia 0.40	u											
Interpretion Signal Dalay 14.2				14	orgontion	<u>ас. р</u>						
Intersection Capacity Litilization 62	8%					Sonvice P						
Analysis Period (min) 15	0 /0			10								

#### Splits and Phases: 3: Greenbank & Wessex/Berrigan



	-	•	<b>†</b>	1	×	Ļ
Lana Group	* \\//DI			• NDD	CDI	• CDT
	VVBL	WBR		INDK	SBL	SBI
	5	~	<b>*I</b> <sub>2</sub>	00		<b>*†</b>
Future Volume (vph)	81	19	752	26	42	528
Future volume (vph)	81	19	/52	26	42	528
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	50.0		0.0	60.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	30.0				30.0	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor	1.00	0.98	1.00		1.00	
Frt		0.850	0.995			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1695	1517	3370	0	1695	3390
Flt Permitted	0.950				0.318	
Satd Flow (perm)	1689	1493	3370	0	566	3390
Right Turn on Red	1000	Yee	0070	Yee	000	0000
Satd Elow (DTOD)		01	6	100		
Jak Chood (k/k)	40	21	0			00
LINK Speea (K/h)	40		60			60
Link Distance (m)	168.4		280.0			221.4
Travel Time (s)	15.2		16.8			13.3
Confl. Peds. (#/hr)	3	3		4	4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adi, Flow (vph)	90	21	836	29	47	587
Shared Lane Traffic (%)		21	000	20		001
Lane Group Flow (uph)	00	21	865	٥	17	587
Enter Blocked Intersection	90		COO	U	4/	00/
	INO L s fi	INO	INO	INO Dista	INO	INO
Lane Alignment	Lett	Right	Lett	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.9		4.9			4.9
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	24	14	2	14	24	0
Number of Detectors	1	Dista	Z		1-4	Z
Detector Template	Left	Right	Inru		Len	Inru
Leading Detector (m)	6.1	6.1	30.5		6.1	30.5
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	6.1	1.8		6.1	1.8
Detector 1 Type	CI+Fx	CI+Fx	CI+Fx		CI+Fx	CI+Fx
Detector 1 Channel	OI! EX	5.º EA	с. · шл		0. · EA	с. · шл
Detector 1 Extend (a)	0.0	0.0	0.0		0.0	0.0
Detector 1 Output (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						<b>_</b> . <b>_</b> //
Detector 2 Extend (c)			0.0			0.0
	D	Derm	0.0		Derm	0.0
Proto stard Disease	Perm	Perm	INA		Perm	NA
Protected Phases		_	2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	34.2	34.2	36.0		36.0	36.0
Total Split (s)	34.2	34.2	75.8		75.8	75.8
Total Split (%)	21 10/	31 10/	68 00/		68 00/	68 00/
Maximum Creat (2)	31.1%	070	00.9%		00.9%	00.9%
	27.0	27.0	09.0		09.0	09.0
rellow Lime (s)	3.0	3.0	3.7		3.7	3.7
All-Red Time (s)	4.2	4.2	2.3		2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0

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Lane Group	WBI	WBR	NBT	NBR	SBI	SBT
Total Lost Time (s)	7.2	72	60		60	60
Lead/Lag	1.2	1.2	0.0		0.0	0.0
Lead-Lag Ontimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7 0	7 0	18.0		18 0	18.0
Flash Dont Walk (s)	20.0	20.0	12.0		10.0	12.0
Podostrian Calls (#/hr)	20.0	20.0	12.0		12.0	12.0
	3	14.0	07.0		07.0	07.0
Actuated a/C Detta	14.2	14.2	07.2		07.2	07.2
	0.13	0.13	0.79		0.79	0.79
V/C Ratio	0.41	0.10	0.32		0.10	0.22
Control Delay	47.9	15.3	3.7		6.0	4.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	47.9	15.3	3.7		6.0	4.7
LOS	D	В	А		А	А
Approach Delay	41.8		3.7			4.8
Approach LOS	D		А			А
90th %ile Green (s)	27.0	27.0	69.8		69.8	69.8
90th %ile Term Code	Ped	Ped	Coord		Coord	Coord
70th %ile Green (s)	13.0	13.0	83.8		83.8	83.8
70th %ile Term Code	Gan	Gan	Coord		Coord	Coord
50th %ile Green (s)	11.2	11.2	85.6		85.6	85.6
50th %ile Term Code	Gan	Gan	Coord		Coord	Coord
30th %ile Green (s)	10.0	10.0	86.8		86.8	8 98
30th %ile Term Code	Min	Min	Coord		Coord	Coord
10th %ile Green (c)			10/ 0		104.0	104.0
	0.0	0.0	Coard		Coard	104.0
	SKIP	SKIP				000rd
Stops (Vpn)	72	6	126		13	137
Fuel Used(I)	7	1	25		1	16
CO Emissions (g/hr)	122	17	468		26	306
NOx Emissions (g/hr)	24	3	90		5	59
VOC Emissions (g/hr)	28	4	108		6	71
Dilemma Vehicles (#)	0	0	10		0	21
Queue Length 50th (m)	18.6	0.0	15.0		2.0	14.5
Queue Length 95th (m)	28.9	6.2	27.8		8.9	35.5
Internal Link Dist (m)	144.4		256.0			197.4
Turn Bay Length (m)		50.0			60.0	
Base Capacity (vph)	414	382	2672		448	2687
Starvation Can Peductn	0	002	0		0	2007
Snillback Can Reducto	0	0	0		0	0
Storago Cap Reducto	0	0	0		0	0
Reduced v/c Ratio	0.22	0.05	0.32		0.10	0.22
Intersection Summary						
Area Type:	Other					
Cycle Length: 110	50101					
Actuated Cycle Longth: 110						
Offect: 0 (0%) Referenced to ab	aso 2.NPT and (		art of Croop			
Network Cycles 75		0.301L, Sta	art of Green			
Ivatural Cycle: 75						
Control Type: Actuated-Coordina	ated					
Maximum v/c Ratio: 0.41						
Intersection Signal Delay: 6.7				Int	tersection L	OS: A
Intersection Capacity Utilization 5	57.5%			IC	U Level of S	Service B
Analysis Period (min) 15						

#### Splits and Phases: 7: Greenbank & Highbury Park



#### 3: Greenbank & Wessex/Berrigan SAT Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	î.		5	*	1	5	**	7	5	**	7
Traffic Volume (vph)	100	85	64	97	78	218	74	954	91	213	987	79
Future Volume (vph)	100	85	64	97	78	218	74	954	91	213	987	79
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		45.0	50.0		45.0	100.0		90.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00		0.96	1.00		0.97
Frt		0.936				0.850			0.850			0.850
Fit Protected	0.950	4054	0	0.950	4704	4547	0.950	2200	4547	0.950	2200	4547
Sata. Flow (prot)	1695	1654	0	1695	1784	1517	1695	3390	1517	1695	3390	1517
Fit Permitted	0.706	4054	0	0.597	4704	1404	0.258	2200	1400	0.241	2200	4470
Sato. Flow (perm)	1247	1004	Voo	1000	1/84	1481 Voo	460	3390	146Z	429	3390	1473 Voo
Sate Flow (PTOP)		21	res			216			165			165
Link Spood (k/b)		40			40	210		60	90		60	90
Link Distance (m)		208.5			101 5			174.7			280.0	
Travel Time (s)		18.8			17.2			10.5			16.8	
Confl Peds (#/hr)	10	10.0	g	q	17.2	10	4	10.5	7	7	10.0	4
Peak Hour Factor	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00
Adi Flow (vph)	100	85	64	97	78	218	74	954	91	213	987	79
Shared Lane Traffic (%)	100	00	U-T	51	10	210	17	004	01	210	001	10
Lane Group Flow (vph)	100	149	0	97	78	218	74	954	91	213	987	79
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7	<b>J</b> •		3.7	J		3.7	<b>J</b> •		3.7	<b>J</b> .
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (a)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	0.0	28.7		0.0	28.7	0.0	0.0	28.7	0.0	0.0	28.7	0.0
Detector 2 Size(m)		18			1.8			18			18	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel		OI! EX			OT EX			OI! EX			OI LA	
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Detector Phase	4	4		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.5	38.5		38.5	38.5	38.5	10.9	31.9	31.9	10.9	31.9	31.9
Total Split (s)	39.0	39.0		39.0	39.0	39.0	15.0	66.0	66.0	15.0	66.0	66.0
Total Split (%)	32.5%	32.5%		32.5%	32.5%	32.5%	12.5%	55.0%	55.0%	12.5%	55.0%	55.0%
Maximum Green (s)	31.5	31.5		31.5	31.5	31.5	9.1	60.1	60.1	9.1	60.1	60.1
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.5	4.5		4.5	4.5	4.5	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rochelle Fortier, Novatech

# 3: Greenbank & Wessex/Berrigan SAT Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	7.5	7.5		7.5	7.5	7.5	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	24.0	24.0		24.0	24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)	9	9		10	10	10		7	7		4	4
Act Effct Green (s)	17.6	17.6		17.6	17.6	17.6	81.0	73.9	73.9	86.1	78.3	78.3
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.68	0.62	0.62	0.72	0.65	0.65
v/c Ratio	0.55	0.55		0.63	0.30	0.54	0.19	0.46	0.10	0.53	0.45	0.08
Control Delay	56.7	43.6		63.9	46.0	10.6	7.1	14.6	2.9	14.5	9.8	1.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.7	43.6		63.9	46.0	10.6	7.1	14.6	2.9	14.5	9.8	1.1
LOS	E	D		E	D	В	A	В	A	В	A	A
Approach Delay		48.8			30.7			13.1			10.1	
Approach LOS		D			С			В			В	
90th %ile Green (s)	31.0	31.0		31.0	31.0	31.0	9.3	60.1	60.1	9.6	60.4	60.4
90th %ile Term Code	Ped	Ped		Ped	Ped	Ped	Gap	Coord	Coord	Max	Coord	Coord
70th %ile Green (s)	19.2	19.2		19.2	19.2	19.2	7.5	70.3	70.3	11.2	74.0	74.0
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Gap	Coord		Gap	Coord	Coord
50th % ile Green (s)	15.4	15.4		15.4	15.4	15.4	0.8	/5./	/5./	9.6	/8.5 Coord	/8.5 Caard
Soth % ile Crean (a)	100	H010		Gap	Gap	Gap	Gap			Gap	000rd	
30th %ile Term Code	IZ.3	IZ.3 Hold		12.0 Gan	12.0 Gan	12.5 Gan	0.2 Gap	79.0 Coord	79.0 Coord	0.4 Gan	02.0	02.0
10th %ile Green (s)	10.0	10.0		10.0	10.0	10 0	0 0	83.6	83.6	0ap 7 1	06.6	0000 0 00
10th %ile Term Code	Min	Min		Min	Min	Min	0.0 Skin	Coord	Coord	Gan	Coord	Coord
Stops (vph)	87	105		88	67	26	24	504	8	90 90	313	3
Fuel Lised(I)	8	10		8	5	7	2	41	2	10	42	2
CO Emissions (g/hr)	145	182		149	99	122	43	771	34	195	773	39
NOx Emissions (g/hr)	28	35		29	19	24	.8	149	7	38	149	7
VOC Emissions (g/hr)	34	42		34	23	28	10	178	. 8	45	178	. 9
Dilemma Vehicles (#)	0	0		0	0	0	0	40	Ũ	0	39	0 0
Queue Length 50th (m)	22.7	26.6		22.2	17.0	0.4	3.7	56.5	0.0	10.9	44.3	0.0
Queue Length 95th (m)	34.7	40.8		34.8	27.0	18.8	12.1	98.7	7.6	37.1	51.5	2.5
Internal Link Dist (m)		184.5			167.5			150.7			256.0	
Turn Bay Length (m)	30.0			35.0		45.0	50.0		45.0	100.0		90.0
Base Capacity (vph)	327	457		277	468	548	412	2087	936	410	2211	994
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.33		0.35	0.17	0.40	0.18	0.46	0.10	0.52	0.45	0.08
Intersection Summary												
Area Type:	Other											
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 1 (1%), Referenced to phase	se 2:NBTL and	d 6:SBTL, S	tart of Greer	ו								
Natural Cycle: 85												
Control Type: Actuated-Coordinate	ed											
Maximum v/c Ratio: 0.63												
Intersection Signal Delay: 17.0	F0/			Int	ersection L(	JS: B						
Intersection Capacity Utilization 84	.5%			IC	U Level of S	ervice E						
Analysis Period (min) 15												

#### Splits and Phases: 3: Greenbank & Wessex/Berrigan



	4	•	1	1	1	Ļ
Lane Group	WBI	WBR	NBT	NBR	SBI	SBT
Lane Configurations			41			
Traffic Volume (vnh)	78	133	1201	72	136	1206
Future Volume (vph)	78	133	1201	72	136	1200
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1200
Storage Length (m)	0.0	50.0	1000	0.0	60.0	1000
Storage Lanes	1	1		0.0	1	
Taper Length (m)	30 0			0	30.0	
Lane I Itil Factor	1 00	1.00	0.95	0.95	1 00	0 95
Ped Bike Factor	1.00	0.00	1.00	0.30	1.00	0.00
Frt	1.00	0.50	0 002		1.00	
Elt Protected	0.050	0.000	0.552		0.050	
Setd Elow (prot)	1605	1517	2250	٥	1605	2200
Elt Pormittod	0.050	1317	2220	0	0 104	2280
	0.950	1400	2250	0	0.194	2200
Salu. Flow (perm)	1000	1493	3338	U	346	3390
Right Lurn on Red		Yes		res		
Sato. Flow (RTOR)		98	11			
Link Speed (k/h)	40		60			60
Link Distance (m)	168.4		280.0			221.4
Travel Time (s)	15.2		16.8			13.3
Confl. Peds. (#/hr)	3	3		4	4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	78	133	1201	72	136	1206
Shared Lane Traffic (%)						
Lane Group Flow (vph)	78	133	1273	0	136	1206
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7	U U	3.7	Ū		3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.9		4.9			4.9
Two way Left Turn Lane	1.0					1.0
Headway Factor	1.06	1.06	1 06	1 06	1.06	1.06
Turning Speed (k/h)	24	14	1.00	14	24	1.00
Number of Detectors	1	14	2	14	24	2
Detector Templato	1	Diabt	Z Thru		104	Thru
Loading Detector (m)	Leit	Right £ 1	20 5		Leil	20 5
	0.1	0.1	0.0		0.1	30.5
Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	6.1	1.8		6.1	1.8
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel			J^			J. LA
Detector 2 Extend (s)			0.0			0.0
	Dorm	Porm	NIA		Perm	NIA
Protected Phases	Femi		2		i enn	6
Pormitted Phases	0	0	2		C	U
Detector Dheep	ð	ð	0		0	<u>^</u>
Detector Phase	8	ð	2		6	0
Switch Phase			40.0		40.0	(0.0
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	34.2	34.2	36.0		36.0	36.0
Total Split (s)	34.2	34.2	85.8		85.8	85.8
Total Split (%)	28.5%	28.5%	71.5%		71.5%	71.5%
Maximum Green (s)	27.0	27.0	79.8		79.8	79.8
Yellow Time (s)	3.0	3.0	3.7		3.7	3.7
All-Red Time (s)	4.2	4.2	2.3		2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
						2.0

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<	۰.	1	1	1	Ŧ
WBI	WBR	NBT	NBR	SBI	SBT
72	7.2	6.0		60	60
1.2	1.2	0.0		0.0	0.0
3.0	3.0	3.0		3.0	3.0
None	None	C-Max		C-Max	C-Max
		10 0		10 0	10 0
1.0	1.0	10.0		10.0	10.0
20.0	20.0	12.0		12.0	12.0
3	3	4		0	0
14.1	14.1	92.7		92.7	92.7
0.12	0.12	0.77		0.77	0.77
0.39	0.51	0.49		0.51	0.46
52.9	21.7	3.8		15.5	6.3
0.0	0.0	0.0		0.0	0.0
52.9	21.7	3.8		15.5	6.3
D	С	А		В	А
33.3		3.8			7.2
С		А			А
27.0	27.0	79.8		79.8	79.8
Ped	Ped	Coord		Coord	Coord
12 7	12 7	94 1		94 1	94 1
Gan	Gan	Coord		Coord	Coord
10.0	10 0	00010 05 0		95.0	05.0
Can	Gan	Coord		Coord	Coord
Gap	10 0	0000		06.0	06.0
IU.U	10.0	90.0		90.0	90.0
Min	IVIIN 10.0	Coord		Coord	Coord
10.0	10.0	96.8		96.8	96.8
Min	Min	Coord		Coord	Coord
69	39	204		65	405
7	7	41		6	42
123	129	767		118	782
24	25	148		23	151
28	30	177		27	180
0	0	9		0	50
17.8	7.8	18.9		8.6	37.7
28.5	23.2	33.3		42.1	87.1
144.4		256.0			197.4
	50.0			60.0	
379	411	2595		267	2618
0	0	0			0
0	0	0		0	0
0	0	0		0	0
0	0 00	0 40		0 54	0
0.21	0.32	0.49		0.51	0.46
Other					
Other					
hase 2:NBT and 6	6:SBTL, Sta	art of Green			
ated					
ated					
ated			Int	ersection I (	DS: A
ated			Int	ersection L(	DS: A Service C
	WBL           7.2           3.0           None           7.0           20.0           3           14.1           0.12           0.39           52.9           0.0           52.9           0           7.0           20.0           33           C           27.0           Ped           12.7           Gap           10.9           Gap           10.0           Min           10.0           Min           10.0           Min           0.0           7           123           24           28           0           17.8           28.5           144.4           379           0           0           0.21	WBL         WBR           7.2         7.2           3.0         3.0           None         None           7.0         7.0           20.0         20.0           3         3           14.1         14.1           0.12         0.12           0.39         0.51           52.9         21.7           0.0         0.0           52.9         21.7           0.0         0.0           52.9         21.7           0.0         0.0           52.9         21.7           D         C           33.3         C           27.0         27.0           Ped         Ped           12.7         12.7           Gap         Gap           Gap         Gap           Gap         Gap           10.0         10.0           Min         Min           10.0         10.0           Min         Min           123         129           24         25           28         30           0         0           0	WBL         WBR         NBT           7.2         7.2         6.0           3.0         3.0         3.0           None         None         C-Max           7.0         7.0         18.0           20.0         20.0         12.0           3         3         4           14.1         14.1         92.7           0.12         0.12         0.77           0.39         0.51         0.49           52.9         21.7         3.8           0.0         0.0         0.0           52.9         21.7         3.8           D         C         A           33.3         3.8         C           A         23.3.3         3.8           C         A           33.3         3.8           C         A           12.7         12.7	WBL         WBR         NBT         NBR           7.2         7.2         6.0           3.0         3.0         3.0           None         None         C-Max           7.0         7.0         18.0           20.0         20.0         12.0           3         3         4           14.1         14.1         92.7           0.12         0.12         0.77           0.39         0.51         0.49           52.9         21.7         3.8           0.0         0.0         0.0           52.9         21.7         3.8           D         C         A           33.3         3.8         C           A         27.0         27.0         79.8           Ped         Ped         Coord           12.7         12.7         94.1           Gap         Gap         Coord           10.9         10.9         95.9           Gap         Gap         Coord           10.0         10.0         96.8           Min         Min         Coord           10.0         10.0         96.8      <	WBL         WBR         NBT         NBR         SBL           7.2         7.2         6.0         6.0           3.0         3.0         3.0         3.0           None         None         C-Max         C-Max           7.0         7.0         18.0         18.0           20.0         20.0         12.0         12.0           3         3         4         0           14.1         14.1         92.7         92.7           0.12         0.12         0.77         0.77           0.39         0.51         0.49         0.51           52.9         21.7         3.8         15.5           D         C         A         B           33.3         3.8         15.5           D         C         A         B           31.1         Gap

#### Splits and Phases: 7: Greenbank & Highbury Park



#### 3: Greenbank & Wessex/Berrigan SUN Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	î.		5	*	1	1	**	7	5	**	7
Traffic Volume (vph)	80	53	49	57	44	162	30	567	28	71	465	35
Future Volume (vph)	80	53	49	57	44	162	30	567	28	71	465	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		45.0	50.0		45.0	100.0		90.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00		0.97	0.99		0.97
Frt		0.928				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1695	1639	0	1695	1784	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.728			0.691			0.485			0.416		
Satd. Flow (perm)	1286	1639	0	1223	1784	1483	862	3390	1464	738	3390	1474
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42				162			103			103
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		208.5			191.5			174.7			280.0	
Travel Time (s)		18.8			17.2			10.5			16.8	
Confl. Peds. (#/hr)	10		9	9		10	4		7	7		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	80	53	49	57	44	162	30	567	28	71	465	35
Shared Lane Traffic (%)		100	•			100				= 4	105	
Lane Group Flow (vph)	80	102	0	57	44	162	30	567	28	/1	465	35
Enter Blocked Intersection	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
	Lett	Left	Right	Left	Left	Right	Left	Left	Right	Lett	Left	Right
Median Width(m)		3./			3.7			3./			3.7	
		0.0			0.0			0.0			0.0	
		4.9			4.9			4.9			4.9	
Hoodway Easter	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors	24	2	14	24	2	14	24	2	14	24	2	14
Detector Template	ام	Thru		ا م	Z	Right	ا ft	Z	Right	ا ftما	Z	Right
Leading Detector (m)	61	30.5		61	30.5	6 1	61	30.5	6 1	61	30.5	6 1
Trailing Detector (m)	0.0	0.0		0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	61	1.8		6.0	1.8	6.0	6.0	1.8	6.0	6.0	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel	0. 2.	0. 2.1		0. 2/	0. 2.1	0. 2.1	0. 2.1	0. 2/	0. 2.4	0. 2.1	0. 2.	0. 2/
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Detector Phase	4	4		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.5	38.5		38.5	38.5	38.5	10.9	31.9	31.9	10.9	31.9	31.9
Total Split (s)	39.0	39.0		39.0	39.0	39.0	13.0	58.0	58.0	13.0	58.0	58.0
Total Split (%)	35.5%	35.5%		35.5%	35.5%	35.5%	11.8%	52.7%	52.7%	11.8%	52.7%	52.7%
Maximum Green (s)	31.5	31.5		31.5	31.5	31.5	7.1	52.1	52.1	7.1	52.1	52.1
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.5	4.5		4.5	4.5	4.5	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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# 3: Greenbank & Wessex/Berrigan SUN Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	7.5	7.5		7.5	7.5	7.5	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	24.0	24.0		24.0	24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)	9	9		10	10	10		7	7		4	4
Act Effct Green (s)	15.5	15.5		15.5	15.5	15.5	75.9	70.9	70.9	77.9	73.6	73.6
Actuated g/C Ratio	0.14	0.14		0.14	0.14	0.14	0.69	0.64	0.64	0.71	0.67	0.67
v/c Ratio	0.44	0.38		0.33	0.17	0.47	0.05	0.26	0.03	0.12	0.21	0.03
Control Delay	48.6	28.0		44.8	39.7	9.9	6.3	10.6	0.1	5.2	7.5	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.6	28.0		44.8	39.7	9.9	6.3	10.6	0.1	5.2	7.5	0.1
LOS	D	C		D	D	A	A	B	A	A	A	A
Approach Delay		37.0			22.5			10.0			6.8	
Approach LOS	24.0	D		24.0	C	24.0	7.4	A	50.4	7.0	A	50.0
90th % lie Green (s)	31.0	31.0		31.0	31.0	31.0	7.4	52.1	52.1	7.6	52.3	52.3
90th % lie Croop (a)	Ped	Ped		Ped	Ped	Ped	Gap	C00rd	C00rd	Max 7 1		
70th % lie Green (S)	14.5	14.5		14.5	14.5	14.5	0.2	09.1	09.1	(.) Con	70.0 Coord	70.0 Coord
	Gap	Gap					Gap	71.0	71.0	Gap	70.6	70.6
50th % ile Term Code	IZ.Z	IZ.Z		IZ.Z	IZ.Z	IZ.Z	0.9 Gan	Coord	Coord	0.0 Gan	Coord	Coord
30th %ile Green (s)	10.0	10 0		10.0	10.0	10.0	0 0	74.6	74.6	6 1	86.6	86.6
30th %ile Term Code	Min	Min		Min	Min	Min	Skin	Coord	Coord	Gan	Coord	Coord
10th %ile Green (s)	10.0	10.0		10.0	10.0	10.0	0.0	86.6	86.6	0.0	86.6	86.6
10th %ile Term Code	Min	Min		Min	Min	Min	Skin	Coord	Coord	Skin	Coord	Coord
Stops (vph)	70	53		47	37	22	10	243	0	18	140	00010
Fuel Used(I)	6	5		4	3	5	1	21	0	3	19	1
CO Emissions (g/hr)	107	97		71	51	90	17	392	8	48	344	16
NOx Emissions (g/hr)	21	19		14	10	17	3	76	2	9	66	3
VOC Emissions (a/hr)	25	22		16	12	21	4	90	2	11	79	4
Dilemma Vehicles (#)	0	0		0	0	0	0	26	0	0	18	0
Queue Length 50th (m)	16.5	12.1		11.6	8.8	0.0	1.3	24.3	0.0	2.6	15.3	0.0
Queue Length 95th (m)	25.8	22.7		19.6	15.5	15.1	6.3	51.9	0.0	8.6	29.5	0.1
Internal Link Dist (m)		184.5			167.5			150.7			256.0	
Turn Bay Length (m)	30.0			35.0		45.0	50.0		45.0	100.0		90.0
Base Capacity (vph)	368	499		350	510	540	654	2183	979	585	2268	1020
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.20		0.16	0.09	0.30	0.05	0.26	0.03	0.12	0.21	0.03
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110	0.11071											
Offset: 0 (0%), Referenced to phas	se 2:NBTL and	16:SBTL, S	tart of Green									
Natural Cycle: 85	d											
Movimum v/o Dofice 0.47	u											
Intersection Signal Delay: 12.9				فمرا	ore option L (	רפי ם						
Intersection Capacity Hilitration 62	10/					Convice D						
Analysis Period (min) 15	. 1 70					DEIVICE D						
Analysis Fellou (IIIII) 13												

#### Splits and Phases: 3: Greenbank & Wessex/Berrigan



# 7: Greenbank & Highbury Park

	<	•	1	1	1	Ŧ
Lane Group	WRI	WRR	NRT	NBR	SBI	SBT
Lane Configurations	VVDL			NDN		
	<b>1</b> 01	25	770	21	50	<b>5</b> 45
Future Volume (vpn)	91	20	770	21	50	545 545
I deal Flow (vobal)	1900	1800	1800	1200	1200	1200
Storage Longth (m)	1800	1000 E0 0	1000	1000	60.0	1000
Storage Length (M)	0.0	0.06		0.0	0.00	
Storage Lanes	20.0			0	20.0	
Lape Litil Foots	30.0	4.00	0.05	0.05	30.0	0.05
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Peu Bike Factor	1.00	0.90	0.004		1.00	
Fil Fil Desta sta d	0.050	0.850	0.994		0.050	
Fit Protected	0.950			•	0.950	
Satd. Flow (prot)	1695	1517	3366	0	1695	3390
Fit Permitted	0.950				0.338	
Satd. Flow (perm)	1689	1493	3366	0	602	3390
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		25	7			
Link Speed (k/h)	40		60			60
Link Distance (m)	168.4		280.0			221.4
Travel Time (s)	15.2		16.8			13.3
Confl. Peds. (#/hr)	3	3		4	4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	91	25	779	31	50	545
Shared Lane Traffic (%)				•	••	0.0
Lane Group Flow (vph)	91	25	810	0	50	545
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	l eft	Right	Left	Right	Left	Left
Median Width(m)	27	rugiit	27	rugitt	LGIL	27
Link Offeet(m)	3.7		0.0			0.0
Crosswalk Width(m)	0.0		1.0			1.0
Two way Loft Turn Long	4.9		4.9			4.9
Leadway Fastar	4.00	4.00	1.00	1.00	1.00	4.00
	1.06	1.00	1.00	1.06	1.06	1.06
Turning Speed (k/h)	24	14	^	14	24	~
Number of Detectors	1	1	2		1	- 2
Detector Template	Left	Right	l'hru		Left	í hru
Leading Detector (m)	6.1	6.1	30.5		6.1	30.5
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	6.1	1.8		6.1	1.8
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (c)			0.0			0.0
	Dorm	Dorm	0.0 NIA		Porm	0.0
Protected Desce	Feini	Feilii	NA O		L GIIII	
Protected Phases	<u></u>	0	2		<u>^</u>	0
Permitted Phases	8	8	•		6	^
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	34.2	34.2	36.0		36.0	36.0
Total Split (s)	34.2	34.2	75.8		75.8	75.8
Total Split (%)	31.1%	31.1%	68.9%		68.9%	68.9%
Maximum Green (s)	27.0	27.0	69.8		69.8	69.8
Yellow Time (s)	3.0	3.0	3.7		3.7	3.7
All-Red Time (s)	4.2	4.2	2.3		2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0

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l ane Group	WBI	WBR	NBT	NBR	SBI	SBT
Total Lost Time (s)	72	72	6.0		6.0	60
Lead/Lag	1.2	1.2	0.0		0.0	0.0
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	30	30		30	30
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	18.0		18.0	18.0
Flash Dont Walk (s)	20.0	20.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)	3	3	4		0	0
Act Effct Green (s)	14.3	14.3	87.2		87.2	87.2
Actuated g/C Ratio	0.13	0.13	0.79		0.79	0.79
v/c Ratio	0.42	0.12	0.30		0.10	0.20
Control Delay	48.0	14.5	3.6		5.9	4.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	48.0	14.5	3.6		5.9	4 6
LOS	D	B	A		A	 A
Approach Delay	40.8	5	3.6			47
Approach LOS			Δ			Δ
90th %ile Green (s)	27.0	27.0	69.8		69.8	69.8
90th %ile Term Code	Pad	Pod	Coord		Coord	Coord
70th %ile Green (s)	13.1	13.1	83.7		83.7	83.7
70th %ile Term Code	Gan	Gan	Coord		Coord	Coord
50th %ile Green (c)	11 2	11 2	85 5		85 5	85 5
50th %ile Term Code	Con	Gan	Coord		Coord	Coord
20th % ile Creen (a)	10.0	0ap	00010		0000	06.0
20th % ile Term Code	10.0 Min	Nip	Coord		Coord	Coord
	IVIII1		104.0		104.0	101.0
	0.0	0.0	104.0 Coard		104.0 Coard	104.0 Canad
	SKIP	БКІр	000ra			000rd
Stops (vpn)	80	9	128		14	138
	1	1	20		2	17
	13/	22	400		31	314
NOX Emissions (g/hr)	26	4	94		6	61
VUC Emissions (g/hr)	32	5	112		(	(2
Dilemma Vehicles (#)	0	0	10		0	22
Queue Length 50th (m)	18.9	0.0	13.6		2.1	13.3
Queue Length 95th (m)	29.4	6.7	25.7		9.2	32.8
Internal Link Dist (m)	144.4		256.0			197.4
Turn Bay Length (m)		50.0			60.0	
Base Capacity (vph)	414	385	2668		477	2686
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.22	0.06	0.30		0.10	0.20
Intersection Summary						
Area Type:	Other					
Cycle Length: 110						
Actuated Cycle Length: 110						
Offset: 0 (0%), Referenced to ph	nase 2:NBT and 6	SSBTL. Sta	art of Green			
Natural Cycle: 75		, 54				
Control Type: Actuated-Coordina	ated					
Maximum v/c Ratio: 0.42						
Intersection Signal Delay: 6.9				Int	ersection L	OS' A
Intersection Capacity Utilization	59 0%					Service R
Analysis Period (min) 15				10		

#### Splits and Phases: 7: Greenbank & Highbury Park



#### 3: Greenbank & Wessex/Berrigan SAT Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	î.		ň	*	1	5	**	1	ň	**	1
Traffic Volume (vph)	100	85	64	104	84	235	74	1052	98	230	1089	79
Future Volume (vph)	100	85	64	104	84	235	74	1052	98	230	1089	79
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		45.0	50.0		45.0	100.0		90.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00		0.96	1.00		0.97
Frt		0.936				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1695	1654	0	1695	1784	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.702	1071	•	0.599	170.1		0.227		( 100	0.202		4 4 7 0
Satd. Flow (perm)	1240	1654	0	1060	1784	1481	405	3390	1462	360	3390	1473
Right Turn on Red		0.4	Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			40	198		00	95		00	95
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		208.5			191.5			1/4./			280.0	
I ravel Time (s)	10	18.8	0	0	17.2	10	4	10.5	7	7	16.8	4
Confi. Peds. (#/nr)	10	1.00	4 00	4 00	1.00	10	4	1.00	1 00	1 00	1.00	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (Vpn) Sharad Lana Traffia (%)	100	80	04	104	84	235	74	1052	98	230	1089	79
	100	140	٥	104	0.4	<b>77</b>	74	1050	00	220	1000	70
Enter Blocked Intersection	No	149 No	No	No	04 No	200 No	14 No	No	90 No	230 No	1009 No	79 No
Lano Alignment	INU Loft	Loft	Dight	Loft	Loft	Dight	Loft	Loff	Pight	Loft	Loft	Diaht
Modian Width(m)	Leit	2.7	Right	Leit	2.7	Right	Leit	2.7	Right	Leit	2.7	Right
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		0.0 4 9			0.0 4 9			0.0 4 Q			0.0 4 Q	
Two way Left Turn Lane		4.5			4.5			4.3			4.5	
Headway Eactor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	1.00	14	24	1.00	14	24	1.00	14	24	1.00	14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		-	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Detector Phase	4	4		8	8	8	5	2	2	1	6	6
Switch Phase	(0.0	10.0		40.0	40.0	40.0		10.0	10.0		(0.0	
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
iviinimum Split (s)	38.5	38.5		38.5	38.5	38.5	10.9	31.9	31.9	10.9	31.9	31.9
Total Split (s)	39.0	39.0		39.0	39.0	39.0	15.0	66.0	66.0	15.0	66.0	66.0
i otal Split (%)	32.5%	32.5%		32.5%	32.5%	32.5%	12.5%	55.0%	55.0%	12.5%	55.0%	55.0%
Wallow Time (a)	31.5	31.5		31.5	31.5	31.5	9.1	60.1	60.1	9.1	60.1	60.1
Tellow Time (s)	3.0	3.0		3.0	3.0	3.U	3.7	3.1	3.1	3.7	3.1	3./
All-Red Time (S)	4.5	4.5		4.5	4.5	4.5	2.2	2.2	2.2	2.2	2.2	2.2
LUST TIME AUJUST (S)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rochelle Fortier, Novatech

#### 3: Greenbank & Wessex/Berrigan SAT Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	7.5	7.5		7.5	7.5	7.5	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	24.0	24.0		24.0	24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)	9	9		10	10	10		7	7		4	4
Act Effct Green (s)	18.0	18.0		18.0	18.0	18.0	79.3	72.2	72.2	86.6	77.9	77.9
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.66	0.60	0.60	0.72	0.65	0.65
v/c Ratio	0.54	0.54		0.65	0.31	0.60	0.22	0.52	0.11	0.61	0.50	0.08
Control Delay	55.8	42.8		65.3	46.0	15.8	7.7	16.3	3.4	20.6	10.2	1.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.8	42.8		65.3	46.0	15.8	1.1	16.3	3.4	20.6	10.2	1.1
LOS	E	D		E	D	В	A	B	A	C	В	A
Approach Delay		48.0			34.0			14.8			11.4	
Approach LOS	24.0	D 21.0		24.0	24.0	24.0	0.2	B CO 4	CO 4	0.0	B	CO 4
90th %ile Green (s)	31.0	31.U		31.0 Ded	31.U	31.U	9.3	00.1	60.1	9.0	00.4	60.4 Coord
Soth % lie Croop (a)	20 0	20 0		20 0	20 0	20 0	Gap	0.23		12 0	C00rd	C00rd
70th % ile Term Code	20.0	ZU.U		20.0	20.0	20.0	7.5 Con	Coord	Coord	13.0 Con	Coord	Coord
50th %ile Groop (s)	16.1	16.1		16 1	16 1	0ap 16 1	6 g	73.5	73.5	0ap	77.8	77.8
50th %ile Term Code	Hold	Hold		Gan	Gan	Gan	0.0 Gan	Coord	Coord	Gan	Coord	Coord
30th %ile Green (s)	13.1	13.1		13 1	13 1	13 1	6 2	77 0	77 0	0 7	81 /	81 /
30th %ile Term Code	Hold	Hold		Gan	Gan	Gan	Gan	Coord	Coord	Gan	Coord	Coord
10th %ile Green (s)	10.0	10.0		10.0	10.0	10 0	0.0	82.5	82.5	8 2	96.6	96.6
10th %ile Term Code	Min	Min		Min	Min	Min	Skin	Coord	Coord	Gan	Coord	Coord
Stops (vph)	87	105		95	71	49	26	601	10	115	345	3
Fuel Used(I)	8	10		9	6	8	2	49	2	13	46	2
CO Emissions (g/hr)	144	180		162	106	155	45	904	38	241	859	39
NOx Emissions (g/hr)	28	35		31	20	30	9	174	7	46	166	7
VOC Emissions (g/hr)	33	42		37	24	36	10	208	9	56	198	9
Dilemma Vehicles (#)	0	0		0	0	0	0	44	0	0	43	0
Queue Length 50th (m)	22.5	26.4		23.8	18.2	7.9	3.8	68.6	0.3	12.4	48.8	0.0
Queue Length 95th (m)	34.8	40.8		37.0	28.7	28.0	12.1	112.7	8.8	#52.8	56.1	2.6
Internal Link Dist (m)		184.5			167.5			150.7			256.0	
Turn Bay Length (m)	30.0			35.0		45.0	50.0		45.0	100.0		90.0
Base Capacity (vph)	325	457		278	468	534	372	2038	917	378	2199	989
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.33		0.37	0.18	0.44	0.20	0.52	0.11	0.61	0.50	80.0
Intersection Summary												
Area Type:	Other											
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 1 (1%), Referenced to ph	ase 2:NBTL and	I 6:SBTL, S	tart of Green									
Natural Cycle: 85												
Control Type: Actuated-Coordina	ated											
Maximum v/c Ratio: 0.65				1.1								
Intersection Signal Delay: 18.3	20 40/			Int	ersection L(	JS: B						
Apply a pariod (min) 45	00.4%			IC	U LEVEL OF S	DEI VICE E						
Analysis Period (Min) 15	de canceitu au		longor									
Oueue shown is maximum off	ter two evolop	eue may be	ionger.									
Splits and Phases: 3: Greenba	ank & Wessex/E	Berrigan										
								- A.				1.0

101	• * • • • • • • • • • • • • • • • • • •	
15 8	66.s	39.8
105	• * 26 (R)	<del>1</del> 08
15.5	203	20.5

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Lane Group	WRI	WRD	NRT	NRD	SBI	CRT
Lane Configurations	VVDL	WDR -		NDR	JDL 1	
	<b>1</b> 02	142	1226	77	145	1222
Future Volume (vph)	03	143	1320	11	145	1332
ruture volume (vpn)	0J	143	1000	1000	140	1000
Storogo Longth (m)	10081	1000	1800	1800	1000	1800
Storage Length (M)	0.0	50.0		0.0	00.0	
Storage Lanes	1	T		U	1	
Laper Length (m)	30.0	4 00	0.05	0.05	30.0	0.05
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor	1.00	0.98	1.00		1.00	
FIL Fil Droke steed	0.050	0.850	0.992		0.050	
Fit Protected	0.950	4547	2250	•	0.950	2200
Sato. Flow (prot)	1695	1517	3358	0	1695	3390
	0.950	4 400	0050	^	0.164	0000
Satd. Flow (perm)	1688	1493	3358	0	292	3390
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		75	10			
Link Speed (k/h)	40		60			60
Link Distance (m)	168.4		280.0			221.4
Travel Time (s)	15.2		16.8			13.3
Confl. Peds. (#/hr)	3	3		4	4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	83	143	1326	77	145	1332
Shared Lane Traffic (%)						
Lane Group Flow (vph)	83	143	1403	0	145	1332
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7	Ŭ		3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.9		4.9			4.9
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	61	6.1	30.5		61	30.5
Trailing Detector (m)	0.0	0.1	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	6.1	1.0		6.1	1.8
Detector 1 Type						
Detector 1 Channel	UI+EX	UI+EX	UI+EX		UI+EX	UI+EX
	0.0	0.0	0.0		0.0	0.0
Detector 1 Extend (S)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	34.2	34.2	36.0		36.0	36.0
Total Split (s)	34.2	34.2	85.8		85.8	85.8
Total Split (%)	28.5%	28.5%	71.5%		71.5%	71.5%
Maximum Green (s)	27.0	27.0	79.8		79.8	79.8
Yellow Time (s)	21.0	3.0	37		37	3.0
		1.0	22		22	2.7
Lost Time Adjust (s)	4.2	4.2	0.0		2.5	2.5
LUST TIME AUJUST (S)	0.0	0.0	0.0		0.0	0.0

Rochelle Fortier, Novatech

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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Total Lost Time (s)	7.2	7.2	6.0		6.0	6.0
Lead/Lag	1.2	1.2	0.0		0.0	0.0
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	18.0		18.0	18.0
Flash Dont Walk (s)	20.0	20.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)	20.0	20.0	12.0		12.0	12.0
	1//	14.4	92 /		92.4	021
Actuated a/C Ratio	0.12	0 10	0 77		0.77	0 77
Actualed g/C Ratio	0.12	0.12	0.77		0.77	0.77
Central Delay	0.41	0.00	0.04		0.00	0.01
	55.1	32.9	4.2		25.0	0.9
Tetel Delay	0.0	0.0	0.0		0.0	0.0
l otal Delay	53.1	32.9	4.2		25.6	6.9
LUS	D	C	A		C	A
Approach Delay	40.3		4.2			8.7
Approach LOS	D		Α			A
90th %ile Green (s)	27.0	27.0	79.8		79.8	79.8
90th %ile Term Code	Ped	Ped	Coord		Coord	Coord
70th %ile Green (s)	13.9	13.9	92.9		92.9	92.9
70th %ile Term Code	Gap	Gap	Coord		Coord	Coord
50th %ile Green (s)	11.2	11.2	95.6		95.6	95.6
50th %ile Term Code	Gap	Gap	Coord		Coord	Coord
30th %ile Green (s)	10.0	10.0	96.8		96.8	96.8
30th %ile Term Code	Min	Min	Coord		Coord	Coord
10th %ile Green (s)	10.0	10.0	96.8		96.8	96.8
10th %ile Term Code	Min	Min	Coord		Coord	Coord
Stops (vph)	73	65	239		75	483
Fuel Lised(I)	7	Q	46		8	400
CO Emissions (a/br)	131	168	862		150	807
NOv Emissions (g/III)	25	20	166		20	172
VOC Emissions (g/hr)	20	32	100		29	007
VUC EIIIISSIUIS (9/11)	30	29	199		30	201
Diterritina venicies (#)	0		9		14.0	00
Queue Length 50th (m)	19.0	15.5	23.9		11.2	44.9
Queue Length 95th (m)	30.0	31.5	37.6		#64.2	101.7
Internal Link Dist (m)	144.4		256.0			197.4
Turn Bay Length (m)		50.0			60.0	
Base Capacity (vph)	379	394	2587		224	2609
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.22	0.36	0.54		0.65	0.51
Intersection Summary						
Area Type:	Other					
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 0 (0%) Referenced to ph	ase 2.NRT and 6	SBTL St	art of Green			
Natural Cycle: 100						
Control Type: Actuated Coordin	atad					
Maximum v/a Datia: 0.65						
Interpretion Signal Delay 0.0				اسل	orocotion L	
	75 50/					CO. A
Intersection Capacity Utilization	10.0%			IC	U Level of S	Service D
Analysis Period (min) 15			Less.			
# 95th percentile volume exce	eds capacity, que	eue may be	longer.			
Queue shown is maximum at	tter two cycles.					

Splits and Phases: 7: Greenbank & Highbury Park



#### 3: Greenbank & Wessex/Berrigan SUN Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	î.		5	*	1	1	**	7	5	**	7
Traffic Volume (vph)	80	53	49	61	48	174	30	626	30	77	513	35
Future Volume (vph)	80	53	49	61	48	174	30	626	30	77	513	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		45.0	50.0		45.0	100.0		90.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00		0.97	0.99		0.97
Frt		0.928				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1695	1639	0	1695	1784	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.726			0.691			0.463			0.386		
Satd. Flow (perm)	1283	1639	0	1223	1784	1483	823	3390	1464	685	3390	1474
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42				174			103			103
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		208.5			191.5			174.7			280.0	
Travel Time (s)		18.8			17.2			10.5			16.8	
Confl. Peds. (#/hr)	10		9	9		10	4		7	7		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	80	53	49	61	48	174	30	626	30	77	513	35
Shared Lane Traffic (%)		100	•		10	4=4					- 10	
Lane Group Flow (vph)	80	102	0	61	48	1/4	30	626	30	11	513	35
Enter Blocked Intersection	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
	Lett	Left	Right	Left	Left	Right	Left	Left	Right	Lett	Left	Right
Median Width(m)		3./			3.7			3./			3.7	
		0.0			0.0			0.0			0.0	
		4.9			4.9			4.9			4.9	
Hoodway Easter	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/b)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of Detectors	24	2	14	24	2	14	24	2	14	24	2	14
Detector Template	ا م	Thru		ا م	Z	Right	ا ft	Z	Right	ا ftما	Thru	Right
Leading Detector (m)	6 1	30.5		61	30.5	6 1	61	30.5	6 1	61	30.5	6 1
Trailing Detector (m)	0.0	0.0		0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	61	1.8		6.0	1.8	6.0	6.0	1.8	6.0	6.0	1.8	6.0
Detector 1 Type	CI+Fx	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Fx	CI+Fx
Detector 1 Channel	0. 2.	0. 2.1		0. 2/	0. 2.1	0. 2.1	0. 2.1	0. 2/	0. 2.4	0. 2.1	0. 2.4	0. 2/
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Detector Phase	4	4		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.5	38.5		38.5	38.5	38.5	10.9	31.9	31.9	10.9	31.9	31.9
Total Split (s)	39.0	39.0		39.0	39.0	39.0	13.0	58.0	58.0	13.0	58.0	58.0
Total Split (%)	35.5%	35.5%		35.5%	35.5%	35.5%	11.8%	52.7%	52.7%	11.8%	52.7%	52.7%
Maximum Green (s)	31.5	31.5		31.5	31.5	31.5	7.1	52.1	52.1	7.1	52.1	52.1
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.5	4.5		4.5	4.5	4.5	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rochelle Fortier, Novatech

# 3: Greenbank & Wessex/Berrigan SUN Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	7.5	7.5		7.5	7.5	7.5	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	24.0	24.0		24.0	24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)	9	9		10	10	10		7	7		4	4
Act Effct Green (s)	15.5	15.5		15.5	15.5	15.5	75.8	70.8	70.8	77.9	73.6	73.6
Actuated g/C Ratio	0.14	0.14		0.14	0.14	0.14	0.69	0.64	0.64	0.71	0.67	0.67
v/c Ratio	0.44	0.38		0.35	0.19	0.48	0.05	0.29	0.03	0.14	0.23	0.03
Control Delay	48.6	28.0		45.6	40.1	10.0	6.3	10.9	0.1	5.3	7.6	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.6	28.0		45.6	40.1	10.0	6.3	10.9	0.1	5.3	7.6	0.1
LOS	D	C		D	D	В	A	В	A	A	A	A
Approach Delay		37.1			22.8			10.2			6.9	
Approach LOS	04.0	D		04.0	C	04.0	7.4	B	50.4	7.0	A	50.0
90th %ile Green (s)	31.0	31.0		31.0	31.0	31.0	7.4	52.1	52.1	7.6	52.3	52.3
	Ped	Ped		Ped	Ped	Ped	Gap	Coord	Coord	Max		
70th % lie Green (s)	14.5	14.5		14.5	14.5	14.5	0.2	08.9 Caard	08.9 Caard	7.3	70.0 Co.ord	0.07 Coord
70th % lie Creen (e)	Gap	Gap		H0I0	H0I0	H0I0	Gap			Gap	C00rd	
Solin % lie Green (S)	12.2	IZ.Z		IZ.Z	IZ.Z	IZ.Z	5.9 Con	/ I.O	/ I.O	0.7	72.0 Coord	72.0 Coord
30th %ile Groop (s)	0ap	10 0		10.0	10.0	10.0	Gap	74.5	74.5	Gap 6.2	86.6	0000
30th %ile Term Code	Min	Min		Min	Min	Min	Skin	Coord	Coord	Gan	Coord	Coord
10th %ile Green (s)	10.0	10.0		10.0	10.0	10.0	0.0	86.6	86.6	0.0	86.6	86.6
10th %ile Term Code	Min	Min		Min	Min	Min	Skin	Coord	Coord	Skin	Coord	Coord
Stops (vph)	70	53		52	40	22	11	274	0	19	155	00010
Fuel Used(I)	6	5		4	3	5	1	24	0 0	3	20	1
CO Emissions (g/hr)	107	97		77	56	96	18	439	8	52	381	16
NOx Emissions (g/hr)	21	19		15	11	19	3	85	2	10	73	3
VOC Emissions (g/hr)	25	22		18	13	22	4	101	2	12	88	4
Dilemma Vehicles (#)	0	0		0	0	0	0	28	0	0	20	0
Queue Length 50th (m)	16.6	12.1		12.4	9.6	0.0	1.3	27.4	0.0	2.9	17.0	0.0
Queue Length 95th (m)	25.8	22.7		20.7	16.7	15.5	6.3	57.8	0.0	9.2	32.0	0.2
Internal Link Dist (m)		184.5			167.5			150.7			256.0	
Turn Bay Length (m)	30.0			35.0		45.0	50.0		45.0	100.0		90.0
Base Capacity (vph)	367	499		350	510	548	629	2181	978	552	2268	1020
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.20		0.17	0.09	0.32	0.05	0.29	0.03	0.14	0.23	0.03
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110 Offset: 0 (0%), Referenced to phas	e 2:NBTL and	d 6:SBTL, S	tart of Green									
Natural Cycle: 85												
Control Type: Actuated-Coordinate	d											
Maximum v/c Ratio: 0.48												
Intersection Signal Delay: 13.8				Inte	ersection L(	DS: B						
Intersection Capacity Utilization 63.	.6%			ICI	U Level of S	Service B						
Analysis Period (min) 15												

#### Splits and Phases: 3: Greenbank & Wessex/Berrigan



# 7: Greenbank & Highbury Park

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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	*	#	At.		*	
Traffic Volume (vph)	98	26	861	33	54	603
Future Volume (vph)	98	26	861	33	54	603
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	50.0	1000	0.0	60.0	1000
Storage Lanes	0.0	1		0.0	1	
Taper Length (m)	30.0	1		0	30.0	
Lano Litil Eactor	30.0	1.00	0.05	0.05	1.00	0.05
Lane Ulli. Factor	1.00	1.00	0.95	0.95	1.00	0.95
	1.00	0.98	1.00		1.00	
	0.050	0.850	0.994		0.050	
	0.950	4 - 1 -	0000	^	0.950	
Satd. Flow (prot)	1695	1517	3366	0	1695	3390
Fit Permitted	0.950				0.304	
Satd. Flow (perm)	1689	1493	3366	0	541	3390
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		26	7			
Link Speed (k/h)	40		60			60
Link Distance (m)	168.4		280.0			221.4
Travel Time (s)	15.2		16.8			13.3
Confl. Peds. (#/hr)	3	3		4	4	
Peak Hour Factor	1 00	1 00	1 00	1 00	1 00	1 00
Adi Flow (vph)	08	26	861	33	54	603
Shared Lane Traffic (%)	30	20	001		J4	000
	0.9	26	801	٥	51	603
Enter Blocked Intersection	90 No	20	No No	No	No No	No
Lano Alianment	INU Loff	Diabt	INU Loff	Diabt	INU Loff	INU Loft
	Len	Right	Len	Right	Leit	Len
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.9		4.9			4.9
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	61	61	30.5		61	30.5
Trailing Detector (m)	0.1	0.1	0.0		0.1	0.0
Detector 1 Desition(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	0.0	0.0	1.0		0.0	1.0
	0.1	0.1			0.1	
	CI+Ex	CI+EX	CI+EX		CI+EX	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			CI+Ev			CI+Ev
Detector 2 Channel						UITLX
			0.0			0.0
Delector Z Extend (S)	<b>P</b>	<b>_</b>	0.0		<b>D</b>	0.0
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	34.2	34.2	36.0		36.0	36.0
Total Split (s)	34.2	34.2	75.8		75.8	75.8
Total Split (%)	21 10/	31 10/	68 0%		68 0%	68.0%
Maximum Groon (a)	07.0	01.1% 07.0	60.0		60.9%	60.0
	27.0	27.0	09.0		09.0	09.0
Yellow Lime (s)	3.0	3.0	3.7		3.7	3.7
All-Red Time (s)	4.2	4.2	2.3		2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0

Rochelle Fortier, Novatech

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Lane Group	WBI	WBR	NBT	NBR	SBI	SBT
Total Lost Time (s)	72	72	6.0		6.0	60
Lead/Lag		1.2	0.0		0.0	0.0
Lead-Lag Optimize?						
Vehicle Extension (s)	30	30	30		30	30
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	18.0		18.0	18.0
Flash Dont Walk (s)	20.0	20.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)	20.0	20.0	12.0		12.0	12.0
Act Effet Green (s)	1/ 5	1/ 5	82.2		82.2	823
Actuated a/C Patio	0.12	0 12	02.5		02.5	02.5
via Datio	0.13	0.13	0.75		0.75	0.75
Control Dolov	0.44	0.12	0.55		0.13	0.24
Control Delay	40.0	14.1	4.0		0.4	5.2
	0.0	0.0	0.0		0.0	0.0
l otal Delay	48.6	14.1	4.0		6.4	5.2
LOS	D	В	A		A	A
Approach Delay	41.4		4.0			5.3
Approach LOS	D		А			А
90th %ile Green (s)	27.0	27.0	69.8		69.8	69.8
90th %ile Term Code	Ped	Ped	Coord		Coord	Coord
70th %ile Green (s)	13.6	13.6	83.2		83.2	83.2
70th %ile Term Code	Gap	Gap	Coord		Coord	Coord
50th %ile Green (s)	11.7	11.7	85.1		85.1	85.1
50th %ile Term Code	Gap	Gap	Coord		Coord	Coord
30th %ile Green (s)	10.0	10.0	86.8		86.8	86.8
30th %ile Term Code	Min	Min	Coord		Coord	Coord
10th %ile Green (s)	10.0	10.0	86.8		86.8	86.8
10th %ile Term Code	Min	Min	Coord		Coord	Coord
Stops (vph)	86	9	175		16	176
Fuel Used(I)	8	1	30		2	20
CO Emissions (a/br)	148	23	561		34	366
NOx Emissions (g/hr)	20	20	108		7	71
VOC Emissions (g/hr)	23	4	100		0	01
Dilomma Vohiolog (#)	04	0	129		0	04
Oueve Length 50th (m)	00.0	0	14		0	15.0
Queue Length SUth (m)	20.3	0.0	14.5		2.4	15.3
Queue Length 95th (m)	31.1	6.9	21.2		10.1	30.0
Internal LINK DISt (m)	144.4	<b>5 ^ ^</b>	256.0		00.0	197.4
Turn Bay Length (m)		50.0	0.5.5.1		60.0	<u></u>
Base Capacity (vph)	414	386	2521		404	2537
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.24	0.07	0.35		0.13	0.24
Intersection Summary						
Area Type:	Other					
Cycle Length: 110						
Actuated Cycle Length: 110						
Offset: 0 (0%), Referenced to pl	hase 2:NBT and 6	6:SBTL. Sta	art of Green			
Natural Cycle: 75						
Control Type: Actuated-Coordin	ated					
Maximum v/c Ratio: 0.44	<del>-</del>					
Intersection Signal Delay: 7.3				Int	ersection L (	<u> 15. ⊽</u>
Intersection Capacity Litilization	60.3%					Convice P
Analysis Daried (min) 15	00.3%					
Analysis Period (min) 15						

#### Splits and Phases: 7: Greenbank & Highbury Park



# 3: Greenbank & Wessex/Berrigan SAT Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	L		5	*	1	5	**	1	5	**	7
Traffic Volume (vph)	103	85	64	97	78	218	74	963	91	213	994	81
Future Volume (vph)	103	85	64	97	78	218	74	963	91	213	994	81
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		45.0	50.0		45.0	100.0		90.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00		0.96	1.00		0.97
Frt	0.050	0.936		0.050		0.850	0.050		0.850	0.050		0.850
FIT Protected	0.950	1051	0	0.950	1704	4547	0.950	2200	4547	0.950	2200	4547
Sato. Flow (prot)	1095	1054	U	0.507	1784	1517	1095	3390	1517	0.020	3390	1017
Fit Permitted	0.700	165/	٥	1056	170/	1/01	0.255	2200	1/60	0.230	2200	1/72
Right Turn on Red	1247	1054	Vos	1050	1704	1401 Voc	404	3390	1402 Voc	423	2290	1473 Voc
Satd Flow (RTOR)		31	163			214			95			95
Link Speed (k/b)		40			40	217		60	55		60	
Link Distance (m)		208.5			191 5			174 7			280.0	
Travel Time (s)		18.8			17.2			10.5			16.8	
Confl. Peds. (#/hr)	10	10.0	9	9		10	4	10.0	7	7	10.0	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adi, Flow (vph)	103	85	64	97	78	218	74	963	91	213	994	81
Shared Lane Traffic (%)			• •						• ·			• .
Lane Group Flow (vph)	103	149	0	97	78	218	74	963	91	213	994	81
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(III)	0.1 CLEX											
Detector 1 Channel	CI+EX	CI+EX		CI+EX	CI+EX	CI+EX	CI+EX	CI+EX	CI+EX	CI+EX	CI+EX	CI+EX
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	0.0	28.7		0.0	28.7	0.0	0.0	28.7	0.0	0.0	28.7	0.0
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Detector Phase	4	4		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.5	38.5		38.5	38.5	38.5	10.9	31.9	31.9	10.9	31.9	31.9
Total Split (s)	39.0	39.0		39.0	39.0	39.0	15.0	66.0	66.0	15.0	66.0	66.0
Total Split (%)	32.5%	32.5%		32.5%	32.5%	32.5%	12.5%	55.0%	55.0%	12.5%	55.0%	55.0%
Maximum Green (s)	31.5	31.5		31.5	31.5	31.5	9.1	60.1	60.1	9.1	60.1	60.1
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.5	4.5		4.5	4.5	4.5	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rochelle Fortier, Novatech

#### 3: Greenbank & Wessex/Berrigan SAT Peak\_\_\_\_\_

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	7.5	7.5		7.5	7.5	7.5	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	24.0	24.0		24.0	24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)	9	9		10	10	10		7	7		4	4
Act Effct Green (s)	17.6	17.6		17.6	17.6	17.6	81.0	73.9	73.9	86.1	78.3	78.3
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.68	0.62	0.62	0.72	0.65	0.65
v/c Ratio	0.56	0.55		0.63	0.30	0.55	0.20	0.46	0.10	0.53	0.45	80.0
Control Delay	57.6	43.6		63.9	46.0	10.9	7.2	14.6	2.9	14.7	9.8	1.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
l otal Delay	57.6	43.6		63.9	46.0	10.9	7.2	14.6	2.9	14./	9.8	1.1
LUS	E	U 40.0		E	D	В	A	40.0	A	В	A	A
Approach Delay		49.3			30.9			13.2			10.1	
Approach LUS	21.0	21 O		21.0	21.0	21.0	0.2	B 60.1	60.1	0.6	60 A	60.4
90th %ile Green (S)	31.0 Dod	31.U Dod		31.U Dod	31.0 Dod	31.0 Dod	9.3	00.1	00.1	9.0 Max	60.4	60.4
	10.2	10.2		10.2	10.2	10.2	Gap	70.2	70.2	11.0	74.0	74.0
70th %ile Torm Code	Hold	19.2 Hold		19.2 Can	Gan	Gan	Con	Coord	70.3 Coord	Can	Coord	Coord
50th % ile Groop (s)	15.4	15.4		15 /	15 /	15 /	Gap 6.8	75.7	75.7	0.6	78.5	78.5
50th %ile Term Code	Hold	Hold		Gan	Gan	Gan	Can	Coord	Coord	9.0 Gan	Coord	Coord
30th %ile Green (s)	12.5	12.5		12.5	12.5	12.5	62	70.8	70.8	8 /	82.0	82.0
30th %ile Term Code	Gan	Gan		Gan	Gan	Gan	Gan	Coord	Coord	Gan	Coord	Coord
10th %ile Green (s)	10.0	10.0		10.0	10.0	10.0	0.0	83.6	83.6	7 1	96.6	96.6
10th %ile Term Code	Min	Min		Min	Min	Min	Skip	Coord	Coord	Gap	Coord	Coord
Stops (vph)	92	105		88	67	28	24	510	8	91	319	3
Fuel Used(I)	8	10		8	5	7	2	42	2	11	42	2
CO Emissions (g/hr)	152	182		149	99	124	43	780	34	196	781	40
NOx Emissions (g/hr)	29	35		29	19	24	8	150	7	38	151	8
VOC Emissions (g/hr)	35	42		34	23	29	10	180	8	45	180	9
Dilemma Vehicles (#)	0	0		0	0	0	0	40	0	0	39	0
Queue Length 50th (m)	23.4	26.6		22.2	17.0	0.9	3.7	57.2	0.0	10.8	45.3	0.0
Queue Length 95th (m)	35.7	40.8		34.8	27.0	19.3	12.1	100.1	7.6	37.0	53.0	2.6
Internal Link Dist (m)		184.5			167.5			150.7			256.0	
Turn Bay Length (m)	30.0			35.0		45.0	50.0		45.0	100.0		90.0
Base Capacity (vph)	327	457		277	468	546	408	2087	936	406	2211	994
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.33		0.35	0.17	0.40	0.18	0.46	0.10	0.52	0.45	0.08
Intersection Summary												
Area Type: Oth	er											
Cycle Length: 120												
Actuated Cycle Length: 120	NDTI on		art of Croon									
Netural Cycles 85	.INDIL and	10.3BTL, SI	ant of Green	1								
Natural Cycle. 00 Control Type: Actuated Coordinated												
Maximum v/c Patio: 0.63												
Intersection Signal Delay: 17.1				Int	arcaction L (	JC B						
Intersection Capacity Litilization 84.8%						envice F						
intercoolion oupdoity ofinzation 04.070	,			100								

#### Splits and Phases: 3: Greenbank & Wessex/Berrigan



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Lane Group	WRI	WRR	NRT	NRR	SBI	SBT
Lane Configurations	VVDL			NDN		
	<b>n</b>	146	1105	00	151	1201
Future Volume (vpn)	92	140	1195	90	151	1201
Ideal Flow (vphpl)	9Z 1900	140	1800	1800	1800	1201
Storage Length (m)	1000	50.0	1000	0.0	60.0	1000
Storage Lance	0.0	50.0		0.0	00.0	
Tapar Longth (m)	20.0			0	20.0	
Lana Litil Easter	30.0	1.00	0.05	0.05	30.0	0.05
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Feu Bike Factor	1.00	0.90	0.00		1.00	
Fit Fit Drotostad	0.050	0.850	0.989		0.050	
	0.950	4547	2240	0	0.950	2200
Satd. Flow (prot)	1695	1517	3346	U	1695	3390
	0.950	1.100	0010	•	0.191	0000
Satd. Flow (perm)	1688	1493	3346	0	340	3390
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		99	14			
Link Speed (k/h)	40		60			60
Link Distance (m)	168.4		280.0			221.4
Travel Time (s)	15.2		16.8			13.3
Confl. Peds. (#/hr)	3	3		4	4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	92	146	1195	90	151	1201
Shared Lane Traffic (%)						
Lane Group Flow (vph)	92	146	1285	0	151	1201
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7	rugin	3.7	rugin	Lon	3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.0		1.0			1.0
Two way Left Turn Long	4.3		4.3			4.9
Hoodway Easter	1 06	1.06	1.06	1.06	1.06	1.00
Turning Speed (k/h)	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (K/n)	24	14	~	14	24	
Number of Detectors	1	1	- 2		1	- 2
Detector Template	Lett	Right	I hru		Lett	I hru
Leading Detector (m)	6.1	6.1	30.5		6.1	30.5
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	6.1	1.8		6.1	1.8
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			CI+Ex			CI+Fx
Detector 2 Channel						
Detector 2 Extend (s)			0.0			.0.0
	Dorm	Dorm	0.0 NIA		Dorm	0.0 NIA
Protected Phases	reiiil	Feim	N/A 2		L GIIII	
Pormitted Phases	0	0	2		C	0
Petroter Dhases	ð	Ŏ	0		Ö	^
Detector Phase	8	8	2		Ь	6
Switch Phase		10.0	10.0		40.0	
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	34.2	34.2	36.0		36.0	36.0
Total Split (s)	34.2	34.2	85.8		85.8	85.8
Total Split (%)	28.5%	28.5%	71.5%		71.5%	71.5%
Maximum Green (s)	27.0	27.0	79.8		79.8	79.8
Yellow Time (s)	3.0	3.0	3.7		3.7	3.7
All-Red Time (s)	4.2	4.2	2.3		2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0

Rochelle Fortier, Novatech

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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Total Lost Time (s)	7.2	7.2	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	18.0		18.0	18.0
Flash Dont Walk (s)	20.0	20.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)	3	3	4		0	0
Act Effct Green (s)	14.5	14.5	92.3		92.3	92.3
Actuated g/C Ratio	0.12	0.12	0.77		0.77	0.77
v/c Ratio	0.45	0.54	0.50		0.58	0.46
Control Delay	54.3	24.7	3.9		19.3	6.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	54.3	24.7	3.9		19.3	6.4
LOS	D	С	А		В	А
Approach Delay	36.1		3.9			7.8
Approach LOS	D		Α			A
90th %ile Green (s)	27.0	27.0	79.8		79.8	79.8
90th %ile Term Code	Ped	Ped	Coord		Coord	Coord
70th %ile Green (s)	13.8	13.8	93.0		93.0	93.0
70th %ile Term Code	Gan	Gan	Coord		Coord	Coord
50th %ile Green (s)	11 9	11 9	94 9		94 9	94.9
50th %ile Term Code	Gan	Gan	Coord		Coord	Coord
30th %ile Green (s)	10 0	10 0	96.8		96.8	96.8
30th %ile Term Code	Min	Min	Coord		Coord	Coord
10th %ile Groop (s)	10.0	10.0	06.8		06.8	06.8
10th %ile Term Code	10.0 Min	Min	Goord		Goord	Coord
Stops (uph)	11/11/1	50	200		78	/10
Stops (vpr)	02	50	209		10	410
Fuel Osed(I)	104	112	42		140	42
CO Emissions (g/m)	124	110	119		142	/ 00 150
NOX Emissions (g/nr)	24	22	100		21	104
VOC Emissions (g/nr)	29	26	180		33	181
Dilemma venicies (#)	0	10 5	9		0	50
Queue Length 50th (m)	21.0	10.5	19.8		11.0	39.5
Queue Length 95th (m)	32.5	27.0	33.7		#60.2	86.4
Internal Link Dist (m)	144.4		256.0			197.4
Turn Bay Length (m)		50.0			60.0	
Base Capacity (vph)	379	412	2575		261	2606
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.24	0.35	0.50		0.58	0.46
Intersection Summary						
	Other					
Area Type:	Other					
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 0 (0%), Referenced to ph	hase 2:NBT and 6	5:SBTL, Sta	art of Green			
Natural Cycle: 90	- ( - 4					
Control Type: Actuated-Coordina	ated					
Maximum v/c Ratio: 0.58						
Intersection Signal Delay: 8.4				In	tersection L	JS: A
Intersection Capacity Utilization	72.4%			IC	U Level of S	Service C
Analysis Period (min) 15						
# 95th percentile volume exce	eds capacity, que	eue may be	longer.			
Queue shown is maximum af	fter two cycles.					
Splits and Phases: 7: Greenba	ank & Highbury	Park				

1 1 a2 (R) 35.8 a → 26 (R) 35.8 a 34.2 a

#### 8: Highbury Park & Access SAT Peak

	≯	÷	-	٠.	1	2
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	1.		11	
Traffic Volume (veh/h)	34	197	196	5	4	28
Future Volume (Veh/h)	34	197	196	5	4	28
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	34	197	196	5	4	28
Pedestrians				, i i i i i i i i i i i i i i i i i i i	•	
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		168				
pX. platoon unblocked						
vC. conflicting volume	201				464	198
vC1. stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	201				464	198
tC. single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				99	97
cM capacity (veh/h)	1371				543	843
	50.4		00.4			
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	231	201	32			
Volume Left	34	0	4			
Volume Right	0	5	28			
cSH	1371	1700	788			
Volume to Capacity	0.02	0.12	0.04			
Queue Length 95th (m)	0.6	0.0	1.0			
Control Delay (s)	1.3	0.0	9.8			
Lane LOS	А		А			
Approach Delay (s)	1.3	0.0	9.8			
Approach LOS			А			
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			37.5%	ICI	J Level of S	ervice
Analysis Period (min)			15			

#### 3: Greenbank & Wessex/Berrigan SUN Arrival Peak

	٦	-	$\mathbf{r}$	4	4	•	•	1	ř	1	ţ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	1.		5	*	7	5	**	7	5	**	1
Traffic Volume (vph)	98	53	49	57	44	162	30	629	28	71	480	39
Future Volume (vph)	98	53	49	57	44	162	30	629	28	71	480	39
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		45.0	50.0		45.0	100.0		90.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99		0.050	1.00		0.97	0.99		0.97
Frt	0.050	0.928		0.050		0.850	0.050		0.850	0.050		0.850
Fit Protected	0.950	4000	0	0.950	4704	4547	0.950	2200	4547	0.950	2200	4547
Satd. Flow (prot)	1695	1639	0	1695	1784	1517	1695	3390	1517	1695	3390	1517
Fit Permitted	0.728	1620	٥	1000	1701	1517	0.478	2200	1464	0.384	2200	1171
Salu. Flow (perifi) Bight Turn on Pod	1200	1029	Voc	1223	1/04	1517 Voc	049	2280	1404 Voc	002	2280	1474 Voc
Satd Flow (RTOP)		12	165			162			103			103
Link Speed (k/b)		42			40	102		60	105		60	105
Link Distance (m)		208 5			191 5			174 7			280.0	
Travel Time (s)		18.8			17.2			10.5			16.8	
Confl Peds (#/hr)	10	10.0	9	9	11.2		4	10.0	7	7	10.0	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adi, Flow (vph)	98	53	49	57	44	162	30	629	28	71	480	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	102	0	57	44	162	30	629	28	71	480	39
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(III)												
Detector 1 Channel	CI+EX	CI+EX		CI+EX	CI+EX	CI+EX	CI+EX	CI+EX	CI+EX	CI+EX	CI+EX	
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	010	28.7		0.0	28.7	0.0	0.0	28.7	0.0	0.0	28.7	0.0
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Detector Phase	4	4		8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.5	38.5		38.5	38.5	38.5	10.9	31.9	31.9	10.9	31.9	31.9
Total Split (s)	39.0	39.0		39.0	39.0	39.0	13.0	58.0	58.0	13.0	58.0	58.0
Total Split (%)	35.5%	35.5%		35.5%	35.5%	35.5%	11.8%	52.7%	52.7%	11.8%	52.7%	52.7%
Wallow Time (a)	31.5	31.5		31.5	31.5	31.5	/.1	52.1	52.1	/.1	52.1	52.1
reliow Time (s)	3.0	3.0		3.0	3.0	3.0	3.7	3.7	3./	3./	3./	3.7
All-Red Time (S)	4.5	4.5		4.5	4.5	4.5	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Aujust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rochelle Fortier, Novatech
# 3: Greenbank & Wessex/Berrigan SUN Arrival Peak

	۶		$\mathbf{F}$	4	-	٠.	1	1	7	1	Ļ	4
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	7.5	7.5		7.5	7.5	7.5	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	24.0	24.0		24.0	24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)	9	9		10	10	10		7	7	•	4	4
Act Effct Green (s)	16.4	16.4		16.4	16.4	16.4	75.0	69.9	69.9	77.0	72.7	72.7
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.68	0.64	0.64	0.70	0.66	0.66
V/C Ratio	0.51	0.30		0.31	0.17	0.45	0.05	0.29	0.03	0.13	0.21	0.04
Control Delay	50.4	27.0		43.3	38.7	9.3	0.5	11.3	0.1	5.3	1.1	0.2
Queue Delay	0.0	0.0		12.2	0.0	0.0	0.0	11.2	0.0	0.0	0.0	0.0
	50.4	27.0		43.3	JO.7	9.5	0.0 A	II.3 D	0.1	5.3	1.1	0.2
Approach Dolay	U	38.5		U	21.6	A	A	10.6	A	A	A 60	A
Approach LOS		JU.J			21.0			10.0 D			0.9	
90th %ile Green (s)	31.0	31.0		31.0	31.0	31.0	74	52.1	52.1	76	52.3	523
90th %ile Term Code	Ped	Ped		Ped	Ped	Ped	Gan	Coord	Coord	Max	Coord	Coord
70th %ile Green (s)	16.3	16.3		16.3	16.3	16.3	6.3	67.2	67.2	7.2	68 1	68 1
70th %ile Term Code	Gan	Gan		Hold	Hold	Hold	Gan	Coord	Coord	Gan	Coord	Coord
50th %ile Green (s)	13.7	13.7		13.7	13.7	13.7	5.9	70.4	70.4	6.6	71 1	71 1
50th %ile Term Code	Gap	Gap		Hold	Hold	Hold	Gap	Coord	Coord	Gap	Coord	Coord
30th %ile Green (s)	11.2	11.2		11.2	11.2	11.2	0.0	73.4	73.4	6.1	85.4	85.4
30th %ile Term Code	Gap	Gap		Hold	Hold	Hold	Skip	Coord	Coord	Gap	Coord	Coord
10th %ile Green (s)	10.0	10.0		10.0	10.0	10.0	0.0	86.6	86.6	0.0	86.6	86.6
10th %ile Term Code	Min	Min		Min	Min	Min	Skip	Coord	Coord	Skip	Coord	Coord
Stops (vph)	85	53		47	37	22	12	283	0	18	154	0
Fuel Used(I)	7	5		4	3	5	1	24	0	3	19	1
CO Emissions (g/hr)	134	95		69	51	89	18	449	8	48	362	18
NOx Emissions (g/hr)	26	18		13	10	17	4	87	2	9	70	3
VOC Emissions (g/hr)	31	22		16	12	20	4	104	2	11	84	4
Dilemma Vehicles (#)	0	0		0	0	0	0	29	0	0	18	0
Queue Length 50th (m)	20.2	11.9		11.4	8.6	0.0	1.4	28.8	0.0	2.7	15.2	0.0
Queue Length 95th (m)	30.6	22.7		19.6	15.5	15.1	6.3	58.3	0.0	8.3	31.8	0.3
Internal Link Dist (m)		184.5			167.5			150.7			256.0	
Turn Bay Length (m)	30.0			35.0		45.0	50.0		45.0	100.0		90.0
Base Capacity (vph)	368	499		350	510	550	639	2155	968	544	2240	1009
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.20		0.16	0.09	0.29	0.05	0.29	0.03	0.13	0.21	0.04
Intersection Summary	Othor											
Area Type.	Other											
Actuated Cycle Length: 110												
Ottset: 0 (0%), Referenced to pha	ase 2:NBTL and	d 6:SBTL, S	tart of Greei	n								
Natural Cycle: 85												
Control Type: Actuated-Coordina	ited											
Maximum v/c Ratio: 0.51												
Intersection Signal Delay: 14.2	0.00/			Int	ersection L	05: B						
Intersection Capacity Utilization 5	00.0%			IC	U Level of S	Service B						
Analysis Period (min) 15												

#### Splits and Phases: 3: Greenbank & Wessex/Berrigan



# 7: Greenbank & Highbury Park SUN Arrival Peak

Lane Group         WBL         WBR         NBT         NBR         SBL         SBT           Lane Configurations         1         4         1         125         540           Fatter Volume (vph)         115         49         773         117         125         540           Storage Length (m)         0.0         65.00         0.0         60.0         1800<		<	٠.	1	1	1	Ŧ
Lane Configurations         No.	Lane Group	WBI	WBR	NBT	NBR	SBL	SBT
And Boungardian         Total         Total         Total         Total         Total         Total         Field           Frafic Volume (vph)         115         49         773         117         125         540           Geal Flow (vph)         1800	Lane Configurations	102				000	
Line Count (tph)         110         120         130         111         120         540           Ideal Flow (vphp)         1800         1800         1800         1800         1800         1800         1800           Storage Length (m)         0         0         50.0         0.0         60.0         0.0           Storage Length (m)         30.0	Traffic Volume (voh)	115	49	773	117	125	540
Late Late Legit (m)         Lio         Lio <thlio< th="">         Lio         <thlio< th=""></thlio<></thlio<>	Future Volume (vph)	115	49	773	117	125	540
Content (Philp)         Toto         Social Social Cool         Toto         Root         Root <throot< th="">         Root         <throot< th=""> <t< td=""><td>Ideal Flow (vphpl)</td><td>1800</td><td>1800</td><td>1800</td><td>1800</td><td>1800</td><td>1800</td></t<></throot<></throot<>	Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lings Lings (m)         Los         Los <thlos< th=""></thlos<>	Storage Length (m)	0.0	50.0	1000	0.0	60.0	1000
Lang Units         I <thi< th="">         I         <thi< th=""> <thi< <="" td=""><td>Storage Lanes</td><td>1</td><td>1</td><td></td><td>0.0</td><td>1</td><td></td></thi<></thi<></thi<>	Storage Lanes	1	1		0.0	1	
Table Evaluation         100         100         0.95         1.00         0.95           Ped Bike Factor         1.00         0.98         1.00         1.00         0.95           Ped Bike Factor         1.00         0.950         0.950         0.950           Fit Protected         0.950         0.304         0.330           Stadt Flow (prot)         1699         1517         3311         0         1695         3390           Right Turn on Red         Yes         Yes         Yes         0.304 </td <td>Taper Length (m)</td> <td>30.0</td> <td></td> <td></td> <td>U</td> <td>30.0</td> <td></td>	Taper Length (m)	30.0			U	30.0	
Lane Unit Audu         1.00         1.00         0.35         0.35         1.00         0.03           Fit Protected         0.950         0.950         0.950         0.950           Satd, Flow (prot)         1695         1517         3311         0         1695         3390           Riph Turn on Red         0.950         0.334         0.334         0.334         3351         0         541         3390           Right Turn on Red         Yes         Yes         Yes         100	Lane Litil Factor	1 00	1 00	0.05	0.95	1 00	0.95
Fird         1.00         1.00         1.00         1.00           Fit Protected         0.950         0.950         0.950           Satd, Flow (prot)         1695         1517         3311         0         1695         3330           Satd, Flow (perm)         1689         1493         3311         0         541         3390           Satd, Flow (perm)         1689         1493         3311         0         541         3390           Satd, Flow (perm)         1684         280.0         221.4         1685         168.         13.3           Conti, Pots, (#/hr)         3         3         4         4         Peeak Hour Factor         1.00	Pod Piko Eastor	1.00	0.08	1.00	0.35	1.00	0.35
Bit Protected         0.950         0.950           Satd. Flow (prot)         1695         1517         3311         0         1695         3390           Satd. Flow (perm)         1689         1493         3311         0         541         3390           Right Turn on Red         Yes         Yes         Yes         Yes         Yes           Satd. Flow (perm)         1684         280.0         221.4         For (ROR)         49         30           Link Speed (kh)         40         60         60         60         15.2         16.8         13.3           Confi, Peds. (#/hr)         3         3         4         4         3         3         4         4           Peak Hour Factor         1.00	Frt	1.00	0.90	0.00		1.00	
Introductor         0.300         0.300         0.300           FILP emritted         0.950         0.304           Satd, Flow (port)         1689         1493         3311         0         541         3390           Statd, Flow (perm)         1689         1493         3311         0         541         3390           Statd, Flow (perm)         1689         1493         3311         0         541         3390           Statd, Flow (PTOR)         49         30	Elt Protected	0 050	0.000	0.000		0.950	
Sade L Flow (prot)         1030         1000 <td>Satd Elow (prot)</td> <td>1605</td> <td>1517</td> <td>2211</td> <td>٥</td> <td>1605</td> <td>3300</td>	Satd Elow (prot)	1605	1517	2211	٥	1605	3300
Intermined         0.500         0.504           Right Turn on Red         Yes         Yes         S41         3390           Right Turn on Red         Yes         Yes         Yes         S41         3390           Satd, Flow (RTOR)         49         30	Elt Dormitted	0.050	1017	0011	U	0.304	0000
Jack Inverties         1003         1423         3311         0         541         3390           Satd, Flow (RTOR)         49         30         60         60         60           Link Speed (k/h)         40         60         60         60           Link Distance (m)         1684         280.0         221.4           Travel Time (s)         15.2         16.8         13.3           Conf. Peds. (#hr)         3         3         4         4           Peak Hour Factor         1.00         1.00         1.00         1.00         1.00           Lane Group Flow (vph)         115         49         773         117         125         540           Eane Group Flow (vph)         115         49         890         0         125         540           Eane Group Flow (vph)         115         49         890         0         125         540           Eane Group Flow (vph)         115         49         890         0         125         540           Eane Group Flow (vph)         3.7         3.7         3.7         3.7         3.7           Link Offset(m)         0.0         0.0         0.0         0.0         0.0 <t< td=""><td>Satd Elow (norm)</td><td>1600</td><td>1/02</td><td>2211</td><td>0</td><td>0.304 E11</td><td>3200</td></t<>	Satd Elow (norm)	1600	1/02	2211	0	0.304 E11	3200
Name         Tes         Tes           Stall Flow (RTOR)         49         30         60         60           Link Speed (k/h)         40         60         60         60           Link Speed (k/h)         168.4         280.0         221.4         Travel Time (s)         13.3           Confl. Peds. (#hr)         3         3         4         4         4           Peak Hour Factor         1.00	Dight Turn on Rod	1009	1493 Voo	3311	Vee	541	2280
Statu. Flow (K1 OK)         49         30           Link Speed (kh)         40         60         60           Link Distance (m)         168.4         280.0         221.4           Travel Time (s)         15.2         16.8         13.3           Confl. Peds. (khr)         3         3         4         4           Peak Hour Factor         1.00         1.00         1.00         1.00         1.00         1.00         1.00           Shared Lane Traffic (%)	Right Turri on Kea		res		res		
Link Speen (kn)         40         60         60           Link Distance (m)         168.4         280.0         221.4           Travel Time (s)         15.2         16.8         13.3           Confi. Peds. (#/hr)         3         3         4         4           Peak Hour Factor         1.00         1.00         1.00         1.00         1.00         1.00           Add, Flow (vph)         115         49         890         0         125         540           Shared Lane Traffic (%)         1         49         890         0         125         540           Enter Blocked Intersection         No	Satu. Flow (RTUR)	10	49	30			00
Link Distance (m)         168.4         220.0         221.4           Travel Time (s)         15.2         16.8         13.3           Ornf. Peds (#/hr)         3         3         4         4           Peak Hour Factor         1.00	LINK Speed (K/h)	40		60			60
Iravel Ime (s)         15.2         16.8         13.3           Confl. Peds. (#hr)         3         3         4         4           Peak Hour Factor         1.00         1.00         1.00         1.00         1.00         1.00           Adj. Flow (vph)         115         49         773         117         125         540           Shared Lane Traffic (%)         115         49         890         0         125         540           Eane Group Flow (vph)         115         49         890         0         125         540           Eane Group Flow (vph)         115         49         890         0         125         540           Eane Group Flow (vph)         3.7         3.7          3.7          3.7           Lane Group Flow (vph)         0.0	LINK Distance (m)	168.4		280.0			221.4
Contl. Peds. (#mr)         3         3         4         4           Peak Hour Factor         1.00         1.00         1.00         1.00         1.00         1.00         1.00           Shared Lane Traffic (%)         115         49         773         117         125         540           Lane Group Flow (vph)         115         49         890         0         125         540           Enter Blocked Intersection         No         No         No         No         No         No         No           Lane Alignment         Left         Right         Left         Right         Left         Left         Right         Left         Left         Right         Left         Left         Right         Left         Left         Left         No	Travel Time (s)	15.2		16.8			13.3
Peak Hour Factor         1.00	Confl. Peds. (#/hr)	3	3		4	4	
Adj. Flow (vph)         115         49         773         117         125         540           Shared Lane Traffic (%)         115         49         890         0         125         540           Eane Group Flow (vph)         115         49         890         0         125         540           Enter Blocked Intersection         No         No         No         No         No         No         No           Lane Alignment         Left         Right         Left         Right         Left         Left         Left         Left         Midth         Alg.	Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)         Lane Group Flow (vph)       115       49       890       0       125       540         Enter Blocked Intersection       No	Adj. Flow (vph)	115	49	773	117	125	540
Lane Group Flow (vph)         115         49         890         0         125         540           Enter Blocked Intersection         No         No <t< td=""><td>Shared Lane Traffic (%)</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	Shared Lane Traffic (%)						
Enter Blocked Intersection         No         No         No         No         No         No         No           Lane Alignment         Left         Right         Left         Right         Left         Right         Thru         Left         Ch <td< td=""><td>Lane Group Flow (vph)</td><td>115</td><td>49</td><td>890</td><td>0</td><td>125</td><td>540</td></td<>	Lane Group Flow (vph)	115	49	890	0	125	540
Lane Alignment         Left         Right         Left         Right         Left         Left         Median Width(m)         3.7         3.7         3.7           Link Offset(m)         0.0         0.0         0.0         0.0         0.0         0.0           Crosswalk Width(m)         4.9         4.9         4.9         4.9         4.9           Two way Left Turn Lane         1         1         2         1         2           Detector Template         Left         Right         Thru         Left         Thru           Leading Detector (m)         6.1         6.1         30.5         6.1         30.5           Trailing Detector (m)         0.0         0.0         0.0         0.0         0.0         0.0           Detector 1 Size(m)         6.1         6.1         1.8         6.1         1.8           Detector 1 Size(m)         6.1         6.1         1.8         1.8         1.8           Detector 1 Size(m)         0.0         0.0         0.0         0.0         0.0         0.0           Detector 1 Size(m)         0.1         0.1         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0	Enter Blocked Intersection	No	No	No	No	No	No
Median Width(m)         3.7         3.7         3.7         3.7           Link Offset(m)         0.0         0.0         0.0         0.0           Crosswalk Width(m)         4.9         4.9         4.9         4.9           Two way Left Turn Lane         Headway Factor         1.06         1	Lane Alignment	Left	Right	Left	Right	Left	Left
Link Offset(m)         0.0         0.0         0.0           Crosswalk Width(m)         4.9         4.9         4.9         4.9           Headway Factor         1.06         1.06         1.06         1.06         1.06           Turming Speed (kh)         24         14         14         24           Number of Detectors         1         1         2         1         2           Detector Template         Left         Right         Thru         Left         Thru           Leading Detector (m)         6.1         6.1         30.5         6.1         30.5           Trailing Detector (m)         0.0         0.0         0.0         0.0         0.0         0.0           Detector 1 Position(m)         0.0	Median Width(m)	3.7	, i i i i i i i i i i i i i i i i i i i	3.7	Ŭ.		3.7
Crosswalk Width(m)         4.9         4.9         4.9           Two way Left Tum Lane         1.06         1.06         1.06         1.06         1.06           Headway Factor         1.06         1.06         1.06         1.06         1.06         1.06           Turming Speed (k/h)         24         14         14         24         1         2           Detector Template         Left         Right         Thru         Left         Thru         Left         Thru           Leading Detector (m)         6.1         6.1         30.5         6.1         30.5           Trailing Detector 1 Position(m)         0.0         0.0         0.0         0.0         0.0           Detector 1 Size(m)         6.1         6.1         1.8         6.1         1.8           Detector 1 Channel         Detector 1 Channel         Detector 1 Queue (s)         0.0         0.0         0.0         0.0           Detector 1 Queue (s)         0.0	Link Offset(m)	0.0		0.0			0.0
Two way Left Turn Lane         Image of the second sec	Crosswalk Width(m)	4.9		4.9			4.9
Headway Factor         1.06         1.05         1.05         1.05         1.05         1.05         1.05         1.05         1.05         1.06         1.06         1.06         1.06         1.06         1.06         1.06         1.06         1.06         1.06         1.06         1.06         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00	Two way Left Turn Lane						
Internation         Internation <thinternation< th=""> <thinternation< th=""></thinternation<></thinternation<>	Headway Factor	1 06	1 06	1 06	1 06	1 06	1.06
Line         Line <thline< th="">         Line         Line         <thl< td=""><td>Turning Speed (k/h)</td><td>24</td><td>14</td><td></td><td>14</td><td>24</td><td>1.00</td></thl<></thline<>	Turning Speed (k/h)	24	14		14	24	1.00
Number of bottoms         I <thi< th="">         I         I</thi<>	Number of Detectors	1	1	2	14	1	2
Detector (m)         6.1         6.1         30.5         6.1         30.5           Trailing Detector (m)         0.0         0.0         0.0         0.0         0.0         0.0           Detector 1 Position(m)         0.0         0.0         0.0         0.0         0.0         0.0         0.0           Detector 1 Position(m)         0.0	Namber of Detectors	L off	Right	- Thru		Loft	
Detector (m)         0.1         0.1         0.0         0.0         0.0         0.0         0.0           Detector 1 Position(m)         0.0         0.0         0.0         0.0         0.0         0.0           Detector 1 Size(m)         6.1         6.1         1.8         6.1         1.8           Detector 1 Size(m)         6.1         6.1         1.8         6.1         1.8           Detector 1 Channel           CI+Ex         CI+Ex         CI+Ex         CI+Ex         CI+Ex           Detector 1 Channel           0.0         0.0         0.0         0.0         0.0           Detector 1 Queue (s)         0.0	Leading Detector (m)	E I	6 1	30.5		Een 61	20 5
Training Detector (III)         0.0         0.0         0.0         0.0         0.0         0.0           Detector 1 Position(m)         0.0         0.0         0.0         0.0         0.0         0.0           Detector 1 Size(m)         6.1         6.1         1.8         6.1         1.8           Detector 1 Type         CI+Ex	Trailing Detector (m)	0.1	0.1	0.0		0.1	30.3
Detector 1         Position(m)         0.0         0.0         0.0         0.0         0.0         0.0           Detector 1         Size(m)         6.1         6.1         1.8         6.1         1.8           Detector 1         Type         CI+Ex         CI+Ex </td <td>Detector 1 Decition (m)</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td></td> <td>0.0</td> <td>0.0</td>	Detector 1 Decition (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)         6.1         6.1         1.8         6.1         1.8           Detector 1 Type         CI+Ex	Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Type         CI+Ex	Detector 1 Size(m)	6.1	6.1	1.8		6.1	1.8
Detector 1 Channel           Detector 1 Extend (s)         0.0         0.0         0.0         0.0           Detector 1 Queue (s)         0.0         0.0         0.0         0.0         0.0           Detector 1 Delay (s)         0.0         0.0         0.0         0.0         0.0           Detector 2 Position(m)         28.7         28.7         28.7           Detector 2 Size(m)         1.8         1.8         1.8           Detector 2 Size(m)         1.8         1.8         1.8           Detector 2 Channel         0.0         0.0         0.0           Detector 2 Extend (s)         0.0         0.0         0.0           Turn Type         Perm         Perm         NA         Perm         NA           Protected Phases         2         6	Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex
Detector 1 Extend (s)         0.0	Detector 1 Channel						
Detector 1 Queue (s)         0.0         1.8         1.8         1.8         1.8         1.8         Detector 2 Channel         0.0	Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)         0.0         0.0         0.0         0.0         0.0         0.0           Detector 2 Position(m)         28.7         28.7         28.7         28.7         28.7         28.7         28.7         28.7         Detector 2 Size(m)         1.8         1.8         1.8         1.8         Detector 2 Size(m)         1.8         1.8         1.8         Detector 2 Channel         CI+Ex         CI+Ex         Detector 2 Channel         0.0 <td>Detector 1 Queue (s)</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td></td> <td>0.0</td> <td>0.0</td>	Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)         28.7         28.7           Detector 2 Size(m)         1.8         1.8           Detector 2 Type         CI+Ex         CI+Ex           Detector 2 Channel         0.0         0.0           Detector 2 Extend (s)         0.0         0.0           Turn Type         Perm         Perm         NA           Protected Phases         2         6           Permitted Phases         8         8         6           Detector Phase         34.2         34.2         36.0         36.0           Minimum Initial (s)         10.0         10.0         10.0         10.0           Minimum Split (s)         34.2         34.2         75.8         75.8           Total Split (s)         31.1%         31.1%         68.9%         68.9%           Maximum Green (s)         27.0         27.0         69.8         69.8         69.8           Yellow Time (s)         3.0 <t< td=""><td>Detector 1 Delay (s)</td><td>0.0</td><td>0.0</td><td>0.0</td><td></td><td>0.0</td><td>0.0</td></t<>	Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Size(m)         1.8         1.8           Detector 2 Type         CI+Ex         CI+Ex           Detector 2 Channel         0.0         0.0           Detector 2 Extend (s)         0.0         0.0           Turn Type         Perm         Perm         NA           Protected Phases         2         6           Permitted Phases         8         8         6           Detector Phase         8         2         6           Switch Phase         10.0         10.0         10.0         10.0           Minimum Initial (s)         10.0         10.0         10.0         10.0           Minimum Split (s)         34.2         34.2         75.8         75.8           Total Split (%)         31.1%         31.1%         68.9%         68.9%           Maximum Green (s)         27.0         27.0         69.8         69.8           Vellow Time (s)         3.0         3.0	Detector 2 Position(m)			28.7			28.7
Detector 2 Type         CI+Ex         CI+Ex           Detector 2 Channel         0.0         0.0           Detector 2 Extend (s)         0.0         0.0           Turn Type         Perm         Perm         NA           Protected Phases         2         6           Permitted Phases         8         8         6           Detector Phase         8         8         6           Detector Phase         8         2         6           Switch Phase         10.0         10.0         10.0         10.0           Minimum Initial (s)         10.0         10.0         10.0         10.0           Minimum Split (s)         34.2         34.2         36.0         36.0           Total Split (s)         31.1%         31.1%         68.9%         68.9%           Maximum Green (s)         27.0         27.0         69.8         69.8           Yellow Time (s)         3.0         3.0         3.7         3.7         3.7           All-Red Time (s)         4.2         4.2         2.3         2.3         2.3         2.3           Lost Time Adjust (s)         0.0         0.0         0.0         0.0         0.0	Detector 2 Size(m)			1.8			1.8
Detector 2 Channel         0.0         0.0           Detector 2 Extend (s)         0.0         0.0           Turn Type         Perm         Perm         NA           Protected Phases         2         6           Permitted Phases         8         8         6           Detector Phase         8         8         2         6           Switch Phase         8         8         2         6           Switch Phase         7         75.8         75.8         75.8           Minimum Initial (s)         31.1%         31.1%         68.9%         68.9%         68.9%           Maximum Green (s)         27.0         27.0         69.8         69.8         69.8         69.8           Yellow Time (s)         3.0         3.0         3.7         3.7         3.7           All-Red Time (s)         4.2         4.2         2.3         2.3         2.3           Lost Time Adjust (s)         0.0         0.0         0.0         0.0         0.0	Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Extend (s)         0.0         0.0           Detector 2 Extend (s)         Perm         Perm         NA         Perm         NA           Protected Phases         2         6         5         5         6         6         6         6         6         5         5         7         6         8         8         2         6         6         6         5         5         5         7         5         7         5         7         5         7         5         7         8         7         5         7         8         7         5         7         8         7         5         7         5         7         8         7         8         7         8         9         8         9         8         9	Detector 2 Channel						
Turn Type         Perm         Perm         NA         Perm         NA           Protected Phases         2         6         5         5         6         6         6         5         5         6         6         6         5         5         6         6         6         5         5         6         6         6         5         5         5         7         6         6         6         6         5         5         7         5         7         5         7         5         7         5         7         5         7         5         8         7         5         7         5         7         5         7         5         7         5         7         5         7         5         7         5         7         5         7         5         7         5         7         5         7         5         7         5         7	Detector 2 Extend (s)			0.0			0.0
Initial (s)         Initial (s) <thinitial (s)<="" th=""> <thinitial (s)<="" th=""></thinitial></thinitial>		Parm	Porm	ΝΔ		Perm	ND
Permitted Phases         8         8         6           Detector Phase         8         8         2         6         6           Switch Phase         8         8         2         6         6           Minimum Initial (s)         10.0         10.0         10.0         10.0         10.0           Minimum Split (s)         34.2         34.2         36.0         36.0         36.0           Total Split (s)         34.2         34.2         75.8         75.8         75.8           Total Split (s)         31.1%         68.9%         68.9%         68.9%           Maximum Green (s)         27.0         27.0         69.8         69.8         69.8           Yellow Time (s)         3.0         3.0         3.7         3.7         3.7           All-Red Time (s)         4.2         4.2         2.3         2.3         2.3         2.3           Lost Time Adjust (s)         0.0         0.0         0.0         0.0         0.0         0.0	Protected Phases	1 6111	GIII	2		i enn	6
Detector Phase         8         8         2         6         6           Switch Phase         6         10.0         10	Permitted Phases	0	Q	2		6	0
Detector Prise         o         o         o         2         6         6           Switch Phase         Minimum Initial (s)         10.0         10.0         10.0         10.0         10.0           Minimum Split (s)         34.2         34.2         36.0         36.0         36.0           Total Split (s)         34.2         34.2         75.8         75.8         75.8           Total Split (%)         31.1%         31.1%         68.9%         68.9%         68.9%           Maximum Green (s)         27.0         27.0         69.8         69.8         69.8           Yellow Time (s)         3.0         3.0         3.7         3.7         3.7           All-Red Time (s)         4.2         4.2         2.3         2.3         2.3           Lost Time Adjust (s)         0.0         0.0         0.0         0.0         0.0	Detector Decos	0	0	0		0	c
Switch Fridse           Minimum Initial (s)         10.0         10.0         10.0         10.0           Minimum Initial (s)         34.2         34.2         36.0         36.0         36.0           Total Split (s)         34.2         34.2         75.8         75.8         75.8           Total Split (%)         31.1%         31.1%         68.9%         68.9%         68.9%           Maximum Green (s)         27.0         27.0         69.8         69.8         69.8           Yellow Time (s)         3.0         3.0         3.7         3.7         3.7           All-Red Time (s)         4.2         4.2         2.3         2.3         2.3           Lost Time Adjust (s)         0.0         0.0         0.0         0.0         0.0	Delector Pridse	ð	Ŏ	2		0	0
Winimum Initial (s)         10.0         10.0         10.0         10.0         10.0         10.0           Minimum Split (s)         34.2         34.2         36.0         36.0         36.0           Total Split (s)         34.2         34.2         75.8         75.8         75.8           Total Split (%)         31.1%         31.1%         68.9%         68.9%         68.9%           Maximum Green (s)         27.0         27.0         69.8         69.8         69.8           Yellow Time (s)         3.0         3.0         3.7         3.7         3.7           All-Red Time (s)         4.2         4.2         2.3         2.3         2.3           Lost Time Adjust (s)         0.0         0.0         0.0         0.0         0.0	Switch Phase	40.0	40.0	10.0		40.0	40.0
Winmum Split (s)         34.2         34.2         36.0         36.0         36.0         36.0           Total Split (s)         34.2         34.2         75.8         75.8         75.8         75.8           Total Split (%)         31.1%         31.1%         68.9%         68.9%         68.9%         68.9%           Maximum Green (s)         27.0         27.0         69.8         69.8         69.8         69.8           Yellow Time (s)         3.0         3.0         3.7         3.7         3.7           All-Red Time (s)         4.2         4.2         2.3         2.3         2.3           Lost Time Adjust (s)         0.0         0.0         0.0         0.0         0.0	iviinimum Initial (s)	10.0	10.0	10.0		10.0	10.0
I otal Split (s)         34.2         34.2         75.8         75.8         75.8           Total Split (%)         31.1%         31.1%         68.9%         68.9%         68.9%           Maximum Green (s)         27.0         27.0         69.8         69.8         69.8           Yellow Time (s)         3.0         3.0         3.7         3.7         3.7           All-Red Time (s)         4.2         4.2         2.3         2.3         2.3           Lost Time Adjust (s)         0.0         0.0         0.0         0.0         0.0	iviinimum Split (s)	34.2	34.2	36.0		36.0	36.0
Total Split (%)         31.1%         31.1%         68.9%         68.9%         68.9%           Maximum Green (s)         27.0         27.0         69.8         69.8         69.8           Yellow Time (s)         3.0         3.0         3.7         3.7         3.7           All-Red Time (s)         4.2         4.2         2.3         2.3         2.3           Lost Time Adjust (s)         0.0         0.0         0.0         0.0         0.0	I otal Split (s)	34.2	34.2	75.8		75.8	75.8
Maximum Green (s)         27.0         27.0         69.8 <td>Total Split (%)</td> <td>31.1%</td> <td>31.1%</td> <td>68.9%</td> <td></td> <td>68.9%</td> <td>68.9%</td>	Total Split (%)	31.1%	31.1%	68.9%		68.9%	68.9%
Yellow Time (s)         3.0         3.0         3.7         3.7         3.7           All-Red Time (s)         4.2         4.2         2.3         2.3         2.3           Lost Time Adjust (s)         0.0         0.0         0.0         0.0         0.0	Maximum Green (s)	27.0	27.0	69.8		69.8	69.8
All-Red Time (s)         4.2         4.2         2.3         2.3         2.3           Lost Time Adjust (s)         0.0         0.0         0.0         0.0         0.0	Yellow Time (s)	3.0	3.0	3.7		3.7	3.7
Lost Time Adjust (s) 0.0 0.0 0.0 0.0 0.0	All-Red Time (s)	4.2	4.2	2.3		2.3	2.3
• • • •	Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0

Rochelle Fortier, Novatech

# 7: Greenbank & Highbury Park SUN Arrival Peak

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Lane Group	WRI	WBR	NBT	NBR	SBI	SBT
Total Lost Time (s)	72	72	60	NDIX	60	60
Lead/Lag	1.2	1.2	0.0		0.0	0.0
Lead-Lag Optimize?						
Vehicle Extension (s)	30	30	30		30	30
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	18.0		18.0	18.0
Flash Dont Walk (s)	20.0	20.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)	3	3	4		0	0
Act Effct Green (s)	15 1	15.1	81 7		81 7	81 7
Actuated g/C Ratio	0 14	0 14	0 74		0 74	0 74
v/c Ratio	0.50	0.20	0.36		0.31	0.21
Control Delay	49.8	12.0	4.3		87	5.3
Queue Delay	-0.0	0.0	0.0		0.0	0.0
Total Delay	49.8	12.0	4.3		8.7	5.3
		12.0 R	4.5		Δ	Δ
Approach Delay	28 5	D	13		A	50
Approach LOS	JO.J		4.5			5.9
		27.0	A 60.9		60.9	A 60.9
Sour Mile Green (S)	21.U	ZI.U Dod	Coord		09.0	09.0
	Pea	14.0	010		0100	010
	14.9	14.9	01.9		01.9	01.9
	Gap	Gap	Coord		Coord	Coord
SUIN %Ile Green (S)	12.8	12.8	84.0		84.0	84.0
SUTN %ILE Term Code	Gap	Gap	Coord		Coord	Coord
30th %ile Green (s)	10.7	10.7	86.1		86.1	86.1
30th %ile Term Code	Gap	Gap	Coord		Coord	Coord
10th %ile Green (s)	10.0	10.0	86.8		86.8	86.8
10th %ile Term Code	Min	Min	Coord		Coord	Coord
Stops (vph)	101	12	179		46	158
Fuel Used(I)	8	2	30		5	18
CO Emissions (g/hr)	147	28	565		88	329
NOx Emissions (g/hr)	28	5	109		17	63
VOC Emissions (g/hr)	34	6	130		20	76
Dilemma Vehicles (#)	0	0	13		0	25
Queue Length 50th (m)	23.8	0.0	15.6		6.9	14.3
Queue Length 95th (m)	35.6	9.3	27.2		24.2	32.5
Internal Link Dist (m)	144.4		256.0			197.4
Turn Bay Length (m)		50.0			60.0	
Base Capacity (vph)	414	403	2467		401	2518
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.28	0.12	0.36		0.31	0.21
Intersection Summary						
Area Type:	Other					
Cycle Length: 110	Outor					
Actuated Cycle Length: 110						
Offect: 0 (0%) Deferenced to ph	hace 2.NPT and 4		art of Groop			
Natural Cyclo: 75		.3D1L, 3t	art of Green			
Natural Cycle. (5 Control Typo: Actuated Caredia	atad					
Maximum v/a Datia: 0.50	aleu					
Interneting Circuit Date C.C.						00. 4
Intersection Signal Delay: 8.2	CO C0/			In	tersection L	05: A
Intersection Capacity Utilization	60.6%			IC	U Level of S	Service B
Analysis Period (min) 15						

Splits and Phases: 7: Greenbank & Highbury Park



# 8: Highbury Park & Access SUN Arrival Peak

	≯	<b>→</b>	+	٠.	1	2
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations			1.		M	-
Traffic Volume (veh/h)	162	70	103	28	7	49
Future Volume (Veh/h)	162	70	103	28	7	49
Sian Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1 00	1.00	1 00	1 00	1.00	1 00
Hourly flow rate (vph)	162	70	103	28	7	49
Pedestrians					•	
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		168				
pX, platoon unblocked						
vC conflicting volume	131				511	117
vC1, stage 1 conf vol	101				011	
vC2 stage 2 conf vol						
vCu, unblocked vol	131				511	117
tC single (s)	4 1				64	6.2
tC 2 stage (s)					•	0.2
tF (s)	22				3.5	33
n0 queue free %	89				98	95
cM capacity (veh/h)	1454				464	935
					101	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	232	131	56			
Volume Left	162	0	7			
Volume Right	0	28	49			
cSH	1454	1700	830			
Volume to Capacity	0.11	0.08	0.07			
Queue Length 95th (m)	2.9	0.0	1.6			
Control Delay (s)	5.7	0.0	9.7			
Lane LOS	А		А			
Approach Delay (s)	5.7	0.0	9.7			
Approach LOS			А			
Intersection Summarv						
Average Delay			4.5			
Intersection Canacity Utilization			34.5%	ICI	LL evel of S	Service
			15	100		
Analysis Fellou (IIIII)			15			

# 3: Greenbank & Wessex/Berrigan SUN Departure Pe

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	ţ,		5	*	1	5	**	1	5	**	1
Traffic Volume (vph)	84	53	49	57	44	162	30	582	28	71	527	53
Future Volume (vph)	84	53	49	57	44	162	30	582	28	71	527	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		45.0	50.0		45.0	100.0		90.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99			1.00		0.97	0.99		0.97
Frt		0.928				0.850			0.850			0.850
Flt Protected	0.950	1000	•	0.950	170.4		0.950			0.950		
Satd. Flow (prot)	1695	1639	0	1695	1784	1517	1695	3390	1517	1695	3390	1517
Fit Permitted	0.728	4000	0	0.691	4704	4547	0.456	0000	4404	0.408	0000	4 4 7 4
Satd. Flow (perm)	1286	1639	0	1223	1784	1517	811	3390	1464	724	3390	1474
Right Turn on Red		40	res			res			res 102			res 100
Sato. Flow (RTOR)		42			40	162		60	103		60	103
Link Speed (k/n)		200 5			40			174 7			200 0	
		200.0			191.0			1/4./			200.0	
Confl Peds (#/br)	10	10.0	0	٥	17.2		1	10.5	7	7	10.0	1
Peak Hour Factor	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1.00	1 00	1 00	1.00	1 00
Adi Flow (vph)	84	53	1.00	57	1.00	162	30	582	28	71	527	53
Shared Lane Traffic (%)	04	55	40	JI	44	102	50	502	20	11	JZI	55
Lane Group Flow (vph)	84	102	0	57	44	162	30	582	28	71	527	53
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	Lon	37	rugitt	Lon	37	rugitt	Lon	37	rugitt	Lon	37	rught
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	CI+Ex	Cl+Ex		CI+Ex	Cl+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+EX			CI+EX			CI+EX			CI+EX	
Detector 2 Channel		0.0			0.0			0.0			0.0	
	Dorm	0.0		Dorm	0.0	Dorm		0.0	Dorm	n	0.0	Dorm
Protocted Phases	Perm	NA 1		Perm	NA Q	Penn	pm+pt	NA 2	Perm	pm+pt 1	INA 6	Perm
Parmitted Phases	4	4		8	0	8	2	2	2	6	0	6
Detector Phase	4	1		8	8	8	5	2	2	1	6	6
Switch Phase	4	-		U	0	U	J	2	2	1	0	U
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.5	38.5		38.5	38.5	38.5	10.9	31.9	31.9	10.9	31.9	31.9
Total Split (s)	39.0	39.0		39.0	39.0	39.0	13.0	58.0	58.0	13.0	58.0	58.0
Total Split (%)	35.5%	35.5%		35.5%	35.5%	35.5%	11.8%	52 7%	52.7%	11.8%	52.7%	52 7%
Maximum Green (s)	31.5	31.5		31.5	31.5	31.5	71	52 1	52 1	7 1	52 1	52 1
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	4.5	4.5		4.5	4.5	4.5	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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# 3: Greenbank & Wessex/Berrigan SUN Departure Pe

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	7.5	7.5		7.5	7.5	7.5	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	24.0	24.0		24.0	24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)	9	9		10	10	10		7	7		4	4
Act Effct Green (s)	15.7	15.7		15.7	15.7	15.7	75.7	70.7	70.7	77.7	73.5	73.5
Actuated g/C Ratio	0.14	0.14		0.14	0.14	0.14	0.69	0.64	0.64	0.71	0.67	0.67
v/c Ratio	0.46	0.38		0.33	0.17	0.46	0.05	0.27	0.03	0.12	0.23	0.05
Control Delay	49.0	27.8		44.5	39.5	9.7	6.3	10.8	0.1	4.7	7.1	0.4
	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loc	49.0	27.8		44.5	39.5	9.7	0.3	10.8	0.1	4./	7.1	0.4
LUS Approach Deley	D	27.4		U	D 00 0	А	A	D 10.1	A	А	A C 2	А
Approach LOS		37.4			22.2			IU.I			0.3	
Approach 2005	31.0	21 O		31.0	31.0	31.0	7.4	52 1	52.1	7.6	52 3	52.3
90th %ile Term Code	Ded	Dod		Dod	Dod	Dod	Gan	Coord	Coord	7.0 Max	Coord	Coord
70th %ile Green (s)	1 eu 14 9	14.9		14.9	14.9	14.9	62	68.7	68.7	7 1	69.6	69.6
70th %ile Term Code	Gan	Gan		Hold	Hold	Hold	Gan	Coord	Coord	Gan	Coord	Coord
50th %ile Green (s)	12.5	12 5		12.5	12.5	12.5	5 Q	71.6	71.6	6 6	72.3	72.3
50th %ile Term Code	Gan	Gan		Hold	Hold	Hold	Gan	Coord	Coord	Gan	Coord	Coord
30th %ile Green (s)	10.1	10 1		10.1	10.1	10.1	0.0	74.5	74.5	6 1	86.5	86.5
30th %ile Term Code	Gap	Gap		Hold	Hold	Hold	Skip	Coord	Coord	Gap	Coord	Coord
10th %ile Green (s)	10.0	10.0		10.0	10.0	10.0	0.0	86.6	86.6	0.0	86.6	86.6
10th %ile Term Code	Min	Min		Min	Min	Min	Skip	Coord	Coord	Skip	Coord	Coord
Stops (vph)	73	53		47	37	22	11	253	0	16	158	1
Fuel Used(I)	6	5		4	3	5	1	22	0	3	21	1
CO Emissions (g/hr)	113	97		70	51	89	18	406	8	47	387	25
NOx Emissions (g/hr)	22	19		14	10	17	3	78	2	9	75	5
VOC Emissions (g/hr)	26	22		16	12	21	4	94	2	11	89	6
Dilemma Vehicles (#)	0	0		0	0	0	0	26	0	0	18	0
Queue Length 50th (m)	17.4	12.0		11.6	8.7	0.0	1.3	25.3	0.0	2.3	15.3	0.0
Queue Length 95th (m)	26.8	22.7		19.6	15.5	15.1	6.3	53.5	0.0	7.5	38.5	1.5
Internal Link Dist (m)		184.5			167.5			150.7			256.0	
Turn Bay Length (m)	30.0			35.0		45.0	50.0		45.0	100.0		90.0
Base Capacity (vph)	368	499		350	510	550	621	2178	977	575	2263	1018
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.20		0.16	0.09	0.29	0.05	0.27	0.03	0.12	0.23	0.05
Intersection Summary	Other											
Area Type:	Other											
Actuated Cycle Length: 110												
Offset: 0 (0%), Referenced to phase	se 2:NBTL and	d 6:SBTL, S	tart of Greer	1								
Natural Cycle: 85												
Control Type: Actuated-Coordinate	ed											
Maximum v/c Ratio: 0.46												
Intersection Signal Delay: 13.4	00/			Int	ersection L	DS: B						
Intersection Capacity Utilization 58	.0%			IC	U Level of S	Service B						
Analysis Period (min) 15												

#### Splits and Phases: 3: Greenbank & Wessex/Berrigan



# 7: Greenbank & Highbury Park SUN Departure Pe

	<	•	1	1	1	Ŧ
Lane Group	WBI	WBR	NBT	NBR	SBL	SBT
Lane Configurations	·······				000	
	176	101	773	56	73	<b>TT</b> 540
Future Volume (vph)	170	101	773	56	73	540
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	1000	50.0	1000	0.0	60.0	1000
Storage Length (III)	0.0	50.0		0.0	00.0	
Joinage Lalles	20.0			U	20.0	
Lang Litil Faster	30.0	1.00	0.05	0.05	30.0	0.05
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor	1.00	0.98	0.990		1.00	
Elt Protected	0.950	0.000	0.000		0 950	
Satd Flow (prot)	1605	1517	3350	٥	1605	3300
Elt Permitted	0.950	1017	0000	U	0 323	0000
Satd Flow (perm)	1690	1/02	2350	٥	575	3300
Right Turn on Pod	1009	1495 Voo	3350	Voo	575	2220
Setd Elew (DTOD)		104	40	res		
Salu. FIUW (KTUK)	40	101	13			00
Link Speed (k/h)	40		60			60
LINK DIStance (m)	168.4		280.0			221.4
Travel Time (s)	15.2	-	16.8			13.3
Confl. Peds. (#/hr)	3	3		4	4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	176	101	773	56	73	540
Shared Lane Traffic (%)						
Lane Group Flow (vph)	176	101	829	0	73	540
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7	•	3.7	Ū		3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.9		4.9			4.9
Two way Left Turn Lane						
Headway Factor	1.06	1 06	1 06	1 06	1 06	1 06
Turning Speed (k/h)	24	14		14	24	1.00
Number of Detectors	24	14	2	14	24	2
Number of Detectors	l off	Diaht	Z Thru		l off	
Leading Detector (m)	Leit	Right 6.1	20.5		C 1	20 5
	0.1	0.1	30.5		0.1	30.5
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	6.1	1.8		6.1	1.8
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			28 7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			CI+Ev			CI+Ev
Detector 2 Channel			UITLA			UITLX
Detector 2 Extend (a)			0.0			0.0
	Deres	D	0.0		D	0.0
Turit Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	34.2	34.2	36.0		36.0	36.0
Total Split (s)	34.2	34.2	75.8		75.8	75.8
Total Split (%)	31.1%	31.1%	68.9%		68.9%	68.9%
Maximum Green (s)	27.0	27.0	69.8		69.8	69.8
Yellow Time (s)	30	3.0	37		37	37
All-Red Time (s)	4.2	4.2	23		23	22
Lost Time Adjust (s)	4.2	4.2	2.0		2.0	2.0
LOST TIME AUJUST (S)	0.0	0.0	0.0		0.0	0.0

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# 7: Greenbank & Highbury Park SUN Departure Pe

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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Total Lost Time (s)	72	7.2	60		60	60
Lead/Lag			0.0		0.0	0.0
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	18.0		18.0	18.0
Flash Dont Walk (s)	20.0	20.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)	3	3	4		0	0
Act Effct Green (s)	17.5	17.5	79.3		79.3	79.3
Actuated g/C Ratio	0.16	0.16	0,72		0.72	0.72
v/c Ratio	0.65	0.31	0.34		0.18	0.22
Control Delay	54.0	9.6	4 7		7.6	6.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	54 0	9.6	4 7		7.6	6.0
LOS	D	3.0 A	Α		Α	Δ
Approach Delay	37.8		47			62
Approach LOS	J7.0		+./ A			0.2
90th %ile Green (s)	27.0	27.0	A 60.8		60.8	A 03
Outh % ile Term Code	ZI.U Dod	ZI.U Dod	Coord		Coord	Coord
70th %ile Groop (a)	10.2	10.2	77 5		77 5	77 5
70th % ile Term Code	19.5	19.5	Coord		Coord	(1.5 Coord
	Gap	Gap	0010		00010	00010
Soun % lie Green (S)	16.7	16.7	ou.1		ou.1	80.1 Court
	Gap	Gap	Coord		Coord	Coord
SUTN %ILE Green (S)	14.2	14.2	82.6		82.6	82.6
Suth %ile Ferm Code	Gap	Gap	Coord		Coord	Coord
10th %ile Green (s)	10.5	10.5	86.3		86.3	86.3
10th %ile Term Code	Gap	Gap	Coord		Coord	Coord
Stops (vph)	160	17	172		24	172
Fuel Used(I)	13	3	29		3	18
CO Emissions (g/hr)	237	52	534		48	343
NOx Emissions (g/hr)	46	10	103		9	66
VOC Emissions (g/hr)	55	12	123		11	79
Dilemma Vehicles (#)	0	0	12		0	25
Queue Length 50th (m)	36.2	0.0	15.0		4.2	17.0
Queue Length 95th (m)	52.5	12.9	26.0		13.1	32.5
Internal Link Dist (m)	144.4		256.0			197.4
Turn Bay Length (m)		50.0			60.0	
Base Capacity (vph)	414	442	2417		414	2442
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	Õ		0	0
Reduced v/c Ratio	0.43	0.23	0.34		0.18	0.22
Intersection Summary						
Area Type:	Other					
Cycle Length: 110	00					
Actuated Cycle Length: 110						
Offset: 0 (0%) Referenced to pt	hase 2.NRT and 6	SBTI SH	art of Green			
Natural Cycle: 75						
Control Type: Actuated Coordin	ated					
Maximum v/c Ratio: 0.65	alou					
Intersection Signal Delay: 10.6				نصل	torcontion	00. D
Intersection Signal Delay, 10.6	60.99/					CO. D
Analysis Daried (min) 15	00.0%			iC		
Analysis Period (min) 15						

Splits and Phases: 7: Greenbank & Highbury Park



# 8: Highbury Park & Access SUN Departure Pe

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	1.		11	
Traffic Volume (veh/h)	49	70	103	7	28	162
Future Volume (Veh/h)	49	70	103	7	28	162
Sign Control		Free	Free	-	Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1 00	1.00	1 00	1 00	1 00	1 00
Hourly flow rate (yph)	49	70	103	7	28	162
Pedestrians	10	10	100	,	20	102
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		168				
pX platoon unblocked						
vC conflicting volume	110				274	106
vC1, stage 1 conf vol	110				211	100
vC2, stage 2 conf vol						
vCu, unblocked vol	110				274	106
tC. single (s)	4 1				64	62
tC 2 stage (s)					0.1	J.L
tF (s)	22				35	33
p0 queue free %	97				96	83
cM capacity (veh/h)	1480				691	948
	1100				001	010
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	119	110	190			
Volume Left	49	0	28			
Volume Right	0	7	162			
cSH	1480	1700	899			
Volume to Capacity	0.03	0.06	0.21			
Queue Length 95th (m)	0.8	0.0	6.1			
Control Delay (s)	3.2	0.0	10.1			
Lane LOS	А		В			
Approach Delay (s)	3.2	0.0	10.1			
Approach LOS			В			
Intersection Summary						
Average Delay			5.5			
Intersection Capacity Utilization			32.3%	ICL	J Level of S	Service
Analysis Period (min)			15			

# 3: Greenbank & Wessex/Berrigan SAT Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	1.		5	*	1	5	**	1	5	**	1
Traffic Volume (vph)	103	85	64	104	84	235	74	1061	98	230	1096	81
Future Volume (vph)	103	85	64	104	84	235	74	1061	98	230	1096	81
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		45.0	50.0		45.0	100.0		90.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00		0.96	1.00		0.97
Frt		0.936				0.850			0.850			0.850
Fit Protected	0.950	1051	0	0.950	4704	4547	0.950	0000	4547	0.950	0000	4547
Satd. Flow (prot)	1695	1654	0	1695	1784	1517	1695	3390	1517	1695	3390	1517
Fit Permitted	0.702	4054	0	0.599	4704	4404	0.225	2200	4400	0.199	2200	4470
Sato. Flow (perm)	1240	1654	U	1060	1784	1481	401	3390	1462	354	3390	1473
Right Turn on Rea		24	res			107			res			res
Salu. Flow (RTOR)		31			40	197		60	90		60	90
Link Distance (m)		208.5			101 5			174 7			280.0	
		18.8			17.0			10.5			16.8	
Confl Peds (#/br)	10	10.0	Q	٩	17.2	10	4	10.5	7	7	10.0	4
Peak Hour Factor	1 00	1.00	1 00	1 00	1.00	1 00	1 00	1 00	1 00	1 00	1 00	1 00
Adi Flow (vph)	103	85	64	104	84	235	74	1061	98	230	1006	81
Shared Lane Traffic (%)	100	00	04	104	04	200	14	1001	50	200	1000	01
Lane Group Flow (vph)	103	149	0	104	84	235	74	1061	98	230	1096	81
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		37		2011	37		2011	37		2011	37	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+EX			CI+Ex	
Detector 2 Channel		0.0			0.0			0.0			0.0	
Detector 2 Extend (S)	Dorm	0.0		Dorm	0.0	Dorm		0.0	Dorm		0.0	Dorm
Protocted Phases	Perm	INA 4		Perm	0	Penn	pm+pt	NA 2	Perm	pm+pt 1	NA 6	Perm
Protected Phases	4	4		Q	0	Q	ງ ວ	2	2	6	0	6
Petrotor Phase	4	1		0 Q	Q	0 Q	5	2	2	1	6	6
Switch Phase	-	7		U	0	0	J	2	2	1	0	0
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	38.5	38.5		38.5	38.5	38.5	10.0	31.0	31.0	10.0	31.0	31.0
Total Split (s)	39.0	39.0		39.0	39.0	39.0	15.0	66.0	66.0	15.0	66.0	66.0
Total Split (%)	32.5%	32.5%		32.5%	32.5%	32.5%	12.5%	55.0%	55.0%	12.5%	55.0%	55.0%
Maximum Green (s)	31.5	31.5		31.5	31.5	31.5	91	60 1	60 1	91	60 1	60 1
Yellow Time (s)	2.0	2.0		3.0	3.0	3.0	3.7	37	3.7	3.7	37	37
	30	30		3.0	J U	0.0	J /		57	57	57	
All-Red Time (s)	3.0 4.5	4.5		4.5	4.5	4.5	2.2	2.2	2.2	2.2	2.2	2.2

Rochelle Fortier, Novatech

### 3: Greenbank & Wessex/Berrigan SAT Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	7.5	7.5		7.5	7.5	7.5	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	24.0	24.0		24.0	24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)	9	9		10	10	10		7	7		4	4
Act Effct Green (s)	18.0	18.0		18.0	18.0	18.0	79.1	72.1	72.1	86.7	77.9	77.9
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.66	0.60	0.60	0.72	0.65	0.65
v/c Ratio	0.55	0.54		0.65	0.31	0.60	0.22	0.52	0.11	0.62	0.50	0.08
Control Delay	56.6	42.8		65.3	46.0	16.0	7.7	16.5	3.4	21.0	10.2	1.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
l otal Delay	56.6	42.8		65.3	46.0	16.0	1.1	16.5	3.4	21.0	10.2	1.1
LUS Assessed Delevi	E	10 A		E	D 24.4	В	A	14 O	A	C	44 F	A
Approach LOS		48.4			34.1			14.9			11.5	
Approach LOS	21.0	21 0		21.0	21.0	21.0	0.2	B 60 1	60.1	0.6	60 4	60.4
90th %ile Term Code	Dod	Dod		Dod	Dod	Dod	9.0 Can	Coord	Coord	9.0 Max	Coord	Coord
70th %ile Green (s)	20.0	20.0		20 0	20.0	20.0	0ap 7.5	66.7	66.7	1/1 0	73.2	73.2
70th %ile Term Code	Hold	Hold		Can	Can	Can	Gan	Coord	Coord	Gan	Coord	Coord
50th %ile Green (s)	16.1	16.1		16 1	16 1	16 1	68	73.4	73.4	11 2	77.8	77.8
50th %ile Term Code	Hold	Hold		Gan	Gan	Gan	Gan	Coord	Coord	Gan	Coord	Coord
30th %ile Green (s)	13.1	13.1		13.1	13.1	13.1	62	77.8	77.8	9.8	81.4	81.4
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Gap	Coord	Coord	Gap	Coord	Coord
10th %ile Green (s)	10.0	10.0		10.0	10.0	10.0	0.0	82.3	82.3	84	96.6	96.6
10th %ile Term Code	Min	Min		Min	Min	Min	Skip	Coord	Coord	Gap	Coord	Coord
Stops (vph)	92	105		95	71	49	26	610	10	115	353	3
Fuel Used(I)	8	10		9	6	8	2	49	2	13	47	2
CO Emissions (g/hr)	150	180		162	106	155	45	916	38	242	868	40
NOx Emissions (g/hr)	29	35		31	20	30	9	177	7	47	168	8
VOC Emissions (g/hr)	35	42		37	24	36	10	211	9	56	200	9
Dilemma Vehicles (#)	0	0		0	0	0	0	44	0	0	43	0
Queue Length 50th (m)	23.2	26.4		23.8	18.2	8.1	3.8	69.7	0.3	12.2	49.8	0.0
Queue Length 95th (m)	35.7	40.8		37.0	28.7	28.3	12.1	114.1	8.8	#54.1	57.5	2.6
Internal Link Dist (m)		184.5			167.5			150.7			256.0	
Turn Bay Length (m)	30.0			35.0		45.0	50.0		45.0	100.0		90.0
Base Capacity (vph)	325	457		278	468	534	369	2035	915	375	2199	989
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.33		0.37	0.18	0.44	0.20	0.52	0.11	0.61	0.50	0.08
Intersection Summary												
Area Type:	Other											
Cycle Length: 120												
Actuated Cycle Length: 120 Offset: 1 (1%), Referenced to phase	e 2:NBTL and	6:SBTL. S	tart of Greer	ı								
Natural Cycle: 85		, •,										
Control Type: Actuated-Coordinate	ed											
Maximum v/c Ratio: 0.65												
Intersection Signal Delay: 18.4				Int	ersection L(	DS: B						
Intersection Capacity Utilization 88	.6%			ICI	J Level of S	ervice E						
Analysis Period (min) 15												
# 95th percentile volume exceed	s capacity, que	eue may be	longer.									
Queue shown is maximum after	two cycles.	, -	Ŭ									
Splits and Phases: 3: Greenban	k & Wessex/B	errigan										

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# 7: Greenbank & Highbury Park SAT Peak

	<ul> <li>Image: A set of the set of the</li></ul>	•	<b>†</b>	1	1	Ļ
Lano Group	* \\//D1			• NDD	CDI	• CDT
	VVBL	WDR		INDR	SBL	301
Lane Configurations	្តិ	7	1000	05	101	4007
Traffic Volume (vph)	97	156	1320	95	161	1327
Future Volume (vph)	97	156	1320	95	161	1327
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	50.0		0.0	60.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	30.0				30.0	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor	1.00	0.98	1.00		1.00	
Frt		0.850	0.990			
Flt Protected	0.950				0.950	
Satd Flow (prot)	1695	1517	3350	0	1695	3390
Elt Permitted	0.950	1017	0000	U	0 161	0000
Satd Elow (norm)	1600	1/02	3350	0	0.101	3200
Dight Turn on Dad	1000	1493	3350	U	201	2280
Right Lurn on Red		Yes		Yes		
Satd. Flow (RTOR)		76	13			
Link Speed (k/h)	40		60			60
Link Distance (m)	168.4		280.0			221.4
Travel Time (s)	15.2		16.8			13.3
Confl Peds (#/hr)	3	.3		4	4	
Peak Hour Factor	1 00	1 00	1 00	1 00	1 00	1.00
	1.00	1.00	1200	1.00	1.00	1207
Auj. Flow (vpn)	97	156	1320	95	101	1327
Snared Lane Traffic (%)						
Lane Group Flow (vph)	97	156	1415	0	161	1327
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.0		4.0			1.0
	4.5		4.5			4.5
	4.00	4.00	4.00	1.00	4.00	4.00
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	6.1	6.1	30.5		6.1	30.5
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Cize(m)	0.0	0.0	1.0		0.0	1.0
						1.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)	0.0		28.7		0.0	28.7
Detector 2 Size(m)			1.8			1 8
Detector 2 Ture						
Detector 2 Type			CI+EX			CI+EX
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase	0	0	2		0	0
Minimum Initial (a)	10.0	10.0	10.0		10.0	10.0
	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	34.2	34.2	36.0		36.0	36.0
Total Split (s)	34.2	34.2	85.8		85.8	85.8
Total Split (%)	28.5%	28.5%	71.5%		71.5%	71.5%
Maximum Green (s)	27.0	27.0	79.8		79.8	79.8
Yellow Time (s)	30	3.0	37		37	37
All-Red Time (s)	10	1.0	22		23	22
Lost Timo Adjust (s)	4.2	4.2	2.0		2.0	2.5
LOST TIME Adjust (S)	0.0	0.0	0.0		0.0	0.0

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# 7: Greenbank & Highbury Park SAT Peak

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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Total Lost Time (s)	7.2	7.2	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	18.0		18.0	18.0
Flash Dont Walk (s)	20.0	20.0	12.0		12.0	12.0
Podostrian Calls (#/hr)	20.0	20.0	12.0		12.0	12.0
	14.0	14.0	01.0		01.0	01.0
Actuated a/C Datio	14.9	14.9	91.9		91.9	91.9
Actualed g/C Ratio	0.12	0.12	0.77		0.77	0.77
V/C Ratio	0.46	0.62	0.55		0.74	0.51
Control Delay	54.3	35.4	4.4		33.3	7.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	54.3	35.4	4.4		33.3	7.0
LOS	D	D	A		С	A
Approach Delay	42.7		4.4			9.9
Approach LOS	D		А			А
90th %ile Green (s)	27.0	27.0	79.8		79.8	79.8
90th %ile Term Code	Ped	Ped	Coord		Coord	Coord
70th %ile Green (s)	15.1	15.1	91.7		91.7	91.7
70th %ile Term Code	Gap	Gap	Coord		Coord	Coord
50th %ile Green (s)	12.2	12.2	94.6		94.6	94.6
50th %ile Term Code	Gan	Gan	Coord		Coord	Coord
30th %ile Green (s)	10.2	10.2	96.6		96.6	96.6
30th %ile Term Code	Gan	Gan	Coord		Coord	Coord
10th %ile Green (c)	10 0	10 0	00010		06.9	0000
10th % ile Term Code	TU.U	10.0	90.0 Coord		0.0C	90.0 Coord
	MIN	IVIIN	Coord		Coord	Coord
Stops (Vpn)	87	/b	244		88	490
Fuel Used(I)	7	8	47		10	49
CO Emissions (g/hr)	131	151	875		187	903
NOx Emissions (g/hr)	25	29	169		36	174
VOC Emissions (g/hr)	30	35	202		43	208
Dilemma Vehicles (#)	0	0	9		0	55
Queue Length 50th (m)	22.1	18.2	24.6		15.0	47.1
Queue Length 95th (m)	34.0	35.3	38.1		#74.8	101.1
Internal Link Dist (m)	144.4		256.0			197.4
Turn Bay Length (m)		50.0			60.0	
Base Capacity (vph)	379	394	2568		219	2596
Starvation Can Peductn	0,0	0.04	2000		0	2000
Snillback Can Reducto	0	0	0		0	0
Storage Can Reductin	0	0	0		0	0
Storage Cap Reductin	0	0 40	0 55		0 74	0
Reduced V/C Ratio	0.26	0.40	0.55		0.74	0.51
	Other					
Area Type:	Other					
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 0 (0%), Referenced to ph	nase 2:NBT and 6	SBTL, Sta	art of Green			
Natural Cycle: 120						
Control Type: Actuated-Coordin	ated					
Maximum v/c Ratio: 0.74						
Intersection Signal Delay: 10.0				Int	ersection L	OS: B
Intersection Capacity Utilization	76.8%			IC	U Level of S	Service D
Analysis Period (min) 15						
# 95th percentile volume exce	eds capacity oue	ue may he	longer			
	fter two evolves	ac may be	longer.			

Splits and Phases: 7: Greenbank & Highbury Park



#### 8: Highbury Park & Access SAT Peak

	≯	<b>—</b>	←	٠.	1	2
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		đ	1		M	
Traffic Volume (veh/h)	34	212	211	5	4	28
Future Volume (Veh/h)	34	212	211	5	4	28
Sign Control		Free	Free	-	Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1 00	1 00	1.00	1 00	1 00	1.00
Hourly flow rate (yph)	34	212	211	5	1.00	28
Pedestrians	54	212	211	5	-	20
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Dight turn flare (uch)						
Nodian type		Nono	Nono			
Median starage usb)		NOTE	None			
		100				
opsueam signal (m)		100				
px, platoon unblocked	040				40.4	014
	216				494	214
vc1, stage 1 cont vol						
vC2, stage 2 cont vol	040				10.1	011
vCu, unblocked vol	216				494	214
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				99	97
cM capacity (veh/h)	1354				522	827
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	246	216	32			
Volume Left	34	0	4			
Volume Right	0	5	28			
cSH	1354	1700	770			
Volume to Capacity	0.03	0.13	0.04			
Oueue Length 95th (m)	0.00	0.10	1.0			
Control Delay (s)	1 3	0.0	9.9			
Lane LOS	١.5	0.0	5.5			
Approach Dolay (c)	1 2	0.0	0.0			
Approach LOS	1.3	0.0	5.5			
Approach 200			A			
Intersection Summary			10			
Average Delay			1.3			
Intersection Capacity Utilization			39.1%	ICl	J Level of S	ervice
Analysis Period (min)			15			

# 3: Greenbank & Wessex/Berrigan SUN Arrival Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	t.		5	*	1	5	**	1	5	**	1
Traffic Volume (vph)	98	53	49	61	48	174	30	688	30	77	528	39
Future Volume (vph)	98	53	49	61	48	174	30	688	30	77	528	39
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		45.0	50.0		45.0	100.0		90.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99			1.00		0.97	1.00		0.97
Frt		0.928				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1695	1639	0	1695	1784	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.726		-	0.691			0.456			0.355		
Satd. Flow (perm)	1283	1639	0	1223	1784	1517	811	3390	1464	630	3390	1474
Right Turn on Red		10	Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			10	1/4			103			103
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		208.5			191.5			1/4./			280.0	
I ravel I ime (s)	10	18.8	•	0	17.2		4	10.5	7	7	16.8	4
Confi. Peds. (#/nr)	10	1.00	4 00	4 00	1.00	1.00	4	1.00	1 00	1 00	1.00	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (Vpn) Sharad Lana Traffia (%)	98	53	49	01	48	1/4	30	000	30	11	528	39
	00	100	٥	61	10	17/	20	600	20	77	E 00	20
Enter Blocked Intersection	98 No	No	No	No	40 No	174 No	No	No	No	No	JZ0 No	39 No
Lano Alignment	Loft	Loft	Dight	Loft	Loft	Dight	Loft	Loft	Dight	Loft	Loff	Dight
Modian Width(m)	Leit	2.7	Right	Leit	3.7	Right	Leit	3.7	Right	Leit	2.7	Right
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		0.0 4 9			0.0 4 Q			0.0 4 Q			0.0 4 Q	
Two way Left Turn Lane		4.5			4.3			4.5			4.3	
Headway Eactor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	1.00	14	24	1.00	14	24	1.00	14	24	1.00	14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Detector Phase	4	4		8	8	8	5	2	2	1	6	6
Switch Phase	10.0	10.0		40.0	(0.0	40.0		40.0	40.0		10.0	40.0
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
iviinimum Split (s)	38.5	38.5		38.5	38.5	38.5	10.9	31.9	31.9	10.9	31.9	31.9
Total Split (S)	39.0	39.0		39.0	39.0	39.0	13.0	58.0	58.0	13.0	58.0	58.0
I otal Split (%)	35.5%	35.5%		35.5%	35.5%	35.5%	11.8%	52.7%	52.7%	11.8%	52.7%	52.7%
Wallow Time (a)	31.5	31.5		31.5	31.5	31.5	/.1	52.1	52.1	/.1	52.1	52.1
Tellow Time (S)	3.0	3.0		3.0	3.0	3.0	3./	3./	3./	3./	3.1	3.7
All-Red Time (S)	4.5	4.5		4.5	4.5	4.5	2.2	2.2	2.2	2.2	2.2	2.2
LOST TIME AUJUST (S)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rochelle Fortier, Novatech

# 3: Greenbank & Wessex/Berrigan SUN Arrival Peak

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	7.5	7.5		7.5	7.5	7.5	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	24.0	24.0		24.0	24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)	9	9		10	10	10		7	7		4	4
Act Effct Green (s)	16.5	16.5		16.5	16.5	16.5	74.9	69.8	69.8	77.0	72.7	72.7
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.68	0.63	0.63	0.70	0.66	0.66
V/c Ratio	0.51	0.36		0.33	0.18	0.46	0.05	0.32	0.03	0.15	0.24	0.04
Control Delay	50.4	27.0		44.0	39.0	9.4	6.5	11.6	0.1	5.4	7.8	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loc	50.4	27.0		44.0	39.0	9.4	0.5	11.0	0.1	5.4	0.1	0.1
LUS Approach Delev	U	20 5		U	D 01.0	А	A	10 0	A	А	A 7.0	A
Approach LOS		30.5			21.9			10.9			7.0	
Approach LOS	31.0	21 O		31.0	31.0	31.0	7 /	52 1	52.1	76	52 3	52.3
90th %ile Torm Code	Dod	Dod		Dod	Dod	Dod	Gan	Coord	Coord	7.0 Max	Coord	Coord
70th %ile Green (s)	16 3	16 3		16 3	16 3	16 3	63	67.0	67.0	74	68.1	68 1
70th %ile Term Code	Gan	Gan		Hold	Hold	Hold	Gan	Coord	Coord	Gan	Coord	Coord
50th %ile Green (s)	13.8	13.8		13.8	13.8	13.8	5 Q	70.2	70.2	67	71.0	71.0
50th %ile Term Code	Gan	Gan		Hold	Hold	Hold	Gan	Coord	Coord	Gan	Coord	Coord
30th %ile Green (s)	11.2	11.2		11.2	11.2	11.2	0.0	73.3	73.3	62	85.4	85.4
30th %ile Term Code	Gap	Gap		Hold	Hold	Hold	Skip	Coord	Coord	Gap	Coord	Coord
10th %ile Green (s)	10.0	10.0		10.0	10.0	10.0	0.0	86.6	86.6	0.0	86.6	86.6
10th %ile Term Code	Min	Min		Min	Min	Min	Skip	Coord	Coord	Skip	Coord	Coord
Stops (vph)	85	53		52	39	22	12	317	0	18	169	0
Fuel Used(I)	7	5		4	3	5	1	27	0	3	21	1
CO Emissions (g/hr)	134	95		75	55	95	18	499	8	52	399	18
NOx Emissions (g/hr)	26	18		15	11	18	4	96	2	10	77	3
VOC Emissions (g/hr)	31	22		17	13	22	4	115	2	12	92	4
Dilemma Vehicles (#)	0	0		0	0	0	0	31	0	0	20	0
Queue Length 50th (m)	20.2	11.9		12.2	9.4	0.0	1.4	32.4	0.0	3.0	16.8	0.0
Queue Length 95th (m)	30.6	22.7		20.7	16.7	15.5	6.3	64.5	0.0	8.9	34.4	0.3
Internal Link Dist (m)		184.5			167.5			150.7			256.0	
Turn Bay Length (m)	30.0			35.0		45.0	50.0		45.0	100.0		90.0
Base Capacity (vph)	367	499		350	510	558	614	2152	966	511	2239	1008
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.20		0.17	0.09	0.31	0.05	0.32	0.03	0.15	0.24	0.04
Intersection Summary	0.4											
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110												
Offset: 0 (0%), Referenced to pha	ise 2:NBTL an	d 6:SBTL, S	tart of Gree	n								
Natural Cycle: 85												
Control Type: Actuated-Coordinat	ed											
Interpretion Signal Data 440				1-1	oroootine L (							
Intersection Signal Delay: 14.2	0.00/			Int	ersection L	US: B						
Analysis Daried (min) 15	0.0%			iC	U Level of S	Del VICE B						
Analysis Fellou (IIIII) 15												

#### Splits and Phases: 3: Greenbank & Wessex/Berrigan



# 7: Greenbank & Highbury Park SUN Arrival Peak

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Lane Group	WBI	WBR	NBT	NBR	SBI	SBT
Lane Configurations	······································		A1.		000	
Traffic Volume (vnh)	122	50	855	110	120	508
	122	50	855	110	129	508
I deal Flow (vphpl)	1000	1000	1900	1900	129	1900
Storogo Longth (m)	1000	1000	1800	1000	1000	1800
Storage Length (M)	0.0	0.00		0.0	00.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	30.0		0.0-	0.0-	30.0	<u> </u>
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor	1.00	0.98	1.00		1.00	
Frt		0.850	0.982			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1695	1517	3318	0	1695	3390
Flt Permitted	0.950				0.275	
Satd. Flow (perm)	1689	1493	3318	0	490	3390
Right Turn on Red		Yes		Yes		
Satd Flow (RTOR)		. 50	27			
Link Sneed (k/h)	10		60			60
Link Distance (m)	40 160 /		280.0			221 /
	100.4		200.0			42.2
Travel Time (S)	15.2	•	16.8			13.3
Contl. Peds. (#/hr)	3	3		4	4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	122	50	855	119	129	598
Shared Lane Traffic (%)						
Lane Group Flow (vph)	122	50	974	0	129	598
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	l off	Right	l off	Right	Left	l off
Modian Width(m)	27	Night	27	Right	Leit	27
iviedian width(m)	3./		3./			3.1
LINK Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.9		4.9			4.9
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		l eft	Thru
Leading Detector (m)	£ 1	6 1	30 5		£ 1	20 5
	0.1	0.1	30.5		0.1	0.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	6.1	1.8		6.1	1.8
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delev (a)	0.0	0.0	0.0		0.0	0.0
Detector T Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
	Parm	Perm	NΔ		Perm	NΔ
Protected Phases			- 2			201
Protected Phases		0	2		^	0
Permitted Phases	8	8	-		6	-
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	34.2	34.2	36.0		36.0	36.0
Total Split (s)	34.2	34.2	75.8		75.8	75.8
Total Split (%)	21 1%	31.1%	68.0%		68.9%	68 9%
Maximum Groop (a)	JT.170	01.1%	60.0		00.9%	60.0
	27.0	27.0	09.0		09.0	09.0
Yellow Lime (s)	3.0	3.0	3.7		3.7	3.7
All-Red Time (s)	4.2	4.2	2.3		2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0

Rochelle Fortier, Novatech

# 7: Greenbank & Highbury Park SUN Arrival Peak

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Lane Group	WRI	WBR	NRT	NBR	SBI	SBT
Total Lost Time (s)	7.2	72	6.0	RER	60	6.0
l ead/l ag	1.2	1.2	0.0		0.0	0.0
Lead-Lag Optimize?						
Vehicle Extension (s)	30	30	30		30	30
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	18.0		18.0	18.0
Flash Dont Walk (s)	20.0	20.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)	.3		4		0	0
Act Effet Green (s)	15.4	15.4	81.4		81 4	81.4
Actuated a/C Ratio	0 14	0 14	0 74		0.74	0 74
v/c Ratio	0.14	0.14	0.74		0.74	0.74
Control Dolay	50.3	11.0	13		0.00	5.5
	50.5	0.0	4.5		9.9	0.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
	50.3	11.9	4.3		9.9	5.5
LUS Assessed Dalay	U OO A	В	A		A	A
Approach Delay	39.1		4.3			6.3
Approach LOS	D	<u> </u>	A			A
90th %ile Green (s)	27.0	27.0	69.8		69.8	69.8
90th %ile Term Code	Ped	Ped	Coord		Coord	Coord
70th %ile Green (s)	15.4	15.4	81.4		81.4	81.4
70th %ile Term Code	Gap	Gap	Coord		Coord	Coord
50th %ile Green (s)	13.3	13.3	83.5		83.5	83.5
50th %ile Term Code	Gap	Gap	Coord		Coord	Coord
30th %ile Green (s)	11.1	11.1	85.7		85.7	85.7
30th %ile Term Code	Gap	Gap	Coord		Coord	Coord
10th %ile Green (s)	10.0	10.0	86.8		86.8	86.8
10th %ile Term Code	Min	Min	Coord		Coord	Coord
Stops (vph)	107	12	201		51	180
Fuel Used(I)	8	2	33		5	20
CO Emissions (g/hr)	157	28	621		95	369
NOx Emissions (g/hr)	30	5	120		18	71
VOC Emissions (g/hr)	36	7	143		22	85
Dilemma Vehicles (#)	0	0	1/		0	27
Oueue Length 50th (m)	25.2	0.0	16.5		76	16.5
Queue Length 95th (m)	20.2	0.0	28.6		27.0	26.3
Internal Link Dict (m)	G.16	9.5	20.0		21.0	107 4
	144.4	E0.0	200.0		60.0	197.4
Turri Bay Length (m)	444	50.0	0400		0.00	0540
Base Capacity (vpn)	414	404	2463		362	2510
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.29	0.12	0.40		0.36	0.24
Intersection Summary						
Area Type:	Other					
Cycle Length: 110						
Actuated Cycle Length: 110						
Offset: 0 (0%), Referenced to ph	nase 2:NBT and 6	5:SBTL, Sta	art of Green			
Natural Cycle: 75		, , ,				
Control Type: Actuated-Coordin	ated					
Maximum v/c Ratio: 0.52						
Intersection Signal Delay: 8.3				Int	tersection L	OS A
Intersection Capacity Litilization	63.0%					Service R
Analysis Period (min) 15	00.070			10		
Analysis Penou (min) 15						

Splits and Phases: 7: Greenbank & Highbury Park



# 8: Highbury Park & Access SUN Arrival Peak

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	1.		M	
Traffic Volume (veh/h)	162	75	111	28	7	49
Future Volume (Veh/h)	162	75	111	28	7	49
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	162	75	111	28	7	49
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		168				
pX, platoon unblocked						
vC, conflicting volume	139				524	125
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	139				524	125
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				98	95
cM capacity (veh/h)	1445				456	926
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	237	139	56			
Volume Left	162	0	7			
Volume Right	0	28	49			
cSH	1445	1700	820			
Volume to Capacity	0 11	0.08	0.07			
Queue Length 95th (m)	29	0.0	17			
Control Delay (s)	5.6	0.0	9.7			
Lane LOS	Δ	0.0	Δ			
Approach Delay (s)	56	0.0	97			
Approach LOS	0.0	0.0	A			
Intersection Summary						
Average Delev			12			
Intersection Canacity Utilization			4.0			onvico
			JJ.270			
Analysis Period (min)			15			

# 3: Greenbank & Wessex/Berrigan SUN Departure Pe

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	t.		5	*	1	5	**	1	5	**	1
Traffic Volume (vph)	84	53	49	61	48	174	30	641	30	77	575	53
Future Volume (vph)	84	53	49	61	48	174	30	641	30	77	575	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	35.0		45.0	50.0		45.0	100.0		90.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		0.99			1.00		0.97	0.99		0.97
Frt		0.928				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1695	1639	0	1695	1784	1517	1695	3390	1517	1695	3390	1517
Flt Permitted	0.726		_	0.691			0.434			0.379		
Satd. Flow (perm)	1283	1639	0	1223	1784	1517	772	3390	1464	673	3390	1474
Right Turn on Red		10	Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			10	174			103			103
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		208.5			191.5			1/4./			280.0	
I ravel I ime (s)	10	18.8	•	•	17.2		4	10.5	7	7	16.8	4
Confi. Peds. (#/nr)	10	1.00	4 00	4 00	1.00	1.00	4	1.00	1 00	1 00	1.00	4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (Vpn) Sharad Lana Traffia (%)	84	53	49	01	48	1/4	30	64 1	30	11	5/5	53
	01	100	٥	61	10	17/	20	611	20	77	575	E.2
Enter Blocked Intersection	04 No	No.	No	No	40 No	174 No	No	No	No	No	575 No	55 No
Lano Alignment	INU Loft	Loft	Dight	Loft	Loft	Dight	Loft	Loft	Dight	Loft	Loff	Dight
Modian Width(m)	Leit	2.7	Right	Leit	3.7	Right	Leit	3.7	Right	Leit	2.7	Right
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		0.0 4 9			0.0 1 Q			0.0 4 Q			0.0 4 Q	
Two way Left Turn Lane		т.5			ч.5			т.5			ч.5	
Headway Eactor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	1.00	14	24	1.00	14	24	1.00	14	24	1.00	14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Detector Phase	4	4		8	8	8	5	2	2	1	6	6
Switch Phase	10.0	10.0		40.0	(0.0	40.0		40.0	40.0		10.0	40.0
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
iviinimum Split (s)	38.5	38.5		38.5	38.5	38.5	10.9	31.9	31.9	10.9	31.9	31.9
Total Split (S)	39.0	39.0		39.0	39.0	39.0	13.0	58.0	58.0	13.0	58.0	58.0
i otal Split (%)	35.5%	35.5%		35.5%	35.5%	35.5%	11.8%	52.7%	52.7%	11.8%	52.7%	52.7%
Wallow Time (c)	31.5	31.5		31.5	31.5	31.5	/.1	52.1	52.1	/.1	52.1	52.1
Tellow Time (S)	3.0	3.0		3.0	3.0	3.0	3./	3./	3./	3./	3.1	3.7
All-Red Time (S)	4.5	4.5		4.5	4.5	4.5	2.2	2.2	2.2	2.2	2.2	2.2
LOSETIME AUJUST (S)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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# 3: Greenbank & Wessex/Berrigan SUN Departure Pe

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	7.5	7.5		7.5	7.5	7.5	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	24.0	24.0		24.0	24.0	24.0		19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)	9	9		10	10	10		7	7		4	4
Act Effct Green (s)	15.7	15.7		15.7	15.7	15.7	75.6	70.6	70.6	77.8	73.4	73.4
Actuated g/C Ratio	0.14	0.14		0.14	0.14	0.14	0.69	0.64	0.64	0.71	0.67	0.67
v/c Ratio	0.46	0.38		0.35	0.19	0.48	0.05	0.29	0.03	0.14	0.25	0.05
Control Delay	49.1	27.8		45.2	39.9	9.8	6.3	11.1	0.1	4.8	7.2	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LOS	49.1	27.8		45.2	39.9	9.8	0.3	11.1	0.1	4.8	1.2	0.3
LUS Approach Delevi	U	27.4		U	D 20 5	A	A	10 A	A	A	A	A
Approach LOS		37.4			22.5			10.4			0.4	
Approach LOS	31.0	21 O		31.0	31.0	31.0	7 /	52 1	52.1	76	52 3	52.3
90th %ile Term Code	Dod	Dod		Dod	Dod	Dod	Gan	Coord	Coord	7.0 Max	Coord	Coord
70th %ile Green (s)	1/ Q	1/ Q		1/LQ	1/1 Q	1/1 Q	6 2	68.5	68.5	73	0000 60 6	0000 60 6
70th %ile Term Code	Gan	Gan		Hold	Hold	Hold	Gan	Coord	Coord	Gan	Coord	Coord
50th %ile Green (s)	12.6	12.6		12.6	12.6	12.6	5 Q	71 4	71 4	67	72.2	72.2
50th %ile Term Code	Gan	Gan		Hold	Hold	Hold	Gan	Coord	Coord	Gan	Coord	Coord
30th %ile Green (s)	10.1	10.1		10.1	10.1	10.1	0.0	74.4	74.4	62	86.5	86.5
30th %ile Term Code	Gap	Gap		Hold	Hold	Hold	Skip	Coord	Coord	Gap	Coord	Coord
10th %ile Green (s)	10.0	10.0		10.0	10.0	10.0	0.0	86.6	86.6	0.0	86.6	86.6
10th %ile Term Code	Min	Min		Min	Min	Min	Skip	Coord	Coord	Skip	Coord	Coord
Stops (vph)	73	53		52	39	22	12	284	0	18	175	1
Fuel Used(I)	6	5		4	3	5	1	24	0	3	23	1
CO Emissions (g/hr)	113	97		76	56	96	18	453	8	51	425	25
NOx Emissions (g/hr)	22	19		15	11	18	4	87	2	10	82	5
VOC Emissions (g/hr)	26	22		18	13	22	4	104	2	12	98	6
Dilemma Vehicles (#)	0	0		0	0	0	0	29	0	0	20	0
Queue Length 50th (m)	17.4	12.0		12.4	9.5	0.0	1.3	28.6	0.0	2.6	16.8	0.0
Queue Length 95th (m)	26.8	22.7		20.7	16.7	15.5	6.3	59.5	0.0	8.2	40.9	1.2
Internal Link Dist (m)		184.5			167.5			150.7			256.0	
Turn Bay Length (m)	30.0			35.0		45.0	50.0		45.0	100.0		90.0
Base Capacity (vph)	367	499		350	510	558	595	2175	976	543	2263	1018
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.20		0.17	0.09	0.31	0.05	0.29	0.03	0.14	0.25	0.05
Intersection Summary	Others											
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110			hart of Ore									
Offset: 0 (0%), Referenced to pha	ISE 2:INBTL and	a 6:581L, S	tart of Greel	n								
Natural Cycle: 85	ad											
Control Type: Actuated-Coordinat	ed											
Intersection Signal Delay: 12.4				1.04	orcostion L	10. D						
Intersection Signal Delay: 13.4	0 00/			int		JO. D						
Analysis Poriod (min) 15	0.0%			iC	U Level of S	DELVICE R						
Analysis Fellou (IIIII) 10												

#### Splits and Phases: 3: Greenbank & Wessex/Berrigan



# 7: Greenbank & Highbury Park SUN Departure Pe

	✓	•	1	1	1	Ŧ
Lane Group	WBI	WBR	NBT	NBR	SBL	SBT
	WDL 1				000	
	193	102	<b>T 13</b>	59	77	508
Future Volume (vph)	103	102	855	50	77	508
I deal Flow (vphp)	100	102	1000	00 1900	1000	1900
Storogo Longth (m)	1800	1800	1800	1800	1000	1800
Storage Length (m)	0.0	50.0		0.0	60.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	30.0				30.0	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor	1.00	0.98	1.00		1.00	
Frt		0.850	0.990			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1695	1517	3350	0	1695	3390
Flt Permitted	0.950				0.291	
Satd. Flow (perm)	1689	1493	3350	0	518	3390
Right Turn on Red		Yes		Yes		
Satd Flow (RTOR)		102	12	100		
Link Speed (k/b)	10	102	60			60
Link Distance (m)	40		280.0			221 /
	108.4		280.0			221.4
Travel Time (s)	15.2		16.8			13.3
Contl. Peds. (#/hr)	3	3		4	4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	183	102	855	58	77	598
Shared Lane Traffic (%)						
Lane Group Flow (vph)	183	102	913	0	77	598
Enter Blocked Intersection	No	No	No	No	No	No
		Diaht	Loft	Diaht	Loff	Loff
	Leit	Right	Len	Right	Len	Len
iviedian Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.9		4.9			4.9
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2		1	2
Detector Tomplate	Loft	Diaht	Thru		Loff	Thru
Leading Detector (m)	Leit	Right	20.5		Leit	20 5
	6.1	0.1	30.5		0.1	30.5
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	6.1	6.1	1.8		6.1	1.8
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Oueue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Deley (a)	0.0	0.0	0.0		0.0	0.0
Detector T Detay (S)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
	Perm	Perm	NΔ		Perm	NΔ
Protected Phases		i cim	2		1 0111	6
Dermitted Dhases	0	0	2		C	0
	ð	ŏ	•		Ö	~
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	34.2	34.2	36.0		36.0	36.0
Total Split (s)	34.2	34.2	75.8		75.8	75.8
Total Split (%)	31.1%	31.1%	68.9%		68.9%	68.9%
Maximum Green (s)	27.0	27.0	60.0		69.8	60.0
Vollow Time (s)	21.0	21.0	27		27	2 7
	3.0	3.0	3.1		3.1	3.1
All-Red Time (s)	4.2	4.2	2.3		2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0

Rochelle Fortier, Novatech

# 7: Greenbank & Highbury Park SUN Departure Pe

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Lane Group	WBI	WBR	NBT	NBR	SBI	SBT
Total Lost Time (s)	72	72	60		60	60
Lead/Lag			0.0		0.0	0.0
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	18.0		18.0	18.0
Flash Dont Walk (s)	20.0	20.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)	3	3	4		0	0
Act Effet Green (s)	17 9	17 9	78 9		78 9	78.9
Actuated g/C Ratio	0.16	0.16	0.72		0.72	0.72
v/c Ratio	0.10	0.10	0.72		0.72	0.72
Control Dolay	54.3	0.51	1.7		0.21 g 2	6.3
	0.0	9.0	4.7		0.2	0.3
Total Delay	U.U EA 2	0.0	0.0		0.0	0.0
	54.3	9.5	4./		ŏ.∠	0.3
LUS Angreach Dalau	D	A	A		A	A
Approach Delay	38.3		4./			6.5
Approach LOS	D	07.0	A			A
90th %ile Green (s)	27.0	27.0	69.8		69.8	69.8
90th %ile Term Code	Ped	Ped	Coord		Coord	Coord
70th %ile Green (s)	19.8	19.8	77.0		77.0	77.0
70th %ile Term Code	Gap	Gap	Coord		Coord	Coord
50th %ile Green (s)	17.2	17.2	79.6		79.6	79.6
50th %ile Term Code	Gap	Gap	Coord		Coord	Coord
30th %ile Green (s)	14.6	14.6	82.2		82.2	82.2
30th %ile Term Code	Gap	Gap	Coord		Coord	Coord
10th %ile Green (s)	10.8	10.8	86.0		86.0	86.0
10th %ile Term Code	Gap	Gap	Coord		Coord	Coord
Stops (vph)	166	17	188		29	196
Fuel Used(I)	13	3	32		3	21
CO Emissions (a/hr)	247	52	587		54	385
NOx Emissions (g/hr)	48	10	113		10	74
VOC Emissions (g/hr)	57	12	135		12	80
Dilemma Vehicles (#)	0	0	14		0	27
Oueue Length 50th (m)	37.6	0.0	16.0		47	10.6
Queue Length 95th (m)	5/ 3	12 0	27 /		11.1	26.2
Internal Link Dict (m)	14.5	12.9	21.4		14.4	107 /
Turn Poyl onath (m)	144.4	E0 0	200.0		60.0	131.4
Turn Bay Length (m)	444	50.0	2400		00.0	0400
Dase Capacity (Vpn)	414	443	2406		3/1	2432
Starvation Cap Reductin	0	0	0		U	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.44	0.23	0.38		0.21	0.25
Intersection Summary	Ollere					
Area Type:	Other					
Cycle Length: 110						
Actuated Cycle Length: 110						
Offset: 0 (0%), Referenced to pl	hase 2:NBT and 6	6:SBTL, Sta	art of Green			
Natural Cycle: 75						
Control Type: Actuated-Coordin	ated					
Maximum v/c Ratio: 0.67						
Intersection Signal Delay: 10.4				Int	tersection L	OS: B
Intersection Capacity Utilization	63.1%			IC	U Level of S	Service B
Analysis Period (min) 15						

#### Splits and Phases: 7: Greenbank & Highbury Park



# 8: Highbury Park & Access SUN Departure Pe

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	1		M	
Traffic Volume (veh/h)	49	75	111	7	28	162
Future Volume (Veh/h)	49	75	111	7	28	162
Sian Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	49	75	111	7	28	162
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		168				
pX, platoon unblocked						
vC, conflicting volume	118				288	114
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	118				288	114
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				96	83
cM capacity (veh/h)	1470				680	938
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	124	118	190			
Volume Left	49	0	28			
Volume Right	0	7	162			
cSH	1470	1700	888			
Volume to Capacity	0.03	0.07	0.21			
Queue Length 95th (m)	0.8	0.0	6.1			
Control Delay (s)	3.1	0.0	10.2			
Lane LOS	A		В			
Approach Delay (s)	3.1	0.0	10.2			
Approach LOS			В			
Intersection Summary						
Average Delay			5.4			
Intersection Capacity Utilization			32.6%	ICI	J Level of S	ervice
Analysis Period (min)			15			