MAY 24, 2024

PROJECT NO: 2571-6892

SENT VIA: EMAIL TO MSHIH@LINCOLN.CA

Town of Lincoln 4800 South Service Rd Beamsville, ON L3J 1L3

Attention: Melissa Shih

RE: TRANSPORTATION IMPACT STUDY ADDENDUM IMPROVEMENT WARRANTS

Dear Melissa,

C.F. Crozier & Associates Inc. (Crozier) was retained by 4933 Vic Court Globizen LP ("Globizen") in support of a proposed mixed-use development located at 4933 Victoria Avenue North in the Town of Lincoln (Town). This letter was prepared in response to the pre-submission comments provided by Town Staff.

Per the meeting held between the Town, Crozier and Globizen on May 21, 2024, this letter was prepared to provide information regarding the timing and scope of the improvements required by the growth in the area and the additional traffic expected once this development is completed. It is to provide additional information regarding the Transportation Demand Management facilities on site as they relate to the larger network. Attached to this letter is the diagram showing the connections between the site and the proposed active transportation network in the surrounding area.

This letter is to serve as an addendum to the Transportation Impact Study (TIS) dated May 2024. Specific details regarding the development, growth rates in the area and the development's horizon years can be found in the TIS.

Per the meeting, two scenarios were examined to determine the timing and type of improvements required. These two scenarios include one where the traffic in the area is grown by the growth rates for traffic in the area and no other developments in area and another where the 4933 Victoria Avenue North development is added to the first scenario. These scenarios were tested in each of the horizon years as described in the TIS.

Tables 1 and 2 summarize the results for the warrants for intersection signalization and left turn lane for the intersections of Victoria Avenue North/North Service Road and South Service Road/QEW Niagara bound respectively. The traffic signal warrants were done per the Ontario Manual (OTM) Justifications 1-4 and 7. The left turn lane warrants were done per the Ministry of Transportation's (MTO's) supplement for the Transportation Association of Canada's (TAC's) Geometric Design Guide for Canadian Roads (GDGCR). While all horizon years were tested, the critical years, determined by whether any improvement is required, are included in these tables.





Table 1: Victoria Avenue North and North Service Road Warrant Results

| Maryanak | Year/Scenario | | | | | | | |
|-------------------------------|-----------------------|------------------------|------------------------|--|--|--|--|--|
| Warrant | 2036 with just Growth | 2026 with Site Traffic | 2036 with Site Traffic | | | | | |
| Left Turn Lane | Not Warranted | Not Warranted | Warranted | | | | | |
| Intersection Signalization | Warranted | Warranted | Warranted | | | | | |

Table 2: South Service Road and QEW Niagara bound Warrant Results

| Warrant | Year/Scenario |
|-------------------------------|------------------------|
| warrani | 2036 with Site Traffic |
| Intersection Signalization | Not Warranted |

As can be seen in **Table 1**, at Victoria Avenue North and North Service Road the signals are warranted by 2036 without the development being included however this warrant moves up to the year 2026 once the development's expected trips are added. Also in 2036, with the traffic growth and the site traffic expected, an exclusive left turn lane is required with a storage length of 15 metres per the charts in the MTO's supplement. **Figure 1** estimates the requirements to the intersection to include this left turn lane.

As seen in **Table 2**, the intersection of South Service Road and QEW Niagara bound does not trigger the signalization in the ultimate scenario. Left turn lanes are existing at this intersection. The detailed results of the warrants are attached to this letter.

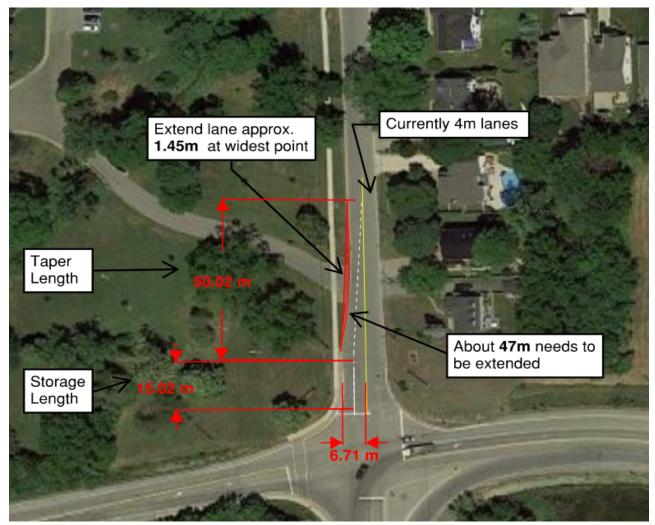


Figure 1 – Intersection Improvements at Victoria Avenue North and North Service Road

We trust that the contents herein address the comments received to date in relation to the proposed development located at 4933 Victoria Avenue North in the Town of Lincoln.

Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Sincerely,

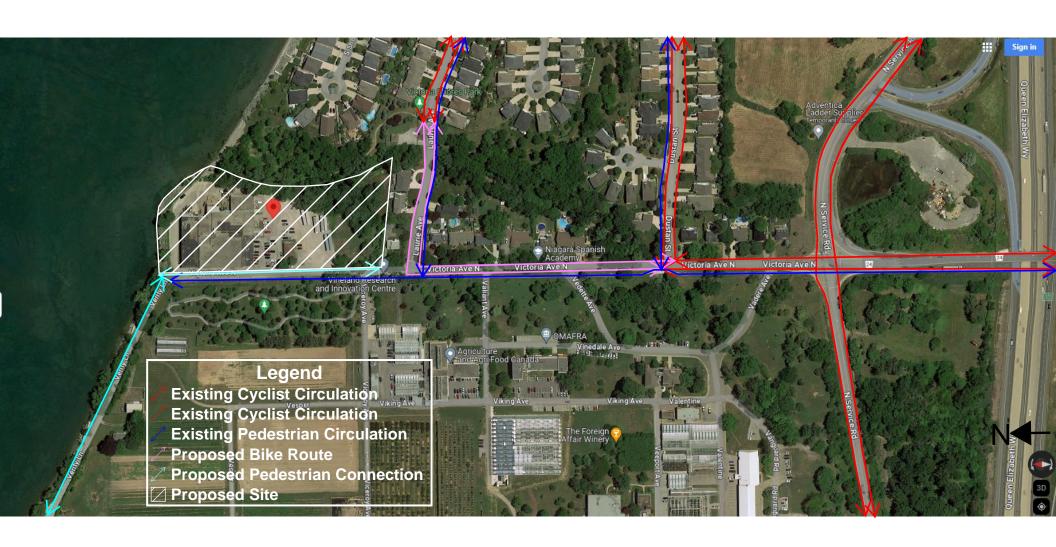
C.F. CROZIER & ASSOCIATES INC.

lan Lindley, P.Eng. MASc. Project Engineer, Transportation

IL;dd

Attachment A

Active Transportation Connections



Attachment B

Warrant Results

| Input Dat | a Silet | ŧL . | | Analysis | Sneet | Results | Sileet | Proposed | d Collision | | | | |
|--|--|--|---|---------------------------|--|--------------------------------------|------------------------------------|-------------------------------------|----------------------------------|---|----------------------------|----------------------------------|--|
| What are the int | ersectina r | oadwavs? | | Victoria Ave | enue N and N | Jorth Servic | e Road | | | GO | TO Justific | ation: | |
| | • | • | | | | | | | | | | | |
| Vhat is the dire | ction of the | Main Road | d street? | | North-South | - | When was t | he data coll | ected? | 2031 Grov | vn | | |
| | | | | | | | | | | | | | |
| Justification | 1 - 4: Vo | olume Wa | arrants | | | | | | | | | | |
| a Number of I | anes on the | Main Roa | d? | 1 | | | | | | | | | |
| o Number of I | anes on the | Minor Roa | ad? | 1 | ▼ | | | | | | | | |
| | | | | | | | | | | | | | |
| : How many a | approaches | ? | 4 🔻 | | | | | | | | | | |
| c How many a | approaches | ? | 4 | | | | | | | | | | |
| Ť | | - | | Urban | <u> </u> | Popula | ation >= 10,000 | AND | Speed < 70 k | cm/hr | | | |
| d What is the | operating e | environmen | nt? | | | · | | AND | Speed < 70 k | km/hr | | | |
| I What is the | operating e | environmen | nt? | | | · | | AND | Speed < 70 k | cm/hr | | | |
| d What is the | operating e | environmen | ume at the in | ntersection? | | in table be | elow) | AND | | | estbound A | pproach | Pedestrians |
| d What is the | operating e | environmen vehicle volu | ume at the in | ntersection? | ' (Please fill | in table be | elow) | | | | estbound A TH | pproach RT | Crossing Mair |
| I What is the | operating e | environmen vehicle volu | ume at the ir | ntersection? | ' (Please fill | in table be | elow) Main So | uthbound Ap | pproach | Minor W | | | |
| I What is the Hour Ending | operating e eight hour Main No LT | environmen vehicle volu rthbound A TH | ume at the ir | ntersection? Minor E LT | P (Please fill astbound A _l | in table be oproach | Main Sou | uthbound Ap | pproach RT | Minor W | TH | RT | Crossing Mair Road |
| d What is the e What is the Hour Ending | operating e eight hour Main No LT 14 | environmen vehicle volu rthbound A TH 15 | ume at the ir Approach RT 156 | Minor E LT 3 | astbound Ap | I in table be oproach RT 58 | Main Sou | uthbound Ap TH 18 | pproach RT 3 | Minor W | TH 58 | RT 20 | Crossing Mair Road |
| Hour Ending 7:00 8:00 | operating e eight hour Main No LT 14 14 | environmen vehicle volu rthbound A TH 15 15 | ume at the ir | Minor E LT 3 3 | astbound Ap TH 24 24 | pproach RT 58 58 | Main Sor | uthbound Ap TH 18 18 | pproach RT 3 3 | Minor W LT 200 200 | TH 58 58 | RT 20 20 | Crossing Mair Road 0 |
| Hour Ending 7:00 8:00 9:00 | operating e eight hour Main No LT 14 14 14 | environmen vehicle volu rthbound A TH 15 15 | ume at the ir spproach RT 156 156 156 | Minor E LT 3 3 3 | TH 24 24 24 | pproach RT 58 58 58 | Main Sou LT 9 9 | uthbound Ap TH 18 18 18 | pproach RT 3 3 3 | Minor W LT 200 200 200 | TH 58 58 58 | RT 20 20 20 | Crossing Mair Road 0 0 0 |
| 1 What is the 1 What is th | operating e eight hour Main No LT 14 14 14 14 | vehicle volu rthbound A TH 15 15 15 | nt? ume at the ir upproach RT 156 156 156 156 | Minor E LT 3 3 3 3 | astbound Ap TH 24 24 24 24 24 24 | pproach RT 58 58 58 58 | Main Sor LT 9 9 9 | thbound Ap TH 18 18 18 18 18 | pproach RT 3 3 3 3 | Minor W LT 200 200 200 200 | TH 58 58 58 58 | RT 20 20 20 20 20 | Crossing Mair Road 0 0 0 0 |
| 1 What is the Hour Ending 7:00 8:00 9:00 12:00 13:00 | operating eeight hour Main No LT 14 14 14 14 14 | rthbound A TH 15 15 15 15 15 | nt? ume at the ir upproach RT 156 156 156 156 156 | Minor E LT 3 3 3 3 3 3 | astbound Ap TH 24 24 24 24 24 24 24 24 | 58 58 58 58 58 | Main Sol LT 9 9 9 9 | 1thbound Ap TH 18 18 18 18 18 18 | 3 3 3 3 3 | Minor W. LT 200 200 200 200 200 200 | TH 58 58 58 58 58 58 | RT 20 20 20 20 20 20 20 20 | Crossing Mair Road 0 0 0 0 0 0 |
| 8:00 9:00 12:00 13:00 16:00 | operating eeight hour Main No LT 14 14 14 14 14 14 | rthbound A TH 15 15 15 15 15 15 | nt? ume at the ir pproach RT 156 156 156 156 156 156 | Minor E LT 3 3 3 3 3 3 | astbound Ap TH 24 24 24 24 24 24 24 24 24 2 | 58 58 58 58 58 58 | Main Soi LT 9 9 9 9 | 1thbound Ap TH 18 18 18 18 18 18 18 | pproach RT 3 3 3 3 3 3 3 | Minor W LT 200 200 200 200 200 200 200 200 | TH 58 58 58 58 58 58 58 58 | RT 20 20 20 20 20 20 20 20 20 20 | Crossing Mair Road 0 0 0 0 0 0 0 0 0 0 |

| Preceding Months | Number of Collisions* |
|---------------------|-----------------------|
| 1-12 | 0 |
| 13-24 | 0 |
| 25-36 | 0 |

^{*} Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

| | Zor | ne 1 | Zo | ne 2 | Zone 3 (i | f needed) | Zone 4 (| f needed) | Total |
|---------------------------------------|------------|------------|----------|------------|-----------|------------|----------|------------|-------|
| | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Iotai |
| Total 8 hour pedestrian volume | 10,000 | 5 | 10 | 5 | 0 | 0 | 0 | 0 | |
| Factored 8 hour pedestrian volume | 20, | 005 | 2 | 25 | (| 0 | | 0 | |
| % Assigned to crossing rate | 23 | 3% | 34 | 4% | 30 |)% | 10 | 0% | |
| Net 8 Hour Pedestrian Volume at Cross | sing | | | | | | | | 4,610 |
| Net 8 Hour Vehicular Volume on Street | Being Cros | sed | | | | | | | 2,000 |

| | Zoi | ne 1 | Zo | ne 2 | Zone 3 (| if needed) | Zone 4 (| if needed) | Total |
|--|----------|------------|----------|------------|----------|------------|----------|------------|-------|
| | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | iotai |
| Total 8 hour pedestrian volume | 10,000 | 5 | 10 | 5 | 0 | 0 | 0 | 0 | |
| Total 8 hour pedestrians delayed greater than 10 seconds | 10 | 10 | 1 | 6 | 2 | 4 | 0 | 0 | |
| Factored volume of total pedestrians | 20, | 005 | : | 25 | | 0 | | 0 | |
| Factored volume of delayed pedestrians | 3 | 30 | | 8 | | 8 | | 0 | |
| % Assigned to Crossing Rate | 23 | 3% | 3 | 4% | 30% | | 100% | | |
| Net 8 Hour Volume of Total Pedestrians | s | | | | | | | | 4,610 |
| Net 8 Hour Volume of Delayed Pedestri | ians | | | | | | | | 12 |

| Results | | <u>Input Sheet</u> | | sis Sheet | Prop |
|-------------------------|---------------------------|--------------------|-----------|----------------|----------|
| Intersection: V | ictoria Avenue N and Nort | h Service Road | Count Dat | te: 2031 Growi | n |
| Summary F | Results | | | | |
| | Justification | Compliano | -0 | Signal Jus | stified? |
| | Justinication | Compliant | | YES | NO |
| 1. Minimum Vehicular | A Total Volume | 80 | % | | |
| Vehicular | B Crossing Volume | 100 | % | | ~ |
| 2. Delay to Cross | A Main Road | 30 | % | | |
| Traffic | B Crossing Road | 100 | % | | • |
| 3. Combination | A Justificaton 1 | 80 | % | | |
| | B Justification 2 | 30 | % | | ~ |
| 4. 4-Hr Volume | | 68 | % | | ~ |
| | | | | | |
| 5. Collision Expe | erience | 0 | % | | ~ |

Justification met

Justification not met

6. Pedestrians

A Volume

B Delay

Major Road:Victoria Avenue NCondition:Free FlowDate:22-May-24Minor Road:North Service RoadMajor Rd. Lanes:1Project No.:2571-6892

Horizon Year: 2031 Grown Intersection Type: Existing Analyst: AK

OTM Book 12 - Table 19 - Justification 7 - Projected Volumes (Traffic Signal Justification for Future Development - Traffic Impact Studies)

| | | | MUM EMENIT 1 | MINI REQUIREN | MUM | | COMPLIANCE | |
|---------------------|---|-----------------------------|--------------------|------------------|--------------------|-----------|------------|------------|
| JUSTIFICATIO N | DESCRIPTION | REQUIREMENT 1 LANE HIGHWAYS | | | LANE | Sectional | | Entire |
| IN | | Free Flow | Restricted Flow | Free Flow | Restricted Flow | Numerical | Percentage | Percentage |
| | A. Vehicle Volume, All Approaches (Avg. Hour) | 576 | 864 | 720 | 1080 | 574.5 | 100% | 100% |
| Vehicular Volume | B. Vehicle Volume, Along Minor Streets (Avg. Hour) | 144 | 204 | 144 | 204 | 361 | 251% | 100% |
| 2. Delay to | A. Vehicle Volume, Major Street (Avg. Hour) | 576 | 864 | 720 | 1080 | 213.5 | 37% | 37% |
| | B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour) | 60 | 90 | 144 | 204 | 260 | 433% | 31% |

| Note: | Signal Justification 7 Met: | Yes | X | No |
|-------|-----------------------------|-----|---|----|
| | | | | |

Existing Intersection Requires 120 % Justification Proposed Intersection Requires 150 % Justication

Inputs: Condition is "Free Flow" or "Restricted Flow"

Major Lanes is number of through lanes per direction (1,2,3)

| nput Dat | | | | | | | | | | | | | |
|---|--|--|--|--------------------------|--|---|---|---------------------------------------|----------------------------------|---|----------------------------|----------------------------------|---|
| | | | | | | | | | | GO | TO Justific | ation: | |
| hat are the in | ersecting r | oadways? | | Victoria Ave | enue N and N | lorth Servic | e Road | | | | | | |
| /hat is the dire | ction of the | Main Road | d street? | | North-South | | When was t | he data coll | ected? | 2036 Grov | vn + Site | | |
| | | | | | | | | | | | | | |
| ustification | 1 - 4: Vo | olume Wa | arrants | | | | | | | | | | |
| Number of I | anes on the | e Main Roa | d? | 1 | V | | | | | | | | |
| Number of I | anes on the | e Minor Roa | ad? | 1 | - | | | | | | | | |
| | | | | | | | | | | | | | |
| - How many a | pproaches | 2 | 4 🔻 | | | | | | | | | | |
| Ť | | | | | | | | | | | | | |
| :- How many a | | | | Urban | _ | Popula | ation >= 10,000 | AND | Speed < 70 k | cm/hr | | | |
| What is the | operating e | environmen | t? | | | · | | AND | Speed < 70 k | km/hr | | | |
| What is the | operating e | environmen | t? | | | · | | AND | Speed < 70 k | km/hr | | | |
| What is the | operating e | environmen | t? | itersection? | | l in table be | elow) | AND | | | estbound A | pproach | Pedestrians |
| What is the | operating e | environmen vehicle vol | t? | itersection? | (Please fil | l in table be | elow) | | | | estbound A TH | pproach RT | Pedestrians Crossing Mair |
| - What is the | operating e | environmen vehicle volu | t? ume at the in | itersection? | (Please fil | l in table be | elow) Main Sou | ıthbound Ap | pproach | Minor W | | | Crossing Mair |
| - What is the - What is the | operating e eight hour Main No LT | environmen vehicle volu rthbound A TH | t? ume at the ir pproach RT | Minor E LT 3 | (Please fil astbound A | I in table be pproach RT | Main Sou | ıthbound Ap | pproach RT 3 | Minor W | TH | RT | Crossing Mair Road |
| - What is the - What is the - What is the | operating e eight hour Main No LT 15 | environmen vehicle volu rthbound A TH 62 | t? ume at the in pproach RT 173 | ntersection? Minor E | (Please fil astbound Ap TH 27 | I in table be pproach RT 64 | Main Sou LT 52 | uthbound Ap TH 56 | pproach RT | Minor W | TH 63 | RT 67 | Crossing Mair Road |
| - What is the - What is the - Wor Ending 7:00 8:00 | operating eeight hour Main No LT 15 15 | environmen vehicle volu rthbound A TH 62 62 | t? ume at the ir pproach RT 173 | Minor E LT 3 3 | astbound Ap TH 27 27 | pproach RT 64 64 | Main Sou LT 52 52 | thbound Ap TH 56 56 | pproach RT 3 3 | Minor W LT 220 220 | TH 63 63 | RT 67 67 | Crossing Mair Road 0 |
| - What is the | operating eeight hour Main No LT 15 15 15 | rthbound A TH 62 62 62 | pproach RT 173 173 173 | Minor E LT 3 3 3 | (Please fil astbound Ap TH 27 27 27 27 | pproach RT 64 64 64 | Main Sou LT 52 52 52 52 | thbound Ap TH 56 56 56 | pproach RT 3 3 3 | Minor W LT 220 220 220 | TH 63 63 63 | RT 67 67 67 | Crossing Mair Road 0 0 0 |
| - What is the - What is the - What is the - What is the - Hour Ending - 7:00 - 8:00 - 9:00 - 12:00 | operating eeight hour Main No LT 15 15 15 15 | vehicle volu rthbound A TH 62 62 62 62 62 | pproach RT 173 173 173 173 | Minor E LT 3 3 3 3 | astbound Ap TH 27 27 27 27 27 | pproach RT 64 64 64 64 | Main Sou LT 52 52 52 52 | thbound Ap TH 56 56 56 56 | pproach RT 3 3 3 3 | Minor W LT 220 220 220 220 220 | TH 63 63 63 63 | RT 67 67 67 67 | Crossing Mair Road 0 0 0 0 0 |
| - What is the - | operating eight hour Main No LT 15 15 15 15 15 | rthbound A TH 62 62 62 62 62 62 | tr? ume at the in pproach RT 173 173 173 173 173 | Minor E LT 3 3 3 3 3 3 | astbound Ap TH 27 27 27 27 27 27 27 | Proproach RT 64 64 64 64 64 64 | Main Sou LT 52 52 52 52 52 52 | thbound Ap TH 56 56 56 56 56 56 | nproach RT 3 3 3 3 3 | Minor W LT 220 220 220 220 220 220 | TH 63 63 63 63 63 63 | RT 67 67 67 67 67 | Crossing Mair Road 0 0 0 0 0 0 0 |
| 7:00 8:00 9:00 12:00 16:00 | operating eeight hour Main No LT 15 15 15 15 15 15 | rthbound A TH 62 62 62 62 62 62 62 | pproach RT 173 173 173 173 173 173 173 173 | Minor E LT 3 3 3 3 3 3 3 | ## (Please fill astbound A) ## TH | Proproach RT 64 64 64 64 64 64 64 | Main Sou LT 52 52 52 52 52 52 52 52 52 52 52 | thbound Ap TH 56 56 56 56 56 56 56 56 | pproach RT 3 3 3 3 3 3 3 | Minor W LT 220 220 220 220 220 220 220 220 | TH 63 63 63 63 63 63 63 | RT 67 67 67 67 67 | Crossing Mair Road 0 0 0 0 0 0 0 0 0 0 0 |

| Preceding Months | Number of Collisions* |
|---------------------|-----------------------|
| 1-12 | 0 |
| 13-24 | 0 |
| 25-36 | 0 |

^{*} Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

| | Zor | ne 1 | Zo | ne 2 | Zone 3 (i | f needed) | Zone 4 (i | f needed) | Total |
|---------------------------------------|------------|------------|----------|------------|-----------|------------|-----------|------------|-------|
| | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Total |
| Total 8 hour pedestrian volume | 10,000 | 5 | 10 | 5 | 0 | 0 | 0 | 0 | |
| Factored 8 hour pedestrian volume | 20, | 005 | 2 | 25 | (|) | | 0 | |
| % Assigned to crossing rate | 23 | 3% | 34 | 4% | 30 |)% | 10 | 0% | |
| Net 8 Hour Pedestrian Volume at Cross | sing | | | | | | | | 4,610 |
| Net 8 Hour Vehicular Volume on Street | Being Cros | sed | | | | | | | 2,000 |

| | Zor | ne 1 | Zo | ne 2 | Zone 3 (i | f needed) | Zone 4 (| if needed) | Total |
|--|----------|------------|----------|------------|-----------|------------|----------|------------|-------|
| | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | TOtal |
| Total 8 hour pedestrian volume | 10,000 | 5 | 10 | 5 | 0 | 0 | 0 | 0 | |
| Total 8 hour pedestrians delayed greater than 10 seconds | 10 | 10 | 1 | 6 | 2 | 4 | 0 | 0 | |
| Factored volume of total pedestrians | 20, | 005 | 2 | 25 | | 0 | | 0 | |
| Factored volume of delayed pedestrians | 3 | 0 | | 8 | | 8 | | 0 | |
| % Assigned to Crossing Rate | 23 | 1% | 34 | 4% | | 0% | | 00% | |
| Net 8 Hour Volume of Total Pedestrians | 5 | | | | | | | | 4,610 |
| Net 8 Hour Volume of Delayed Pedestri | ans | | | | | | | | 12 |

| Results | She | et | <u>I</u> nput Sheet | Analysi | is Sheet | Prop | osed Collision |
|-------------------------|---------|--------------------|---------------------|------------|--------------|----------|----------------|
| Intersection: V | ictoria | Avenue N and North | h Service Road | Count Date | e: 2036 Grow | n + Site | |
| Summary F | Resul | ts | | | | | |
| | Justifi | ication | Compliano | :e | Signal Jus | stified? | |
| | | | Compilation | | YES | NO | |
| 1. Minimum Vehicular | Α 1 | Total Volume | 100 | % | | | |
| Volume | В | Crossing Volume | 100 | % | ~ | | |
| 2. Delay to Cross | A I | Main Road | 50 | % | | | |
| Traffic | в (| Crossing Road | 100 | % | | ~ | |
| 3. Combination | Α . | Justificaton 1 | 100 | % | | | |
| | в. | Justification 2 | 50 | % | | ~ | |
| 4. 4-Hr Volume | | | 100 | % | V | | |
| | | | | | | | |
| 5. Collision Expe | erience | | 0 | % | | | |

Justification met

Justification not met

6. Pedestrians

A Volume

B Delay

Major Road:Victoria Avenue NCondition:Free FlowDate:22-May-24Minor Road:North Service RoadMajor Rd. Lanes:1Project No.: 2571-6892

Horizon Year: 2036 Grown + Site Intersection Type: Existing Analyst: AK

OTM Book 12 - Table 19 - Justification 7 - Projected Volumes (Traffic Signal Justification for Future Development - Traffic Impact Studies)

| | | MINI REQUIRI | MUM EMENT 1 | MINI REQUIREN | MUM | | COMPLIANCE | |
|-------------------------|---|-----------------|-----------------|------------------|-----------------|-----------|------------|------------|
| JUSTIFICATIO N | DESCRIPTION | 1 | GHWAYS | | LANE | Sed | ctional | Entire |
| IN | | Free Flow | Restricted Flow | Free Flow | Restricted Flow | Numerical | Percentage | Percentage |
| 1. Minimum Vehicular | A. Vehicle Volume, All Approaches (Avg. Hour) | 576 | 864 | 720 | 1080 | 804.37 | 140% | 1400/ |
| Verlicular Volume | B. Vehicle Volume, Along Minor Streets (Avg. Hour) | 144 | 204 | 144 | 204 | 443.86 | 308% | 140% |
| 2. Delay to | A. Vehicle Volume, Major Street (Avg. Hour) | 576 | 864 | 720 | 1080 | 360.51 | 63% | 620/ |
| Cross Traffic | B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour) | 60 | 90 | 144 | 204 | 286 | 477% | 63% |

| Note: | Signal Justification 7 Met: | X | Yes | No |
|-------|-----------------------------|---|-----|-------|
| | <u> </u> | | | 1 |

Existing Intersection Requires 120 % Justification Proposed Intersection Requires 150 % Justication

Inputs: Condition is "Free Flow" or "Restricted Flow"

Major Lanes is number of through lanes per direction (1,2,3)

| Input Dat | | • | | | Sheet | Results 8 | | | Collision | | | | |
|--|---|--|---|---------------------------|--|---|------------------------------------|--|------------------------------|---|----------------------------|-------------------------------|---|
| _ | | | | | | | | | | GO | TO Justific | ation: | |
| Vhat are the int | ersecting r | oadways? | | Victoria Ave | enue N and N | lorth Service | e Road | | | | | | |
| What is the dire | ction of the | Main Road | d street? | | North-South | _ | When was t | he data coll | ected? | 2036 Grov | vn | | |
| | | | | | | | | | | | | | |
| Justification | 1 - 4: Vo | olume W | arrants | | | | | | | | | | |
| a Number of I | anes on the | e Main Roa | d? | 1 | ▼ | | | | | | | | |
| o Number of la | anes on the | e Minor Roa | ad? | 1 | | | | | | | | | |
| | | | | | _ | | | | | | | | |
| c How many a | pproaches | ? . | 4 | | | | | | | | | | |
| · · | | | | Lirbon | _ | Partile | | AND | Smaad v 70 k | one the or | | | |
| d What is the | operating e | environmen | it? | Urban | - | · | ntion >= 10,000 | AND | Speed < 70 k | m/hr | | | |
| d What is the | operating e | environmen | it? | | | · | | AND | Speed < 70 k | m/hr | | | |
| d What is the | operating e | environmen | ume at the in | itersection? | | in table be | ·low) | AND | | | estbound A | pproach | Pedestrians |
| d What is the | operating e | environmen vehicle vol | ume at the in | itersection? | ' (Please fill | in table be | ·low) | | | | estbound A TH | pproach RT | Pedestrians Crossing Mair Road |
| d What is the | operating e | environmen vehicle volu | ume at the in | itersection? | (Please fill | in table be | low) Main So | uthbound Ap | pproach | Minor W | | | Crossing Mair |
| d What is the | operating e eight hour Main No LT | environmen vehicle volu rthbound A TH | ume at the in | ntersection? Minor E LT | P (Please fill astbound Ap | in table be oproach | Main Sou | uthbound Ap | pproach RT | Minor W | TH | RT | Crossing Mair Road |
| d What is the e What is the Hour Ending | operating e eight hour Main No LT 15 | environmen vehicle volu rthbound A TH 17 | ume at the in pproach RT 173 | Minor E LT 3 | astbound Ap | I in table be oproach RT 64 | Main Sou | uthbound Ap TH 19 | pproach RT 3 | Minor W | TH 63 | RT 22 | Crossing Mair Road |
| d What is the e What is the Hour Ending 7:00 8:00 | eight hour Main No LT 15 15 | environmen vehicle volu rthbound A TH 17 | ume at the in | Minor E LT 3 3 | astbound Ap TH 27 27 27 | pproach RT 64 64 | Main Sor | uthbound Ap TH 19 19 | pproach RT 3 3 | Minor W LT 220 220 | TH 63 63 | RT 22 22 | Crossing Mair Road 0 |
| d What is the b What is the Hour Ending 7:00 8:00 9:00 | eight hour Main No LT 15 15 15 | rthbound A TH 17 17 | ume at the ir pproach RT 173 173 173 | Minor E LT 3 3 3 | (Please fill astbound Ap TH 27 27 27 27 | pproach RT 64 64 64 | Main Sou LT 9 9 | uthbound Ap TH 19 19 19 | pproach RT 3 3 3 | Minor W LT 220 220 220 | TH 63 63 63 | RT 22 22 22 | Crossing Mair Road 0 0 |
| 1 What is the e What is the Hour Ending 7:00 8:00 9:00 12:00 | operating e eight hour Main No LT 15 15 15 15 | vehicle volu rthbound A TH 17 17 17 | ume at the in upproach RT 173 173 173 173 | Minor E LT 3 3 3 3 | astbound Ap TH 27 27 27 27 27 | pproach RT 64 64 64 64 | Main Sor | uthbound Ap TH 19 19 19 19 19 | pproach RT 3 3 3 3 | Minor W LT 220 220 220 220 | TH 63 63 63 63 | RT 22 22 22 22 22 | Crossing Mair Road 0 0 0 0 |
| d What is the e What is the Hour Ending 7:00 8:00 9:00 12:00 13:00 | operating e eight hour Main No LT 15 15 15 15 15 | rthbound A TH 17 17 17 17 17 | pproach RT 173 173 173 173 173 | Minor E LT 3 3 3 3 3 3 | astbound Ap TH 27 27 27 27 27 27 27 | Proproach RT 64 64 64 64 64 64 | Main Sol LT 9 9 9 9 | 1thbound Ap TH 19 19 19 19 19 19 | 3 3 3 3 3 3 3 3 3 | Minor W. LT 220 220 220 220 220 220 | TH 63 63 63 63 63 63 | RT 22 22 22 22 22 22 22 | Crossing Mair Road 0 0 0 0 0 0 0 |
| 7:00 8:00 9:00 12:00 16:00 | operating earling Main No LT 15 15 15 15 15 15 | rthbound A TH 17 17 17 17 17 17 | pproach RT 173 173 173 173 173 173 173 | Minor E LT 3 3 3 3 3 3 3 | 2 (Please fill astbound Ap TH 27 27 27 27 27 27 27 27 27 27 27 27 27 | Proproach RT 64 64 64 64 64 64 64 | Main Soi LT 9 9 9 9 | 1thbound Ap TH 19 19 19 19 19 19 19 19 | Dproach RT 3 3 3 3 3 3 3 3 | Minor W LT 220 220 220 220 220 220 220 220 | TH 63 63 63 63 63 63 63 | RT 22 22 22 22 22 22 22 22 22 | Crossing Mair Road 0 0 0 0 0 0 0 0 0 0 |

| Preceding Months | Number of Collisions* |
|---------------------|-----------------------|
| 1-12 | 0 |
| 13-24 | 0 |
| 25-36 | 0 |

^{*} Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

| | Zor | ie 1 | Zo | ne 2 | Zone 3 (i | f needed) | Zone 4 (i | f needed) | Total |
|--------------------------------------|--------------|------------|----------|------------|-----------|------------|-----------|------------|-------|
| | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | TOTAL |
| Total 8 hour pedestrian volume | 10,000 | 5 | 10 | 5 | 0 | 0 | 0 | 0 | |
| Factored 8 hour pedestrian volume | 20, | 005 | 2 | 25 | | 0 | | 0 | |
| % Assigned to crossing rate | 23 | % | 3 | 4% | 30 | 0% | 10 | 0% | |
| Net 8 Hour Pedestrian Volume at Cros | sing | | | | | | | | 4,610 |
| Net 8 Hour Vehicular Volume on Stree | t Being Cros | sed | | | | | | | 2,000 |

| | Zor | | Zo | ne 2 | Zone 3 (| if needed) | Zone 4 (| if needed) | Total |
|--|----------|------------|----------|------------|----------|------------|----------|------------|-------|
| | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | TOTAL |
| Total 8 hour pedestrian volume | 10,000 | 5 | 10 | 5 | 0 | 0 | 0 | 0 | |
| Total 8 hour pedestrians delayed greater than 10 seconds | 10 | 10 | 1 | 6 | 2 | 4 | 0 | 0 | |
| Factored volume of total pedestrians | 20, | 005 | : | 25 | | 0 | | 0 | |
| Factored volume of delayed pedestrians | _ | 30 | | 8 | | 8 | | 0 | |
| % Assigned to Crossing Rate | 23 | 3% | 3 | 4% | 30 | 0% | 10 | 00% | |
| Net 8 Hour Volume of Total Pedestrians | s | | | | | | | | 4,610 |
| Net 8 Hour Volume of Delayed Pedestri | ians | | | | | | | | 12 |

| Results | Sh | eet | Input Sheet | Analys | is Sheet | Prop |
|-------------------------|-------|---------------------|-----------------|------------|--------------|----------|
| Intersection: V | ictor | ia Avenue N and Nor | th Service Road | Count Date | e: 2036 Grow | n |
| Summary F | Resi | ults | | | | |
| | Just | ification | Compliano | :e | Signal Jus | stified? |
| | | | | | YES | NO |
| 1. Minimum Vehicular | Α | Total Volume | 88 | % | _ | _ |
| Volume | В | Crossing Volume | 100 | % | | ~ |
| 2. Delay to Cross | Α | Main Road | 33 | % | | |
| Traffic | В | Crossing Road | 100 | % | | ~ |
| 3. Combination | Α | Justificaton 1 | 88 | % | | |
| | В | Justification 2 | 33 | % | | ~ |
| 4. 4-Hr Volume | | | 77 | % | | ~ |
| | | | | | | |
| 5. Collision Expe | rienc | ee | 0 | % | | ~ |

Justification met

Justification not met

6. Pedestrians

A Volume

B Delay

Major Road:Victoria Avenue NCondition:Free FlowDate:22-May-24Minor Road:North Service RoadMajor Rd. Lanes:1Project No.:2571-6892

Horizon Year: 2036 Grown Intersection Type: Existing Analyst: AK

OTM Book 12 - Table 19 - Justification 7 - Projected Volumes (Traffic Signal Justification for Future Development - Traffic Impact Studies)

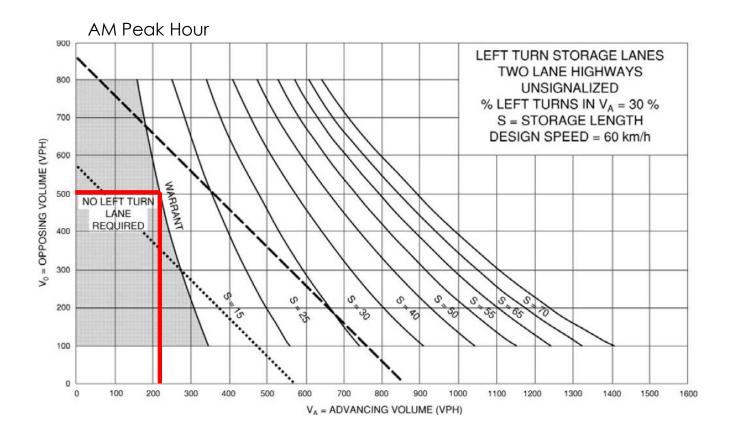
| | | MINI REQUIRI | MUM EMENT 1 | MINI REQUIREN | MUM | | COMPLIANCE | |
|---------------------|---|-----------------|-----------------|------------------|-----------------|-----------|------------|------------|
| JUSTIFICATIO N | DESCRIPTION | I | 3HWAYS | | ELANE | Sed | ctional | Entire |
| IN | | Free Flow | Restricted Flow | Free Flow | Restricted Flow | Numerical | Percentage | Percentage |
| | A. Vehicle Volume, All Approaches (Avg. Hour) | 576 | 864 | 720 | 1080 | 634 | 110% | 1100/ |
| Vehicular Volume | B. Vehicle Volume, Along Minor Streets (Avg. Hour) | 144 | 204 | 144 | 204 | 398.25 | 277% | 110% |
| 2. Delay to | A. Vehicle Volume, Major Street (Avg. Hour) | 576 | 864 | 720 | 1080 | 235.75 | 41% | 440/ |
| | B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour) | 60 | 90 | 144 | 204 | 286 | 477% | 41% |

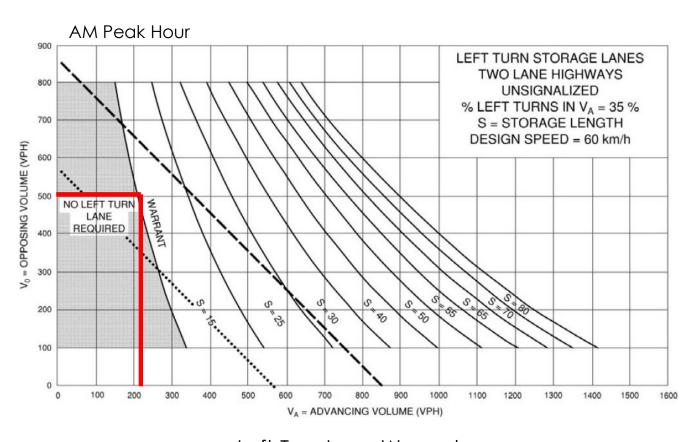
| Note: | Signal Justification 7 Met: | X | Yes | No |
|-------|-----------------------------|---|-----|-------|
| | | | 4 | 4 |

Existing Intersection Requires 120 % Justification Proposed Intersection Requires 150 % Justication

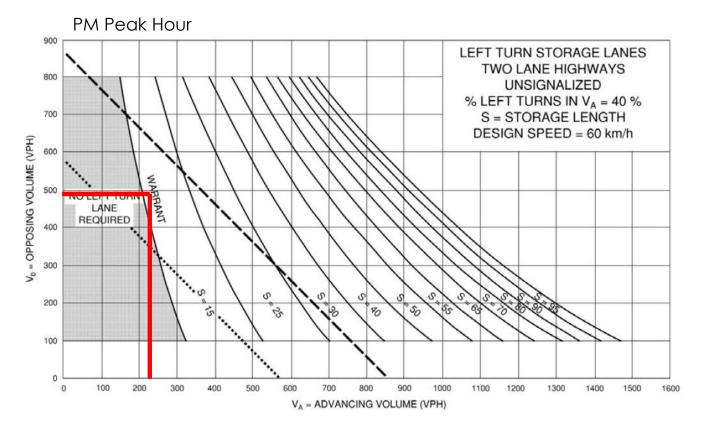
Inputs: Condition is "Free Flow" or "Restricted Flow"

Major Lanes is number of through lanes per direction (1,2,3)





Left-Turn Lane Warrant 2036 Grown + Site Traffic Victoria Avenue North and North Service Road



Left-Turn Lane Warrant
2036 Grown + Site Traffic
Victoria Avenue North and North Service Road

| Input Dat | u 01101 | , | | | Sheet | recounts | Sheet | Fioposec | d Collision | | | | |
|--|--|--|---|---------------------------|--|---|---|--|------------------------------|---|----------------------------------|--|---|
| Vhat are the int | orcooting r | oodwaya? | | Viotorio Ave | nua Nand I | North Servic | o Bood | | | GO | TO Justific | ation: | |
| viiat are trie irii | ersecuriy r | oauways: | _ | VICIONA AVE | enue in anu i | NOTHI SELVIC | e Roau | | | | | | |
| Vhat is the dire | ction of the | Main Road | d street? | | North-South | • | When was t | he data coll | ected? | 2026 Grov | vn + Site | | |
| | | | | | | | | | | | | | |
| Justification | 1 - 4: V | olume W | arrants | | | | | | | | | | |
| a Number of I | anes on the | e Main Roa | d? | 1 | | | | | | | | | |
| Number of I | anes on the | e Minor Roa | ad? | 1 | ┰ | | | | | | | | |
| | | | | | | | | | | | | | |
| How many a | approaches | ? 4 | 4 | | | | | | | | | | |
| _ | | | | Lirbon | | Panul | -tion >= 40 0000 | AND | Sunad < 70 h | v ma lla m | | | |
| c How many a | | | | Urban | - | Popula | ation >= 10,000 | AND | Speed < 70 k | km/hr | | | |
| I What is the | operating o | environmen | it? | | | • | · | AND | Speed < 70 k | cm/hr | | | |
| I What is the | operating o | environmen | ume at the in | ntersection? | | II in table be | elow) | AND uthbound Ap | | | estbound A | pproach | Pedestrians |
| I What is the | operating o | environmen vehicle voli | ume at the in | ntersection? | ' (Please fi | II in table be | elow) | | | | estbound A | pproach RT | Pedestrians Crossing Mair Road |
| What is the | operating of eight hour | environmen vehicle volu | ume at the ir | ntersection? | ' (Please fi | Il in table be | elow) | uthbound Ap | pproach | Minor W | | · · | Crossing Mair |
| What is the What is the | operating of eight hour Main No LT | environmen vehicle volu orthbound A TH | ume at the ir | ntersection? Minor E LT | (Please fi astbound A | Il in table be pproach RT | Main So | uthbound Ap | proach RT | Minor W LT | TH | RT | Crossing Mair Road |
| I What is the - What is the Hour Ending 7:00 | operating of eight hour Main No LT 13 | environmen vehicle volu rthbound A TH 59 | ume at the ir approach RT 142 | Minor E LT 3 | (Please fi astbound A TH | pproach RT 52 | Main Sor | uthbound Ap TH 52 | pproach RT 3 | Minor W LT 181 | TH 52 | RT 64 | Crossing Mair Road |
| - What is the - What is the Hour Ending 7:00 8:00 | operating of eight hour Main No LT 13 13 | vehicle voluerthbound A TH 59 59 | ume at the ir | Minor E LT 3 3 | astbound A TH 22 22 | pproach RT 52 52 | Main Sor LT 51 | uthbound Ap TH 52 52 | pproach RT 3 3 | Minor W LT 181 181 | TH 52 52 | RT 64 64 | Crossing Mair Road 0 |
| I What is the What is the Hour Ending 7:00 8:00 9:00 | operating of eight hour Main No LT 13 13 | vehicle voluerthbound A TH 59 59 59 | ume at the ir spproach RT 142 142 142 | Minor E LT 3 3 3 | (Please fi astbound A TH 22 22 22 | pproach RT 52 52 52 | Main Sor LT 51 51 51 | uthbound Ap TH 52 52 52 52 | pproach RT 3 3 3 | Minor W LT 181 181 181 | TH 52 52 52 | RT 64 64 64 | Crossing Mair Road 0 0 0 |
| - What is the - What is the Hour Ending 7:00 8:00 9:00 12:00 | operating of eight hour Main No LT 13 13 13 13 | vehicle volunthbound A TH 59 59 59 59 | ume at the ir spproach RT 142 142 142 142 | Minor E LT 3 3 3 3 | astbound A TH 22 22 22 22 22 | pproach RT 52 52 52 52 52 | Main Sor LT 51 51 51 51 | uthbound Ap TH 52 52 52 52 52 52 | pproach RT 3 3 3 3 | Minor W LT 181 181 181 181 | TH 52 52 52 52 52 | RT 64 64 64 64 | Crossing Mair Road 0 0 0 0 0 |
| - What is the - What is the Hour Ending 7:00 8:00 9:00 12:00 13:00 | operating of eight hour Main No LT 13 13 13 13 13 | vehicle volu rthbound A TH 59 59 59 59 59 | nt? ume at the ir upproach RT 142 142 142 142 142 | Minor E LT 3 3 3 3 3 3 | astbound A TH 22 22 22 22 22 22 | pproach RT 52 52 52 52 52 52 52 | Main Sol LT 51 51 51 51 | uthbound Ap TH 52 52 52 52 52 52 52 52 | nproach RT 3 3 3 3 3 | Minor W LT 181 181 181 181 181 | TH 52 52 52 52 52 52 52 | RT 64 64 64 64 64 | Crossing Mair Road 0 0 0 0 0 0 0 |
| d What is the Hour Ending 7:00 8:00 9:00 12:00 13:00 16:00 | operating of eight hour Main No LT 13 13 13 13 13 13 | vehicle volu rthbound A TH 59 59 59 59 59 | nt? pproach RT 142 142 142 142 142 142 142 14 | Minor E LT 3 3 3 3 3 3 3 | 2 (Please fi astbound A TH 22 22 22 22 22 22 22 | pproach RT 52 52 52 52 52 52 52 52 | Main So LT 51 51 51 51 51 51 | uthbound Ap TH 52 52 52 52 52 52 52 52 52 52 | pproach RT 3 3 3 3 3 3 3 3 | Minor W LT 181 181 181 181 181 181 | TH 52 52 52 52 52 52 52 52 | RT 64 64 64 64 64 64 | Crossing Mair Road 0 0 0 0 0 0 0 0 0 0 0 |

| Preceding Months | Number of Collisions* |
|---------------------|-----------------------|
| 1-12 | 0 |
| 13-24 | 0 |
| 25-36 | 0 |

^{*} Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

| | Zor | ie 1 | Zo | ne 2 | Zone 3 (i | f needed) | Zone 4 (i | f needed) | Total |
|--------------------------------------|--------------|------------|----------|------------|-----------|------------|-----------|------------|-------|
| | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | TOTAL |
| Total 8 hour pedestrian volume | 10,000 | 5 | 10 | 5 | 0 | 0 | 0 | 0 | |
| Factored 8 hour pedestrian volume | 20, | 005 | 2 | 25 | | 0 | | 0 | |
| % Assigned to crossing rate | 23 | % | 3 | 4% | 30 | 0% | 10 | 0% | |
| Net 8 Hour Pedestrian Volume at Cros | sing | | | | | | | | 4,610 |
| Net 8 Hour Vehicular Volume on Stree | t Being Cros | sed | | | | | | | 2,000 |

| | Zoi | | Zo | ne 2 | Zone 3 (i | if needed) | Zone 4 (| if needed) | Total |
|--|----------|------------|----------|------------|-----------|------------|----------|------------|-------|
| | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Total |
| Total 8 hour pedestrian volume | 10,000 | 5 | 10 | 5 | 0 | 0 | 0 | 0 | |
| Total 8 hour pedestrians delayed greater than 10 seconds | 10 | 10 | 1 | 6 | 2 | 4 | 0 | 0 | |
| Factored volume of total pedestrians | 20, | 005 | : | 25 | | 0 | | 0 | |
| Factored volume of delayed pedestrians | 3 | 0 | | 8 | | 8 | | 0 | |
| % Assigned to Crossing Rate | 23 | 3% | 3 | 4% | 30 | 0% | 100% | | |
| Net 8 Hour Volume of Total Pedestrians | S | | | | | | | | 4,610 |
| Net 8 Hour Volume of Delayed Pedestri | ans | | | | | | | | 12 |

| Results ! | | enue N and North | Input Sheet | | is Sheet | | osed Collision |
|-------------------------|------------|--------------------|-----------------|------------|--------------|-----------|----------------|
| | | chac it and itoral | Oct vice i toda | Oount Date | J. 2020 GIOW | II · OILC | |
| Summary R | tesuits | | | | | | |
| | Justificat | ion | Complian | ce | Signal Jus | stified? | |
| | | | Compilan | | YES | NO | |
| 1. Minimum Vehicular | A Tota | l Volume | 96 | % | | _ | |
| Volume | B Cros | ssing Volume | 100 | % | | ~ | |
| 2. Delay to Cross | A Main | Road | 44 | % | | | |
| Traffic | B Cros | sing Road | 100 | % | | ~ | |
| 3. Combination | A Just | ificaton 1 | 96 | % | | | |
| | B Just | ification 2 | 44 | % | | ~ | |
| 4. 4-Hr Volume | | | 85 | % | | ~ | |
| | | | | | | | |
| 5. Collision Expe | rience | | 0 | % | | ~ | |

Justification met

Justification not met

6. Pedestrians

A Volume

B Delay

Major Road:Victoria Avenue NCondition:Free FlowDate:22-May-24Minor Road:North Service RoadMajor Rd. Lanes:1Project No.: 2571-6892

Horizon Year: 2026 Grown + Site Intersection Type: Existing Analyst: AK

OTM Book 12 - Table 19 - Justification 7 - Projected Volumes (Traffic Signal Justification for Future Development - Traffic Impact Studies)

| | | | MUM EMENT 1 | | MUM | | COMPLIANCE | |
|-------------------------|---|-----------------------------|-----------------|-------------------------------|-----------------|-----------|------------|------------|
| JUSTIFICATIO N | DESCRIPTION | REQUIREMENT 1 LANE HIGHWAYS | | REQUIREMENT 2 OR MORE LANE | | Sed | Entire | |
| IN | | Free Flow | Restricted Flow | Free Flow | Restricted Flow | Numerical | Percentage | Percentage |
| 1. Minimum Vehicular | A. Vehicle Volume, All Approaches (Avg. Hour) | 576 | 864 | 720 | 1080 | 691.87 | 120% | 1200/ |
| Verlicular Volume | B. Vehicle Volume, Along Minor Streets (Avg. Hour) | 144 | 204 | 144 | 204 | 373.12 | 259% | 120% |
| 2. Delay to | A. Vehicle Volume, Major Street (Avg. Hour) | 576 | 864 | 720 | 1080 | 318.76 | 55% | FF0/ |
| Cross Traffic | B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour) | 60 | 90 | 144 | 204 | 235 | 392% | 55% |

| Note: | Signal Justification 7 Met: | X | Yes | No |
|-------|-----------------------------|---|-----|----|
| | | | | |

Existing Intersection Requires 120 % Justification Proposed Intersection Requires 150 % Justication

Inputs: Condition is "Free Flow" or "Restricted Flow"

Major Lanes is number of through lanes per direction (1,2,3)

Major Road: South Service Road Condition: Free Flow Date: 22-May-24 Minor Road: QEW Niagara Bound Ramps Major Rd. Lanes: 1 Project No.: 2571-6892

Horizon Year: 2036 Grown + Site SAT Intersection Type: Existing Analyst: AK

OTM Book 12 - Table 19 - Justification 7 - Projected Volumes (Traffic Signal Justification for Future Development - Traffic Impact Studies)

| | | | MUM EMENT 1 | MINI REQUIREN | MUM | | COMPLIANCE | |
|---------------------|---|-----------------------------|-----------------|------------------|-----------------|-----------|------------|------------|
| JUSTIFICATIO N | DESCRIPTION | REQUIREMENT 1 LANE HIGHWAYS | | | LANE | Sed | Entire | |
| IV | | Free Flow | Restricted Flow | Free Flow | Restricted Flow | Numerical | Percentage | Percentage |
| | A. Vehicle Volume, All Approaches (Avg. Hour) | 864 | 1296 | 1080 | 1620 | 636.45 | 74% | 740/ |
| Vehicular Volume | B. Vehicle Volume, Along Minor Streets (Avg. Hour) | 216 | 306 | 216 | 306 | 311.95 | 144% | 74% |
| 2. Delay to | A. Vehicle Volume, Major Street (Avg. Hour) | 864 | 1296 | 1080 | 1620 | 324.5 | 38% | 220/ |
| Cross Traffic | B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour) | 90 | 135 | 216 | 306 | 21 | 23% | 23% |

| Note: | Signal Justification 7 Met: | Yes | X | No |
|-------|-----------------------------|-----|---|----|
| | | | | 2 |

Existing Intersection Requires 120 % Justification Proposed Intersection Requires 150 % Justication

Inputs: Condition is "Free Flow" or "Restricted Flow"

Major Lanes is number of through lanes per direction (1,2,3)

| nput Dat | a Silet | ; L | | Analysis | Sneet | Results | Sneet | Proposed | d Collision | _ | | | | | | |
|--|--|--|---------------------------------------|-------------------------------|---------------------------|----------------------------------|----------------------|--|------------------------------------|------------------------------------|--|---------------------------------------|---|--|--|--|
| Vhat are the int | ersecting re | nadways? | Г | South Servi | ce Road an | d OFW Niac | ara Bound R | amns | | GC | TO Justific | cation: | | | | |
| mat are the mi | orocoung r | Jaawayo. | | Oddi Ocivi | cc rtoad an | u QLVV IVIAÇ | jara Dourid I | апрэ | | | | | | | | |
| /hat is the dire | ction of the | Main Road | I street? | | East-West | | When was t | he data coll | ected? | 2036 Gro | wn + Site (A | M/PM) | | | | |
| | | | | | | | | | | | | | | | | |
| ustification | 1 - 4: Vo | lume Wa | arrants | | | | | | | | | | | | | |
| a Number of la | anes on the | Main Road | d? | 1 | ▼ | | | | | | | | | | | |
| Number of la | anes on the | Minor Roa | nd? | 1 | ▼ | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| How many a | pproaches | ? 3 | 3 🔻 | | | | | | | | | | | | | |
| · | | , | _ | Listan | | Parada | | AND | 0 | | | | | | | |
| c How many a | | , | _ | Urban | - | Popula | ntion >= 10,000 | AND | Speed < 70 k | km/hr | | | | | | |
| I What is the | operating e | nvironment | 1? | | | · | · | AND | Speed < 70 k | km/hr | | | | | | |
| I What is the | operating e | nvironment | t? ime at the i | ntersection? | | II in table be | elow) | AND | | | outhbound / | Approach | Pedestrians | | | |
| What is the | operating e | nvironment | t? ime at the i | ntersection? | ' (Please fi | II in table be | elow) | | | | outhbound / | Approach RT | Pedestrians Crossing Mair Road | | | |
| What is the | operating e | nvironment | t? ume at the i | ntersection? | ' (Please fi | Il in table be | elow) | estbound Ap | proach | Minor So | ······ | · · · · · · · · · · · · · · · · · · · | Crossing Mair | | | |
| - What is the | operating e eight hour v Main Ea | nvironment vehicle volu stbound Ap | t? ume at the i pproach RT | ntersection? Minor No | (Please fi orthbound A | Il in table be Approach RT | Main We | estbound Ap | proach RT | Minor So | TH | RT | Crossing Mair Road | | | |
| - What is the - What is the - What is the - What is the | operating e eight hour v Main Ea LT 291 | rivironment vehicle volu stbound Ap TH 17 | t? ume at the i pproach RT 0 | ntersection? Minor No LT 0 | P (Please fi | Il in table be | Main We | estbound Ap TH 16 | proach RT 11 | Minor So | TH 0 | RT 209 | Crossing Mair Road | | | |
| - What is the - What is the - What is the - What is the - Hour Ending - 7:00 - 8:00 | operating e eight hour v Main Ea LT 291 291 | reprise the second of the seco | t? ume at the i pproach RT 0 0 | Minor No | P (Please fi | Approach RT 0 | Main We | estbound Ap TH 16 16 | proach RT 11 | Minor So LT 9 | TH 0 0 | RT 209 209 | Crossing Mair Road 0 | | | |
| - What is the - What is the - What is the - Hour Ending - 7:00 - 8:00 - 9:00 | operating e eight hour v Main Ea LT 291 291 291 | vehicle volu stbound Ap TH 17 17 | t? ume at the i pproach RT 0 0 0 | Minor No LT 0 0 0 | TH 0 0 0 0 | Approach RT 0 0 0 | Main We LT 0 0 0 | estbound Ap TH 16 16 16 | proach RT 11 11 | Minor So LT 9 9 | TH 0 0 0 | RT 209 209 209 | Crossing Mair Road 0 0 0 | | | |
| - What is the - What is the - What is the - None Ending - 7:00 - 8:00 - 9:00 - 12:00 | operating e eight hour v Main Ea LT 291 291 291 291 291 | rivironment vehicle volu stbound Ap TH 17 17 17 | pproach RT 0 0 0 0 | Minor No LT 0 0 0 0 | O (Please fi | Approach RT 0 0 0 0 | Main We LT 0 0 0 0 0 | ### ################################## | proach RT 11 11 11 11 | Minor Sc LT 9 9 9 | TH 0 0 0 0 0 0 | RT 209 209 209 209 | Crossing Mair Road 0 0 0 0 0 | | | |
| - What is the - What is the - What is the - Hour Ending - 7:00 8:00 9:00 12:00 13:00 | Main Ea LT 291 291 291 291 291 | rehicle volustbound Ap TH 17 17 17 17 | pproach RT 0 0 0 0 0 0 | Minor No LT 0 0 0 0 0 0 | P (Please fi | Approach RT 0 0 0 0 0 0 | Main Wo | 16 16 16 16 16 16 16 | proach RT 11 11 11 11 11 | Minor So LT 9 9 9 | TH 0 0 0 0 0 0 0 0 0 | RT 209 209 209 209 209 | Crossing Mair Road 0 0 0 0 0 0 0 | | | |
| 7:00 8:00 9:00 12:00 16:00 | Main Ea LT 291 291 291 291 291 291 291 | stbound Ap TH 17 17 17 17 17 17 | pproach RT 0 0 0 0 0 0 0 | Minor No LT 0 0 0 0 0 0 0 | O (Please fi | Approach RT 0 0 0 0 0 0 0 | Main Wo | ### 16 | proach RT 11 11 11 11 11 11 | Minor Sc LT 9 9 9 9 | TH 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | RT 209 209 209 209 209 209 209 | Crossing Mair Road 0 0 0 0 0 0 0 0 0 0 | | | |

| Preceding Months | Number of Collisions* |
|---------------------|-----------------------|
| 1-12 | 0 |
| 13-24 | 0 |
| 25-36 | 0 |

^{*} Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

| | Zor | ne 1 | Zo | ne 2 | Zone 3 (i | f needed) | Zone 4 (i | f needed) | Total |
|---------------------------------------|------------|------------|----------|------------|-----------|------------|-----------|------------|-------|
| | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Total |
| Total 8 hour pedestrian volume | 10,000 | 5 | 10 | 5 | 0 | 0 | 0 | 0 | |
| Factored 8 hour pedestrian volume | 20, | 005 | 2 | 25 | (|) | | 0 | |
| % Assigned to crossing rate | 23 | 3% | 34 | 4% | 30 |)% | 10 | 0% | |
| Net 8 Hour Pedestrian Volume at Cross | sing | | | | | | | | 4,610 |
| Net 8 Hour Vehicular Volume on Street | Being Cros | sed | | | | | | 2,000 | |

| | Zoi | ne 1 | Zo | ne 2 | Zone 3 (| if needed) | Zone 4 (| if needed) | Total |
|--|----------|------------|----------|------------|----------|------------|----------|------------|-------|
| | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | iotai |
| Total 8 hour pedestrian volume | 10,000 | 5 | 10 | 5 | 0 | 0 | 0 | 0 | |
| Total 8 hour pedestrians delayed greater than 10 seconds | 10 | 10 | 1 | 6 | 2 | 4 | 0 | 0 | |
| Factored volume of total pedestrians | 20, | ,005 | : | 25 | | 0 | | 0 | |
| Factored volume of delayed pedestrians | 3 | 30 | | 8 | | 8 | | 0 | |
| % Assigned to Crossing Rate | 23 | 3% | 3 | 4% | 30 | 0% | 100% | | |
| Net 8 Hour Volume of Total Pedestrians | s | | | | | | | | 4,610 |
| Net 8 Hour Volume of Delayed Pedestri | ans | | | | | | | | 12 |

| Results Sheet | Input Sheet | Analysis Sheet | Proposed Collision |
|--|----------------------|-----------------------|--------------------|
| Intersection: South Service Road and QEV | N Niagara Bound Ramp | Count Date: 2036 Grow | vn + Site (AM/PM) |
| | | | |
| Cummon, Doculto | | | |

| NO V |
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Major Road: South Service Road Condition: Free Flow Date: 22-May-24 Minor Road: QEW Niagara Bound Ramps Major Rd. Lanes: 1 Project No.: 2571-6892

Horizon Year: 2036 Grown + Site (AM/PM) Intersection Type: Existing Analyst: AK

OTM Book 12 - Table 19 - Justification 7 - Projected Volumes (Traffic Signal Justification for Future Development - Traffic Impact Studies)

| | | MINI REQUIRI | MUM EMENT 1 | MINI REQUIREN | MUM | | COMPLIANCE | |
|-------------------------|---|-----------------|-----------------|------------------|-----------------|-----------|------------|------------|
| JUSTIFICATIO N | DESCRIPTION | | GHWAYS | | LANE | Sed | ctional | Entire |
| IN | | Free Flow | Restricted Flow | Free Flow | Restricted Flow | Numerical | Percentage | Percentage |
| 1. Minimum Vehicular | A. Vehicle Volume, All Approaches (Avg. Hour) | 864 | 1296 | 1080 | 1620 | 553.35 | 64% | 640/ |
| Venicular Volume | B. Vehicle Volume, Along Minor Streets (Avg. Hour) | 216 | 306 | 216 | 306 | 218.17 | 101% | 64% |
| 2. Delay to | A. Vehicle Volume, Major Street (Avg. Hour) | 864 | 1296 | 1080 | 1620 | 335.19 | 39% | 400/ |
| Cross Traffic | B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour) | 90 | 135 | 216 | 306 | 9 | 10% | 10% |

| Note: | Signal Justification 7 Met: | Yes | X | No |
|-------|-----------------------------|-----|---|----|
| | | | | 2 |

Existing Intersection Requires 120 % Justification Proposed Intersection Requires 150 % Justication

Inputs: Condition is "Free Flow" or "Restricted Flow"

Major Lanes is number of through lanes per direction (1,2,3)

| nput Dat | a Snee | Σ | | Analysis | Sheet | Results | Sheet | Propose | d Collision | | | | |
|--|--|--|---|-------------------------------|---|----------------------------------|--------------------------|---------------------------------------|--------------------------------|--|--|---------------------------------------|---|
| Vhat are the int | ersecting ro | oadways? | Г | South Servi | ce Road and | d QEW Niag | ara Bound R | amps | | GO | TO Justific | ation: | |
| Vhat is the dire | ction of the | Main Road | street? | Г | East-West | _ | When was | the data coll | ected? | 2036 Gro | wn + Site S | AT | |
| | | | | | | _ | | | | , | | | |
| lustification | 1 - 4: Vo | lume Wa | arrants | | | | | | | | | | |
| a Number of I | anes on the | Main Road | d? | 1 | ▼ | | | | | | | | |
| Number of I | anes on the | Minor Roa | nd? | 1 | ▼ | | | | | | | | |
| | | | | | | | | | | | | | |
| c How many a | pproaches | ? 3 | 3 🔻 | | | | | | | | | | |
| · · | • | - ' | | Lirban | | Popule | ntion >= 10 000 | AND | Snood < 70 k | ·m/h·r | | | |
| d What is the | operating e | nvironment | 1? | Urban | <u> </u> | • | ation >= 10,000 | AND | Speed < 70 k | :m/hr | | | |
| · · | operating e | nvironment | 1? | | | • | | AND | Speed < 70 k | .m/hr | | | |
| d What is the | operating e | nvironment | t? ime at the i | ntersection? | | II in table be | elow) | AND | | | outhbound A | Approach | Pedestrians |
| d What is the | operating e | nvironment | t? ime at the i | ntersection? | ' (Please fil | II in table be | elow) | | | | outhbound A | Approach RT | Pedestrians Crossing Main Road |
| I What is the | operating e eight hour v | nvironment | t? ume at the i | ntersection? | ' (Please file | Il in table be | elow) Main W | estbound Ap | proach | Minor Sc | y | Ÿ | Crossing Main |
| I What is the - What is the Hour Ending 7:00 8:00 | operating e eight hour v Main Ea LT 289 289 | environment vehicle volu stbound Ap TH 17 | t? ume at the i pproach RT | ntersection? Minor No | P (Please file | Il in table be Approach RT | Main W | estbound Ap | pproach RT 11 | Minor So LT 21 21 | ТН | RT 291 291 | Crossing Main |
| Hour Ending 7:00 8:00 9:00 | operating e eight hour v Main Ea LT 289 289 289 | vehicle volu stbound Ap TH 17 17 | ime at the i | ntersection? Minor No LT 0 | P (Please file | Il in table be Approach RT 0 | Main Wo | estbound Ap TH 8 | pproach RT 11 11 | Minor So LT 21 21 21 | TH 0 | RT 291 291 291 | Crossing Main Road |
| 1 What is the 1 What is th | operating e eight hour v Main Ea LT 289 289 289 289 | rivironment vehicle volu stbound Ap TH 17 17 17 | t? ume at the i pproach RT 0 0 0 0 | Minor No LT 0 0 0 0 | O (Please fill orthbound A O O O O O O O O O O O O O O O O O O | Approach RT 0 0 0 0 | Main Wo | estbound Ap TH 8 8 8 8 | proach RT 11 11 11 11 | Minor Sc LT 21 21 21 21 21 | TH 0 0 | RT 291 291 291 291 | Crossing Main Road 0 |
| 7:00 8:00 9:00 13:00 | operating e eight hour v Main Ea LT 289 289 289 | vehicle volu stbound Ap TH 17 17 | t? ume at the i pproach RT 0 0 0 | Minor No LT 0 0 0 | O (Please file orthbound A TH 0 0 0 0 | Approach RT 0 0 0 | Main Wo | estbound Ap TH 8 8 8 | pproach RT 11 11 | Minor So LT 21 21 21 | TH 0 0 0 0 | RT 291 291 291 | Crossing Main Road 0 0 0 |
| 7:00 8:00 9:00 12:00 16:00 | operating e eight hour v Main Ea LT 289 289 289 289 | reprint the street of the stre | t? ume at the i pproach RT 0 0 0 0 | Minor No LT 0 0 0 0 | O (Please fill orthbound A O O O O O O O O O O O O O O O O O O | Approach RT 0 0 0 0 | Main Wo | estbound Ap TH 8 8 8 8 | Pproach RT 11 11 11 11 11 11 | Minor Sc LT 21 21 21 21 21 21 | TH 0 0 0 0 0 0 | RT 291 291 291 291 | Crossing Main Road 0 0 0 0 |
| 1 What is the 2 What is the 4 What is the 4 What is the 5 What is the 6 What is the 6 What is the 7:00 8:00 9:00 12:00 13:00 | operating e eight hour v Main Ea LT 289 289 289 289 289 | reprint the street of the stre | pproach RT 0 0 0 0 0 0 | Minor No LT 0 0 0 0 0 0 | O (Please fill orthbound A TH 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Approach RT 0 0 0 0 0 0 | Main Wo | estbound Ap TH 8 8 8 8 8 | proach RT 11 11 11 11 11 | Minor Sc LT 21 21 21 21 21 | TH 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | RT 291 291 291 291 291 | Crossing Main Road 0 0 0 0 |
| 1 What is the 2 What is the 4 What is the 4 What is the 5 What is the 6 What is the 6 What is the 7:00 8:00 9:00 12:00 13:00 16:00 | Main Ea LT 289 289 289 289 289 289 | reprint the street of the stre | t? pproach RT 0 0 0 0 0 0 | Minor No LT 0 0 0 0 0 0 0 | Orthbound A TH 0 0 0 0 0 0 0 0 0 | Approach RT 0 0 0 0 0 0 0 | Main W. LT 0 0 0 0 0 0 | 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 | Pproach RT 11 11 11 11 11 11 | Minor Sc LT 21 21 21 21 21 21 | TH 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | RT 291 291 291 291 291 291 291 | Crossing Main Road 0 0 0 0 0 0 0 0 0 |

| Preceding Months | Number of Collisions* |
|---------------------|-----------------------|
| 1-12 | 0 |
| 13-24 | 0 |
| 25-36 | 0 |

^{*} Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

| | Zor | Zone 1 | | ne 2 | Zone 3 (i | f needed) | Zone 4 (i | Total | |
|--------------------------------------|--------------|------------|----------|------------|-----------|------------|-----------|------------|-------|
| | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | TOTAL |
| Total 8 hour pedestrian volume | 10,000 | 5 | 10 | 5 | 0 | 0 | 0 | 0 | |
| Factored 8 hour pedestrian volume | 20, | 005 | 2 | 25 | | 0 | | 0 | |
| % Assigned to crossing rate | 23 | % | 3- | 4% | 30 | 0% | 10 | 0% | |
| Net 8 Hour Pedestrian Volume at Cros | sing | | | | | | | | 4,610 |
| Net 8 Hour Vehicular Volume on Stree | t Being Cros | sed | | | | | | | 2,000 |

| | Zor | ne 1 | Zo | ne 2 | Zone 3 (if needed) | | Zone 4 (if needed) | | Total |
|--|--|------------|----------|------------|--------------------|------------|--------------------|------------|-------|
| | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Assisted | Unassisted | Iotai |
| Total 8 hour pedestrian volume | 10,000 | 5 | 10 | 5 | 0 | 0 | 0 | 0 | |
| Total 8 hour pedestrians delayed greater than 10 seconds | 10 | 10 | 1 | 6 | 2 | 4 | 0 | 0 | |
| Factored volume of total pedestrians | 20, | 005 | : | 25 | | 0 | | 0 | |
| Factored volume of delayed pedestrians | 3 | 30 | | 8 | | 8 | | 0 | |
| % Assigned to Crossing Rate | 23 | 3% | 3- | 4% | 30 | 0% | 10 | 00% | |
| Net 8 Hour Volume of Total Pedestrians | S | | | | | | | | 4,610 |
| Net 8 Hour Volume of Delayed Pedestri | Net 8 Hour Volume of Delayed Pedestrians | | | | | | | | |

| Results Sheet | <u>I</u> nput Sheet | | Analysis Sheet | Proposed Collision |
|---|---------------------|-----|-----------------------|--------------------|
| Interposition: South Service Bood and OEI | A/ Niogoro Pound De | omn | Count Date: 2026 Cray | Cito CAT |

Intersection: South Service Road and QEW Niagara Bound Ramps Count Date: 2036 Grown + Site SA

Summary Results

| | Justification | Compliano | ۵. | Signal Ju | stified? |
|-------------------------|-------------------|-----------|----|-----------|----------|
| · | Justineation | Compilano | | YES | NO |
| 1. Minimum Vehicular | A Total Volume | 88 | % | _ | _ |
| Volume | B Crossing Volume | 100 | % | | ~ |
| 2. Delay to Cross | A Main Road | 45 | % | | |
| Traffic | B Crossing Road | 28 | % | | ~ |
| 3. Combination | A Justificaton 1 | 88 | % | | |
| | B Justification 2 | 28 | % | | ~ |
| 4. 4-Hr Volume | | 90 | % | | ~ |

| 5. Collision Experience | | 0 % | | V |
|-------------------------|--|-----|--|---|
|-------------------------|--|-----|--|---|

| 6. Pedestrians | A Volume | Justification met | |
|----------------|----------|-----------------------|---|
| | B Delay | Justification not met | ~ |