

May 30, 2024

Municipality of Port Hope  
5 Mill Street South  
Port Hope, ON L1A 2S6

Attention: Theodhora Merepeza

RE: **220 Peter St Development – Traffic Brief**  
**Jewell Engineering File No. 220-5146**

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Ms. Merepeza,

Jewell Engineering Inc. (Jewell) has prepared this Traffic Brief to inform interest groups and all levels of decision-makers the impact of the proposed development at 220 Peter St in Port Hope, ON. This letter has been prepared to support the site plan application for the site.

#### Site Location

The development site is situated in a commercial area approx. 2km east of the downtown Port Hope area and 2km south of Highway 401. The site has an area of approx. 8ha.

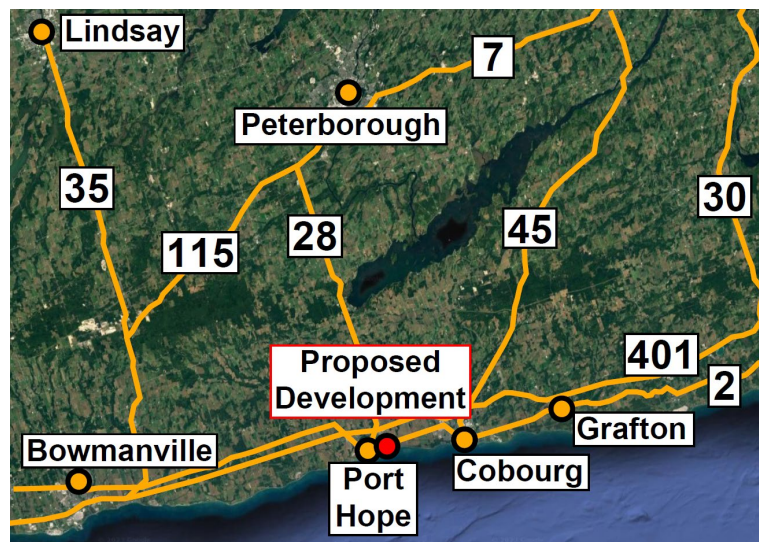


Figure 1: Surrounding Area (Google, Maxar Tech 2015)

Peter St (County Rd 2) is a four-lane, hard-surfaced arterial road, as shown in Figure 2. CR2 extends to Cobourg 8km to the east, and Newtonville 17.5km to the west. In the vicinity of the proposed development, Peter St has a posted speed limit of 50 km/hr.



Figure 2: Peter St, Facing West (Google, Maxar Tech 2021)

### **Existing Conditions**

The existing site remains undeveloped and is presently used for agricultural purposes. The site is bound by CN Rail tracks to the north. There is notable vegetation along the north and south property lines.

The approximate location of the proposed development site is shown in Figure 3.



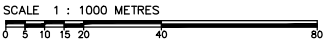
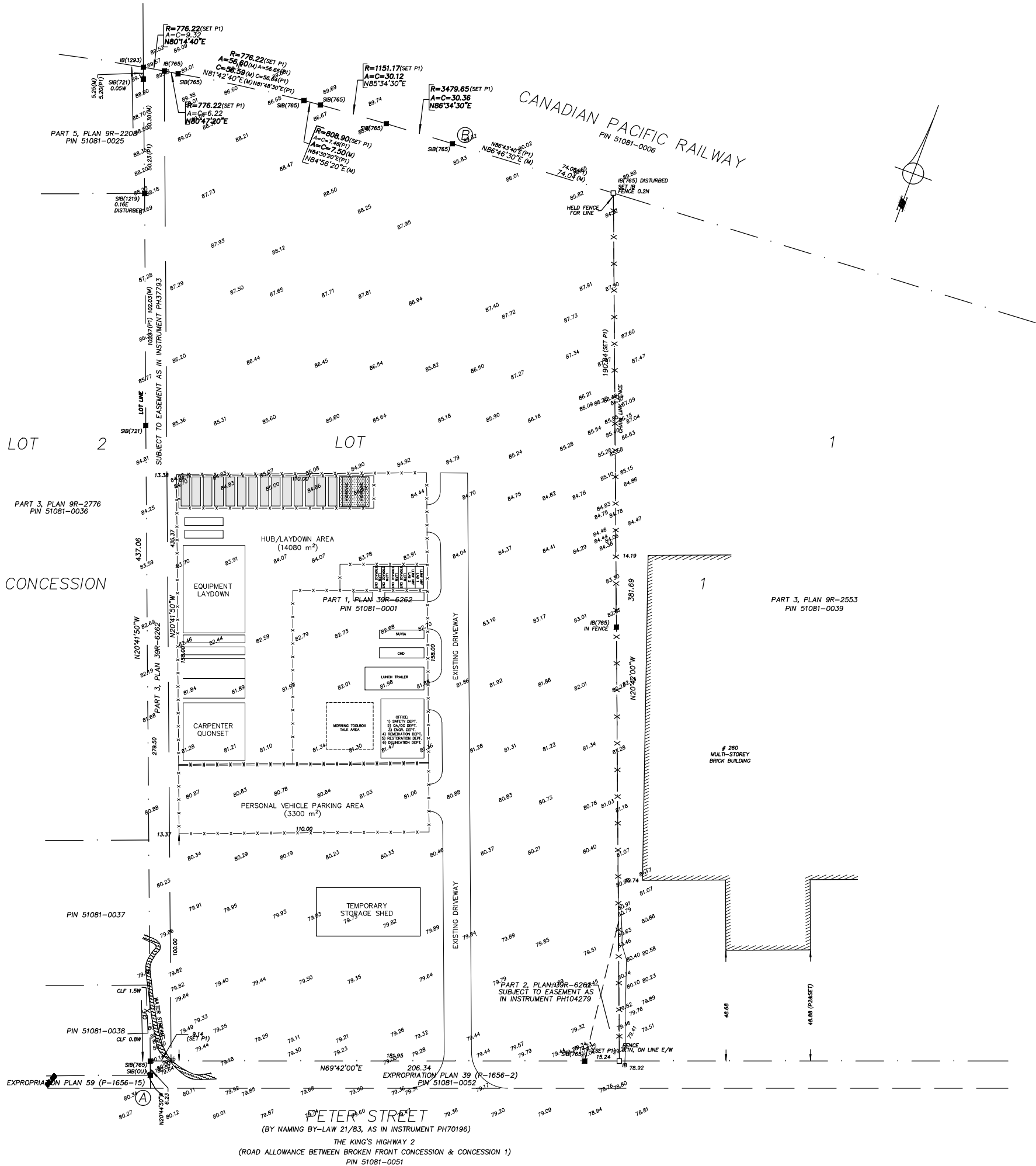
Figure 3: Existing Conditions (Google, Maxar Tech 2018)

### **Proposed Conditions**

Ultimately, the subject site is intended to be fully developed for industrial use. However, in the interim, a portion of the subject site will be used by contractors as a multi-purpose site for storing construction equipment and materials. The site will include a field office building, quonset, lunch trailer, parking lot, and several laydown and storage areas. The remainder of the site will remain undeveloped in interim conditions.

The access for the proposed site intersects on the north side of Peter St, forming a new T intersection 240m west of Hamilton Rd with stop control at the southbound site access.

The proposed site plan for the interim contract yard is shown below.



**BEARING NOTES**  
BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK OBSERVATIONS, UTM ZONE 17 (81° WEST LONGITUDE), NAD83(CSRS)(2010).  
FOR BEARING COMPARISONS, THE FOLLOWING ROTATIONS WERE APPLIED:  
P1,P2 - 1°54'20" COUNTER-CLOCKWISE

**DISTANCE NOTES - METRIC**  
DISTANCES AND COORDINATES ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.  
DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 1.000182.

**CAUTION**  
THE WORK AND DRAWINGS HEREIN WERE COMPLETED FOR THE EXCLUSIVE USE OF OUR CLIENT AND NO LIABILITY IS ASSUMED TO ANY THIRD PARTIES OR SUBSEQUENT OWNERS.

- LEGEND**
- DENOTES SURVEY MONUMENT FOUND
  - DENOTES SURVEY MONUMENT SET
  - SIB DENOTES STANDARD IRON BAR
  - IB DENOTES IRON BAR
  - M DENOTES MEASURED
  - P1 DENOTES PLAN 39R-6262
  - P2 DENOTES PLAN 9R-2536
  - 721 DENOTES J.L. SYLVESTER, O.L.S.
  - 765 DENOTES HORTON, WALLACE & DAVIES LTD., O.L.S.
  - 1219 DENOTES WILLIAM R. BRICK, O.L.S.
  - 1293 DENOTES SYLVESTER & BROWN LTD., O.L.S.
  - OU DENOTES ORIGIN UNKNOWN
  - DENOTES FENCE W/ TYPE
  - CLF DENOTES CHAIN LINK FENCE

BUILDING TIES SHOWN HEREON ARE TO THE FOUNDATION UNLESS OTHERWISE NOTED.  
ALL BEARINGS AND DISTANCES AGREE WITH CITED PLANS UNLESS OTHERWISE NOTED.

| INTEGRATION DATA                                                                                                                                          |            |           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|
| OBSERVED REFERENCE POINTS DERIVED FROM GPS OBSERVATIONS USING A REAL TIME NETWORK AND ARE REFERRED TO UTM ZONE 17 (81° WEST LONGITUDE) NAD83(CSRS)(2010). |            |           |
| URBAN ACCURACY PER SEC. 14(2), O.REG. 216/10.                                                                                                             |            |           |
| POINT ID                                                                                                                                                  | NORTHING   | EASTING   |
| A                                                                                                                                                         | 4870445.06 | 718914.27 |
| B                                                                                                                                                         | 4870875.45 | 718896.74 |

CAUTION: COORDINATES CANNOT IN THEMSELVES BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN

| Notes |                  |      |
|-------|------------------|------|
|       |                  |      |
|       |                  |      |
|       |                  |      |
|       |                  |      |
| No.   | Revision / Issue | Date |

Client

Consultant

**BSG Engineering Ltd.**  
Geo-Environmental & Building Sciences

1315 LAWRENCE AVE E, SUITE 524, TORONTO, ONT. M3A 3R3  
Tel: (416) 798-2126 Fax: 1(866)345-6228

Project Title

220 PETER STREET  
PORT HOPE, ONTARIO

Drawing Title

SITE PLAN

|                |               |
|----------------|---------------|
| Drawn By: M.R. | Checked: W.H. |
| Project #      | Drawing #     |
| Date MAY 2024  | A1            |
| Scale N.T.S.   |               |



## **Lines of Sight**

A sight line analysis was completed by Jewell in 2022 at the site access location along Peter St in support of the site entrance permit. The entrance was subsequently constructed.

See Appendix A for the analysis.

## **Vehicular Trip Generation**

Jewell retained Ontario Traffic Inc. (OTI) to conduct traffic counts on Peter St at the proposed site entrance location between Hamilton Rd and Rose Glen Rd S. These counts were conducted from Friday, September 30, 2022 to Monday, October 3, 2022. The traffic counts identified 11:45-12:45(PM) as the AM peak hour and 3:15-4:15 as the PM peak hour.

A seasonal adjustment factor of 1.22 was applied to the October traffic counts to reflect the peak traffic counts at the seasonal high (approximately July 15<sup>th</sup>). This factor was obtained from MTO traffic data for Highway 401, as this is the closest MTO highway to the development site. Jewell used the Commuter Tourist Recreation traffic pattern observed in 2019 (most recent data), which is the appropriate pattern type for Highway 401 trips in the Port Hope area.

Jewell applied a growth factor of 2% to background traffic to conservatively reflect 2024 traffic conditions, which is a conservative representation of the growth rate of both Port Hope and Northumberland County (Table 1).

*Table 1: Stats Canada Census Population Data (2022)*

| Census Area           | 2016 Population | 2021 Population | Annual Growth Rate |
|-----------------------|-----------------|-----------------|--------------------|
| Port Hope             | 16,753          | 17,294          | 0.6%               |
| Northumberland County | 85,598          | 89,365          | 0.9%               |

Trip generation estimates for the 220 Peter St development of the interim contract yard were provided by the client (2693345 Ontario Ltd.) in consultation with the prospective tenant. Daily vehicle trips to and from the site are anticipated to include:

- 5 tri-axles
- 5 pick-up trucks
- 5 cars and vans
- 2 trailers
- 6-10 pieces of construction equipment

As a conservative estimate, Jewell assumed that the inbound trips for the AM peak hour will be 10 (pick-up trucks and cars/vans), with trips being split equally from both directions. Jewell assumed that the number of outbound trips for the AM peak hour will be 20 (tri-axes, pick-up trucks, construction equipment), with 50% of trips heading eastbound and 50% heading westbound based on equal EB/WB background traffic.

Conversely, the PM peak inbound trips were assumed to be 20, with 50% of trips arriving from the west and 50% from the east. The PM peak outbound trips were conservatively assumed to be 10, with trips being split equally in both directions.

The performance of the study intersection with the existing geometry and the added development generated traffic are summarized below.

*Table 2: Level of Service - Background + 220 Peter St Development*

|                                                   |                 | <b>2024 Background + Development</b> |                |
|---------------------------------------------------|-----------------|--------------------------------------|----------------|
|                                                   |                 | <b>AM Peak</b>                       | <b>PM Peak</b> |
| <b>Proposed Site Access/Peter St Intersection</b> |                 |                                      |                |
| <b>EBL</b>                                        | LOS             | B                                    | B              |
|                                                   | v/c             | 0.009                                | 0.022          |
|                                                   | Delay (s)       | 10.9                                 | 12.6           |
|                                                   | 95% Queue (veh) | 0                                    | 0.1            |
| <b>EBT</b>                                        | LOS             | A                                    | A              |
|                                                   | v/c             | -                                    | -              |
|                                                   | Delay (s)       | 0.1                                  | 0.3            |
|                                                   | 95% Queue (veh) | -                                    | -              |
| <b>WB</b>                                         | LOS             | -                                    | -              |
|                                                   | v/c             | -                                    | -              |
|                                                   | Delay (s)       | -                                    | -              |
|                                                   | 95% Queue (veh) | -                                    | -              |
| <b>SB</b>                                         | LOS             | C                                    | D              |
|                                                   | v/c             | 0.093                                | 0.075          |
|                                                   | Delay (s)       | 22                                   | 31.8           |
|                                                   | 95% Queue (veh) | 0.3                                  | 0.2            |

As demonstrated in Table 2, all approaches will operate at an acceptable level of service with minimal delay and queuing with the addition of the proposed development traffic. Trips to and from the development have level-of-service D or better, and there is no significant impact to through traffic on Peter Street. As a result, the existing geometry is sufficient and no upgrades (i.e. turning lanes) are required to the existing road network.

## **Conclusions**

The proposed development at 220 Peter St will involve the addition of a small site office, quonset, parking lot, and multiple laydown and storage areas. The development is expected to

produce a maximum of 30 peak-hour trips, which will have no noticeable impact on the operation of the existing road network.

Lines of sight are sufficient to provide safe ingress/egress at the proposed site access, provided that the contractor ensures vegetation along Peter St is sufficiently maintained or removed.

Levels of service remain acceptable with existing geometry and the additional traffic generated from the development. The additional turning movements will have minimal impact on traffic flow, consequently, no upgrades are required to support the proposed development.

Prepared by



Andrew Rosenthal, EIT  
Jewell Engineering Inc.

Reviewed by



Amanda Redden, P.Eng.  
Jewell Engineering Inc.

## **Appendix A**

### **Sight Line Analysis**





September 30, 2022

Municipality of Port Hope  
5 Mill Street South  
Port Hope, ON L1A 2S6

Attention: Theodhora Merepeza

**RE: Peter St Industrial Lot, Port Hope**  
**Traffic Lines of Sight**  
**Jewell Engineering File No. 220-5146**

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**BELLEVILLE**  
(HEAD OFFICE)  
1—71 Millennium Pkwy.  
Belleville ON K8N 4Z5  
Tel: 613-969-1111  
info@jewelleng.ca

**TOLL FREE**  
**1-800-966-4338**

**KINGSTON**  
208—4 Cataraqui St.  
Kingston ON K7K 1Z7  
Tel: 613-389-7250  
kingston@jewelleng.ca

**OAKVILLE**  
214-231 Oak Park Boulevard  
Oakville, ON L6H 7S8  
Tel: 905-257-2880  
oakville@jewelleng.ca

[www.jewelleng.ca](http://www.jewelleng.ca)

Jewell Engineering Inc. (Jewell) was retained by Mr. Syed to investigate of the lines of sight at the proposed entrance location for the property along Peter St in Port Hope, between Hamilton Road and Rose Glen Rd S. This line-of-sight analysis was completed in support of the Entrance Permit Application.

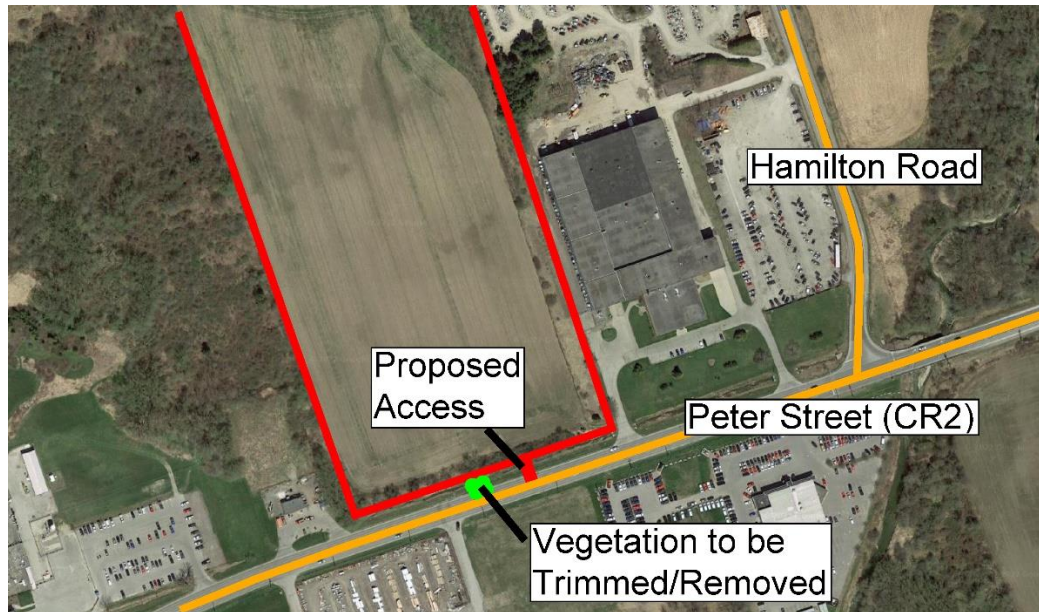
A Jewell staff member conducted a site visit on September 15, 2022 to ensure the lines of sight along Peter St are sufficient to safely enter and exit the site.

Peter St is a four-lane, hard-surfaced road that runs along the site's south property boundary. The posted speed limit on Peter St was recently dropped from 60km/h to 50km/h, and this posted speed limit is in place between Rose Glen Rd S and east of Hamilton Road. As the posted speed limit is 50km/h, Jewell conservatively assumes a design speed of 70km/h. At this speed, the following minimum sight distances apply:

- Intersection sight distance
  - Left turn from stop: 150m
  - Right turn from stop: 130m
- Stopping sight distance: 110m (assuming 3% downgrade)

Intersection sight distances are based on the ability for vehicles to advance from a stop "...without forcing a major-road vehicle to slow to less than 70% of their initial speed", according to the TAC Manual Chapter 9, Pg. 65 (2017). In contrast, stopping sight distance is the time it takes a driver travelling at the design speed to identify a hazard (such as a vehicle in the path of travel), react to that hazard (based on 90<sup>th</sup> percentile reaction time), and come to a complete stop behind that obstruction.

The proposed site entrance is located 139m east of the west property line. A small tree is situated west of the proposed entrance, and this tree can limit the line of sight from a stationary driver's perspective. This hazard can be eliminated by trimming or removing the tree. After removal of the vegetation, the lines of sight are in excess of 200m in either direction and will therefore meet the minimum requirement for safe site access.



The contractor should ensure that vegetation along Peter St (including, but not limited to, the vegetation noted above) is sufficiently trimmed and/or removed to ensure that safe access is provided.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Amanda Redden'.

Amanda Redden, P.Eng.  
Jewell Engineering Inc.

## **Appendix B**

### **Terms of Reference**

**From:** [Amanda Redden](#)  
**To:** [Andrew Rosenthal](#); [Emma Babbitt](#)  
**Subject:** FW: Tenant info  
**Date:** Monday, May 27, 2024 12:59:33 PM  
**Attachments:** [220 Peter Street - SitePlanCombined.pdf](#)

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Thanks,  
Amanda Redden, P.Eng.  
Municipal Engineer

Jewell Engineering  
1-71 Millennium Parkway  
Belleville, ON  
K8N 4Z5  
Office 613.969.1111  
Cell 613.242.9456  
Fax 613.969.8988

-----Original Message-----

From: Hyder Syed <[hyder\\_syed2000@yahoo.com](mailto:hyder_syed2000@yahoo.com)>  
Sent: Friday, May 24, 2024 11:07 AM  
To: Amanda Redden <[reddena@jewelleng.ca](mailto:reddena@jewelleng.ca)>  
Subject: Tenant info

Good morning Amanda,

Following is the info:

5 Triaxels  
5 pick up trucks  
5 regular cars and vans  
2 Trailers  
6-10 peices of construction equipment.

Total of maximum: 15-20v ehicles

Distribution of traffic thru 8-4 PM.

Some vehicles are kept at job sites, some employees report to job site directly. Inflow to the yard between 7-9 am will be 10-12 vehicles.

Regards  
Hyder Syed  
Sent from my iPhone

**Appendix C**  
**OTI Traffic Counts**

|       | Friday, September 30 / 2022 |     |     |     | Saturday, October 1 / 2022 |     |     |     | Sunday, October 2 / 2022 |     |     |     | Monday, October 3 / 2022 |     |     |     | Weekday (Fri/Mon Average) |     |     |     |
|-------|-----------------------------|-----|-----|-----|----------------------------|-----|-----|-----|--------------------------|-----|-----|-----|--------------------------|-----|-----|-----|---------------------------|-----|-----|-----|
|       | AM                          |     | PM  |     | AM                         |     | PM  |     | AM                       |     | PM  |     | AM                       |     | PM  |     | AM                        |     | PM  |     |
|       | EB                          | WB  | EB  | WB  | EB                         | WB  | EB  | WB  | EB                       | WB  | EB  | WB  | EB                       | WB  | EB  | WB  | EB                        | WB  | EB  | WB  |
| 12:00 | 9                           | 6   | 124 | 148 | 26                         | 25  | 109 | 108 | 27                       | 22  | 102 | 97  | 12                       | 7   | 116 | 114 | 11                        | 7   | 120 | 131 |
| 12:15 | 9                           | 5   | 130 | 134 | 20                         | 27  | 111 | 102 | 18                       | 19  | 92  | 112 | 11                       | 9   | 136 | 109 | 10                        | 7   | 133 | 122 |
| 12:30 | 15                          | 5   | 135 | 120 | 25                         | 29  | 120 | 111 | 22                       | 25  | 106 | 104 | 13                       | 4   | 137 | 93  | 14                        | 5   | 136 | 107 |
| 12:45 | 7                           | 11  | 128 | 113 | 23                         | 28  | 111 | 128 | 17                       | 20  | 102 | 117 | 9                        | 10  | 135 | 107 | 8                         | 11  | 132 | 110 |
| 1:00  | 8                           | 6   | 126 | 115 | 22                         | 12  | 111 | 120 | 15                       | 21  | 108 | 100 | 8                        | 8   | 142 | 113 | 8                         | 7   | 134 | 114 |
| 1:15  | 10                          | 5   | 158 | 133 | 18                         | 17  | 112 | 106 | 12                       | 11  | 110 | 99  | 12                       | 6   | 126 | 125 | 11                        | 6   | 142 | 129 |
| 1:30  | 8                           | 5   | 140 | 128 | 11                         | 15  | 113 | 94  | 10                       | 14  | 89  | 105 | 9                        | 5   | 144 | 133 | 9                         | 5   | 142 | 131 |
| 1:45  | 5                           | 7   | 133 | 125 | 8                          | 16  | 95  | 98  | 8                        | 16  | 95  | 98  | 6                        | 6   | 134 | 119 | 6                         | 7   | 134 | 122 |
| 2:00  | 4                           | 9   | 135 | 145 | 9                          | 8   | 109 | 111 | 9                        | 12  | 89  | 94  | 8                        | 8   | 144 | 144 | 6                         | 9   | 140 | 145 |
| 2:15  | 8                           | 5   | 149 | 137 | 8                          | 8   | 115 | 107 | 8                        | 18  | 93  | 113 | 8                        | 6   | 150 | 120 | 8                         | 6   | 150 | 129 |
| 2:30  | 6                           | 6   | 158 | 127 | 7                          | 8   | 103 | 97  | 6                        | 9   | 99  | 87  | 7                        | 9   | 132 | 130 | 7                         | 8   | 145 | 129 |
| 2:45  | 6                           | 4   | 158 | 116 | 8                          | 8   | 94  | 102 | 11                       | 8   | 102 | 91  | 7                        | 5   | 133 | 139 | 7                         | 5   | 146 | 128 |
| 3:00  | 7                           | 4   | 135 | 157 | 7                          | 9   | 102 | 118 | 5                        | 6   | 100 | 98  | 6                        | 5   | 156 | 146 | 7                         | 5   | 146 | 152 |
| 3:15  | 9                           | 6   | 156 | 149 | 8                          | 4   | 100 | 109 | 7                        | 6   | 95  | 100 | 10                       | 4   | 179 | 140 | 10                        | 5   | 168 | 145 |
| 3:30  | 8                           | 4   | 140 | 169 | 6                          | 5   | 106 | 106 | 4                        | 7   | 92  | 81  | 5                        | 7   | 164 | 164 | 7                         | 6   | 152 | 167 |
| 3:45  | 8                           | 5   | 132 | 146 | 6                          | 5   | 110 | 108 | 5                        | 8   | 99  | 84  | 10                       | 4   | 145 | 170 | 9                         | 5   | 139 | 158 |
| 4:00  | 11                          | 6   | 159 | 179 | 8                          | 4   | 102 | 108 | 5                        | 2   | 102 | 78  | 10                       | 8   | 137 | 147 | 11                        | 7   | 148 | 163 |
| 4:15  | 14                          | 11  | 155 | 156 | 4                          | 6   | 88  | 99  | 5                        | 6   | 94  | 101 | 13                       | 7   | 153 | 153 | 14                        | 9   | 154 | 155 |
| 4:30  | 10                          | 11  | 127 | 192 | 3                          | 8   | 92  | 105 | 6                        | 6   | 103 | 99  | 9                        | 11  | 123 | 155 | 10                        | 11  | 125 | 174 |
| 4:45  | 11                          | 7   | 135 | 158 | 8                          | 4   | 97  | 88  | 2                        | 1   | 99  | 82  | 10                       | 9   | 146 | 134 | 11                        | 8   | 141 | 146 |
| 5:00  | 16                          | 8   | 156 | 152 | 8                          | 4   | 109 | 92  | 6                        | 4   | 86  | 78  | 17                       | 14  | 135 | 141 | 17                        | 11  | 146 | 147 |
| 5:15  | 23                          | 14  | 122 | 135 | 11                         | 8   | 81  | 81  | 4                        | 4   | 96  | 110 | 24                       | 16  | 161 | 119 | 24                        | 15  | 142 | 127 |
| 5:30  | 27                          | 15  | 120 | 131 | 11                         | 15  | 90  | 102 | 4                        | 8   | 81  | 104 | 38                       | 11  | 132 | 123 | 33                        | 13  | 126 | 127 |
| 5:45  | 37                          | 13  | 115 | 124 | 13                         | 11  | 94  | 76  | 11                       | 6   | 93  | 100 | 33                       | 12  | 102 | 118 | 35                        | 13  | 109 | 121 |
| 6:00  | 33                          | 17  | 94  | 112 | 17                         | 11  | 93  | 92  | 4                        | 9   | 81  | 79  | 38                       | 20  | 91  | 105 | 36                        | 19  | 93  | 109 |
| 6:15  | 58                          | 17  | 98  | 95  | 18                         | 12  | 89  | 98  | 8                        | 11  | 83  | 87  | 60                       | 16  | 83  | 95  | 59                        | 17  | 91  | 95  |
| 6:30  | 55                          | 22  | 84  | 94  | 11                         | 19  | 104 | 82  | 5                        | 11  | 79  | 90  | 62                       | 24  | 86  | 98  | 59                        | 23  | 85  | 96  |
| 6:45  | 50                          | 34  | 78  | 83  | 17                         | 18  | 88  | 74  | 11                       | 15  | 69  | 83  | 44                       | 26  | 79  | 82  | 47                        | 30  | 79  | 83  |
| 7:00  | 51                          | 28  | 65  | 74  | 19                         | 21  | 69  | 72  | 10                       | 13  | 72  | 70  | 44                       | 38  | 52  | 63  | 48                        | 33  | 59  | 69  |
| 7:15  | 62                          | 42  | 57  | 60  | 21                         | 31  | 66  | 69  | 23                       | 18  | 69  | 71  | 59                       | 50  | 63  | 60  | 61                        | 46  | 60  | 60  |
| 7:30  | 81                          | 67  | 49  | 74  | 35                         | 38  | 69  | 67  | 14                       | 19  | 71  | 81  | 81                       | 67  | 57  | 60  | 81                        | 67  | 53  | 67  |
| 7:45  | 94                          | 58  | 47  | 55  | 53                         | 25  | 64  | 69  | 25                       | 24  | 68  | 69  | 63                       | 67  | 54  | 67  | 79                        | 63  | 51  | 61  |
| 8:00  | 110                         | 91  | 58  | 55  | 28                         | 50  | 74  | 55  | 22                       | 29  | 58  | 67  | 76                       | 51  | 54  | 54  | 93                        | 71  | 56  | 55  |
| 8:15  | 124                         | 102 | 55  | 61  | 36                         | 39  | 69  | 58  | 21                       | 23  | 62  | 71  | 115                      | 80  | 42  | 54  | 120                       | 91  | 49  | 58  |
| 8:30  | 109                         | 95  | 44  | 58  | 41                         | 46  | 44  | 65  | 47                       | 41  | 51  | 60  | 99                       | 103 | 54  | 57  | 104                       | 99  | 49  | 58  |
| 8:45  | 89                          | 90  | 51  | 59  | 52                         | 40  | 67  | 50  | 30                       | 29  | 38  | 58  | 92                       | 92  | 52  | 60  | 91                        | 91  | 52  | 60  |
| 9:00  | 99                          | 93  | 49  | 39  | 56                         | 53  | 48  | 58  | 37                       | 23  | 44  | 56  | 95                       | 84  | 48  | 52  | 97                        | 89  | 49  | 46  |
| 9:15  | 95                          | 92  | 31  | 40  | 77                         | 59  | 62  | 37  | 66                       | 25  | 43  | 56  | 107                      | 99  | 34  | 53  | 101                       | 96  | 33  | 47  |
| 9:30  | 105                         | 96  | 37  | 49  | 87                         | 74  | 56  | 50  | 61                       | 45  | 36  | 55  | 88                       | 106 | 30  | 46  | 97                        | 101 | 34  | 48  |
| 9:45  | 123                         | 97  | 29  | 35  | 61                         | 68  | 36  | 53  | 62                       | 62  | 34  | 31  | 115                      | 91  | 19  | 47  | 119                       | 94  | 24  | 41  |
| 10:00 | 113                         | 88  | 22  | 34  | 75                         | 88  | 46  | 39  | 61                       | 65  | 41  | 30  | 98                       | 99  | 30  | 47  | 106                       | 94  | 26  | 41  |
| 10:15 | 124                         | 102 | 31  | 38  | 106                        | 83  | 53  | 46  | 69                       | 63  | 37  | 34  | 95                       | 102 | 19  | 28  | 110                       | 102 | 25  | 33  |
| 10:30 | 114                         | 110 | 20  | 37  | 111                        | 102 | 40  | 38  | 71                       | 76  | 32  | 32  | 112                      | 110 | 20  | 34  | 113                       | 110 | 20  | 36  |
| 10:45 | 106                         | 121 | 18  | 24  | 88                         | 116 | 34  | 46  | 102                      | 71  | 27  | 26  | 106                      | 108 | 11  | 29  | 106                       | 115 | 15  | 27  |
| 11:00 | 122                         | 124 | 19  | 29  | 109                        | 94  | 34  | 25  | 88                       | 88  | 20  | 19  | 109                      | 128 | 24  | 24  | 116                       | 126 | 22  | 27  |
| 11:15 | 105                         | 99  | 16  | 21  | 116                        | 81  | 33  | 36  | 116                      | 102 | 24  | 17  | 94                       | 140 | 17  | 23  | 100                       | 120 | 17  | 22  |
| 11:30 | 111                         | 112 | 14  | 24  | 112                        | 103 | 32  | 34  | 111                      | 95  | 13  | 25  | 110                      | 142 | 14  | 29  | 111                       | 127 | 14  | 27  |
| 11:45 | 116                         | 113 | 16  | 18  | 116                        | 103 | 34  | 23  | 105                      | 86  | 20  | 22  | 122                      | 126 | 10  | 22  | 119                       | 120 | 13  | 20  |



## **Appendix D**

### **Synchro Reports**

| Intersection             |        |        |      |        |       |       |
|--------------------------|--------|--------|------|--------|-------|-------|
| Int Delay, s/veh         | 0.4    |        |      |        |       |       |
| Movement                 | EBL    | EBT    | WBT  | WBR    | SBL   | SBR   |
| Lane Configurations      |        | ↕↕     | ↕↕   |        | ↕     |       |
| Traffic Vol, veh/h       | 5      | 645    | 608  | 5      | 10    | 10    |
| Future Vol, veh/h        | 5      | 645    | 608  | 5      | 10    | 10    |
| Conflicting Peds, #/hr   | 0      | 0      | 0    | 0      | 0     | 0     |
| Sign Control             | Free   | Free   | Free | Free   | Stop  | Stop  |
| RT Channelized           | -      | None   | -    | None   | -     | None  |
| Storage Length           | -      | -      | -    | -      | 0     | -     |
| Veh in Median Storage, # | -      | 0      | 0    | -      | 0     | -     |
| Grade, %                 | -      | 0      | 0    | -      | 0     | -     |
| Peak Hour Factor         | 92     | 92     | 92   | 92     | 92    | 92    |
| Heavy Vehicles, %        | 60     | 5      | 5    | 60     | 60    | 60    |
| Mvmt Flow                | 5      | 701    | 661  | 5      | 11    | 11    |
| Major/Minor              | Major1 | Major2 |      | Minor2 |       |       |
| Conflicting Flow All     | 666    | 0      | -    | 0      | 1025  | 333   |
| Stage 1                  | -      | -      | -    | -      | 664   | -     |
| Stage 2                  | -      | -      | -    | -      | 361   | -     |
| Critical Hdwy            | 5.3    | -      | -    | -      | 8     | 8.1   |
| Critical Hdwy Stg 1      | -      | -      | -    | -      | 7     | -     |
| Critical Hdwy Stg 2      | -      | -      | -    | -      | 7     | -     |
| Follow-up Hdwy           | 2.8    | -      | -    | -      | 4.1   | 3.9   |
| Pot Cap-1 Maneuver       | 618    | -      | -    | -      | 153   | 520   |
| Stage 1                  | -      | -      | -    | -      | 344   | -     |
| Stage 2                  | -      | -      | -    | -      | 531   | -     |
| Platoon blocked, %       |        | -      | -    | -      |       |       |
| Mov Cap-1 Maneuver       | 618    | -      | -    | -      | 151   | 520   |
| Mov Cap-2 Maneuver       | -      | -      | -    | -      | 151   | -     |
| Stage 1                  | -      | -      | -    | -      | 340   | -     |
| Stage 2                  | -      | -      | -    | -      | 531   | -     |
| Approach                 | EB     | WB     |      | SB     |       |       |
| HCM Control Delay, s     | 0.2    | 0      |      | 22     |       |       |
| HCM LOS                  |        |        |      | C      |       |       |
| Minor Lane/Major Mvmt    | EBL    | EBT    | WBT  | WBR    | SBLn1 |       |
| Capacity (veh/h)         | 618    | -      | -    | -      | -     | 234   |
| HCM Lane V/C Ratio       | 0.009  | -      | -    | -      | -     | 0.093 |
| HCM Control Delay (s)    | 10.9   | 0.1    | -    | -      | -     | 22    |
| HCM Lane LOS             | B      | A      | -    | -      | -     | C     |
| HCM 95th %tile Q(veh)    | 0      | -      | -    | -      | -     | 0.3   |

| Intersection             |        |        |      |        |       |       |
|--------------------------|--------|--------|------|--------|-------|-------|
| Int Delay, s/veh         | 0.4    |        |      |        |       |       |
| Movement                 | EBL    | EBT    | WBT  | WBR    | SBL   | SBR   |
| Lane Configurations      |        | ↑↑     | ↑↑   |        | ↑↑    |       |
| Traffic Vol, veh/h       | 10     | 769    | 802  | 10     | 5     | 5     |
| Future Vol, veh/h        | 10     | 769    | 802  | 10     | 5     | 5     |
| Conflicting Peds, #/hr   | 0      | 0      | 0    | 0      | 0     | 0     |
| Sign Control             | Free   | Free   | Free | Free   | Stop  | Stop  |
| RT Channelized           | -      | None   | -    | None   | -     | None  |
| Storage Length           | -      | -      | -    | -      | 0     | -     |
| Veh in Median Storage, # | -      | 0      | 0    | -      | 0     | -     |
| Grade, %                 | -      | 0      | 0    | -      | 0     | -     |
| Peak Hour Factor         | 92     | 92     | 92   | 92     | 92    | 92    |
| Heavy Vehicles, %        | 60     | 5      | 5    | 60     | 60    | 60    |
| Mvmt Flow                | 11     | 836    | 872  | 11     | 5     | 5     |
| Major/Minor              | Major1 | Major2 |      | Minor2 |       |       |
| Conflicting Flow All     | 883    | 0      | -    | 0      | 1318  | 442   |
| Stage 1                  | -      | -      | -    | -      | 878   | -     |
| Stage 2                  | -      | -      | -    | -      | 440   | -     |
| Critical Hdwy            | 5.3    | -      | -    | -      | 8     | 8.1   |
| Critical Hdwy Stg 1      | -      | -      | -    | -      | 7     | -     |
| Critical Hdwy Stg 2      | -      | -      | -    | -      | 7     | -     |
| Follow-up Hdwy           | 2.8    | -      | -    | -      | 4.1   | 3.9   |
| Pot Cap-1 Maneuver       | 484    | -      | -    | -      | 91    | 430   |
| Stage 1                  | -      | -      | -    | -      | 252   | -     |
| Stage 2                  | -      | -      | -    | -      | 474   | -     |
| Platoon blocked, %       |        | -      | -    | -      |       |       |
| Mov Cap-1 Maneuver       | 484    | -      | -    | -      | 87    | 430   |
| Mov Cap-2 Maneuver       | -      | -      | -    | -      | 87    | -     |
| Stage 1                  | -      | -      | -    | -      | 241   | -     |
| Stage 2                  | -      | -      | -    | -      | 474   | -     |
| Approach                 | EB     | WB     |      | SB     |       |       |
| HCM Control Delay, s     | 0.5    | 0      |      | 31.8   |       |       |
| HCM LOS                  |        |        |      | D      |       |       |
| Minor Lane/Major Mvmt    | EBL    | EBT    | WBT  | WBR    | SBLn1 |       |
| Capacity (veh/h)         | 484    | -      | -    | -      | -     | 145   |
| HCM Lane V/C Ratio       | 0.022  | -      | -    | -      | -     | 0.075 |
| HCM Control Delay (s)    | 12.6   | 0.3    | -    | -      | -     | 31.8  |
| HCM Lane LOS             | B      | A      | -    | -      | -     | D     |
| HCM 95th %tile Q(veh)    | 0.1    | -      | -    | -      | -     | 0.2   |