

Technical Memorandum

To:	Tom Hanrahan – City of Barrie Jeff Sharp – City of Barrie	From:	John Northcote, P.Eng.
Date:	April 17 th , 2019	Project #:	1302
Project Name:	BEMP 2 Barrie		
Subject:	Transportation Design Manual – Conformity Review		
Distribution:	Ray Duhamel – The Jones Consulting Group Ltd.		

On behalf of our client (BEMP Holdings 2 Inc.), JD Northcote Engineering Inc. [JD Engineering] has completed a review of the attached Draft Plan of Subdivision, as prepared by Jones Consulting Group Ltd. Our review identifies locations within the proposed design that do not conform to the City of Barrie Transportation Design Manual (2017) [City TM]. All non-conforming elements have been assessed to determine if they will result in operational or traffic safety issues. Recommendations for mitigation have been included where necessary.

1. Intersection Angle

1.1. City TM Criteria

According to the Transportation Association of Canada *Geometric Design Guide for Canadian Roads* (2017) [TAC Guidelines], intersection angles less than 70° and greater than 110° are typically not desirable.

1.2. Non-Conformance Location

None

2. Intersection Spacing

2.1. City TM Criteria

According to the TAC Guidelines, the typical minimum spacing between adjacent intersections along a collector road is 60 metres. On a local road the minimum spacing between four-legged intersections is 60 metres. On a local road, where adjacent intersections are three-legged, a minimum spacing of 40 metres is acceptable.

2.2. Non-Conformance Location

None

3. Driveway Spacing

3.1. City TM Criteria

The TAC Guidelines recommend a 2.0 metre tangent spacing between a driveway and an adjacent intersection (Figure 8.9.2). According to the City Zoning By-law, the minimum driveway setback from the property line for a single detached unit is 0.6m. The following minimum driveway widths have been assumed for the purpose of our analysis:

Single driveway – 3.0 metre wide
(townhouse, semi-detached, single detached units with less than 10 metre frontage)

Double driveway – 6.0 metre wide
(single detached units with more than 10 metre frontage)

3.2. Non-Conformance Location

3.2.1. Lot 19

A double driveway for Lot 19 extends 0.39 metres into the required two metre clear zone, adjacent to the corner radius of the northwest corner of the Madelaine Drive / Street E & Street G intersection. It is recommended that a modified driveway width (5.5 metres wide) is provided for this lot.

3.2.2. Lot 158

A double driveway for Lot 158 extends 0.33 metres into the required two metre clear zone, adjacent to the corner radius of the northeast corner of the Madelaine Drive / Shepherd Drive & Street H intersection. It is recommended that a modified driveway width (5.5 metres wide) is provided for this lot.

3.2.3. Lot 186

A double driveway for Lot 186 extends 0.167 metres into the required two metre clear zone, adjacent to the corner radius of the southeast corner of the Madelaine Drive / Street E & Street G intersection. It is recommended that a modified driveway width (5.5 metres wide) is provided for this lot.

3.2.4. Lot 187

A double driveway for Lot 187 extends 0.35 metres into the required two metre clear zone, adjacent to the corner radius of the northeast corner of the Madelaine Drive / Street E & Street G intersection. It is recommended that a modified driveway width (5.5 metres wide) is provided for this lot.

3.2.5. Lot 218

A double driveway for Lot 218 extends 0.02 metres into the required two metre clear zone, adjacent to the corner radius of the southeast corner of the Madelaine Drive / Street F intersection. Based on our review, a double driveway at this lot will not cause any traffic operations or traffic safety issues.

4. **Road Centreline Radius**

4.1. City TM Criteria

Applying the methodology outlined in the TAC Guidelines, a vehicle can comfortably maintain travelling at the design speed (60km/h) on a road with a centerline radius of 177 metres (with a normal crown in low speed urban environment). Similarly, a vehicle can comfortably maintain travelling at the design speed (70km/h) on a road with a centerline radius of 297 metres (with a normal crown in an urban environment). The City TM identifies a design speed of 60km/h for local roads and 70km/h for collector roads.

Through our discussions with the City, as a general rule, a minimum centerline radius of 177 metres is required on collector roads and 'long' local roads unless there are extenuating circumstances.

4.2. Non-Conformance Location

4.2.1. Madelaine Drive

Madelaine Drive (collector road) has been designed with a minimum centerline radius of 290 metres west at Street E / Street G

4.2.1.1. Analysis

Through our discussions with the City, as a general rule, a minimum centerline radius of 177 metres is required on collector roads and 'long' local roads unless there are extenuating circumstances. The proposed design exceeds this criterion.

4.2.2. Shepherd Drive

Shepherd Drive (collector road) has been designed with a minimum centerline radius of 100 metres west of Street C.

4.2.2.1. Analysis

The alignment of Shepherd Drive is constrained by the alignment of the existing road block to the west of the property and by the stormwater management block to the south.

A raised intersection is recommended at the Shepherd Drive / Street C intersection. This traffic calming addresses the reduced centerline radius and also controls speeds on the approaches of this intersection.

Shepherd Drive (collector road) has been designed with a minimum centerline radius of 160 metres west of Madelaine Drive.

4.2.2.2. Analysis

The end of the horizontal curve in Shepherd Drive is located approximately 20 metres west of the centre of the intersection of Madelaine Drive / Shepherd Drive & Street H. Vehicles approaching from the west will be preparing to stop at the intersection and vehicles approaching from the east will have just made a right or left turn movement from Madelaine Drive or come to a stop on the east side of Madelaine Drive; consequently, excessive travel speed is not anticipated to be an issue at this location. Furthermore, the sight distance for vehicle approaching from the east and west is in excess of the minimum sight stopping distance for the 70km/h (105 metres) design speed.

4.2.3. Street C

Street C (local road) has been designed with a minimum centerline radius of 19 metres north of Shepherd Drive.

4.2.3.1. Analysis

The length of the curve is very short and is not anticipated to result in any operational issues. Furthermore, the sight distance for vehicle approaching from the north and south is in excess of the minimum sight stopping distance for the 60km/h (85 metres) design speed. Vehicles approaching from the north will be preparing to stop at the intersection and vehicles approaching from the south will have just made a right or left turn movement from Shepherd Drive; consequently, excessive travel speed is not anticipated to be an issue at this location.

Street C (local road) northeast and northwest corner – 14 metre centerline radius around a 90° bend in the road.

4.2.3.2. Analysis

This is a low volume local road – no change in configuration is required.

Street C (local road) has been designed with a minimum centerline radius of 74 metres north of Street E.

4.2.3.3. Analysis

The length of the curve is very short and is not anticipated to result in any operational issues. Furthermore, the sight distance for vehicle approaching from the north and south is in excess of the minimum sight stopping distance for the 60km/h (85 metres) design speed.

4.2.4. Street I

Street I (local road) northwest corner – 14 metre centerline radius around a 90° bend in the road.

4.2.4.1. Analysis

This is a low volume local road – no change in configuration is required.

5. Intersection Sight Distance

5.1. City TM Criteria

The minimum sight stopping distance according to the TAC Guidelines is 85 metres for a design speed of 60km/h and 105 metres for a design speed of 70km/h.

5.2. Non-Conformance Location

5.2.1. Intersection of Shepherd Drive / Street C

Southbound vehicles on Street C have a sight distance of approximately 69 metres to the west.

5.2.1.1. Analysis

The above-noted sight distance criterion only applies for a scenario with one-way stop control in the south direction at this intersection.

5.2.1.2. Recommendation

As noted in Section 4.2.2, a raised intersection is recommended at the Shepherd Drive / Street C intersection. This traffic calming addresses the reduced sight distance by controlling speeds on the approaches of this intersection. With this traffic calming measure, the sight distance available will be suitable for its intended use.

6. Tangent Length Through Intersection

6.1. City TM Criteria

The TAC Guidelines recommend that intersections are ideally located on tangent sections. The TAC Guidelines also suggest a 20 metre tangent length or more on a minor road at an intersection.

6.2. Non-Conformance Location

6.2.1. Madelaine Drive / Shepherd Drive & Street H

Curve in Shepherd Drive west of Madelaine Drive

6.2.1.1. Analysis

Sight distance is not limited by curve in the road per TAC Guidelines for the design speed (70km/h) – no change in configuration required.

6.2.2. Madelaine Drive / Street E & Street G

Madelaine Drive intersects Street E and Street G on a curve

6.2.2.1. Analysis

Sight distance is not limited by curve in the road per TAC Guidelines for the design speed (70km/h) – no change in configuration required.

6.2.3. Shepherd Drive / Street C

Shepherd Drive intersects Street C on a curve. Curve in Street C north of Shepherd Drive.

6.2.3.1. Analysis

As noted in Section 4.2.2, a raised intersection is recommended at the Shepherd Drive / Street C intersection. This traffic calming addresses the curve on Shepherd Drive and controls speeds on the approaches of this intersection.

6.2.4. Street C / Street E

Curve in Street C north of Street E

6.2.4.1. Analysis

Sight distance is not limited by curve in the road, the curve meets the TAC Guidelines for the design speed (60km/h) – no change in configuration required.

7. Summary

Based the above-noted analysis, the following mitigation measures are recommended:

Shepherd Drive / Street C intersection

- Traffic calming is recommended at this intersection through the use of a raised intersection

Driveways

- A maximum driveway width of 5.5 metres is recommended for Lot 19.
- A maximum driveway width of 5.5 metres is recommended for Lot 158.
- A maximum driveway width of 5.5 metres is recommended for Lot 186.
- A maximum driveway width of 5.5 metres is recommended for Lot 187.

We trust you will find this submission acceptable. Should you have any questions or concerns or require any additional information in this regard, please contact our office.