Proposed Building Shadow Study

Date:	July 5, 2022
Location:	415 Boler Road London, Ontario
PAAI Project #:	1180
Prepared for:	York Developments 303 Richmond Street, Unit 201 London, Ontario N6B 2H8

Proposed Building Shadow Study

EXECUTIVE SUMMARY

Location:	415 Boler Road London, Ontario
Latitude:	42 degrees 57’ 12.28” North
Longitude:	81 degrees 19’ 53.64” West
Time Zone:	Eastern
Standard Time:	GMT -5 hours
Daylight Time:	GMT -4 hours
Building Height:	22m (to top of parapet)

York Developments are currently pursuing a site plan application submission for the proposed development in London, on Boler Road at the intersection of Byron Baseline Road. Philip Agar Architect Inc. has been engaged to carry out a Shadow Impact Study as one of the requirements to fulfill for the site plan application submission.

PROCESS

As the City of London does not have standards for Shadow Impact Studies, we have used the City of Waterloo Shadow Study Criteria as directed. A copy of the City of Waterloo Shadow Study Criteria has been included for reference. A 3D model of the area surrounding the site has been created in order to show the affects of the shadows and the calculations have been included for reference. The Shadow Impact Study will show the effect of the proposed new development on the surrounding environment during solstice and equinox, shortest and longest days of the year in the morning, noon and afternoon.

THE DEVELOPMENT

The current working plan is to develop a 6 storey apartment on this corner site. Currently the occupied by single family homes. The north and west perimeter of the site is also lined by multi-storey single family homes. To the east of the site, across Boler Road is an existing church. To the south of the development, there is a large parking lot, a gas station and commercial buildings.

OBSERVATIONS

Review of the study shows that there is minimal impact on the surrounding buildings and properties. The siting of the new development is such that the shadow impact is internal for the majority of the time with minor exceptions.

Regarding the winter shadows in December, there are some shadow impact on the adjacent properties north of the development.

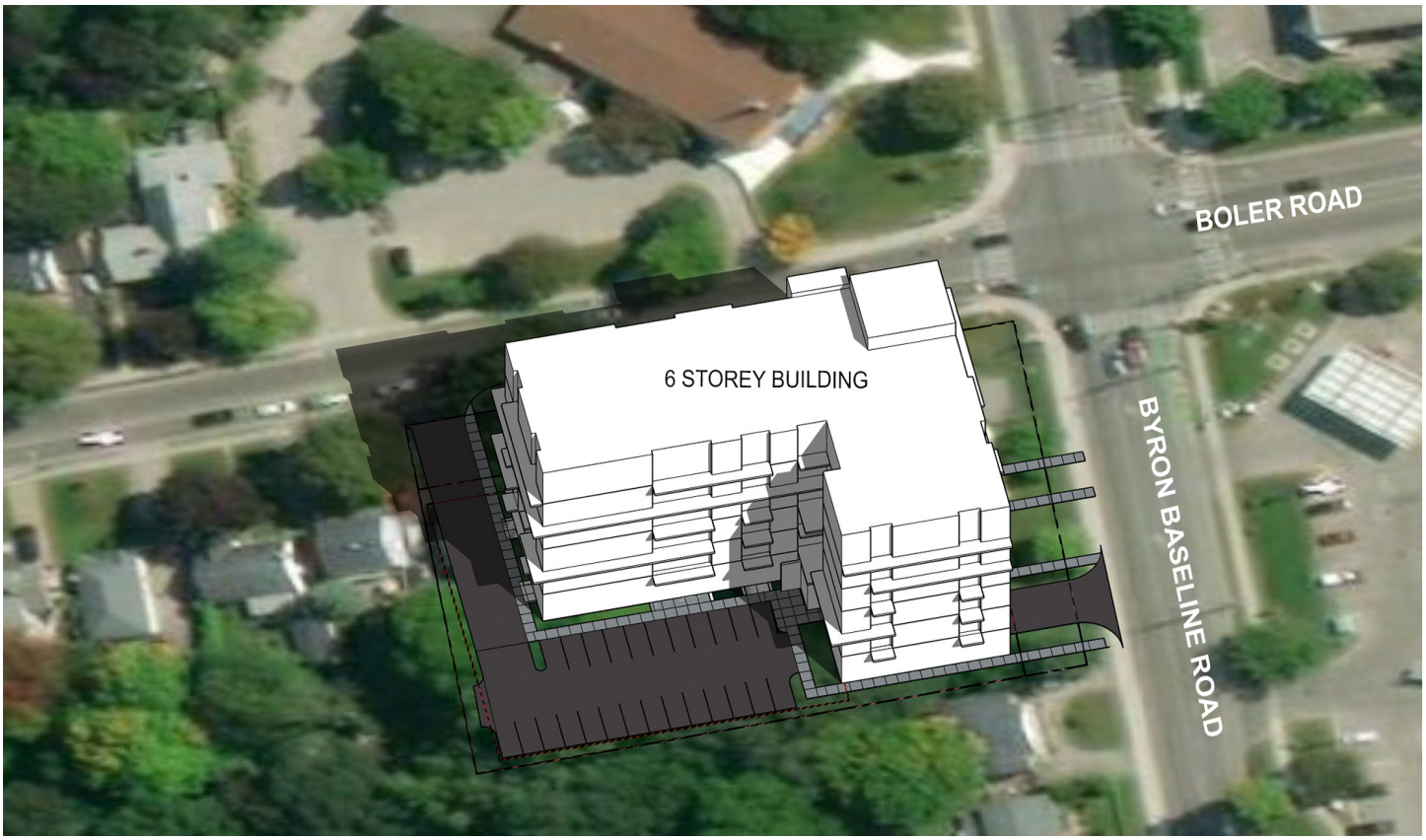
For the spring, summer and autumn shadows (March 21, June 21 and September 21) the proposed development's shadows do not impact adjacent properties. There are some minor shadows cast onto adjacent roadways.

The majority of the proposed development's shadows are cast within its own property. See the attached drawings.

These are well within the City of Waterloo Shadow Study Criteria that requires the following principals:

- *As a principle, at least 50% or more of any property should not be shaded for more than two interval times (a four hour equivalency); or,*
- *As a principle, at least 50% of any property should be in full sun for at least two interval times (a four hour equivalency).*

KEY PLAN



K: SHADOW STUDY CRITERIA

To evaluate the impact of intensification, the City of Waterloo may require a Shadow Study to illustrate the shadow impact the proposed development has on the site and surrounding properties with emphasis on residential uses, outdoor amenity spaces and park spaces, and to provide recommendations to reduce shadowing based on City criteria. At the discretion of the City, a Shadow Study may be required for development over 6 storeys (18m) height. The Shadow Study requirement will be identified through the pre-consultation process for the following types of applications:

- Official Plan applications
- Zone Change applications
- Site Plan applications
- Minor Variance applications

Ideal times to measure the impact of sun and shadow occur during the equinox, the beginning of spring and fall (around March 21 and September 21) and the summer solstice, the beginning of summer in the northern hemisphere. During the equinox, the sun shines directly on the equator and the length of day and night are nearly equal in all parts of the world. Another important time to consider is during the summer, a time when people generally use their amenity space or public space the most. Based on this, the City of Waterloo shall require shadow tests for the following dates and times:

Date(s)	Times
• Spring shadows, March 21 (equinox):	10am, 12 pm, 2 pm, 4 pm, 6 pm
• Summer shadows, June 21 (solstice):	10am, 12 pm, 2 pm, 4 pm, 6 pm
• Autumn shadows, September 21 (equinox):	10am, 12 pm, 2 pm, 4 pm, 6 pm
• Winter shadows, December 21 (solstice)	10 am, 12 pm, 2 pm

These times allow for measuring of hours of sunlight intervals. Additional times may be requested to respond to specific site conditions and shading concerns. The level of impact is measured by the time of shadow, or duration. To be considered compatible, a Shadow Study must demonstrate:

- As a principle, at least 50% or more of any property should not be shaded for more than two interval times (a four hour equivalency); or,
- As a principle, at least 50% of any property should be in full sun for at least two interval times (a four hour equivalency).

These criteria are similar to other municipal shadow study requirements in the Province. The study should include a summary letter describing how the proposed development meets minimum shadow criteria. If the proposal does not meet the general Shadow Study criteria, the Shadow Study must identify other massing options that would meet the intent of shadow criteria.

The study model is to include the site (highlighted on the plan), as well as, surrounding streets, blocks, parks and all buildings located within the shadow impact boundary during the requested times. Where possible, the model should include other approved but not built buildings within the model area. The City of Waterloo will provide this information. The shadow model is to be plotted in colour to a standard metric scale.

Spring Shadows, March 21 GMT -4 (Equinox)

10 am

12 pm

2 pm

4 pm

6 pm

March 21 (GMT-4)

Hour	Sun Altitude	Azimuth	Shadow Length (m) 6 STOREY - (22.066m)
10:00am	16.08	105.04	**76.5**
12:00pm	35.48	130.71	**31.0**
2:00pm	46.85	168.09	**20.7**
4:00pm	43.2	210.76	**23.5**
6:00pm	27.22	242.24	**42.9**

For the 10am time frame, shadows are cast onto the adjacent western properties. For the 12pm, 2pm and 4pm time frames the proposed building casts shadows mostly internally on it's own site and partially onto the adjacent street. For the 6pm time frame, shadows are cast onto the adjacent eastern property, and Boler Road. At no time during the Spring Shadow study does the proposed development impact more than 50% of any adjacent property for 2 or more intervals. As a principal, at least 50% of any adjacent property is in full sun for at least 2 intervals. There are no other impacts on adjacent properties.

See page 9-13 for enlarged shadow study illustrations.

Summer Shadows, June 21 GMT-4 (Solstice)

10 am

12 pm

2 pm

4 pm

6 pm

June 21 (GMT-4)

Hour	Sun Altitude	Azimuth	Shadow Length (m) 6 STOREY - (22.066m)
10:00am	32.39	86.96	**34.8**
12:00pm	53.97	110.87	**16.0**
2:00pm	69.69	161.76	**8.2**
4:00pm	62.66	231.88	**11.4**
6:00pm	42.33	263.52	**24.2**

For the 10am, 12pm, 2pm, 4pm and 6pm time frames, the proposed building casts shadows internally on it's own site and the adjacent streets. The property is covered by less than 50% shadows.

At no time during the Summer Shadow study does the proposed development impact any adjacent property by more than 50%. See page 14-18 for enlarged shadow study illustrations.

Autumn Shadows, September 21 GMT-4 (Equinox)

10 am

12 pm

2 pm

4 pm

6 pm

September 21 (GMT-4)			
Hour	Sun Altitude	Azimuth	Shadow Length (m) 6 STOREY - (22.066m)
10:00am	18.71	107.5	**65.2**
12:00pm	37.52	134.29	**28.7**
2:00pm	47.36	173.22	**20.3**
4:00pm	41.82	215.17	**24.7**
6:00pm	24.88	245.18	**47.6**

For the 10am time frame, shadows are cast onto the adjacent western properties. For the 12pm, 2pm and 4pm time frames the proposed building casts shadows internally on it's own site and partially onto the adjacent streets. At 6pm the proposed building cast shadows partially onto the adjacent easterly site. The property is covered by less than 50% shadows. At no time during the Autumn Shadow study does the proposed development impact more than 50% of any adjacent property for 2 or more intervals. As a principal, at least 50% of any adjacent property is in full sun for at least 2 intervals. There are no other impacts on adjacent properties.

See page 19-23 for enlarged shadow study illustrations.

York DEVELOPMENTS | AGAR ARCHITECT philip agar architect inc.

Winter Shadows, December 21 GMT-5 (Solstice)

10 am

12 pm

2 pm

December 21 (GMT-5)

Hour	Sun Altitude	Azimuth	Shadow Length (m) 6 STOREY - (22.066m)
10:00am	8.79	133.94	**142.7**
12:00pm	20.88	159.52	**57.8**
2:00pm	23.08	174.12°	**51.8**

At 10am the proposed building casts shadows onto the northwest properties of both Byron Boulevard and Boler Road. There is no concern for the shadows impacting the Byron Boulevard properties. It does not impact more than 50% of the adjacent Byron Boulevard properties for 2 or more intervals. The Boler Road properties north of the site have 50% shadows cast on the rear portion of their properties at 10am, however at 12pm the shadows move towards the front yard of the affected properties. The shadows moving from the rear half to the front half of the site creates less of an impact for the neighboring tenants outdoor amenity space. It is important to consider that this study is during the winter months when people are less likely to use their back-yards/outdoor spaces.

See page 24-26 for enlarged shadow study illustrations.

Spring Shadows, March 21 GMT-4 (Equinox)

10 am

Spring Shadows, March 21 GMT-4 (Equinox)

12 pm

Spring Shadows, March 21 GMT-4 (Equinox)

2 pm

Spring Shadows, March 21 GMT-4 (Equinox)

4 pm

Spring Shadows, March 21 GMT-4 (Equinox)

6 pm

Summer Shadows, June 21 GMT-4 (Solstice)

10 am

Summer Shadows, June 21 GMT-4 (Solstice)

12 pm

Summer Shadows, June 21 GMT-4 (Solstice)

2 pm

Summer Shadows, June 21 GMT-4 (Solstice)

4 pm

Summer Shadows, June 21 GMT-4 (Solstice)

6 pm

Autumn Shadows, September 21 GMT-4 (Equinox)

10 am

Autumn Shadows, September 21 GMT-4 (Equinox)

12 pm

Autumn Shadows, September 21 GMT-4 (Equinox)

2 pm

Autumn Shadows, September 21 GMT-4 (Equinox)

4 pm

Autumn Shadows, September 21 GMT-4 (Equinox)

6 pm

Winter Shadows, December 21 GMT-5 (Solstice)

10 am

Winter Shadows, December 21 GMT-5 (Solstice)

12 pm

Winter Shadows, December 21 GMT-5 (Solstice)

2 pm