SUN / SHADOW STUDY

OLD LAKESHORE

Proposed Mixed-Use Development

2107-2119 Old Lakeshore Road

City of Burlington

Prepared for:

Old Lakeshore (Burlington) Inc.

Prepared by:

Ralph Bouwmeester, P. Eng.

RBA File: S19023

November 1, 2019

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The following describes the potential shadow impact of the proposed development. Reference should be made to our shadow study drawings dated November 1, 2019, following. Drawings SS-1 to SS-6 show the proposed shadow extents at 9:30 AM, 12:30 PM and 3:30 PM on the 21st of March, June and December as required by the City of Burlington. Key roof heights are provided on Drawing RH-1 along with relevant notes, etc.

The key spring/fall, summer and winter dates of Mar 21, Jun 21 and Dec 21 represent the annual range of shadowing, with the longest shadows occurring in December and the shortest in June. March and September typically represent average annual conditions.

Shadowing from existing and approved unbuilt buildings is not reflected in this shadow study; therefore, actual net new shadowing will be less than shown. As a result, the term "incremental shadows" as used in the following sections refers to potential new shadowing, not necessarily actual new shadowing. Because many areas are already shaded, it is important to note that the shadows shown herein represent their maximum potential reach and coverage, not the actually proposed reach and coverage by new shadows.

The following describes the incremental ground level shadows due to the proposal.

March 21

9:30 AM – incremental shadows fall northwest across Lakeshore Road and the south face of a 5-storey seniors' building at the northeast corner of Lakeshore Road and Martha Street. The shadows extend up Martha Street and reach part of the south face of a 12-storey apartment building north of the seniors' building. Both buildings partially intercept shadows beyond to the northwest.

The shadows reach the fronts of several of the 3-storey mixed-use units on the west side of Martha Street south of Pine Street and the fronts of the five 3-storey townhomes north of Pine Street. There is no outdoor living space in front of the ground floor shops south of Pine Street, and the front yards of the townhomes north of Pine are predominantly driveways.

Due to the low sun angle (22.2° - i.e. shadow length = 2.45 x building height), the rear yards of the towns are self-shadowed.

12:30 PM – incremental shadows fall north across Lakeshore Road and the south and partial west face of the 7-storey apartment building at 2121 Lakeshore Road. Although the front yard is partially landscaped, there is no outdoor living space, and much of the front yard is driveway and parking. The apartment building will partially intercept shadows to the north toward and across the creek valley.

3:30 PM – incremental shadows fall northeast across Lakeshore Road and reach a sewage pumping station and wooded creek valley on the north side of Lakeshore. Shadows fall short of Torrance Street and just knick the southwest corner of a swimming pool at a 15-storey apartment building at the northwest corner of Lakeshore Road and Torrance Street (360 Torrance Street). Shadowing that might occur just prior to 3:30 will likely be intercepted by shadows from the heavily treed area around the pool; minimal incremental shadowing is expected.

June 21

9:30 AM – incremental shadows cross the parking lot directly west of the site and a one-storey commercial building beyond that at 2096 Lakeshore. They also reach a parking lot at the northwest corner of Lakeshore and Martha as well as part of the south face of the seniors' building across the street. Much of the shadowing falls on Lakeshore Road and Martha Street.

12:30 PM – incremental shadows fall north across Lakeshore Road; they do not reach the 7-storey apartment building at 2121 Lakeshore Road. Although the front yard is partially landscaped, there is no outdoor living space, and much of the front yard is driveway and parking.

3:30 PM – incremental shadows fall primarily on Old Lakeshore Road, on part of a commercial parking lot on the south side of the road, on a driveway leading to a residential development (Pier 21) at 2136 Old Lakeshore Road, and on a treed area along the south side of Lakeshore Road.

December 21

9:30 AM – incremental shadows fall northwest across Lakeshore Road and the west and partial south face of the 7-storey apartment building at 2121 Lakeshore Road. They have the potential to reach New Street about one block east of Lions Park. The apartment building will partially intercept shadows to the northwest toward and across the creek valley. Shadows also have the potential to reach the south face of four apartment buildings, 3 to 4 storeys in height each, further to the northwest. Due to the low sun angle (13° - i.e. shadow length = 4.33 x building height) at this time, some of these buildings are expected to partially shadow one another.

12:30 PM – incremental shadows fall north across Lakeshore Road and part of the south face of the 7-storey apartment building at 2121 Lakeshore Road. The 7-storey building will partially intercept shadows to the north toward and across the creek valley. Incremental shadows will reach part of the west face of the 15-storey apartment building at 360 Torrance Street. The 15-storey building will intercept most of the shadows to the north of it.

3:30 PM – incremental shadows run northeasterly across several city blocks. They cross the wooded area along the north side of Lakeshore Road easterly to Torrance Street, the row of homes on the north side of Lakeshore Road between Torrance Street and Smith Avenue, some of the homes between Smith Avenue and Stratheden Drive, the driveway into Lakeshore Public School and the south edge of the playground and north end (mostly windowless) of the school building. Due to the low sun angle (9.9° - i.e. shadow length = 5.71 x building height), minimal incremental shadowing is expected.

Due to the low sun angles and inherently long shadows in December, many of the areas within the potential reach of the project's shadows are already in shade. We do not expect the incremental differences to be significant. We also note that December shadows are rarely given much weight in the review of development applications.

Existing shadow conditions

Two high-rises have been recently built southwest of the subject site at the southwest corner of Lakeshore Road and Pearl Street. These will reduce net new shadowing northeast of the proposal particularly at the 3:30 PM test time in December.

The existing parking lot (at 374 Martha Street) west of the subject site was approved by LPAT in 2018 for a 26-storey mixed-use development. This approved building will reduce net new shadowing to the west at or before the 9:30 AM test times.

5-hour sunlight availability on the opposite side of the street

We have considered the City's requirement (as per Section 2.3 of the City of Burlington Tall Building Guidelines, Brook McIlroy, August 2016) for 5 hours of sunlight on the opposite side of the street. The section states, *"As a rule-of-thumb, height and massing of the podium (not including the tower) shall ensure a minimum of five hours of sunlight on the opposite side of the street at the equinoxes (March 21 and September 21)."* We interpret "*opposite side of the street"* to mean "opposite sidewalk" and we assume this applies to the area between the opposite curb and property line. Note: sun/shadow durations are similar on March 21 and September 21.

Given the orientation of the site and the direction of Lakeshore Road, we have determined that shadows from the proposed podium will not reach the north sidewalk of Lakeshore Road at any of the test times. This exceeds the requirement quoted above.

Sunrise and sunset times in this location on March 21st are 7:21 am and 7:33 pm, respectively.

Summary
In summary, based on our review of the March, June, and December 21st shadows, and having due regard for shadow duration, seasonal variations, time of day, and the context of urban built form in downtown neighbourhoods, it is my opinion that incremental ground level shadowing resulting from the proposed development over and above existing is limited and reasonable.

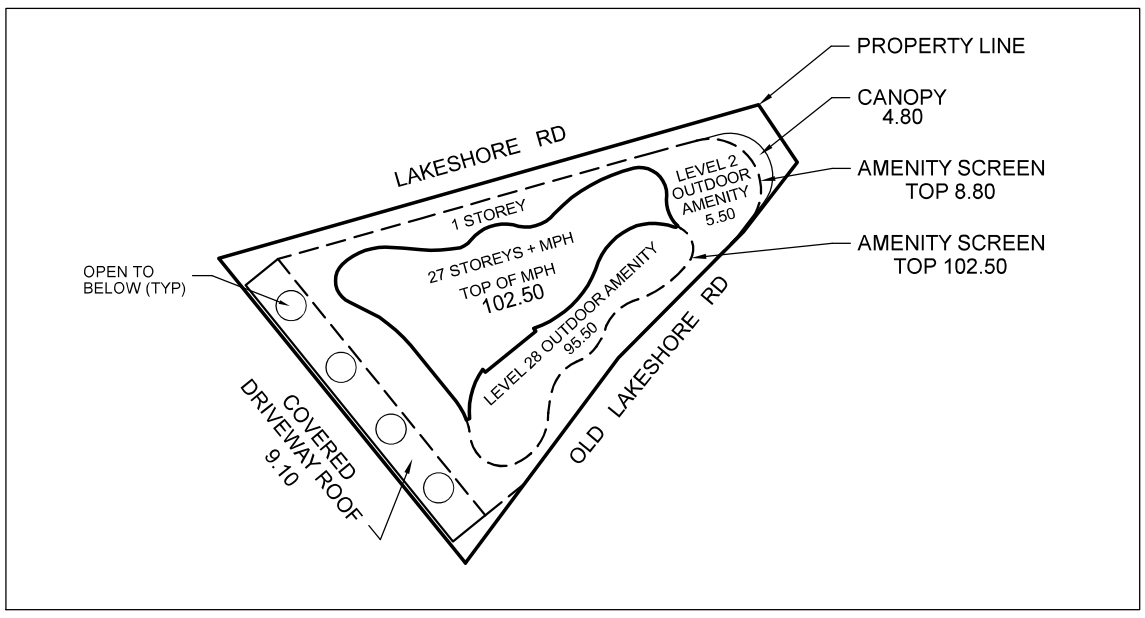
In terms of the *Tall Building Guidelines* goal for five hours of sunlight on the opposite sidewalk, we have determined that shadows from the proposed podium will not reach the north sidewalk of Lakeshore Road at any of the test times.

Ralph Bouwmeester, P. Eng.
R. Bouwmeester & Associates
November 1, 2019

NOTES:

1. ROOF HEIGHTS INCLUDE PARAPETS, RAILINGS, AND ROOF-TOP FEATURES, WHERE APPLICABLE AND UNLESS SHOWN OTHERWISE.
2. ROOF HEIGHTS ARE SHOWN IN METRES ABOVE FINISHED GRADE AT SUBJECT SITE.
3. SHADOWS ARE SHOWN ON ASSUMED FLAT GROUND PLANE.
4. ROOF HEIGHTS DERIVED FROM ARCHITECTURAL PLANS AND MODELS BY GRAZIANI + CORAZZA ARCHITECTS INC.

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PROPOSED

GEOGRAPHIC SITE LOCATION:
LATITUDE: 43° 19' 36" N
LONGITUDE: 79° 47' 29" W

TIME ZONE:
EASTERN
- STANDARD TIME (EST) (UT - 5 hrs)
- DAYLIGHT TIME (EDT) (UT - 4 hrs)

0 5 25 50
SCALE 1 : 1000

ROOF HEIGHTS
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Calculated by:	RB	Project:	S19023	Drawing No.: RH-1
Drawn by:	RB	Scale:	1 : 1000	
Checked by:	RB	Date:	NOV 1/19	



MAR 21

9:30 AM

ALL TIMES IN EDT

PROPOSED SHADOW

0 20 100 200

SCALE 1 : 2000



MAR 21

12:30 PM

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Calculated by:	RB	Project:	S19023	Drawing No.: SS-1
Drawn by:	RB	Scale:	1 : 2000	
Checked by:	RB	Date:	NOV 1/19	



MAR 21

3:30 PM

ALL TIMES IN EDT

PROPOSED SHADOW

0 20 100 200

SCALE 1 : 2000

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Calculated by:	RB	Project:	S19023	Drawing No.: SS-2
Drawn by:	RB	Scale:	1 : 2000	
Checked by:	RB	Date:	NOV 1/19	



JUN 21

9:30 AM

ALL TIMES IN EDT

PROPOSED SHADOW

0 20 100 200

SCALE 1 : 2000



JUN 21

12:30 PM

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Calculated by:	RB	Project:	S19023	Drawing No.: SS-3
Drawn by:	RB	Scale:	1 : 2000	
Checked by:	RB	Date:	NOV 1/19	



JUN 21

3:30 PM

ALL TIMES IN EDT

PROPOSED SHADOW

0 20 100 200

SCALE 1 : 2000

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Calculated by:	RB	Project:	S19023	Drawing No.: SS-4
Drawn by:	RB	Scale:	1 : 2000	
Checked by:	RB	Date:	NOV 1/19	



DEC 21

PROPOSED SHADOW

9:30 AM

ALL TIMES IN EST

SCALE 1 : 4000

0 40 200 400



DEC 21

12:30 PM

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Calculated by:	RB	Project:	S19023	Drawing No.: SS-5
Drawn by:	RB	Scale:	1 : 4000	
Checked by:	RB	Date:	NOV 1/19	



DEC 21

PROPOSED SHADOW

3:30 PM

ALL TIMES IN EST

SCALE 1 : 4000

0 40 200 400

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Calculated by:	RB	Project:	S19023	Drawing No.: SS-6
Drawn by:	RB	Scale:	1 : 4000	
Checked by:	RB	Date:	NOV 1/19	