Shadow Analysis

Terms of Reference

1. Description

The Shadow Analysis is a planning submission requirement which provides a visual model of how the proposed development will cast its shadow. Further the Shadow Analysis will demonstrate any potential impacts on shadow sensitive areas, such as public spaces, communal amenity areas, Mainstreet Corridors and Minor Corridors, as designated in the Official Plan and residential private outdoor amenity areas and how these impacts can be mitigated (if applicable).

2. When Required

A Shadow Analysis will be requested as part of the submission package when an increase in height and or massing is submitted through a Zoning By-law amendment application, for a residential, commercial or office use. Two triggers will determine if the Zoning By-law Amendment will require a Shadow Analysis:

☐ Development inside the Greenbelt (as designated in the Official Plan): the proposed development is over 5 storeys in height (≤15 meters). If a development proposal is 5 storeys or less, but is proposing an increase in height and/or massing and is in close proximity to a shadow sensitive area, a shadow analysis may be requested.

- OR –

☐ Development proposals outside the Greenbelt: the proposed development is over 3 storeys in height (≤9 meters) and is in close proximity to a shadow sensitive area. Where a proposed development is not in close proximity to a shadow sensitive area (e.g. industrial development) the trigger for a shadow analysis is over 5 storeys in height (≤15 meters).

The requirement for and scope of a Shadow Analysis will be determined at the formal pre-consultation meeting.

3. Contents

A Shadow Analysis will contain and/or address the points identified in a pre-consultation meeting. Failure to address the imagery standards may result in the application being considered incomplete.

The Application Submission:

- State the: municipal address and the individual and company who have prepared the drawings.

Imagery Standards:

Test Dates and Times:

- ***Equinox***: September 21st, 8am – 6pm
- ***Solstice***: December 21st, 9am – 3pm and June 21st, 8am – 8pm

☐ Hourly increments

- For medium or high-rise developments.

☐ 2 hour increments

- For low-rise developments or a mid-rise building seeking a modest increase in height and/or massing.

Sun Rise / Sun Set / Solar Noon

June 21 – 5:15am / 8:55pm/ 1:05pm

Sept 21 – 6:49am / 7:01pm / 12:56pm

Dec 21 – 7:39am / 4:22pm / 12:01pm

Note: Sept 21 and March 21 (equinox) result in similar shadow patterns, since the Daylight Saving Time took effect. The ideal time to measure the impact of sun and shadow is during the equinox.

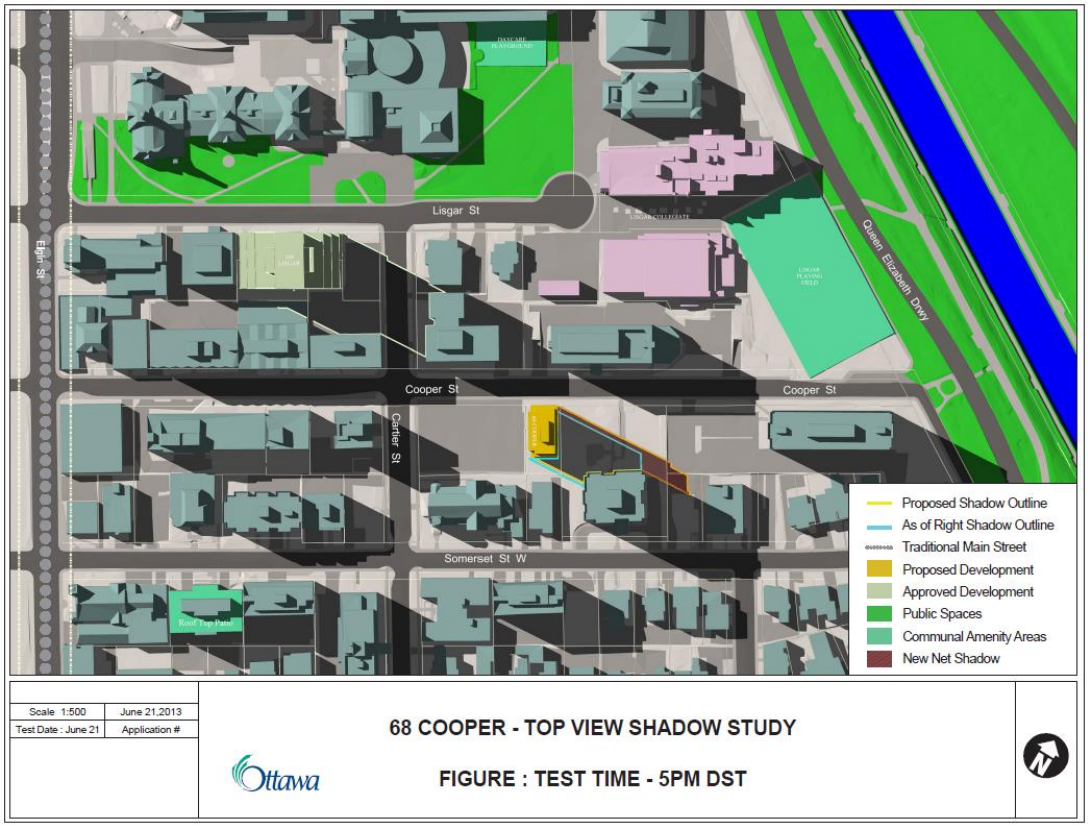

Figure 1 – Top View, June 21st 5pm

Image Line Work:

1. The as-of-right height and massing - identify the shadow outline which would be cast if the as-of-right height and massing were constructed.
2. The proposed building(s) – highlight the site and identify the shadow outline of the proposed building(s). Indicate through, in a different shade/hatching, the area which results in a new net shadow.
3. Approved but not yet constructed - identify proposed development in the study area which have received approval but are not yet constructed. Provide the shadow outline(s) of such buildings only if the shadows, which would be cast, overlap on the shadow area(s) of the proposed application.

Other Miscellaneous Required Criteria:

1. All images are to be displayed in a top view.
2. North arrow, a scale bar and at least one marked street for reference bearing.
3. 3D mapping showing the shadows from the proposed buildings and all buildings within the study area (mapping can be purchased from the City of Ottawa by calling 311 and requesting “mapping information”).
4. Identify the applicable shadow sensitive areas as outlined in the Evaluation Criteria section below.

Miscellaneous Information:

- Time Zone = Eastern
- Eastern Standard Time (EST) = Universal Time, 5 hours
- Eastern Daylight Time (EDT) = Universal Time, 4 hours
- Universal Time (UT) is equivalent to Greenwich Mean Time (GMT)
- EST applies on December 21
- EDT applies on June 21 and September 21

See Section 7: Definitions/ Key Terms

Explanation:

- Indicate, by way of an image (see Figure 4), the as-of-right height and massing and proposed height and massing which was used for the shadow analysis.
- Indicate in text, the latitude and longitude which was used in the analysis.
- Provide a written summary of the shadow impacts, which include the locations of the impact and type of shadow sensitive use where the impact occurs (if applicable).

- If applicable, detail the proposed measures to be adjusted in the development proposal which will minimize or eliminate the resulting shadow impacts. This may require confirmation through the submission of a revised site plan and / or building elevations. A condition of site plan approval will be placed to ensure that the recommendations of the shadow analysis are fully implemented, prior to the City releasing any associated securities.

See Section 7: Definitions / Key Terms for example Mitigation Measures

4. Evaluation Criteria

The Shadow Analysis will be evaluated by analyzing the net increase in shadow against the below applicable Evaluation Criteria for shadow sensitive areas. Not all evaluation criteria will be applicable in each proposed development scenario.

Public spaces

- Definition: Plazas, Passive Open Spaces, Parks, Privately-owned public spaces and cemeteries, Captial greenspaces, Green transportation / utility corridors.
- Criteria: The new net shadow must not result in an average of 50 per cent of any public space being cast in shadow for 5 or more hourly interval times during the September test date only.
- Imagery: Highlight all public spaces in a different contrasting color (e.g. different shade, color, hatching, outline) and identify them on the legend (see Figure 1).
- When applicable: When a public space is captured in the study area.

Communal amenity areas

- Definition: School yards, public outdoor pools, daycare outdoor play areas, communal private rooftop patios and those communal areas associated with commercial and employment areas
- Criteria: The new net shadow must allow for an average of 50 per cent of any communal amenity area being exposed to sun light during two consecutive hourly interval times per day between 11 am and 3 pm (both are inclusive) during all three test dates (with the exception of pools and rooftop patios which only have to meet the criteria for June and Sept).
- Imagery: Highlight all communal amenity areas in a different contrasting color (e.g. different shade, color, hatching, outline) and identify them on the legend (see Figure 1).
- When applicable: When a communal amenity area is captured in the study area.

Mainstreet Corridors and Minor Corridors

- Definition: Streets with a Mainstreet Corridor or Minor Corridor land use designation as per the Official Plan.
- Criteria: No new net shadow in any one spot for more than 3 consecutive hourly test times of the sidewalk on the opposite side of the street, being cast in shadow during the September test date only.
- Imagery: Highlight the Corridor and identify it in the legend (see Figure 1).
- When applicable: When a Corridor is captured in the study area.

Ground level residential private outdoor amenity space

- Definition: Are considered rear yards to low-rise residential use buildings. The no impact zone is the area measured from the exterior rear wall (or other appropriate exterior wall of the dwelling that abuts a private amenity area) outward 7.5 meters or to the property line, whichever is less (see Figure 2).
- Criteria: No new net shadow within the no impact zone of any residential private outdoor amenity space being cast in shadow for more than two consecutive hourly test times during the June and September test date only (see Figure 3).
- Imagery: Highlight the ground level residential private outdoor amenity spaces which results in an impact from the net increase in shadow.
- When applicable: For development proposals outside the greenbelt only.

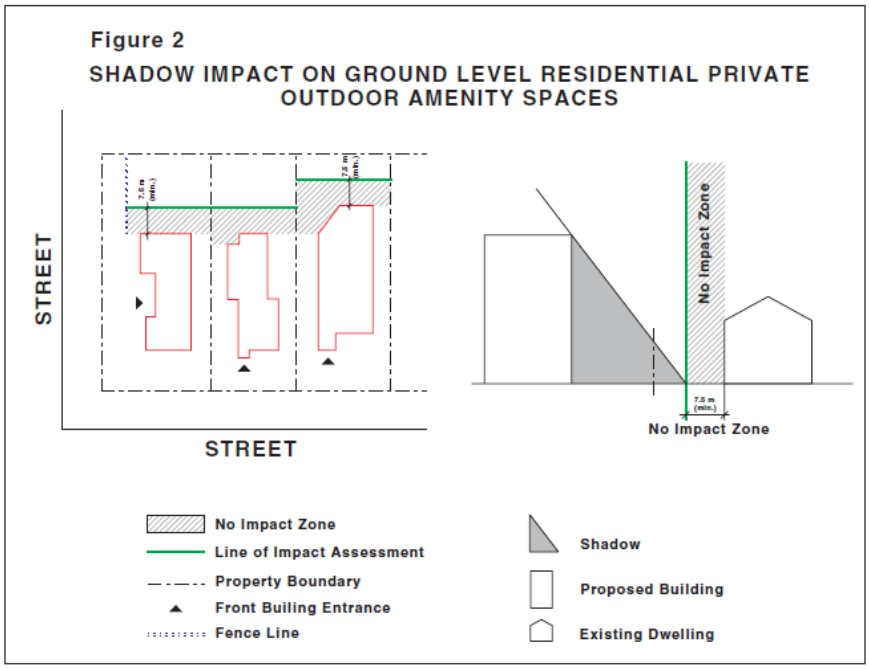

Figure 2 – Ground Level Residential Impact Zone

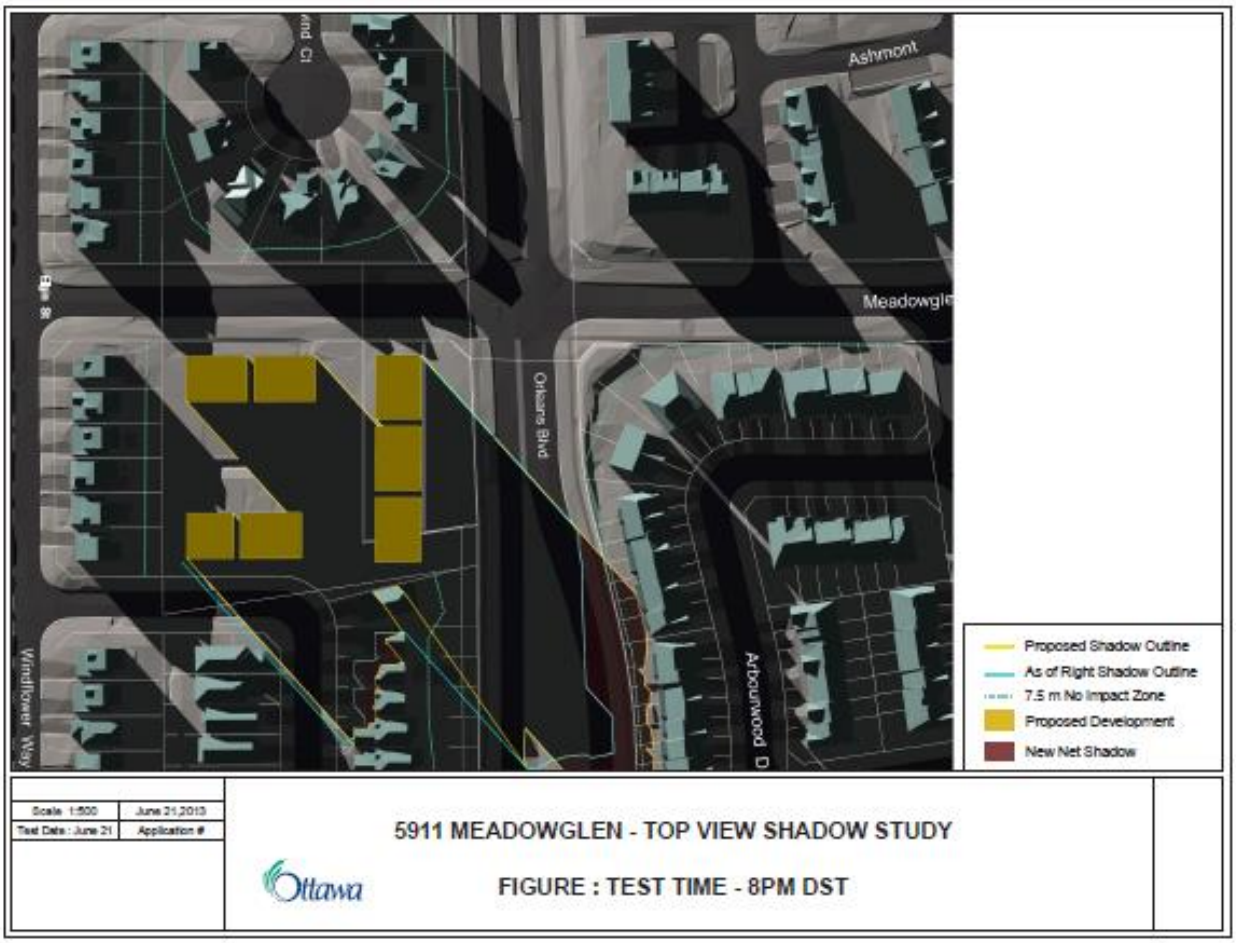

Figure 3 – Suburban, Top View, June 21st 8pm

5. Roles and Responsibilities / Qualifications

The Shadow Analysis should be signed by a licenced architect, landscape architect, professional engineer, or a full Member of the Canadian Institute of Planners (MCIP).

6. Submission

Final Copies will include:

- Electronic copy Shadow Analysis to be supplied in Adobe .PDF format (unlocked and flattened).

- A Sketch-up model of the proposed building(s) would also be preferred for submission; otherwise the submitted height schedules (as per Figure 3) are acceptable.
- Supporting Georeferenced Digital CAD/BIM/GIS files (in accordance with existing City submission standards) for draft and/or final plans may be requested

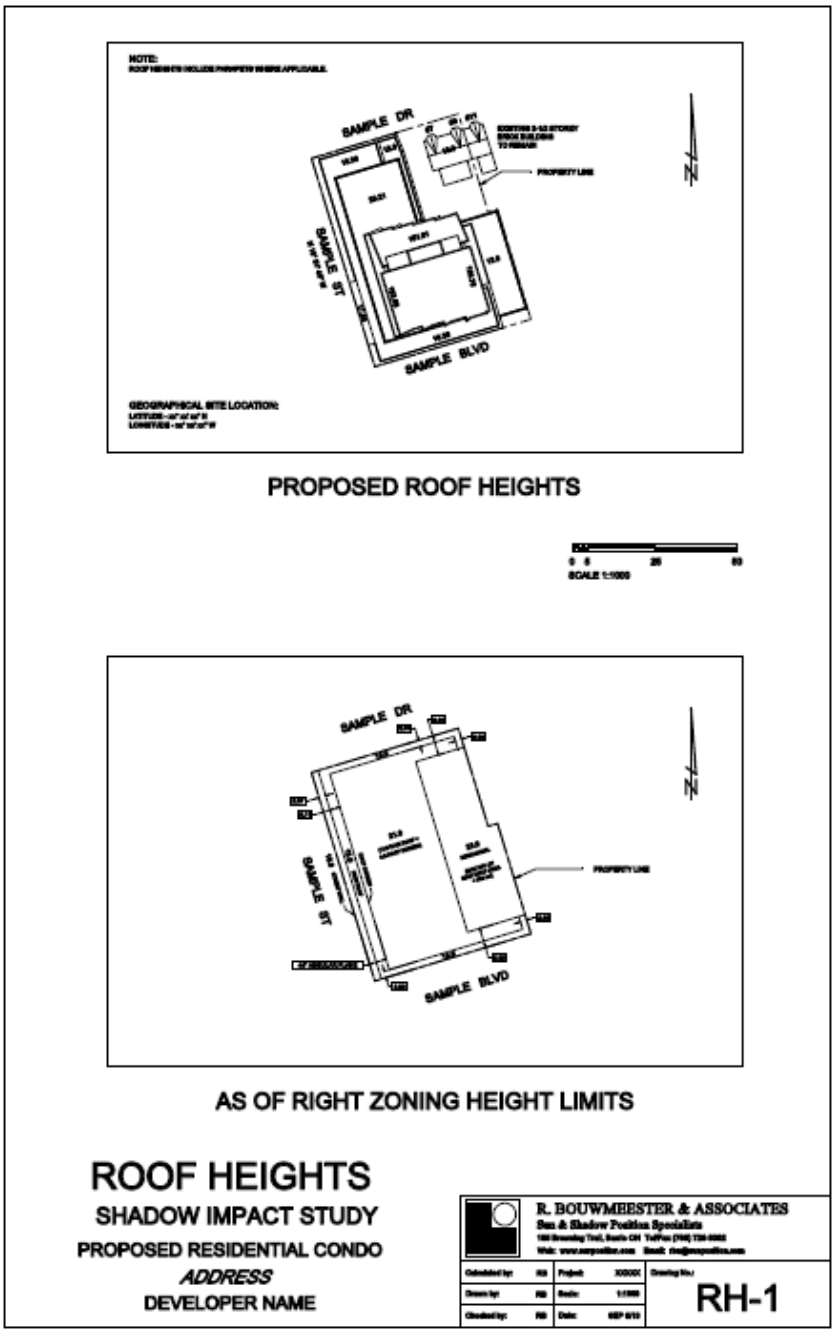

Figure 4: Height and Massing

7. Definitions / Key Terms

As-of-right height and massing: As provided by the existing Official Plan, Secondary Plan or Zoning By-law, which ever provisions prevail.

Equinox: Two times in the year (March 21 and September 21) when the sun shines directly on the equator and the length of the day and night is approximately nearly equal.

New net shadow: Highlights the increase in shadow resulting from the proposed development after taking into account the shadow which would be cast from the as of right height and massing, the current shadows on the landscape and any approved but not yet constructed buildings. The new net shadow is to be highlighted at ground (pedestrian) level on an assumed flat ground plane.

Shadow sensitive areas: are those areas the shadow analysis paces evaluation criteria on: public spaces, communal amenity areas, traditional and arterial mainstreets and residential private outdoor amenity areas.

Solstice: Two times in the year (June 21 and December 21) when the sun reaches its highest and lowest resulting in approximately the longest and shortest sun light periods per day.

Study Area: Is a distance adequate to show the entire length of the shadow(s) during the September test date and times.

Mitigation Measures:

- Reduced height
- Alternative massing
- Different building orientation
- Lot consolidation