

Shadow Study

120 - 158 Queen St S & 169 Crumvie St, Mississauga
April 2024



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Introduction

SRM Architects + Urban Designers is pleased to submit this Shadow Study in support of the Proposed Development located at 120-158 Queen Street South & 169 Crumbie Street (the Site). The applicant proposes a mixed use development with heights ranging from 3 to 15 storeys. This Shadow Study Cover Letter will provide an overview of the shadow study methodology, summarize the shadow impacts resulting from the Proposed Development, and detail the mitigating features included in the site design.

Study Methodology

The Shadow Study was prepared according to the City of Mississauga's Standards for Shadow Studies (February, 2023). A 3D model of the Proposed Development was prepared by SRM Architects + Urban Designers. The model was placed into a 3D massing model created using data from the City's open data portal, with surrounding buildings modeled to reflect existing heights. The combined model was then geolocated to ensure accurate sun position based on the Site's latitude and longitude (43.582640, -79.716426).

The Sun/Shadow Study captures representative days and times as specified in the City's Standards as detailed below.

Test Date	Test Times
June 21 (UTC -4)	7:07am, hourly intervals from 7:20am to 7:20pm, and 7:33pm
September 21 (UTC -4)	8:35am, hourly intervals from 9:12am to 5:12pm, and 5:48pm
December 21 (UTC -5)	9:19am, hourly intervals from 10:17am to 2:17pm, and 3:15pm

After export, the images for each test time were edited to highlight the net new shadows cast by the Proposed Development beyond those cast by the surrounding buildings. Final images for each test time are presented on the following pages.

Shadow Impact Summary

The City's Standards require a written analysis and mitigation plan detailing how the shadow impact criteria have or have not been met and any mitigation features that have been incorporated into the design. The Standards describe five criteria for analysis, measuring sunlight on:

- Residential private outdoor amenity spaces (3.1)
- Communal outdoor amenity areas (3.2)
- Public realm (streets and open spaces) (3.3)
- Turf and flower gardens in public parks (3.4)
- Building faces to allow for the possibility of using solar energy (3.5)

Communal outdoor amenity areas and public open spaces surrounding the Site are shown on the following page together with a sun factor analysis for each space.

There are no impacts beyond the City's criteria for residential private amenity outdoor amenity spaces (3.1), communal outdoor amenity areas (3.2), turf and flower gardens in public parks (3.4), and building faces to allow for the possibility of using solar energy (3.5).

Within the public realm (3.3), three specific areas receive impacts beyond the City's criteria:

- The north side of Street A receives shadow impacts on the boulevard at 9:12am to 1:12.
- The east side of Street B receives shadow impacts on the boulevard at 1:12pm until 4:12pm
- The north side of Street C receives shadow impacts on the boulevard at 9:12am to 2:12pm.

The remainder of the existing and proposed public realm, including the east side of Queen Street South, Market Square, and Public Park are not impacted by net new shadows beyond the City's criteria.

Mitigating Features

The Proposed Development includes several design features that help to mitigate shadow impacts on the surrounding neighbourhood. The 2-storey height along Queen Street South and proposed 45 degree angular plane eliminate shadow cast onto the opposite boulevard during morning and mid-day. The overall height is limited to 15 storeys, with the tallest buildings concentrated at the south west of the site, to minimize shadow impact on neighbouring properties. This maximizes the distance to surrounding buildings and open spaces and creates an appropriate transition in height.

In relation to the shadow impact on Street A, Street B and Street C mentioned above, the proposal uses tall-midrise footprints that are limited to approximately 900 square meters. As Tall-midrise buildings, this reduced floor plate results in smaller shadow profiles that move more quickly across the landscape. The buildings along the west side of Street B have been setback 5m from the sidewalk and have an transition height of 6-storeys along the street to reduce the shadow impact on the opposite boulevards.

Conclusion

Overall, the net new shadows cast by the Proposed Development have an acceptable impact on the surrounding neighbourhood. Any shadow impacts - beyond the city's criteria - fall on the proposed public realm within the Site and do not impact the public realm outside the property boundary. These shadows result in minor impacts to the boulevards on Streets A, B and C. Based on the sun factor analysis, the development will cast an acceptable shadow on private and communal outdoor amenity areas, public spaces, turf and flower gardens, and potential solar energy collection have been recorded. The Site's design and massing, including the angular plane, height limits, concentration of massing, and limited tower floor plate result in a development that is compatible with the existing context.

Sun Factor Analysis (ASave)/AT ≤ 0.5	Outdoor Amenity Areas									Public Space	
	Building 4	Building 3 (6 Storey)	Building 3 (over parking)	Building 2 (8 Storey)	Building 2 (6 Storey)	Building 1B GF	Building 1B (4 Storey)	Building 1A	Public Park	Market Square	
June	76.25	52.05	71.53	63.18	81.15	63.24	74.96	85.92	75.06	76.45	
September	56.56	55.08	84.27	52.76	96.64	58.12	52.7	64.53	57.08	75.73	
December	28.13	63.9	99.9	53.94	100	39.09	41.93	60.81	18.28	53.78	
Average	53.65	57.01	85.23	56.63	92.60	53.48	56.53	70.42	50.14	68.65	

TOR 3.2: Outdoor Amenity Areas

TOR 3.3: Public Spaces, Parks and Plazas

	ADDITIONAL			CONTINUOUS			ADDITIONAL			CONCLUSION
	Sep 21 - 09_12 AM	Sep 21 - 10_12 AM	Sep 21 - 11_12 AM	Sep 21 - 12_12 PM	Sep 21 - 01_12 PM	Sep 21 - 02_12 PM	Sep 21 - 03_12 PM	Sep 21 - 04_12 PM	Sep 21 - 05_12 PM	
Queen Street EBLVD										
Street AN BLVD										
Street A SBLVD										
Street B EBLVD										
Street B WBLVD										
Street CN BLVD										
Street CSBLVD										

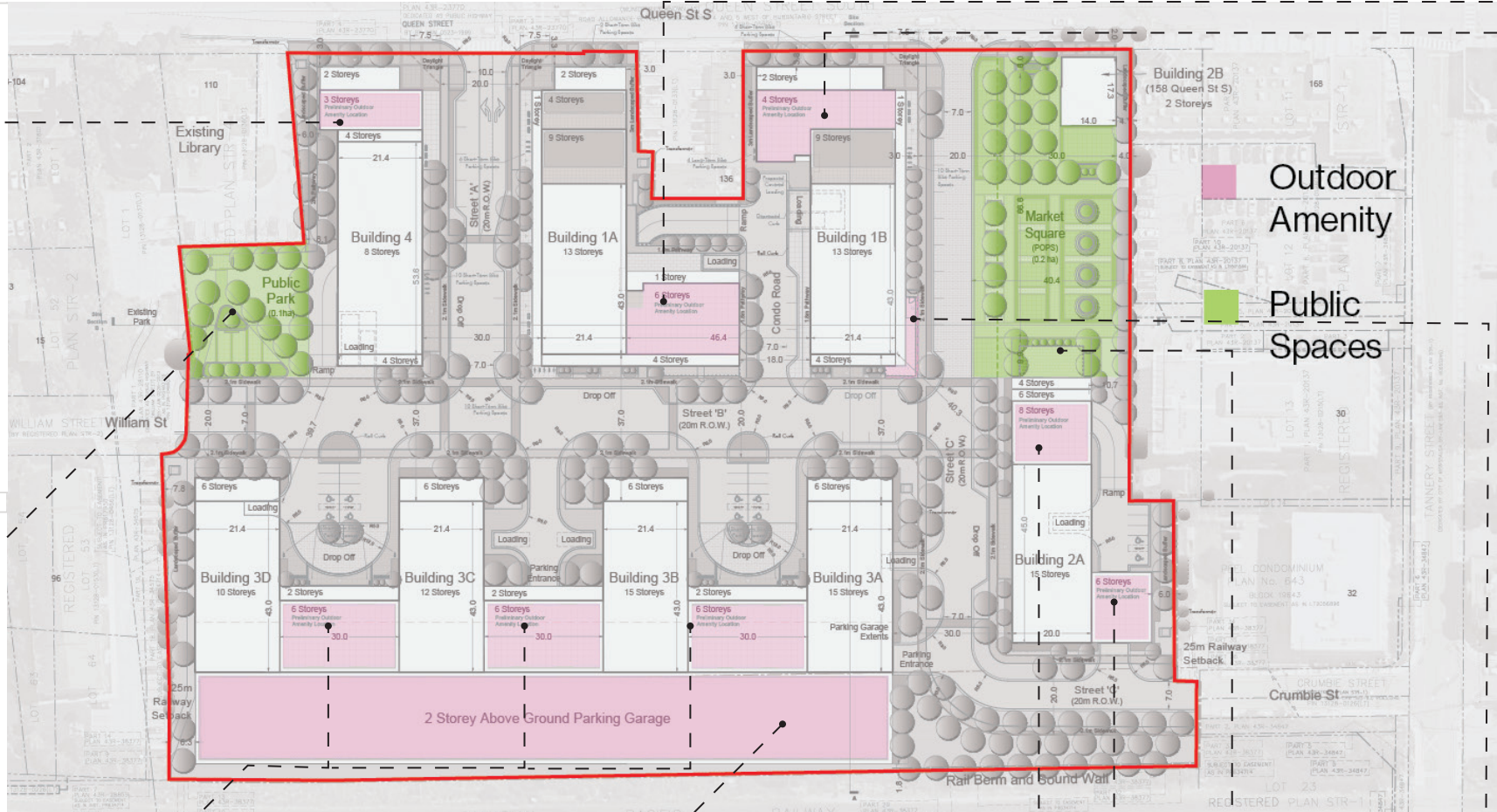
TOR 3.3 Public Realm: High Density Residential Streets. Results in green comply with city criteria.

Shadow Study - Cover Letter

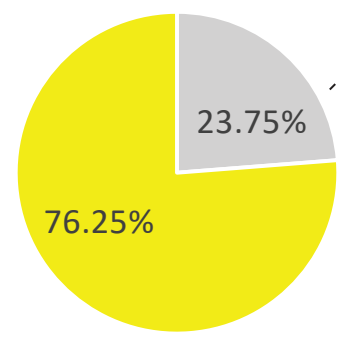
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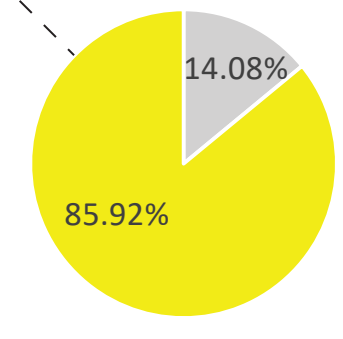


Building 4 - 3 stry



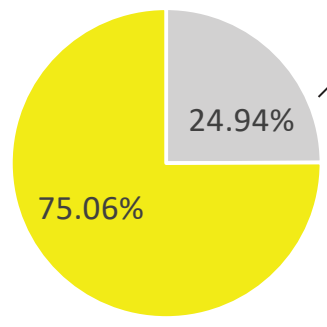
■ Shadow ■ Sun factor

Building 1A - 6th stry



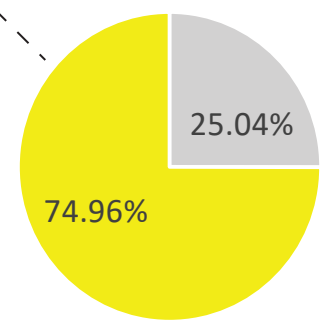
■ Shadow ■ Sun factor

Public Park



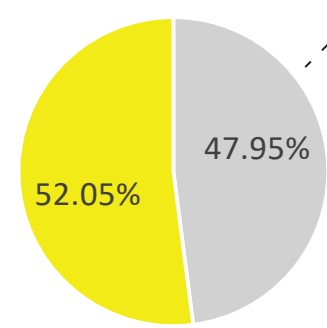
■ Shadow ■ Sun factor

Building 1B - 4th stry



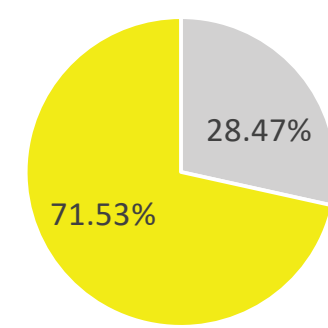
■ Building 1B-4th floor ■ Shadow ■ Sun fact

Building 3 - 6 stry



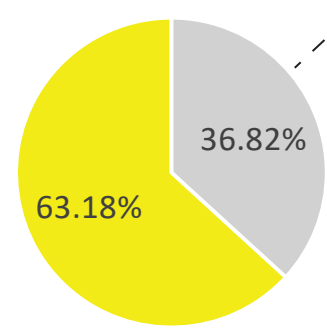
■ Shadow ■ Sun factor

Building 3 - Over Parking



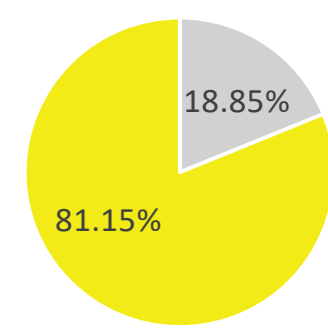
■ Shadow ■ Sun factor

Building 2 - 8 stry



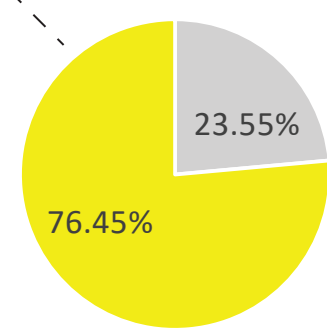
■ Shadow ■ Sun factor

Building 2 - 6 stry



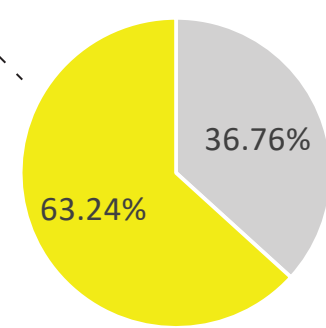
■ Shadow ■ Sun factor

Market Square



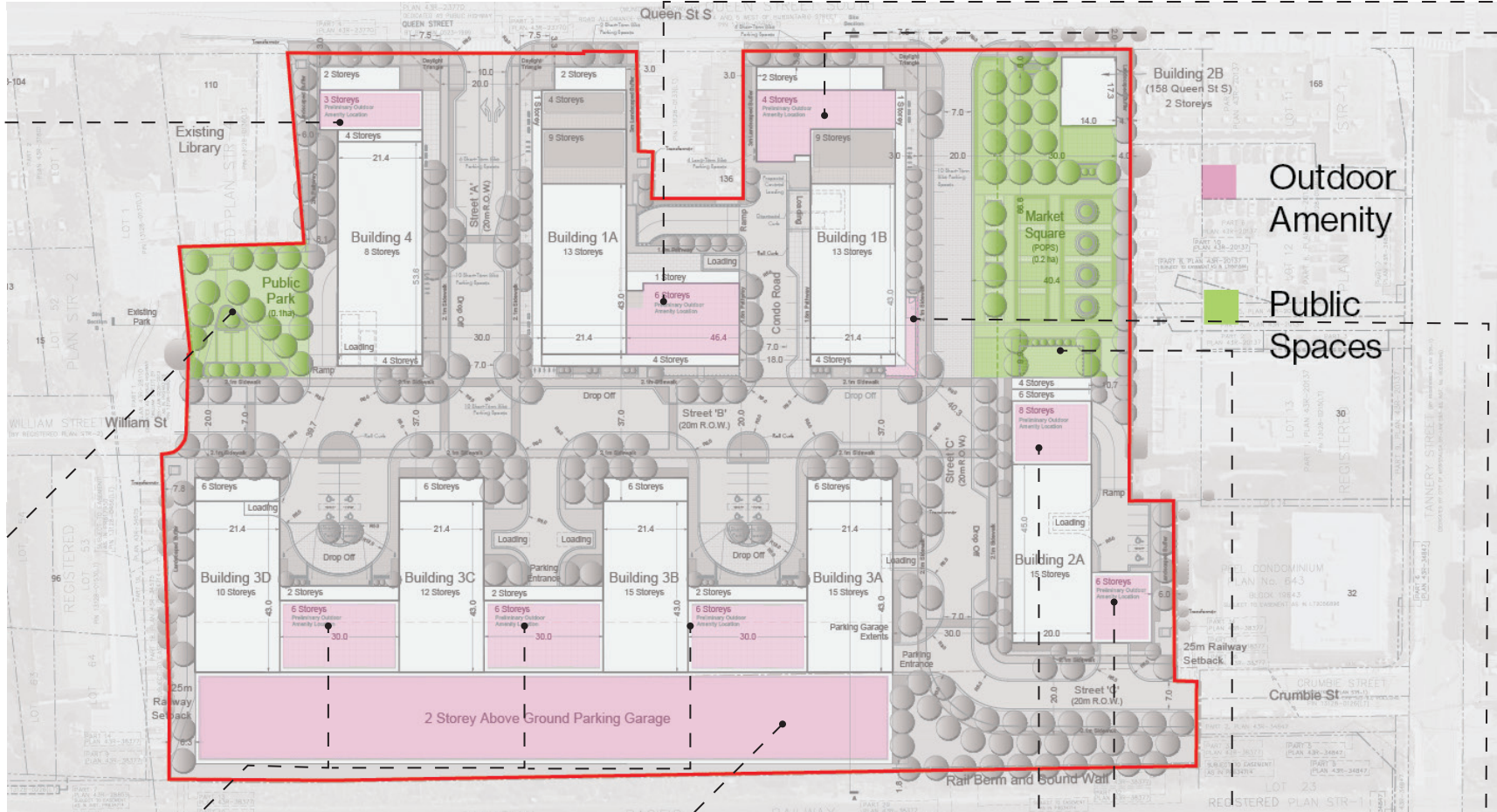
■ Shadow ■ Sun factor

Building 1B - Ground Floor

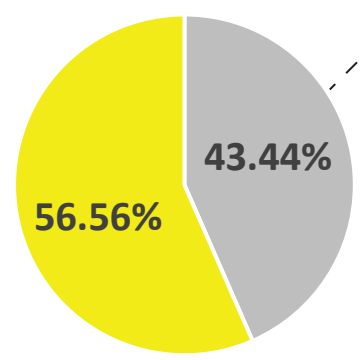


■ Shadow ■ Sun factor



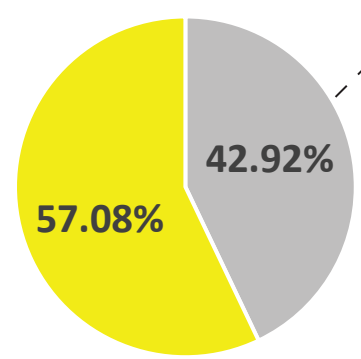


Building 4 - 3 stry



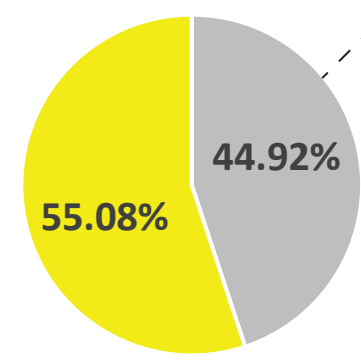
■ Shadow ■ Sun factor

Public Park



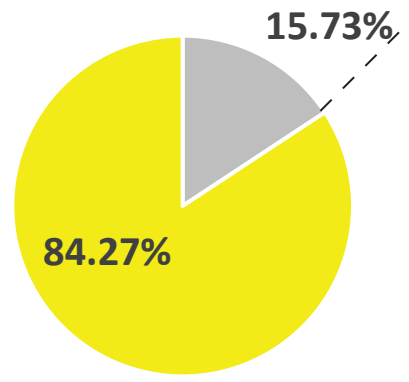
■ Shadow ■ Sun factor

Building 3 - 6 Stry



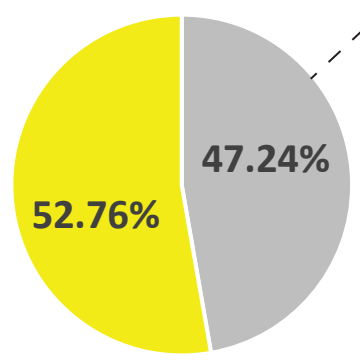
■ Shadow ■ Sun factor

Building 3 - Over parking



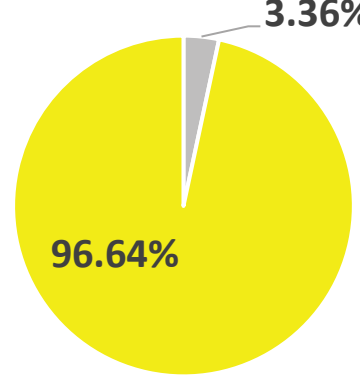
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Building 2A- 8th stry



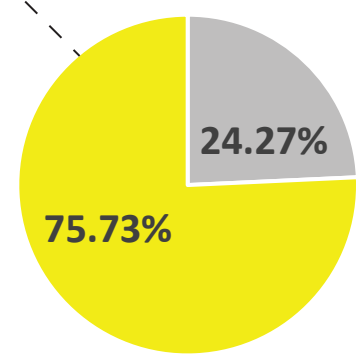
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Building 2A-6 stry



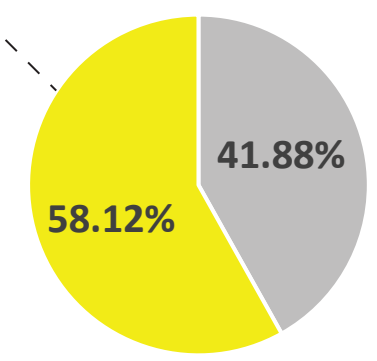
■ Shadow ■ Sun factor

Market Square



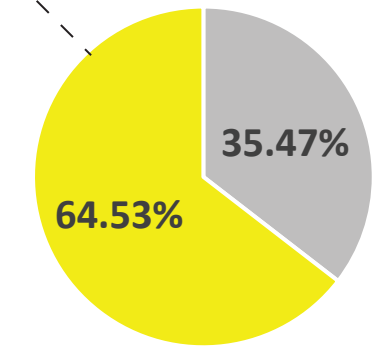
■ Shadow ■ Sun factor

Building 1B - Ground floor



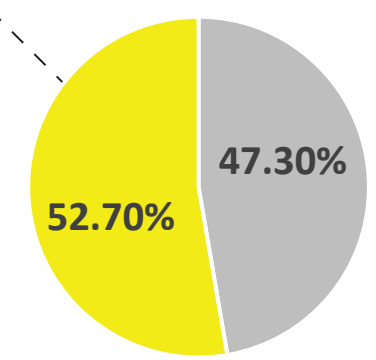
■ Shadow ■ Sun factor

Building 1A - 6th stry



■ Shadow ■ Sun factor

Building 1B - 4th floor



■ Shadow ■ Sun factor

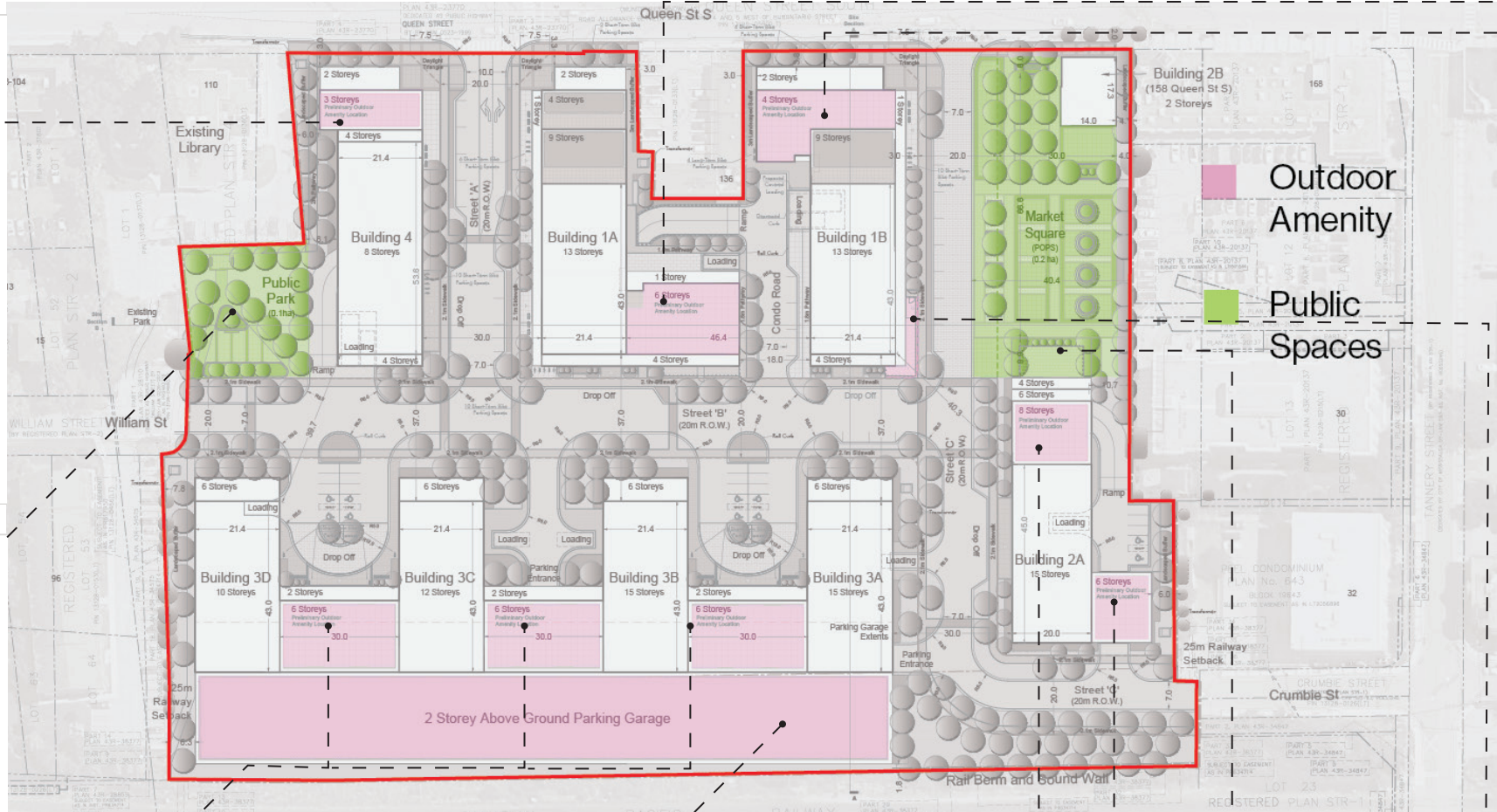


Shadow Study - September 21: Sun factor for outdoor amenity areas and public spaces

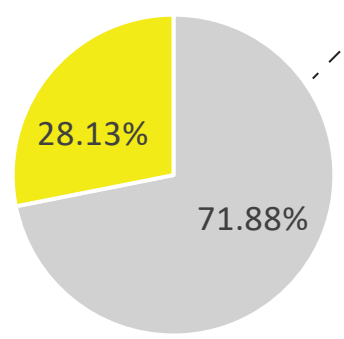
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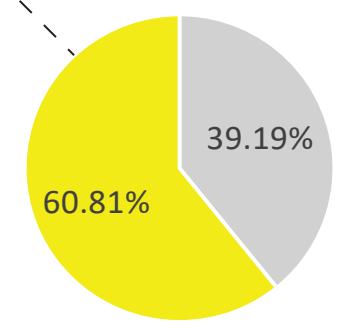


Building 4 - 3 stry



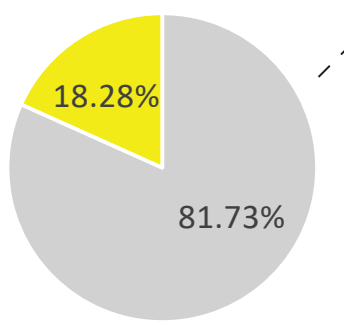
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Building 1A- 6 stry



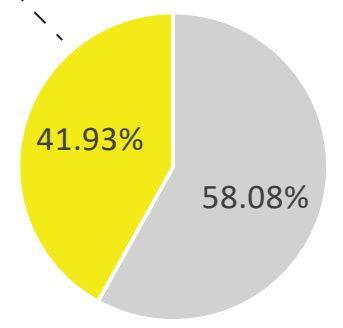
■ Shadow ■ Sun factor

Public Park



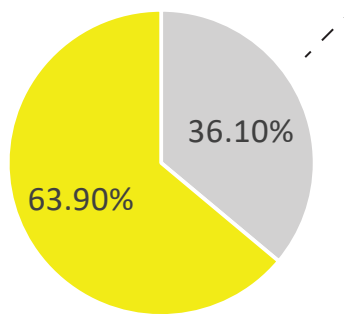
■ Shadow ■ Sun factor

Building 1B- 4 stry



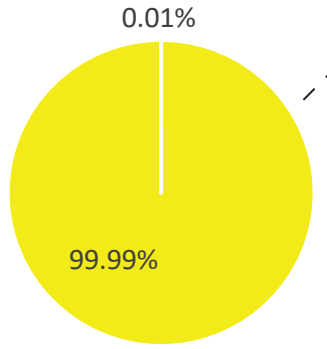
■ Shadow ■ Sun factor

Building 3 - 6 stry



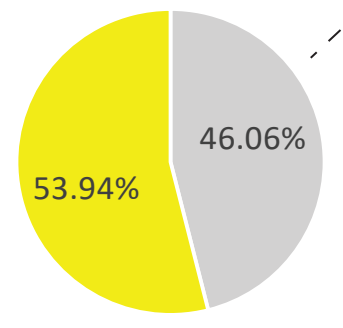
■ Shadow ■ Sun factor

Building 3 - Over parking



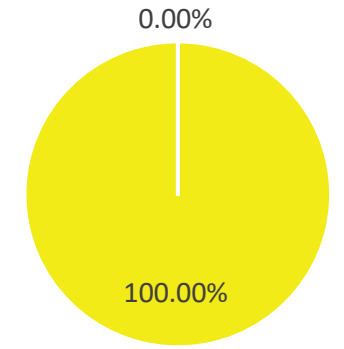
■ Shadow ■ Sun factor

Building 2 - 8 stry



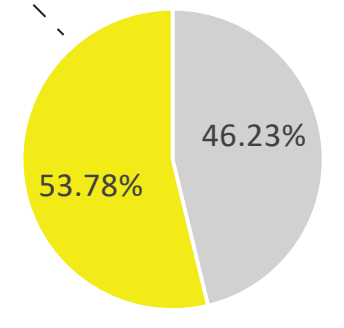
■ Shadow ■ Sun factor

Building 2 - 6 stry



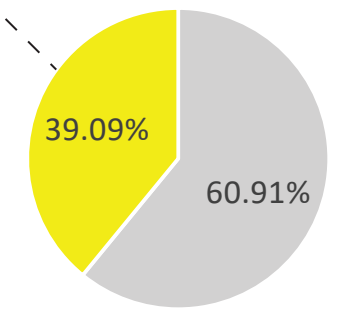
■ Shadow ■ Sun factor

Market Square



■ Shadow ■ Sun factor

Building 1B - Ground Floor



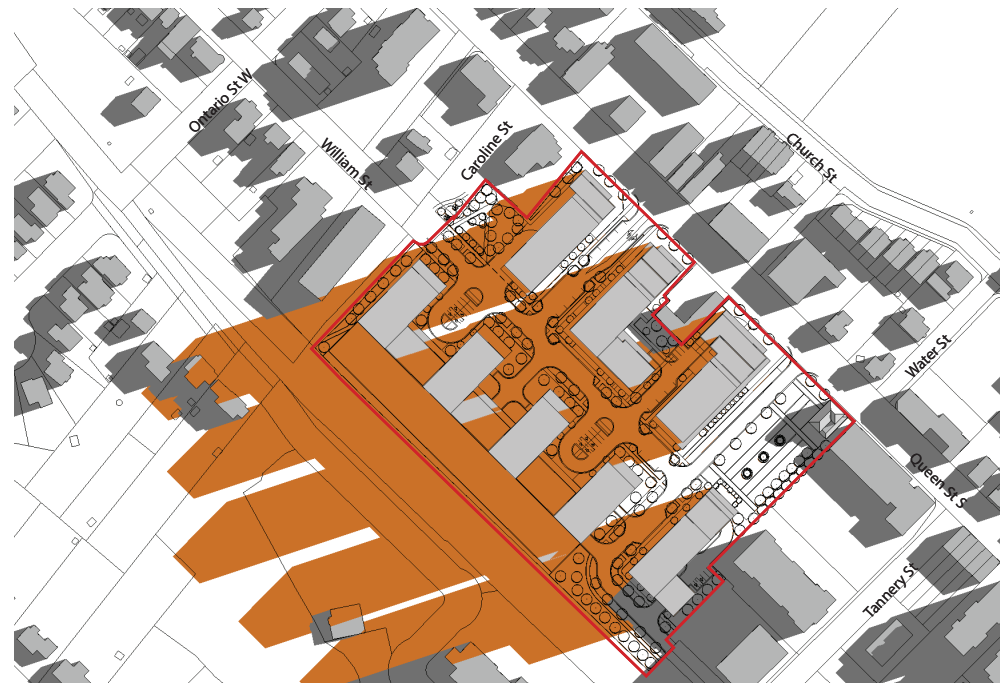
■ Shadow ■ Sun factor

Shadow Study - December 21: Sun factor for outdoor amenity areas and public spaces

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7:20am



8:20am



9:20am



10:20am



11:20am

- Subject Site
- Shadow Cast by Existing
- Shadows Cast by Proposed Development



Shadow Study - June 21

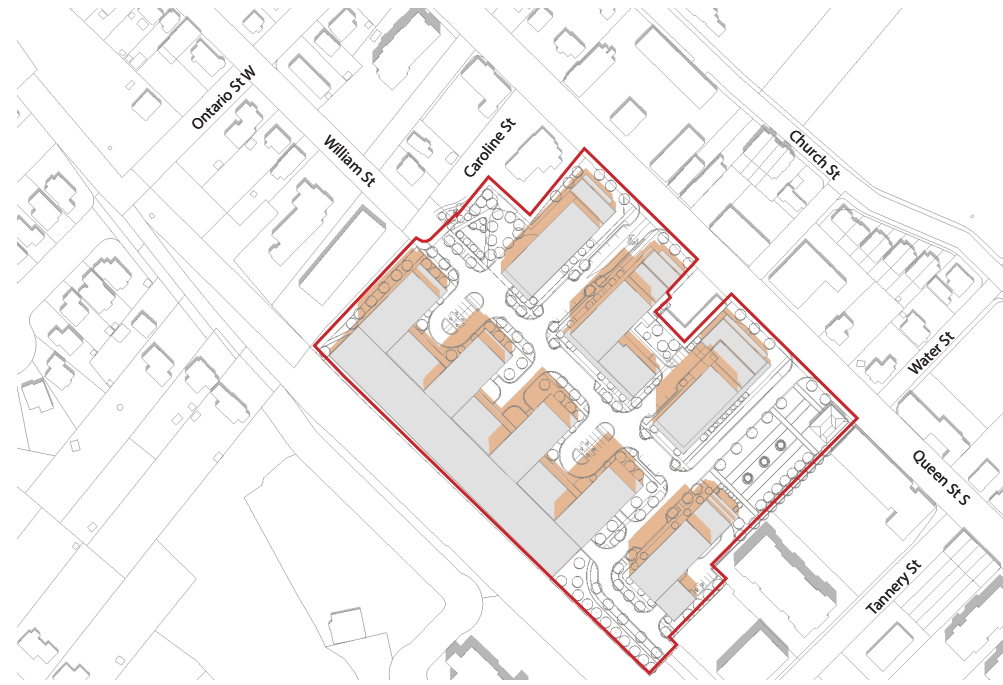
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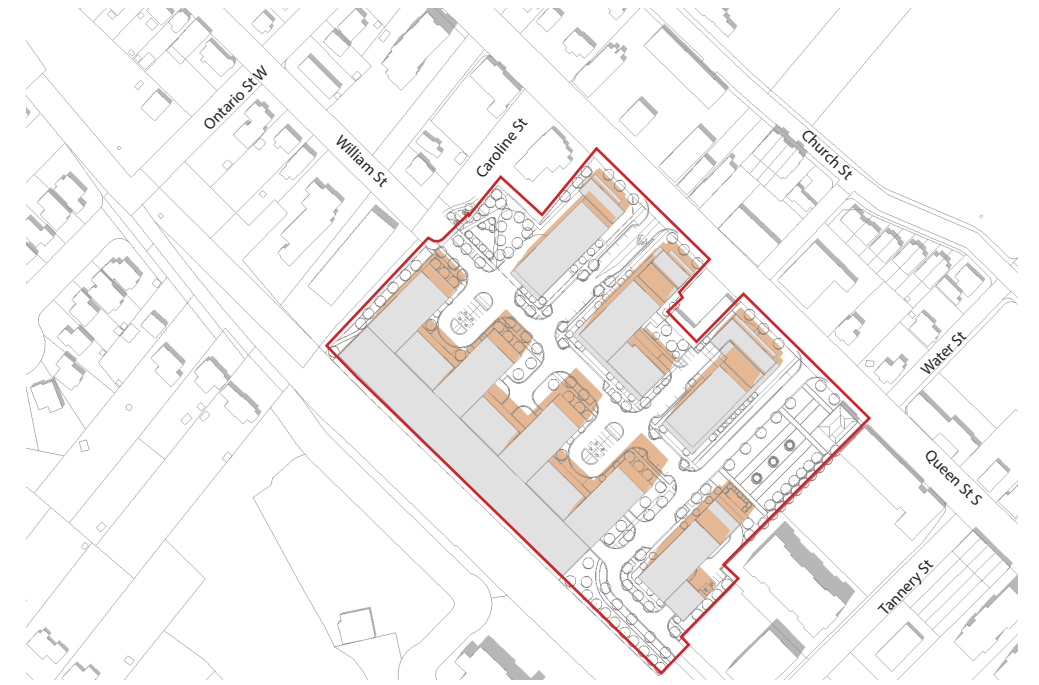




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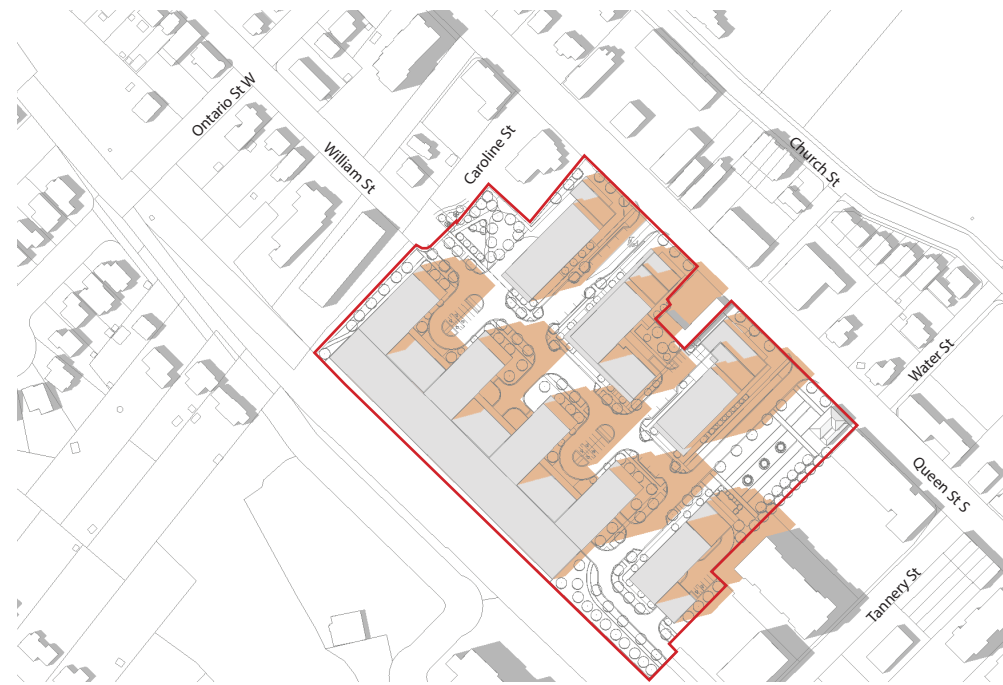
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2:20pm



3:20pm



4:20pm



5:20pm

- Subject Site
- Shadow Cast by Existing
- Shadows Cast by Proposed Development

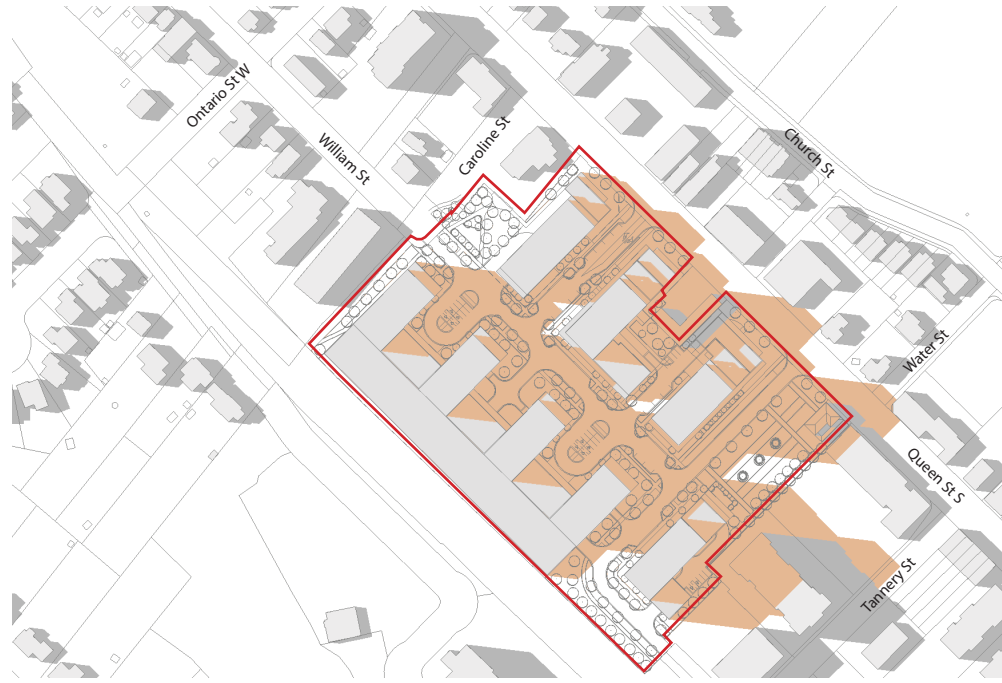


Shadow Study - June 21

120-158 Queen St S & 169 Crumby St, Mississauga

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April 2024








6:20pm



7:20pm

-  Subject Site
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9:12am



10:12am



11:12am



12:12pm



1:12pm

- Subject Site
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- Shadows Cast by Proposed Development

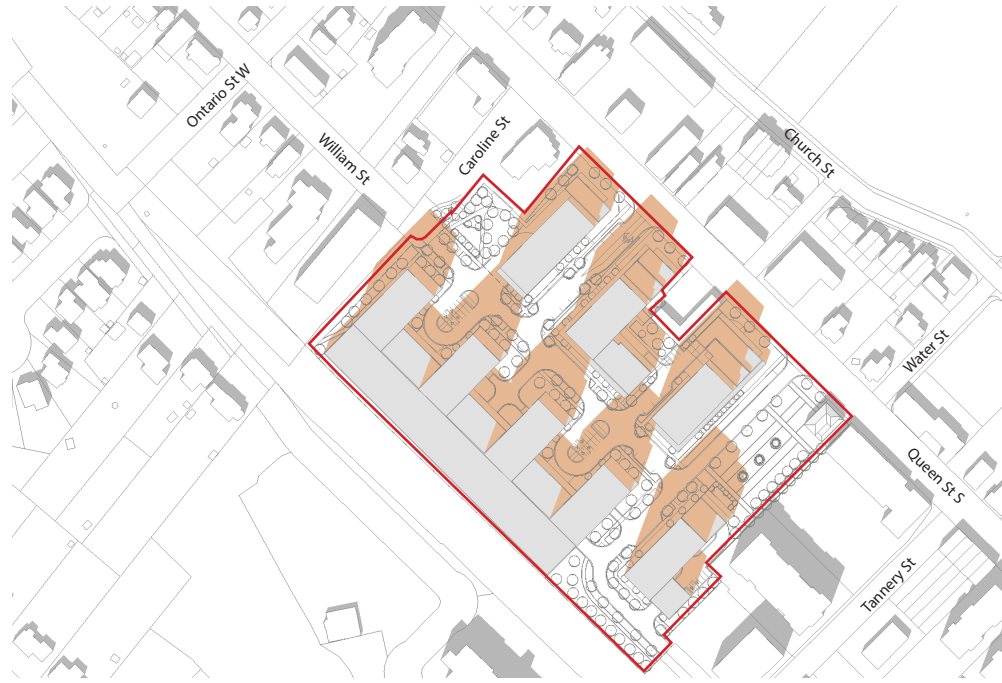


Shadow Study - September 21

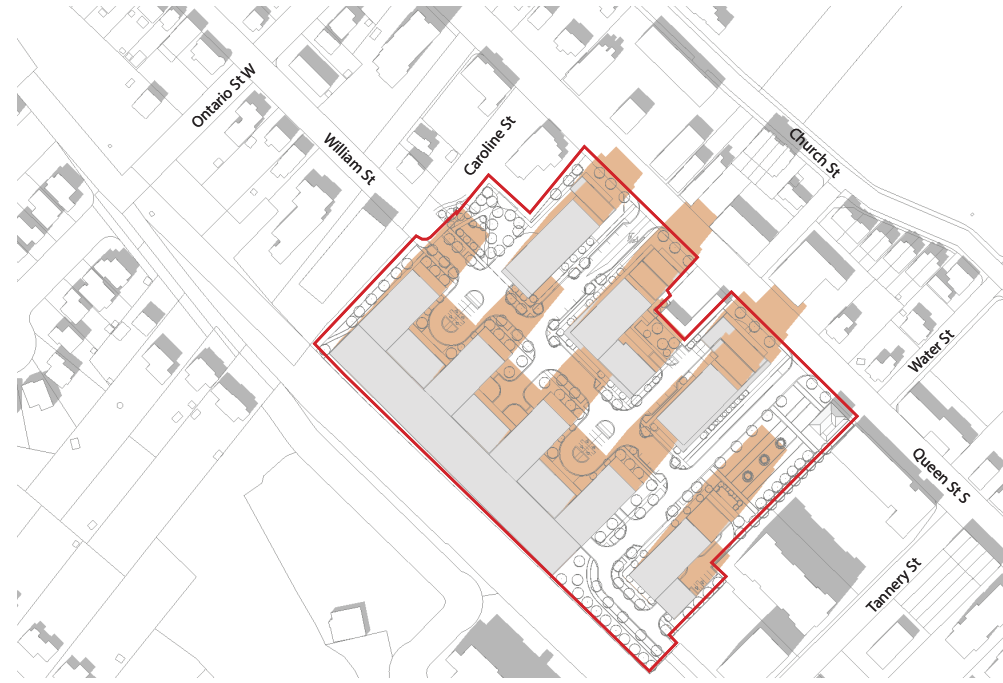
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2:12pm



3:12pm



4:12pm



5:12pm

- Subject Site
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- Shadows Cast by Proposed Development

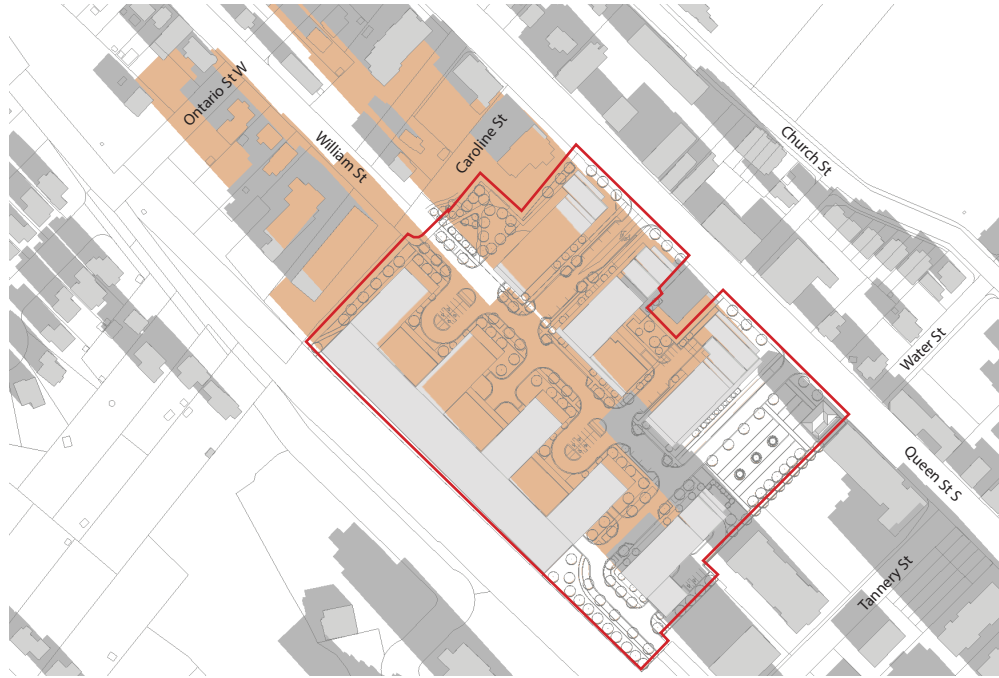


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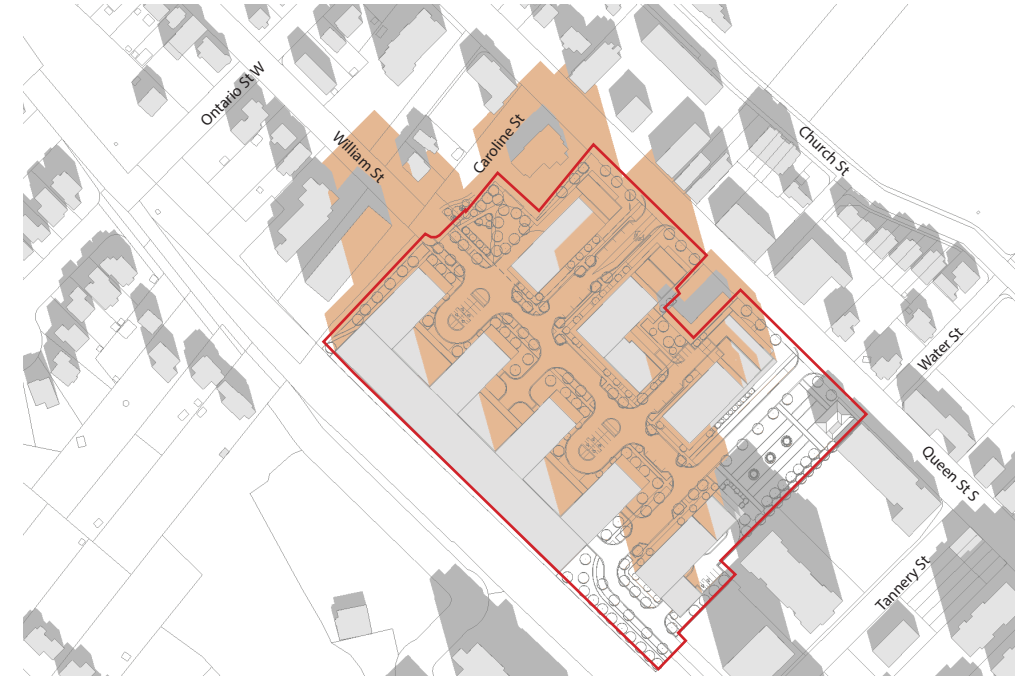




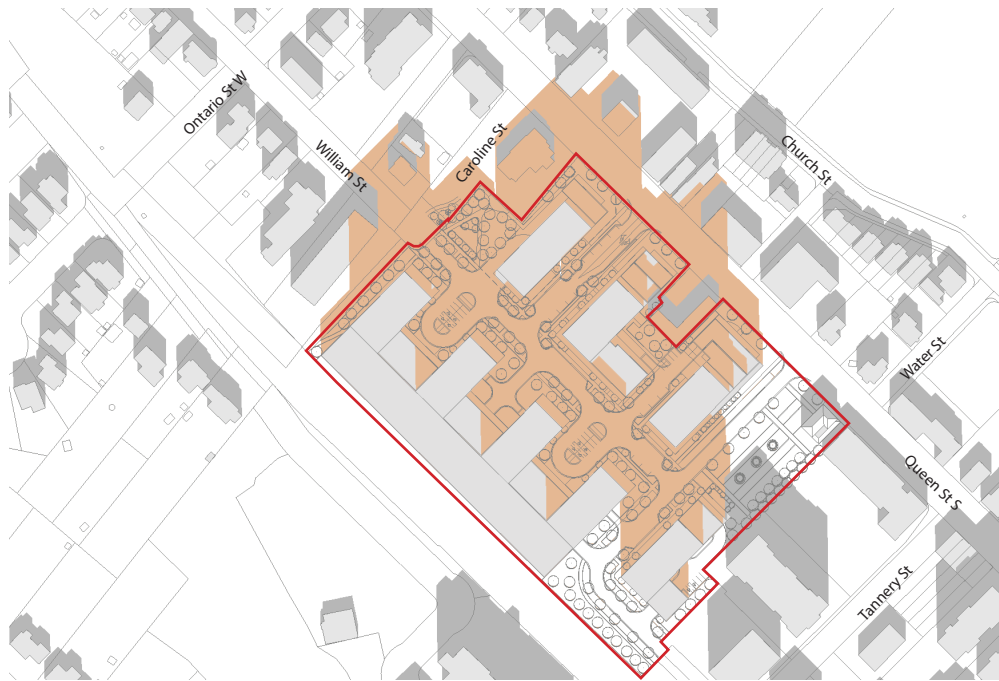
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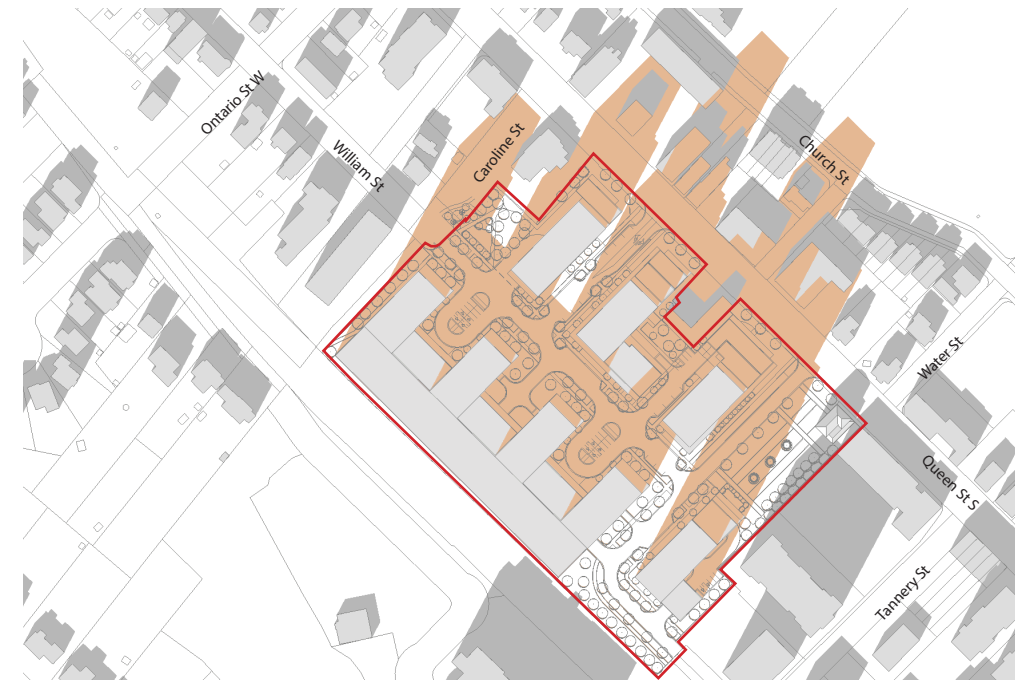
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12:17pm



1:17pm



2:17pm

- Subject Site
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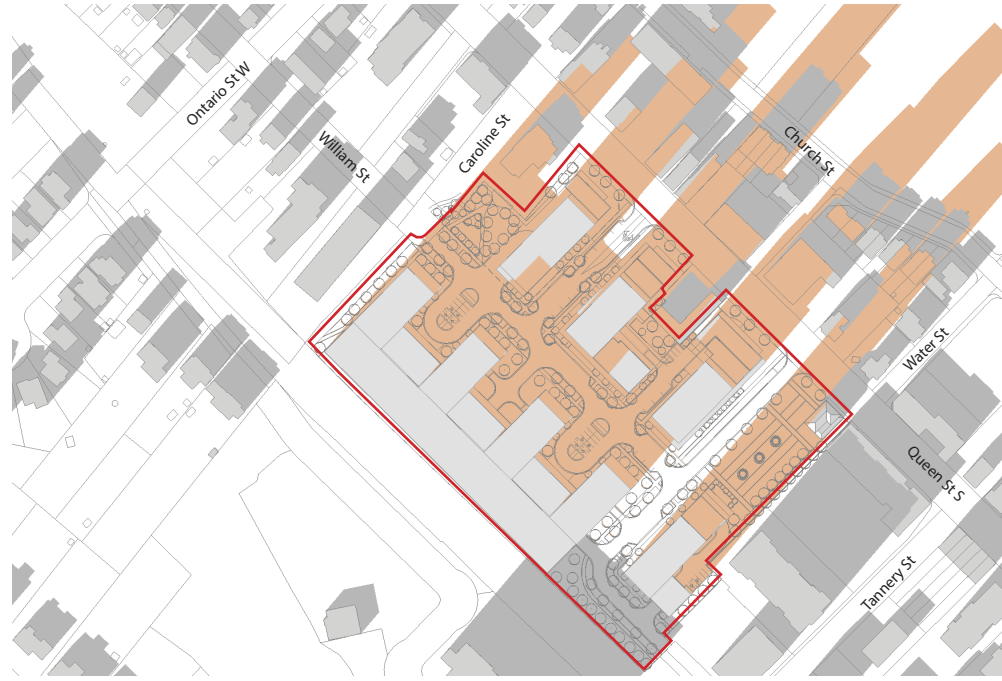


Shadow Study - December 21




120-158 Queen St S & 169 Crumvie St, Mississauga

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April 2024





3:17pm

-  Subject Site
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9:12am



10:12am



11:12am



12:12pm



1:12pm



2:12pm

- Subject Site
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BOULEVARD IMPACT

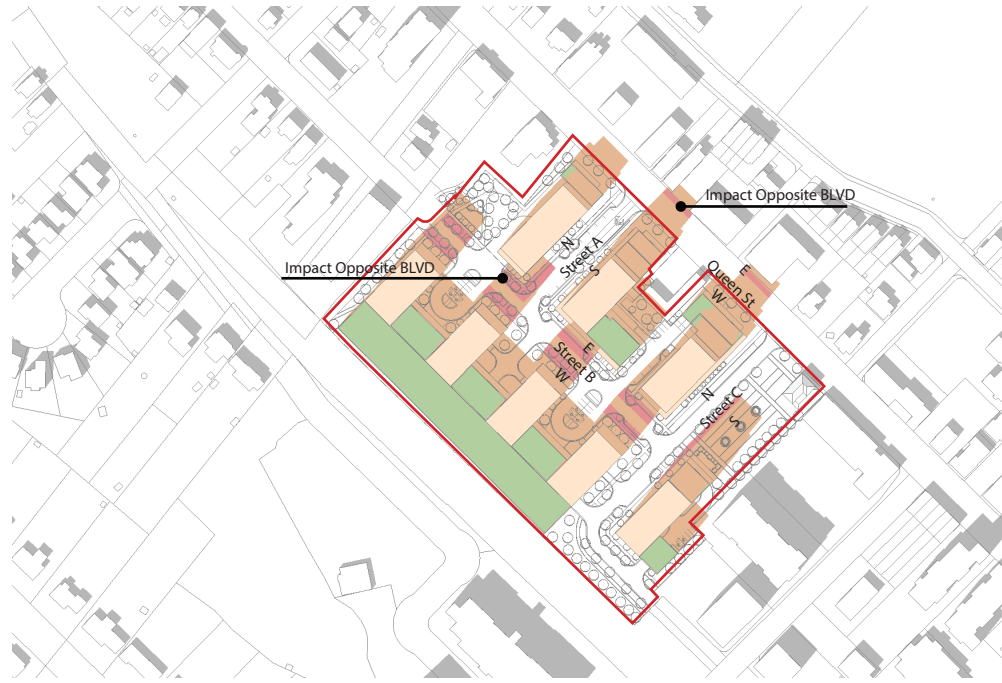


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DARC 3 Submission
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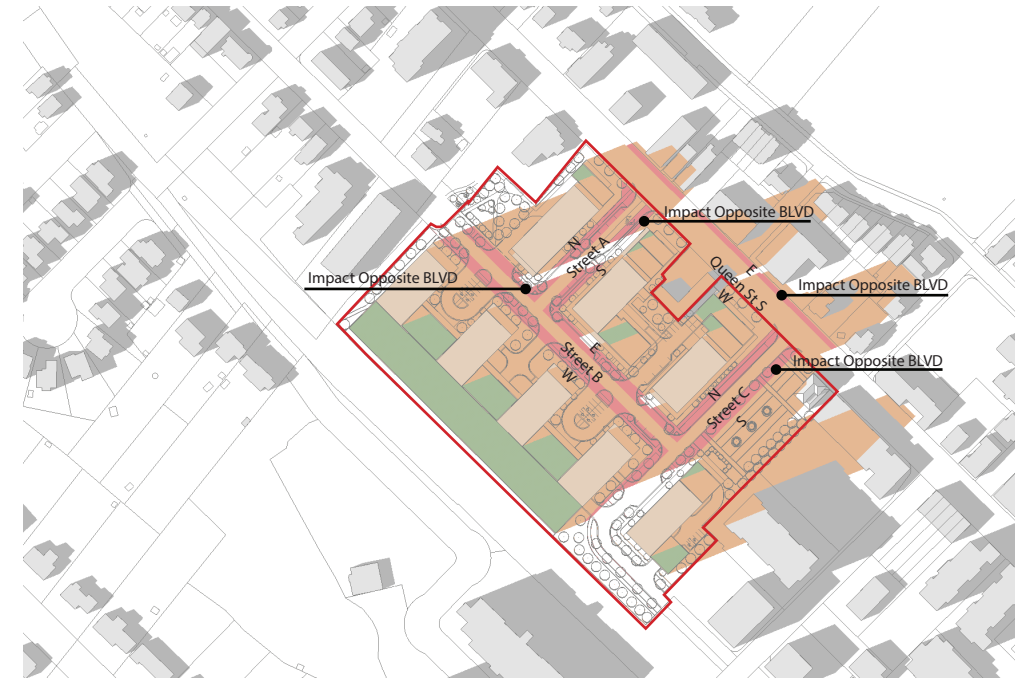




3:12pm



4:12pm



5:12pm

- Subject Site
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BOULEVARD IMPACT



Shadow Study - September 21

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