

SUN/ SHADOW STUDY



91 EGLINTON AVE E MASTER PLAN CITY OF MISSISSAUGA

Sep 2018

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SEPTEMBER/ MARCH 21	SUNRISE+1.5 hr._ 08:35 AM (LOCAL TIME)	1/ RZ-21
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	SOLAR NOON - 2 hr._ 11:12 (LOCAL TIME)	4/ RZ-21
	SOLAR NOON - 1 hr._ 12:12 (LOCAL TIME)	5/ RZ-21
	SOLAR NOON _ 13:12 (LOCAL TIME)	6/ RZ-21
	SOLAR NOON + 1 hr._ 14:12 (LOCAL TIME)	7/ RZ-21
	SOLAR NOON + 2 hr._ 15:12 (LOCAL TIME)	8/ RZ-21
	SOLAR NOON + 3 hr._ 16:12 (LOCAL TIME)	9/ RZ-21
	SOLAR NOON + 4 hr._ 17:12 (LOCAL TIME)	10/ RZ-21
	SUNSET-1.5 hr._ 17:48 (LOCAL TIME)	11/ RZ-21

JUNE 21	SUNRISE+1.5 hr._ 07:07 AM (LOCAL TIME)	1/ RZ-22
	SOLAR NOON - 6 hr._ 07:20 (LOCAL TIME)	2/ RZ-22
	SOLAR NOON - 5 hr._ 08:20 (LOCAL TIME)	3/ RZ-22
	SOLAR NOON - 4 hr._ 09:20 (LOCAL TIME)	4/ RZ-22
	SOLAR NOON - 3 hr._ 10:20 (LOCAL TIME)	5/ RZ-22
	SOLAR NOON - 2 hr._ 11:20 (LOCAL TIME)	6/ RZ-22
	SOLAR NOON - 1 hr._ 12:20 (LOCAL TIME)	7/ RZ-22
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	SOLAR NOON + 5 hr._ 18:20 (LOCAL TIME)	13/ RZ-22
	SOLAR NOON + 6 hr._ 19:20 (LOCAL TIME)	14/ RZ-22
	SUNSET-1.5 hr._ 19:33 (LOCAL TIME)	15/ RZ-22
DECEMBER 21	SUNRISE+1.5 hr._ 09:19 AM (LOCAL TIME)	1/ RZ-22
	SOLAR NOON - 2 hr._ 10:17 (LOCAL TIME)	2/ RZ-22
	SOLAR NOON - 1 hr._ 11:17 (LOCAL TIME)	3/ RZ-22
	SOLAR NOON _ 12:17 (LOCAL TIME)	4/ RZ-22
	SOLAR NOON + 1 hr._ 13:17 (LOCAL TIME)	5/ RZ-22
	SOLAR NOON + 2 hr._ 14:17 (LOCAL TIME)	6/ RZ-22
	SUNSET-1.5 hr._ 15:15 (LOCAL TIME)	7/ RZ-22

Shadow Study Analysis

1 Introduction

The proposed development includes 6 high-rise towers 30-45 storeys, multi-story podiums, Central private amenity areas and a Proposed Public Park at 91 Eglinton Ave E and 5055 Hurontario Street. The site Latitude and Longitude are approximately **79.6500°W, 43.6097°N** at the southeast corner of the project as presented on the City of Mississauga Interactive Online mapping service last access at <http://www6.mississauga.ca/missmaps/maps.aspx>

Astronomic North was determined from the Survey Completed by KRCMAR SURVEYORS LTD; referenced in the Survey / Site plan RZ-01. The Base Plan was drawn in Autodesk Revit using a composite of source plans including the city of Mississauga interactive online mapping service, and google earth images. Time Zone: Eastern , Standard time: UT-5 hours, Daylight Time UT-4 hours.

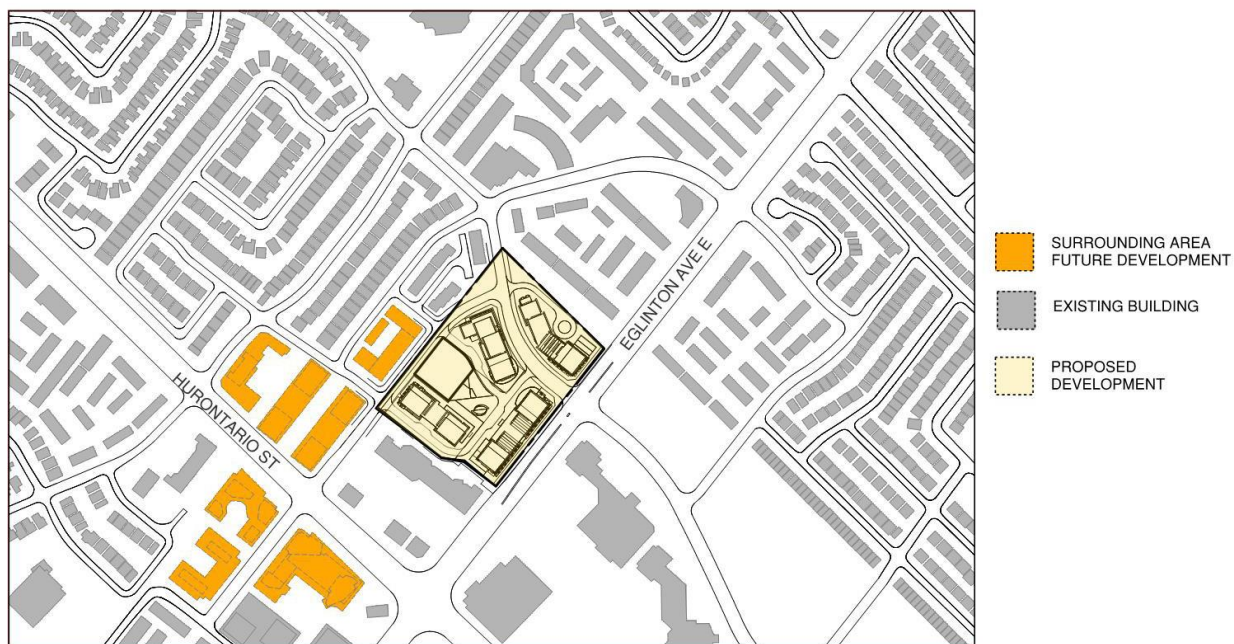


Figure 1- **Shadow study area Analysis** which is 4.0 times the building height to the north, east and west, and 1.5 times the building height to the south; Existing shadows have been produced by existing buildings, and Surrounding area future development in light grey while the new shadow produced by proposed development in Dark grey.

Shadow studies have been illustrated in sheets RZ-21 to RZ-26 and this report is supplementary Analysis to the Shadow studies illustrate the impact of the proposed development in terms of sun and daylight access to the surrounding context as well as proposed public park, not the internal Private Areas.

Dates and times are based on Tables 2,3, and 4 of "STANDARD FOR SHADOW STUDIES" dated June 2014 by City of Mississauga, Planning and building departments.

2 Criteria

Analysis of adequate sunlight on the following:

2.1 Public Park

The Intent of this section is to Calculate the Sun Access Factor on the proposed Public park.

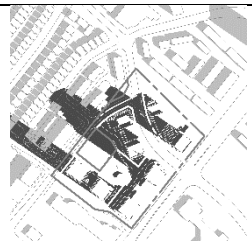
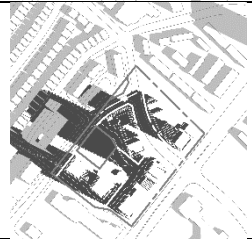
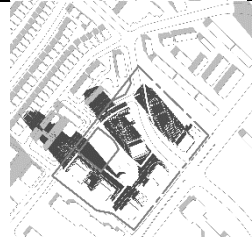
2.1.1 Calculating Sun Access Factor on Public Park on **September/ March 21**


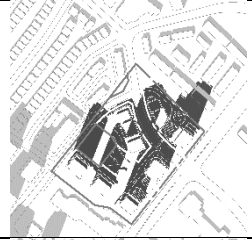

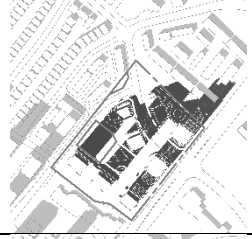



Two major types of Shadow are affecting the Public Park, Surrounding Future development and Proposed future development


2.1.1.1 *Overall Sun Access Factor on September/ March 21*

Overall Sun Access Factor has been calculated based on the Proposed development Shadow and all the Surrounding Future developments shadows; as below:

Table 1; **September/ March 21**; overall Sun access factor.

September/ March 21		Surrounding Area future development Shadow****	Proposed Developme nt Shadow (m ²)	As * Overall (m2)	At ** (m2)	As (ave) / AT Overall
	SUNRISE+1.5 H_ 08:35 AM (LOCAL TIME)	0	2,358	883	3,241	
	SOLAR NOON - 4 hr._ 09:12 (LOCAL TIME)	0	1,325	1,916	3,241	
	SOLAR NOON - 3 hr._ 10:12 (LOCAL TIME)	0	1,293	1,948	3,241	

	SOLAR NOON - 2 hr._ 11:12 (LOCAL TIME)	0	3,193	48	3,241
	SOLAR NOON - 1 hr._ 12:12 (LOCAL TIME)	0	3,101	140	3,241
	SOLAR NOON _ 13:12 (LOCAL TIME)	0	2,275	966	3,241
	SOLAR NOON + 1 hr._ 14:12 (LOCAL TIME)	0	2,064	1,177	3,241
	SOLAR NOON + 2 hr._ 15:12 (LOCAL TIME)	456	2,019	766	3,241
	SOLAR NOON + 3 hr._ 16:12 (LOCAL TIME)	2,965	1,400	276	3,241
	SOLAR NOON + 4 hr._ 17:12 (LOCAL TIME)	3,209	919	32	3,241

	SUNSET-1.5 hr._ 17:48 (LOCAL TIME)					
		3,241	752	0	3,241	
	As(ave)***			741	3,241	0.23

* As

Measure the area in sunshine (AS) for each of the test times from 1.5 hours after sunrise to 1.5 hours before sunset both inclusive

**At

Measure the total Area (AT) of the space or feature

As(ave)***

Find the average of the AS values (As (ave))

Refer to RZ-21 for Future development indicated w/ dash lines

2.1.1.2 Sun Access factor on Proposed Public Park excluding the Surrounding Future developments on September/ March 21.

Table 2; September/ March 21; Sun access factor excluding the surrounding Development

September/ March 21	Proposed Development Shadow (m ²)	At * (m2)	As Existing buildings & Proposed development	As/ At Existing building & Proposed development
SUNRISE+1.5 H_ 08:35 AM (LOCAL TIME)	2,358	3, 241	883	
SOLAR NOON - 4 hr._ 09:12 (LOCAL TIME)	1,325	3, 241	1,916	
SOLAR NOON - 3 hr._ 10:12 (LOCAL TIME)	1,293	3, 241	1,948	
SOLAR NOON - 2 hr._ 11:12 (LOCAL TIME)	3,193	3, 241	48	
SOLAR NOON - 1 hr._ 12:12 (LOCAL TIME)	3,101	3, 241	140	
SOLAR NOON _ 13:12 (LOCAL TIME)	2,275	3, 241	966	
SOLAR NOON + 1 hr._ 14:12 (LOCAL TIME)	2,064	3, 241	1,177	
SOLAR NOON + 2 hr._ 15:12 (LOCAL TIME)	2,019	3, 241	1,222	
SOLAR NOON + 3 hr._ 16:12 (LOCAL TIME)	1,400	3, 241	1,841	
SOLAR NOON + 4 hr._ 17:12 (LOCAL TIME)	919	3, 241	2,322	
SUNSET-1.5 hr._ 17:48 (LOCAL TIME)	752	3, 241	2,489	
Sun Access Factor and As(ave)***		3, 241	1,359	0.42

2.1.1.3 Sun Access factor on Proposed Public Park excluding the Proposed developments including the surrounding development on September/ March 21.

Table 3; September/ March 21; Sun access factor excluding the proposed Development including the surrounding future development

September/ March 21	Existing Building Shadow	Surrounding Area future development Shadow****	At ** (m2)	As Existing Building& Surrounding Future Developments	As/ At Existing Building& Surrounding Future Developments
SUNRISE+1.5 H_ 08:35 AM (LOCAL TIME)	0	0	3,241	3,241	
SOLAR NOON - 4 hr_ 09:12 (LOCAL TIME)	0	0	3,241	3,241	
SOLAR NOON - 3 hr_ 10:12 (LOCAL TIME)	0	0	3,241	3,241	
SOLAR NOON - 2 hr_ 11:12 (LOCAL TIME)	0	0	3,241	3,241	
SOLAR NOON - 1 hr_ 12:12 (LOCAL TIME)	0	0	3,241	3,241	
SOLAR NOON _ 13:12 (LOCAL TIME)	0	0	3,241	3,241	
SOLAR NOON + 1 hr_ 14:12 (LOCAL TIME)	0	0	3,241	3,241	
SOLAR NOON + 2 hr_ 15:12 (LOCAL TIME)	0	456	3,241	2,785	
SOLAR NOON + 3 hr_ 16:12 (LOCAL TIME)	0	2,965	3,241	276	
SOLAR NOON + 4 hr_ 17:12 (LOCAL TIME)	0	3,209	3,241	32	
SUNSET-1.5 hr_ 17:48 (LOCAL TIME)	0	3,241	3,241	0	
Sun Access Factor and As(ave)***			3,241	2,344	0.72

2.1.1.4 Conclusion on Shadow Study on Public Park on September/ March 21.

- Sun Access Factor on the Public park on September / March 21
Including the Proposed Development
Excluding the Surrounding area Future development
Is 0.42
- Sun Access Factor on the Public park on September / March 21
Including the Proposed Development
including the Surrounding area Future development
Is 0.23

The Proposed Development at 91 Eglinton Ave, Mississauga is reducing the Sun access factor by 0.49 from 1.00 to 0.42 or 0.72 to 0.23 and doesn't meet the required Sun Access factor of 0.50 on September 21.





2.1.2 Calculating Sun Access Factor on Public Park on June 21

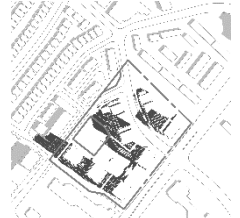
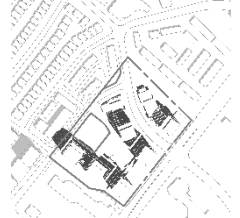

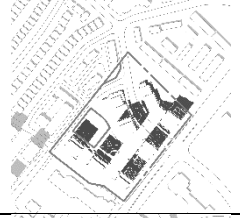
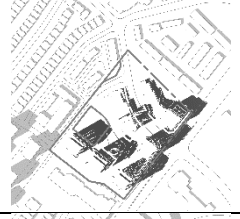
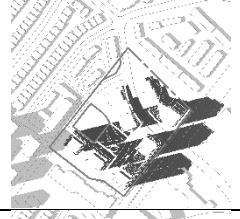

“STANDARD FOR SHADOW STUDIES” dated June 2014 by City of Mississauga, Planning and building departments. On page 16, Under Public Open space, park and Plaza, has not requested Shadow analysis for public park on June 21 or December 21, although as it may be needed for item 2.2 of this report for information the same Analysis has been done on public park for June 21 and December 21.





2.1.2.1 Overall Sun Access Factor on June 21

Table 4; **June 21**; overall Sun access factor

June 21

		Surrounding Area future development Shadow****	Proposed Development Shadow (m ²)	As * Overall (m ²)	At ** (m ²)	As (ave) / AT Overall
	SUNRISE+1.5 hr_ 07:07 AM (LOCAL TIME)	0	2,931	310	3,241	
	SOLAR NOON - 6 hr_ 07:20 (LOCAL TIME)	0	2,895	346	3,241	
	SOLAR NOON - 5 hr_ 08:20 (LOCAL TIME)	0	2,664	577	3,241	
	SOLAR NOON - 4 hr_ 09:20 (LOCAL TIME)	0	2,725	516	3,241	

	SOLAR NOON - 3 hr._ 10:20 (LOCAL TIME)	0	584	2,657	3,241
	SOLAR NOON - 2 hr._ 11:20 (LOCAL TIME)	0	160	3,081	3,241
	SOLAR NOON - 1 hr._ 12:20 (LOCAL TIME)	0	905	2,336	3,241
	SOLAR NOON _ 13:20 (LOCAL TIME)	0	1,233	2,008	3,241
	SOLAR NOON + 1 hr._ 14:20 (LOCAL TIME)	0	1,700	1,541	3,241
	SOLAR NOON + 2 hr._ 15:20 (LOCAL TIME)	0	1,014	2,227	3,241
	SOLAR NOON + 3 hr._ 16:20 (LOCAL TIME)	0	507	2,734	3,241

	SOLAR NOON + 4 hr_ 17:20 (LOCAL TIME)	1,012	238	2,090	3,241
	SOLAR NOON + 5 hr_ 18:20 (LOCAL TIME)	2,800	83	390	3,241
	SOLAR NOON + 6 hr_ 19:20 (LOCAL TIME)	3,241	0	0	3,241
	SUNSET-1.5 hr_ 19:33 (LOCAL TIME)	3,241	0	0	3,241
	Sun Access Factor and As(ave)***			1,388	3,241
					0.43

2.1.2.2 Sun Access factor on Proposed Public Park excluding the Surrounding Future developments on June 21.

Table 5; June 21; Sun access factor excluding the surrounding Development

June 21		Proposed Development t Shadow (m ²)	At ** (m ²)	As Existing building & Proposed development t	As/ At Existing building & Proposed development t
21-Jun	SUNRISE+1.5 hr_ 07:07 AM (LOCAL TIME)	2,931	3,241	310	
	SOLAR NOON - 6 hr_ 07:20 (LOCAL TIME)	2,895	3,241	346	
	SOLAR NOON - 5 hr_ 08:20 (LOCAL TIME)	2,664	3,241	577	
	SOLAR NOON - 4 hr_ 09:20 (LOCAL TIME)	2,725	3,241	516	


SOLAR NOON - 3 hr._ 10:20 (LOCAL TIME)	584	3,241	2,657	
SOLAR NOON - 2 hr._ 11:20 (LOCAL TIME)	160	3,241	3,081	
SOLAR NOON - 1 hr._ 12:20 (LOCAL TIME)	905	3,241	2,336	
SOLAR NOON _ 13:20 (LOCAL TIME)	1,233	3,241	2,008	
SOLAR NOON + 1 hr._ 14:20 (LOCAL TIME)	1,700	3,241	1,541	
SOLAR NOON + 2 hr._ 15:20 (LOCAL TIME)	1,014	3,241	2,227	
SOLAR NOON + 3 hr._ 16:20 (LOCAL TIME)	507	3,241	2,734	
SOLAR NOON + 4 hr._ 17:20 (LOCAL TIME)	238	3,241	3,003	
SOLAR NOON + 5 hr._ 18:20 (LOCAL TIME)	83	3,241	3,158	
SOLAR NOON + 6 hr._ 19:20 (LOCAL TIME)	0	3,241	3,241	
SUNSET-1.5 hr._ 19:33 (LOCAL TIME)	0	3,241	3,241	
Sun Access Factor and As(ave)***		3,241	2,065	0.64

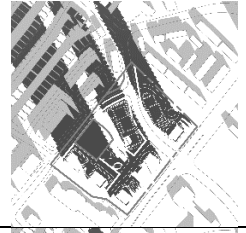

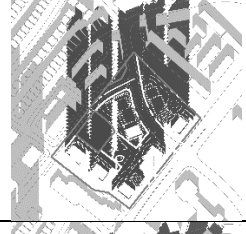



2.1.3 Calculating Sun Access Factor on Public Park on December 21

2.1.3.1 Overall Sun Access Factor on December 21

Table 6; **December 21**; overall Sun access factor

December 21

	Surrounding Area future development Shadow*** *	Proposed Development Shadow (m ²)	As * Overall (m ²)	At ** (m ²)	As (ave) / AT Overall
					
SUNRISE+ 1.5 hr._ 09:19 AM (LOCAL TIME)	0	1,448	1793	3,241	

	SOLAR NOON - 2 hr._ 10:17 (LOCAL TIME)	0	2,866	375	3,241	
	SOLAR NOON - 1 hr._ 11:17 (LOCAL TIME)	0	3,180	61	3,241	
	SOLAR NOON _ 12:17 (LOCAL TIME)	0	3,068	173	3,241	
	SOLAR NOON + 1 hr._ 13:17 (LOCAL TIME)	0	2550	691	3,241	
	SOLAR NOON + 2 hr._ 14:17 (LOCAL TIME)	1383	2314	20	3,241	
	SUNSET-1.5 hr._ 15:15 (LOCAL TIME)	1839	2,570	481	3,241	
	Sun Access Factor and As(ave) ***			513	3,241	0.16

2.1.3.2 Sun Access factor on Proposed Public Park excluding the Surrounding Future developments on December 21.

Table 7; June 21; Sun access factor excluding the surrounding Development

	Proposed Development Shadow (m ²)	At ** (m ²)	As Existing building & Proposed development	As/ At Existing building & Proposed development
SUNRISE+1.5 hr_ 09:19 AM (LOCAL TIME)	1,448	3,241	1,793	
SOLAR NOON - 2 hr_ 10:17 (LOCAL TIME)	2,866	3,241	375	
SOLAR NOON - 1 hr_ 11:17 (LOCAL TIME)	3,180	3,241	61	
SOLAR NOON _ 12:17 (LOCAL TIME)	3,068	3,241	173	
SOLAR NOON + 1 hr_ 13:17 (LOCAL TIME)	2550	3,241	691	
SOLAR NOON + 2 hr_ 14:17 (LOCAL TIME)	2314	3,241	927	
SUNSET-1.5 hr_ 15:15 (LOCAL TIME)	2,570	3,241	671	
Sun Access Factor and As(ave) ***		3,241	670	0.21

2.2 Communal Outdoor Amenity Areas

Communal Outdoor Amenity Areas Include Children's Play area, Tot lots, and Park Feature, Such as Sandboxes, wading Pools, etc, and Outdoor Amenity areas used by Seniors which have not been located in this stage but Items 2.1.2 and 2.1.3 have captured the requirement for this section in the Public park.

2.3 Residential private outdoor Amenity Spaces.

"STANDARD FOR SHADOW STUDIES" dated June 2014 by City of Mississauga, Planning and building departments defines a criteria for no more than 2 consecutive hourly set times shadow on these space.

This Criteria has been reviewed through a visual inspection, on set times on the area below:



There are a few areas (Mostly north east of the project) in some time set that the proposed development are not meeting the requirement.

2.4 Public Realm

2.4.1 Angular Planes to Protect Opposite Boulevards & Sidewalks,

- a) Angular plane from the closest edge of the opposite curb on the north side of Future road A (Armdale Rd.)

The Proposed Development doesn't meet the required Full Sunlight on the Opposite boulevard on Armdale Rd. including the sidewalk based on the Angular plane 48.9 degrees (Criteria 3b: High density residential street parallel to Eglinton Ave.

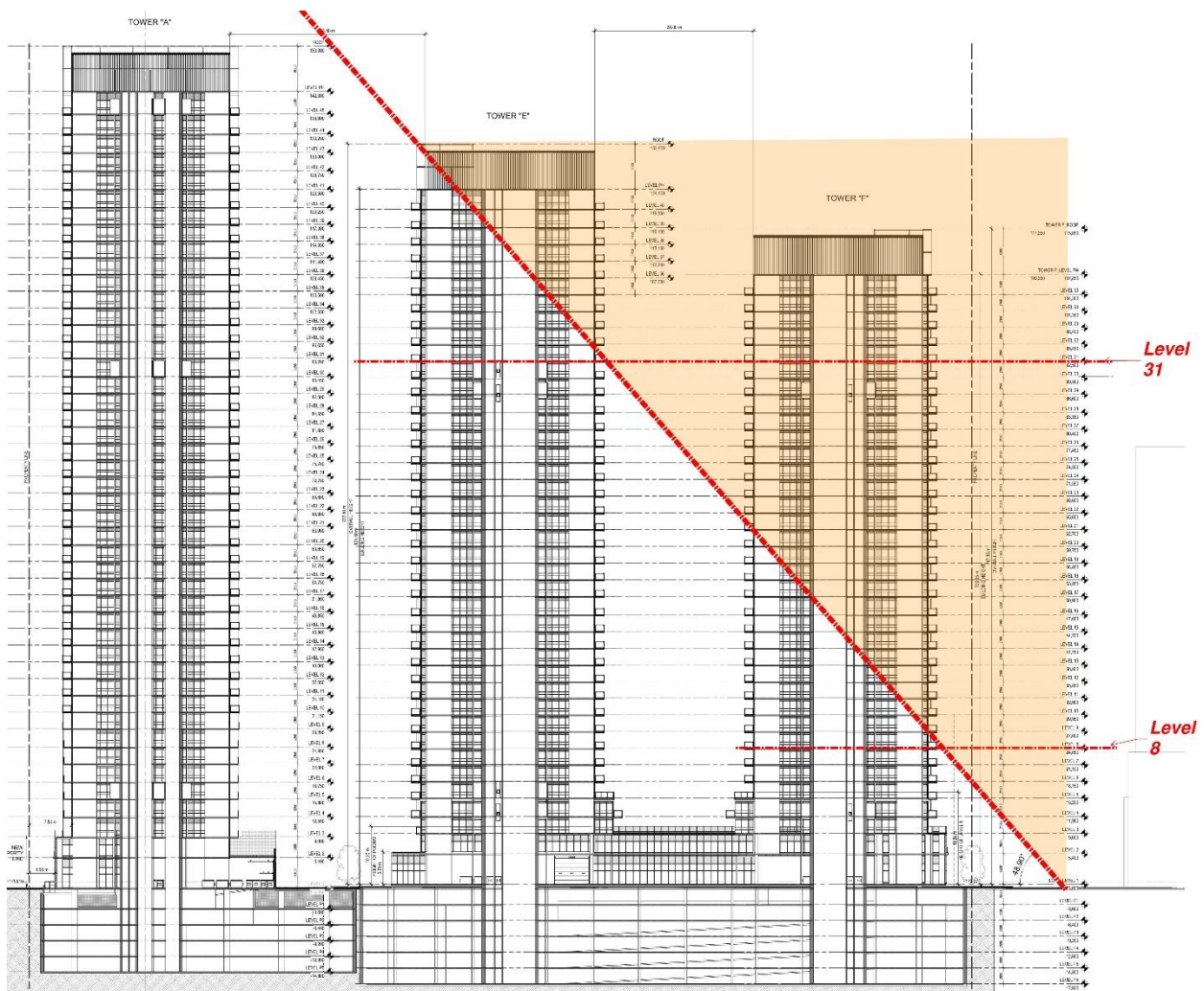


Figure 1- Section through lot 1 and 3, Towers A, E, and F, refer to RZ-20 for Section Details

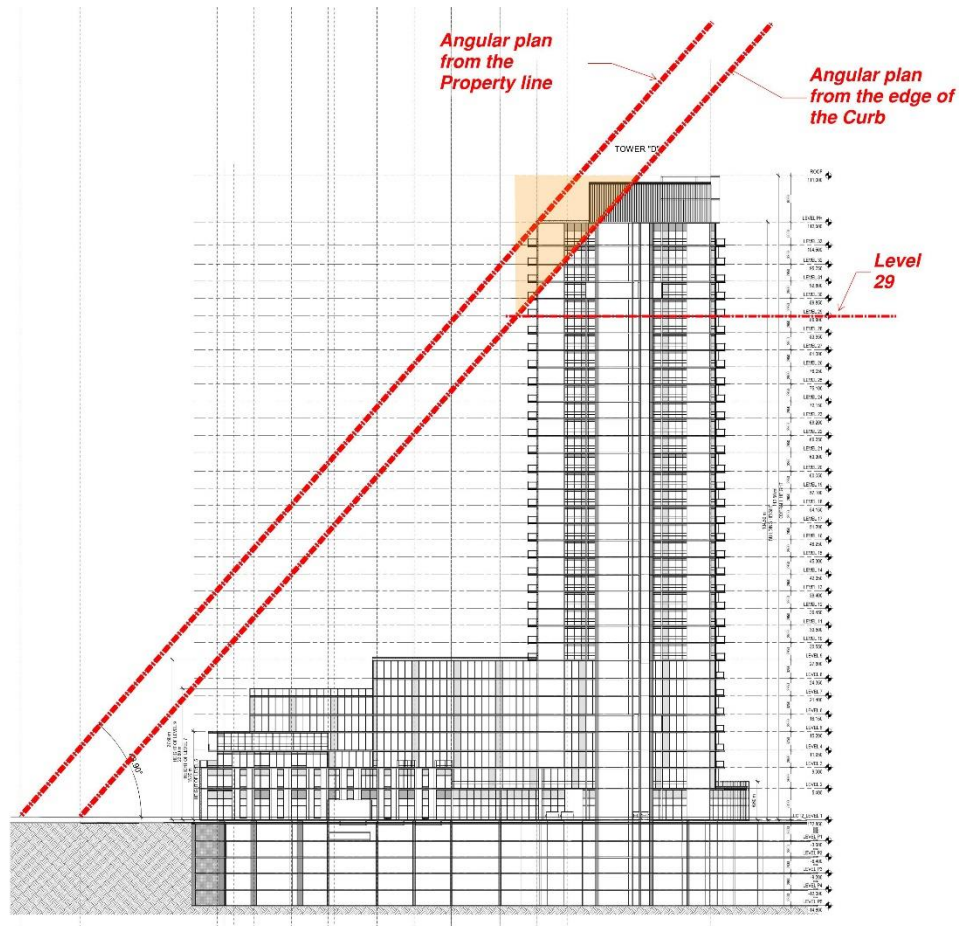


Figure 2- Section through lot 2, Towers DF, refer to RZ-19 for Section Details

3 Conclusion

3.1 Public Park and Communal Outdoor Amenity areas.

Sun Access factors for the proposed development at 91 Eglinton Ave E are as below:

Sun Access Factor	Proposed development excluding Surrounding area development	Proposed Development + Surrounding area development (long term Overall)	Surrounding area development excluding this project	City required Sun Access factor for Public Park
September/ March 21	0.42	0.23	0.72	0.50
June 21	0.64	0.43	0.79	Not Applicable for Public park 0.50 for communal outdoor Amenity Areas
December 21	0.21	0.16	0.86	

The sun access factor of the proposed subject land development creates a factor of 42%; meaning 42% of the time during available daylight the proposed public park will receive direct sunlight during equinoxes from shadows of the subject land development ONLY. When factor in overall surrounding area developments in conjunction with the proposed subject land development, the sun access factor is reduced to 23%.

In conclusion, while slightly below city guideline, the sun access factor created from the subject land development alone is within the acceptable range in our opinion, while we have no control of the shadows created from the surrounding area developments which contributes to a significant reduction of the overall sun shadow factor.

3.2 Angular Planes to Protect Opposite Boulevards & Sidewalks

The Proposed Development has been analyzed for the required Full Sunlight on the Opposite boulevard on Armdale Rd. including the sidewalk based on the Angular plane 48.9 degrees (Criteria 3b: High density residential street parallel to Eglinton Ave.)

The Proposed Development in Lot 3, **Tower E below 31 storeys** and **Tower F below than 8 storeys** are meeting the Angular plane recommended by City of Mississauga. In Lot 2 **Tower D below than 29 Storeys** are meeting the recommended Angular plane. No angular plane is considered for Future Street Thornwood Dr. as it is completely inside the primary property lines.

3.3 Residential private outdoor Amenity Spaces.

This Criteria has been reviewed through a visual inspection, on set times; except a few areas in north and east community which the overall shadow impact is more than two consecutive hourly test times; the proposed development are meeting the requirement. Other future developments are affecting the overall shadow impact.

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