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KNYMH
ARCHITECTURE • SOLUTIONS

SHADOW IMPACT ANALYSIS

PROPOSED DEVELOPMENT
1177-1187 West 5th Street
Hamilton, Ontario

KNYMH FILE # 19002

Prepared by:
KNYMH INC.

March 10, 2023

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DOCUMENT REVISION HISTORY:

Version	Revision Date	Revision Summary	Tracking
1.0	2022.05.24	ISSUED: Initial draft report	0524.247
2.0	2022.06.02	EDIT: City-Wide Corridor Planning Principles and Design guidelines included in report	0524.247
3.0	2023.03.10	EDIT: Massing update for proposed building. Revision includes Figures 2.1-1 through 4.2-10. EDIT: Max. building height noted in Section 2.0 updated	0524.247

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SHADOW IMPACT ANALYSIS

PROPOSED DEVELOPMENT

1177-1187 West 5th Street
Hamilton, Ontario

1.0 PURPOSE:

The purpose of this report is to analyse the shadow impact of a proposed development upon the adjacent properties, streets, and public spaces at the above noted location. We will discuss and comment upon the shadow impact associated with the height and massing of the proposed development upon the adjacent properties using a computer generated model for analysis of the proposed ten (10) storey building with a flat roof and a rooftop mechanical room which includes the rooftop building service equipment.

We have provided graphics along with a Site Plan and Satellite imagery of the surrounding area.

The property is located in Hamilton Ontario, on the north of the intersection between West 5th Street and Rymal Road.

2.0 DESCRIPTION OF THE SITE AND NEIGHBOURING PROPERTIES:

The Subject Property: (Figure 2.1-1)

The subject property is a combination of three (3) lots; #1177, #1183 & #1187 West 5th Street. All lots except for #1187 are currently occupied by 2-3 storey buildings. The existing buildings will be removed as part of the scope in the proposed development. The subject lot area is approx. 0.0512 hectares.

The proposed development labelled as building 'A' consists of one (1) building upon the subject lands. The proposed development features a ten (10) storey building with two-hundred fifteen (215) residential units.

The 'as of right' massing is represented as building 'B'. Considering the subject lands encompasses two (2) zones, the massing of building 'B' reflects the following zoning restrictions Townhouse - Maisonette (RT-20) for #1187 West 5th St. and Agricultural (AA) for #1177 & #1183 West 5th St.

	'As of Right'	**Proposed Development**
Max. building height :	11m (RT-20 & AA)	33.36m
Min. setback from street line :	6m (RT-20)	14m
Min. front yard setback :	12m (AA)	3.3m
Min. interior side yard setback :	4.5m (AA), 6m (RT-20)	6m (RT-20), 20.9m (AA)
Min. rear yard setback :	10.5m (AA), 6m (RT-20)	7.4m

The subject lands and neighbouring parcels generally appear to be uniform in grade. For the purpose of this analysis the proposed development and adjacent properties are represented at the same elevation.

Neighbouring properties include:

2.1) TO THE EAST (Study Area 1): The property abuts commercial property at #1508 Rymal Road West featuring 2-3 storey buildings with parking allocated adjacent to the property boundary of the subject lands.

2.2) TO THE NORTH and NORTHEAST (Study Area 2): The property abuts residential properties consisting of three (3) storey townhouse buildings with frontage along West 5th Street and Sonoma Valley Crescent.

2.3) TO THE WEST and NORTHWEST (Study Area 3): The property abuts West 5th Street which features a pedestrian sidewalk on the east side. Immediately across West 5th Street is vacant land zoned as Small Lot Single Family Dwelling (R4/S). North of the vacant lot are residential properties featuring single two (2) storey detached dwellings with frontage along West 5th Street.

2.4) TO THE SOUTH (Study Area 4): The property abuts commercial property at #1550 Rymal Road West featuring 2-3 storey buildings with parking allocated adjacent to the property boundary of the subject lands.

SITE CONTEXT MAP

Latitude: 43.206386 N
Longitude: 79.896129 W

N

3.0 METHOD OF ANALYSIS:

The method of analysis will consist of a discussion of the shadow impact the proposed development will have on the adjacent properties and the public realm. The summary is within Section 6.0.

The graphic analysis which we present within this report is developed using a computer generated modelling program in conjunction with satellite imagery and survey information with the assessment criteria specified in the following documents:

A. Terms of Reference: Shadow Impact Study for Downtown Hamilton [Appendix 'F' to Report PED18074] developed by the City of Hamilton; and
B. Section 4.12 Shadow Impacts: City-Wide Corridor Planning Principles and Design Guidelines [April 2012] developed by the City of Hamilton

North Orientation: The software uses imagery from Google Maps which is aligned with True North using a variant of the original Mercator projection that is oriented along the Earth's polar axis, and the massing model is centred upon the UTM Grid North at the latitude and longitude specified.

Geographic Coordinates: 43.206386 N, 79.896129 W
Standard Time: UTC -5:00
Daylight Savings Time: UTC -4:00
Test Dates: March 21 and September 21
Test Times: Hourly intervals starting 1.5 hours after sunrise and ending 1.5 hours before sunset.

Date / Time	Sunrise	Sunrise (+1.5)	Sunset	Sunset (-1.5)
Mar 21 (UTC -4:00)	7:20 am	8:50 am	7:33 pm	6:03 pm
September 21 (UTC -4:00)	7:06 am	8:36 am	7:17 pm	5:47 pm

3.1 ASSESSMENT CRITERIA (A) Terms of Reference: Shadow Impact

Impact Analysis (Public / Private Realm - Amenity): Shadows from proposed development shall allow for a minimum of 3 hours of sun coverage between 10:00 a.m. and 4:00 p.m. as measured from March 21st to September 21st on public sidewalks and public and private outdoor amenity space such as patios, sitting areas, and other similar programs.

Impact Analysis (Public Realm): Shadows from the proposed development shall allow for a minimum of 50% sun coverage at all times of the day as measured from March 21st to September 21st on public plazas, parks and open spaces, school yards, and playgrounds.

3.2 ASSESSMENT CRITERIA (B) City-Wide Corridor Planning Principles

Impact Analysis (Public / Private Realm - Amenity): Adjacent properties, adjacent public spaces and the public sidewalk on one side of the street should receive a minimum of 5 hours of sunlight throughout the day measured on March 21st.

4.0 SHADOW IMPACT ANALYSIS OF THE PROPOSED DEVELOPMENT

4.1 SUN/SHADOW STUDY: (SEPTEMBER 21 • Figure 4.1-1 through 4.1-10)

A summary of the September 21 shadow effect of the proposal upon the surrounding area. This commentary will discuss the impact of the proposed mixed use building's shadows upon properties at the north, east and southeast side of the subject property. The impact is studied at the specific time period and assessment criteria noted in Section 3 of this document of the proposed development in addition to an 'as of right' comparative mass permitted by the Zoning by-law for the subject land.

It should be noted that the Fall are "moderate" in terms of shadow length and duration relative to annual shadows. The times for this period are under Eastern Daylight Time. (UTC -4:00)

4.1A 9:30am September 21 (Figure 4.1-1 – 4.1-4)

From 9:30am, the sun in spring rotates approximately 184-degrees from east to west in 12-hours. It is low in the sky rising to approximately 25-degrees at this time of day.

Study Area (3) Impact

- Morning shadow falls upon the vacant land between #1172 & #1204 West 5th St.
- Impact to pedestrian sidewalk on east side along West 5th Street.

Comparative 'As of Right' Example

- The as of right example shows a similar impact to the vacant land between #1172 & #1204 West 5th St., shadow clears vacant land by 9:36am.
- Impact to pedestrian sidewalk on east side along West 5th Street, shadow clears sidewalk by 10:36am.

4.1B 12:30pm September 21 (Figure 4.1-5 – 4.1.-7)

At 12:30pm, the sun in spring is approximately 46-degrees in the sky and originates from near-south.

Study Area (3) Impact

- Shadow falls upon the vacant land between #1172 & #1204 West 5th St., shadow clears vacant land by 12:36pm.
- Impact to pedestrian sidewalk on east side along West 5th Street, shadow clears sidewalk by 1:36pm.

Comparative 'As of Right' Example

- The shadow falls upon the subject lands, no impact observed.

Study Area (2) Impact

- The shadow falls upon the subject lands, no impact observed.

Comparative 'As of Right' Example

- The shadow falls upon the subject land and extends north impacting the properties at #1175 West 5th St. & #39 Sonoma Valley Crescent starting at 12:36pm.

4.1C 3:30pm September 21 (Figure 4.1-8 – 4.1-10)

At 3:30pm, the sun in spring is past its peak. It is approximately 37-degrees above the horizon and the shadows are still relatively short at this time of day.

Study Area (2) Impact

- The shadow falls upon the subject land and extends north impacting the properties at #1175 West 5th St. & #39 Sonoma Valley Crescent starting at 3:36pm. Shadow clears residential property at #1175 West 5th St. at 5:36pm,

Comparative 'As of Right' Example

- The shadow falls upon the subject land and extends north impacting the properties at #1175 West 5th St. & #39 Sonoma Valley Crescent to end of test period.

Study Area (1) Impact

- Shadow falls upon the commercial property at #1508 Rymal Road West starting at 3:36pm to end of test period.

Comparative 'As of Right' Example

- The as of right example shows a similar impact to the commercial property at #1508 Rymal Road West starting at 4:36pm to end of test period.

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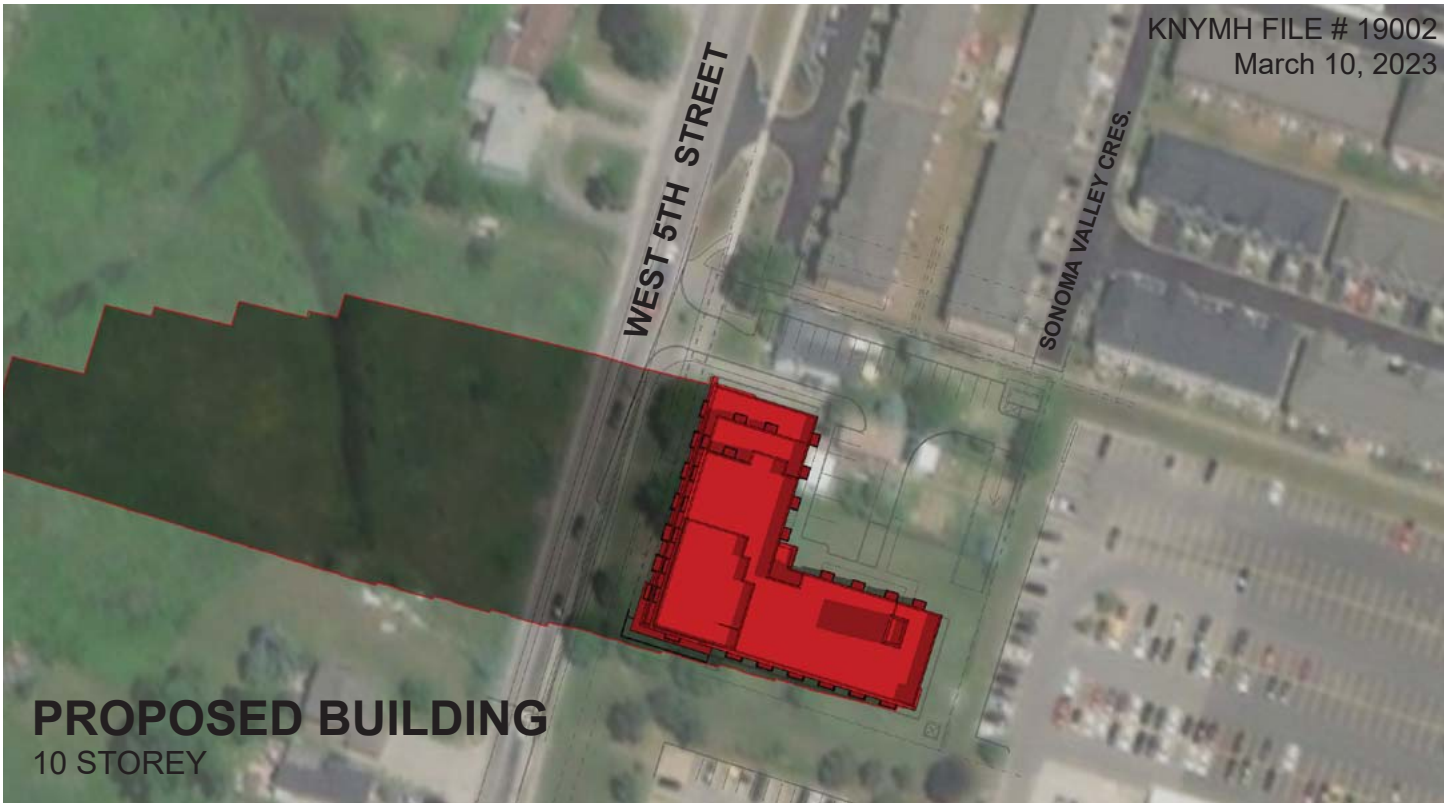
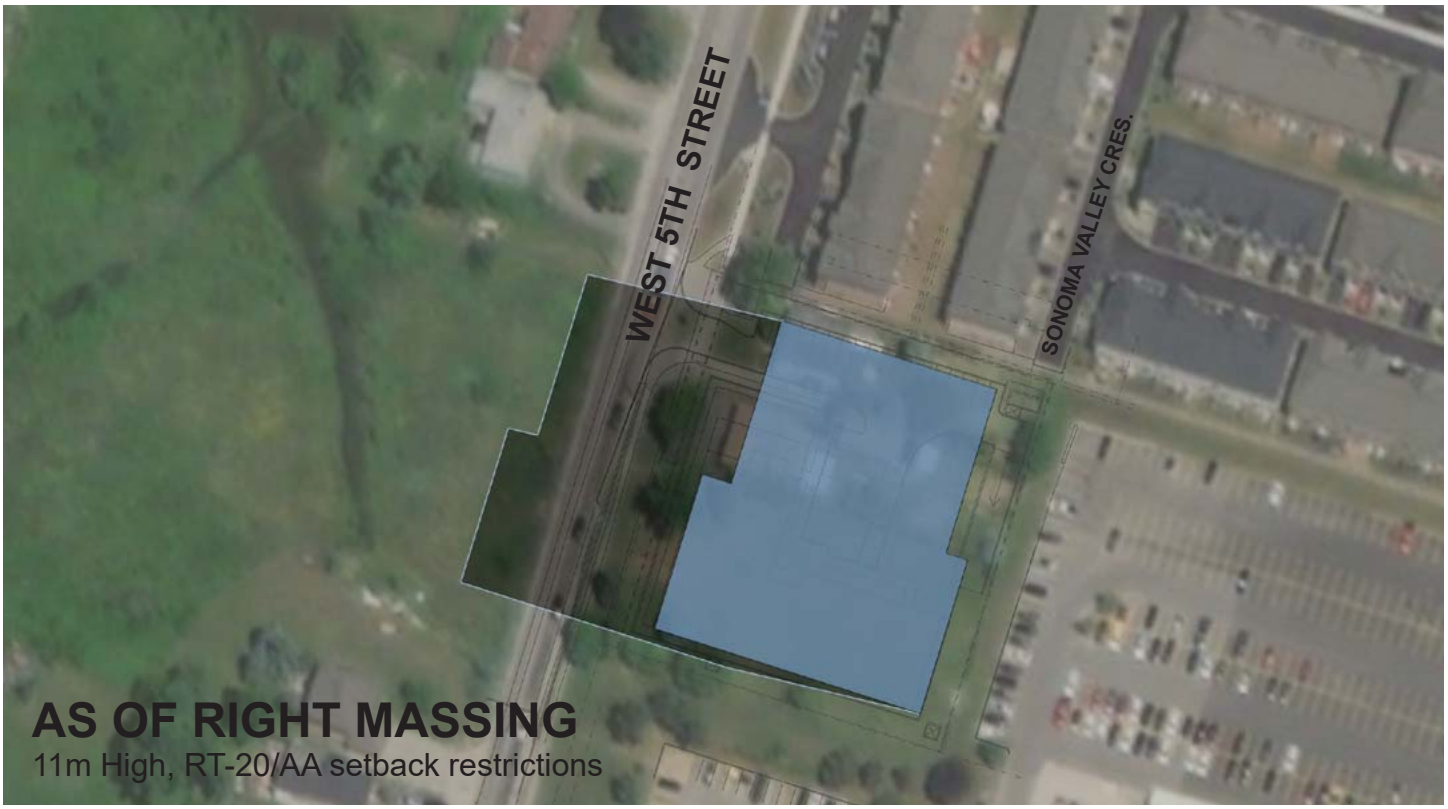
March 10, 2023





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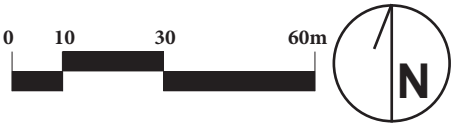
Longitude: 79.896129 W



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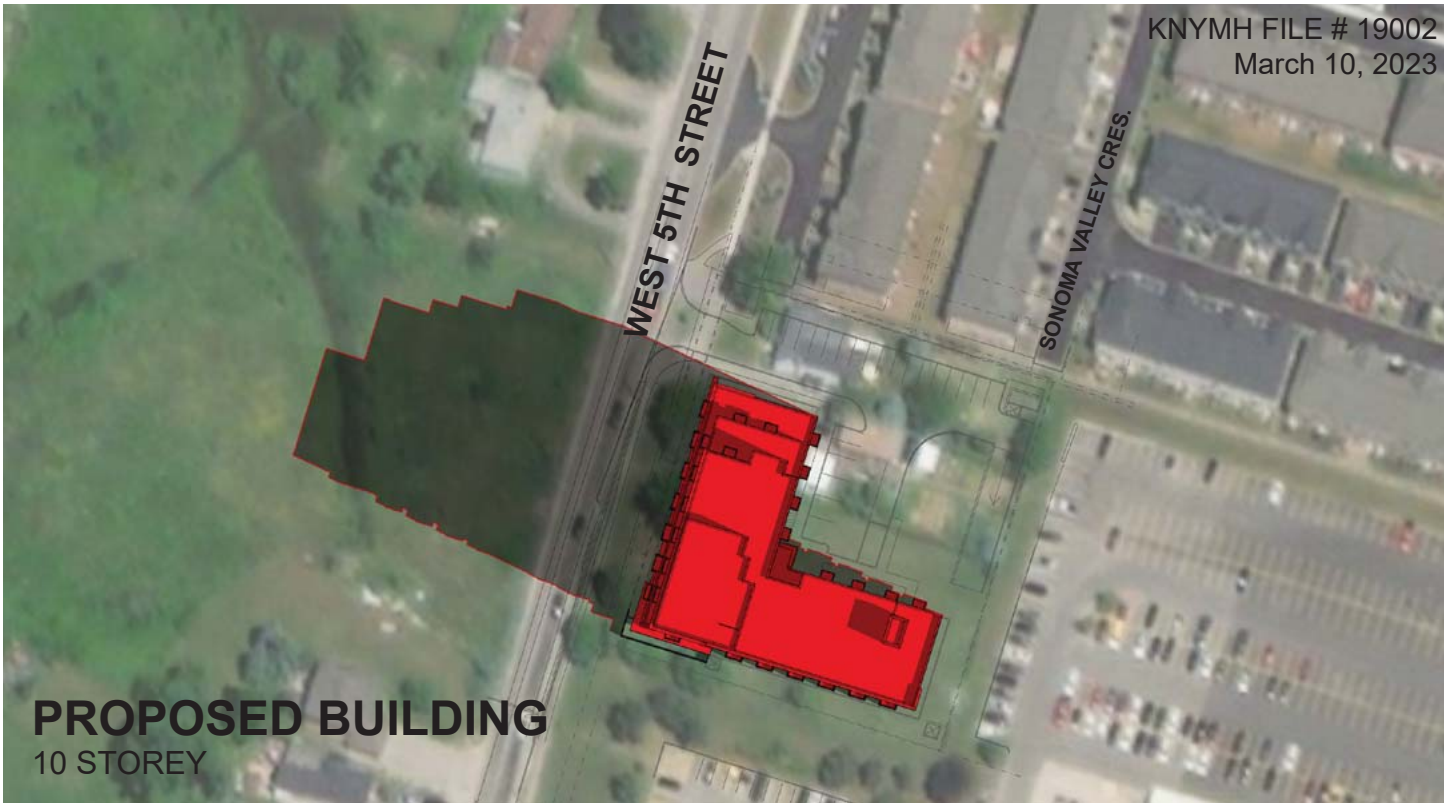
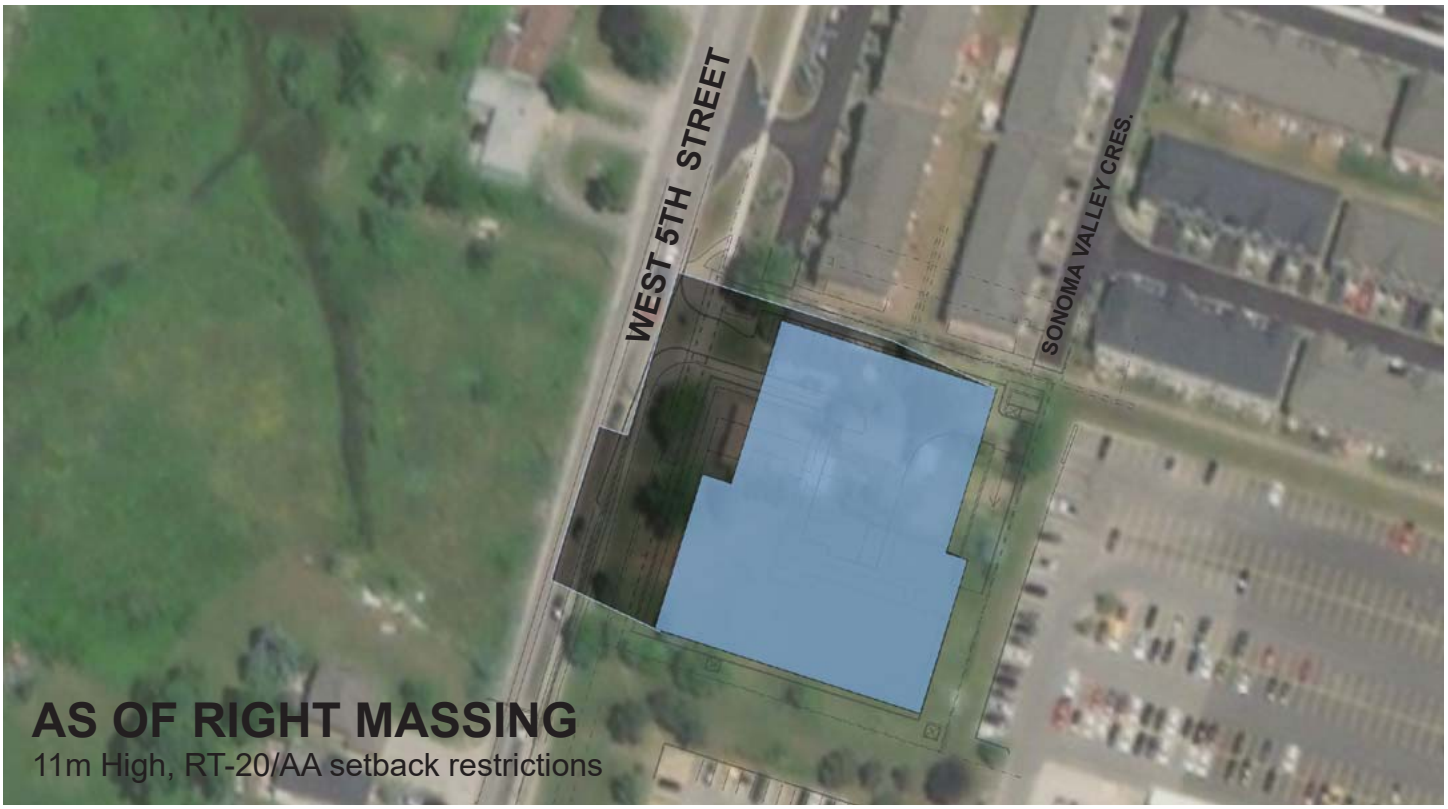
March 10, 2023



PROPOSED BUILDING
10 STOREY



AS OF RIGHT MASSING
11m High, RT-20/AA setback restrictions

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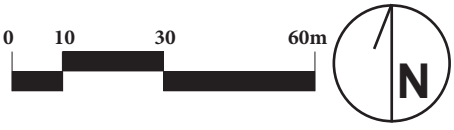

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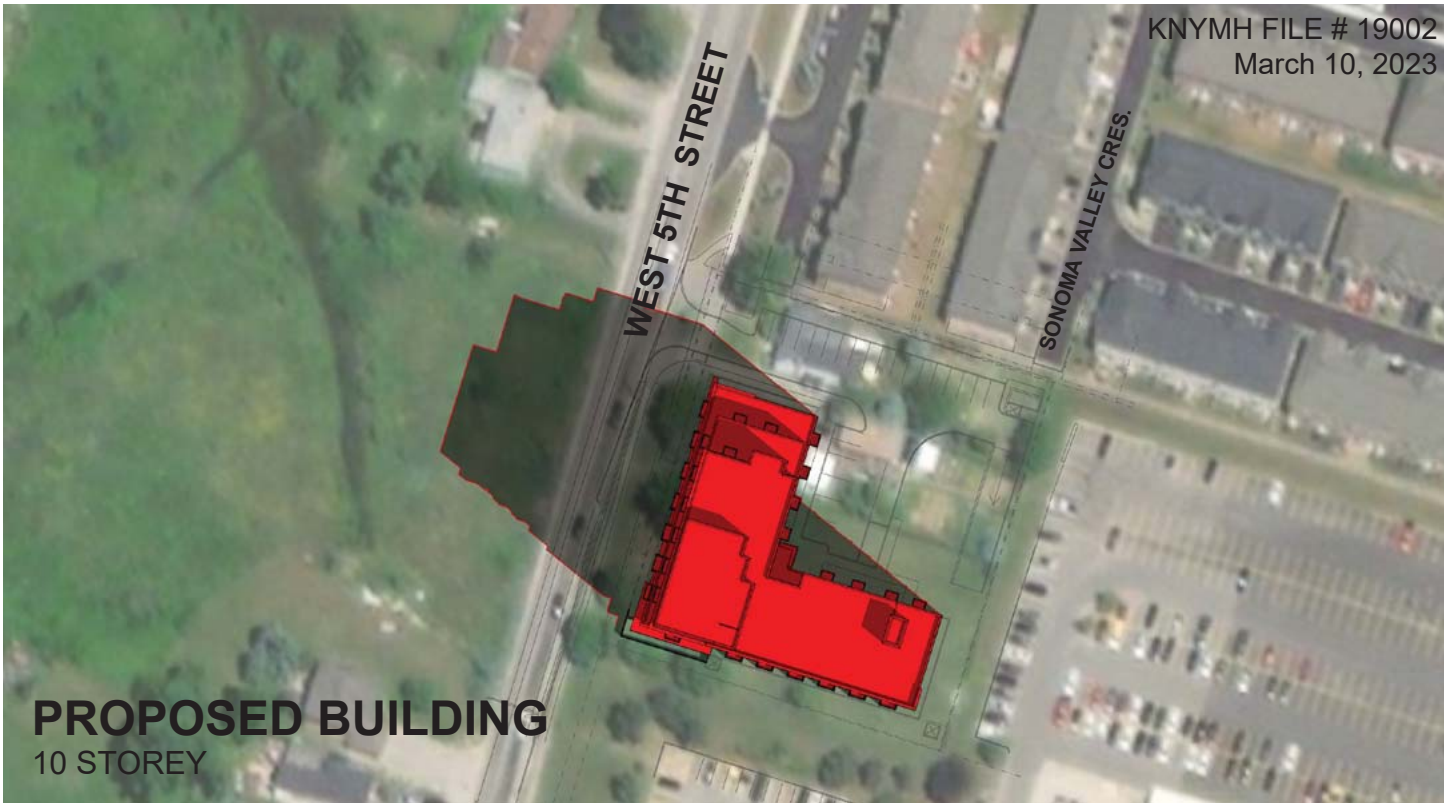

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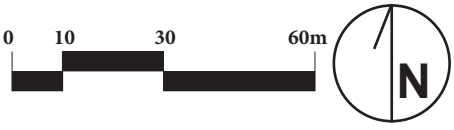

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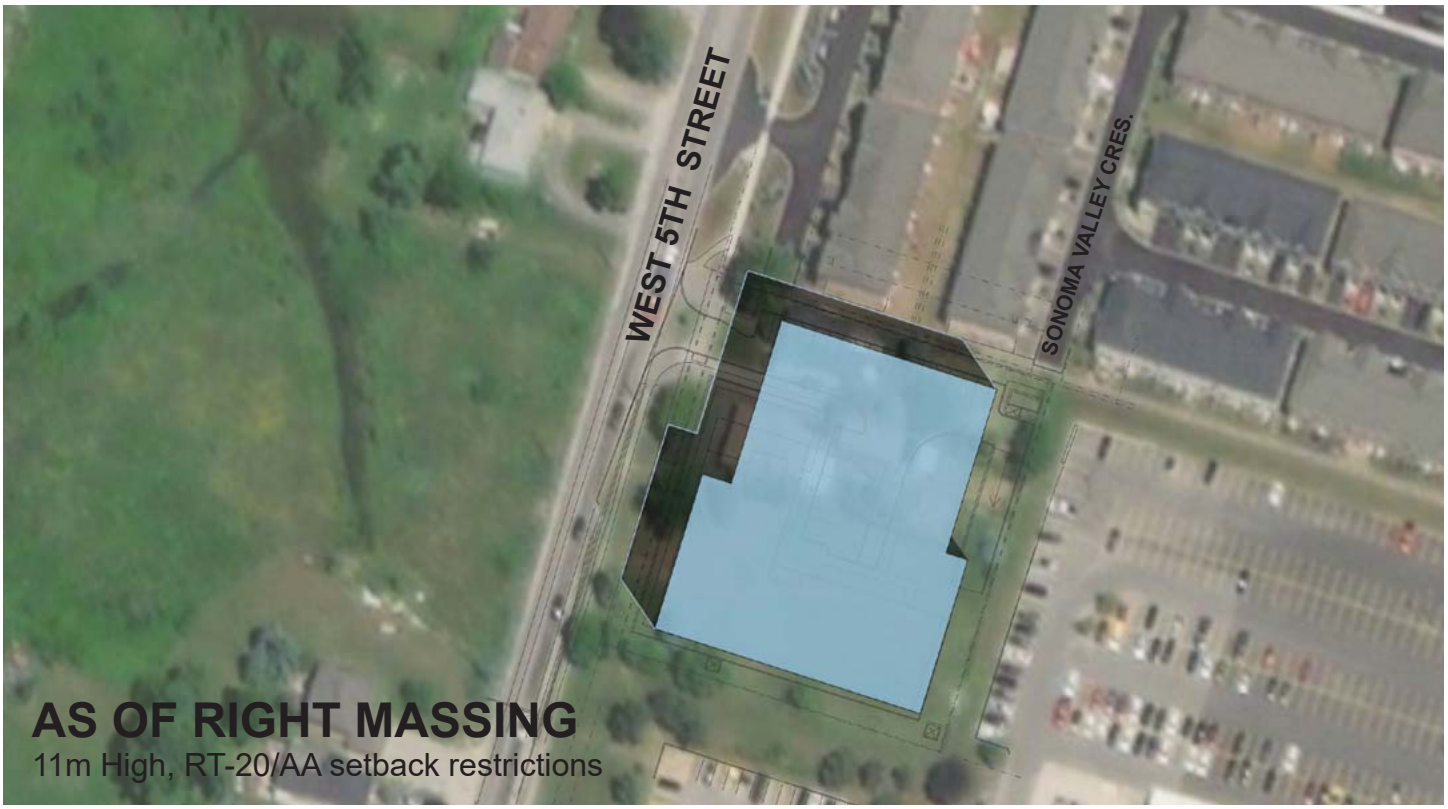

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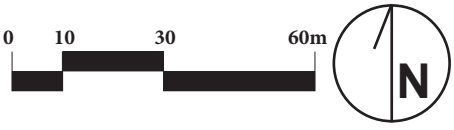

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PROPOSED BUILDING
10 STOREY

AS OF RIGHT MASSING
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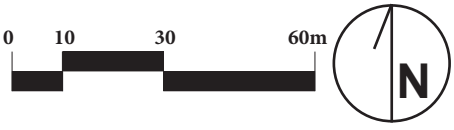

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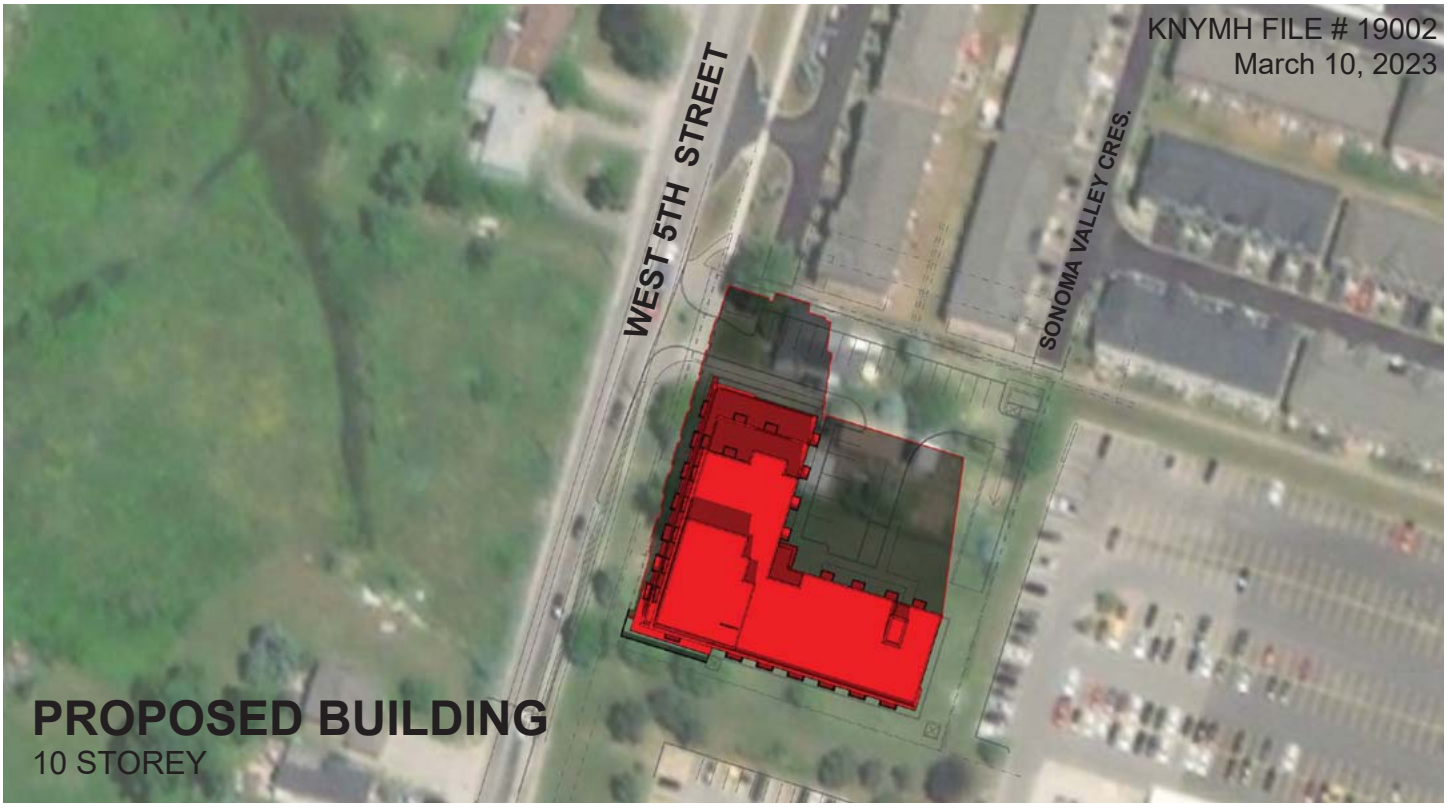

PROPOSED BUILDING
10 STOREY

AS OF RIGHT MASSING
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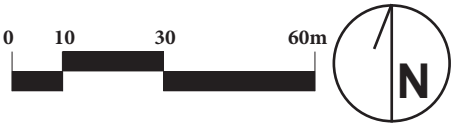

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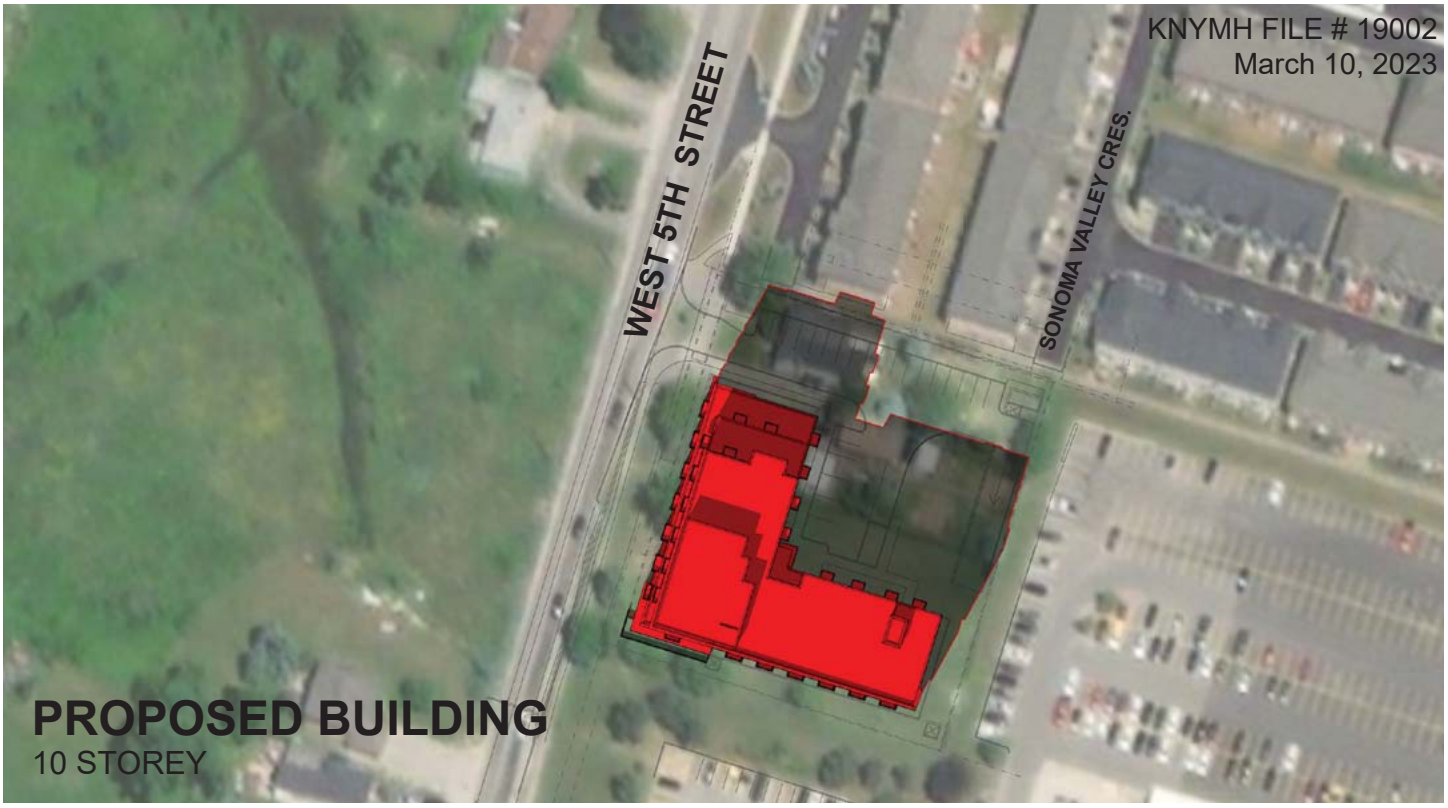

PROPOSED BUILDING
10 STOREY

AS OF RIGHT MASSING
11m High, RT-20/AA setback restrictions

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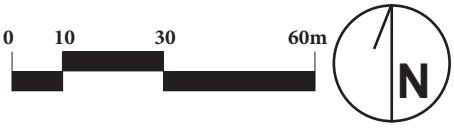

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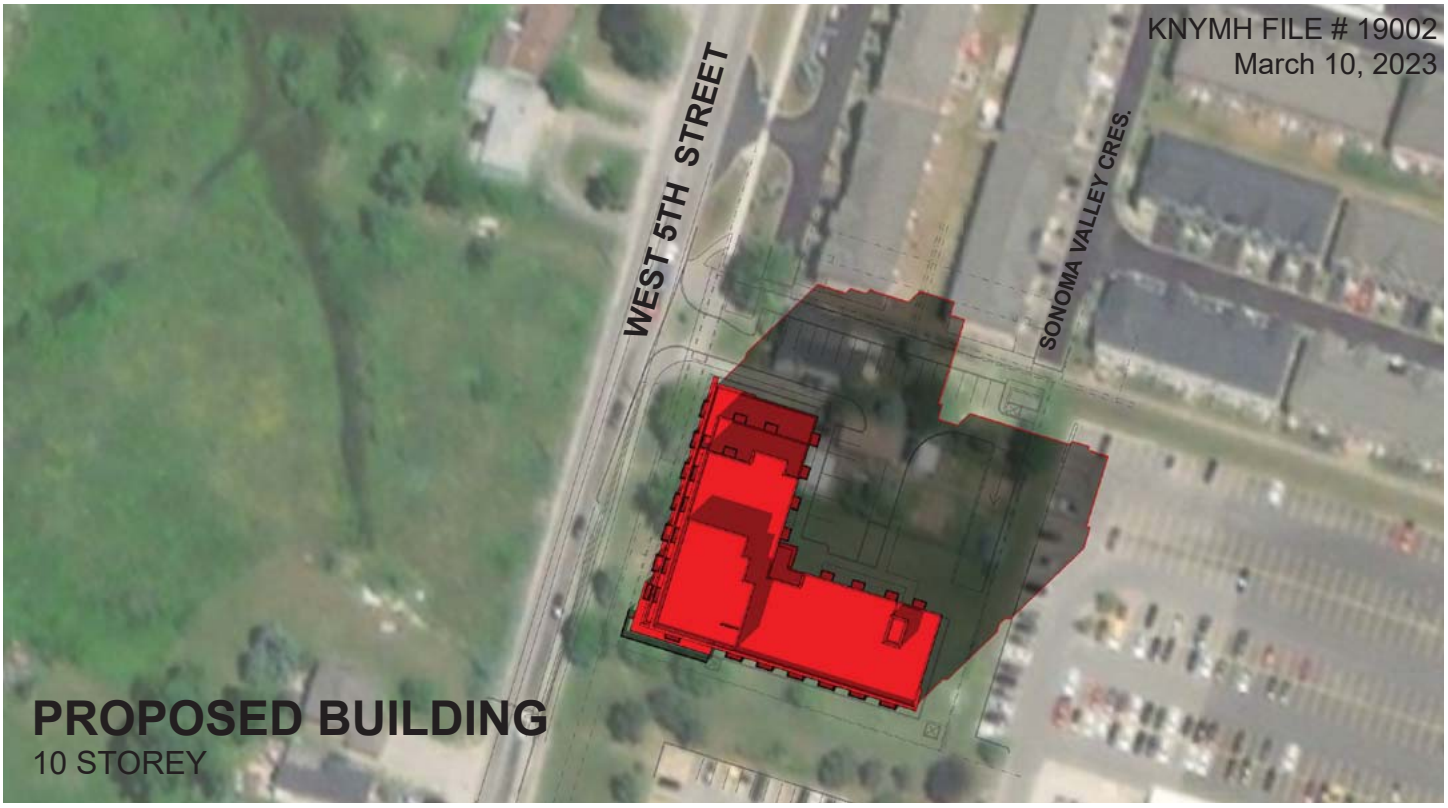

PROPOSED BUILDING
10 STOREY

AS OF RIGHT MASSING
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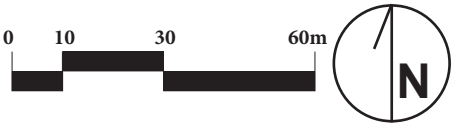

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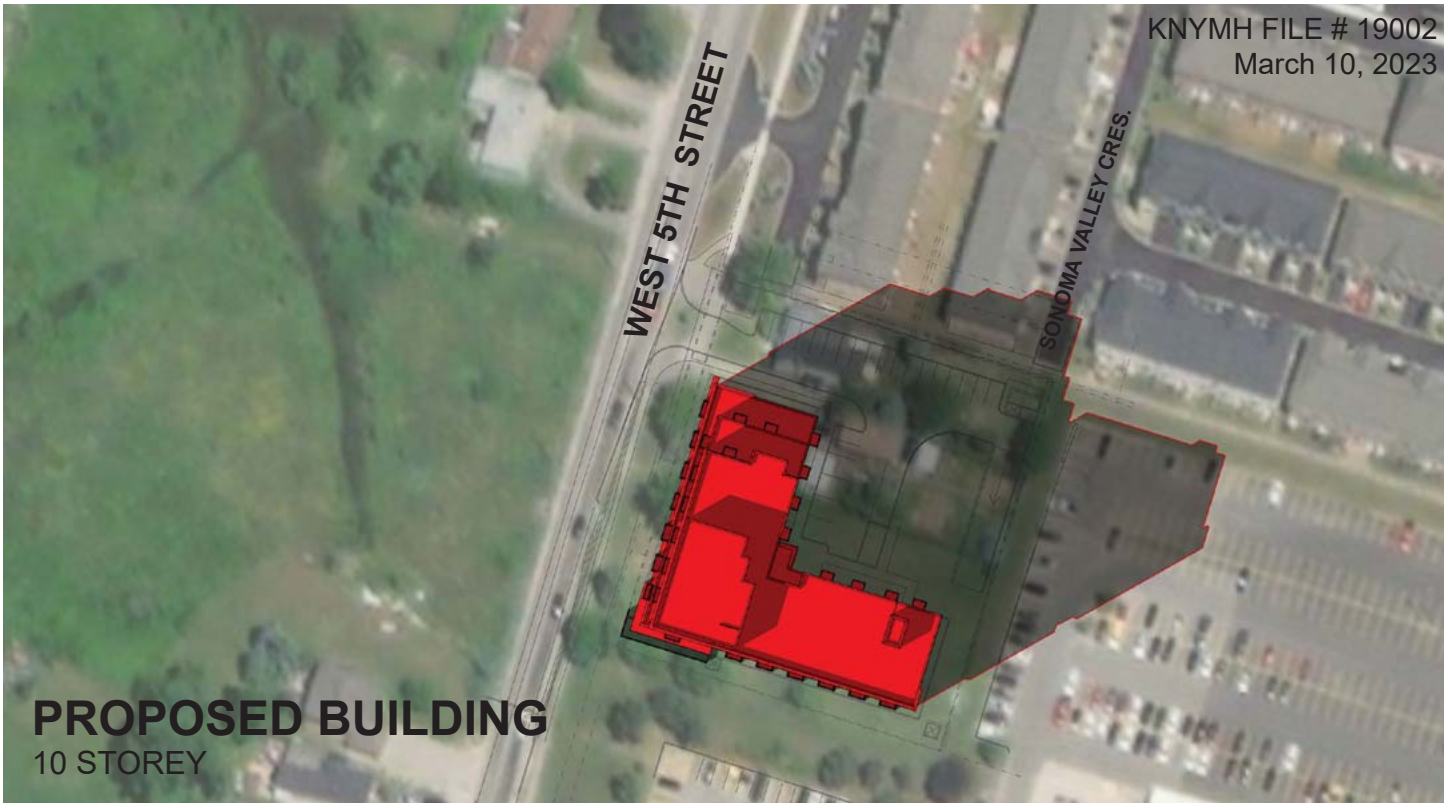

PROPOSED BUILDING
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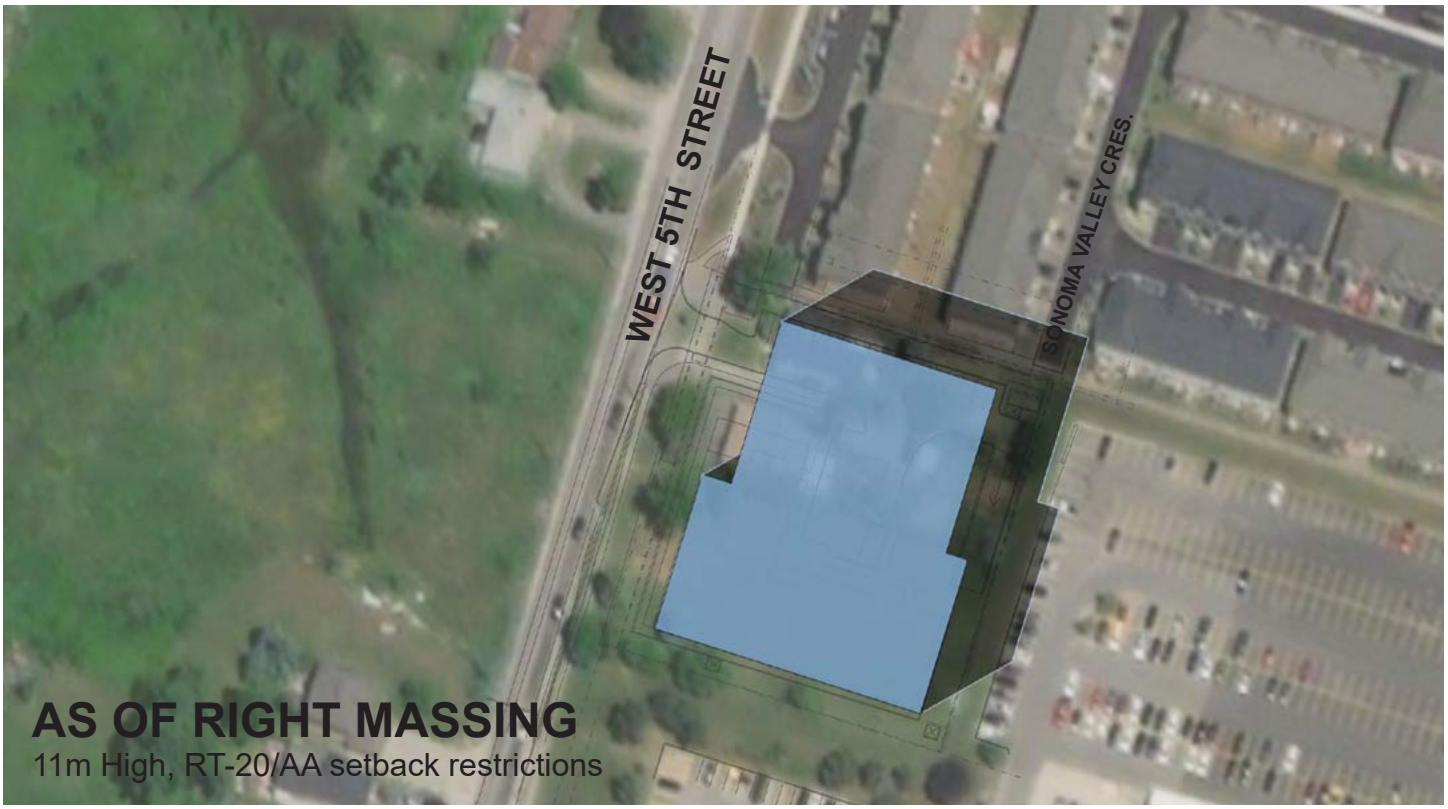

AS OF RIGHT MASSING
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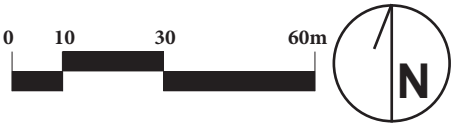

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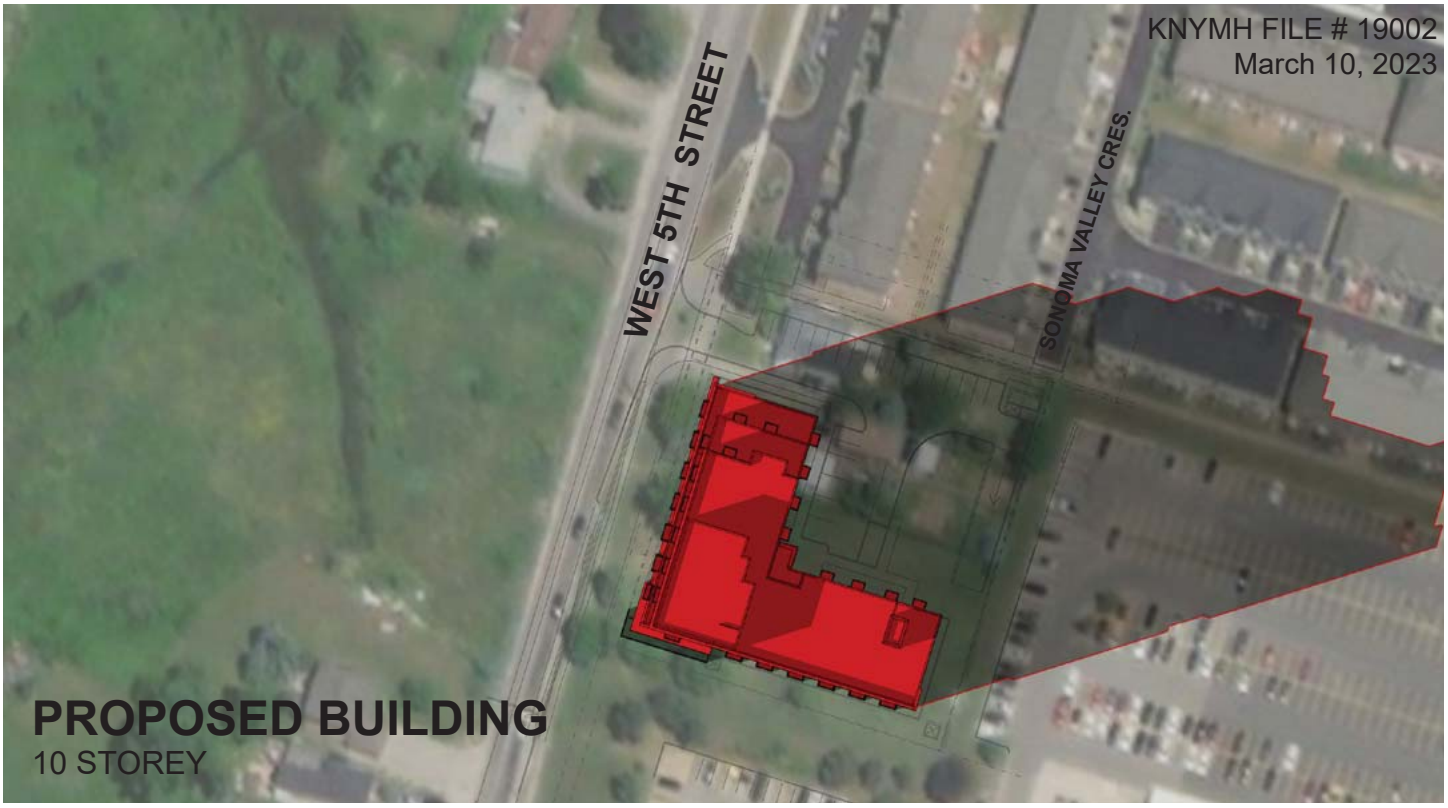

PROPOSED BUILDING
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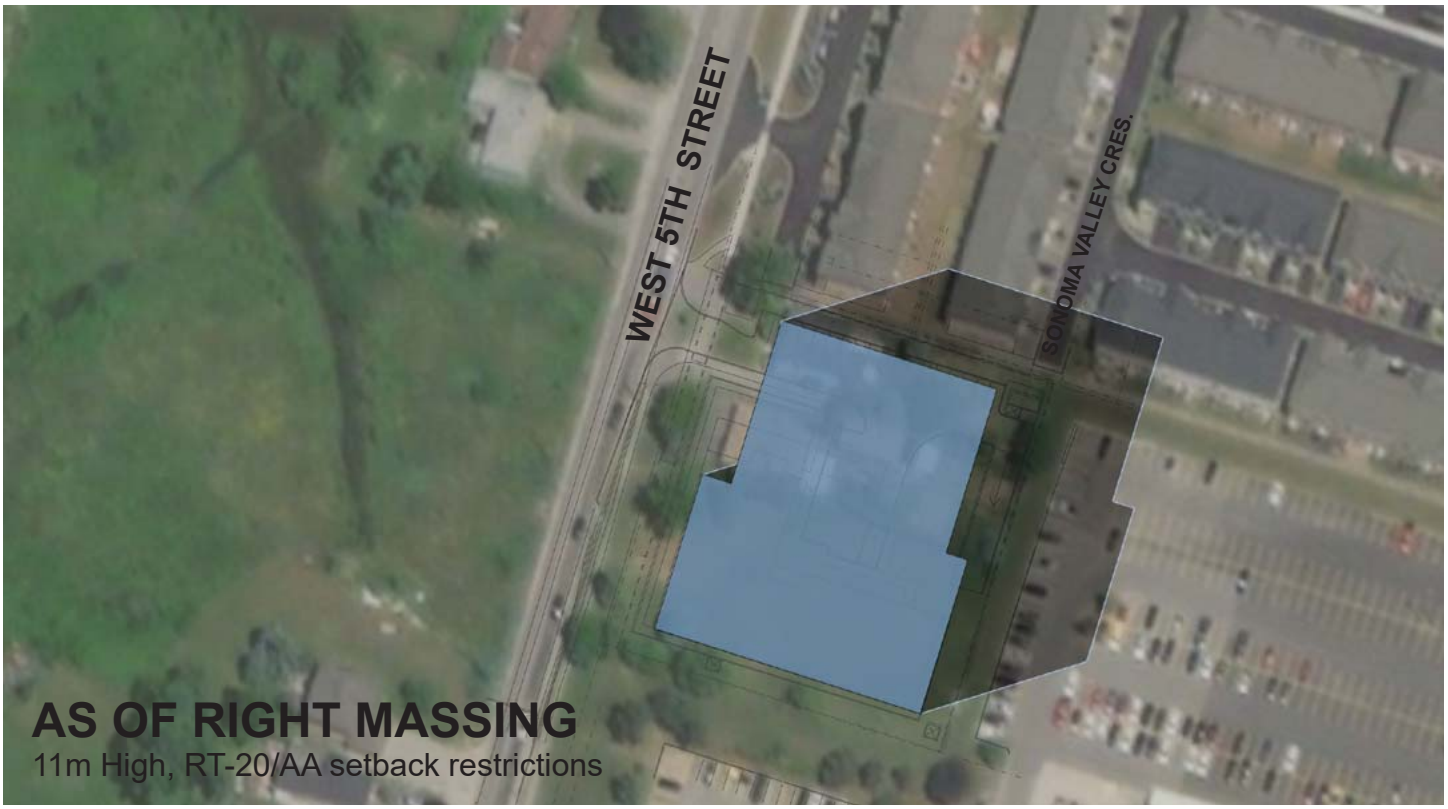

AS OF RIGHT MASSING
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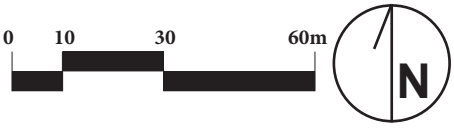

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4.2 SUN/SHADOW STUDY: (MARCH 21 • Figure 4.2-1 to 4.2-10)

A summary of the Spring shadow effect of the proposal upon the surrounding area. This commentary will discuss the impact of the proposed mixed use building's shadows upon properties at the north, east and southeast side of the subject property. The impact is studied at the specific time period and assessment criteria noted in section 3 of this document of the proposed development in addition to an 'as of right' comparative mass permitted by the Zoning by-law for the subject land.

It should be noted that the Spring are "moderate" in terms of shadow length and duration relative to annual shadows. The times for this period are under Eastern Daylight Time. (UTC -4:00)

4.2A 9:30am March 21 (Figure 4.2-1 – 4.2-4)

From 9:30am, the sun in spring rotates approximately 184-degrees from east to west in 12-hours. It is low in the sky rising to approximately 23-degrees at this time of day.

Study Area (3) Impact

- Morning shadow falls upon the vacant land between #1172 & #1204 West 5th St.
- Impact to pedestrian sidewalk on east side along West 5th Street.

Comparative 'As of Right' Example

- The as of right example shows a similar impact to the vacant land between #1172 & #1204 West 5th St., shadow clears vacant land by 9:50am.
- Impact to pedestrian sidewalk on east side along West 5th Street, shadow clears sidewalk by 11:50am.

4.2B 12:30pm March 21 (Figure 4.2-5 – 4.2-7)

At 12:30pm, the sun in spring is approximately 45-degrees in the sky and originates from near-south.

Study Area (3) Impact

- Shadow falls upon the vacant land between #1172 & #1204 West 5th St., shadow clears vacant land by 12:50pm.
- Impact to pedestrian sidewalk on east side along West 5th Street, shadow clears sidewalk by 1:50pm.

Comparative 'As of Right' Example

- The shadow falls upon the subject lands, no impact observed.

Study Area (2) Impact

- The shadow falls upon the subject lands, no impact observed.

Comparative 'As of Right' Example

- The shadow falls upon the subject land and extends north impacting the properties at #1175 West 5th St. & #39 Sonoma Valley Crescent starting at 12:50pm.

4.2C 3:30pm March 21 (Figure 4.2-8 – 4.2-10)

At 3:30pm, the sun in spring is past its peak. It is approximately 39-degrees above the horizon and the shadows are still relatively short at this time of day.

Study Area (2) Impact

- The shadow falls upon the subject land and extends north impacting the properties at #1175 West 5th St. & #39 Sonoma Valley Crescent starting at 3:50pm. Shadow clears residential property at #1175 West 5th St. at 5:50pm,

Comparative 'As of Right' Example

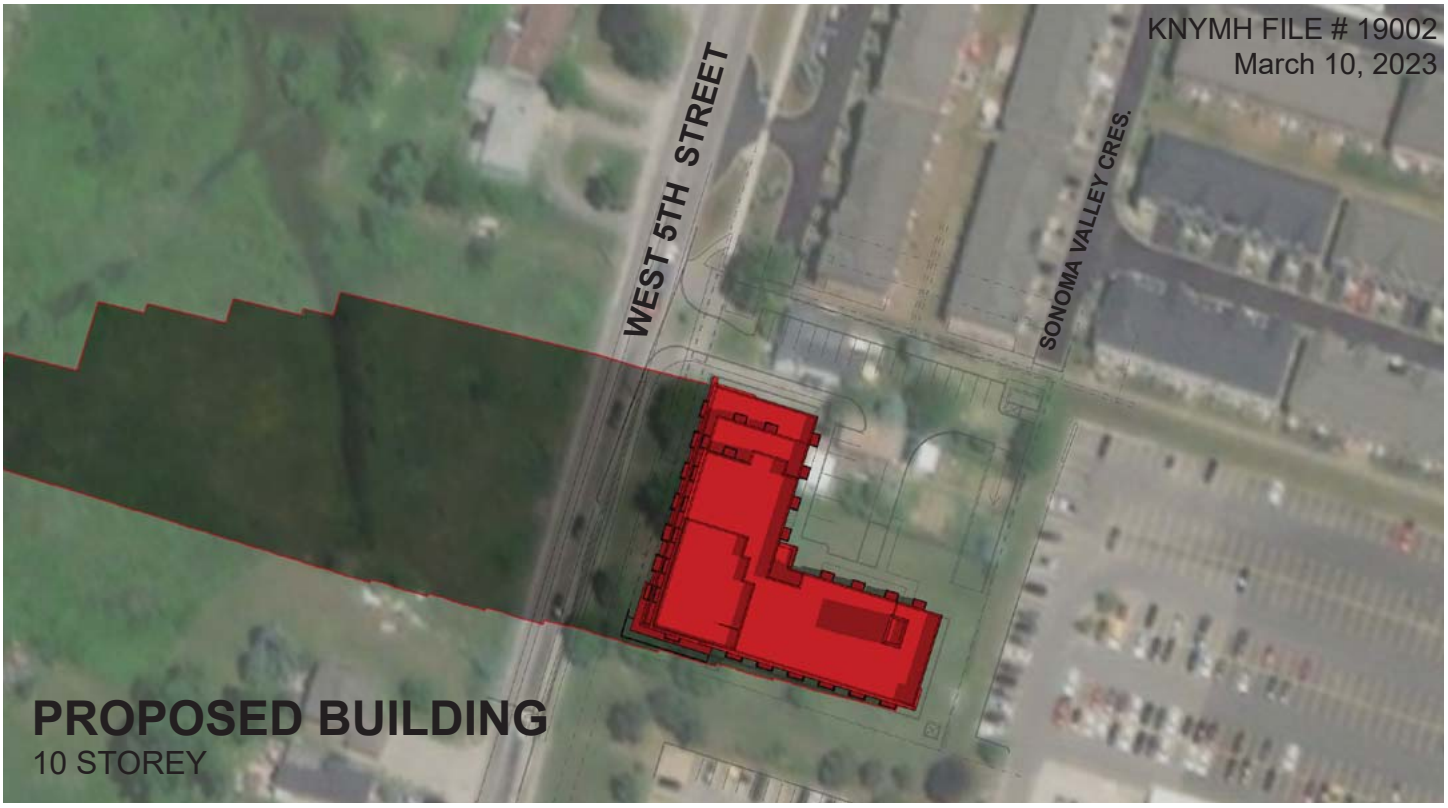
- The shadow falls upon the subject land and extends north impacting the properties at #1175 West 5th St. & #39 Sonoma Valley Crescent to end of test period.

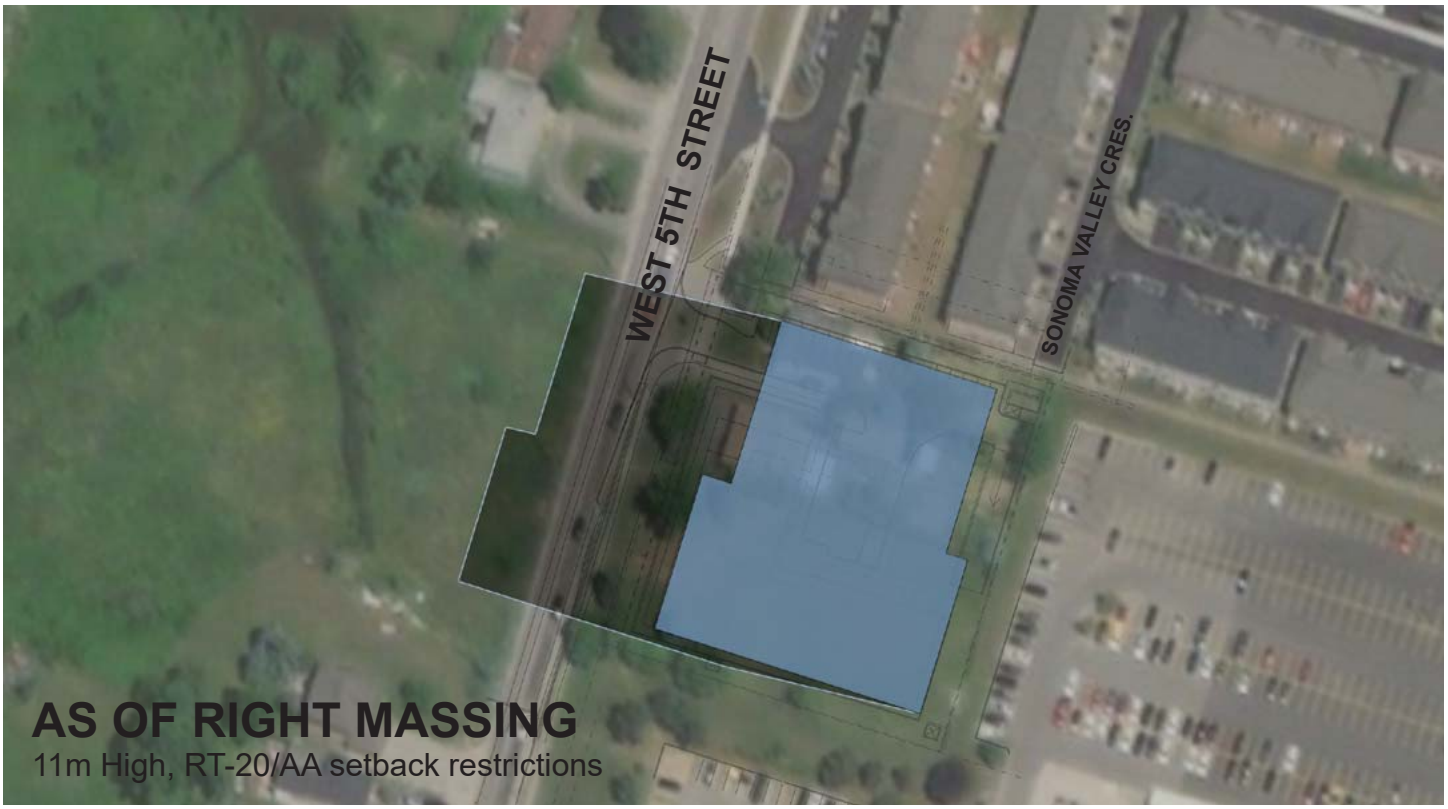
Study Area (1) Impact

- Shadow falls upon the commercial property at #1508 Rymal Road West starting at 3:50pm to end of test period.

Comparative 'As of Right' Example

- The as of right example shows a similar impact to the commercial property at #1508 Rymal Road West starting at 4:50pm to end of test period.





MARCH 21, 8:50AM

UTC: (-04:00)
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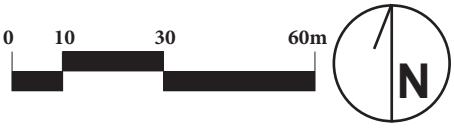
Longitude: 79.896129 W



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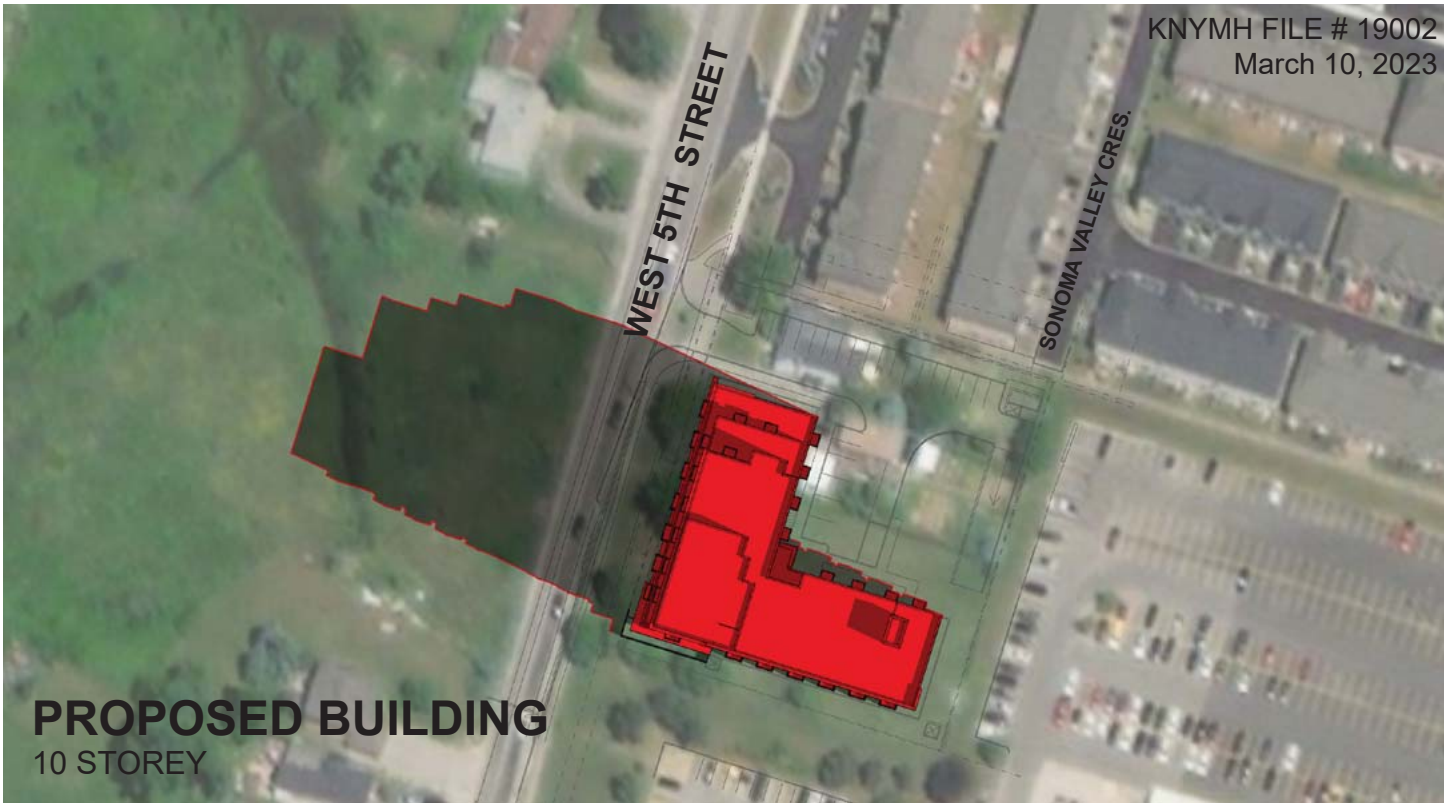
March 10, 2023



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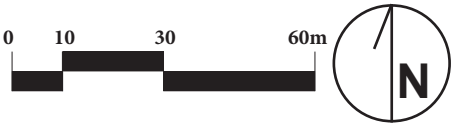

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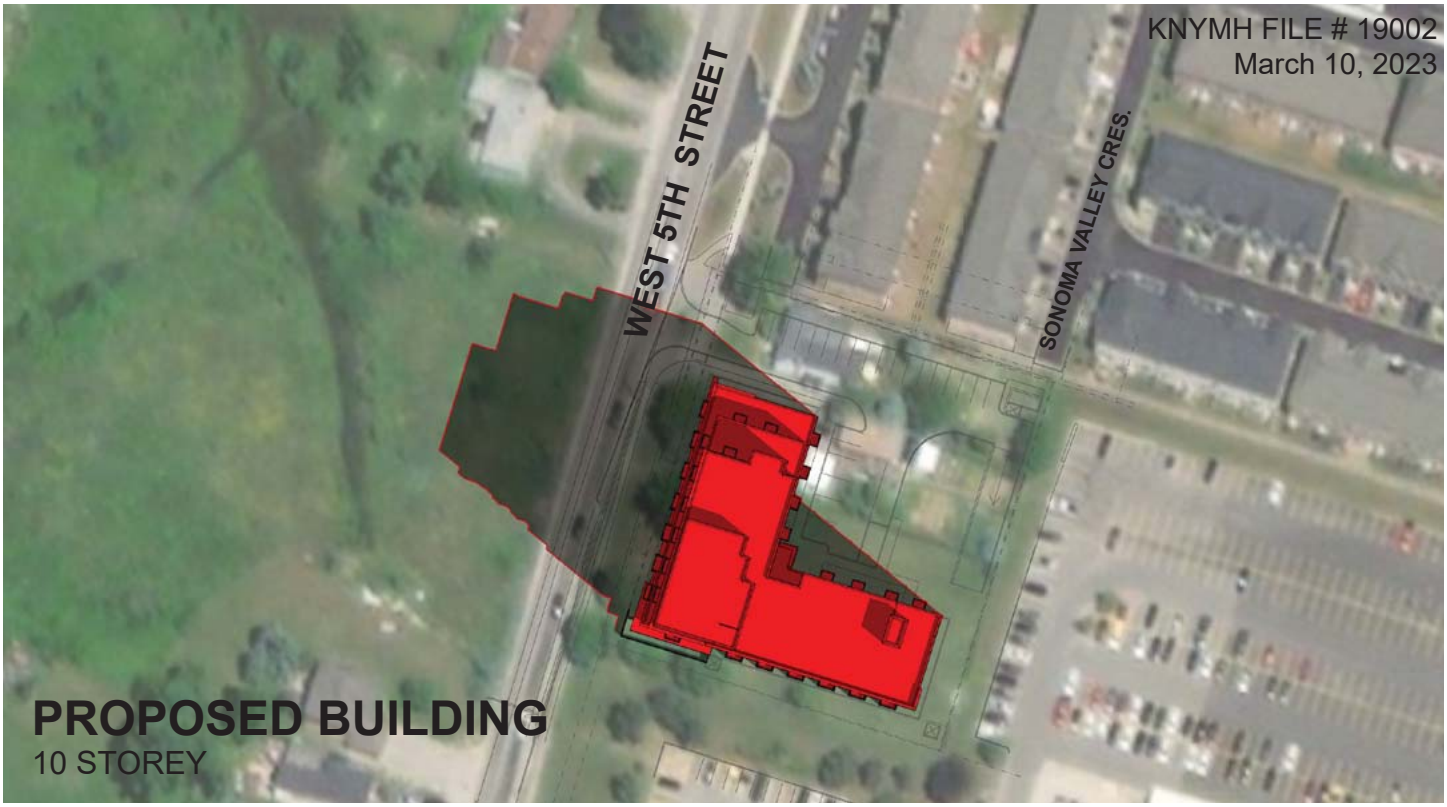

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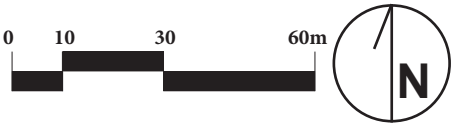

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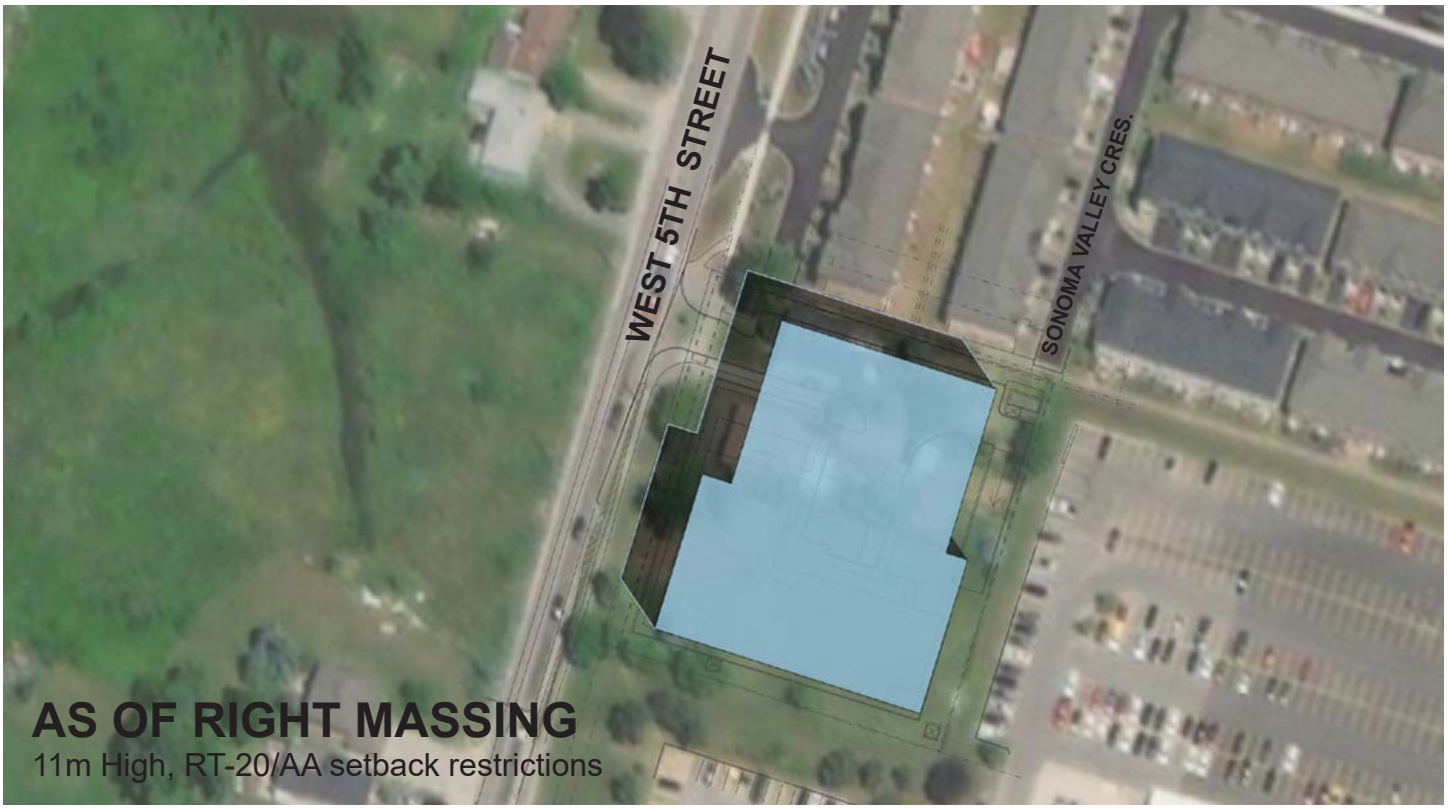

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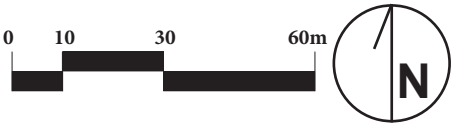

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KNYMH FILE # 19002
March 10, 2023

PROPOSED BUILDING
10 STOREY

AS OF RIGHT MASSING
11m High, RT-20/AA setback restrictions

MARCH 21, 12:50PM

UTC: (-04:00)
Latitude: 43.206386 N
Longitude: 79.896129 W

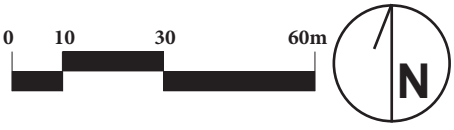

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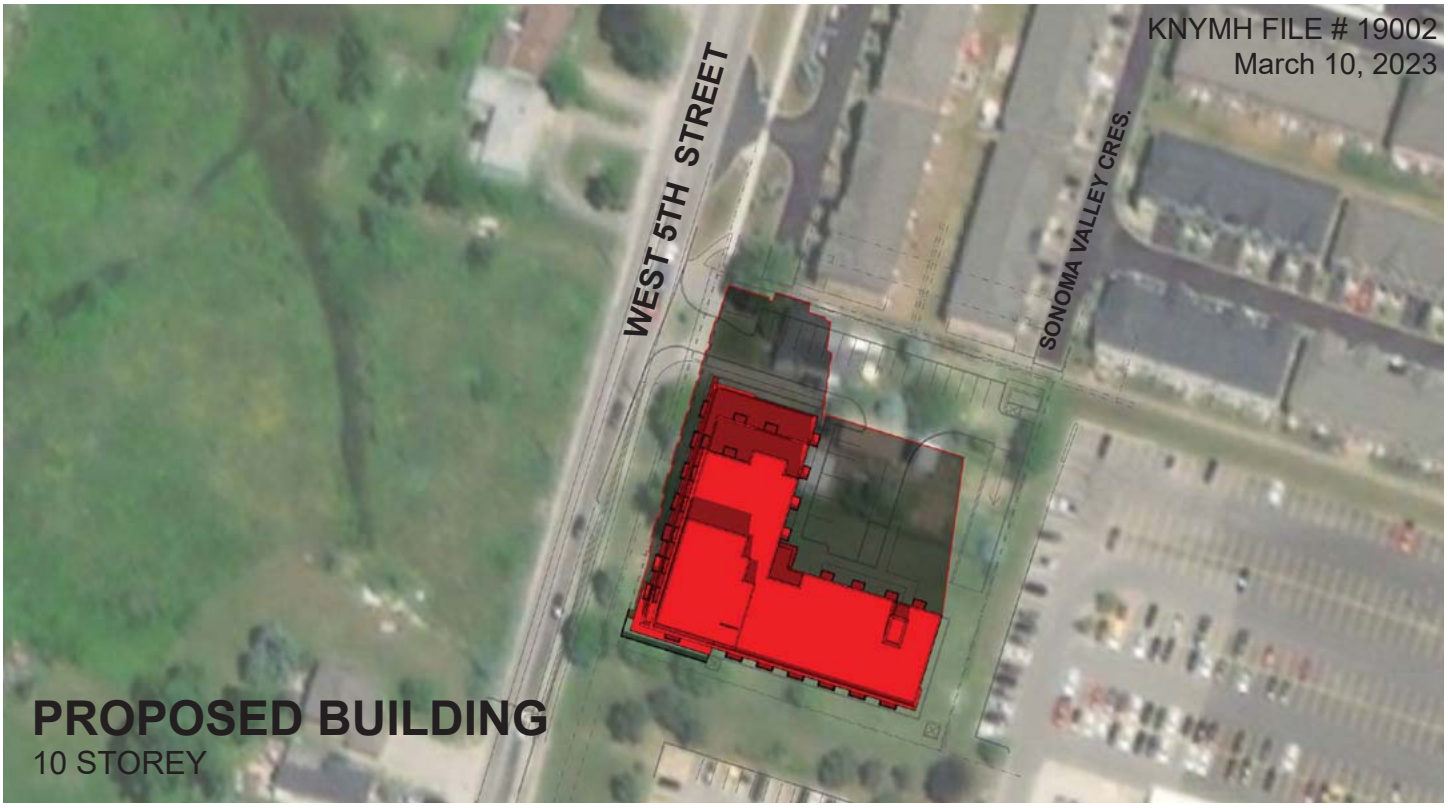
Figure 4.2-5



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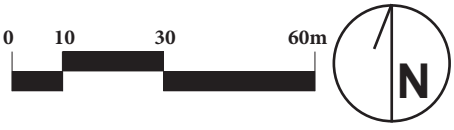

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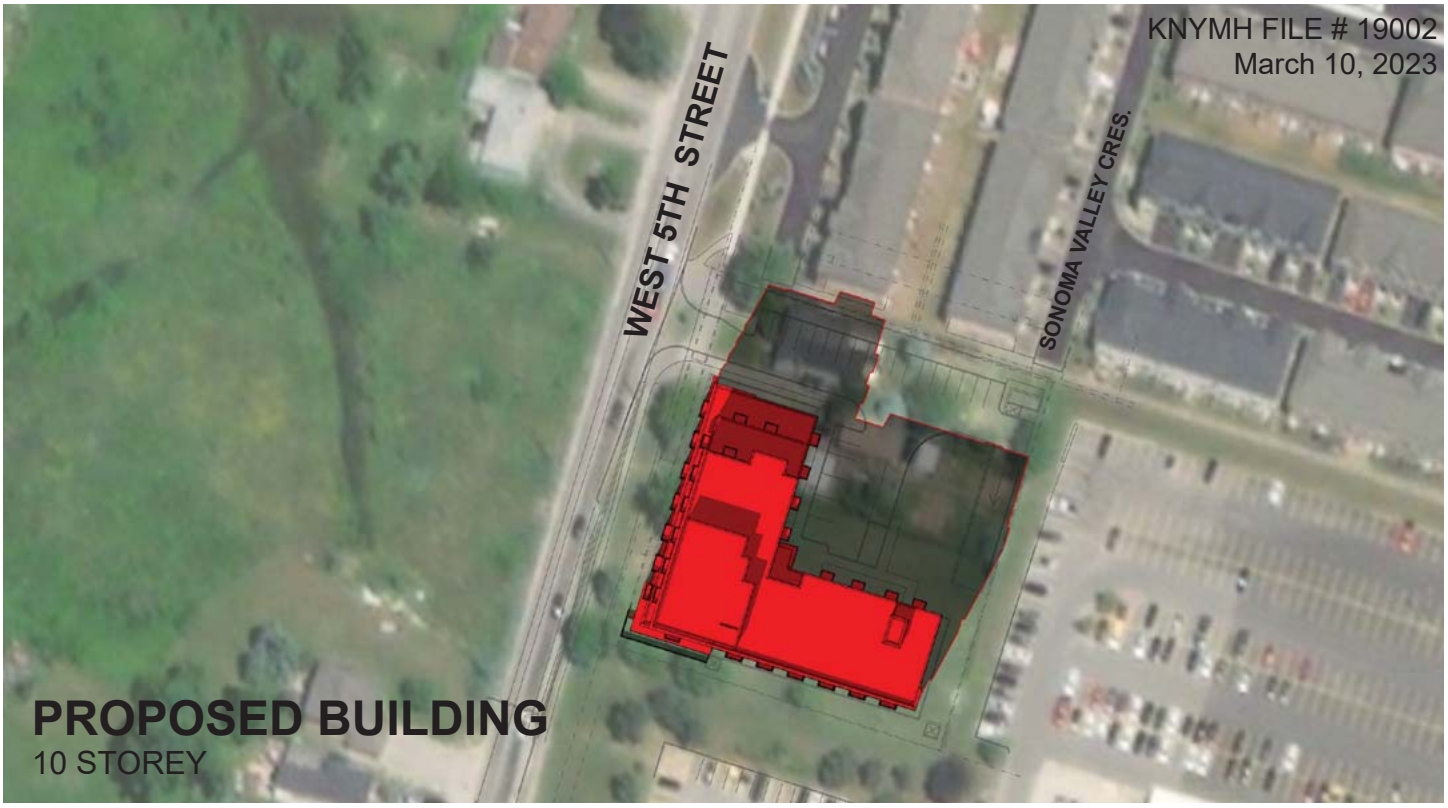
KNYMH FILE # 19002
March 10, 2023



PROPOSED BUILDING
10 STOREY

AS OF RIGHT MASSING
11m High, RT-20/AA setback restrictions

MARCH 21, 2:50PM

UTC: (-04:00)
Latitude: 43.206386 N
Longitude: 79.896129 W

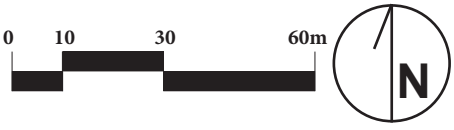


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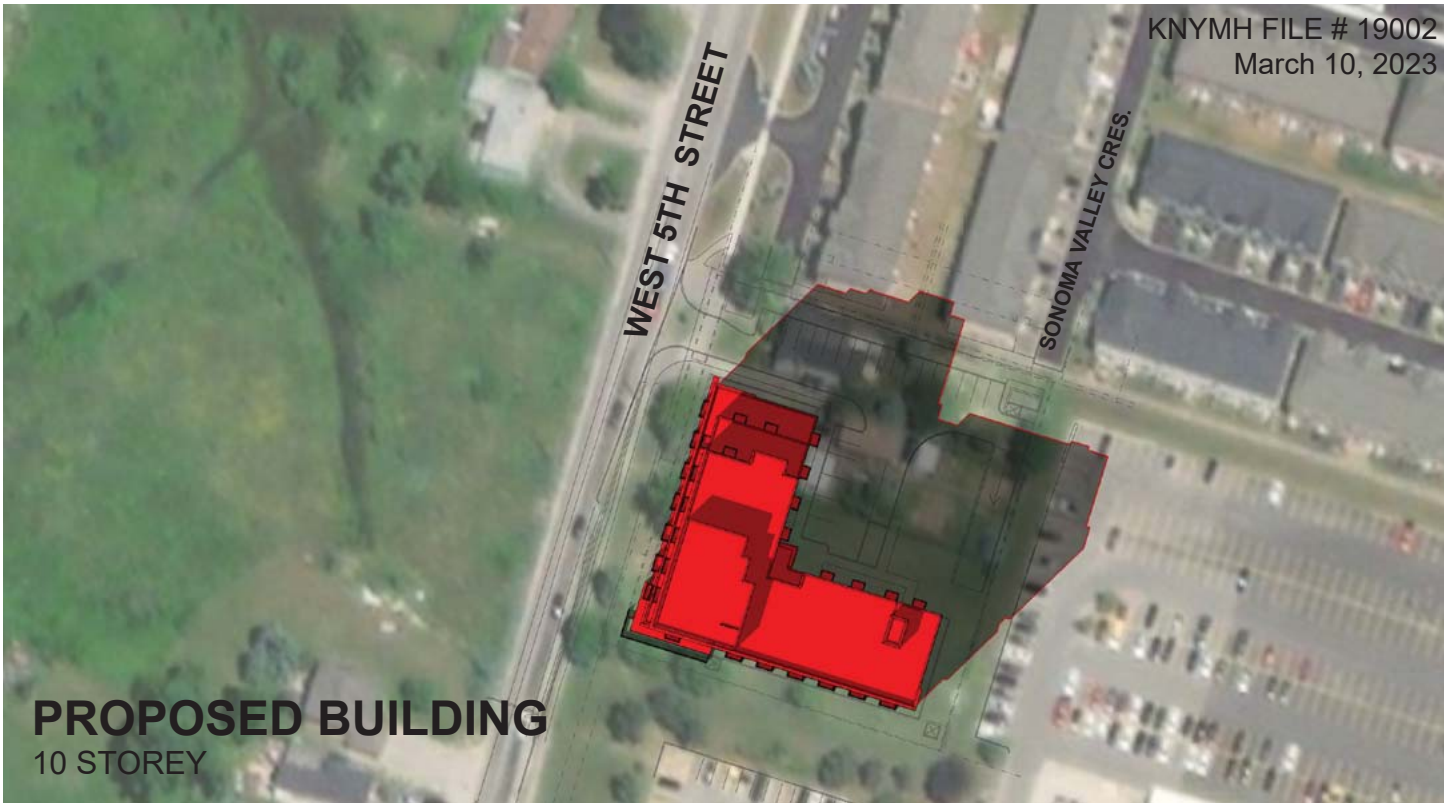
Figure 4.2-7

KNYMH FILE # 19002
March 10, 2023

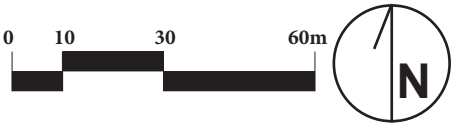


PROPOSED BUILDING
10 STOREY

AS OF RIGHT MASSING
11m High, RT-20/AA setback restrictions

MARCH 21, 3:50PM

UTC: (-04:00)
Latitude: 43.206386 N
Longitude: 79.896129 W



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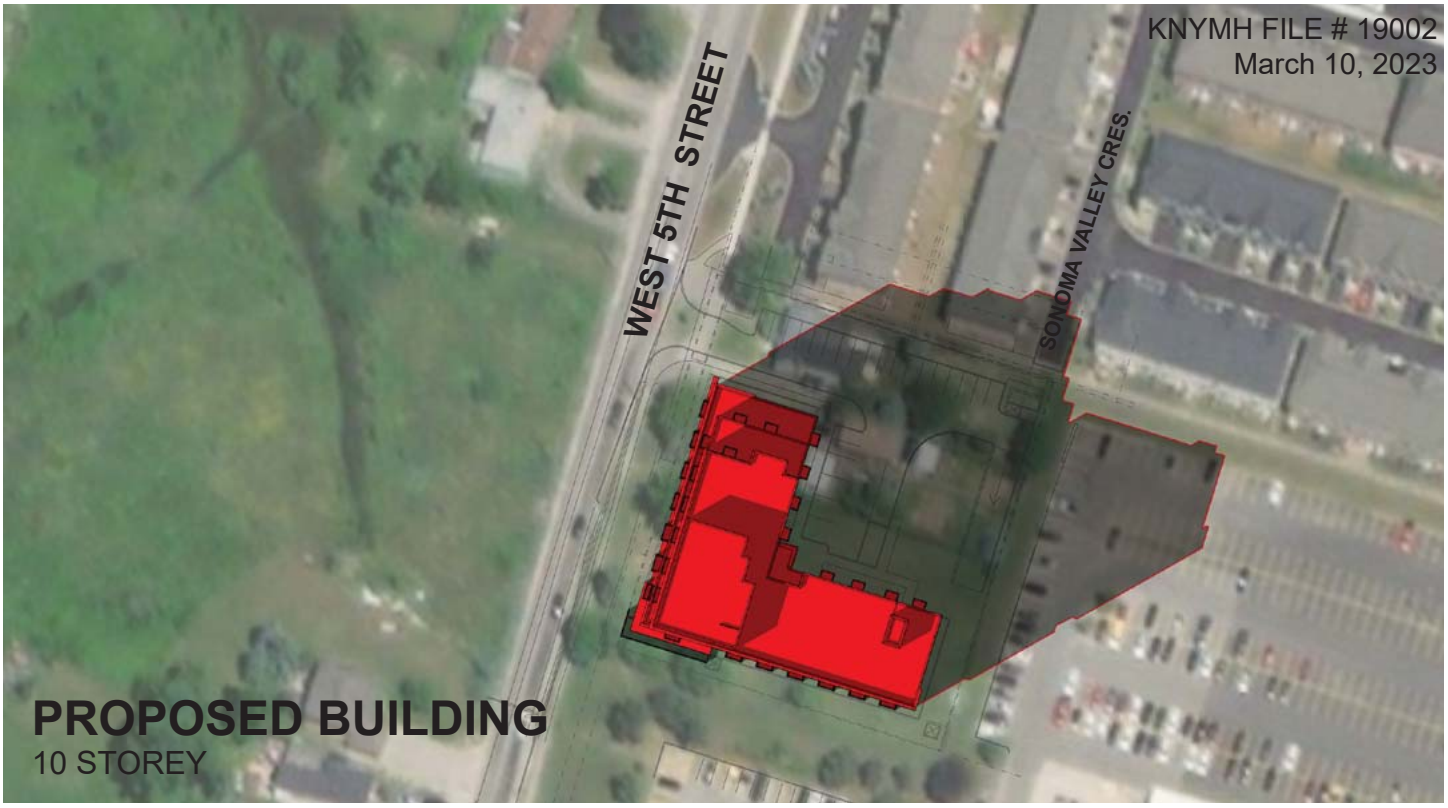
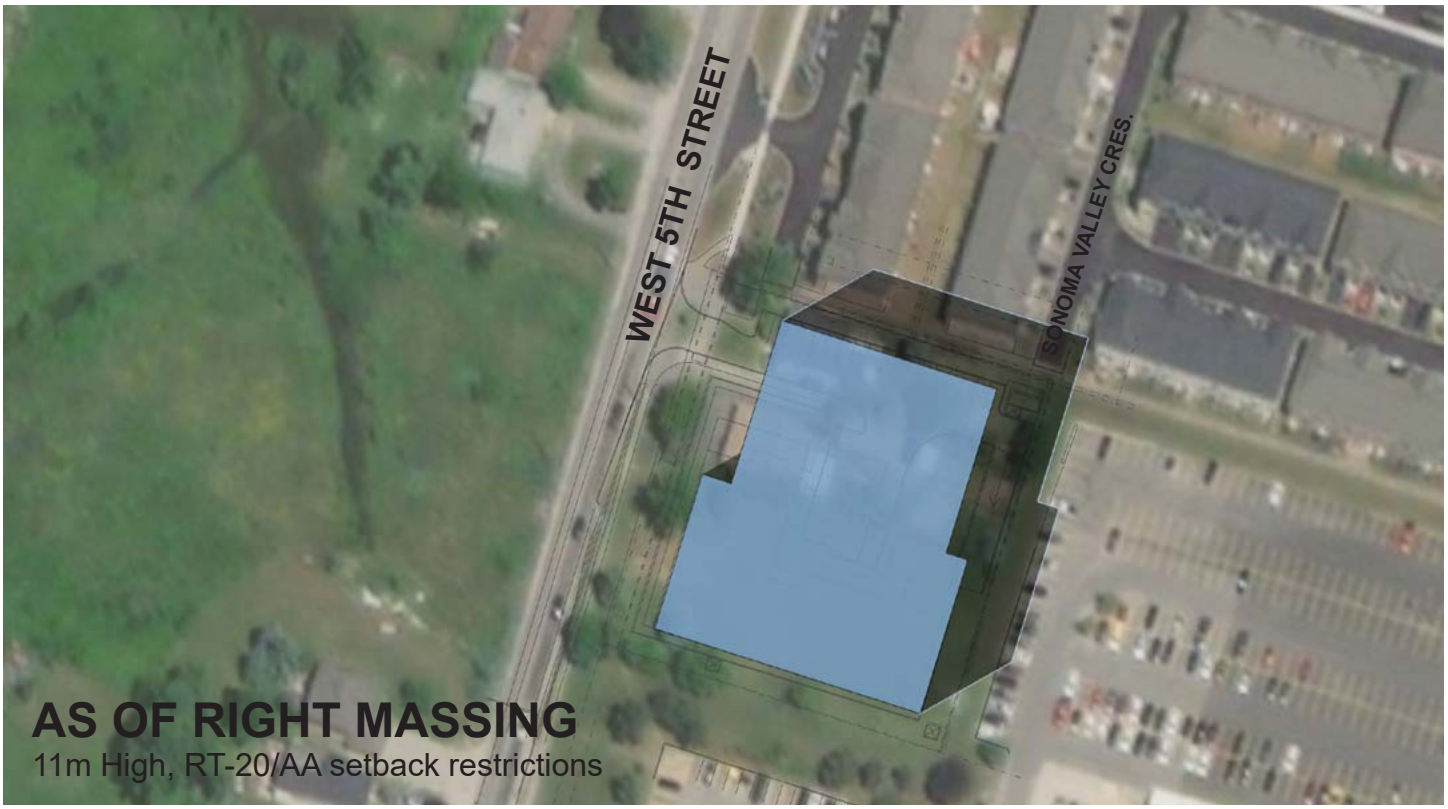
KNYMH FILE # 19002
March 10, 2023



PROPOSED BUILDING
10 STOREY



AS OF RIGHT MASSING
11m High, RT-20/AA setback restrictions

MARCH 21, 4:50PM

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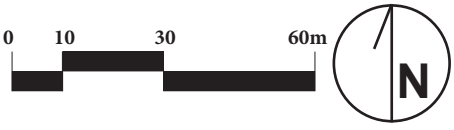
Longitude: 79.896129 W



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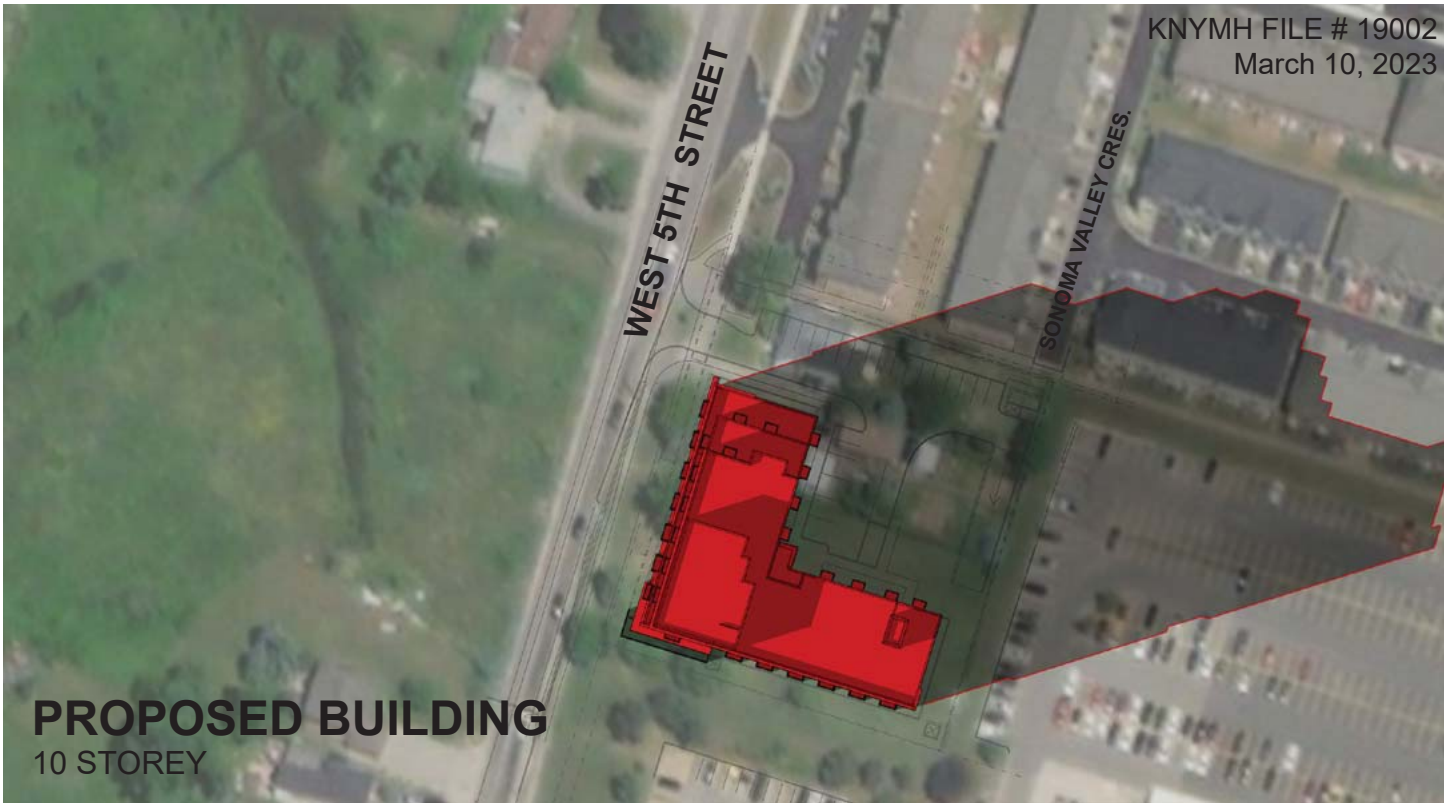

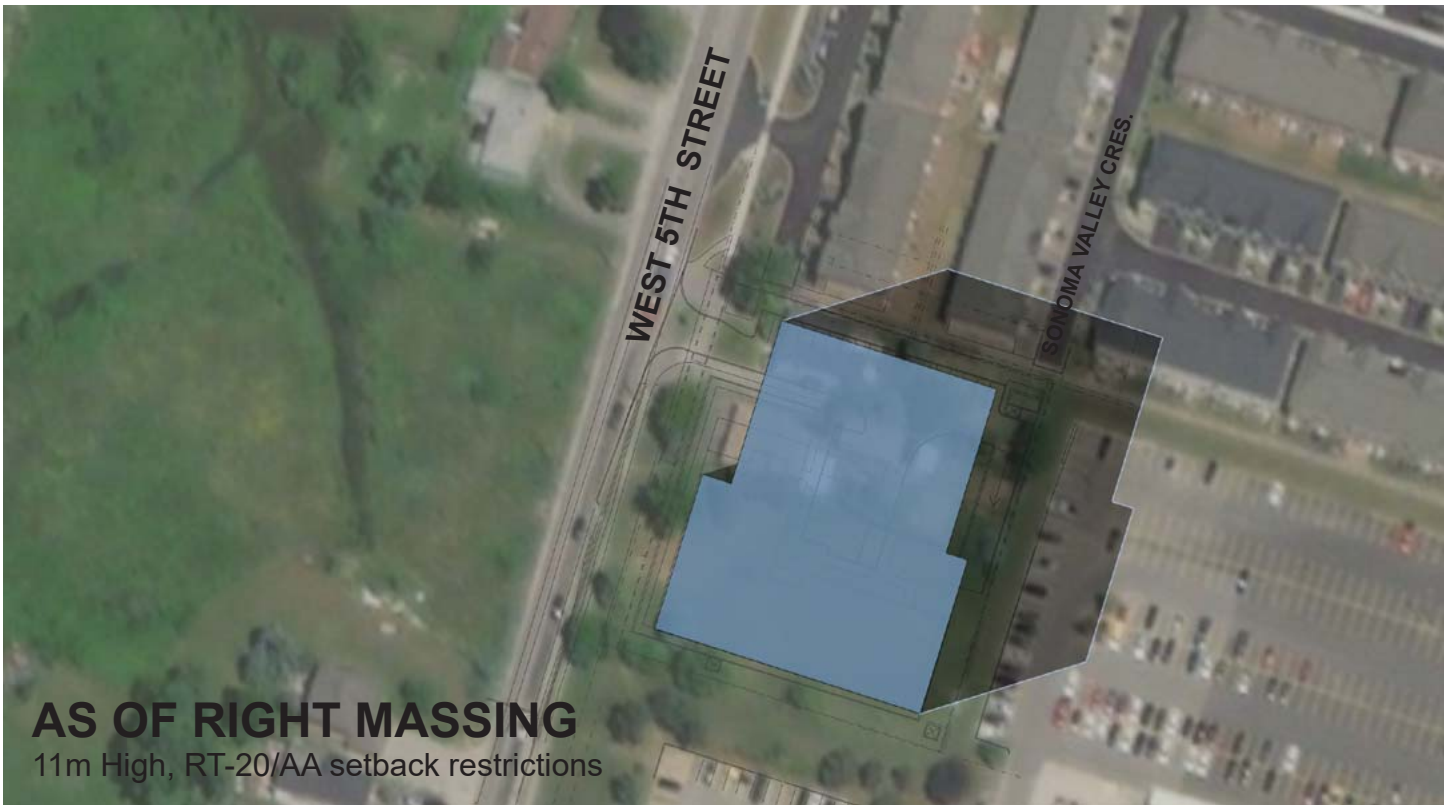

MARCH 21, 5:50PM

UTC: (-04:00)
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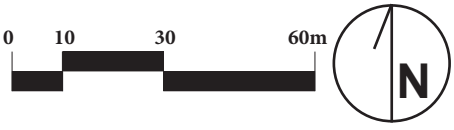
Longitude: 79.896129 W



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5.0 GENERAL OBSERVATIONS: REGARDING THE PROPOSED DEVELOPMENT

5.1 ASSESSMENT CRITERIA (A) - The shadow impact on Public sidewalks and other non-residential outdoor amenity areas between 10:00 a.m. and 4:00 p.m on March 21 & September 21 (Public Realm): (3 hours of sun coverage)

- March 21 impact analysis indicates that the public sidewalk along West 5th Street will experience more than 3 hours of continuous sunlight during the test period. No other public amenity spaces are impacted in the surrounding neighbourhood.
- September 21 impact analysis indicates that the public sidewalks along West 5th Street will experience more than 3 hours of continuous sunlight during the test period. No other public amenity spaces are impacted in the surrounding neighbourhood.

5.2 ASSESSMENT CRITERIA (A) - The shadow impact on residential amenity between 10:00 a.m. and 4:00 p.m spaces on March 21 & September 21 (Residential Amenity):

- March 21 the neighbouring residential outdoor amenity spaces and potential future development of vacant land observed during this test period will experience more than 3 hours of continuous sunlight.
- September 21 the neighbouring residential outdoor amenity spaces and potential future development of vacant land observed during this test period will experience more than 3 hours of continuous sunlight.

5.3 ASSESSMENT CRITERIA (A) - The shadow impact on of public plazas, parks and open spaces, school yards and playground areas at all times of day on March 21 and September 21 (Public Realm): (minimum of 50% sun coverage)

- March 21 and September 21 there is no impact to public plazas, parks and opens spaces, school yards or playground areas.

5.4 COMPARATIVE SUMMARY (A) – 'As of Right'

Both the 'As of Right' and proposed massing meet the assessment criteria outlined in the terms of reference prepared by the City of Hamilton. The notable difference when comparing the massing of the 'as of right' against the proposed development is the impact of the shadow on the properties north of the subject lands in study area 2. The 'as of right' massing is located closer to the property boundary and has a greater impact as a result. The orientation of the proposed massing on the site mitigates this impact and sensitive to the residential properties to the north.

5.5 ASSESSMENT CRITERIA (B) - Adjacent properties should receive a minimum of 5 hours of sunlight throughout the day measured on March 21st (Private Realm):

- On March 21 from sunrise to sunset the neighbouring residential properties and potential future development of vacant land observed during this test period will experience more than 5 hours of sunlight.

5.6 ASSESSMENT CRITERIA (B) - Adjacent public spaces and the public sidewalk on one side of the street should receive a minimum of 5 hours of sunlight throughout the day measured on March 21st (Public Realm):

- On March 21 from sunrise to sunset the adjacent public spaces and the public sidewalk on the east side of West 5th street observed during this test period will experience more than 5 hours of sunlight.

6.0 SUMMARY OBSERVATIONS: REGARDING IMPACT OF DEVELOPMENT UPON THE SURROUNDING AREA

The shadow impact on public sidewalks, plazas, parks, school yards and non-residential outdoor amenity areas on March 21 and September 21.

- The shadow analysis demonstrates during the test periods the public sidewalks will experience long periods of continuous sunlight will minimal sun shading impacting their use meeting the criteria of 3 hours between 10:00 a.m. and 4:00 p.m.

The shadow impact on residential amenity spaces on March 21 and September 21.

- The Residential amenity spaces in the surrounding area will experience long periods of continuous sunlight will minimal sun shading impacting their use meeting the criteria of 3 hours between 10:00 a.m. and 4:00 p.m.

The shadow impact on public plazas, parks and open spaces, school yards and playground areas at all times of day on March 21 and September 21.

- The study found no impact to public plazas, parks and opens spaces, school yards or playground areas meeting the guideline requirements.

The shadow impact on adjacent properties, adjacent public spaces and the public sidewalk on one side of the street on March 21.

- The shadow analysis demonstrates during that adjacent properties, adjacent public spaces and the public sidewalk will experience long periods of sunlight will minimal sun shading impacting their use meeting the criteria of 5 hours during the day.

When compared against the ‘as of right’ massing for this site the proposed development proves to be the ideal massing and site orientation to mitigate sun/shadow impact on the neighbouring residential properties north of the subject lands.

The proposed development will meet or exceed the guidelines set for shadow impact analysis by the City of Hamilton on nearby established residential neighbourhoods and the public realm. The building form and orientation of the proposed development ensures that sun shading impact is minimal upon the neighbouring residential properties. Based upon the analysis we suggest that the proposed design will not have a significant negative impact on the surrounding neighbourhood.

In our opinion, this development is compatible with the area and does not have a significant impact on the existing neighbourhood in general.

Sincerely,
KNYMH Inc.