



1027458 Ontario Inc.

Banwell and McHugh Mixed Use Developments

Shadow Impact Study
Windsor, Ontario

Table of Contents

1.0	Introduction	1
1.1	Descripon of Site	2
1.2	Proposed Development	2
2.0	Methodology	3
2.1	Study Test Dates	3
2.2	Study Test Times	4
2.3	Time Zone	4
3.0	Shadow Impact Analysis	5
3.1	March 21 Analysis	5
3.2	June 21 Analysis	6
3.3	September 21 Analysis	7
3.4	December 21 Analysis	8
4.0	Summary	10
4.1	Design Strategies for Shadow Mitigation	10
4.2	Conclusion.....	10

Appendices

A	Conceptual Development Plan - Combined
B	Shadow Diagrams: March 21
C	Shadow Diagrams: June 21
D	Shadow Diagrams: September 21
E	Shadow Diagrams: December 21

Introduction

Dillon Consulting Limited (Dillon) has prepared the following Shadow Impact Study, on behalf of our client, 1027458 Ontario Inc., (Applicant), to assess the potential impact of the shadows created by the proposed mixed use developments. The property is located north of the VIA Railway corridor along the west side Banwell Road, on the south and north sides of McHugh Street with the future extension of Leathorne Street bisecting the northern parcel, in the City of Windsor, herein referred to as the “Subject Sites”.

The “Subject Sites” are recognized legally as three (3) separate parcels. Mixed use developments are proposed for each parcel and are proposed to be developed concurrently within the South Neighbourhood of the East Riverside Planning Area.

For purposes of this report, the parcels will be referred to as:

- **North ‘A’ Site** – the parcel located west of Banwell Road, north of the future extension of Leathorne Street;
- **North ‘B’ Site** - the parcel located west of Banwell Road, between the south side of the future extension of Leathorne Street and the north side of McHugh Street.
- **South Site** – the parcel located north of the VIA Railway corridor at the southwest corner of the Banwell Road and McHugh Street intersection.

The proposed mixed-use developments on the “Subject Sites” are considered together, under one cover, in the following report.

As per the City of Windsor Official Plan – Chapter 8: Urban Design, Shadow Impact Studies may be required for medium, high, and very high-profile development proposals within the City of Windsor to evaluate the impact of the shadows cast by the development and to determine the appropriate design measures to reduce or mitigate any undesirable shadow conditions (City of Windsor Official Plan, Section 8.6.2.3).

The size, shape, and orientation of new buildings creates new shadows at different times of day and year that may limit penetration of direct sunlight into both public and private spaces. By analyzing the existing and proposed shadows of an area together, both incremental and cumulative shadow impacts can be evaluated. The purpose of the Shadow Impact Study is to encourage high-quality development that maintains adequate access to sunlight, for the enjoyment of public and private spaces, within the City of Windsor.

The Shadow Impact Study will consider: 1) The North ‘A’ Site, which is proposed to be developed with two (2) 6-storey residential buildings containing 78 units each, 2) The North ‘B’ Site, proposed to develop two (2) 6-storey residential building containing 78 units and a 6-storey, 24 unit residential building, and 3) The South Site, which will include two (2) 10-storey, 120 unit residential buildings, one (1) 8-storey, 96 unit residential building, one (1) 6-storey, 72 Unit Residential Building, a respite home, and one (1) 2-storey

Business Office. All the 3 development sites will accommodate a total of 744 units, 2,359m² of commercial Gross Floor Area (GFA), and 1,100 surface parking spaces (refer to **Appendix A - Conceptual Development Plan - Combined**).

This Shadow Impact Study has been prepared in support of the Official Plan Amendment and Zoning By-law Amendment applications, required to permit the proposed development.

1.1 Description of Site

The “Subject Sites” are located north of the VIA Railway corridor along the west side Banwell Road, on the south and north sides of McHugh Street with the future extension of Leathorne Street bisecting the northern parcel within the South Neighbourhood of the East Riverside Planning Area in the City of Windsor. These lands are legally described as:

- **North ‘A’ Site** – Part of block 1 on Plan 12M-407 and Part of Lots 143 and 144, Concession 1 in the City of Windsor within the County of Essex
- **North ‘B’ Site** – Part of block 7 on Plan 12M-407 and Part of Lots 143 and 144, Concession 1 in the City of Windsor within the County of Essex
- **South Site** – Part of Blocks 8 and 9, Plan 12M-425 in the City of Windsor within the County of Essex.

The “Subject Sites” are composed of three (3) separate parcels, which are individually referred as the following: “North ‘A’ Site” (1.43ha/3.54ac), “North ‘B’ Site” (1.66ha/4.11ac) and “South Site” (5.35ha/13.23ac) for the purpose of this report. The total site area under application is 8.44 hectares (20.79 ac), having approximately 607.7 metres of fragmented of frontage on Banwell Road.

1.2 Proposed Development

The proposed development of the “Subject Sites” will include the construction of five (5), 6-storey multiple dwelling buildings, two (2) 10-storey multiple dwelling buildings and one (1), 8-storey multiple dwelling building for a total of 744 dwelling units. It will also include a two (2)-storey business office and a respite home with a total gross floor area of 2,359m². The proposed development will provide 1,100 surface parking spaces, which will be centrally located across the three parcels. For the residential land uses on the North ‘A’ Site, the development proposes a parking rate of 1.45 and on North ‘B’ Site a parking rate of 1.50 parking spaces per dwelling unit are proposed. For the South site, a residential parking rate of 1.30 spaces per dwelling unit is proposed. For the business office, a parking rate of 3.4 spaces per 100m² is proposed, and a rate of 2.4 spaces per 100m² is proposed for the respite home.

Access to the “Subject Sites” will be provided from Leathorne Street to North ‘A’ Site and North ‘B’ Site, with McHugh Street providing access to North ‘B’ Site and the South Site.

2.0

Methodology

The Shadow Impact Study was prepared in accordance with the following methodology:

- Utilization of Google Sketch Up for the shadow simulations;
- Generation of the surrounding massing data from municipal Land Fabric data and by using municipal aerial imagery;
- Preparation of the preliminary massing of the proposed development using Google Sketch Up;
- Surrounding context building heights and proposed building heights were determined through standardized floor to floor heights:
 - Single storey: 4.5 metres;
 - Two storeys: 7.5 metres; and
 - Each storey of multiple dwelling buildings: 4.0m.

The shadow diagrams include the following features:

- The “Subject Sites” identified in a red outline with the proposed building footprint;
- Surrounding existing and approved building footprints;
- Underlying parcel fabric;
- Shadows from the proposed development are colour coded in a blue hue;
- Shadows from existing and approved buildings are colour coded in a grey hue; and
- All streets, blocks, open spaces, and existing building structures are shown to a distance that shows the shadow impacts during the requested times.

The shadow analysis and impact assessment are based on the following criteria:

- Impact on surrounding residential properties and the duration of shadows;
- Impact on the public realm;
- Impact on any parks and open spaces; and
- Impact on outdoor amenity areas of the proposed development.

2.1

Study Test Dates

The shadow impacts of the proposed residential development have been evaluated at the following dates:

- March 21st (vernal equinox);
- June 21st (summer solstice);
- September 21st (autumnal equinox); and
- December 21st (winter solstice).

The study test dates were selected to reflect the variety of shadow impacts that may occur within the year. The solstices, June 21st and December 21st, represent the seasonal extremes for each season. June

21st is the longest day of the year when the sun is at its highest and the shadows are the shortest, while December 21st is the shortest day of the year when the sun angle is at its lowest and the shadows are the longest.

2.2 Study Test Times

The shadow impacts of the proposed residential development have been evaluated at the following test times:

- 7:00 am
- 8:00 am
- 8.30 am
- 9:00 am
- 10:00 am
- 11:00 am
- 12:00 pm
- 2:00 pm
- 3:00 pm
- 3.30 pm
- 4:00 pm
- 4:30 pm
- 5:00 pm
- 6:00 pm

Study test times may vary depending on the study test date. The study test times have been appropriately selected to evaluate the relevant shadow impacts at the selected time of year.

2.3 Time Zone

The Shadow Impact Study was prepared using the following time zone standards:

- Eastern Time Zone;
- Standard Time: Universal Time minus 5 hours (Winter Solstice – December 21st); and
- Daylight Saving Time: Universal Time minus 4 hours (Summer Solstice – June 21st, Autumnal Equinox – September 21st, and Vernal Equinox – March 21st).

3.0 Shadow Impact Analysis

3.1 March 21 Analysis

The shadow impacts of the proposed development on the surrounding area have been evaluated on March 21st using the study time intervals of 7:00 am through and up until 5:00 pm.

Between 7:00 am and 8:00 am, the simulated shadows for the North 'A' and 'B' Site extend slightly beyond the "Subject Sites" causing impacts on the proposed interior surface parking located southwest of the development. The shadow impacts from the South Site developments extend south beyond the Subject Site onto a portion of the Railway corridor. These potential shadow impacts are not sustained in duration and are therefore not anticipated to have any significant impact on the proposed development or the experience of the public realm, nor on the natural environmental quality that allows trees and vegetation to thrive. Between 8:00 am to 3:00 pm, the shadows from all three (3) "Subject Sites" move towards the north.

By 3:00pm, the shadow impacts on the neighbouring properties continue to be minimal, casting in a westerly direction, with mostly impacting the interior surface parking area of each of the "Subject Sites." The shadows from Building 'I' from the North 'A' Site begins to extend beyond the "Subject Site" onto the northern adjacent property known as 11325 Firgrove Drive, which is currently vacant.

At 4:00 pm, the simulated shadows from the "Subject Sites" shift north. McHugh Street will experience some shadow impacts from the Business Office on the South site. The vacant property, known as 11325 Firgrove Drive will also experience continued shadowing from Building 'I' on North 'A' Site. There are minimal anticipated impacts to the public realm during this time. The South façade of Building 'C' on the South Site experiences a complete shadow coverage from Building 'D', also located on the South Site temporarily. From 4:00 pm through and until 5:00 pm, the proposed shadows from Building 'C' and 'A' located on the South Site causes major impacts on McHugh Street at the intersection of Banwell Road. However, these anticipated shadow impacts are anticipated to be limited in duration.

In summary, the shadow impacts on March 21st are anticipated to be limited on the neighbouring residential properties, with the most significant and the longest shadow exposure being in the late afternoon. Additionally, the shadow impacts from the buildings on the South Site is anticipated to be minimal when it relates to the public realm along McHugh Street during that same time, with the shadow impacts anticipated to occur for a short period of time. Adequate sun coverage on adjacent pedestrian sidewalks and green spaces during the daytime will remain. The proposed shadows are not expected to have any negative impacts on user experience or quality of life.

Refer to **Appendix C (Shadow Diagrams – March 21)**.

3.2 June 21 Analysis

The shadow impacts of the proposed development on the surrounding area have been evaluated on June 21st using the study time intervals of 7:00 am through and up until 6:00 pm.

From 7:00 am to 4:00 pm, the simulated shadows extend towards the southwest mostly within the “Subject Sites” causing minimal impacts on the proposed interior surface parking. These potential shadow impacts are not sustained in duration and are therefore not anticipated to have any significant impact on the affected properties or the experience of the public realm, nor on the natural environmental quality that allows trees and vegetation to thrive.

By 4:00 pm, the simulated shadows shift north, causing no impacts to the neighbouring properties. Buildings ‘A’ and ‘B’, located on the South site, are anticipated to cause minimal shadow impacts to the east along the pedestrian realm of Banwell Road. The shadows from Building ‘I’ from the North ‘A’ Site begin to extend beyond the “Subject Sites” onto the northern adjacent property known as 11325 Firgrove Drive, which is currently vacant.

From 5:00 pm through and until 6:00 pm, the anticipated shadow from all the buildings fronting onto Banwell Road will impact portions of Banwell Road. At 6:00 pm, Buildings ‘A’ and ‘B’, located on the South Site, are anticipated to cast shadows extending the east beyond Banwell Road onto portions of the Banwell Community Church property. Shadow impacts from Buildings ‘E’, ‘F’ and ‘G’ from North ‘B’ Site, and Buildings ‘H’ and ‘I’ from North ‘A’ Site, are anticipated to have minor impacts on the adjacent low rise residential dwellings at this time. In the evening, the south façade of Building ‘C’ and portions of the west façade of Building ‘A’ on the South site, are anticipated to experience shadow impacts for a limited duration. The overall anticipated shadows are intended to be limited in duration.

In summary, June 21st shadow impacts are anticipated to be the most significant and for a longer duration in the evening hours, primarily impacting the proposed interior surface parking areas of the North ‘A’, North ‘B’ Site, and the South Site. Additionally, there are some shadow impacts anticipated to the public realm along Banwell Road from proposed Buildings ‘A’ and ‘B’, located on the South site, Buildings ‘E’, ‘F’ and ‘G’ from North ‘B’ Site, and Buildings ‘H’ and ‘I’ from North ‘A’ Site. The impacts of these shadows on the public realm are anticipated to occur for a limited duration of time. Adequate sun coverage on the affected pedestrian sidewalks and green spaces during the daytime will be maintained. The proposed shadows are not expected to have any prolonged negative impacts on user experience or quality of life.

Refer to **Appendix D (Shadow Diagrams – June 21)**.

3.3 September 21 Analysis

The shadow impacts of the proposed development on the surrounding area have been evaluated on September 21st using the study time intervals of 7:00 am through and up until 5:00 pm.

At 7:00 am, the simulated shadows from Buildings 'B' and 'D' extend beyond the South Site onto the Railway corridor and some of the residential properties located to the south, causing minimal impacts. During this time, portions of the north façade of Building 'D' are momentarily impacted by shadows. From 8:00 am to 12:00 pm, most of the shadow impacts from Buildings 'F' and 'G' from North 'B' Site, and Buildings 'H' and 'I' from North 'A' Site are anticipated to impact the proposed interior surface parking area. The potential shadow impacts are not sustained in duration and are therefore not anticipated to have a significant impact on the proposed development, the existing surrounding neighbourhood, or the experience of the public realm. Trees and vegetation will receive adequate sun exposure during the daytime hours.

By 3:00 pm, the shadows from Building 'I' from the North 'A' Site will begin to extend beyond the "Subject Site" onto the northern adjacent property, known as 11325 Firgrove Drive, which is currently vacant. From 3:00 pm through and until 4:00pm, the impacts of the potential shadows continue to be minimal, with the exception of the south façade of Building 'C' and the west façade of Building 'A' on the South Site, which are anticipated to experience limited shadow impacts from Building 'D' and 'B'.

At 5:00 pm, the simulated shadows shift north causing major shadow impacts on the existing adjacent residential buildings located on the southeast portion of Questa Drive from Building 'C' and 'D' of the South Site. The respite home on the South Site is anticipated to be entirely shaded at this time. The intersection of McHugh Street and Banwell Road is also anticipated to experience major shadow impacts from the proposed buildings on the South Site at this time. The impacts to the interior surface parking area are minimal and limited in duration on all "Subject Sites".

In summary, September 21st shadowing is the most significant and the longest in duration for the first hour of the morning and last hour of the evening, causing impacts to some of the existing and proposed residential dwellings. The impacts of the proposed shadow on the public realm from Buildings 'A' and 'C' on the South Site onto both McHugh Street and Banwell Road are anticipated to occur for a limited period of time. Similarly, the shadow impacts on the public realm along Banwell Road, from Buildings 'F' and 'G' on North 'B' Site, and Buildings 'H' and 'I' on North 'A' Site, are anticipated to be limited in duration, with adequate sun coverage on affected pedestrian sidewalks and green spaces maintained during the daytime hours. The overall proposed shadows are not expected to have significant and prolonged negative impacts on user experience or quality of life.

Refer to **Appendix E (Shadow Diagrams – September 21)**.

December 21 Analysis

The shadow impacts of the proposed development on the surrounding area have been evaluated on December 21st using the study time intervals of 8:30 am through and up until 3:30 pm.

At 8:30 am, the simulated shadows extend beyond the “Subject Sites” in a westerly direction. Buildings ‘B’ and ‘D’ from the South Site have their shadow extend onto the Railway corridor, with the shadows from Building ‘C’ impacting portions of the residential properties on the southernmost portion of Chateau Avenue. The shadows from Buildings ‘F’ and ‘G’ from North ‘B’ Site, and Buildings ‘H’ and ‘I’ from North ‘A’ Site also extend beyond the “Subject Sites” onto the residential properties on the east side of Questa Drive. Large portions of the proposed interior surface parking area on both the South Site, and the North ‘A’ and ‘B’ are impacted by shadows at this time. These potential shadow impacts are not sustained in duration and are therefore not anticipated to have any significant impact on the affected properties or the experience of the public realm, nor on the potential for trees and vegetation to grow. This is the only time of the year that the garages proposed on the west side of the North ‘B’ site are anticipated to cast a shadow onto the rear yards of the adjacent residential properties, municipally known as 2008 to 2284 Questa Drive, for majority of the daytime hours, causing prolonged shadow impacts on the neighbouring properties.

By 10:00 am, there are no longer shadow impacts onto the existing residential properties from North ‘A’ Site and North ‘B’ Site. Building ‘C’ and Building ‘D’ on the South Site are anticipated to cause limited shadow impacts onto the existing residential dwellings located on the southernmost portion of Chateau Avenue. From 10:00 am through and until 2:00pm, the anticipated shadow impacts continue to affect the proposed interior surface parking area on the North ‘A’ and ‘B’ sites as well as the South Site.

At 2:00 pm, the simulated shadows from Buildings ‘C’ and ‘D’ on the South site, shift towards the northwest causing the major shadow impacts on the neighbouring residential buildings along Chateau Avenue. The shadows from Building ‘I’ on the North ‘A’ Site begins to extend beyond the “Subject Site” onto the northern adjacent property known as 11325 Firgrove Drive, which is currently vacant.

By 3:00 pm, the majority of the South Site is anticipated to experience shadow impacts from Buildings ‘A’, ‘B’ and ‘C’, with the respite home entirely covered at this time. The shadow impacts from Buildings ‘C’ and ‘D’ on the South Site extend beyond the proposed development onto low rise residential building along Chateau Avenue. McHugh Street is anticipated to experience shadow impacts from Building ‘A’ and the Business Office, partially shading some of the existing residential buildings on Questa Drive. The shadows from Buildings ‘E’, ‘F’ and ‘G’ from North ‘B’ Site, and Buildings ‘H’ and ‘I’ from North ‘A’ Site are anticipated to extend onto the residential buildings located on the east side of Questa Drive at this time. The impacts on the proposed interior surface parking areas of all “Subject Sites” are anticipated to be significant and prolonged.

From 3:00 pm through and until 3:30 pm, the anticipated shadow impacts from the “Subject Sites” will majorly impact the existing adjacent residential dwellings located northwest of the proposed

developments. The shadows from Buildings 'A', 'B', 'C' and 'D' on the South Site will have a significant impact on the low rise residential buildings along Chateau Avenue, Questa Drive, and McHugh Street. Both the North 'A' and 'B' Sites are anticipated to be entirely shaded by the shadow from Buildings 'F', 'G', 'H' and 'I' with the majority of the proposed surface parking area impacted by shadow impacts extending onto Elizabeth Kishkon Park.

In summary, December 21st shadow impacts are anticipated to be the most significant and have the longest duration in the evening hours, impacting the existing residential properties located west of the "Subject Sites". Additionally, the majority of the shadow impacts anticipated to the public realm are from the South Site, primarily onto McHugh Street with shadow impacts anticipated onto Chateau Avenue. The public realm along Questa Drive and Leathorne Street are anticipated to be impacted by shadows from the North 'B' site. The shadow impacts from the North 'A' are limited to the vacant open spaces towards the north. The prolonged shadow impacts at this time of year are largely due to the low angle of the sun throughout the winter. The sun exposure experienced within the public realm and on each of the "Subject Sites" remains at an acceptable level. Limited impacts to the experience of the public realm or surrounding area are anticipated as a result of the proposed development.

Refer to **Appendix F (Shadow Diagrams – December 21)**.

4.0

Summary

In summary, it is our opinion that shadow impacts from the proposed development are limited overall. Any shadow impacts occurring for extended periods of time on adjacent properties remains at an acceptable level. Access to sunlight during the daytime hours has been maintained in relation to the public realm, open space, existing and proposed residential properties, and proposed residential amenity areas.

4.1

Design Strategies for Shadow Mitigation

In an effort to reduce any potential negative shadow impacts, certain design strategies have been included such as:

- Building massing. Adjustments such as building setbacks from the property lines have been considered in an effort to consider an appropriate relationship with the pedestrian scale and to maintain an attractive streetscape;
- Building placement. The placement of the residential buildings on the “Subject Sites” have been designed to ensure that there is adequate space separation between the built forms which will allow sunlight to penetrate through and to the “Subject Sites”; and
- Building orientation. The proposed residential buildings are orientated in a manner that aims to reduce the significance and duration of the shadow impacts on the surrounding existing and proposed low profile residential properties.

Other design strategies may be considered at the Site Plan Control stage including, but not limited to, the following:

- Providing high quality landscape treatment such as decorative fencing, trees, and grassed areas to mitigate the perceived massing impacts of the built form;
- Including building setbacks as the built form increases in height;
- Breaking up the mass horizontally and vertically through the creative incorporation of changes in materials and architectural features; and
- Incorporating windows and balconies on all elevations with creative balcony and floor plate design which includes strategically located unit/amenity area locations.

4.2

Conclusion

In conclusion, it is our opinion that the shadow impacts from the proposed residential development are overall minor in effect and short in duration. The proposed shadows have a limited level of impact for the following reasons:

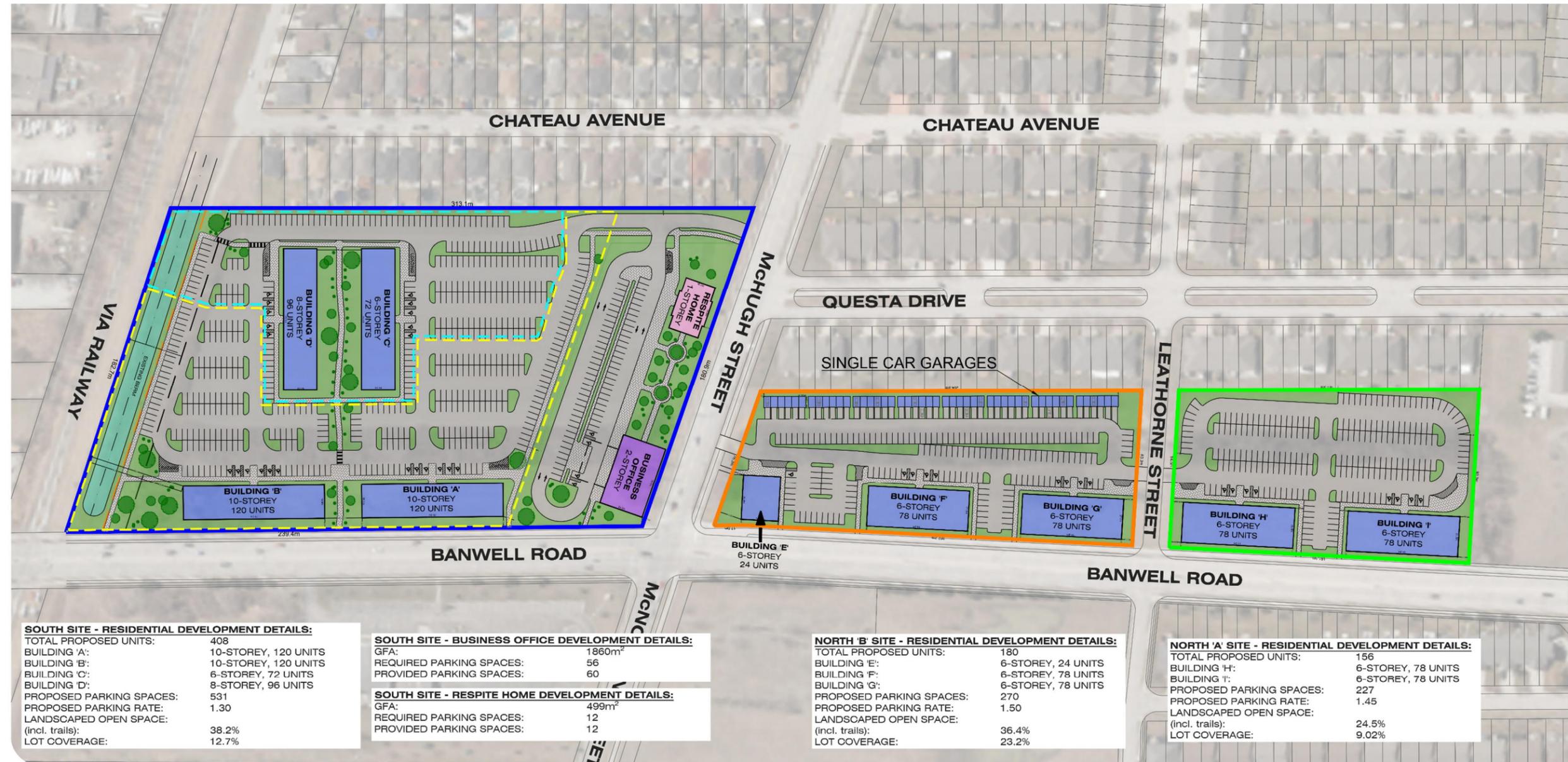
- The majority of cumulative shadowing impacts are moderate and shorter in duration, with shadow impact falling primarily away from residential properties;

- The shadow impacts occurring to the Subject Sites largely affect the proposed surface parking areas. The shadow coverage occurring to the surface parking areas may be beneficial in assisting to mitigate any heat island effect by keeping asphalt temperatures cooler during the daytime hours;
- Of the shadowing impacts identified, the majority occur around sunrise or sunset, meaning that the neighbouring residential properties will continue to retain adequate sunlight access for leisure and recreation activities during the daytime hours, and increasingly in the warmer months;
- The public realm is anticipated to experience some shadow coverage; however, the shadowing is limited in duration and by time of year. Any affected pedestrian sidewalks/trails maintain adequate sunlight coverage during the daytime hours. As such, it will not cause unreasonably negative impacts for, or deter from, the ability for community members to use the public realm in these particular areas; and
- Any significant shadow impacts for extended periods of time on adjacent properties remains at an acceptable level. Access to sunlight during the daytime hours has been maintained in relation to the public realm and the neighbouring residential dwellings, institutional uses, and private outdoor amenity spaces.

Appendix A

Conceptual Development Plan - Combined

Figure 1: Concept Plan –



1027458 ONTARIO LTD.
BANWELL AND McHUGH -
MIXED USE DEVELOPMENTS

CONCEPTUAL DEVELOPMENT PLAN
April 4, 2023

BANWELL AND McHUGH - SOUTH SITE (± 5.35 ha / 13.23 ac)	BANWELL AND McHUGH - NORTH 'A' SITE (± 1.43 ha / 3.54 ac)	BANWELL AND McHUGH - NORTH 'B' SITE (± 1.66 ha / 4.11 ac)	PROPOSED MULTI-UNIT RESIDENTIAL	PROPOSED LANDSCAPED OPEN SPACE	SOUTH SITE - PHASE 1
30m BUFFER FROM RAILWAY	EXTENT OF BERM	EXISTING BERM	PROPOSED BUSINESS OFFICES	PROPOSED RESPITE HOME	SOUTH SITE- PHASE 2

MAP/DRAWING INFORMATION
THIS DRAWING IS FOR INFORMATION PURPOSES ONLY. ALL DIMENSIONS AND BOUNDARY INFORMATION SHOULD BE VERIFIED BY AN O.L.S PRIOR TO CONSTRUCTION.

SCALE: 1: 2000 (11X17)

PROJECT: 22-5144
STATUS: DRAFT
DATE: 04/03/2023

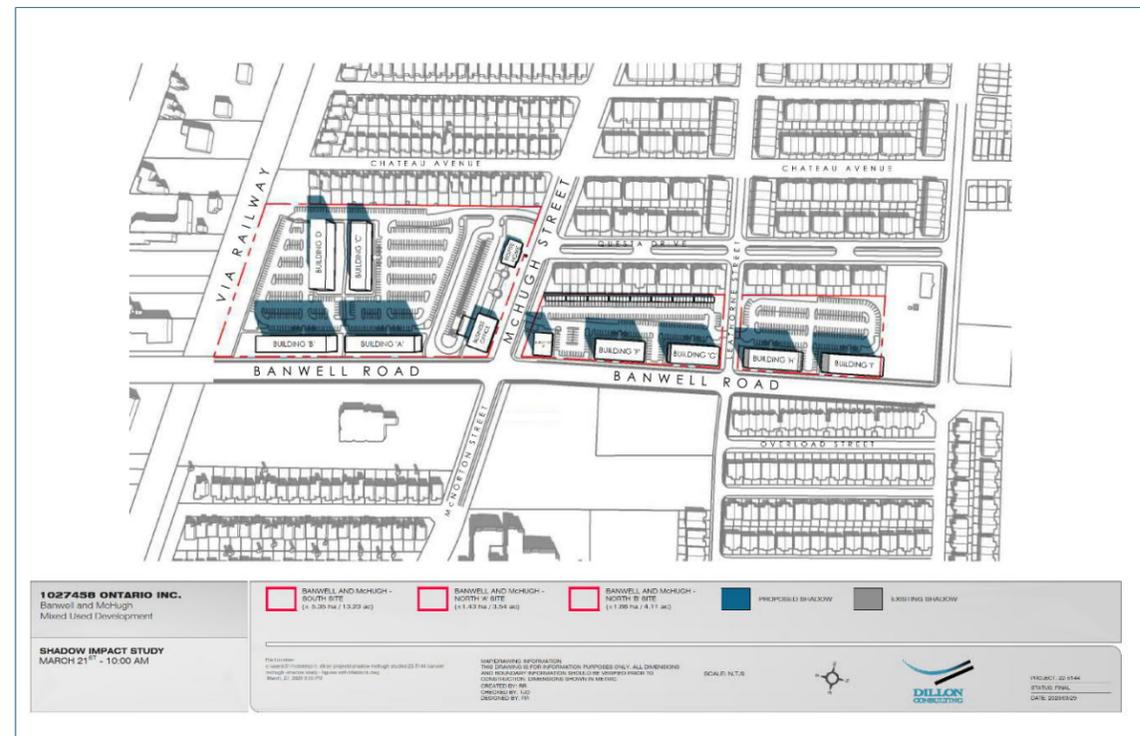
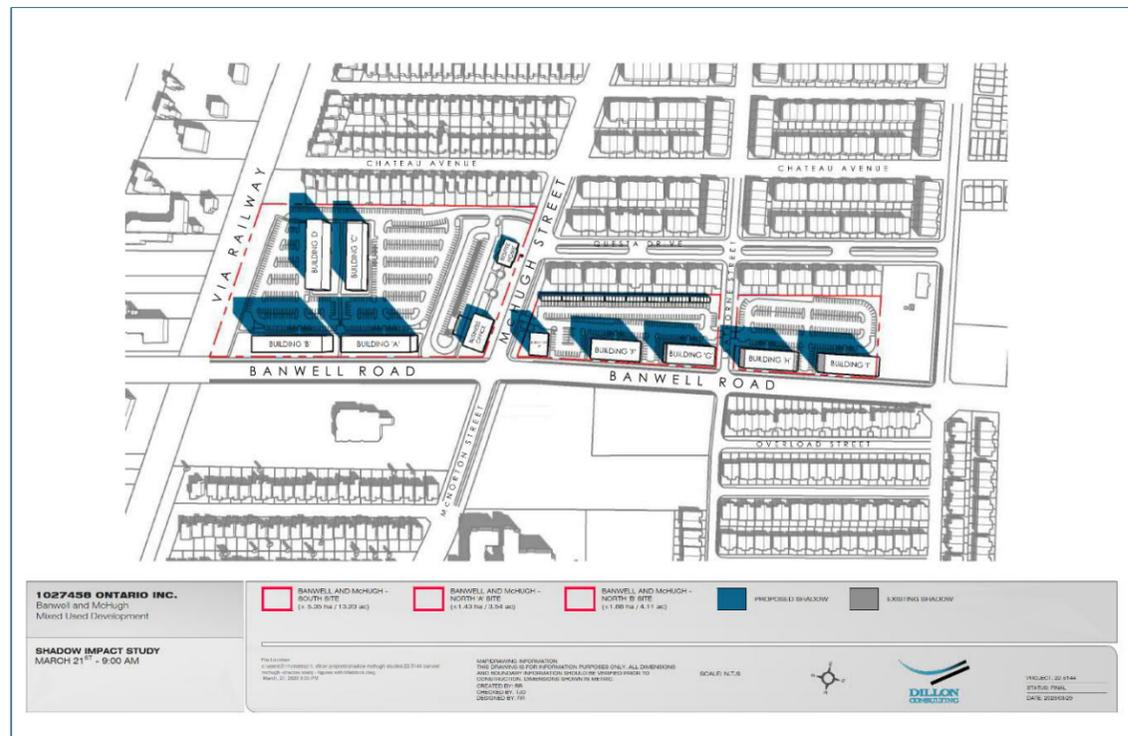
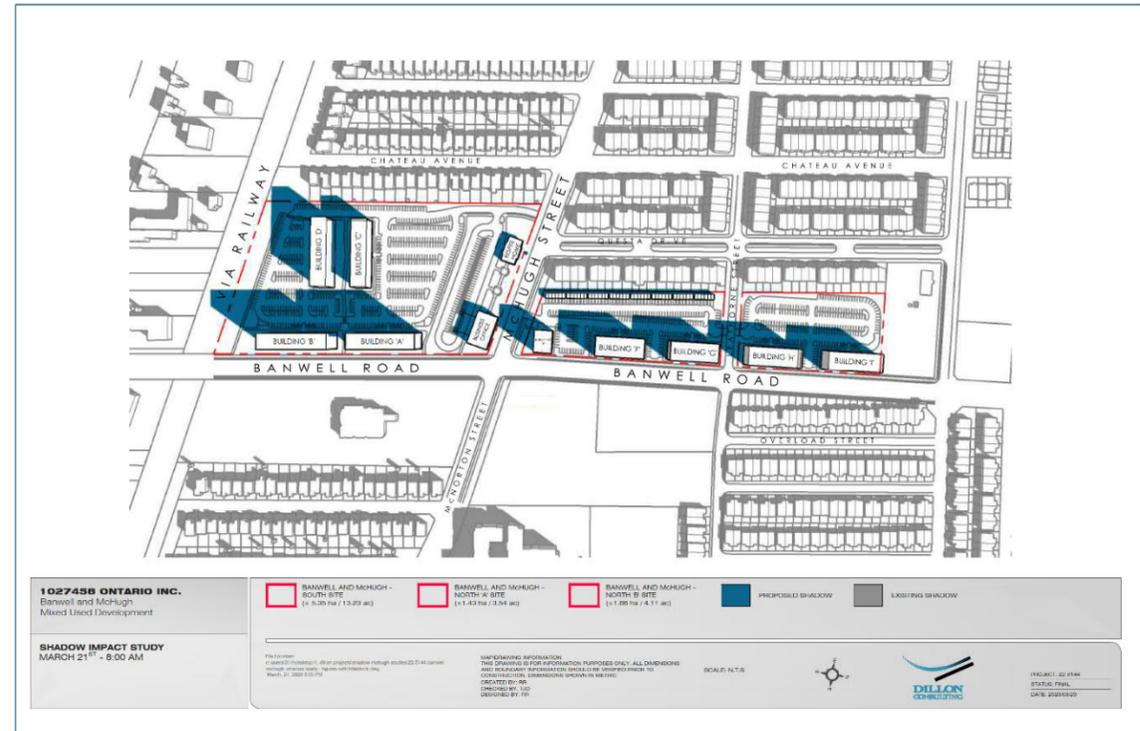
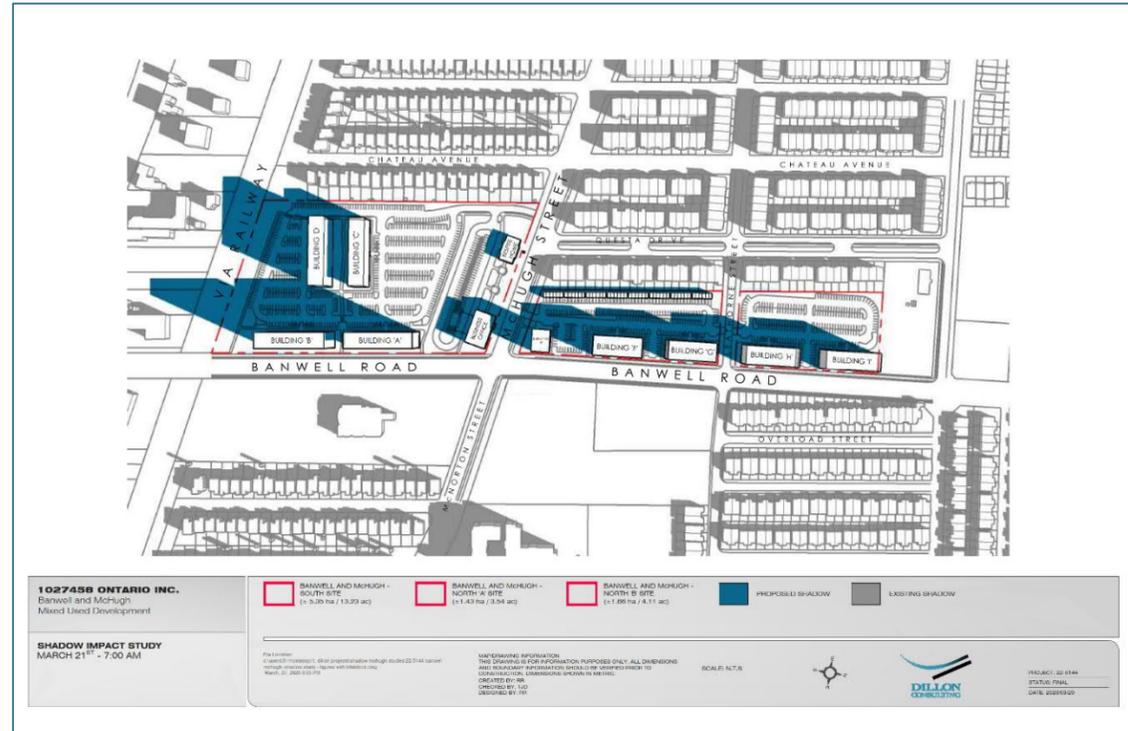
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April, 04, 2023 1:22 PM

SOURCE: THE COUNTY OF ESSEX INTERACTIVE MAPPING (2021)

CREATED BY: MRU
CHECKED BY: TJO
DESIGNED BY: MRU

Appendix B

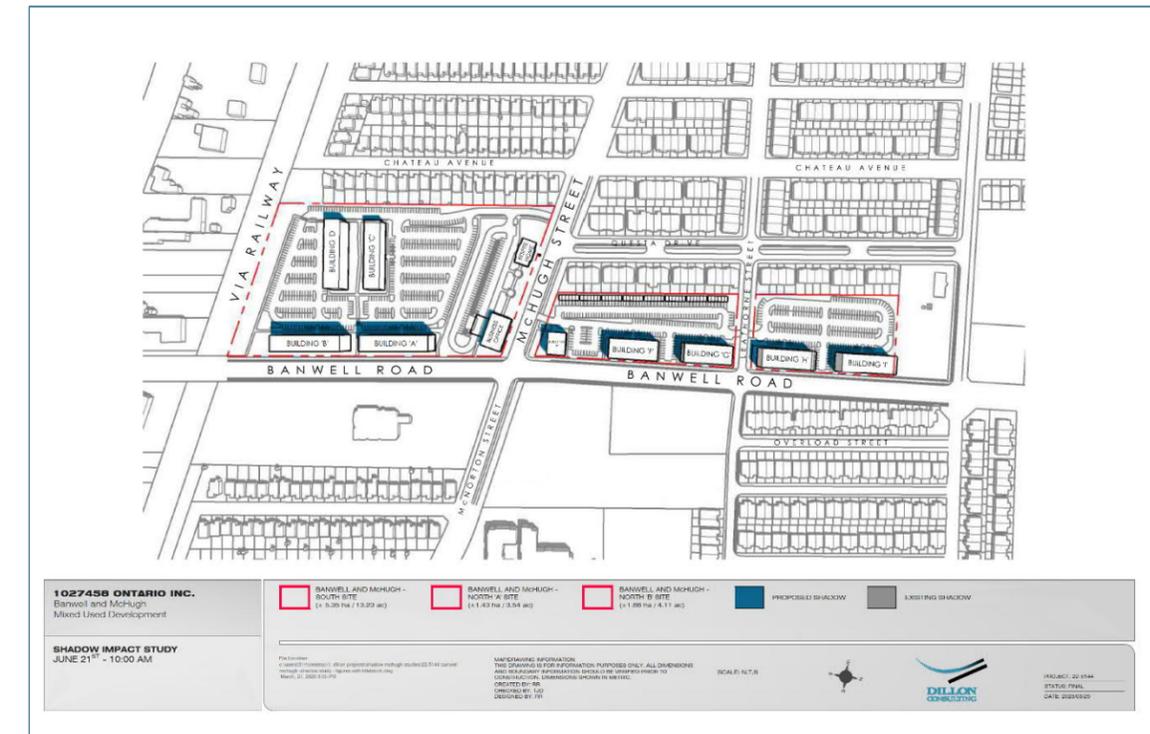
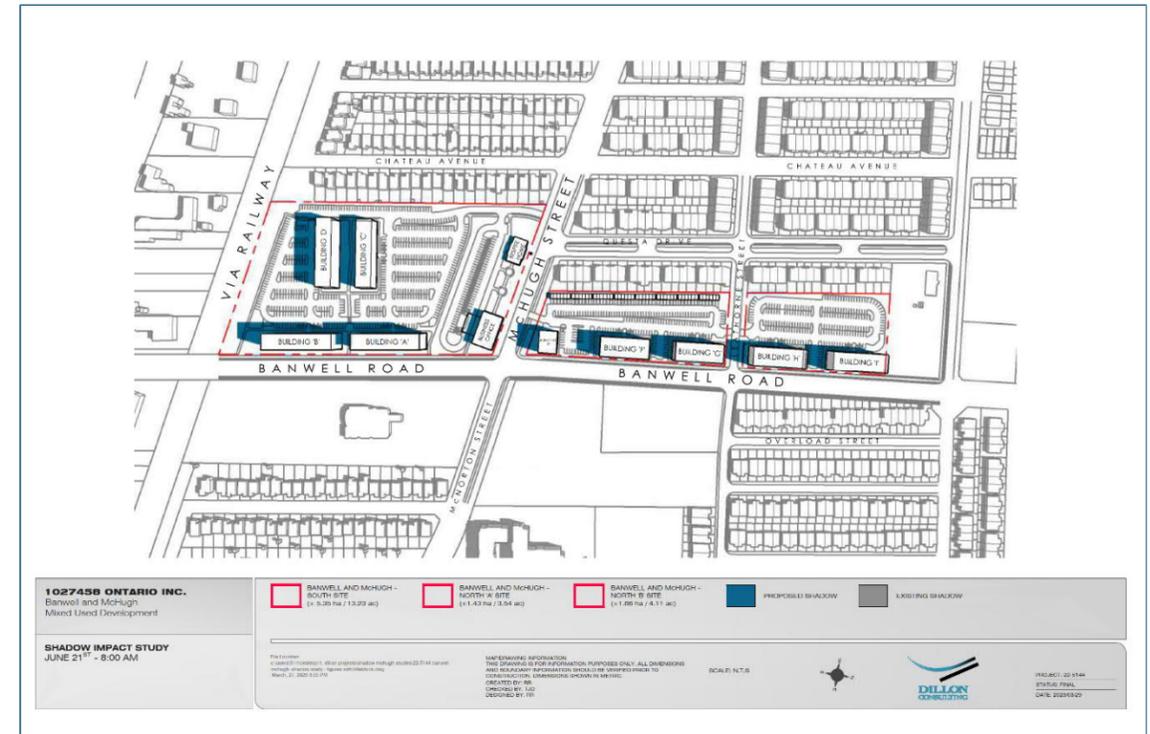
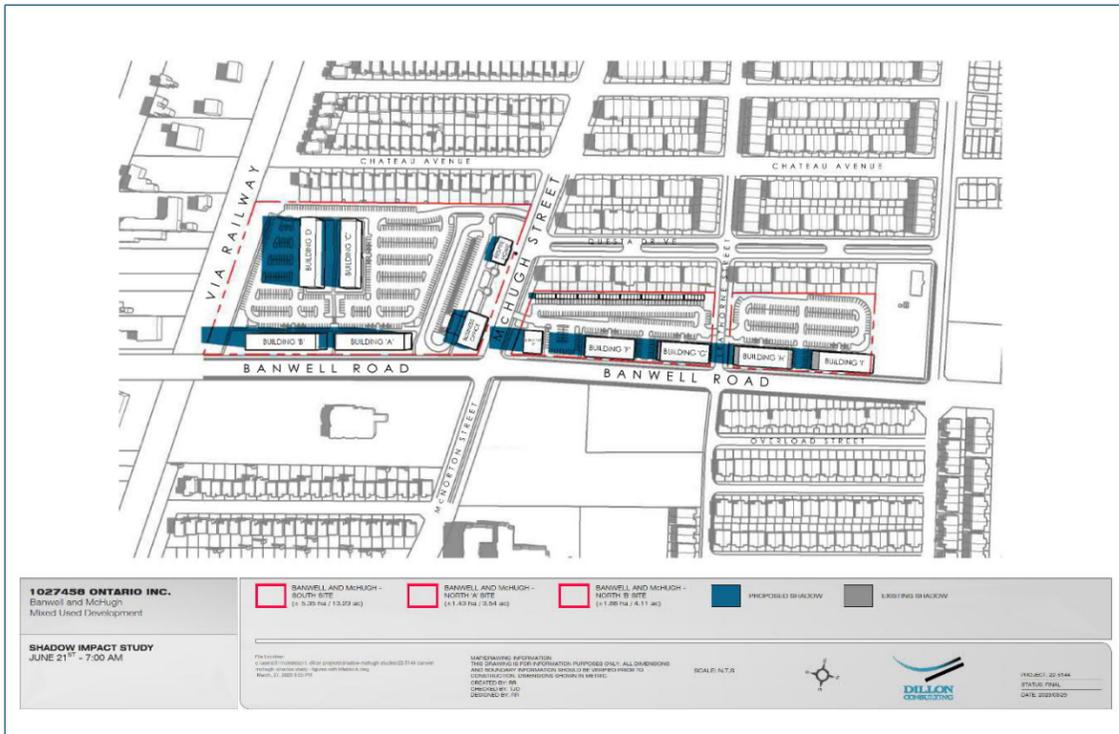
Shadow Diagrams: March 21

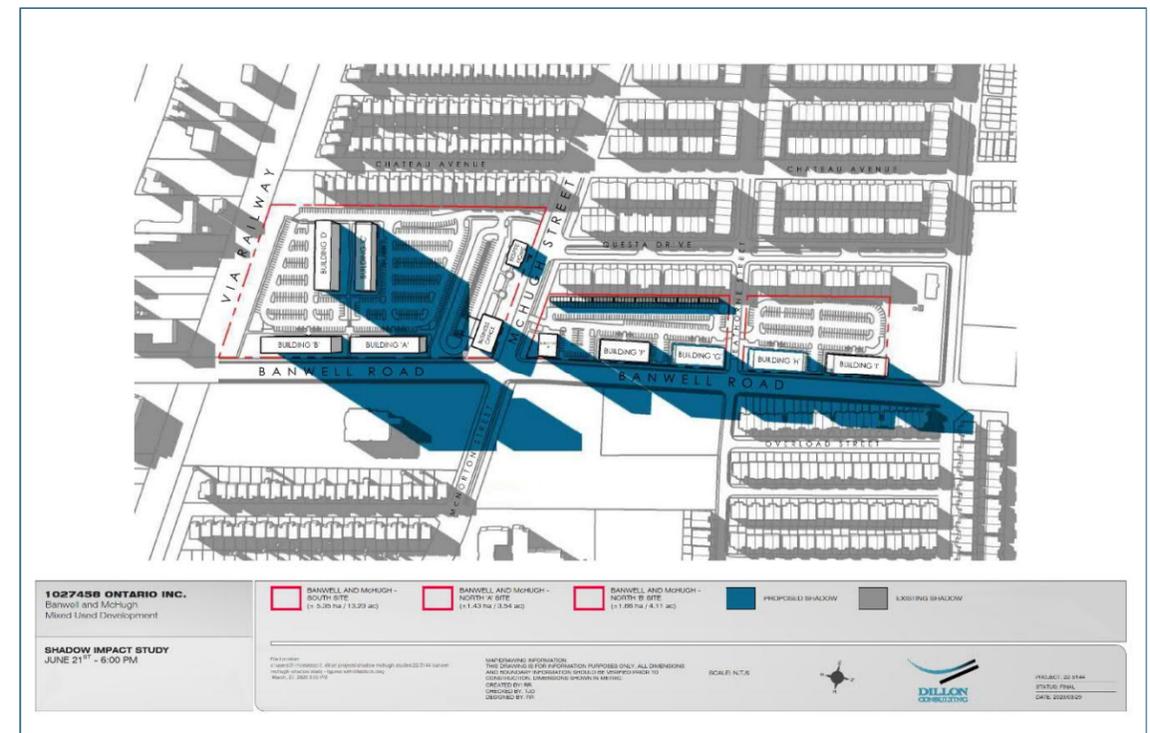
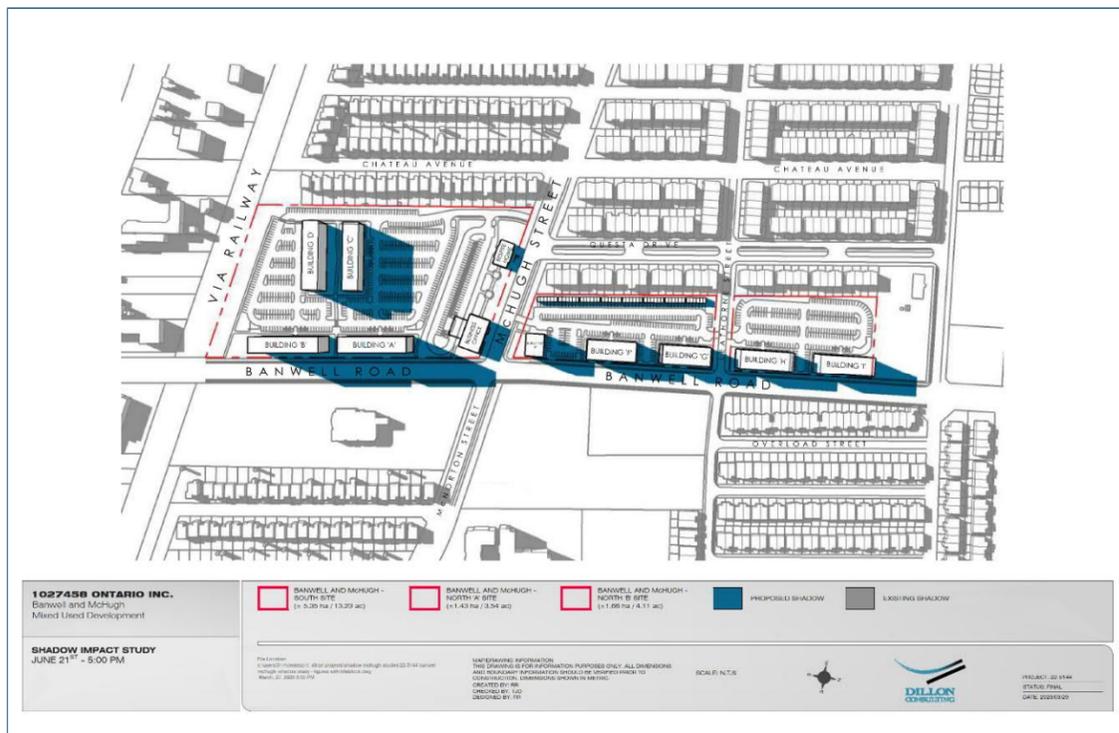
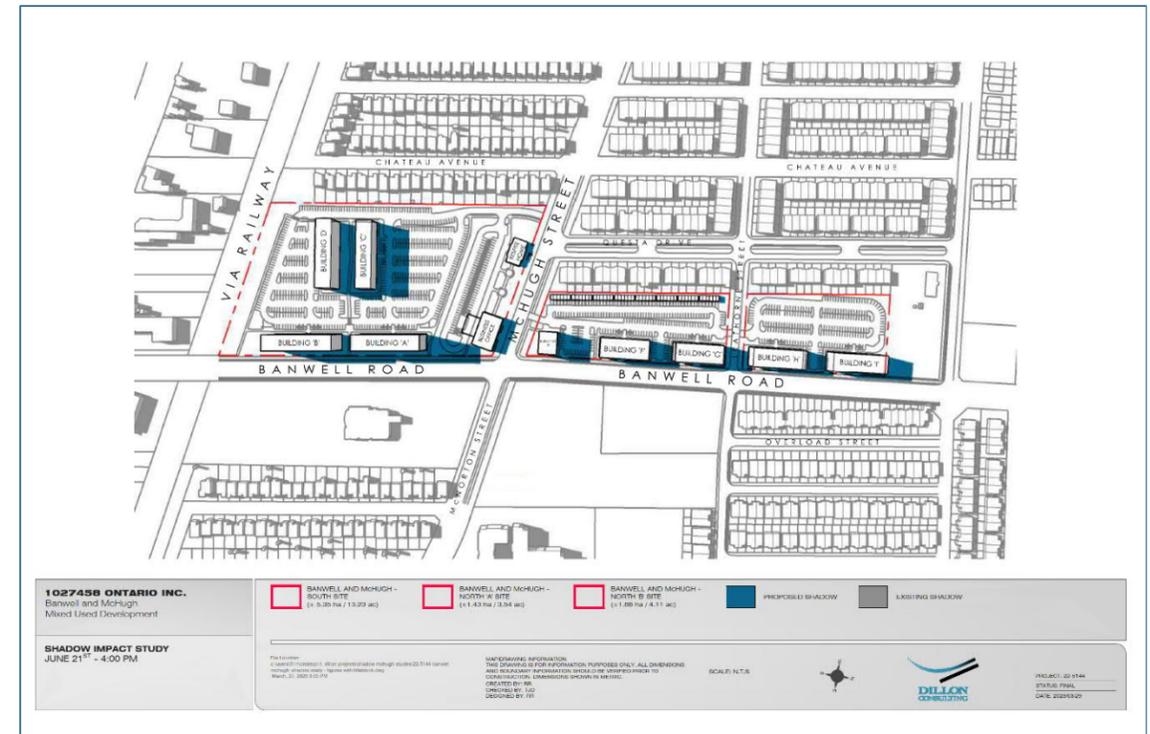


1027458 Ontario Inc.
 Shadow Impact Study – Banwell and McHugh Mixed Use Developments
 March 2023 – 22-5144

Appendix C

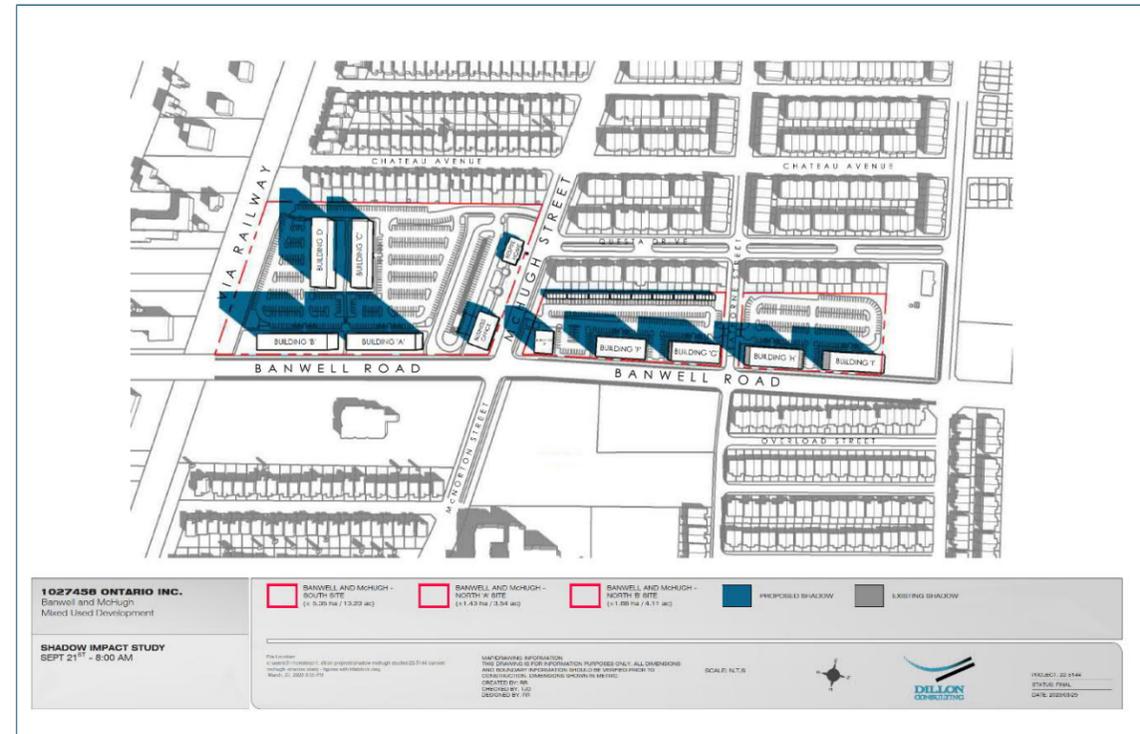
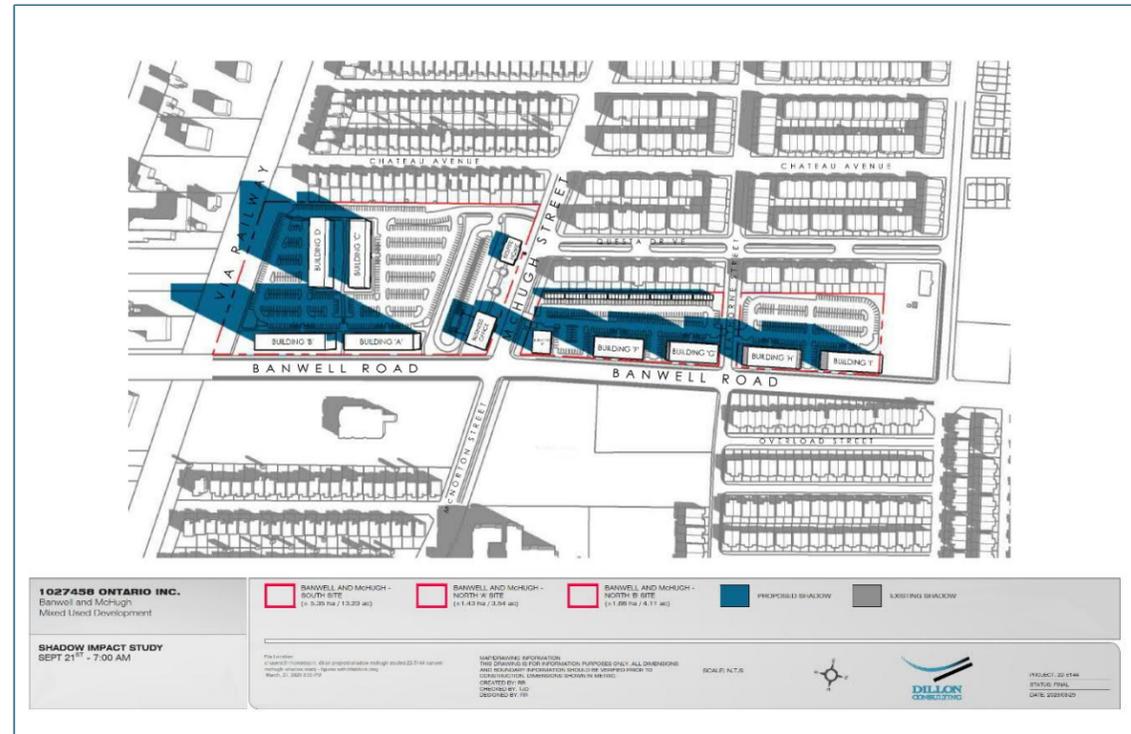
Shadow Diagrams: June 21





Appendix D

Shadow Diagrams: September 21



Appendix E

Shadow Diagrams: December 21

