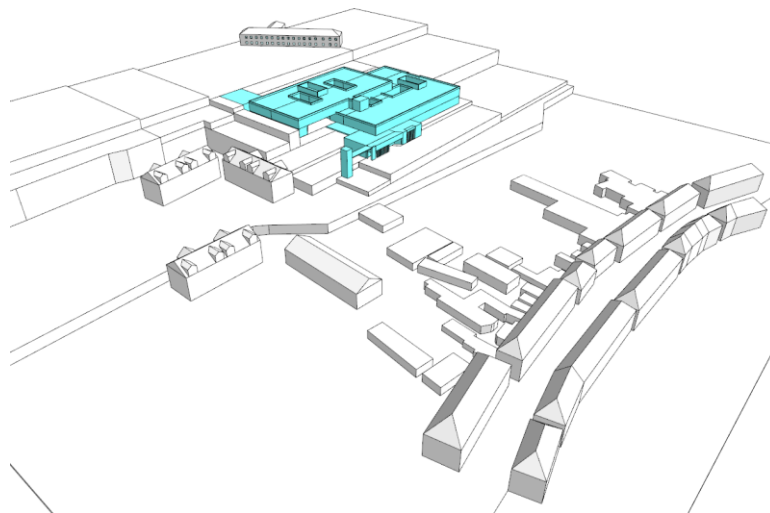




Proposed Civic Office, Roosky Lands, Monaghan Town

Daylight, Sunlight and Overshadowing Study



Report For: Monaghan County Council

Project No: 17125



Version History

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1 Executive Summary

This report summarises the analyses undertaken to quantify the Sunlight and Daylight performance of the proposed Monaghan County Council, Civic Office development located on 'Roosky Lands' Monaghan Town, Co. Monaghan. The report focuses on measuring the daylight and sunlight impact to the existing surrounding dwellings as well as the sunlight performance within the proposed development.

1.1 Planning Authority Guidelines

For clarity, the standard is listed below and the following section 4.2 denotes which standard is applicable for each assessment type:

- BRE Guide –3rd Edition of BR 209 BRE Site Layout Planning for Daylight and Sunlight (2022)

1.2 Reference Standards & Summary of Assessments Undertaken

The various daylight and sunlight assessments that were undertaken using the IES VE software are based on a number of different standards which are referenced in the individual sections of this report. For clarity, the assessments that were undertaken are summarised below as well as the reference standards that were used for each (where applicable):

- **Shadow Analysis**
 - Assessed using shadow images cast at key times throughout the year, i.e. March 21st, June 21st and December 21st to determine if any overshadowing impact occurs and to what extent to any existing neighbouring dwellings in accordance with the BRE Guide (3rd Edition).
- **Sunlight to Amenity Spaces**
 - Assessed using annual Solar Exposure calculations to determine any impact to existing amenities and the sunlight received and also to assess the proposed developments amenity spaces to derive how much sunlight they can expect to receive in accordance with the BRE Guide (3rd Edition).
- **Sunlight to Existing Buildings**
 - Assessed using the Annual Probable Sunlight Hours (APSH) method in accordance with the BRE Guide (3rd Edition) - to determine any impact to sunlight received to the existing neighbouring building main living areas.
- **Daylight to Existing Buildings**
 - Assessed using the Vertical Sky Component (VSC) and Sky Component (for horizontal/sloping roofs) method in accordance with the BRE Guide (3rd Edition) - to determine any impact to existing daylight received to the existing building neighbouring the site.

The following can be concluded based on the assessments undertaken:

1.3 Shadow Analysis

The shadow analysis illustrates different shadows being cast at key times of the year (March 21st, June 21st and December 21st) for the Existing Situations and the Proposed Scheme. The results from the study are summarised as follows:

Diamond Apartments

Minimal additional shading visible from the proposed development on these buildings during March (0800) and December (1000-1200), with no additional overshadowing during the rest of the year.

Building to North East

No additional shading visible from the proposed development on this building throughout the year.

Overall there will be a negligible impact with regards to overshadowing. The potential shading impact is further quantified via the “Sunlight to Amenity Spaces”, “Daylight to Existing Buildings” and “Sunlight to Existing Buildings” sections of this report.

1.4 Sunlight to Amenity Spaces

As outlined in Section 3.3.17 of the BRE Guide (3rd Edition), for a space to appear adequately sunlit throughout the year, at least half of the garden or amenity area should receive at least 2 hours of sunlight on March 21st. In the case of existing amenity spaces, if they are already below the 50% threshold then the BRE recommends the results kept to within 80% of the existing situation.

Existing Amenity Spaces

On March 21st the existing amenity spaces will continue to receive the same levels of sunlight with the proposed development in place when compared to the existing situation. In all cases the results comply with the recommendations in the BRE Guide outlined above.

Proposed Amenity Spaces

On March 21st, 98% of the proposed amenity areas situated within the development site will receive at least 2 hours of sunlight over their combined area, thus complying with the BRE recommendations.

1.5 Sunlight to Existing Buildings

This study considers the proposed scheme and tests if the Annual Probable Sunlight Hours (APSH) results for the living room windows of relevant existing dwellings are greater than 25% annual and 5% winter sunlight or are greater than 0.8 times their former value with the proposed development in place or the reduction in sunlight across the year is less than 4% with the proposed development in place.

Based on the criteria outlined in Section 3.2.9 of the BRE Guide 3rd Edition, one of the existing buildings (Diamond Apartments) fit the requirements to be assessed and as such the APSH assessment was not conducted for the rest of the properties. The BRE guide (3rd Edition) notes that there should be no

impact to sunlight for the rest of the properties “It is not always necessary to do a full calculation to check sunlight potential. The guideline above is met provided either the following is true:

- If the window wall faces within 90° of due south and no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal. Again, obstructions within 90° of due north need not be counted.”

Given the statement above the surrounding dwellings adjacent to the proposed development were verified noting that, in a section perpendicular to the window wall, no angle subtended more than 25° and, in some cases, they were also sitting to the south of the proposed development. Therefore, 2 of the Diamond Apartment buildings as well as the building located to the North East were excluded on the basis, as noted in Section 3.2.9 of the BRE Guide 3rd Edition, that these windows need not be analysed as sunlight impact will be unnoticeable to the existing occupants.

When compared to the Existing Situation, of the 32 no. points tested, 100% meet the BRE recommended values over both the annual and winter periods. These results highlight that the proposed development will have no impact to the sunlight received to these existing neighbouring properties.

1.6 Daylight to Existing Buildings

Based on the criteria outlined in Section 2.2.5 of the BRE guidance (3rd Edition), two of the Diamond Apartments buildings have been included within the VSC assessment. The rest of the neighbouring buildings did not meet the criterion as laid out within the BRE guide.

It is not always necessary to do a full calculation to check daylight potential. The guideline above is met provided the following is true:

- no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal.

Given the statement above the existing surrounding dwellings and the proposed development were verified noting that in a section perpendicular to the window wall, no angle subtended more than 25°. Therefore, as noted above, two of the Diamond Apartments buildings have been included within the VSC assessment, and the rest of the neighbouring buildings were excluded as the daylight impact will be unnoticeable to the occupants.

This study considers the Proposed Scheme and tests if the VSC results are greater than 27% or not less than 0.8 times the value of the Existing Situation.

Of the 32 points tested, 100% have a Proposed VSC value greater than 27% or not less than 0.8 times their former value compared to the Existing Situation, thus complying with the BRE recommendations. It can be concluded that the proposed development will have a negligible impact on the existing neighbouring dwellings with regards to daylight.



1.7 Observations

It is important to note that the recommendations within the BRE Guide (3rd Edition) itself states *“although it gives numerical guidelines these should be interpreted flexibly because natural lighting is only one of many factors in site layout design”*, Although this is true appropriate and reasonable regard has still been taken to the BRE guide.

Whilst the results shown relate to the criteria as laid out in the BRE Guide (3rd Edition), it is important to note that the BRE targets are guidance only and should therefore be used with flexibility and caution when dealing with different types of sites.

In addition, BRE Guide 3rd Edition also notes:

“This report is a comprehensive revision of the 2011 edition of Site layout planning for daylight and sunlight: a guide to good practice. It is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location.”

Taking all of the above information into account and based on the results from each of the assessments undertaken, with regards to the surrounding properties there is a negligible impact when considering sunlight and daylight as a result of the proposed development and the proposed development itself performs very well with the same regard.



2 Introduction

This report presents the analyses undertaken to quantify the Sunlight and Daylight performance of the proposed Monaghan County Council, Civic Office development located on 'Roosky Lands' Monaghan Town, Co. Monaghan. The report focuses on measuring the daylight and sunlight impact to the existing surrounding dwellings as well as the sunlight performance within the proposed development.

2.1 Development Description

A comprehensive description of the proposed development is set out in the Planning Statement. The Statutory Notices should also be referenced.

The proposed development comprises the construction of a new civic office building distributed over three floors which will encompass office accommodation, a Council chamber and a series of supporting spaces, plant, ESB substation and services enclosures. The development will be served by a surface car park, drop-off area and bicycle parking spaces.

Infrastructural works to the existing vehicular route on Slí Ógie Uí Dhufaigh, including the provision of a new clear span bridge over the River Shambles and a new vehicular access 'Quarry Walk' are also proposed. Permeability will be enhanced by a series of pedestrian and cycle links.

Ancillary development works include signage, earthworks, drainage, watermain, utilities, landscaping, boundary treatments, lighting and solar PV panels.

3 BRE – Site Layout Planning for Daylight and Sunlight (3rd Edition)

Access to daylight and sunlight is a vital part of a healthy environment. Sensitive design should provide sufficient daylight and sunlight to new residential developments while not obstructing light to existing homes nearby.

The 3rd Edition of the BR 209 BRE Site Layout Planning for Daylight and Sunlight 2022, advise on planning developments for good access to daylight and sunlight and is widely used by local authorities to help determine the performance of new developments.

3.1 Impact Classification Discussion

BRE guidance in Appendix H (BRE Guide 3rd Edition) – identifies impact classifications as minor, moderate and major adverse. It provides further classifications of these impacts with respect to criteria summarised in the table below.

Where the loss of skylight or sunlight fully meets the guidelines in the BRE guide (3rd Edition), the impact is assessed as negligible or minor adverse. Where the loss of skylight or sunlight does not meet the BRE guidelines, the impact is assessed as minor, moderate or major adverse.

Impact	Description
<i>Negligible adverse impact</i>	<ul style="list-style-type: none"> • <i>Loss of light well within guidelines, or</i> • <i>only a small number of windows losing light (within the guidelines) or limited area of open space losing light (within the guidelines)</i>
<i>Minor adverse impact (a)</i>	<ul style="list-style-type: none"> • <i>Loss of light only just within guidelines and</i> <ul style="list-style-type: none"> ○ <i>a larger number of windows are affected or</i> ○ <i>larger area of open space is affected (within the guidelines)</i>
<i>Minor adverse impact (b)</i>	<ul style="list-style-type: none"> • <i>only a small number of windows or limited open space areas are affected</i> • <i>the loss of light is only marginally outside the guidelines</i> • <i>an affected room has other sources of skylight or sunlight</i> • <i>the affected building or open space only has a low-level requirement for skylight or sunlight</i> • <i>there are particular reasons why an alternative, less stringent, guideline should be applied</i>
<i>Major adverse impact</i>	<ul style="list-style-type: none"> • <i>large number of windows or large open space areas are affected</i> • <i>the loss of light is substantially outside the guidelines</i> • <i>all the windows in a particular property are affected</i> • <i>the affected indoor or outdoor spaces have a particularly strong requirement for skylight or sunlight (living rooms / playground)</i>

4 Methodology

4.1 Planning Authority Guidelines

Chapter 15 of the Monaghan County Development Plan 2019-205 sets out development management standards. It states,

All proposals must minimise overlooking, overbearing and overshadowing to ensure no significant adverse impact on adjoining properties. Proposals which impact negatively on the residential amenity of adjoining properties by reason of overlooking or overshadowing will be resisted. Project drawings determining the degree of impact may be requested. Shadow projection drawings in accordance with 'Site Layout Planning for Daylight and Sunlight; A guide to good practice (1991)' or 'Lighting for Buildings Part 2; A code of practice for day lighting (1992)' may be required.

For clarity, the standard listed below supersedes the referenced 1991 guide.

- BRE Guide –3rd Edition of BR 209 BRE Site Layout Planning for Daylight and Sunlight

4.2 Reference Standards & Summary of Assessments Undertaken

The various daylight and sunlight assessments that were undertaken using the IES VE software are based on a number of different standards which are referenced in the individual sections of this report. For clarity, the assessments that were undertaken are summarised below as well as the reference standards that were used for each (where applicable):

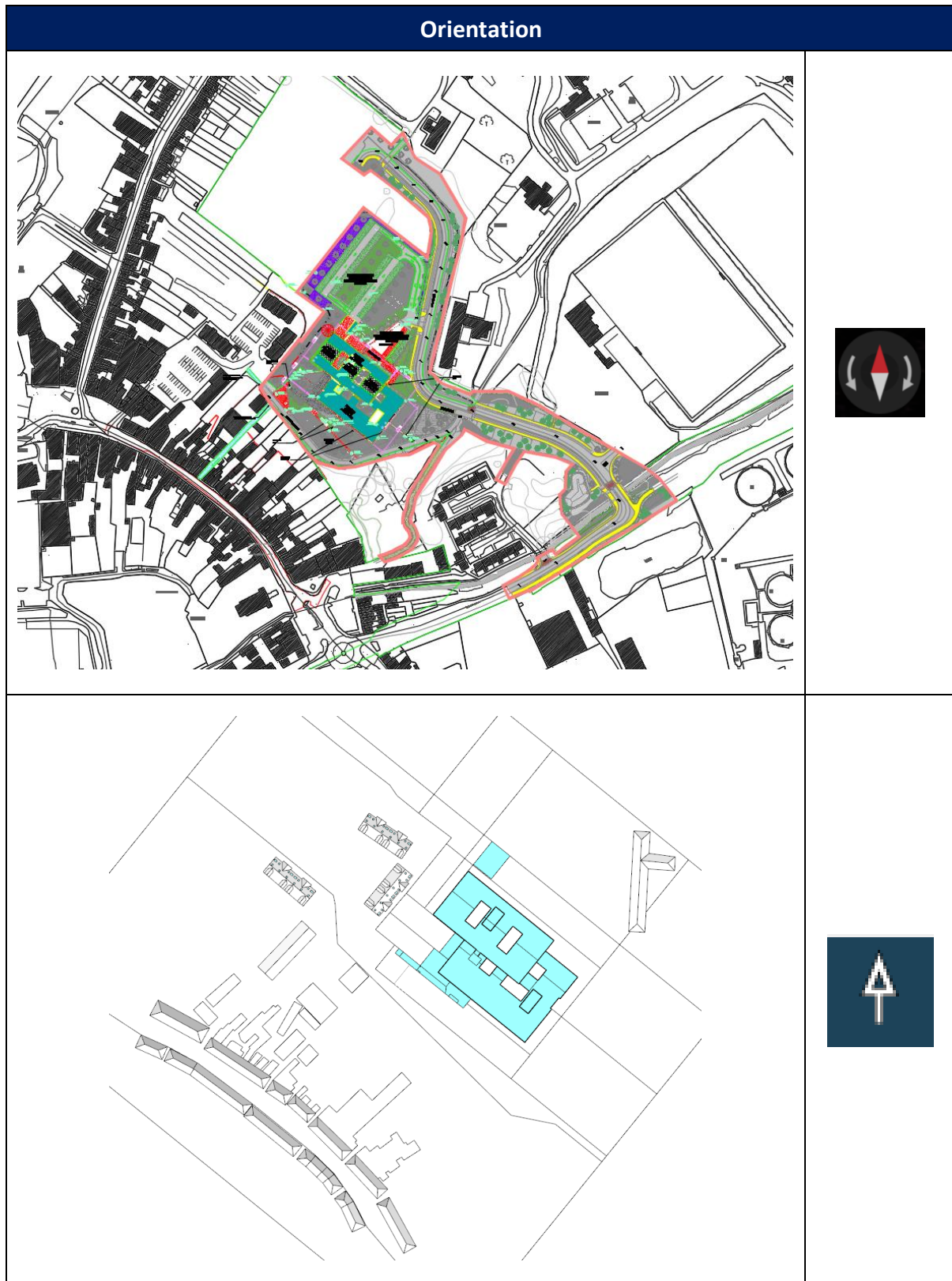
- **Shadow Analysis**
 - Assessed using shadow images cast at key times throughout the year, i.e. March 21st, June 21st and December 21st to determine if any overshadowing impact occurs and to what extent to any existing neighbouring dwellings in accordance with the BRE Guide (3rd Edition).
- **Sunlight to Amenity Spaces**
 - Assessed using annual Solar Exposure calculations to determine any impact to existing amenities and the sunlight received and also to assess the proposed developments amenity spaces to derive how much sunlight they can expect to receive in accordance with the BRE Guide (3rd Edition).
- **Sunlight to Existing Buildings**
 - Assessed using the Annual Probable Sunlight Hours (APSH) method in accordance with the BRE Guide (3rd Edition) - to determine any impact to sunlight received to the existing neighbouring building main living areas.
- **Daylight to Existing Buildings**
 - Assessed using the Vertical Sky Component (VSC) and Sky Component (for horizontal/sloping roofs) method in accordance with the BRE Guide (3rd Edition) - to



determine any impact to existing daylight received to the existing building neighbouring the site.

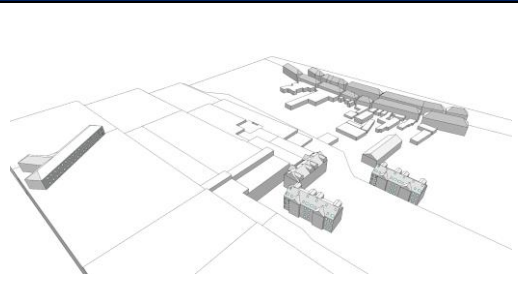
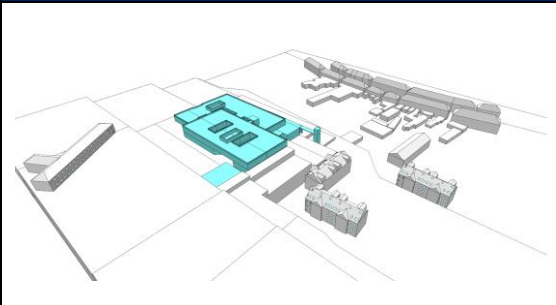
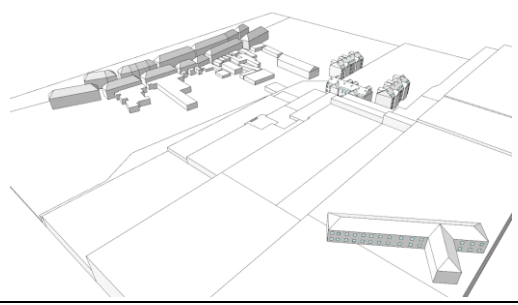
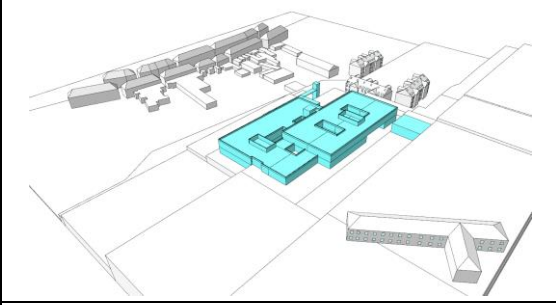
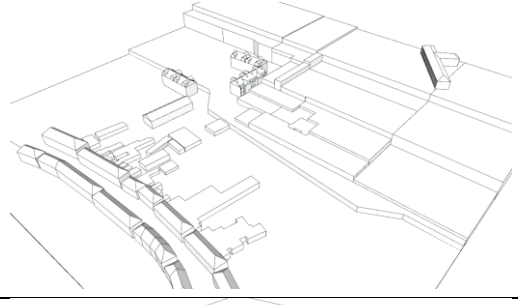
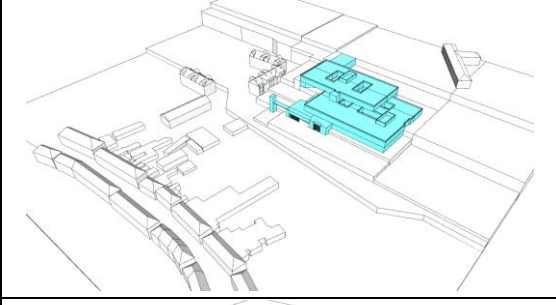
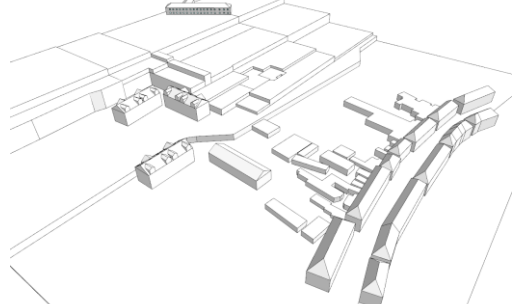
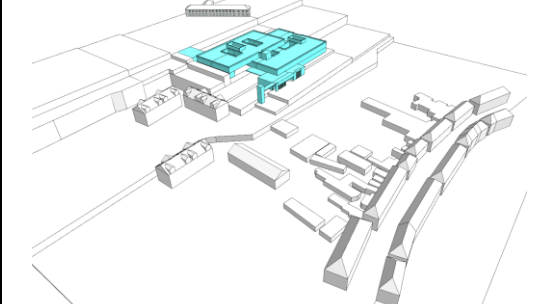
4.3 Orientation

The model orientation has been taken from drawings provided by the Architect with the resulting angle shown below used in the analysis.



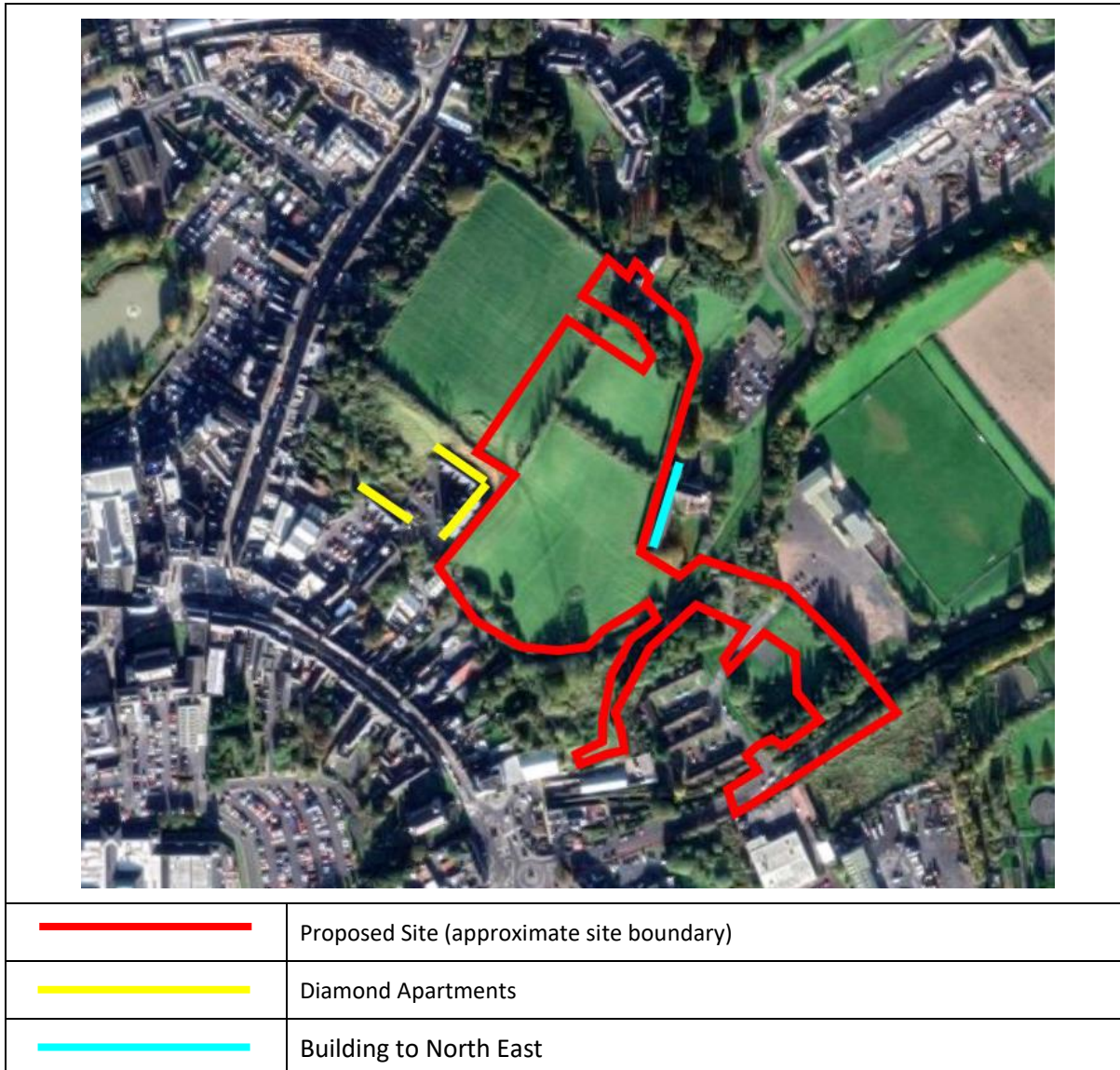
4.4 Proposed Model

The following images illustrate the models created from the architectural information provided and the use of Google/Bing maps where information was absent.

	Existing Situation	Proposed Scheme
View looking from North of Site		
View looking from East of Site		
View looking from South of Site		
View looking from West of Site		

4.5 Potential Sensitive Receptors

To help understand the potential impact to surrounding buildings, potential sensitive receptors were identified as illustrated below. Properties to the South and South East of the proposed development site will not be impacted with regards to daylight and sunlight due to the distance from the proposed development (excluding sheds and outbuildings approximately 105 meters) and have been excluded from assessment on this basis.



5 Shadow Analysis

The statistics of Met Eireann, the Irish Meteorological Service, show that the sunniest months in Ireland are May and June, based on 1981-2010 averages or latest:

<https://www.met.ie/climate/30-year-averages>.

The following can also be shown:

- During December a mean daily duration of 1.7 hours of sunlight out of a potential 7.3 hours sunlight each day is received (i.e. only 23% of potential sunlight hours).
- During June a mean daily duration of 5.8 hours of sunlight out of a potential 15.9 hours sunlight each day is received (i.e. only 36% of potential sunlight hours).

Therefore, the impacts caused by overshadowing are generally most noticeable during the summer months and least noticeable during the winter months.

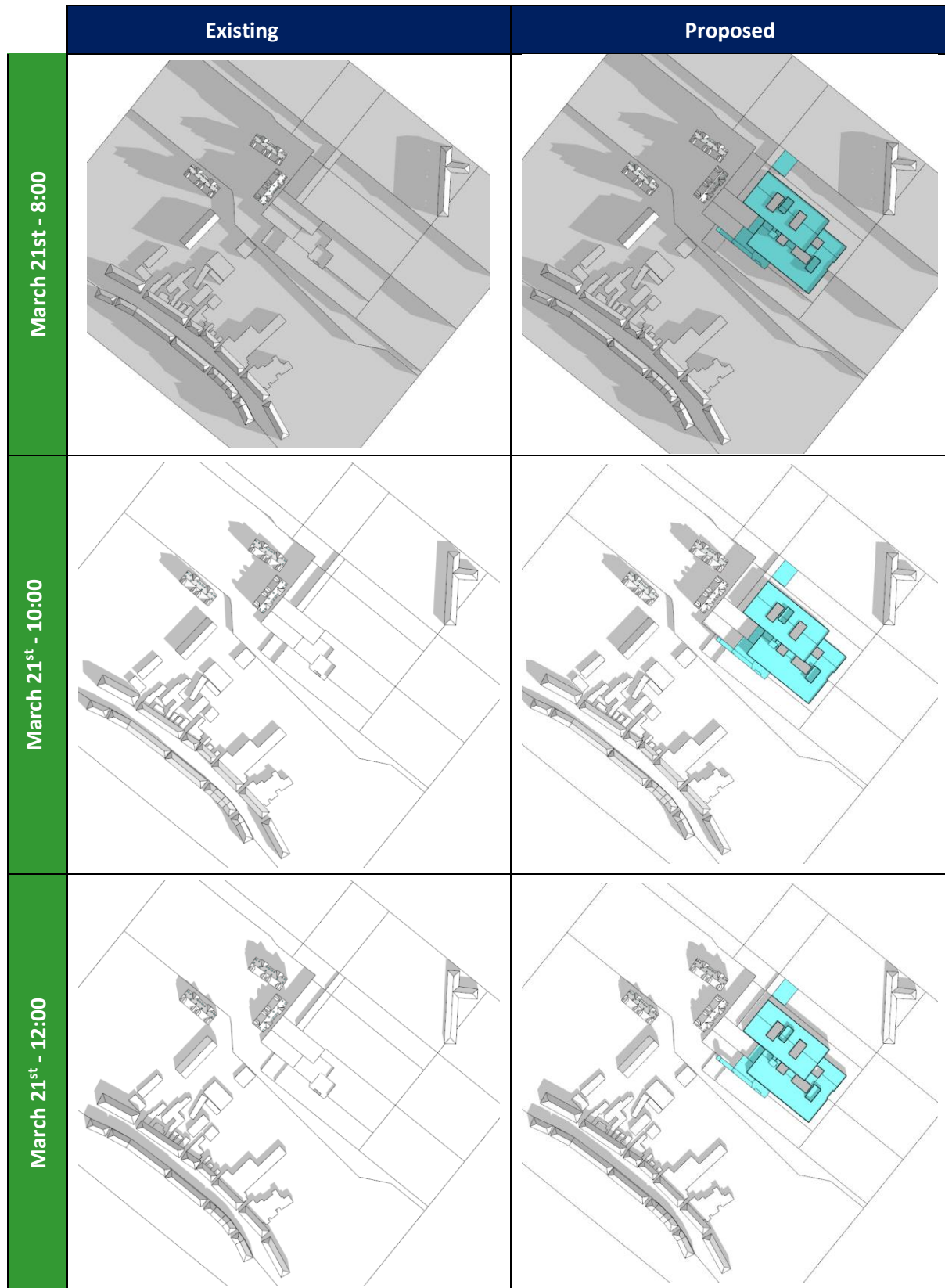
This section will consider the shadows cast by the proposed development on the following dates:

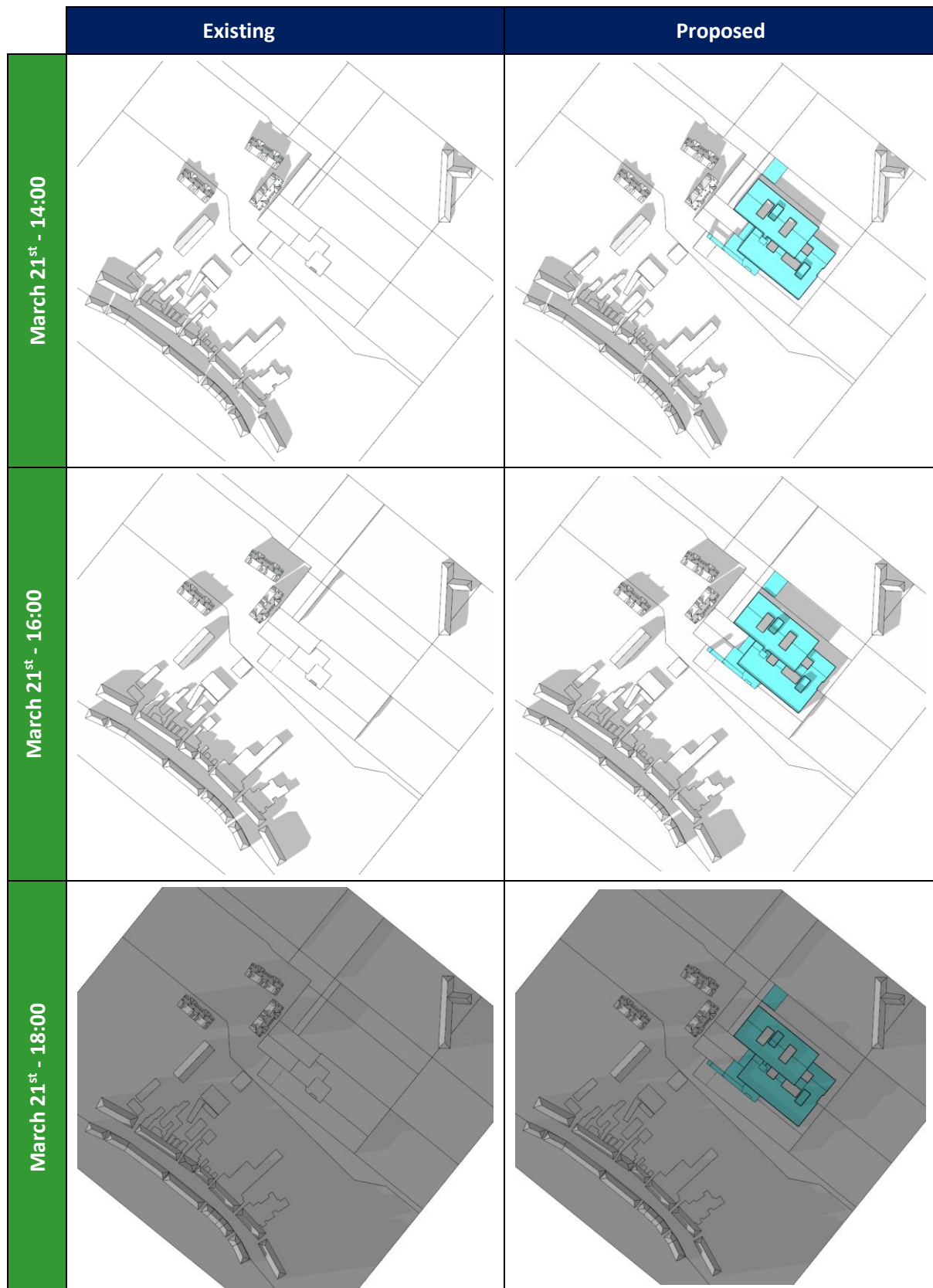
- March 21st / September 21st (Equinox)
- June 21st (Summer Solstice)
- December 21st (Winter Solstice)

These images illustrate shadows cast for 'perfect sunny' conditions with no clouds and assumed that the sun is shining for every hour shown. Given the discussion above it is important to remember that this is not always going to be the case.

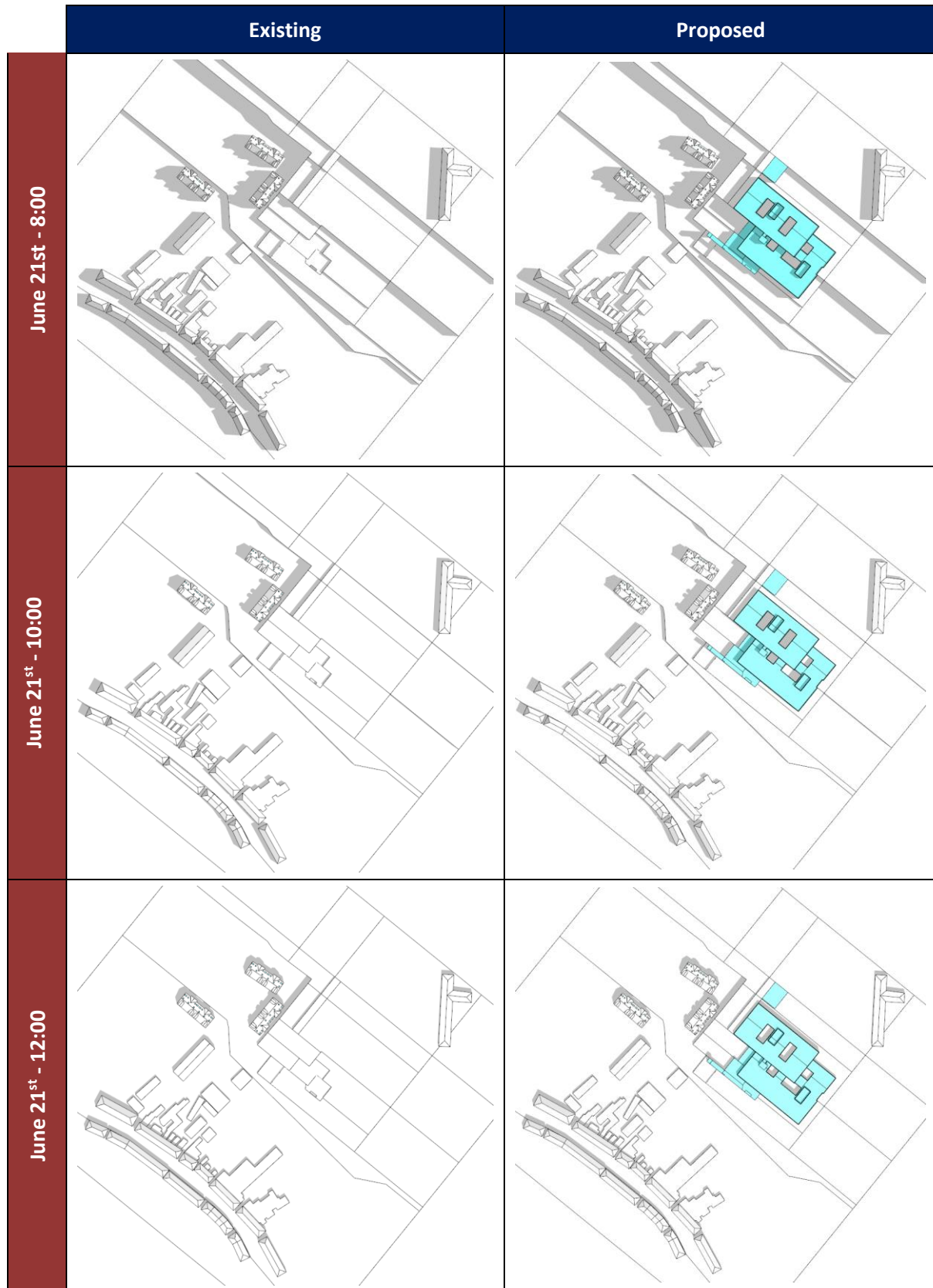
5.1 Plan View

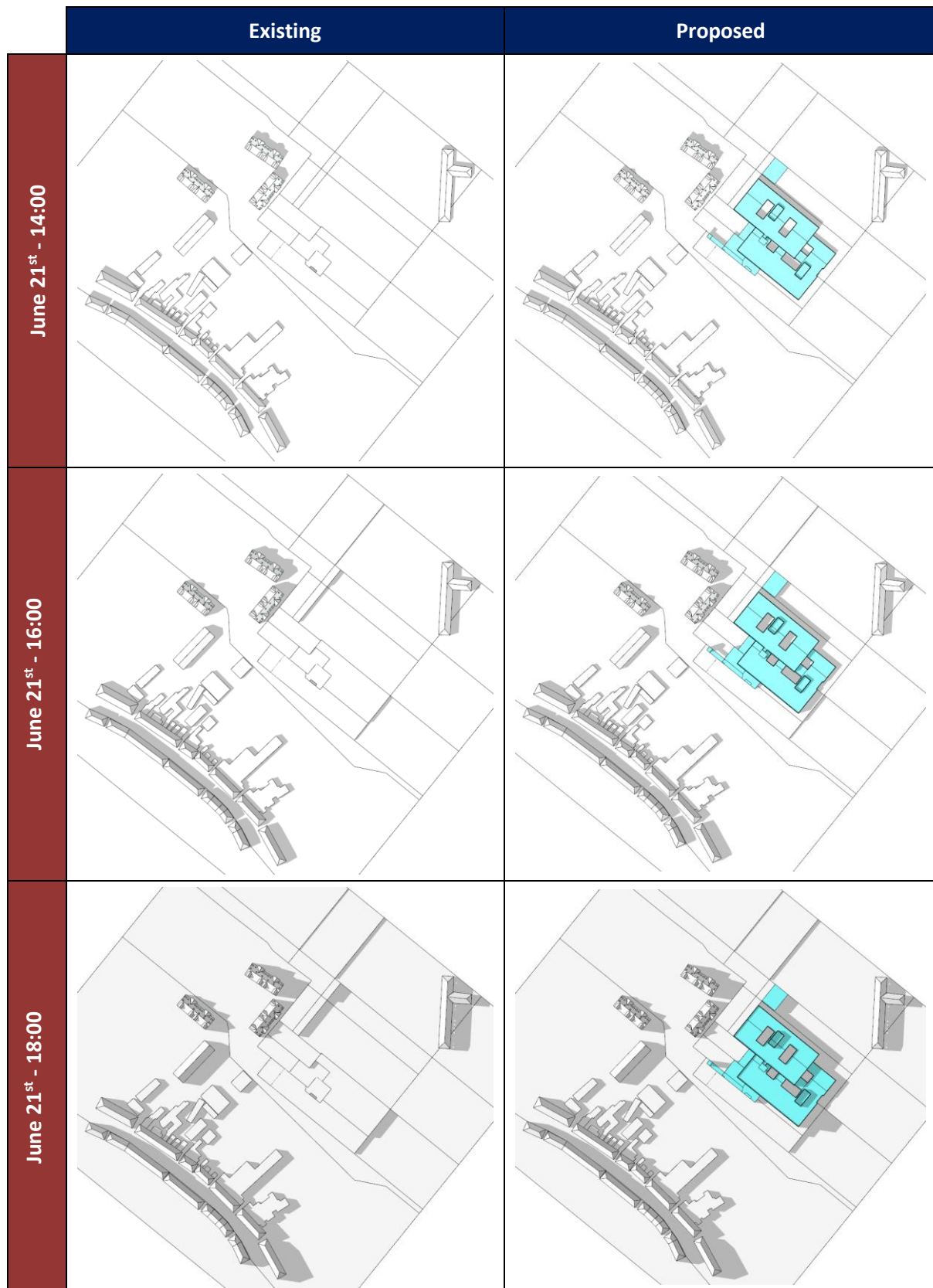
5.1.1 March 21st

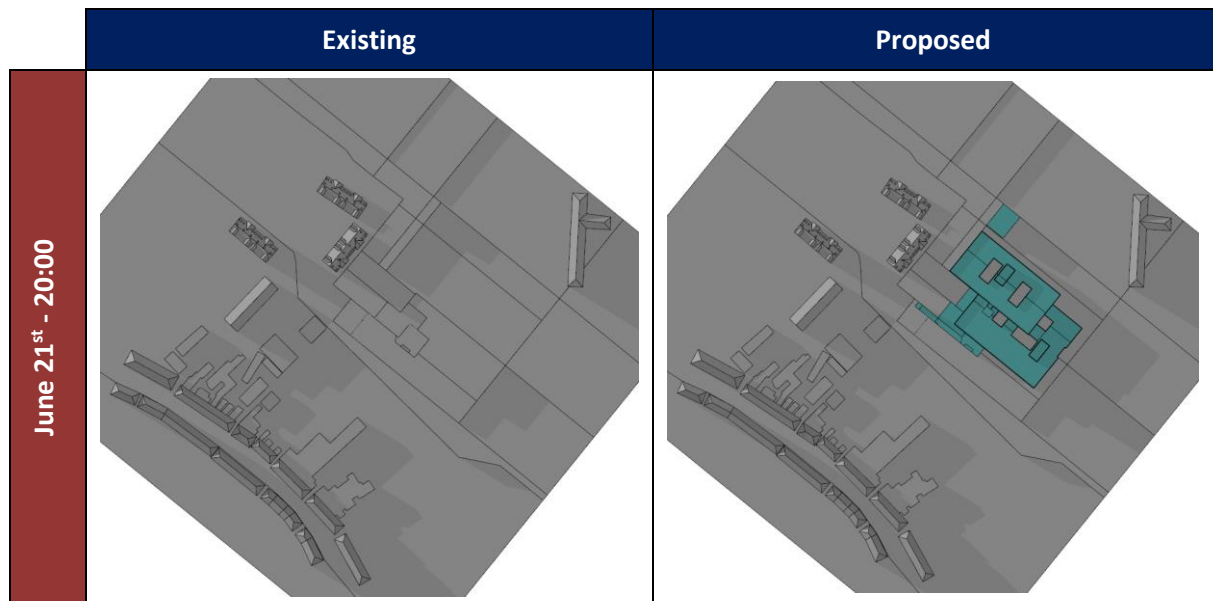




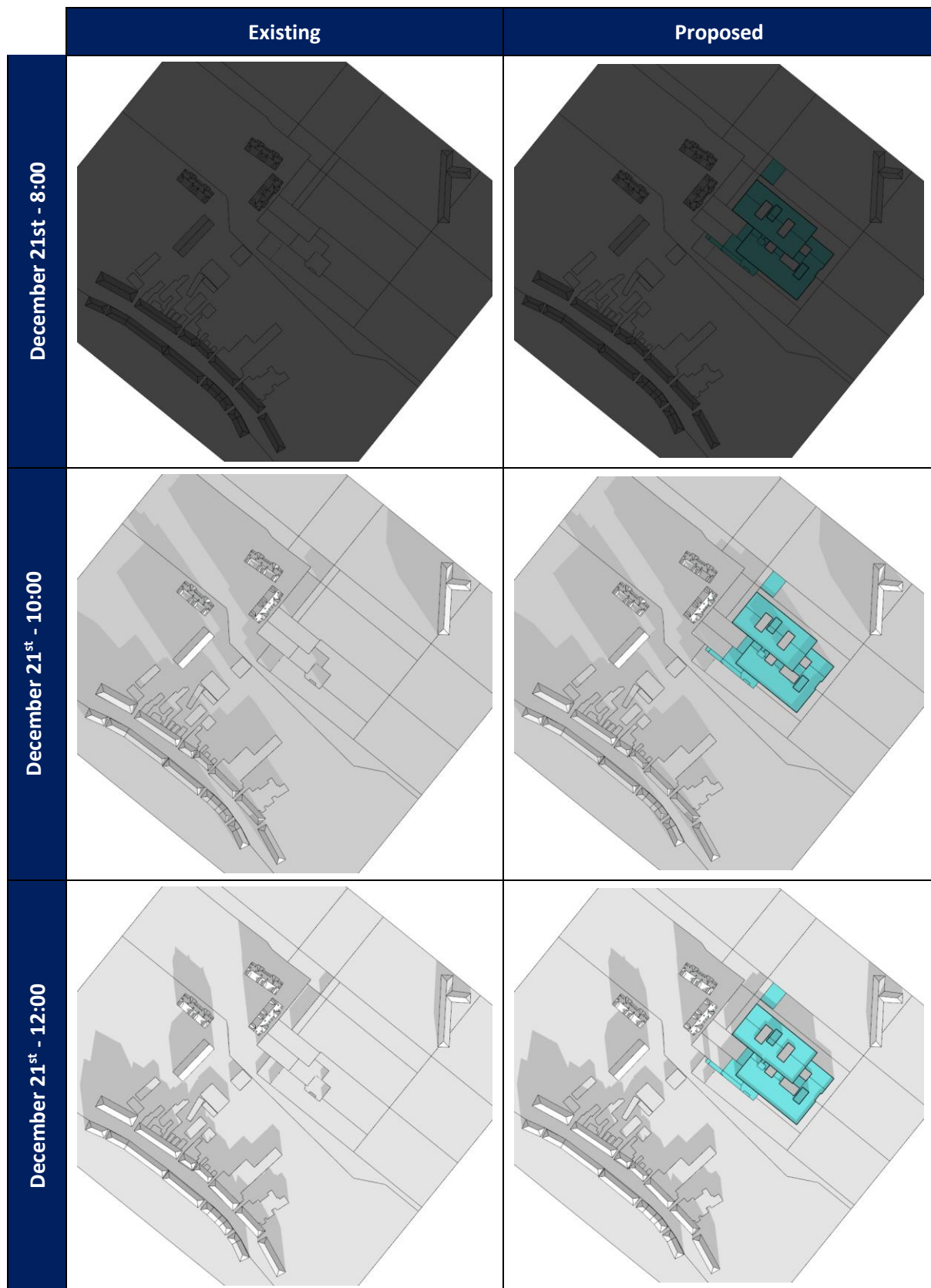
5.1.2 June 21st

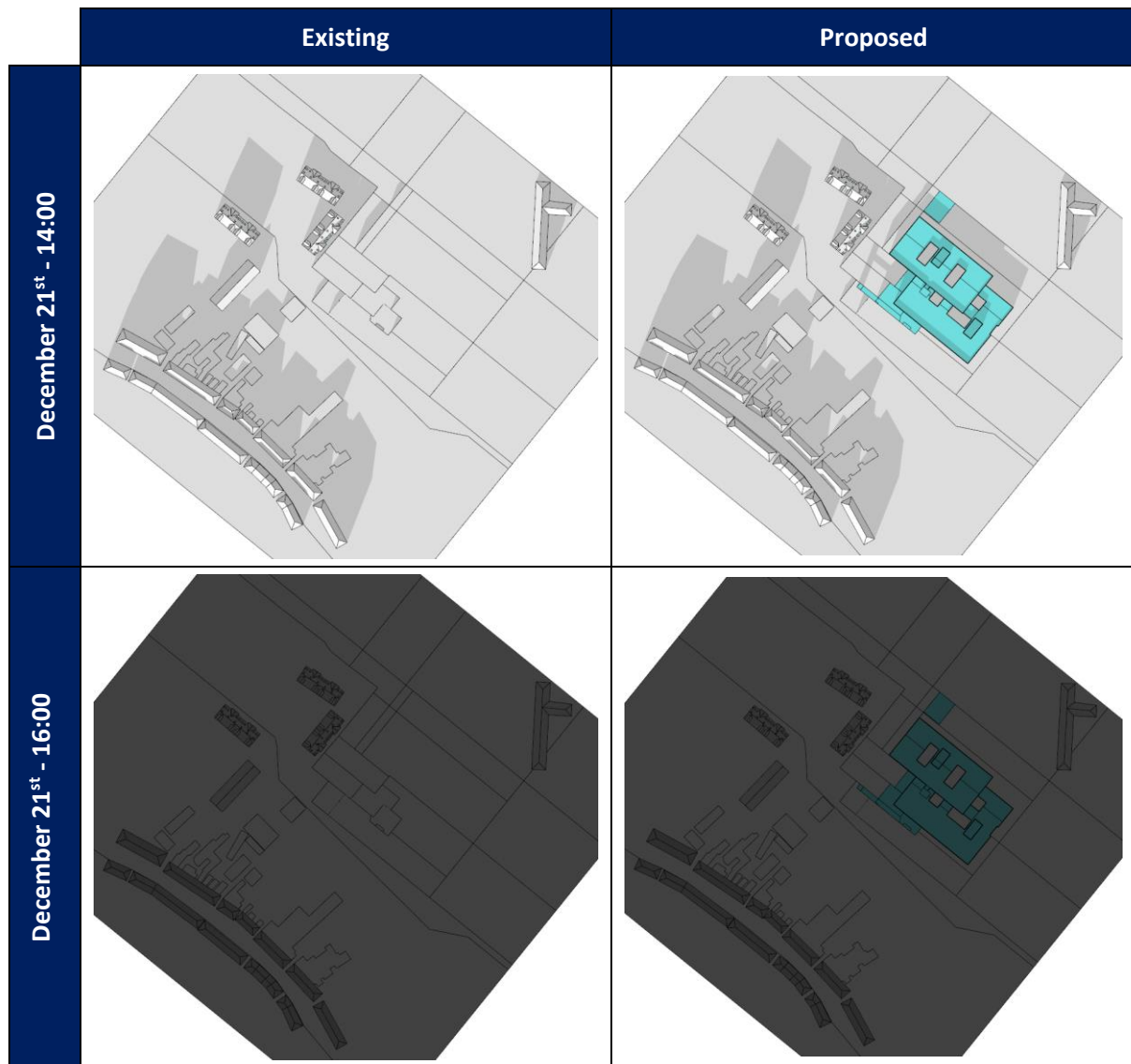






5.1.3 December 21st





5.2 3D View

5.2.1 March 21st

	Existing	Proposed
March 21 st - 8:00		
March 21 st - 10:00		
March 21 st - 12:00		
March 21 st - 14:00		

	Existing	Proposed
March 21 st - 16:00		
March 21 st - 18:00		

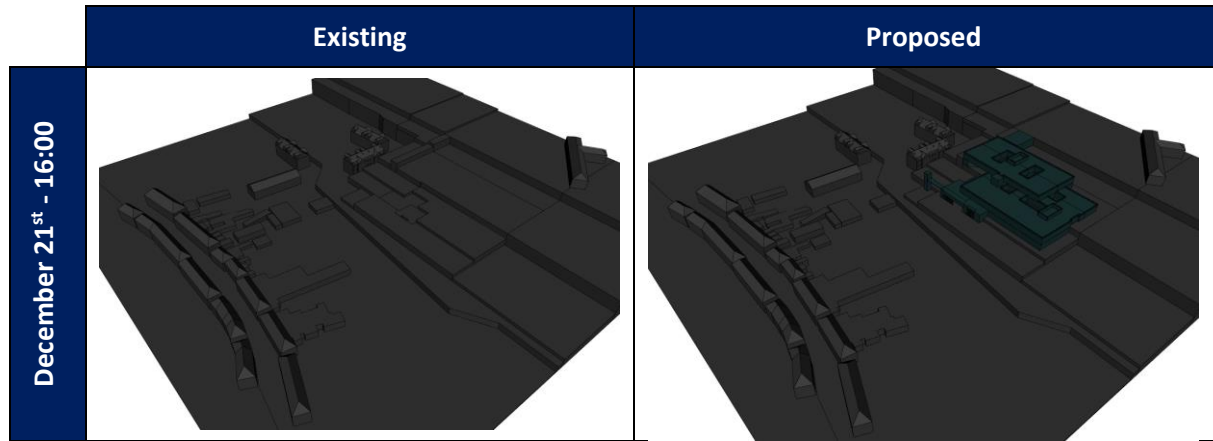
5.2.2 June 21st

	Existing	Proposed
June 21 st - 8:00		
June 21 st - 10:00		
June 21 st - 12:00		
June 21 st - 14:00		

	Existing	Proposed
June 21 st - 16:00		
June 21 st - 18:00		
June 21 st - 20:00		

5.2.3 December 21st

	Existing	Proposed
December 21 st - 8:00		
December 21 st - 10:00		
December 21 st - 12:00		
December 21 st - 14:00		





5.3 Discussion

The shadow analysis illustrates different shadows being cast at key times of the year (March 21st, June 21st and December 21st) for the Existing Context and the Proposed Scheme. The results from the study are summarised as follows:

Diamond Apartments

Minimal additional shading visible from the proposed development on these buildings during March (0800) and December (1000-1200), with no additional overshadowing during the rest of the year.

Building to North East

No additional shading visible from the proposed development on this building throughout the year.

Overall there will be a negligible impact with regards to overshadowing. The potential shading impact is further quantified via the “Sunlight to Amenity Spaces”, “Daylight to Existing Buildings” and “Sunlight to Existing Buildings” sections of this report.

6 Sunlight to Amenity Spaces

6.1 Guidance Requirements

The impact of the proposed development on the sunlight availability to existing and proposed amenity spaces will be considered to determine how the amenity spaces perform when assessed against the BRE Guide (3rd Edition) which states the following in Section 3.3.17:

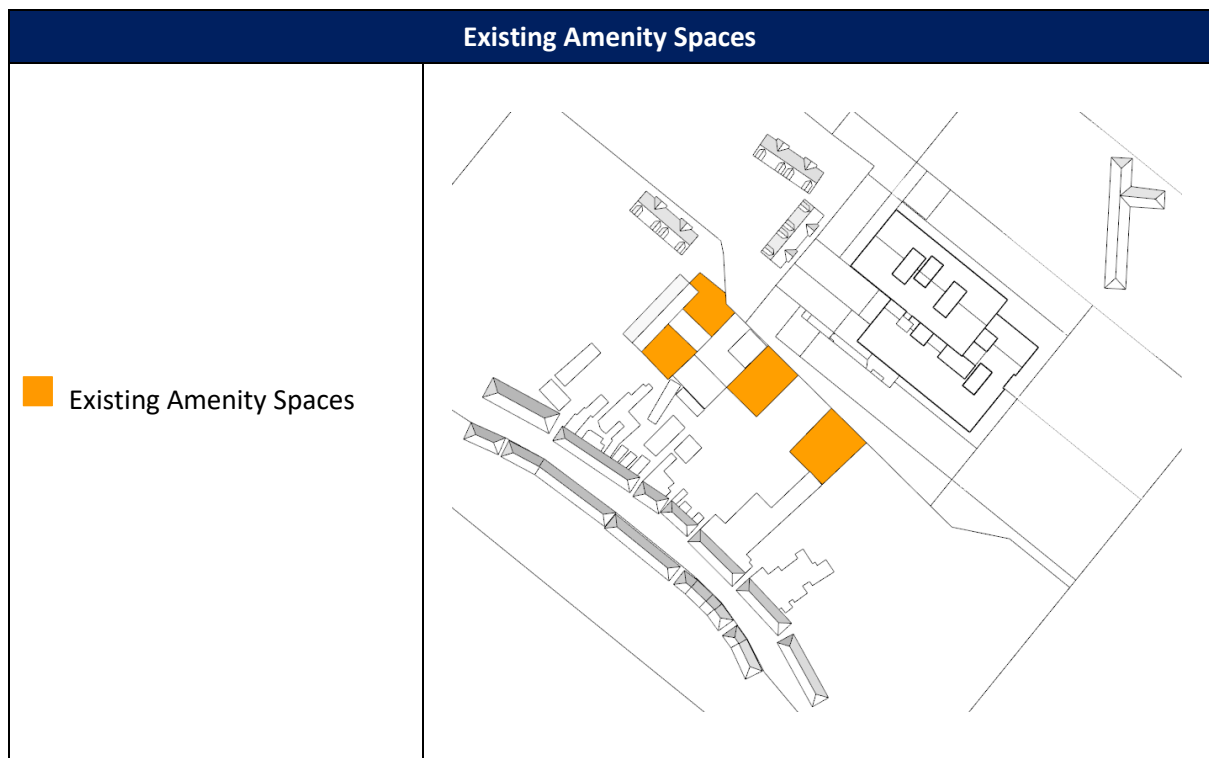
Summary

3.3.17 It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area that can receive two hours of sun on 21 March is less than 0.80 times its former value, then the loss of sunlight is likely to be noticeable. If a detailed calculation cannot be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21 March.

The BRE Guide (3rd Edition) states that for a space to appear adequately sunlit throughout the year, at least half of a garden or amenity space should receive at least 2 hours of sunlight on March 21st.

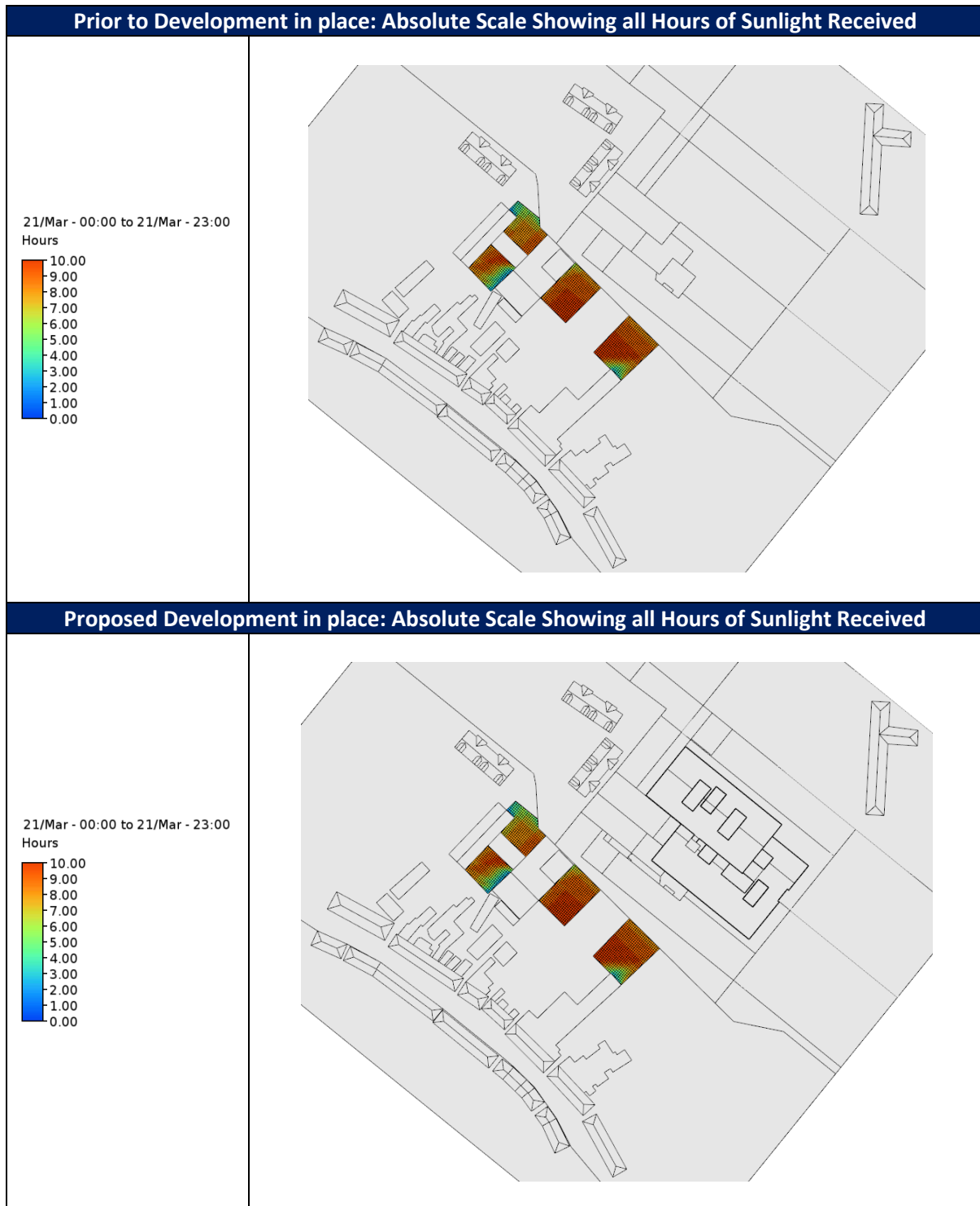
6.2 Existing Amenity Spaces

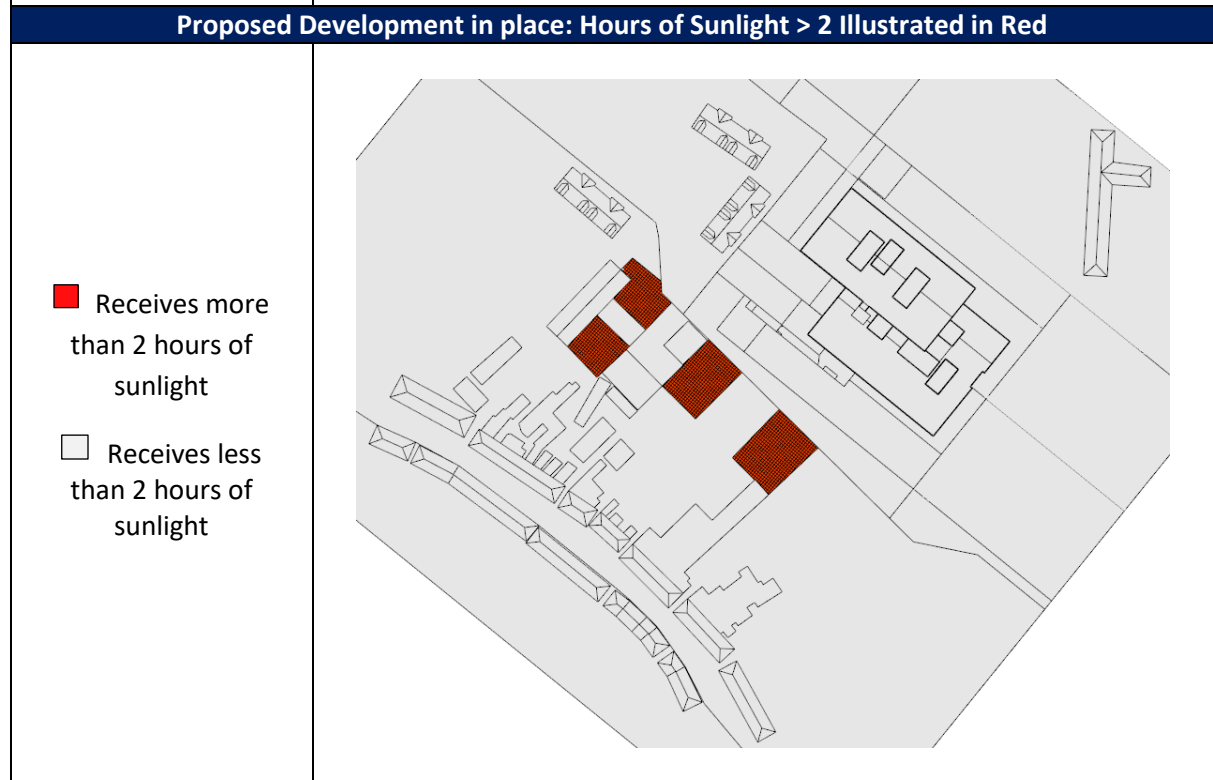
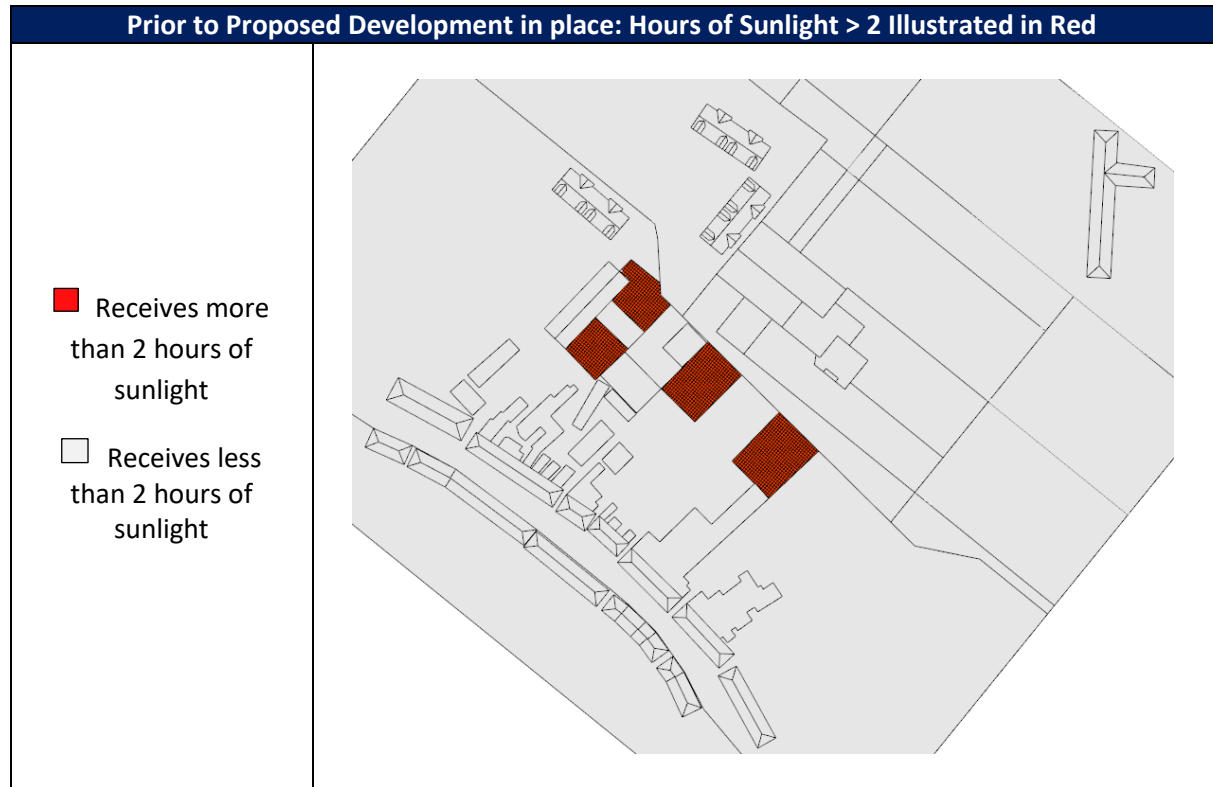
This analysis will be performed on the amenity spaces illustrated in the image below.



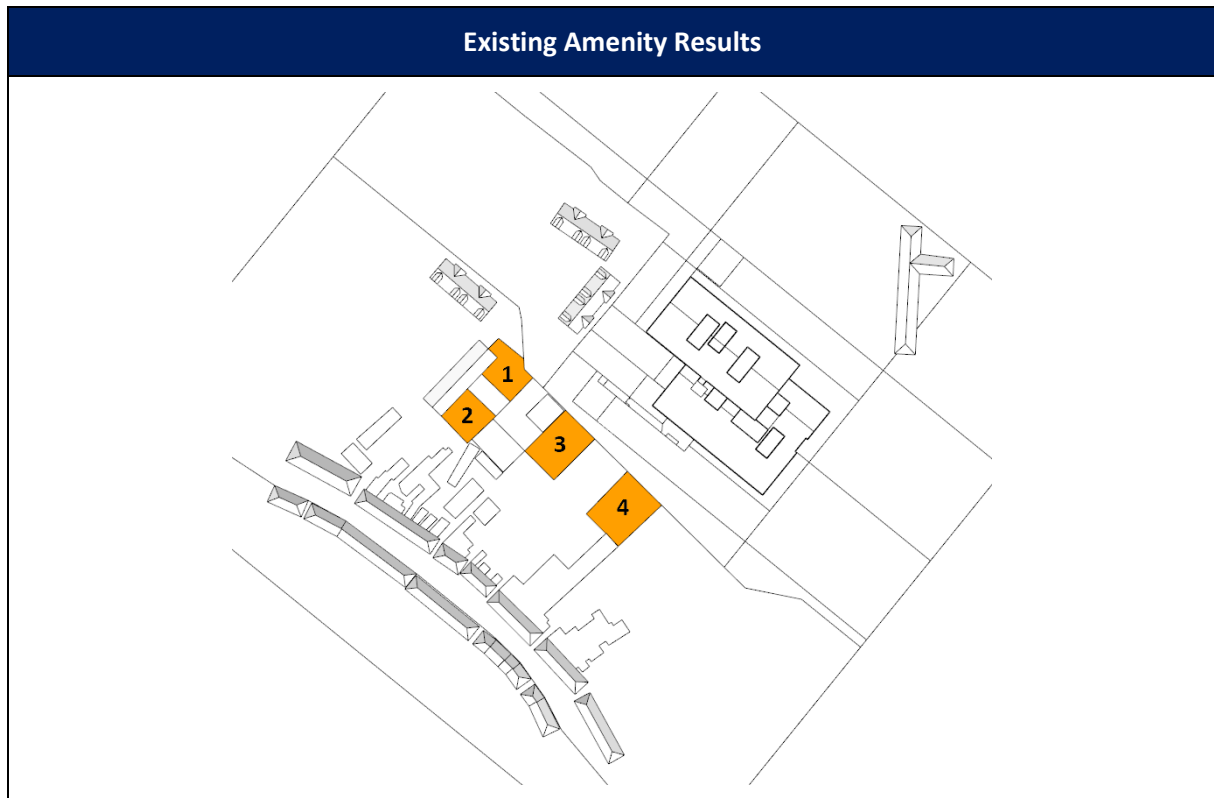
The following images illustrate the predicted results with respect to this space receiving at least 2 hours of sunlight on March 21st. Any areas that receive less than 2 hours of sunlight are colour-coded in grey.

6.2.1 Existing Amenity Spaces Results





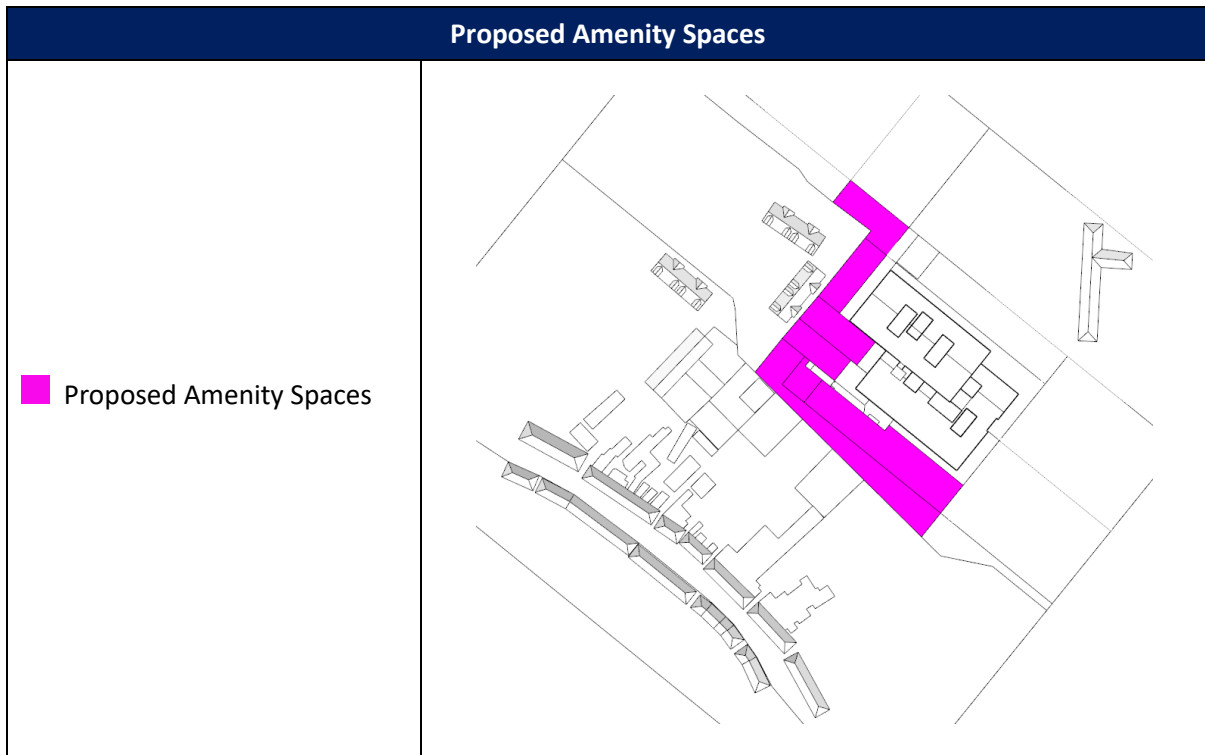
6.2.2 Existing Amenity Results



Ref	Area (m ²)	Existing Area >2 hrs		Existing Area with Proposed Development in Place >2 hrs		Proposed vs Existing (%)	Comment
		(m ²)	(%)	(m ²)	(%)		
1	312	312	100%	312	100%	100%	✓
2	282	282	100%	282	100%	100%	✓
3	450	450	100%	450	100%	100%	✓
4	525	525	100%	525	100%	100%	✓

6.3 Proposed Amenity Spaces

This analysis will be performed on the amenity spaces illustrated in the image below.

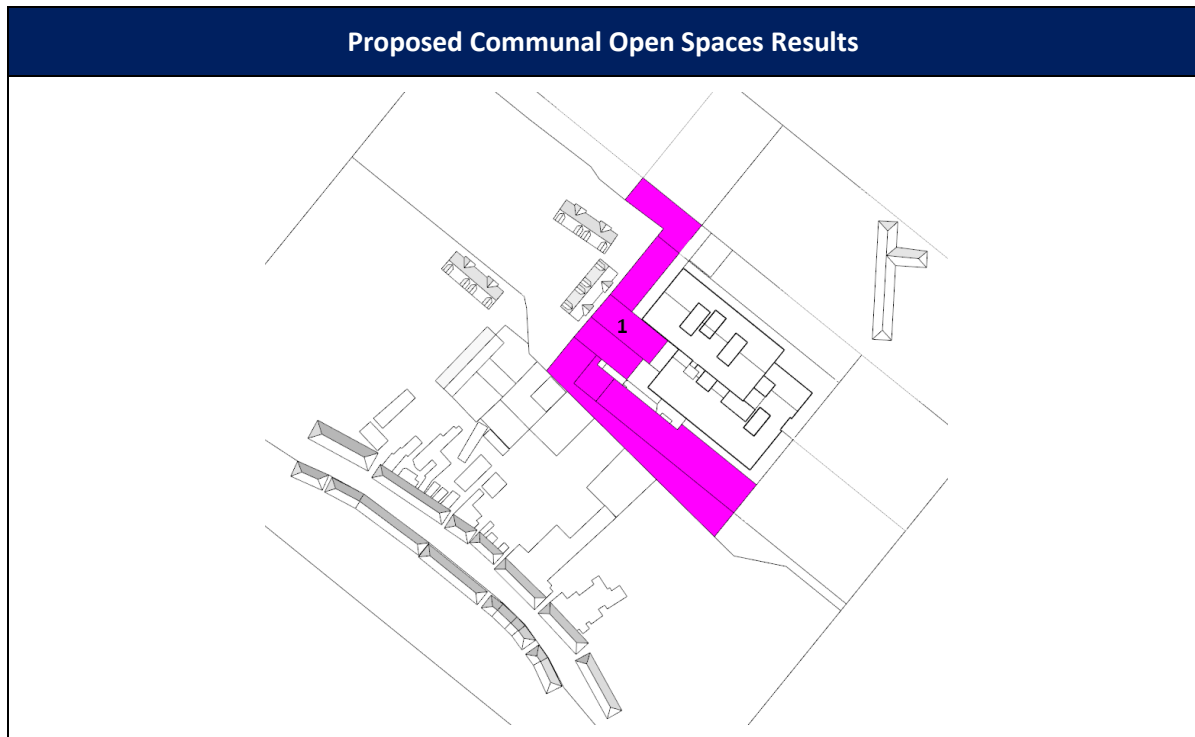


The following images illustrate the predicted results with respect to this space receiving at least 2 hours of sunlight on March 21st. Any areas that receive less than 2 hours of sunlight are colour-coded in grey.

6.3.1 Proposed Amenity Spaces Results



6.3.2 Proposed Amenity Results



Proposed Amenity Spaces:

Ref	Total Area (m ²)	Area Receiving >2h (m ²)	Percent Receiving >2h	Comment
1	4,541	4,476	98%	✓
Total	4,541	4,476	98%	✓



6.4 Discussion

As outlined in Section 3.3.17 of the BRE Guide (3rd Edition), for a space to appear adequately sunlit throughout the year, at least half of the garden or amenity area should receive at least 2 hours of sunlight on March 21st. In the case of existing amenity spaces, if they are already below the 50% threshold then the BRE recommends the results kept to within 80% of the existing situation.

Existing Amenity Spaces

On March 21st the existing amenity spaces will continue to receive the same levels of sunlight with the proposed development in place when compared to the existing situation. In all cases the results comply with the recommendations in the BRE Guide outlined above.

Proposed Amenity Spaces

On March 21st, 98% of the proposed amenity areas situated within the development site will receive at least 2 hours of sunlight over their combined area, thus complying with the BRE recommendations.

7 Sunlight to Existing Buildings

7.1 Guidance – BRE Guide (3rd Edition)

The BRE Guide (3rd Edition) states that interiors where the occupants expect sunlight should receive at least one quarter (25%) of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months, between 21st September and 21st March.

Here 'probable sunlight hours' means the total number of hours in the year that the sun is expected to shine on unobstructed ground, allowing for average levels of cloudiness for the location in question.

If a window reference point can receive more than 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months between 21st September and 21st March, then the room should still receive enough sunlight. Any reduction in sunlight access below this level should be kept to a minimum.

If the available sunlight hours are both less than the amount given and less than 0.8 times their former value, either over the whole year or just during the winter months (21st September to 21st March) and reduction in sunlight across the year has a greater reduction than 4%, then the occupants of the existing building will notice the loss of sunlight.

Summary

3.2.13 If a living room of an existing dwelling has a main window facing within 90° of due south, and any part of a new development subtends an angle of more than 25° to the horizontal measured from the centre of the window in a vertical section perpendicular to the window, then the sunlighting of the existing dwelling may be adversely affected. This will be the case if the centre of the window:

- receives less than 25% of annual probable sunlight hours and less than 0.80 times its former annual value; or less than 5% of annual probable sunlight hours between 21 September and 21 March and less than 0.80 times its former value during that period;
- and also has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.

BRE 3rd Edition guidance document Site Layout Planning for Daylight and Sunlight

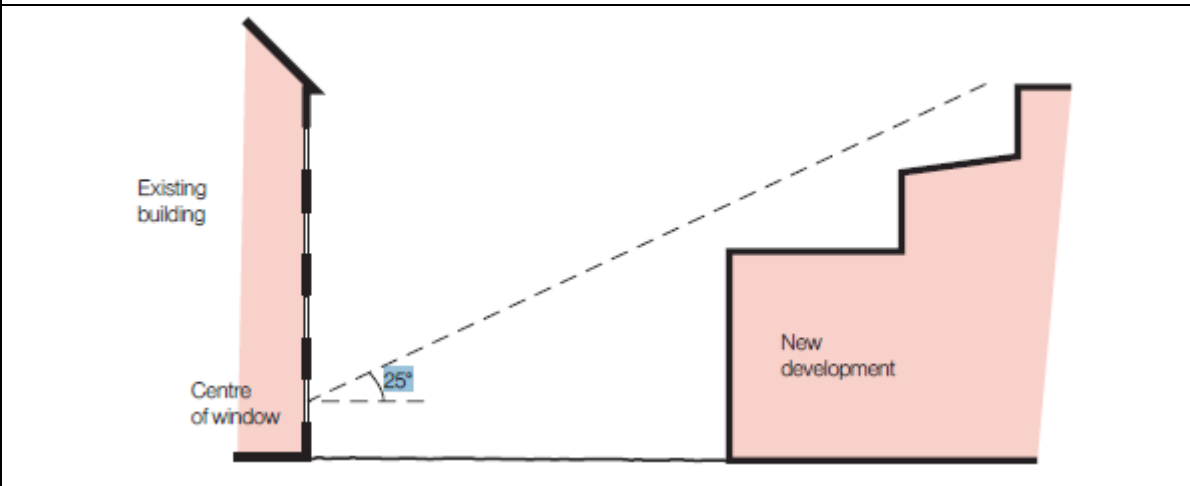
As such this study will compare the Existing Scheme and Proposed Schemes and consider if the values on the existing buildings meet the requirements outlined above when compared to their former value (that of the Existing scheme).

7.2 AP SH Exclusions

The BRE recommendations note that if a new development sits within 90° of due south of any main living room window of an existing dwelling, then these should be assessed for AP SH. However, there are several exceptional cases in which AP SH is not required to be calculated, as indicated below:

3.2.9 It is not always necessary to do a full calculation to check sunlight potential. The guideline above is met provided either of the following is true:

- If the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window (note: obstructions within 90° of due north of the existing window need not count here).
- The window wall faces within 90° of due south and no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal (Figure 14 in section 2.2). Again, obstructions within 90° of due north of the existing window need not be counted.
- The window wall faces within 20° of due south and the reference point has a VSC (section 2.1) of 27% or more.



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Consequently, AP SH will only be calculated for adjacent windows which meet the following conditions:

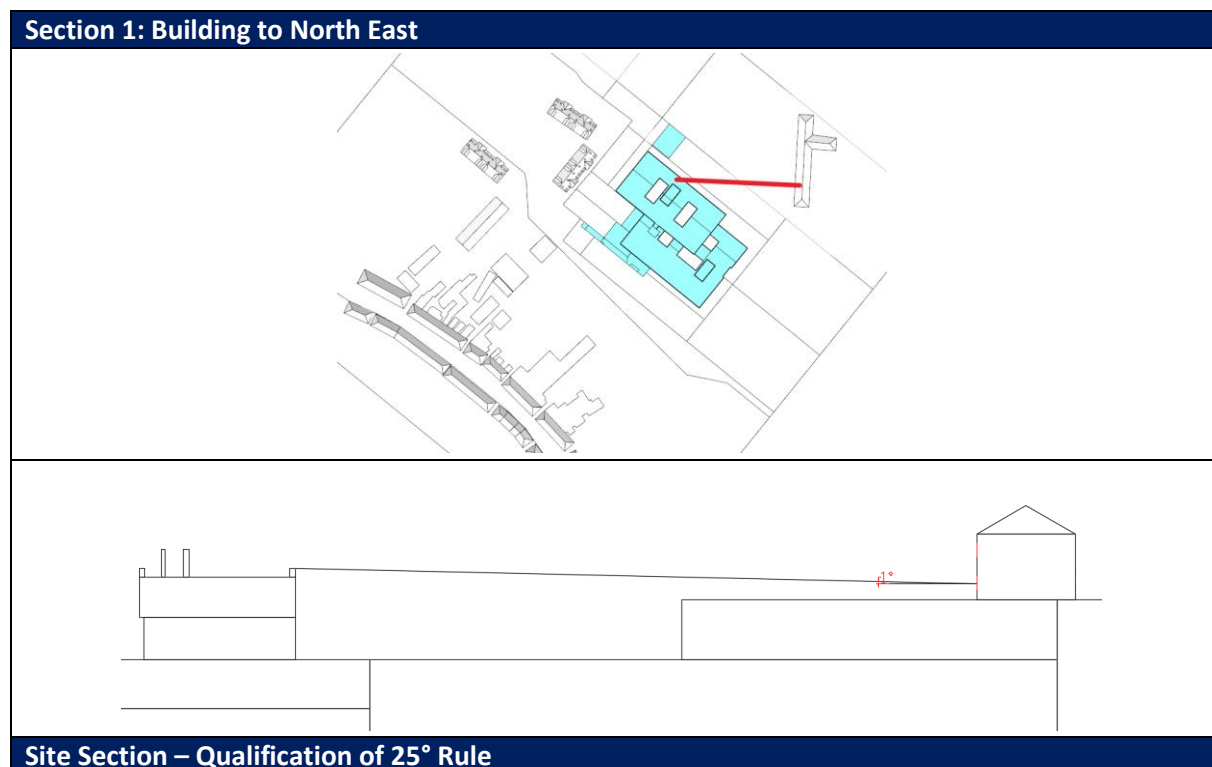
1. The height distance rule is not met and the existing building has a living room with a main window which faces within 90 degrees of due south with the 25° rule not being met either.
2. Existing building is located to the North, East, or West of the Proposed Development.
3. The existing main living room window lies within 20 degrees of due south and has a VSC of less than 27%.

7.3 25-Degree Rule

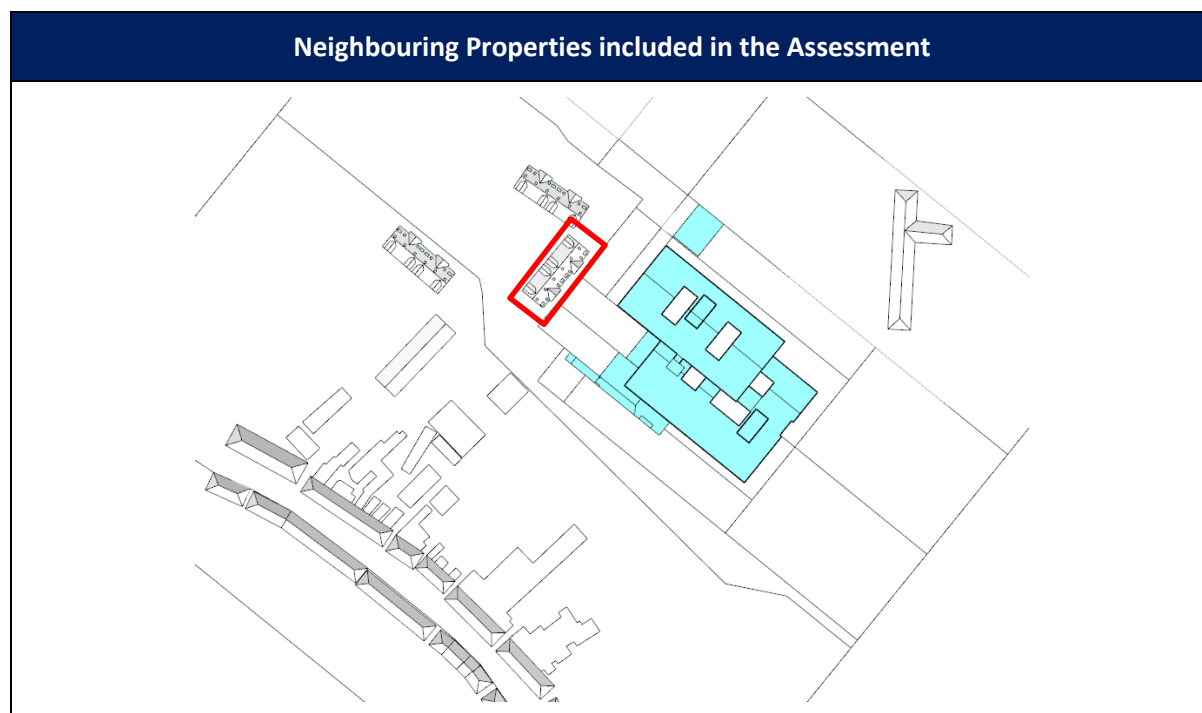
Given the statement above the surrounding elevations adjacent to the proposed development were verified noting that, in a section perpendicular to the window wall, no angle subtended more than 25° in some cases as noted below.

- Building to North East

The following images show the 25-degree test sections or property locations to the East of the proposed development.



Taking the above into consideration, the existing Diamond Apartments building facing the development has been included in this analysis as highlighted in the key image below. Furthermore, only buildings which have living area windows that face within 90 degrees of South have been included. The remaining two Diamond Apartments buildings along with the building located to the North East have been excluded from the assessment based on the criteria outlined above.



7.4 APSH Assessment

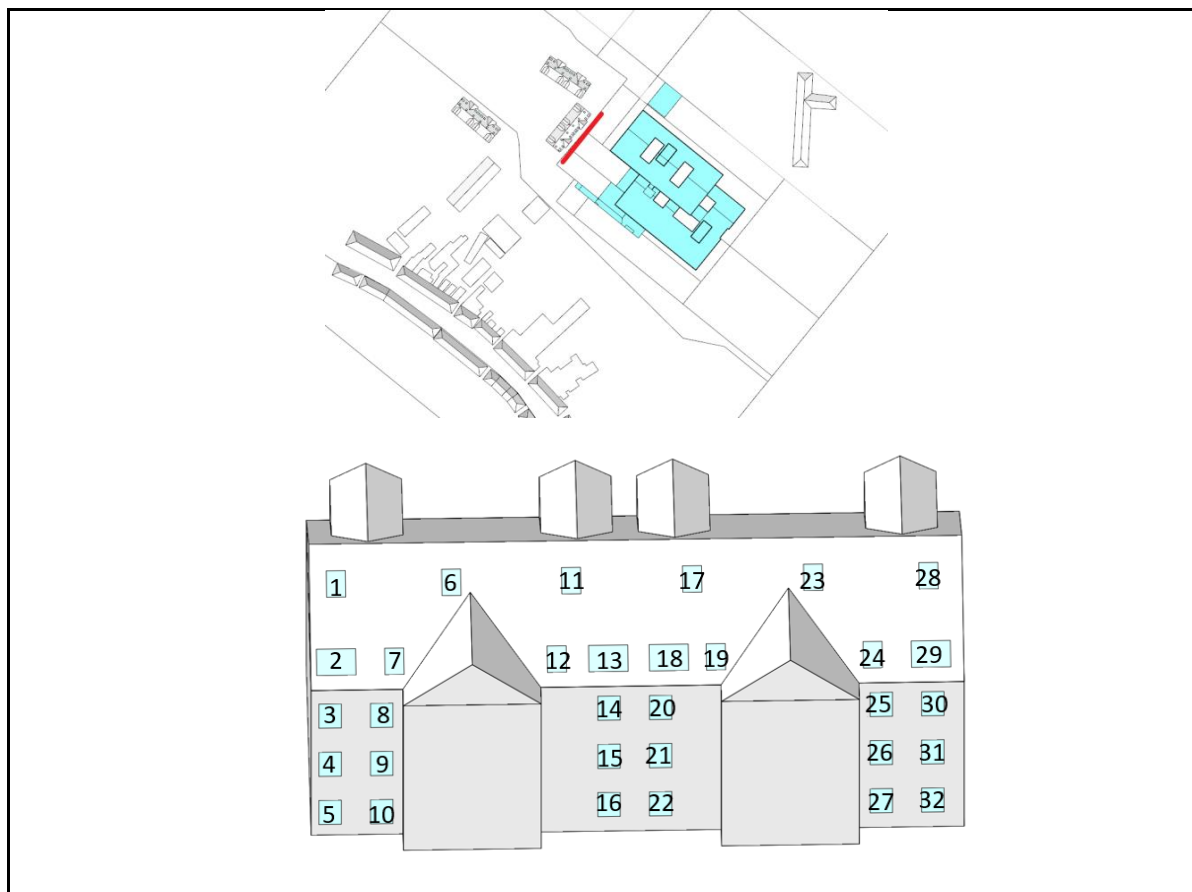
Based on the above criteria, the locations in the following sections have been modelled and analysed with the results also included.

Please note, the “Comment” symbol in each of the tables represents the following:

- ✓/✓ For these locations, both the Proposed Scheme annual and winter APSH results are greater than 25% and 5% respectively, or are greater than 0.8 times their former value or are less than 4% overall annual loss with the proposed development in place.
- ✓/x For these locations, the annual APSH results are greater than 25% or are greater than 0.8 times their former value with the proposed development in place, however, the winter results are below the guidelines.
- x/✓ For these locations, the annual APSH results are less than the recommended values, however, the winter APSH results are greater than 5% or greater than 0.8 times their former value with the proposed development in place.

x/x For these locations, both the annual and winter APSH results are less than 25% and 5% respectively, and less than 0.8 times their former value or are greater than 4% overall annual loss with the proposed development in place.

7.4.1 View 1: Diamond Apartments



Ref.	Existing Scheme APSH		Proposed Scheme APSH		Proposed Scheme APSH as a % of the Existing Scheme		Comment
	Annual	Winter	Annual	Winter	Annual	Winter	
1	81.92	32.87	78.38	30.73	96%	93%	✓/✓
2	79.13	32.25	73.56	29.07	93%	90%	✓/✓
3	64.58	29.37	55.94	24.16	87%	82%	✓/✓
4	59.09	27.53	51.83	22.05	88%	80%	✓/✓
5	27.67	8.56	27.67	8.56	100%	100%	✓/✓
6	81.73	32.79	77.61	30.07	95%	92%	✓/✓
7	76.52	32.25	71.37	28.56	93%	89%	✓/✓
8	59.57	29.37	52.58	23.32	88%	79%	✓/✓
9	54.95	26.64	48.81	21.14	89%	79%	✓/✓
10	26.2	7.34	26.2	7.34	100%	100%	✓/✓
11	81.55	32.60	76.92	29.37	94%	90%	✓/✓
12	67.71	21.51	61.33	17.58	91%	82%	✓/✓
13	73.13	26.49	67.2	23.02	92%	87%	✓/✓
14	54.46	23.41	47.98	18.15	88%	78%	✓/✓
15	32.93	9.73	32.28	9.19	98%	94%	✓/✓
16	9.22	0.62	9.22	0.62	100%	100%	✓/✓



Ref.	Existing Scheme APSH		Proposed Scheme APSH		Proposed Scheme APSH as a % of the Existing Scheme		Comment
17	80.42	32.17	76.22	28.67	95%	89%	✓/✓
18	74.37	28.25	68.68	25.02	92%	89%	✓/✓
19	71.94	28.61	67.48	25.62	94%	90%	✓/✓
20	54.57	25.16	48.88	20.23	90%	80%	✓/✓
21	36.43	12.56	35.40	12.20	97%	97%	✓/✓
22	11.33	1.81	11.33	1.81	100%	100%	✓/✓
23	78.87	30.62	75.21	27.65	95%	90%	✓/✓
24	61.23	15.72	57.20	13.62	93%	87%	✓/✓
25	19.26	1.02	19.26	1.02	100%	100%	✓/✓
26	1.78	0.00	1.78	0.00	100%	100%	✓/✓
27	0.00	0.00	0.00	0.00	100%	100%	✓/✓
28	78.52	30.61	73.58	26.37	94%	86%	✓/✓
29	67.46	21.31	63.09	18.88	94%	89%	✓/✓
30	29.36	5.69	29.36	5.69	100%	100%	✓/✓
31	9.23	1.66	9.23	1.66	100%	100%	✓/✓
32	2.49	0.15	2.49	0.15	100%	100%	✓/✓

7.5 Discussion

This study considers the proposed scheme and tests if the Annual Probable Sunlight Hours (APSH) results for the living room windows are greater than 25% annual and 5% winter sunlight or are greater than 0.8 times their former value with the proposed development in place or the reduction in sunlight across the year is less than 4% with the proposed development in place.

Based on the criteria outlined in Section 3.2.9 of the BRE Guide 3rd Edition, one of the existing buildings (Diamond Apartments) fit the requirements to be assessed and as such the APSH assessment was not conducted for the rest of the properties. The BRE guide (3rd Edition) notes that there should be no impact to sunlight for the rest of the properties “It is not always necessary to do a full calculation to check sunlight potential. The guideline above is met provided either the following is true:

- If the window wall faces within 90° of due south and no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal. Again, obstructions within 90° of due north need not be counted.”

Given the statement above the surrounding dwellings adjacent to the proposed development were verified noting that, in a section perpendicular to the window wall, no angle subtended more than 25° and, in some cases, they were also sitting to the south of the proposed development. Therefore, 2 of the Diamond Apartment buildings as well as the building located to the North East were excluded on the basis, as noted in Section 3.2.9 of the BRE Guide 3rd Edition, that these windows need not be analysed as sunlight impact will be unnoticeable to the existing occupants.

When compared to the Existing Situation, of the 32 no. points tested, 100% meet the BRE recommended values over both the annual and winter periods. These results highlight that the proposed development will have no impact to the sunlight received to these existing neighbouring properties.

8 Daylight to Existing Buildings

8.1 Guidance – BRE Guide (3rd Edition)

When designing a new development, it is important to safeguard the daylight to nearby buildings. The BRE Guide provides numerical values that are purely advisory. Different criteria may be used based on the requirements for daylighting in an area viewed against other site layout constraints. Another issue is whether the existing building is itself a good neighbour, standing a reasonable distance from the boundary and taking no more than its fair share of light. Any reduction in the total amount of skylight can be calculated by determining the vertical sky component at the centre of key reference points. The vertical sky component definition from the BRE Guide (3rd Edition) is described below:

Vertical sky component (VSC)	This is a measure of the amount of light reaching a window. It is the ratio of that part of illuminance, at a point on a given vertical plane, that is received directly from a CIE standard overcast sky, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Usually the 'given vertical plane' is the outside of a window wall. The VSC does not include reflected light, either from the ground or from other buildings.
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The maximum possible VSC value for an opening in a vertical wall, assuming no obstructions, is 40%. This VSC at any given point can be tested in RadianceIES, a module of IES VE.

For typical residential schemes the BRE Guide (3rd Edition) states the following in Section 2.2.7:

2.2.7 If this VSC is greater than 27% then enough skylight should still be reaching the window of the existing building. Any reduction below this level should be kept to a minimum. If the VSC, with the new development in place, is both less than 27% and less than 0.8 times its former value, occupants of the existing building will notice the reduction in the amount of skylight. The area lit by the window is likely to appear more gloomy, and electric lighting will be needed more of the time.
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As such this study will compare the Existing scheme and Proposed scheme and consider if the values on the existing buildings are above 27% or not less than 0.8 times their former value (that of the Existing scheme).

In addition, the BRE notes that the above cannot be applied to horizontal or sloping rooflights. Section 2.2.9 states the following:

2.2.9 For sloping or horizontal rooflights a similar approach can be used, with a horizontal or sloping sky component. If the value with the new development in place is less than 0.80 times the value before, there would be a noticeable reduction in the light entering the rooflight. Horizontal or sloping sky components cannot be calculated using the methods in Appendices A or B; specialist software is required.

As such an assessment of the windows on the pitched roofs has been included and will determine if with the new development in place the proposed value is greater than 0.8 times that of the existing situation.

It is also important to note that Section 2.1.6 of the BRE Guide states that if the VSC is between 15% and 27%, special measures such as larger windows can provide adequate daylight (refer to extract below).

2.1.6 The amount of daylight a room needs depends on what it is being used for. But roughly speaking, if θ is:

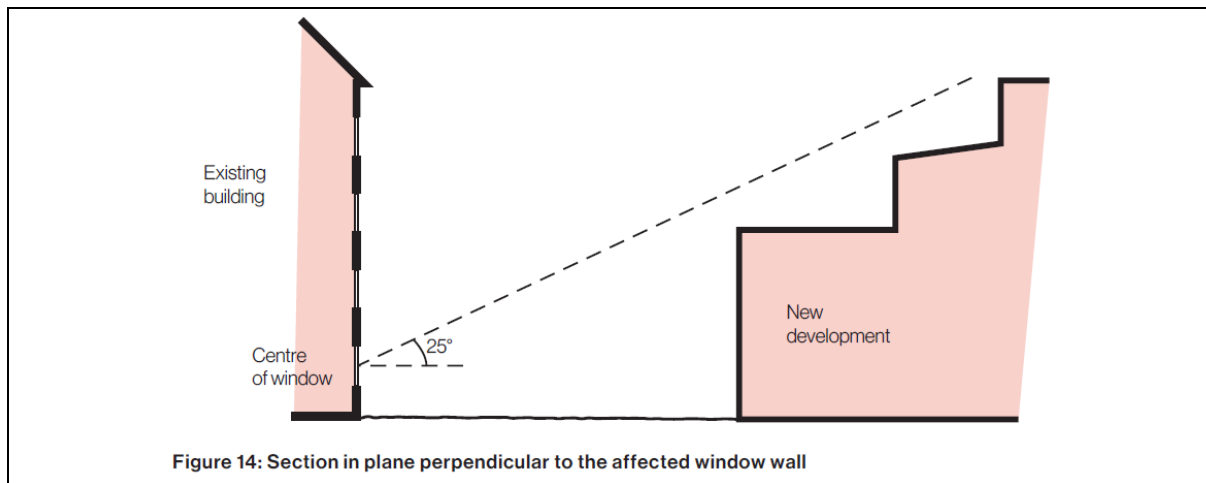
- greater than 65° (obstruction angle less than 25° or VSC at least 27%) conventional window design will usually give reasonable results.
- between 45° and 65° (obstruction angle between 25° and 45°, VSC between 15% and 27%) special measures (larger windows, changes to room layout) are usually needed to provide adequate daylight.
- between 25° and 45° (obstruction angle between 45° and 65°, VSC between 5% and 15%) it is very difficult to provide adequate daylight unless very large windows are used.
- less than 25° (obstruction angle greater than 65°, VSC less than 5%) it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed.

Section 2.2.4 of the BRE Guide states that the daylight to existing windows do not need to be analysed if the distance of each part of the proposed development from the existing windows is three or more times its height above the centre of the existing window.

2.2.4 Loss of light to existing windows need not be analysed if the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window. In these cases the loss of light will be small. Thus, if the new development were 10 m tall, and a typical existing ground floor window would be 1.5 m above the ground, the effect on existing buildings more than $3 \times (10 - 1.5) = 25.5$ m away need not be analysed.

8.2 25 Degree Rule

Section 2.2.5 of the BRE Guide states that if in a section perpendicular to the window wall, no angle subtended more than 25 degrees, as shown in the image below, it is not necessary to do a full calculation as the daylight impact will be unnoticeable to the occupants. Please refer to section 7.3 25 Degree Rule for the section images produced as evidence for each of the qualifying views. One neighbouring elevation did not meet the criteria and have been assessed in the following section.





8.3 Assessment

Based on the above criteria, the building located to the North East have not been included within the assessment as it does not meet the criteria, the locations in the following sections have been modelled and analysed with the results also included.

Please note, the “Comment” symbol in each of the tables represents the following:

- ✓ For these locations, the Proposed Scheme VSC value is greater than 27% or 0.8 times their former value (that of the Existing Situation).
- ✓¹ For these locations, the Proposed Scheme VSC value is less than 0.8 times its former value (that of the Existing). However, the Proposed Scheme VSC values are between 15% and 27% and hence adequate daylight should still be expected (as per Section 2.1.6 of the BRE Guide) given the presence of larger than conventional windows.
- x For these locations, the Proposed Scheme VSC value is less than 15% and less than 0.8 times its former value (that of the Existing Situation), therefore, it does not achieve the BRE recommendations.

8.3.1 View 1: Diamond Apartments



Ref.	Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	86.64	85.53	99%	✓
2	85.80	84.32	98%	✓
3	37.27	34.08	91%	✓
4	35.65	31.24	88%	✓
5	15.97	15.91	100%	✓
6	87.03	85.56	98%	✓
7	83.92	82.75	99%	✓
8	33.13	29.75	90%	✓
9	30.27	27.49	91%	✓
10	13.32	13.08	98%	✓
11	86.58	85.17	98%	✓
12	84.12	81.76	97%	✓
13	85.47	83.26	97%	✓
14	35.13	32.14	91%	✓
15	24.81	24.22	98%	✓



Ref.	Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
16	9.03	9.02	100%	✓
17	86.27	85.00	99%	✓
18	85.25	83.08	97%	✓
19	82.99	80.77	97%	✓
20	33.92	31.11	92%	✓
21	22.71	22.67	100%	✓
22	8.46	8.46	100%	✓
23	86.30	84.46	98%	✓
24	82.05	79.97	97%	✓
25	18.63	18.36	99%	✓
26	6.02	6.58	100%	✓
27	2.62	2.72	100%	✓
28	85.87	84.11	98%	✓
29	83.53	81.45	98%	✓
30	21.49	21.05	98%	✓
31	7.94	7.87	99%	✓
32	3.29	3.03	100%	✓

8.4 Discussion

Based on the criteria outlined in Section 2.2.5 of the BRE guidance (3rd Edition), two of the Diamond Apartments buildings have been included within the VSC assessment. The rest of the neighbouring buildings did not meet the criterion as laid out within the BRE guide.

It is not always necessary to do a full calculation to check daylight potential. The guideline above is met provided the following is true:

- no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal.

Given the statement above the existing surrounding dwellings and the proposed development were verified noting that in a section perpendicular to the window wall, no angle subtended more than 25°. Therefore, as noted above, two of the Diamond Apartments buildings have been included within the VSC assessment, and the rest of the neighbouring buildings were excluded as the daylight impact will be unnoticeable to the occupants.

This study considers the Proposed Scheme and tests if the VSC results are greater than 27% or not less than 0.8 times the value of the Existing Situation.

Of the 32 points tested, 100% have a Proposed VSC value greater than 27% or not less than 0.8 times their former value compared to the Existing Situation, thus complying with the BRE recommendations. It can be concluded that the proposed development will have a negligible impact on the existing neighbouring dwellings with regards to daylight.

9 Conclusion

The following can be concluded based on the assessments undertaken:

9.1 Shadow Analysis

The shadow analysis illustrates different shadows being cast at key times of the year (March 21st, June 21st and December 21st) for the Existing Situation and the Proposed Scheme. The results from the study are summarised as follows:

Diamond Apartments

Minimal additional shading visible from the proposed development on these buildings during March (0800) and December (1000-1200), with no additional overshadowing during the rest of the year.

Building to North East

No additional shading visible from the proposed development on this building throughout the year.

Overall there will be a negligible impact with regards to overshadowing. The potential shading impact is further quantified via the “Sunlight to Amenity Spaces”, “Daylight to Existing Buildings” and “Sunlight to Existing Buildings” sections of this report.

9.2 Sunlight to Amenity Spaces

As outlined in Section 3.3.17 of the BRE Guide (3rd Edition), for a space to appear adequately sunlit throughout the year, at least half of the garden or amenity area should receive at least 2 hours of sunlight on March 21st. In the case of existing amenity spaces, if they are already below the 50% threshold then the BRE recommends the results kept to within 80% of the existing situation.

Existing Amenity Spaces

On March 21st the existing amenity spaces will continue to receive the same levels of sunlight with the proposed development in place when compared to the existing situation. In all cases the results comply with the recommendations in the BRE Guide outlined above.

Proposed Amenity Spaces

On March 21st, 98% of the proposed amenity areas situated within the development site will receive at least 2 hours of sunlight over their combined area, thus complying with the BRE recommendations.

9.3 Sunlight to Existing Buildings

This study considers the proposed scheme and tests if the Annual Probable Sunlight Hours (APSH) results for the living room windows are greater than 25% annual and 5% winter sunlight or are greater than 0.8 times their former value with the proposed development in place or the reduction in sunlight across the year is less than 4% with the proposed development in place.

Based on the criteria outlined in Section 3.2.9 of the BRE Guide 3rd Edition, one of the existing buildings (Diamond Apartments) fit the requirements to be assessed and as such the APSH assessment was not conducted for the rest of the properties. The BRE guide (3rd Edition) notes that there should be no

impact to sunlight for the rest of the properties “It is not always necessary to do a full calculation to check sunlight potential. The guideline above is met provided either the following is true:

- If the window wall faces within 90° of due south and no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal. Again, obstructions within 90° of due north need not be counted.”

Given the statement above the surrounding dwellings adjacent to the proposed development were verified noting that, in a section perpendicular to the window wall, no angle subtended more than 25° and, in some cases, they were also sitting to the south of the proposed development. Therefore, 2 of the Diamond Apartment buildings as well as the building located to the North East were excluded on the basis, as noted in Section 3.2.9 of the BRE Guide 3rd Edition, that these windows need not be analysed as sunlight impact will be unnoticeable to the existing occupants.

When compared to the Existing Situation, of the 32 no. points tested, 100% meet the BRE recommended values over both the annual and winter periods. These results highlight that the proposed development will have no impact to the sunlight received to these existing neighbouring properties.

9.4 Daylight to Existing Buildings

Based on the criteria outlined in Section 2.2.5 of the BRE guidance (3rd Edition), two of the Diamond Apartments buildings have been included within the VSC assessment. The rest of the neighbouring buildings did not meet the criterion as laid out within the BRE guide.

It is not always necessary to do a full calculation to check daylight potential. The guideline above is met provided the following is true:

- no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal.

Given the statement above the existing surrounding dwellings and the proposed development were verified noting that in a section perpendicular to the window wall, no angle subtended more than 25°. Therefore, as noted above, two of the Diamond Apartments buildings have been included within the VSC assessment, and the rest of the neighbouring buildings were excluded as the daylight impact will be unnoticeable to the occupants.

This study considers the Proposed Scheme and tests if the VSC results are greater than 27% or not less than 0.8 times the value of the Existing Situation.

Of the 32 points tested, 100% have a Proposed VSC value greater than 27% or not less than 0.8 times their former value compared to the Existing Situation, thus complying with the BRE recommendations. It can be concluded that the proposed development will have a negligible impact on the existing neighbouring dwellings with regards to daylight.

9.5 Observations

It is important to note that the recommendations within the BRE Guide (3rd Edition) itself states *“although it gives numerical guidelines these should be interpreted flexibly because natural lighting is only one of many factors in site layout design”*, Although this is true appropriate and reasonable regard has still been taken to the BRE guide.

Whilst the results shown relate to the criteria as laid out in the BRE Guide (3rd Edition), it is important to note that the BRE targets are guidance only and should therefore be used with flexibility and caution when dealing with different types of sites.

In addition, BRE Guide 3rd Edition also notes:

“This report is a comprehensive revision of the 2011 edition of Site layout planning for daylight and sunlight: a guide to good practice. It is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location.”

Taking all of the above information into account and based on the results from each of the assessments undertaken, with regards to the surrounding properties there is a negligible impact when considering sunlight and daylight as a result of the proposed development and the proposed development itself performs very well with the same regard.

