Daylight Analysis and Overshadowing

Lands to the Rear of The Copper Kettle Coffee Shop, Main St. Rathcoole, Co. Dublin

12/12/2022

Contents

1. Executive Summary

H3D were engaged to provide a report on the impact of the proposed residential development on the lands to the rear of The Copper Kettle Coffee Shop, Main St., Rathcoole, Co. Dublin. H3D were instructed to conduct the following in response to the Further Information request for KCC 22/1313:

- To create a 3D computer analysis model of the scheme based upon planning drawings provided by DC Turley & Associates.
- Conduct a shadow study demonstrating the shadowing being cast due to the proposed development.
- Conduct a study to investigate if the adjacent amenity areas achieve 2 hours of sunlight on March 21st.
- Investigate the effect of the new development on the adjoining sites to the calculating Vertical Sky Component (VSC).
- Prepare a report setting out the analysis and the findings.

Methodology

The assessment of the proposed development was prepared using the methodology's set out in the British Standard: Lighting for Buildings – Part 2: Code for Practice for Daylighting, BRE 209, 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice', Second Edition 2011, by P. J. Littlefair and the Design Standards for New Apartments - Guidelines for Planning Authorities (March 2018).

BRE Guide and Advisory Note

The numerical guidelines given in these documents are purely advisory. The BRE Guide states that:

> "The advice given here is not mandatory and the guide should not be an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design."
>
> "It is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location" (Section 1.6, p1)

Overall Conclusion

Overshadowing

From the overshadowing images it can be seen that the proposed development introduces minimal additional shadowing external to the site however the other analyses completed in this report demonstrate that the proposed development meets the guidelines set out in 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice', Second Edition 2011, by P. J. Littlefair.

Vertical Sky Component (VSC)

The BRE guidelines state that if the VSC at the centre of a window is more than 27% (or if not, then it is more than 80% of its former value), then the diffuse daylighting of the existing building will not be adversely affected.

All calculated windows analysed achieved the value of 27%. All windows will receive adequate amount of sunlight.

Sunlight Assessment on Amenity Space – 50% Rule

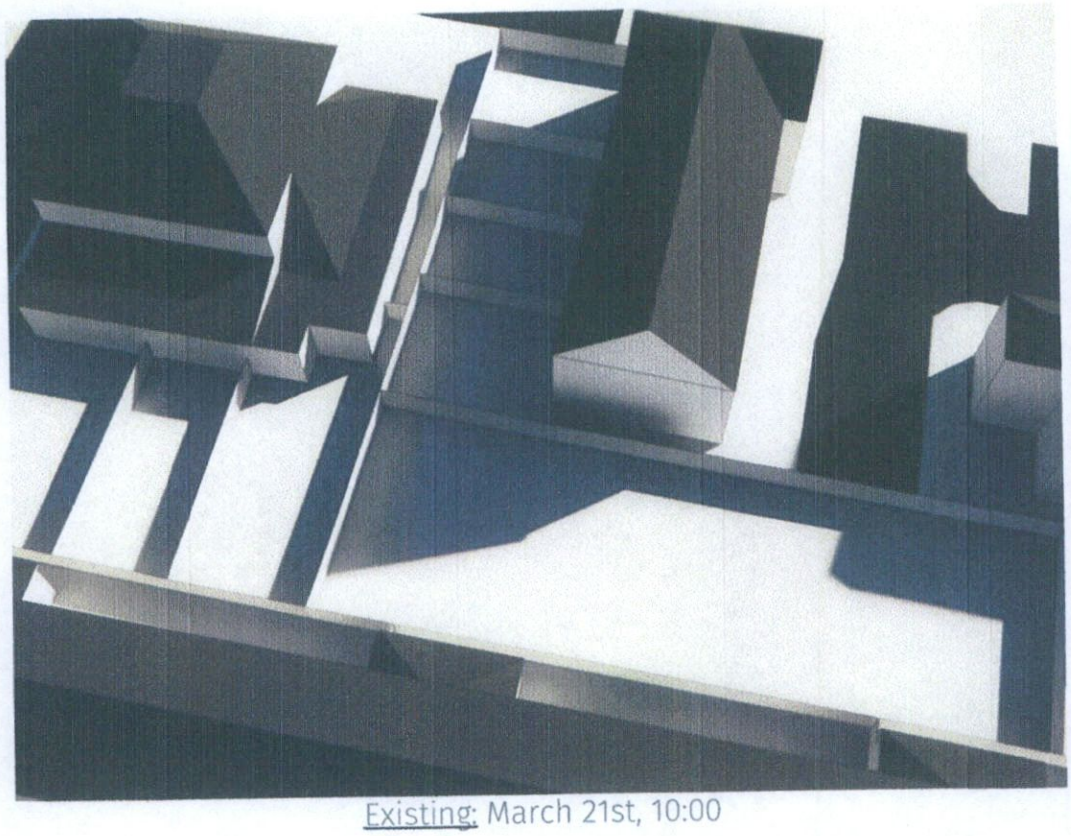
BRE Guide [3.3] It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21st March.

The adjacent amenity spaces analysed all achieve either more than the 50% minimum requirement of area receiving at least two hours of sunlight on March 21st, or the area does not reduce to less than 0.8 times the current amount.

Cian Heffernan
MSc, BEng (Hon) Civil, PgD

2. Overshadowing

The following images illustrate the shadows cast on the neighbouring amenity areas between 10:00 and 16:00.



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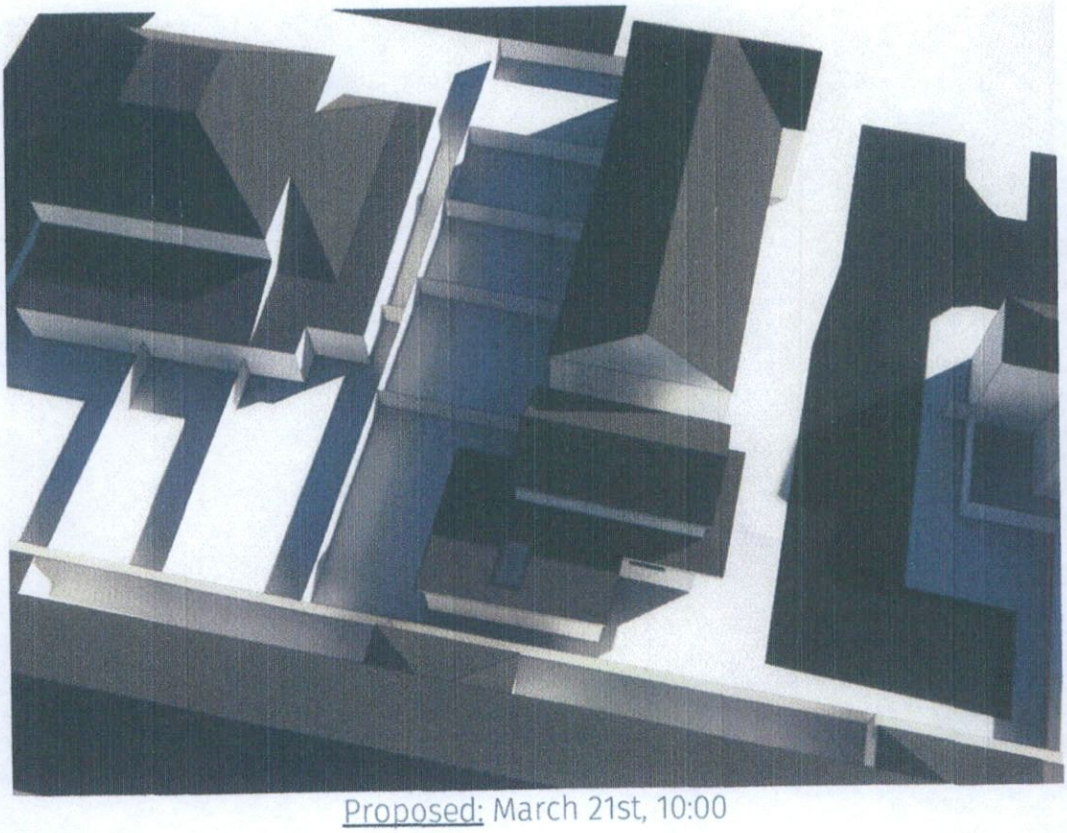

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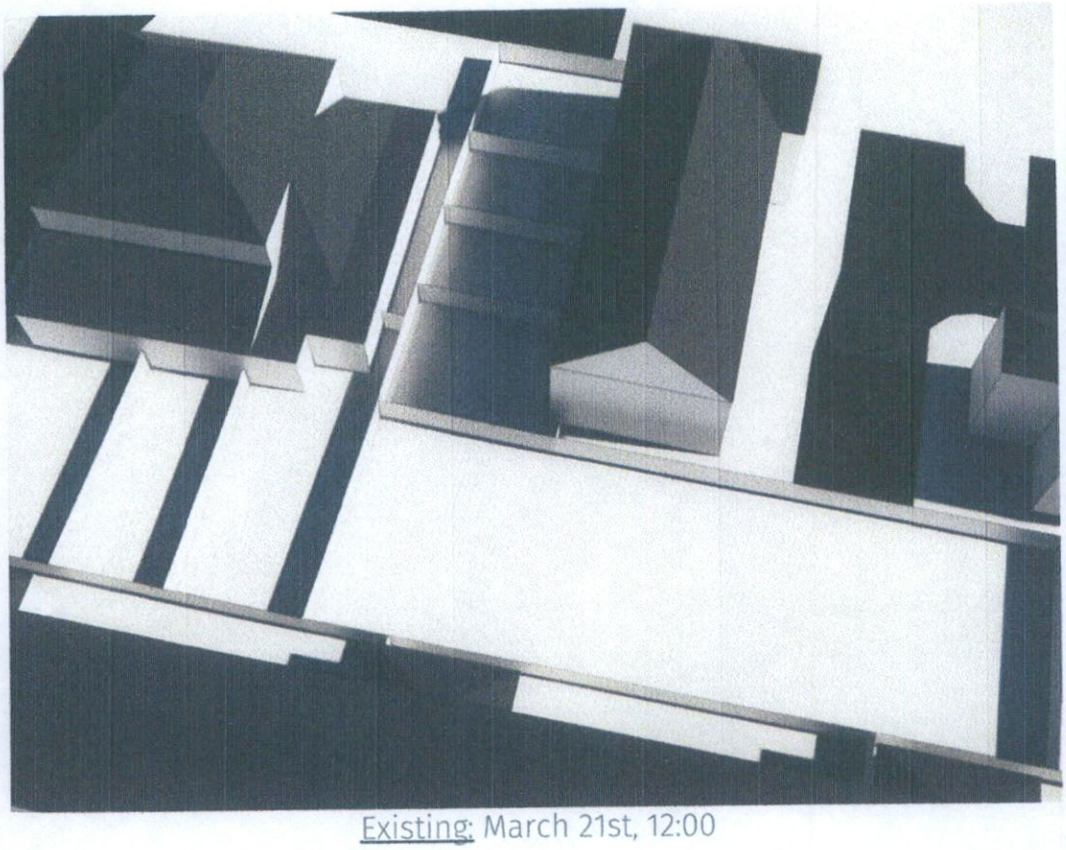

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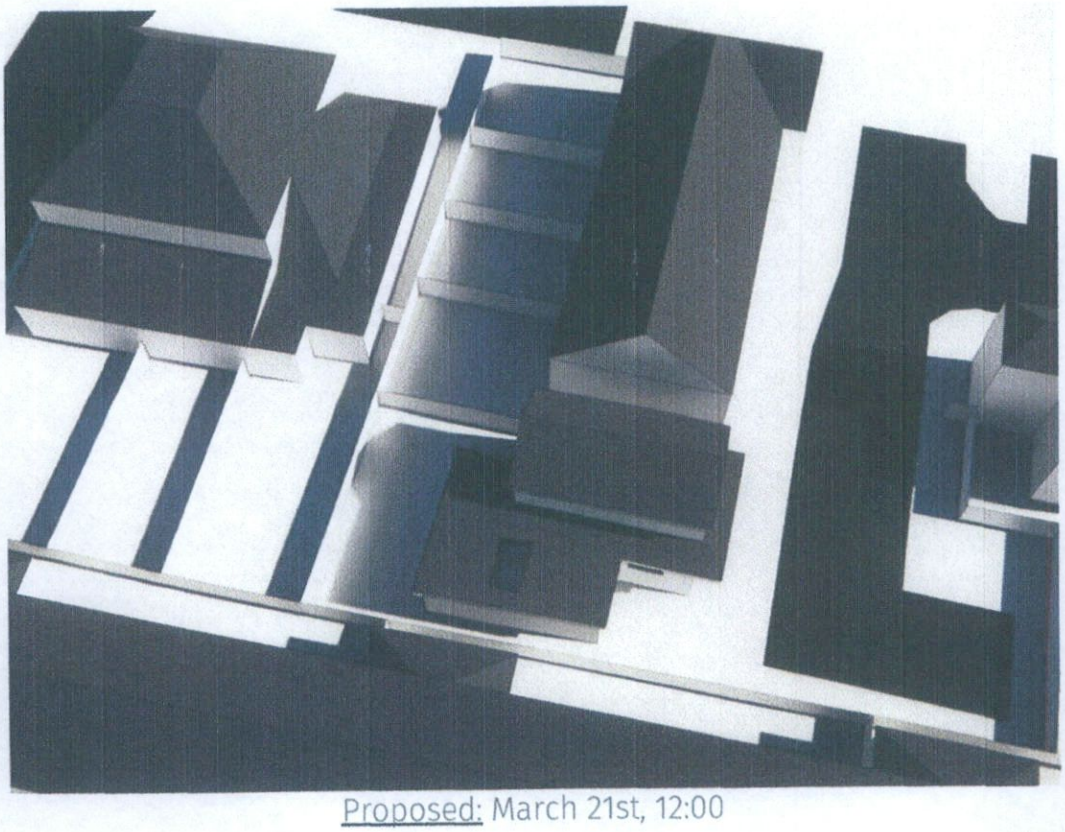

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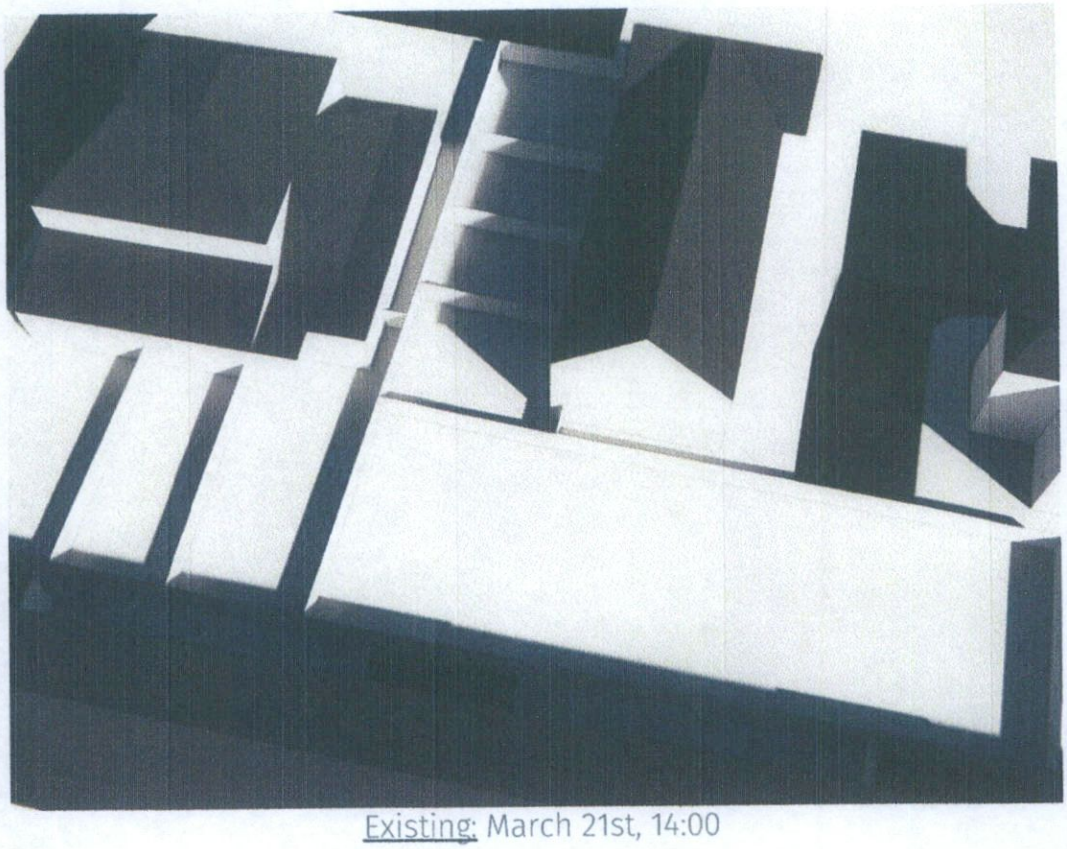

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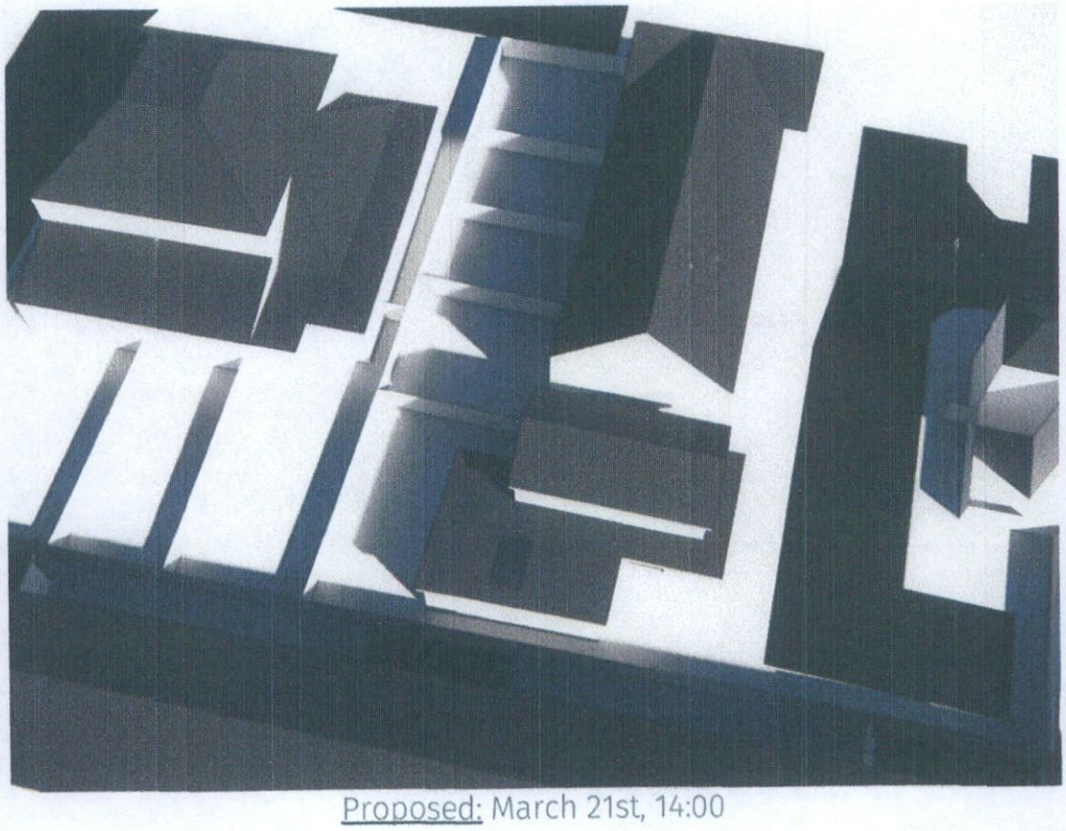

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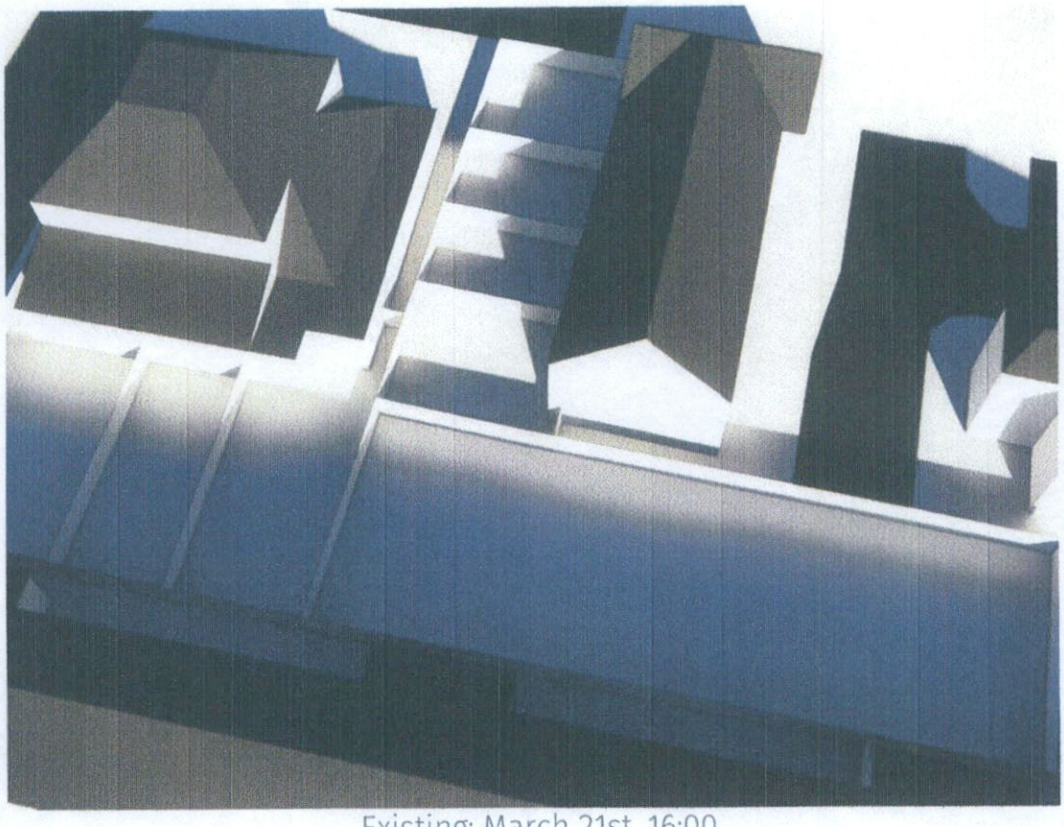

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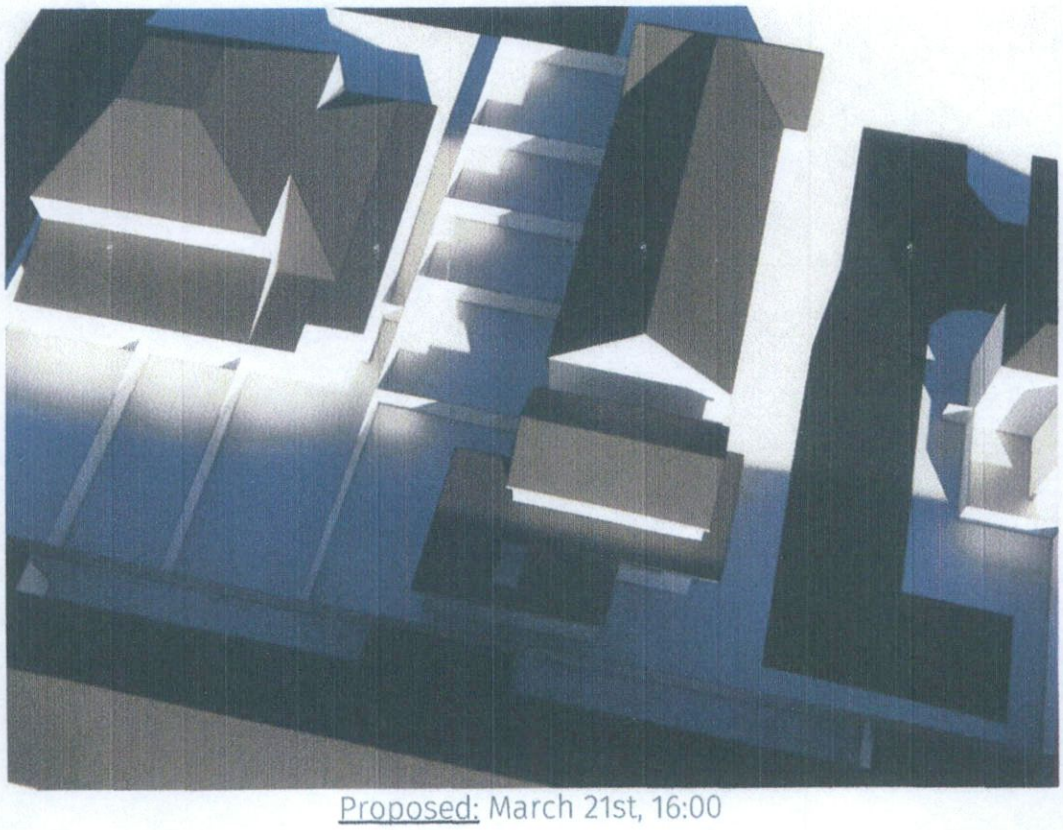

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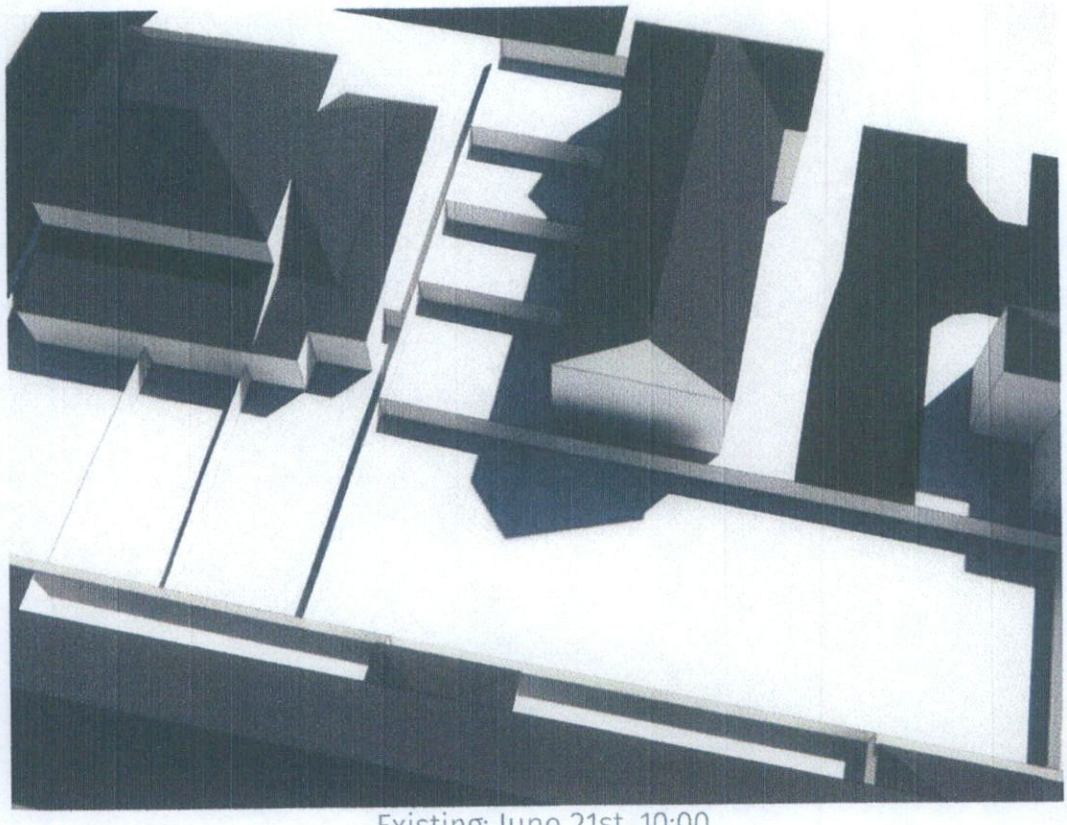

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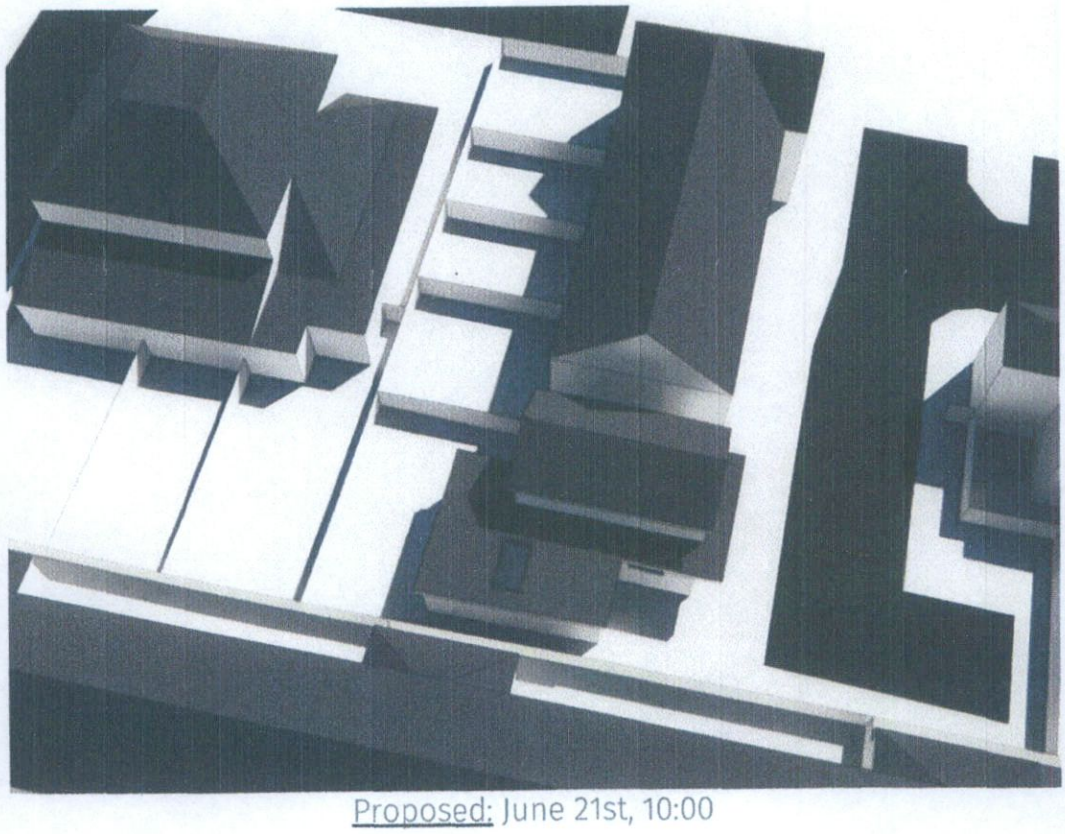

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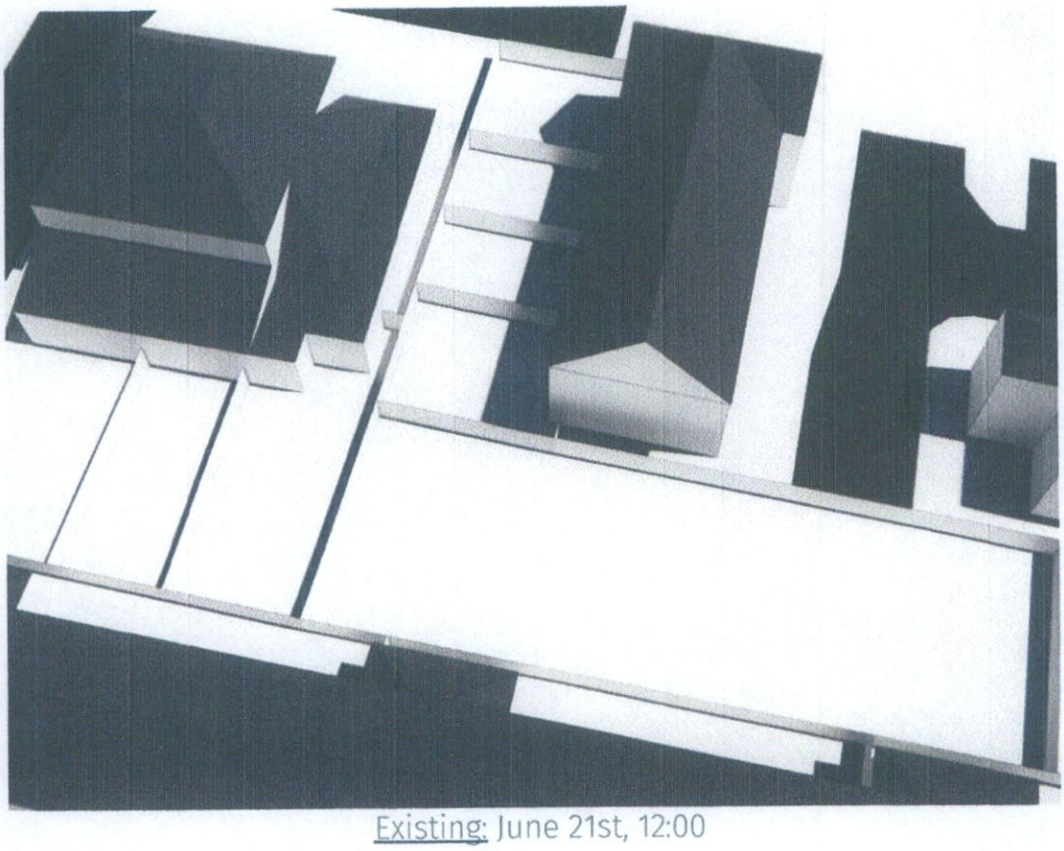

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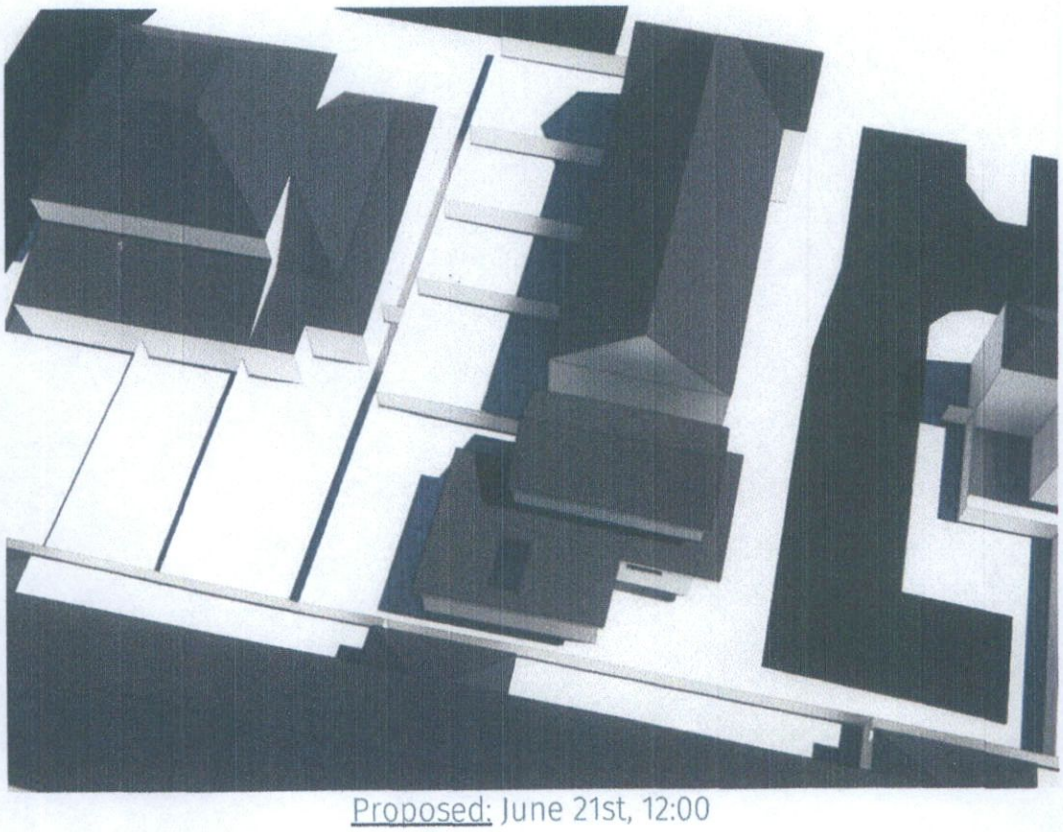

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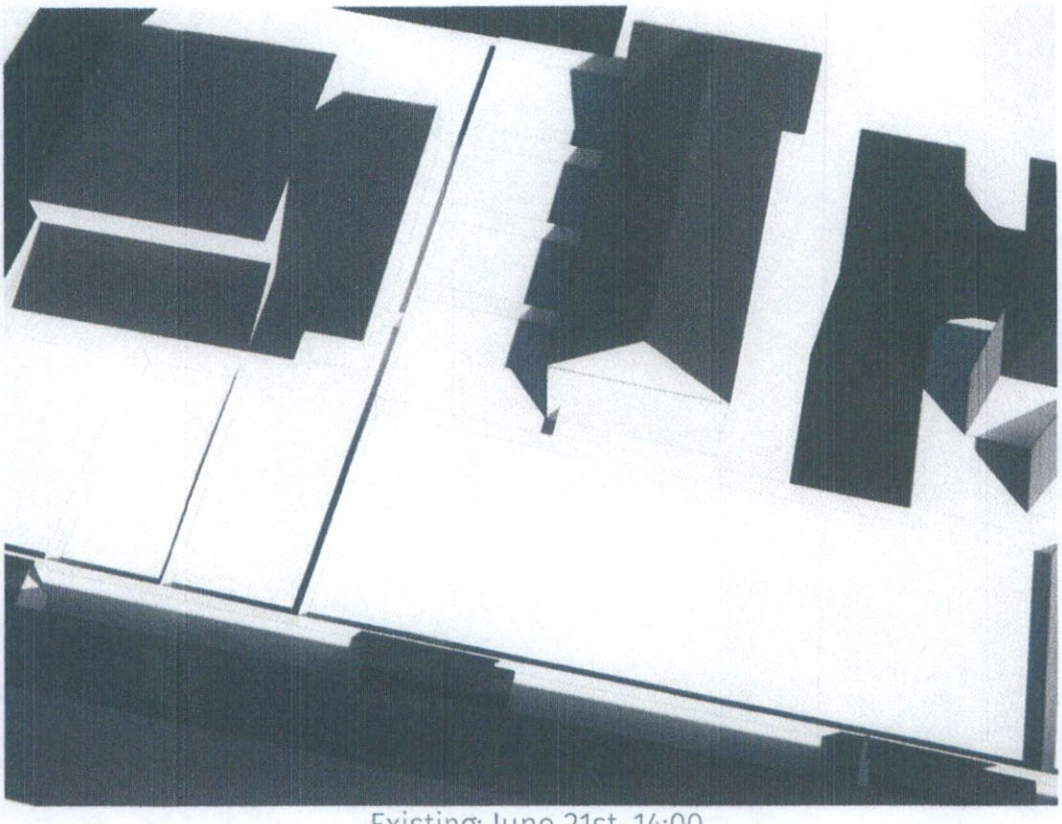

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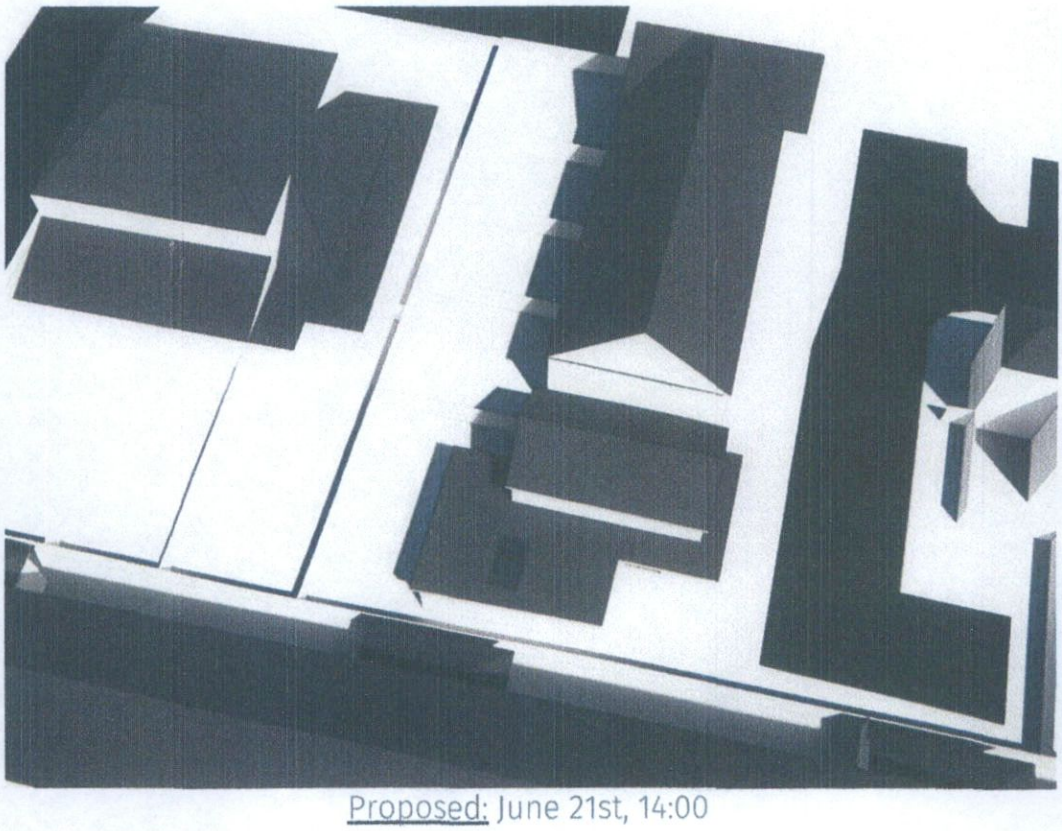

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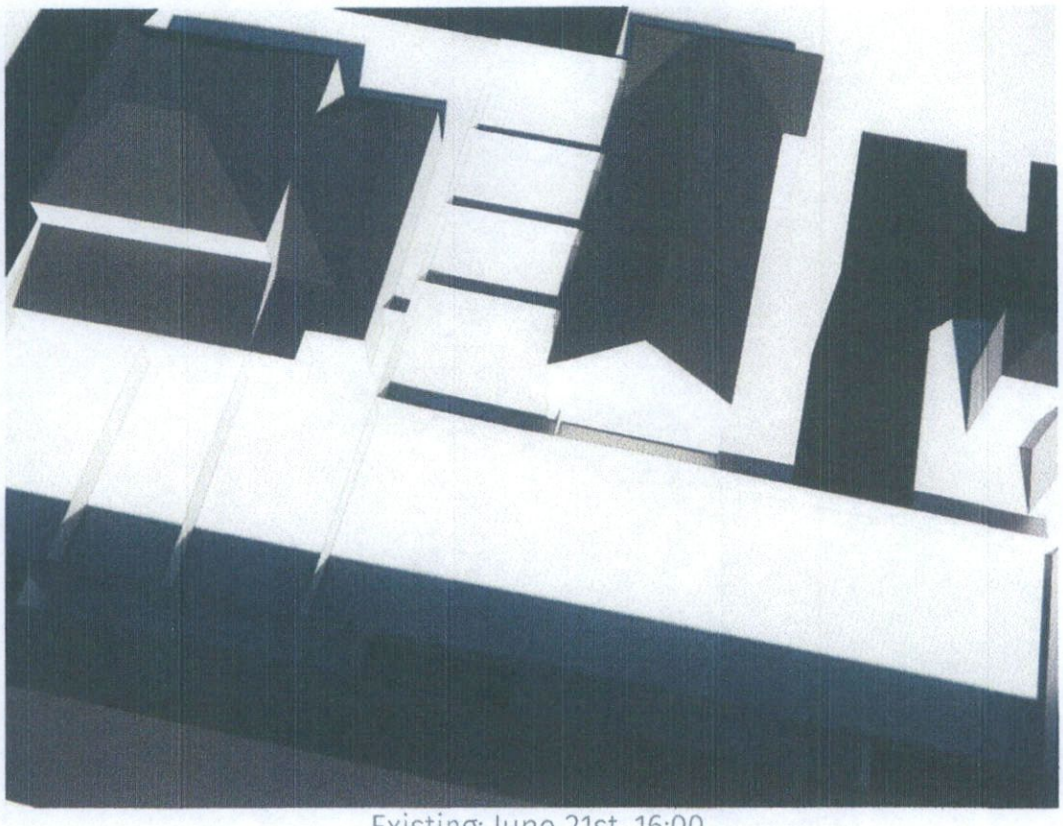

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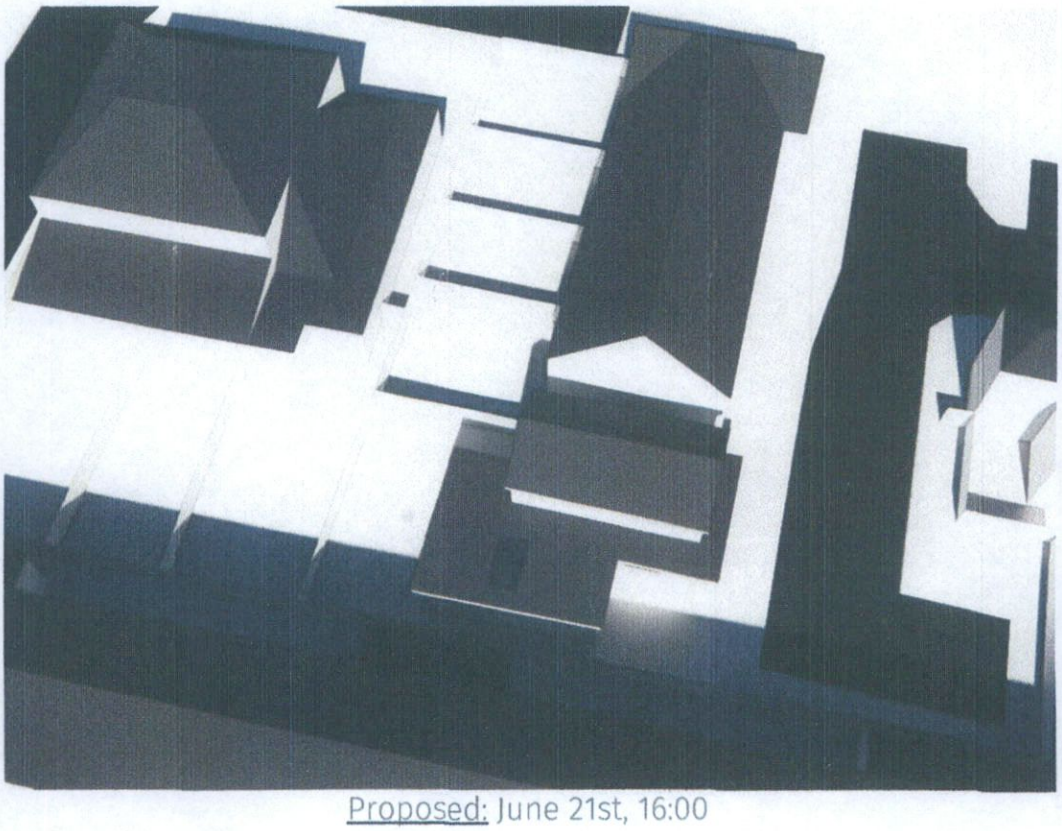

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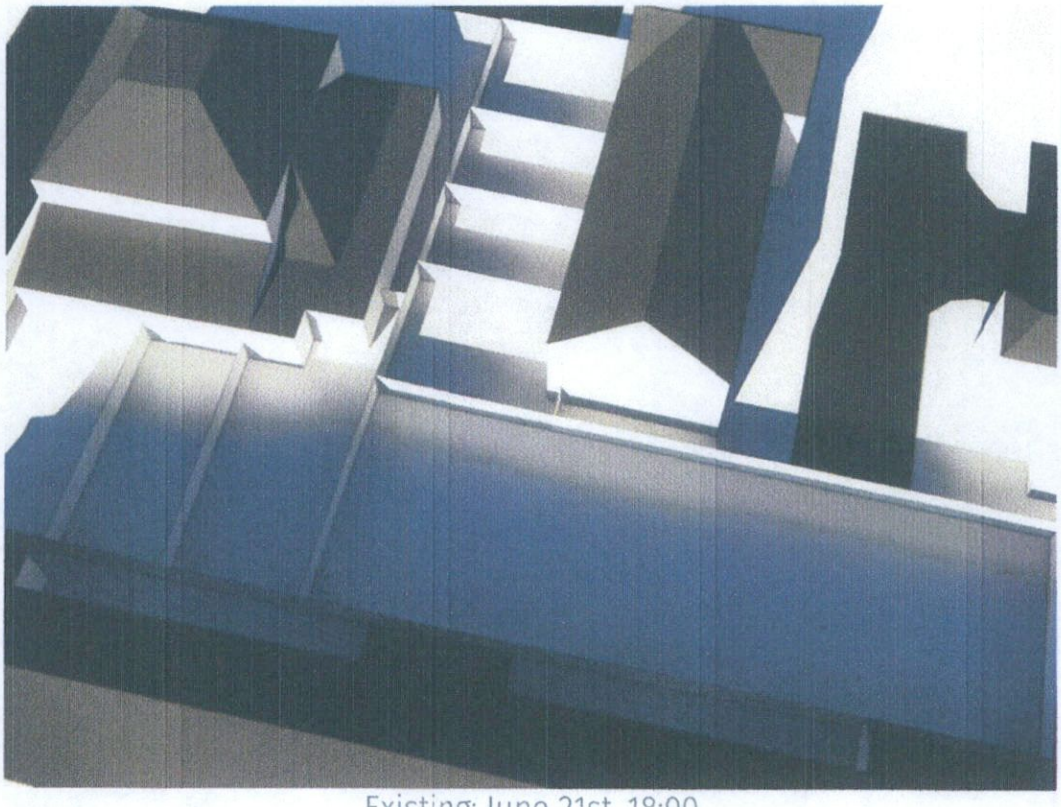

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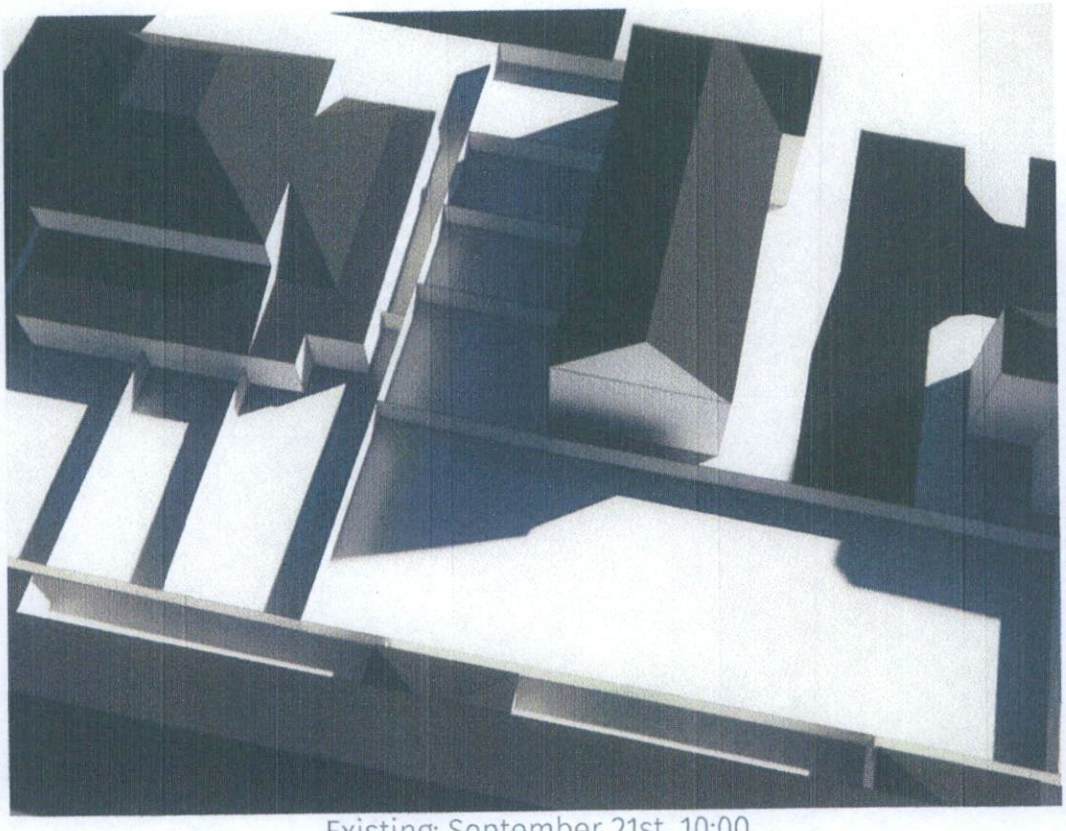

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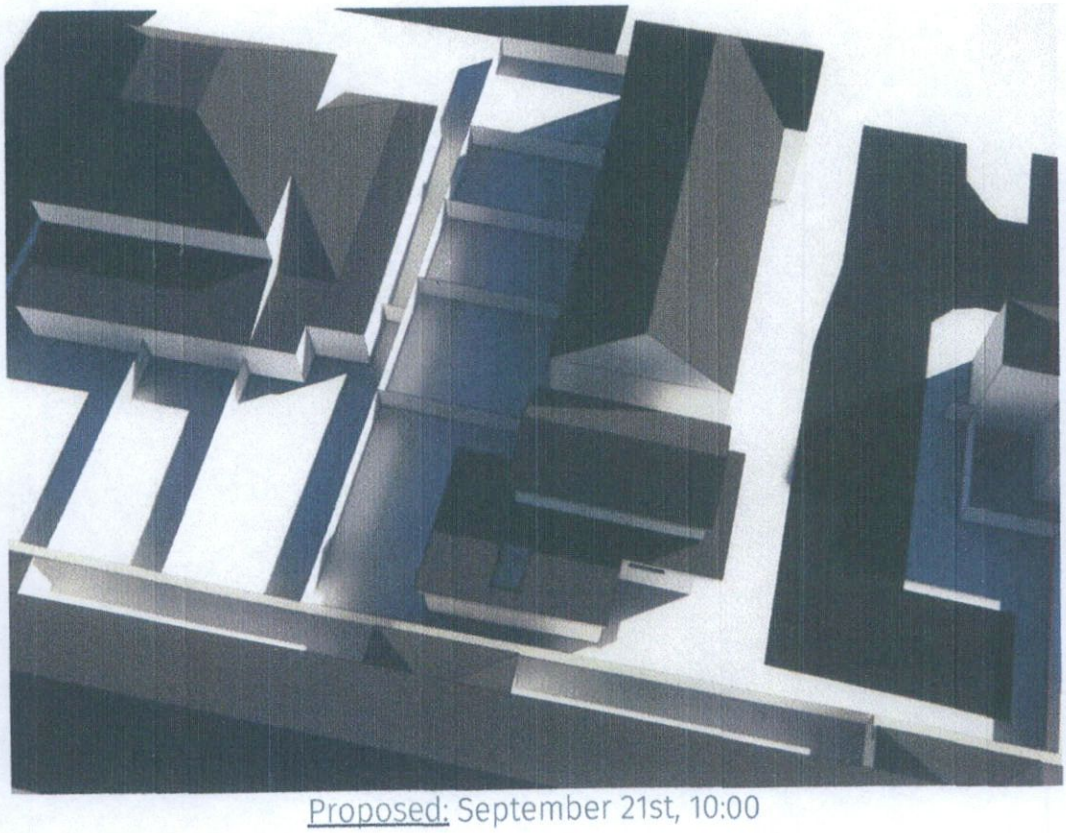

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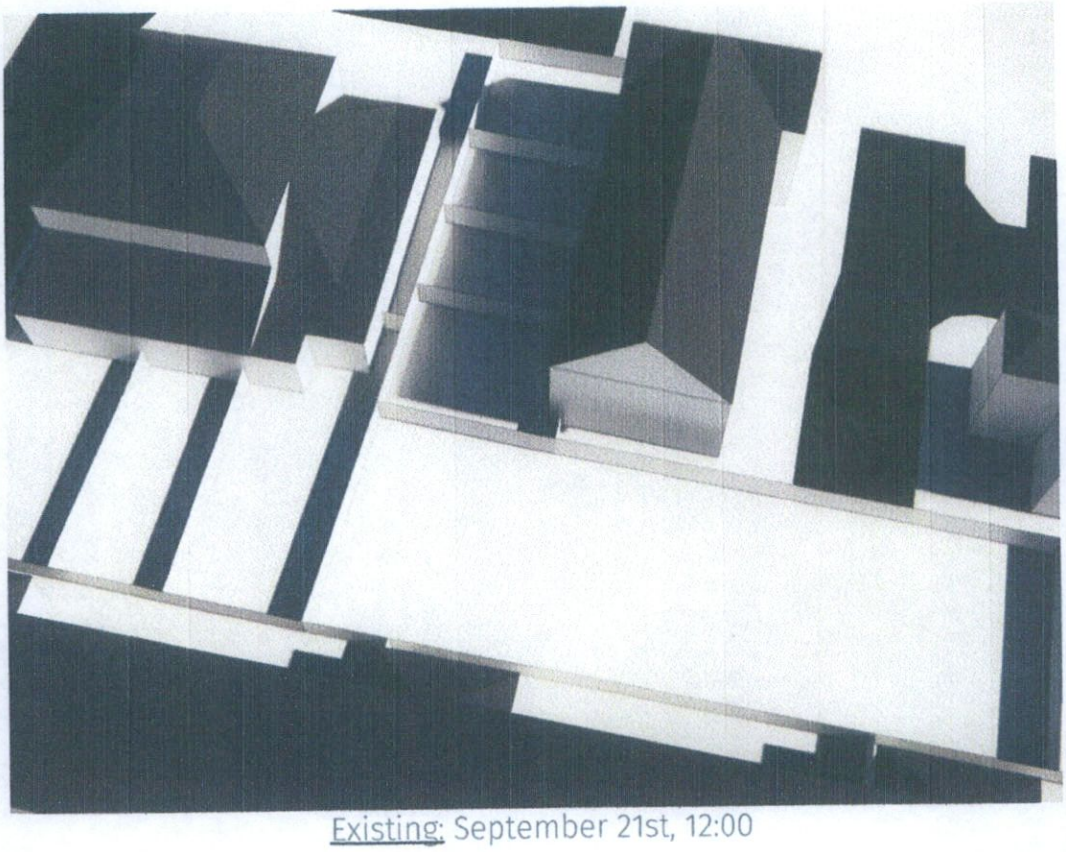

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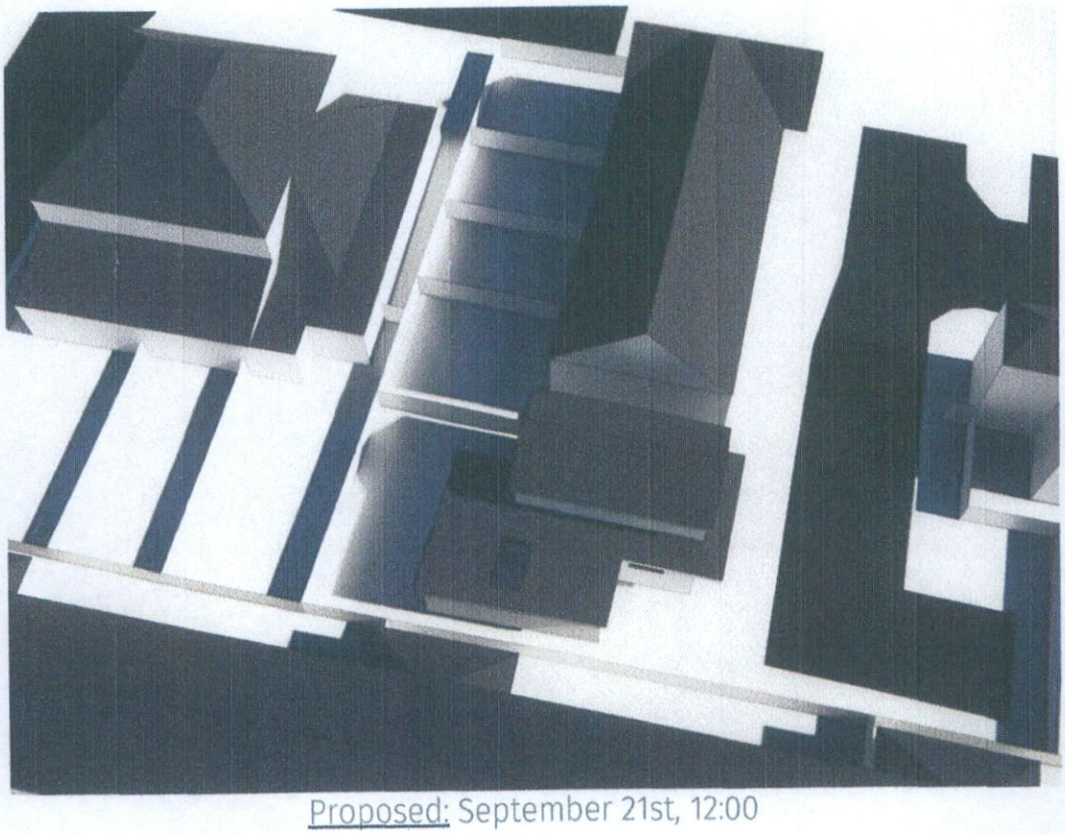

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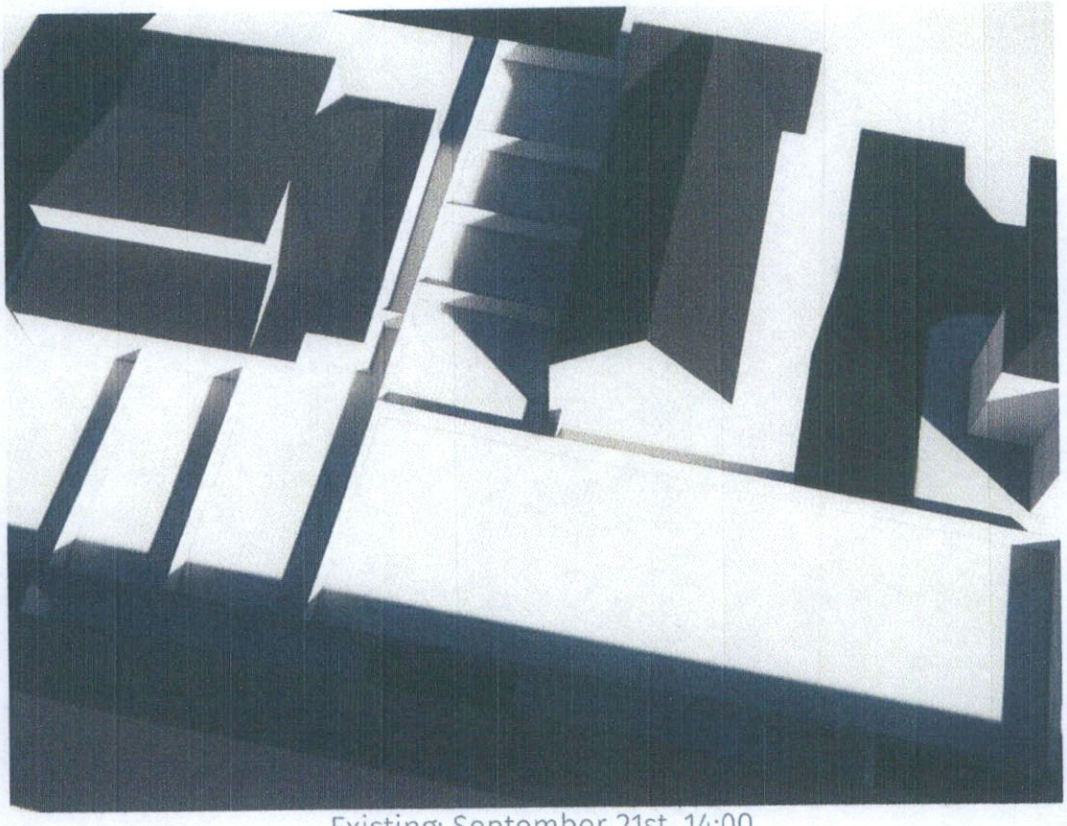

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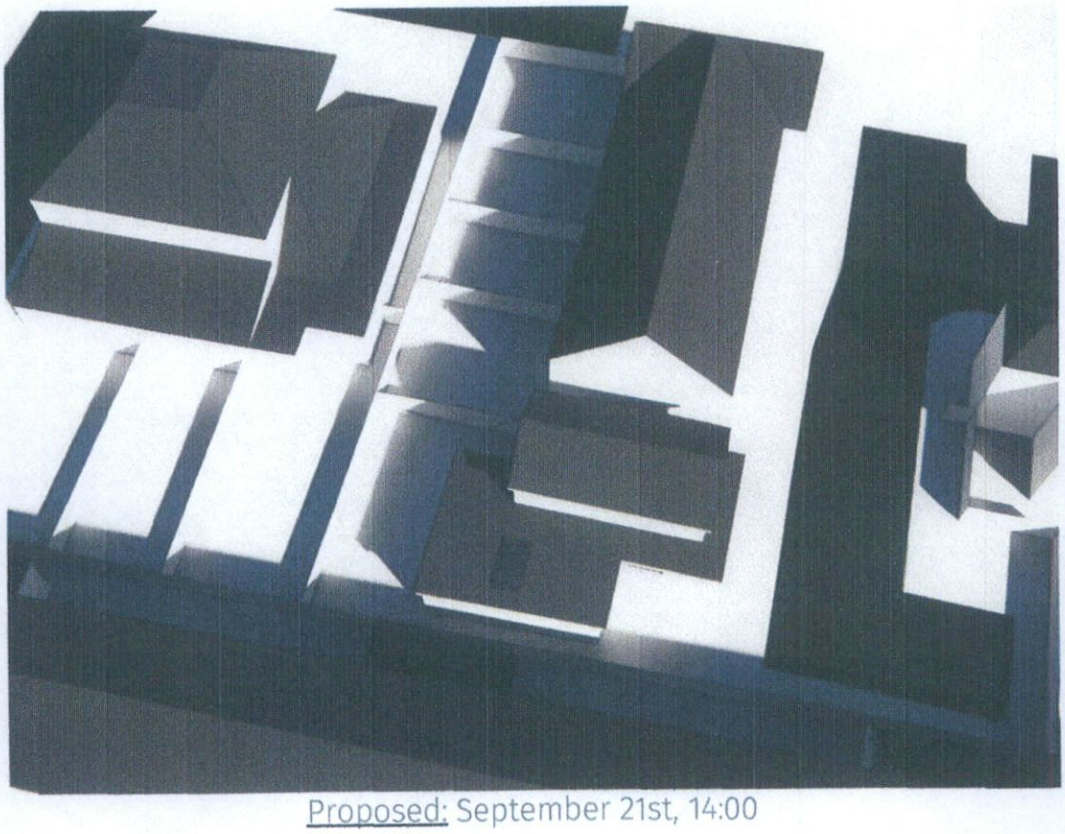

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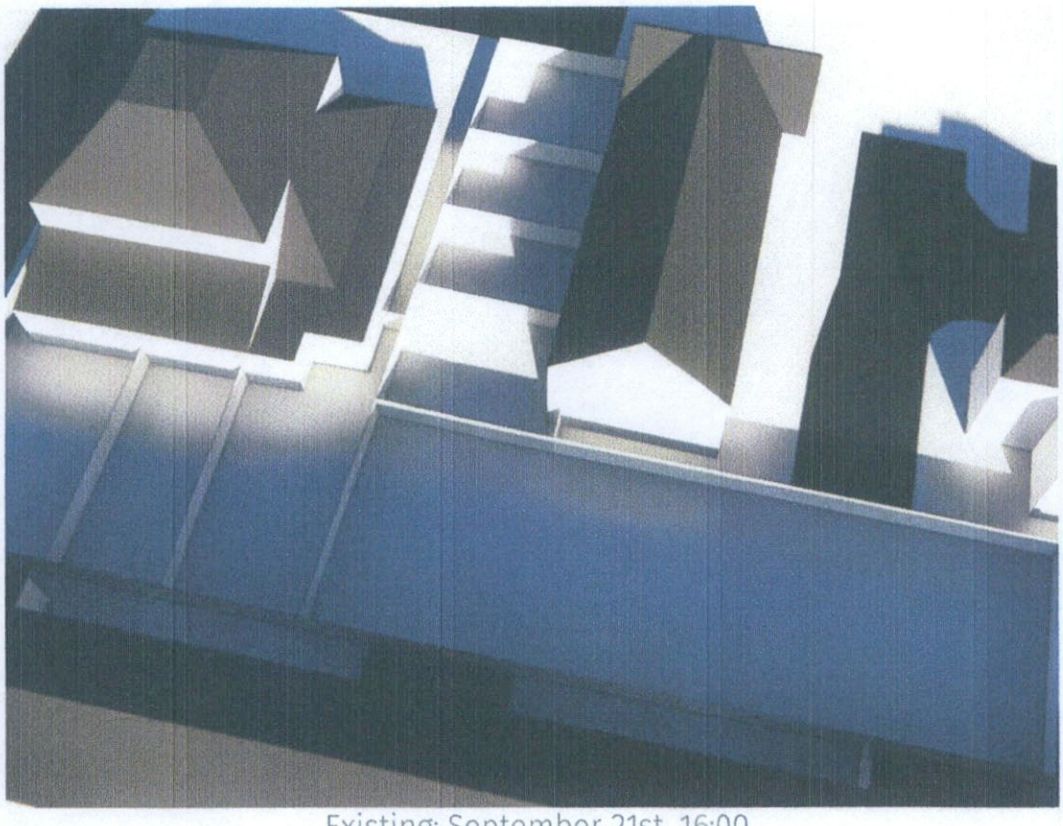

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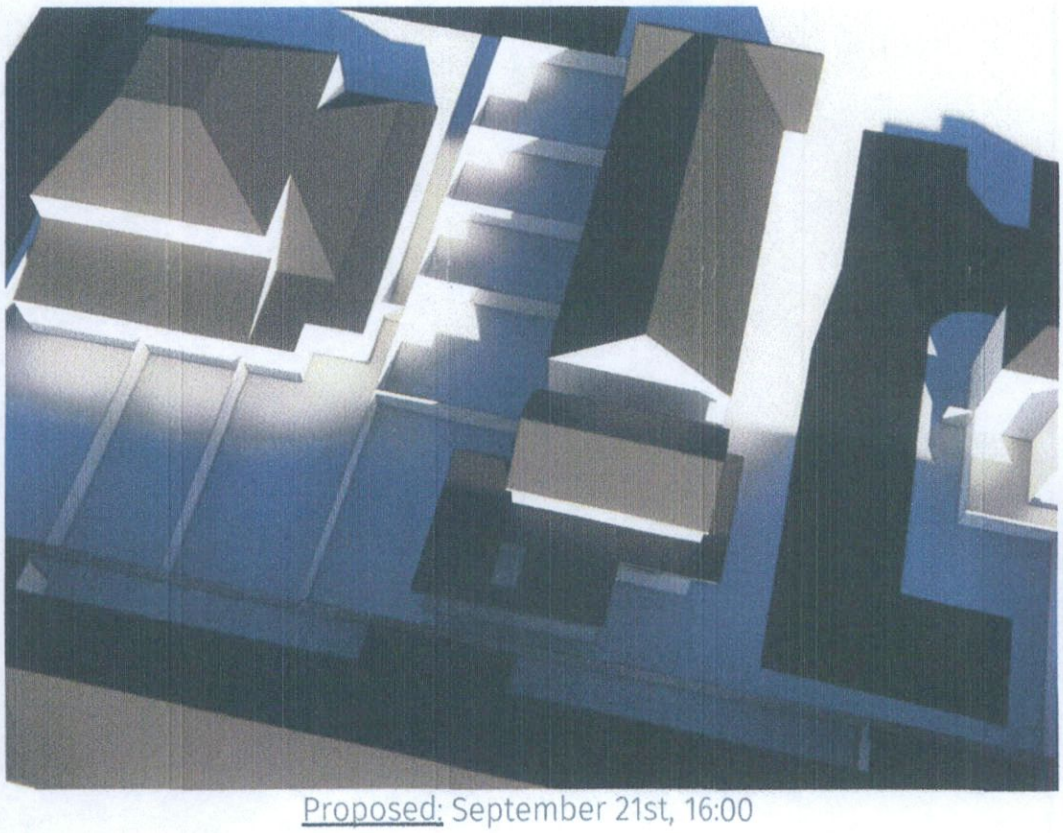

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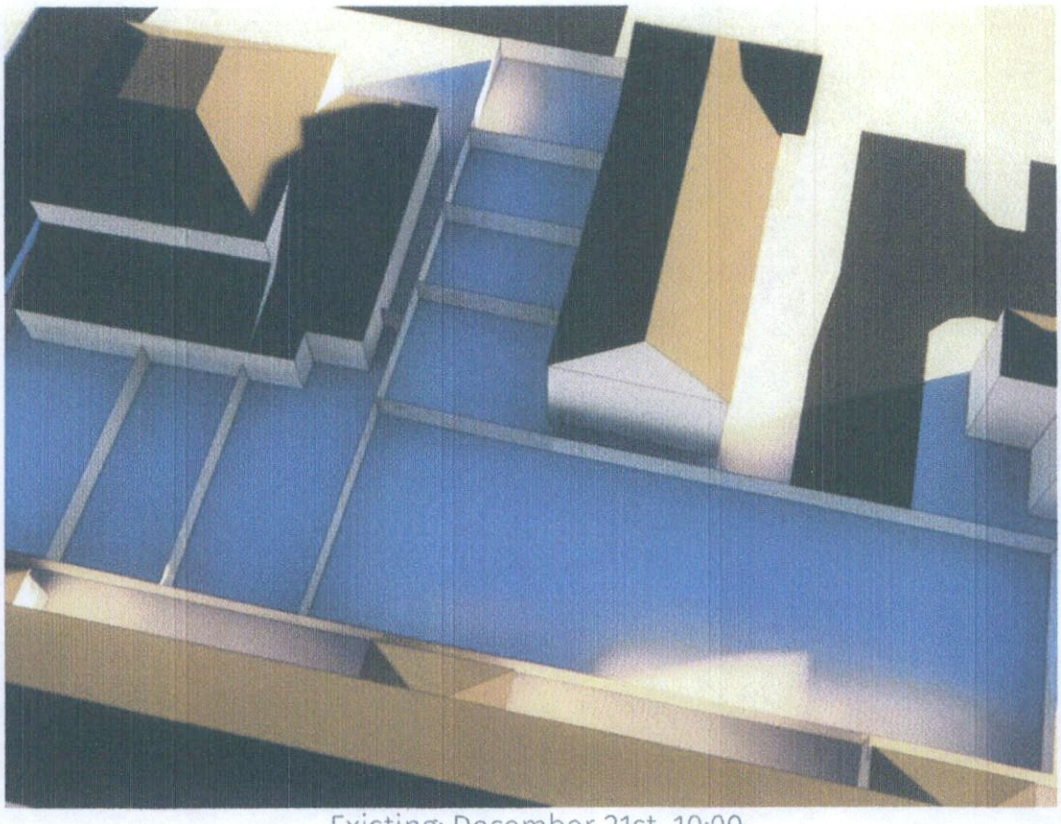

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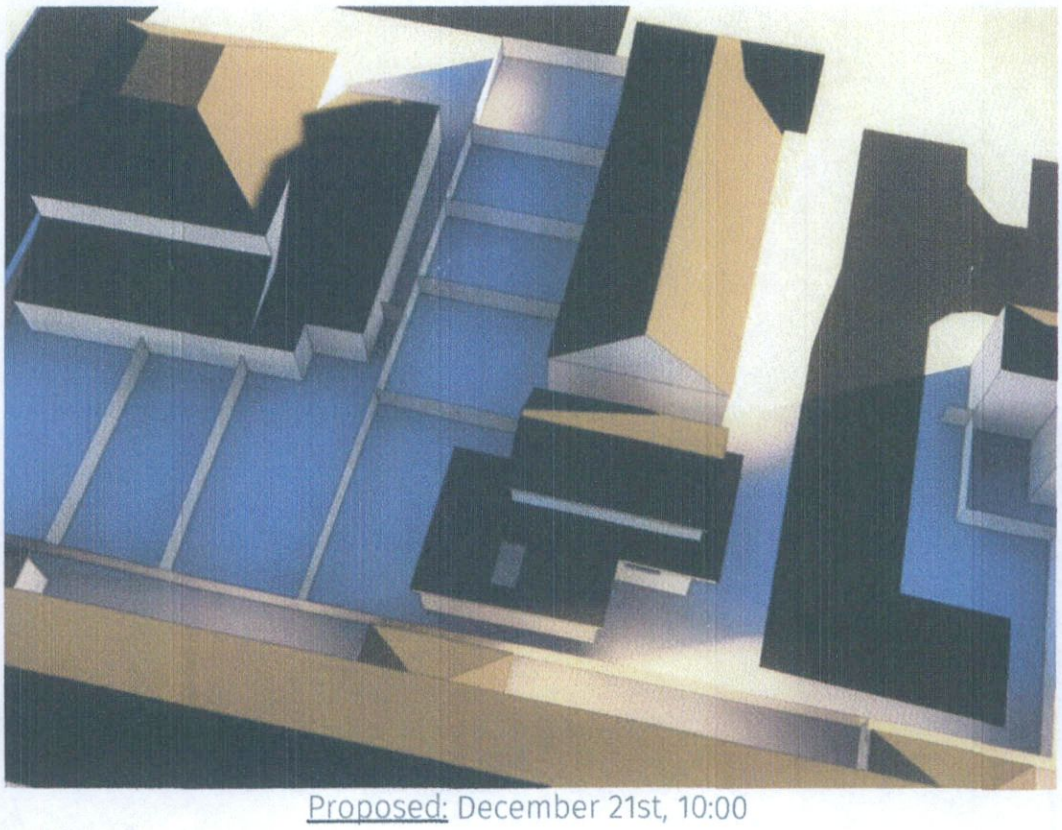

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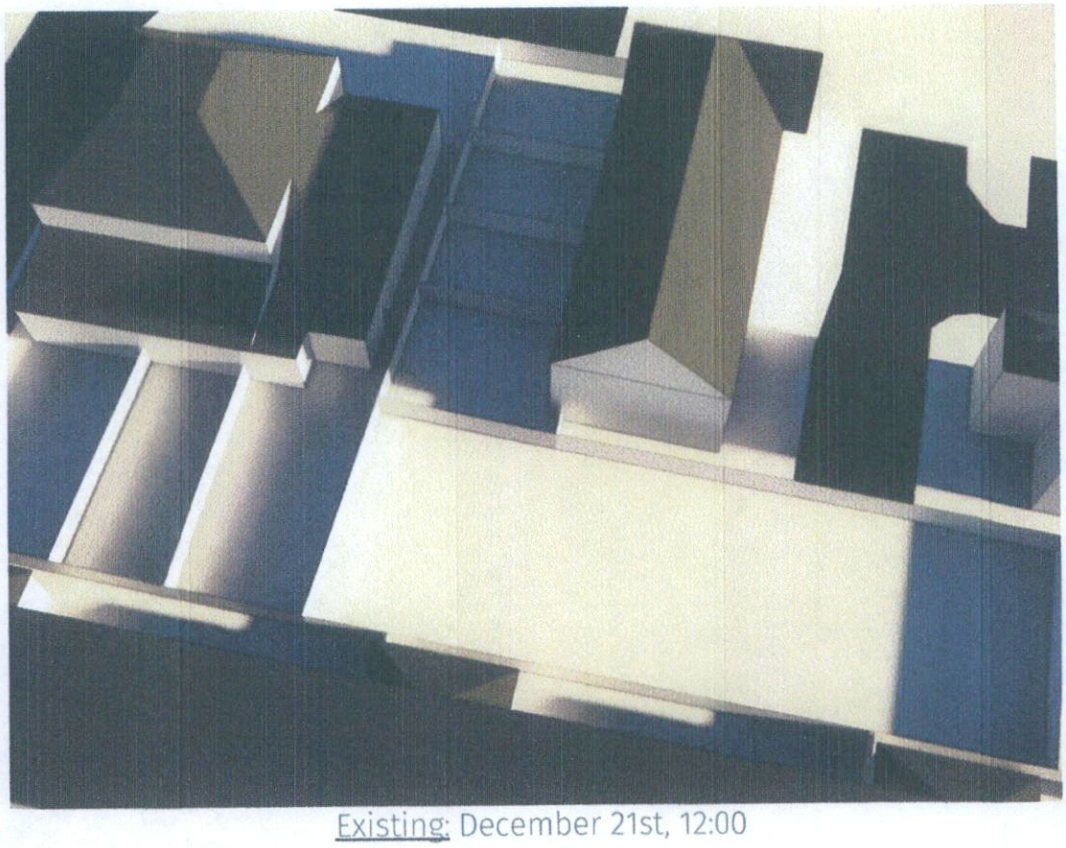

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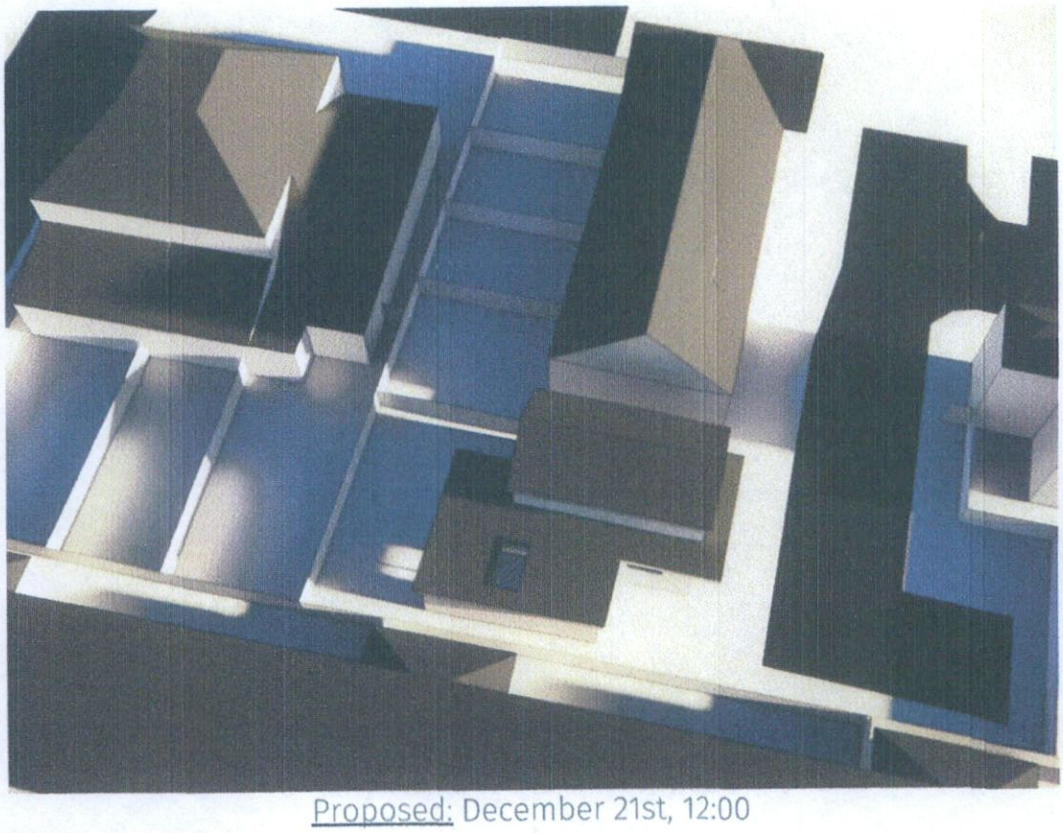

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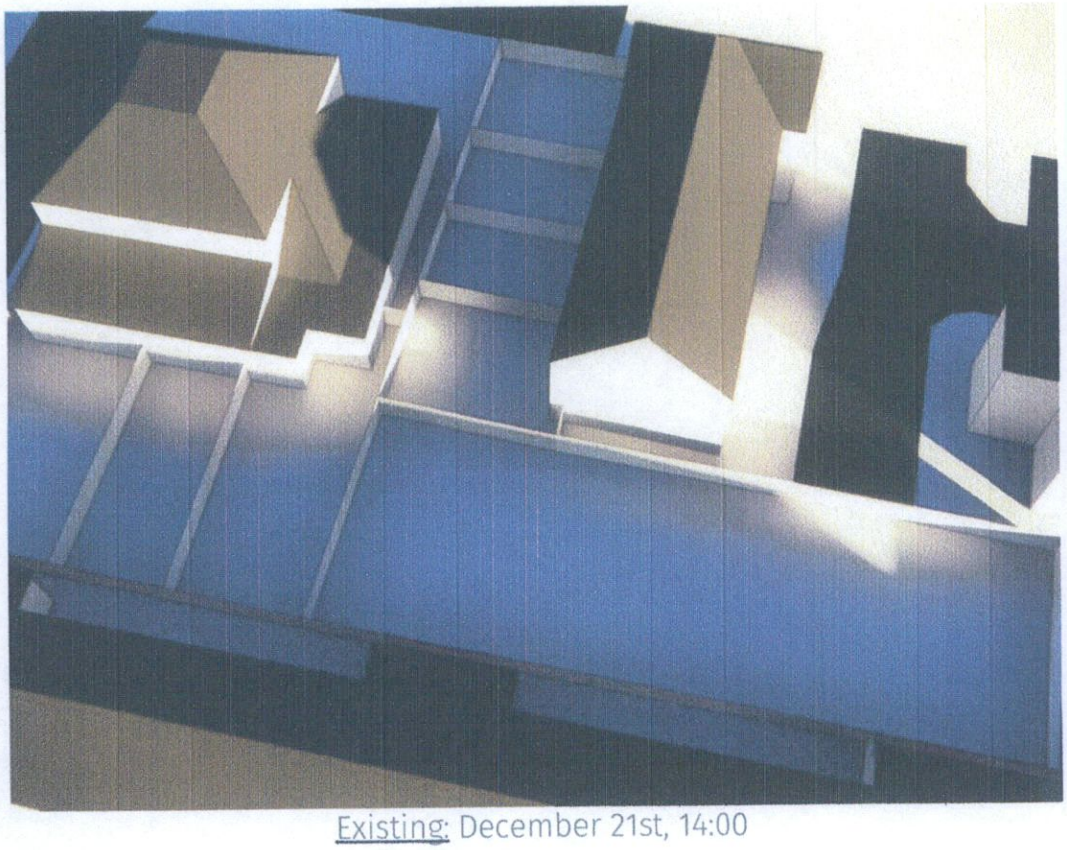

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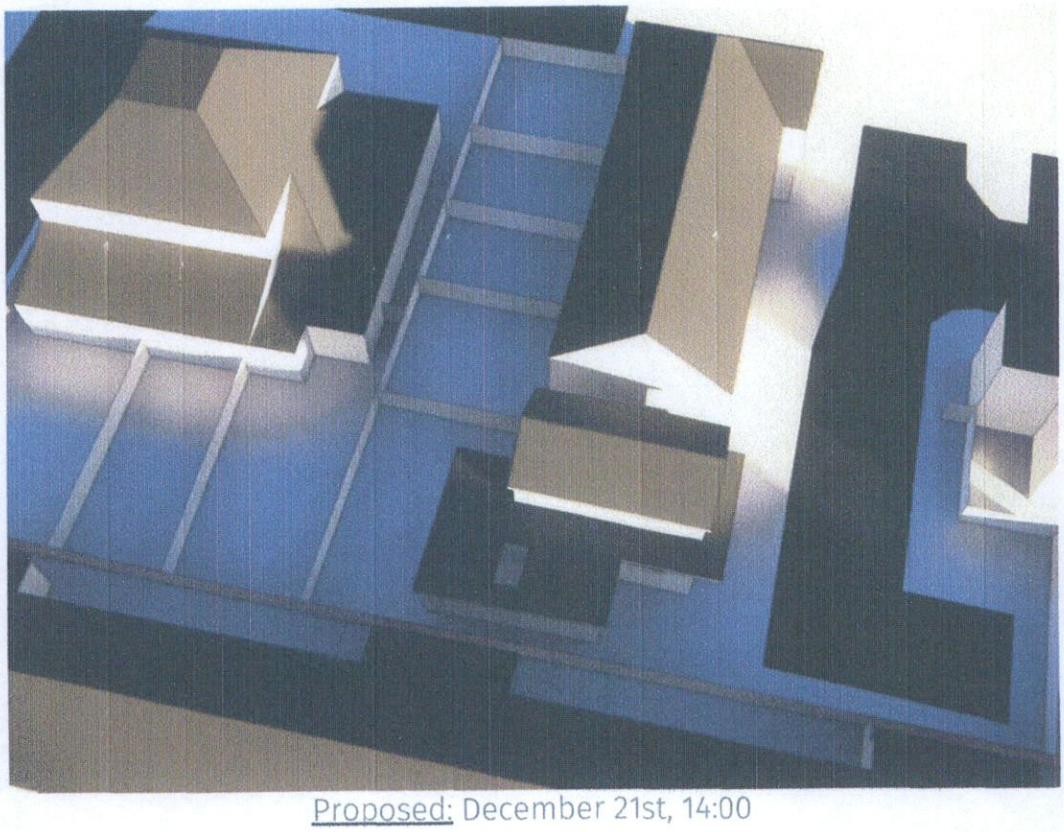

Proposed: December 21st, 14:00

3. Gardens and Open Spaces Overshadowing

As per section 3.3 of 'Site layout Planning for daylight and Sunlight' by Paul Littlefair it is recommended that at least half of the neighbouring garden areas should receive at least two hours of sunlight on March 21st. To investigate this, the area of sunlit garden is calculated as a percentage of the total area.

Paragraph 3.3.11 states that if the area is poorly lit and does not achieve the minimum two hours but the value is no less than 0.8 times the current state then further loss of light would not be significant.

An analysis was conducted by calculating the area of sunlight that received a minimum of two hours of sunlight on March 21st. Below are results in numerical and graphical form.

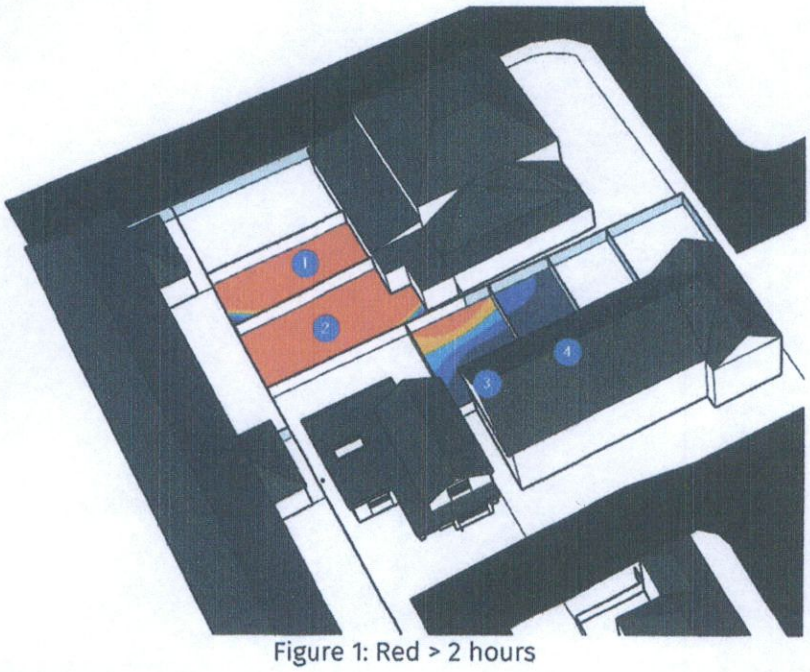

Figure 1: Red > 2 hours

Amenity Overshadowing (Adjacent to Site)						
Garden ID	Garden Space Analysed (m^2)	Area receiving 2 hours of sunlight on March 21st (%)	Minimum area receiving 2 hours of sunlight on March 21st (%)	Existing Area receiving 2 hours of sunlight (%)	>0.8 Existing	Compliance Demonstrated
1	56.15	67.53	50	67.53	N/A	Yes
2	79.48	70.63	50	70.63	N/A	Yes
3	51.80	18.20	50	22.35	Yes	Yes
4	37.58	0.00	50	0.00	Yes	Yes

Table 1: Amenity Overshadowing Analysis

4. Vertical Sky Component (VSC)

The BRE document definition of the Vertical Sky Component (VSC) is Ratio of the part of illuminance, at a point on a given vertical plane, which 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.

The VSC is usually expressed as a percentage and the maximum value for a completely unobstructed window is slightly less than 40%. The recommendations set down in the BRE report,' Site layout for daylight and sunlight, a guide to good practice,' would indicate, for residential properties, that a VSC value of greater than 27% is acceptable. However, a 20% VSC is good for an urban area.

If a window does not achieve 27% a further investigation should be conducted to calculate the existing VSC. If the value of the predicted VSC is not more than 20% lower than the VSC in the existing scenario the windows pass for VSC according to BRE BR209.

It should be noted that the Guide itself, within the introduction, states that the advice given was not mandatory and the Guide should not be an instrument of planning policy, its aim being to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly.

A VSC Analysis was conducted on the rear windows of the adjacent property at The Way, facing the proposed development.

The BRE guidelines define which rooms should be analysed.

"2.2.2 The Guidelines given here are intended for used for rooms in adjoining dwellings where daylight is required, including living rooms, kitchens, and bedrooms. Windows to bathrooms, toilets, storerooms, circulation areas and garages need not be analysed. "

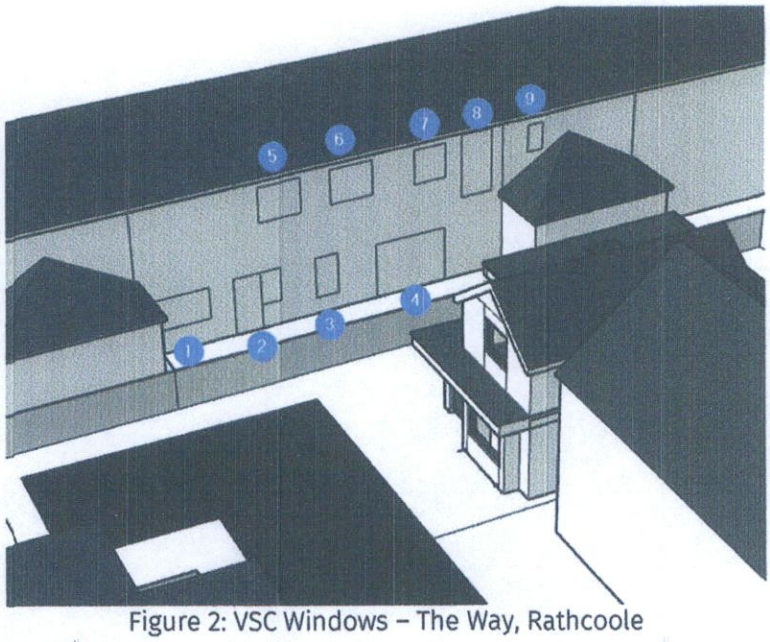

Figure 2: VSC Windows – The Way, Rathcoole

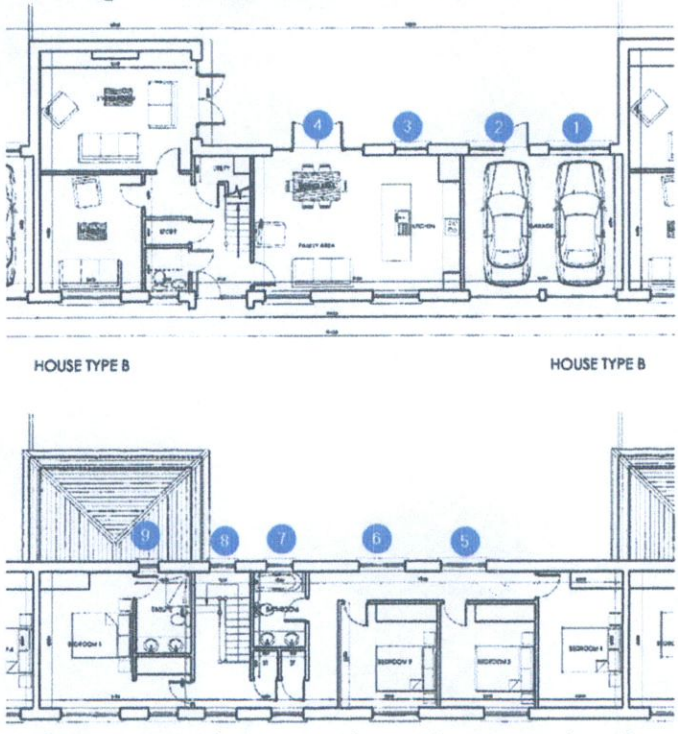

Figure 3: VSC Window Key Plan – The Way, Rathcoole

Window	Room Type	Proposed	<27% Yes/No	Existing	Difference	>0.8 Existing	Compliance Demonstrated
1	Garage	N/A	N/A	N/A	N/A	N/A	N/A
2	Garage	N/A	N/A	N/A	N/A	N/A	N/A
3	Kitchen	31.74	Yes	33.66	0.94	Yes	Yes
4	Dining	28.12	Yes	31.69	0.89	Yes	Yes
5	Hallway	N/A	N/A	N/A	N/A	N/A	N/A
6	Hallway	N/A	N/A	N/A	N/A	N/A	N/A
7	Bathroom	N/A	N/A	N/A	N/A	N/A	N/A
8	Stairs	N/A	N/A	N/A	N/A	N/A	N/A
9	Bathroom	N/A	N/A	N/A	N/A	N/A	N/A

Table 2: VSC Results – The Way, Rathcoole

5. Conclusion

Overshadowing

From the overshadowing images it can be seen that the proposed development introduces minimal additional shadowing external to the site however the other analyses completed in this report demonstrate that the proposed development meets the guidelines set out in 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice', Second Edition 2011, by P. J. Littlefair.

Vertical Sky Component (VSC)

The BRE guidelines state that if the VSC at the centre of a window is more than 27% (or if not, then it is more than 80% of its former value), then the diffuse daylighting of the existing building will not be adversely affected.

All calculated windows analysed achieved the value of 27%. All windows will receive adequate amount of sunlight.

Sunlight Assessment on Amenity Space – 50% Rule

BRE Guide [3.3] 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 21st March.

The adjacent amenity spaces analysed all achieve either more than the 50% minimum requirement of area receiving at least two hours of sunlight on March 21st, or the area does not reduce to less than 0.8 times the current amount.

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