

**20-24 TOLWORTH BROADWAY,
TOLWORTH, SURBITON, KT6 7HL**

**ANALYSIS
OF
SITE LAYOUT
FOR
SUNLIGHT AND DAYLIGHT**

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By

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20 -24 Tolworth Broadway, Tolworth, Surbiton KT6 7HL

Analysis of Site Layout for Daylight & Sunlight

1. Introduction

An application has been submitted for the redevelopment of a commercial building located at 20-24 Tolworth Broadway.

This daylight and sunlight assessment has been prepared to support the planning application for the proposed development. The report assesses the proposals for daylight and sunlight within habitable rooms in the proposed building and its effects on the nearby buildings. The report concludes that the proposal is acceptable and in accordance with the planning policy requirements.

There is no existing specific National Planning Policy relating to the prospective impacts of developments on daylight and sunlight to their surrounding environment. However, the Building Research Establishment publication 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice' is the established National guidance to aid the developer to prevent or minimise the impact of a new development on the existing buildings and on the availability of daylight within the new proposals. The BRE guide has been revised and published a third edition in June 2022. It has been developed in conjunction with daylight and sunlight recommendations in the BS EN 17037:2018.

The 2022 document is referred to as the 'BRE Guide' in this report.

2. Description of Proposed Development

The development is situated on 20-24 Tolworth Broadway in the area of Tolworth in South West London and located within the administrative boundaries of The Royal Borough of Kingston Upon Thames.

The proposal is for the redevelopment of the site through partial demolition of the first and second floor, and new massing at first to third floor to provide nine new flats.

The proposal is shown on the following floor plans by GML Architects.

Location Plan	5062/PA/01
Existing Site Plan	5062/PA/02
Existing Ground Floor Plan	5062/PA/03.0
Existing First Floor Plan	5062/PA/03.1
Existing Second Floor	5062/PA/03.2
Existing Elevations	5062/PA/04
Existing Elevations	5062/PA/05
Existing Site Photos	5062/PA/06
Existing Site Photos	5062/PA/07

Proposed Site Plan	5062/PA/09
Proposed Ground Floor	5062/PA/10
Proposed First Floor	5062/PA/11
Proposed Second Floor	5062/PA/12
Proposed Third Floor	5062/PA/13
Proposed Roof Plans	5062/PA/14
Proposed Elevations	5062/PA/15
Proposed Elevations	5062/PA/16
Proposed Section	5062/PA/17

3. Daylight and Sunlight Requirements

3.1. Regional Planning Policy

The Mayor of London Supplementary Planning Guidance Housing (2016) makes recommendations that the BRE Guide should be applied sensitively to higher density development in London, particularly in central and urban areas.

1.3.45 Policy 7.6Bd requires new development to avoid causing ‘unacceptable harm’ to the amenity of surrounding land and buildings, particularly in relation to privacy and overshadowing and where tall buildings are proposed. An appropriate degree of flexibility needs to be applied when using BRE guidelines to assess the daylight and sunlight impacts of new development on surrounding properties, as well as within new developments themselves. Guidelines should be applied sensitively to higher density development, especially in opportunity areas, town centres, large sites and accessible locations, where BRE advice suggests considering the use of alternative targets. This should take into account local circumstances; the need to optimise housing capacity; and scope for the character and form of an area to change over time.

1.3.46 The degree of harm on adjacent properties and the daylight targets within a proposed scheme should be assessed drawing on broadly comparable residential typologies within the area and of a similar nature across London. Decision makers should recognise that fully optimising housing potential on large sites may necessitate standards which depart from those presently experienced, but which still achieve satisfactory levels of residential amenity and avoid unacceptable.

The SPG includes Standard 32 regarding direct sunlight

Standard 32 - All homes should provide for direct sunlight to enter at least one habitable room for part of the day. Living areas and kitchen dining spaces should preferably receive direct sunlight.

2.3.45 Daylight enhances residents’ enjoyment of an interior and reduces the energy needed to provide light for everyday activities, while controlled sunlight can help to meet part of the winter heating requirement. Sunlight is particularly desirable in living areas and kitchen dining spaces. The risk of overheating should be taken into account when designing for sunlight alongside the need to ensure appropriate levels of privacy. In addition to the above standards, BRE good practice guidelines and methodology¹⁴⁶ can be used to assess

the levels of daylight and sunlight achieved within new developments, taking into account guidance below and in Section 1.3.

2.3.46 Where direct sunlight cannot be achieved in line with Standard 32, developers should demonstrate how the daylight standards proposed within a scheme and individual units will achieve good amenity for residents. They should also demonstrate how the design has sought to optimise the amount of daylight and amenity available to residents, for example, through the design, colour and landscaping of surrounding buildings and spaces within a development.

2.3.47 BRE guidelines on assessing daylight and sunlight should be applied sensitively to higher density development in London, particularly in central and urban settings, recognising the London Plan's strategic approach to optimise housing output (Policy 3.4) and the need to accommodate additional housing supply in locations with good accessibility suitable for higher density development (Policy 3.3). Quantitative standards on daylight and sunlight should not be applied rigidly, without carefully considering the location and context and standards experienced in broadly comparable housing typologies in London.

4. General

4.1. General Effects of New Development on Light to Surrounding Buildings

Figure 1 of this report is a site plan showing the development and its nearby buildings.

The proposed development is part of the shopping parade on Tolworth Broadway, there will not be any external changes to the front of the building and therefore not affect any neighbouring windows.

To the rear of the parade, there are several neighbouring windows that will be impacted by the development. This report analyses all neighbouring windows from numbers 12-34 Tolworth Broadway.

To the rear of the development site are the rear windows and gardens of 17-21 Oakleigh Avenue. All their windows and gardens are analysed in this report.

4.2. Daylight & Sunlight to Rooms within the Development

Daylight and sunlight to rooms within the development are analysed in this report.

5. Criteria for Assessment of Daylight and Sunlight to Neighbouring Windows

5.1. Daylight assessment

The impacts of a development on daylight and sunlight to nearby buildings are considered using the Building Research Establishment (BRE) criteria. The principal measure of the impacts on daylight is the Vertical Sky Component (VSC) test.

The BRE Guide recommends that a room with 27% VSC or at least 80% of the former value will be adequately lit. In cases where rooms are lit by more than one window, the average of their VSC should be taken.

The Building Research Establishment (BRE) also states that if the angle of obstruction caused by a development from a ground-floor window is below 25 degrees, it is unlikely to have a significant impact on the diffuse skylight that the existing building enjoys.

2.2.5 If the proposed development is taller or closer than this, a modified form of the procedure adopted for new buildings can be used to find out whether an existing building still receives enough skylight. First, draw a section in a plane perpendicular to each affected main window wall of the existing building (Figure 14). Measure the angle to the horizontal subtended by the new development at the level of the centre of the lowest window. If this angle is less than 25° for the whole of the development then it is unlikely to have a substantial effect on the diffuse skylight enjoyed by the existing building. If, for any part of the new development, this angle is more than 25°, a more detailed check is needed to find the loss of skylight to the existing building. Both the total amount of skylight and its distribution within the building are important.

“2.2.6 Any reduction in the total amount of skylight can be calculated by finding the VSC at the centre of each main window. In the case of a floor-to-ceiling window such as a patio door, a point 1.6 m above ground 15 (or balcony level for an upper storey) on the centre line of the window may be used. For a bay window, the centre window facing directly outwards can be taken as the main window. If a room has two or more windows of equal size, the mean of their VSCs may be taken. The reference point is in the external plane of the window wall. Windows to bathrooms, toilets, storerooms, circulation areas, and garages need not be analysed. The VSC can be found by using the skylight indicator (Figure A1 in Appendix A) or Waldram Diagram (Figure B1 in Appendix B), or appropriate computer software.

2.2.7 If this VSC is greater than 27% then enough skylight should still be reaching the window of the existing building. This value of VSC typically supplies enough daylight to a standard room when combined with a window of normal dimensions, with glass area around 10% or more of the floor area. 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 0.80 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 gloomier, and electric lighting will be needed more of the time. In presenting results, ratios of VSC should be given to at least two decimal places (for example 0.79 or 0.81) or as the equivalent percentage loss (for example 21% or 19%).

2.2.8 If there would be a significant loss of light to the main window but the room also has one or more smaller windows, an overall VSC may be derived by weighting each VSC element in accordance with the proportion of the total glazing area represented by its window. For example, a room has a main window of area 2 m² whose VSC would drop from 24% to 18%, 0.75 times the value before. However, it also has a smaller window, area 1 m², for which the VSC would be unchanged at 30%. The area weighted VSC ‘before’ would be $(24 \times 2 + 30) / 3 = 26\%$. ‘After’ it would be $(18 \times 2 + 30) / 3 = 22\%$, 0.85 times the value ‘before’. Thus, loss of VSC to the room as a whole would meet the guideline. This method would only be appropriate in situations where the windows light the same areas of the room. It should not be used in situations such as a through lounge more than 5m from window to window, where, for example, a loss of light to the front windows and front portion of the room may not be mitigated by daylight from the rear windows.”

5.2. Sunlight assessment

The acceptable level of sunlight to adjoining properties is evaluated using BRE Guide Annual Probable Sunlight Hours (APSH) test. The acceptability criteria are greater than 25% for the whole year or more than 5% between 21st September and 21st March. Where a development causes a reduction below these values, the reduction should not be greater than 20% of its former value.

“3.2.6 If a room can receive more than one quarter of annual probable sunlight hours (APSH), including at least 5% of APSH in the winter months between 21 September and 21 March, then it should still receive enough sunlight. Also, if the overall annual loss of APSH is 4% or less, the loss of sunlight is small. The sunlight availability indicators (Figures A2, A3 and A4) in Appendix A can be used to check this.

3.2.7 Any reduction in sunlight access below these levels should be kept to a minimum. If the available sunlight hours are both less than the amount above and less than 0.80 times their former value, either over the whole year or just in the winter months (21 September to 21 March), and the overall annual loss is greater than 4% of APSH, then the occupants of the existing building will notice the loss of sunlight; the room may appear colder and less cheerful and pleasant. In presenting results, ratios of sunlight hours should be given to at least two decimal places (for example 0.79 or 0.81) or as the equivalent percentage loss (for example 21% or 19%).

3.2.8 Care needs to be taken in applying this guideline to rooms with multiple windows. Except where the windows are in opposite walls, the annual probable sunlight hours cannot simply be added together. If the calculation method used does not avoid double counting of sunlight through multiple windows, the annual probable sunlight hours for the best sunlit window should be taken. “

5.3. Sunlight to Gardens

The BRE Guide recommends for a garden 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.

“3.3.7 As a check, it is recommended that at least half of the amenity areas listed above should receive at least two hours of sunlight on 21 March. It is instructive to draw the ‘two hours sun contour’ that marks this area on plan, because the use of specific parts of a site can be planned with sunlight in mind. This could include reserving the sunniest parts of the site for gardens and sitting out, while using the shadier areas for car parking (in summer, shade is often valued in car parks). (Figure 30). If a detailed calculation cannot be carried out, and the area is a simple shape, it is suggested that the centre of the area should receive at least two hours of sunlight on 21 March.

3.3.8 Locations that can and cannot receive two or more hours of sunlight on 21 March may be found using specialist software. The space is divided into a grid of points with a recommended spacing of 0.3 m or less, and the proportion of these points that can receive two hours of sunlight on March 21 is computed. It is possible to carry out a check for the centre of an area by using the sun path indicator, which has a line for 21 March (see Appendix A). Sunlight at an altitude of 10° or less does not count, because it is likely to be blocked by low-level planting anyway. In working out the total area to be considered, driveways and hard standing for cars should be left out. Around housing, front gardens that are relatively small and visible from public footpaths should be omitted; only the main back garden should be analysed. Each individual garden for each dwelling in a block should be considered separately.

3.3.11 The above guidance applies both to new gardens and amenity areas and to existing ones that are affected by new developments. If an existing garden or outdoor space is already heavily obstructed then any further loss of sunlight should be kept to a minimum. In this poorly sunlit case, if as a result of new development the area that can receive two hours of direct sunlight on 21 March is reduced to less than 0.80

times its former size, then this further loss of sunlight is significant. The garden or amenity area will tend to look more heavily overshadowed."

6. Daylight and Sunlight to Neighbouring Windows

Figures 7-9 show the neighbouring windows that face the proposed development. The windows are numbered for reference.

The BRE Guide recommends that daylight is satisfactory provided the sky component is greater than 27% or 80% of its former value. The vertical sky component (VSC) for windows is evaluated by the method described in Appendix B of the BRE Guide using the Waldram Sky availability indicator diagram.

For Sunlight the Guide recommends using the Annual Probable Sunlight Hours (APSH). The acceptability criteria are greater than 25% for the whole year or more than 5% between 21st September and 21st March. Where a development causes a reduction below these values, the reduction should not be greater than 20% of its former value. The BRE Guide recommends that north-facing windows are analysed for daylight only.

Daylight

Building Name	Vertical Sky Component					
	Floor Name	Window Name	VSC Existing	VSC Proposed	Pr/Ex	Meets BRE Criteria
12-18 Tolworth Broadway	Ground	W1	18.21	18.13	100%	YES
12-18 Tolworth Broadway	Ground	W2	19.29	19.29	100%	YES
12-18 Tolworth Broadway	Ground	W3	30.71	29.77	97%	YES
12-18 Tolworth Broadway	First	W1	36.41	35.85	98%	YES
12-18 Tolworth Broadway	First	W2	37.01	36.34	98%	YES
12-18 Tolworth Broadway	First	W3	37.15	36.37	98%	YES
12-18 Tolworth Broadway	First	W4	22.24	21.51	97%	YES
12-18 Tolworth Broadway	First	W5	33.82	33.02	98%	YES
12-18 Tolworth Broadway	First	W6	36.24	35.45	98%	YES
12-18 Tolworth Broadway	First	W7	28.28	28.12	99%	YES
12-18 Tolworth Broadway	First	W8	35.1	33.91	97%	YES
12-18 Tolworth Broadway	First	W9	31.39	30.62	98%	YES
12-18 Tolworth Broadway	Second	W1	39.49	39.14	99%	YES
12-18 Tolworth Broadway	Second	W2	32.93	32.49	99%	YES
12-18 Tolworth Broadway	Second	W3	38.51	37.95	99%	YES
12-18 Tolworth Broadway	Second	W4	34.77	34.28	99%	YES
12-18 Tolworth Broadway	Second	W5	38.63	38.05	98%	YES
12-18 Tolworth Broadway	Second	W6	39.25	38.41	98%	YES
12-18 Tolworth Broadway	Second	W7	39.35	38.27	97%	YES
12-18 Tolworth Broadway	Second	W8	39.41	37.31	95%	YES
12-18 Tolworth Broadway	Second	W9	39.45	34.47	87%	YES

26-34 Tolworth Broadway	First	W1	31.54	30.66	97%	YES
26-34 Tolworth Broadway	First	W2	22.99	22.86	99%	YES
26-34 Tolworth Broadway	First	W3	28.43	28.02	99%	YES
26-34 Tolworth Broadway	First	W4	23.03	22.44	97%	YES
26-34 Tolworth Broadway	First	W5	36	35.24	98%	YES
26-34 Tolworth Broadway	First	W6	35.3	34.64	98%	YES
26-34 Tolworth Broadway	First	W7	23.51	23.26	99%	YES
26-34 Tolworth Broadway	First	W8	27.26	26.1	96%	YES
26-34 Tolworth Broadway	First	W9	32.17	30.69	95%	YES
26-34 Tolworth Broadway	First	W10	34.7	33.24	96%	YES
26-34 Tolworth Broadway	First	W11	35.51	34.11	96%	YES
26-34 Tolworth Broadway	Second	W1	39.28	36.4	93%	YES
26-34 Tolworth Broadway	Second	W2	26.32	26.3	100%	YES
26-34 Tolworth Broadway	Second	W3	35.3	34.87	99%	YES
26-34 Tolworth Broadway	Second	W4	29.18	28.59	98%	YES
26-34 Tolworth Broadway	Second	W5	38.72	38.18	99%	YES
26-34 Tolworth Broadway	Second	W6	38.26	37.8	99%	YES
26-34 Tolworth Broadway	Second	W7	31.64	31.49	100%	YES
17 Oakleigh Ave	Ground	W1	33.03	32	97%	YES
17 Oakleigh Ave	Ground	W2	33.99	33.11	97%	YES
19 Oakleigh Ave	Ground	W3	34.27	33.16	97%	YES
19 Oakleigh Ave	Ground	W4	34.09	32.92	97%	YES
21 Oakleigh Ave	Ground	W1	32.25	31.71	98%	YES
21 Oakleigh Ave	Ground	W2	33.96	33.15	98%	YES
21 Oakleigh Ave	Ground	W3	97.81	97.55	100%	YES

Sunlight

Building Name	Annual Probable Sunlight Hours									
	Floor Name	Window Name	Annual Ex	Annual Pr	Pr/Ex	Meets BRE Criteria	Winter Ex	Winter Pr	Pr/Ex	Meets BRE Criteria
12-18 Tolworth Broadway	Ground	W1	31	31	100%	YES	7	7	100%	YES
12-18 Tolworth Broadway	Ground	W2	27	27	100%	YES	6	6	100%	YES
12-18 Tolworth Broadway	Ground	W3	59	59	100%	YES	15	15	100%	YES
12-18 Tolworth Broadway	First	W1	73	73	100%	YES	25	25	100%	YES
12-18 Tolworth Broadway	First	W2	76	76	100%	YES	26	26	100%	YES

12-18 Tolworth Broadway	First	W3	78	78	100%	YES	26	26	100%	YES
12-18 Tolworth Broadway	First	W4	54	52	96%	YES	23	21	91%	YES
12-18 Tolworth Broadway	First	W5	65	63	97%	YES	24	22	92%	YES
12-18 Tolworth Broadway	First	W6	67	64	96%	YES	22	21	95%	YES
12-18 Tolworth Broadway	First	W7	43	43	100%	YES	9	9	100%	YES
12-18 Tolworth Broadway	First	W8	70	67	96%	YES	21	19	90%	YES
12-18 Tolworth Broadway	First	W9	60	55	92%	YES	14	12	86%	YES
12-18 Tolworth Broadway	Second	W1	80	79	99%	YES	28	27	96%	YES
12-18 Tolworth Broadway	Second	W2	64	64	100%	YES	25	25	100%	YES
12-18 Tolworth Broadway	Second	W3	74	74	100%	YES	27	27	100%	YES
12-18 Tolworth Broadway	Second	W4	65	65	100%	YES	26	26	100%	YES
12-18 Tolworth Broadway	Second	W5	72	72	100%	YES	26	26	100%	YES
12-18 Tolworth Broadway	Second	W6	73	71	97%	YES	26	24	92%	YES
12-18 Tolworth Broadway	Second	W7	73	70	96%	YES	26	24	92%	YES
12-18 Tolworth Broadway	Second	W8	73	65	89%	YES	26	21	81%	YES
12-18 Tolworth Broadway	Second	W9	73	55	75%	YES	26	18	69%	YES
17 Oakleigh Ave	Ground	W1	18	16	North	YES	0	0	North	YES
17 Oakleigh Ave	Ground	W2	21	17	North	YES	2	2	North	YES
19 Oakleigh Ave	Ground	W3	29	29	North	YES	4	4	North	YES
19 Oakleigh Ave	Ground	W4	30	30	North	YES	5	5	North	YES
21 Oakleigh Ave	Ground	W1	35	35	North	YES	7	7	North	YES
21 Oakleigh Ave	Ground	W2	37	37	North	YES	7	7	North	YES
21 Oakleigh Ave	Ground	W3	89	89	100%	YES	21	21	100%	YES
26-34 Tolworth Broadway	First	W1	62	61	98%	YES	24	23	96%	YES
26-34 Tolworth Broadway	First	W2	47	47	100%	YES	18	18	100%	YES
26-34 Tolworth Broadway	First	W3	44	44	100%	YES	14	14	100%	YES
26-34 Tolworth Broadway	First	W4	30	29	97%	YES	7	6	86%	YES

26-34 Tolworth Broadway	First	W5	68	66	97%	YES	21	20	95%	YES
26-34 Tolworth Broadway	First	W6	67	65	97%	YES	20	19	95%	YES
26-34 Tolworth Broadway	First	W7	36	36	100%	YES	8	8	100%	YES
26-34 Tolworth Broadway	First	W8	26	26	North	YES	5	5	North	YES
26-34 Tolworth Broadway	First	W9	26	25	North	YES	5	5	North	YES
26-34 Tolworth Broadway	First	W10	26	26	North	YES	5	5	North	YES
26-34 Tolworth Broadway	First	W11	26	26	North	YES	5	5	North	YES
26-34 Tolworth Broadway	Second	W1	73	70	96%	YES	26	26	100%	YES
26-34 Tolworth Broadway	Second	W2	57	57	100%	YES	24	24	100%	YES
26-34 Tolworth Broadway	Second	W3	62	62	100%	YES	21	21	100%	YES
26-34 Tolworth Broadway	Second	W4	44	44	100%	YES	9	9	100%	YES
26-34 Tolworth Broadway	Second	W5	73	73	100%	YES	26	26	100%	YES
26-34 Tolworth Broadway	Second	W6	73	73	100%	YES	26	26	100%	YES
26-34 Tolworth Broadway	Second	W7	53	53	100%	YES	16	16	100%	YES

As shown in the tables above, the daylight and sunlight reduction to all neighbouring windows are better than the BRE Guide recommendations. They all remain above 80% of their previous value.

7. Sunlight to Neighbouring Gardens

The BRE Guide recommends that nearby gardens should continue to receive at least 2 hours of sunlight over 50% of the area on March 21st or at least 80% of the former amount.

Below is a table showing the percentage of sunlight that reaches the neighbouring gardens 17-21 Oakleigh Avenue, as well as the percentage of its previous value.

Building Name	Sunlight to Gardens								
	Floor Name	Amenity Name	Amenity Area	Lit Area Ex	Lit Area Pr	Existing %	Proposed %	Pr/Ex	Meets BRE Criteria
17 Oakleigh Ave	Ground	A1	141	98	98	70%	70%	100%	YES

19 Oakleigh Ave	Ground	A1	164	139	139	85%	85%	100%	YES
21 Oakleigh Ave	Ground	A2	182	143	143	78%	78%	100%	YES

As shown in the table above, the garden will remain above 100% of its former value on March 21st. Therefore, it complies with the BRE recommendations.

8. Daylight Methodology to Rooms within the Development

The recommendations for adequacy of interior daylight are given in Appendix C of the BRE Guide. The Guide makes reference to the British Standard Daylight in Buildings BS EN17037 and its UK National Annex which sets out two criteria for assessing interior daylight. One is based on target illuminances from daylight to be achieved over specified fractions of the reference plane (a plane at table top height covering the room) for at least half of the daylight hours in a typical year. The other, alternative, method is based on calculating the daylight factors achieved over specified fractions of the reference plane.

8.1. Illuminance Method

This method involves using climatic data for the location of the site (via the use of an appropriate, typical or average year, weather file within the software) to calculate the illuminance from daylight at each point on an assessment grid on the reference plane at an at least hourly interval for a typical year.

The UK National Annex gives specific minimum recommendations for habitable rooms in dwellings in the United Kingdom. The National Annex therefore provides the UK guidance on minimum daylight provision in all UK dwellings.

The UK National Annex gives illuminance recommendations of:

- 100 lux in bedrooms
- 150 lux in living rooms
- 200 lux in kitchens.

These are the median illuminances, to be exceeded over at least 50% of the assessment points in the room for at least half of the daylight hours. The recommended levels over 95% of a reference plane need not apply to dwellings in the UK.

The BRE Guidelines state in paragraph C17 that:

“Where a room has a shared use, the highest target should apply. For example, in a bed sitting room in student accommodation, the value for a living room should be used if students would often spend time in their rooms during the day. Local authorities could use discretion here. For example, the target for a living room could be used for a combined living/dining/kitchen area if the kitchens are not treated as habitable spaces, as it may avoid small separate kitchens in a design.”

8.2. Daylight Factor Method

This method involves the computation of the daylight factor at each calculation point on an assessment grid. The daylight factor is the illuminance at a point on the reference plane in a space, divided by the illuminance on an unobstructed horizontal surface outdoors. The CIE standard overcast sky is used, and the ratio is usually expressed as a percentage.

Since the calculation uses an overcast sky model, the daylight factor is independent of orientation and location. For spaces with side windows, equivalent daylight factor targets to achieve a target illuminance over at least half of the daylight hours in a year are based on the formula:

$$D = \text{Target illuminance} / \text{Median external diffuse horizontal illuminance} \times 100 (\%)$$

where the median external diffuse horizontal illuminance ($E_{v,d,med}$) is the illuminance from the sky on an unobstructed horizontal surface achieved for half of the yearly daylight hours at a particular location.

The table below shows the daylight factor targets to be achieved over at least 50% of the assessment grid in domestic habitable rooms with vertical and/or inclined daylight apertures. The UK National Annex gives alternative target values for rooms with diffusing horizontal rooflights. The recommendations are met if the median of the daylight factors calculated in a room meets or exceeds the specific target for room type and location.

Target daylight factors (DT) to achieve over at least 50% of the assessment grid in UK domestic habitable rooms with vertical and/or inclined daylight apertures			
Location	DT for 100 lx (Bedroom)	DT for 150 lx (Living room)	DT for 200 lx (Kitchen)
St Peter (Jersey)	0.6%	0.9%	1.2%
London (Gatwick Airport)	0.7%	1.1%	1.4%
Birmingham	0.6%	0.9%	1.2%
Hemsby (Norfolk)	0.6%	0.9%	1.3%
Finningley (Yorkshire)	0.7%	1.0%	1.3%
Aughton (Lancashire)	0.7%	1.1%	1.4%
Belfast	0.7%	1.0%	1.4%
Leuchars (Fife)	0.7%	1.1%	1.4%
Oban	0.8%	1.1%	1.5%
Aberdeen	0.7%	1.1%	1.4%

9. Sunlight Methodology

For internal sunlight, the BRE Guidelines state in paragraph 3.1.15:

“In general, a dwelling, or non-domestic building that has a particular requirement for sunlight, will appear reasonably sunlit provided:

- *at least one main window wall faces within 90° of due south and*
- *a habitable room, preferably a main living room, can receive a total of at least 1.5 hours of sunlight on 21 March. This is assessed at the inside centre of the window(s); sunlight received by different windows can be added provided they occur at different times and sunlight hours are not double counted.”*

10. Sunlight to Gardens & Open Space

For gardens and open space, the BRE recommends it should receive in at least 50% of the space two hours of sunlight on the 21st March.

“3.3.7 As a check, it is recommended that at least half of the amenity areas listed above should receive at least two hours of sunlight on 21 March. It is instructive to draw the ‘two hours sun contour’ that marks this area on plan, because the use of specific parts of a site can be planned with sunlight in mind. This could include reserving the sunniest parts of the site for gardens and sitting out, while using the shadier areas for car parking (in summer, shade is often valued in car parks). (Figure 30). If a detailed calculation cannot be carried out, and the area is a simple shape, it is suggested that the centre of the area should receive at least two hours of sunlight on 21 March.”

11. Daylight and Sunlight to the Proposed Flats

The BRE and BS EN 17037 guidance allows for two alternative methods to assess daylight within new dwellings.

For this report, we have assessed the proposed new accommodation to determine whether the internal spaces will be provided with adequate daylight using the illuminance method with reference to the Target Illuminance (ET) Factor. This method involves the computation of the illuminance level at each calculation point on an assessment grid.

The following reflectance, transmittance, and maintenance values have been used in the internal daylight calculations:

- Transmittance (T): 0.68
- Reflectance (R): 0.2 for floors, 0.7 for ceilings, and 0.5 for walls
- Maintenance Factor: 0.92

All the flat's daylight distribution exceeds the target illumination level for more than 50% of the room grid. The sunlight results show that all the flats will have at least one habitable room receiving more than 1.5 hours of sunlight on the 21st of March. All amenity spaces will receive more than 2 hours of sunlight on March 21.

The full results of the internal daylight, sunlight analyses and amenities are included in Appendix B.

12. Conclusion

The proposal for the redevelopment of 20-24 Tolworth Broadway results in a slight reduction of daylight and sunlight to the neighbouring windows.

In all cases, the reduction is not significant and remains far better than the minimum recommendations of the BRE Guide.

All the proposed flats have large windows. Daylight and sunlight in all rooms within the proposed flats as well as the proposed amenity areas are better than the recommendations of the Building Research Establishment publication 'Site layout and planning for daylight and sunlight, a guide to good practice' 2022 and the standard planning requirements.

Terence A Rook Bsc. C.Eng., MIMechE, FCIBSE

4th March 2024

Appendix A: Proposed Drawings

Figure 1: Site Plan

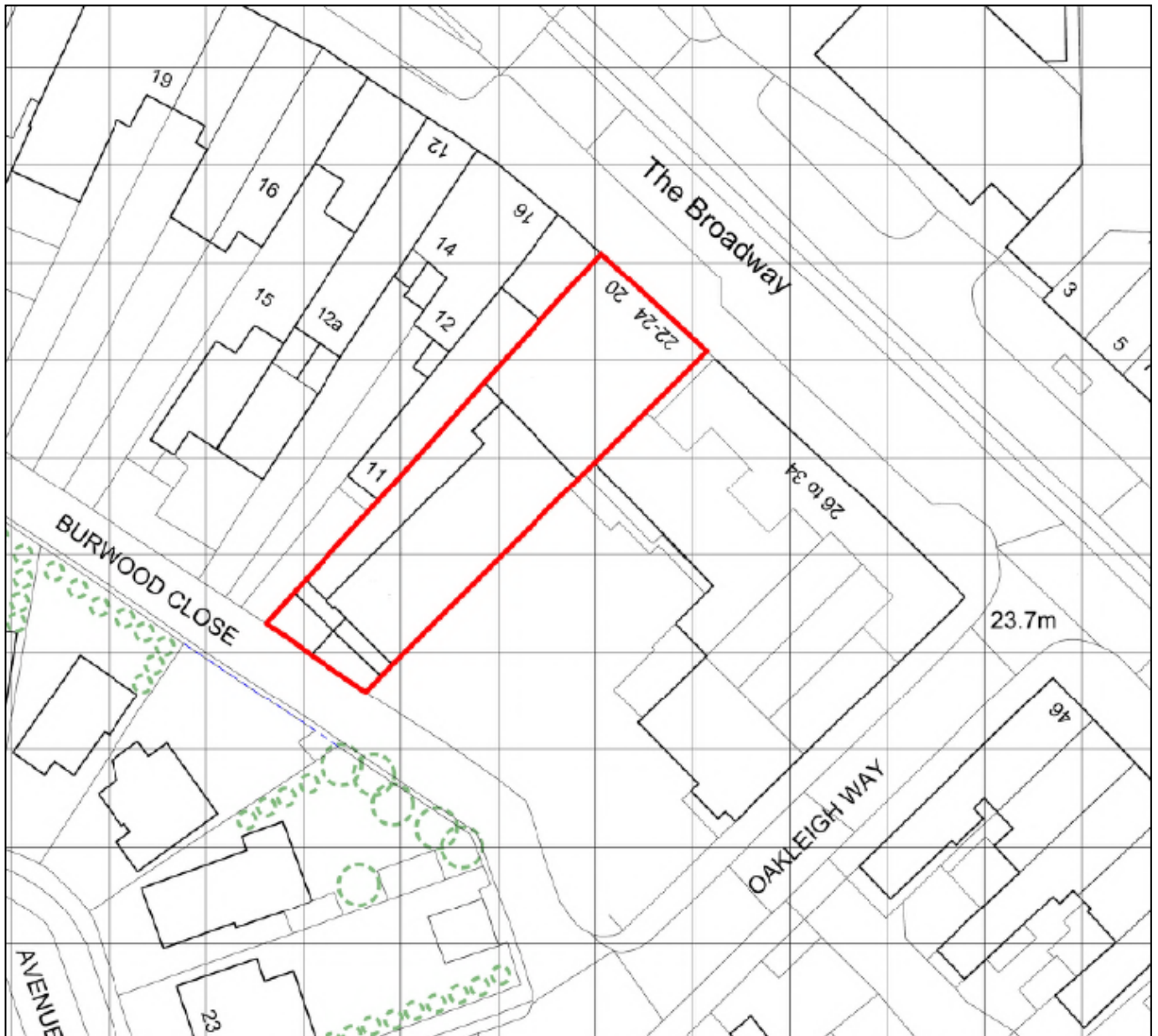


Figure 2: Proposed First Floor Plans

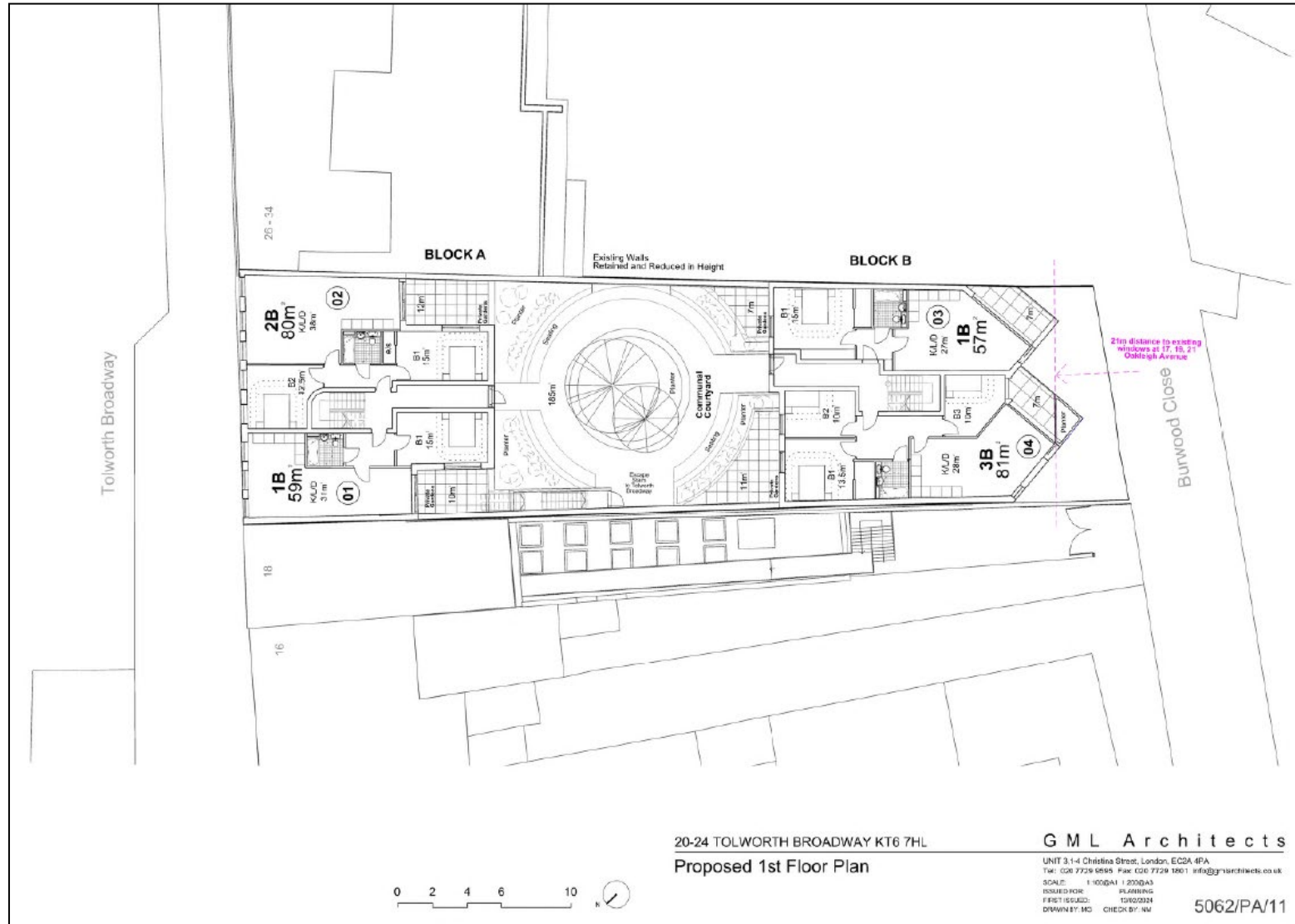


Figure 3: Proposed Second Floor Plans

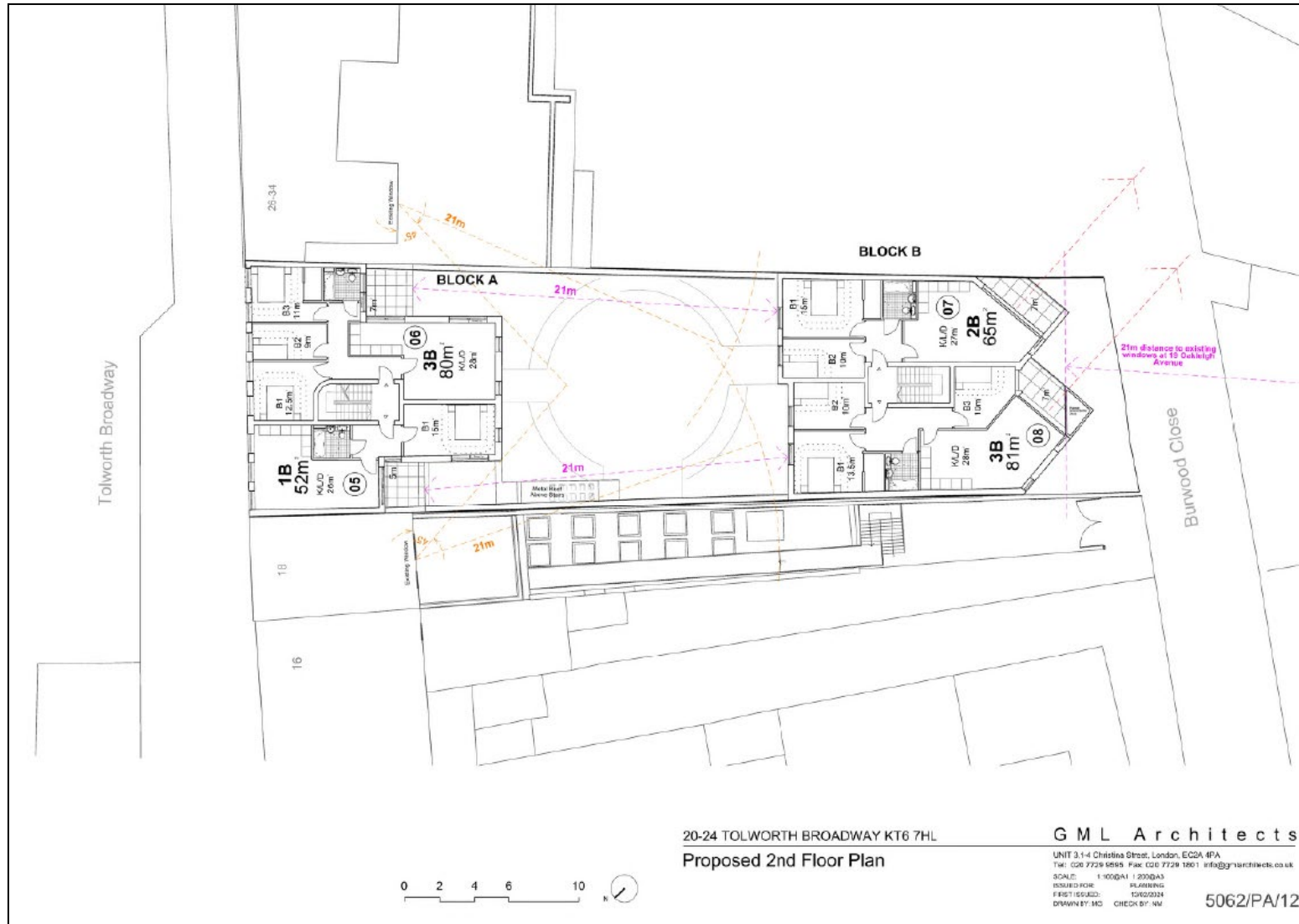


Figure 4: Proposed Third Floor Plan

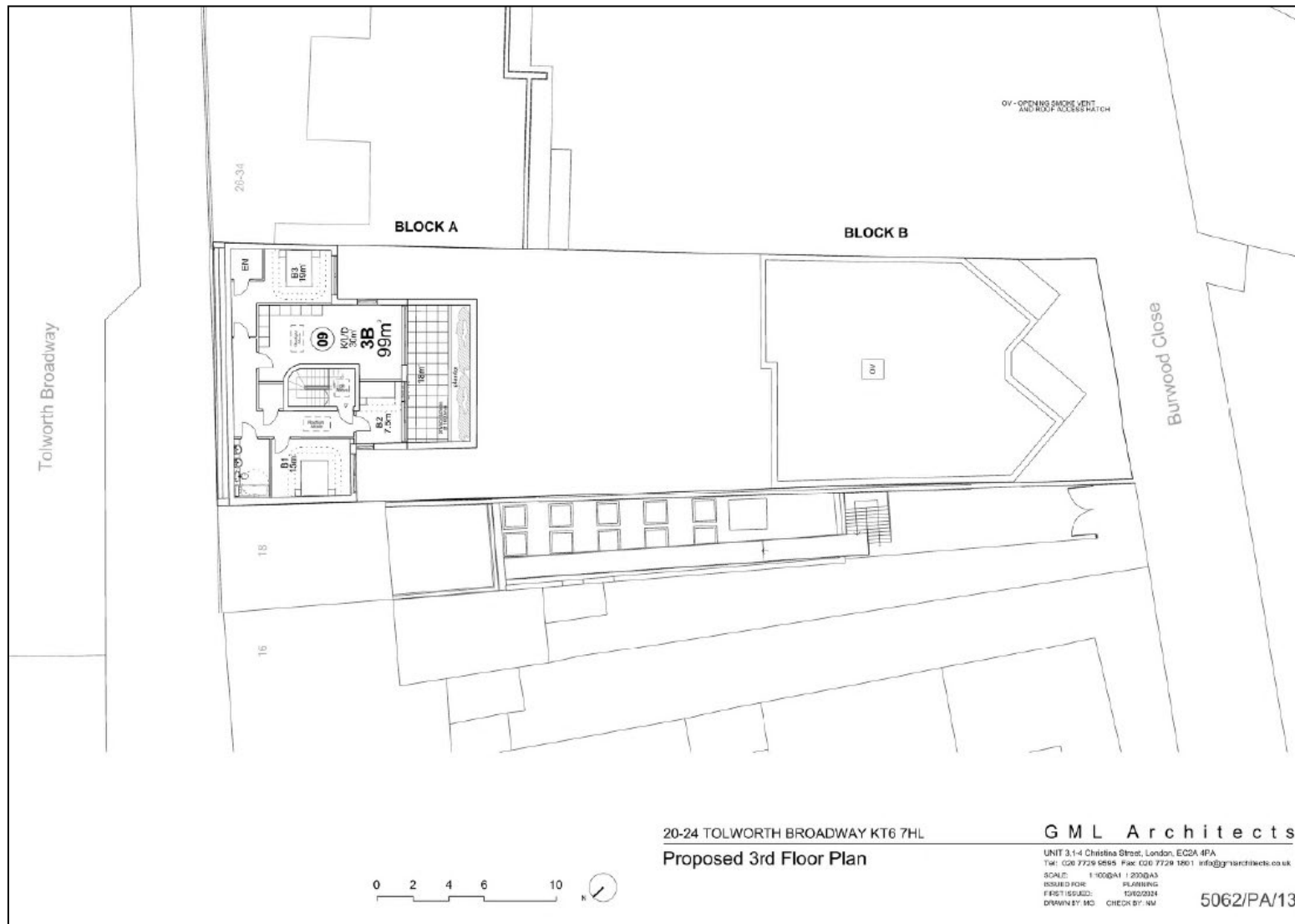


Figure 5: Proposed Elevations

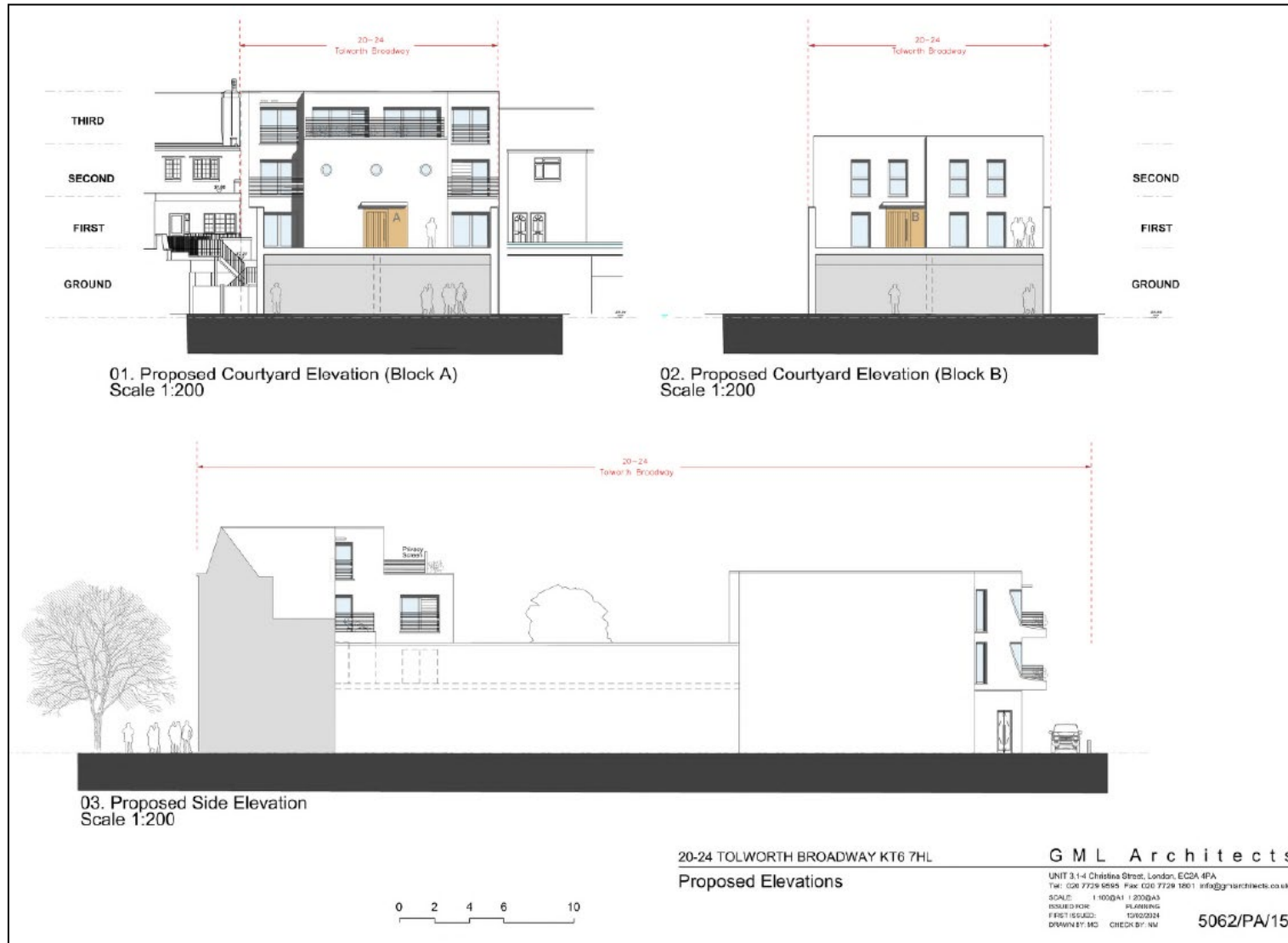


Figure 6: Aerial View of Neighbouring Buildings



Figure 7:Rear View of 12-18 Tolworth Broadway



Figure 8: Rear View of 12-18 Tolworth Broadway



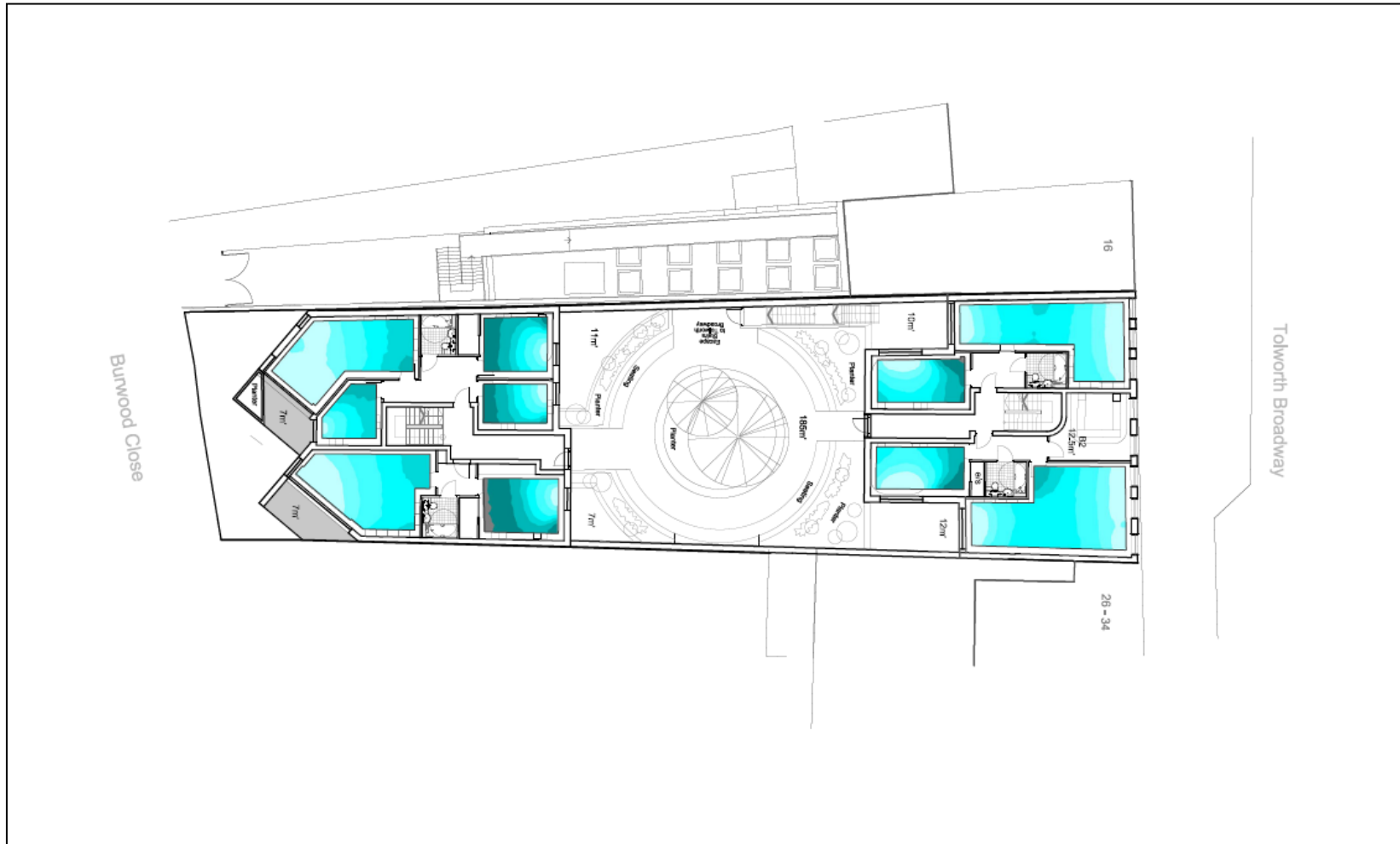
Figure 9: Rear View of 17-21 Oakleigh Avenue



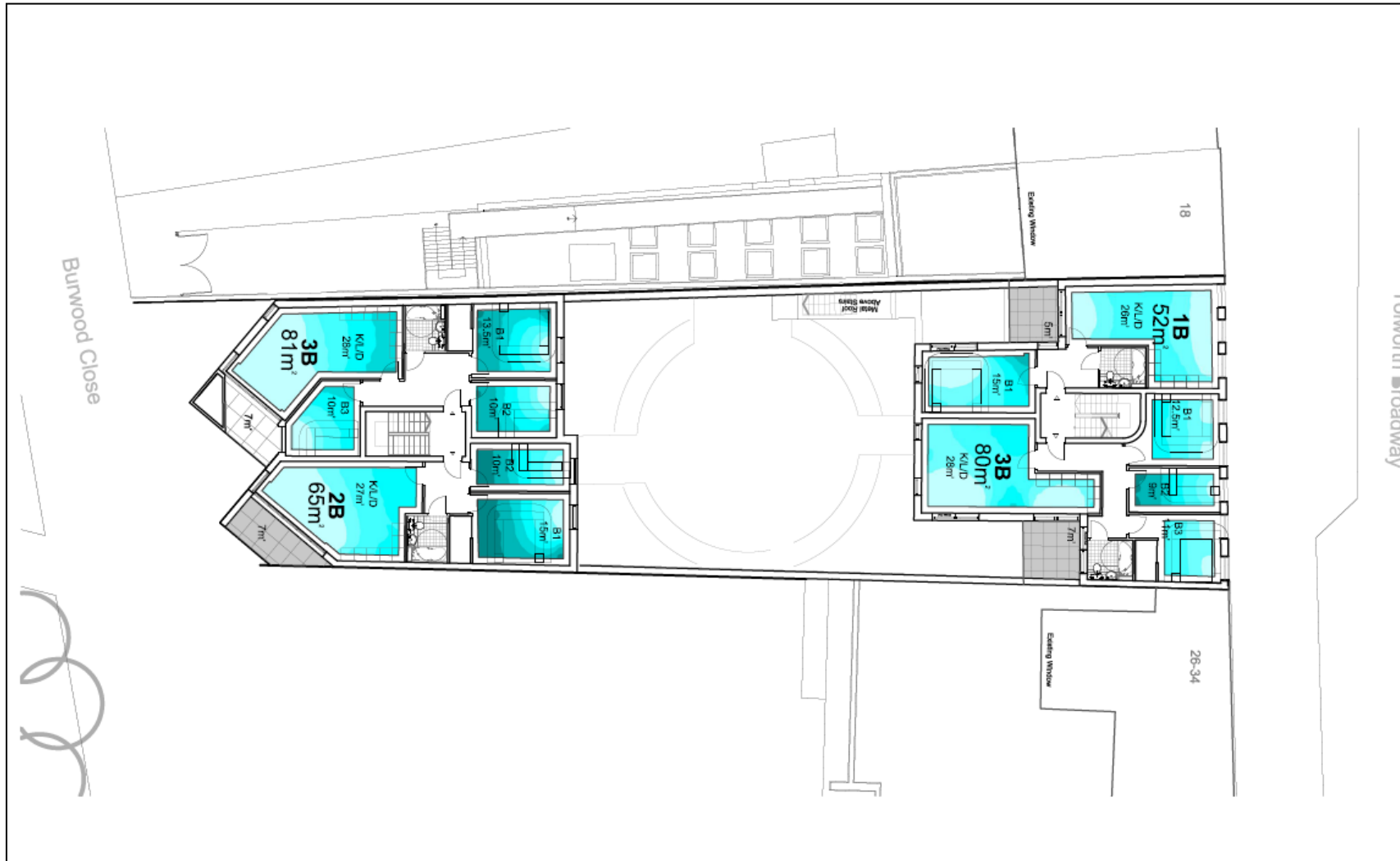
Appendix B Detailed Results

Proposed Internal Illuminance Factor

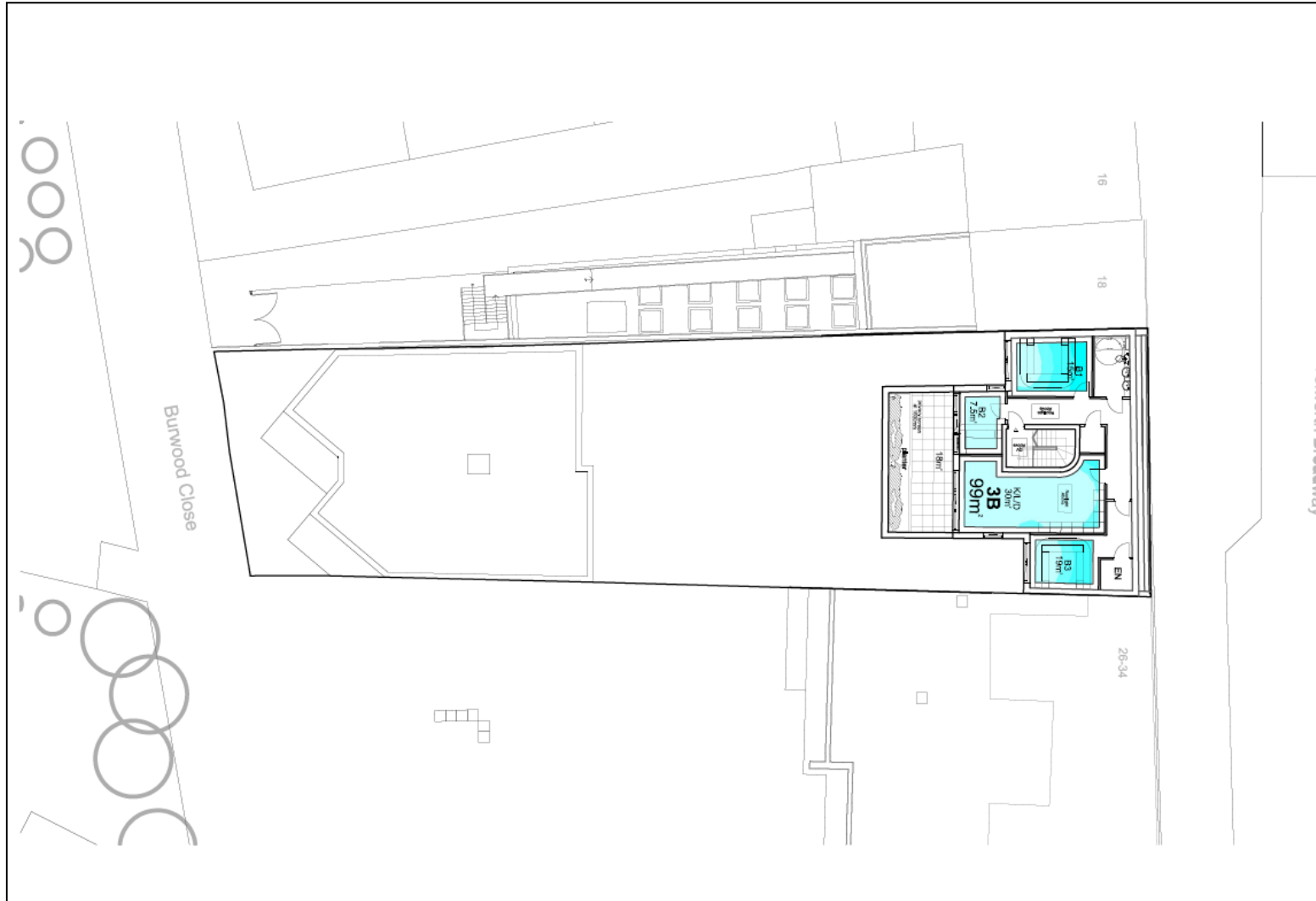
First Floor



Second Floor



Third Floor



Detailed Internal Daylight Results

Project Name: 20-24 Tolworth Broadway. Project No.: 1 Report Title: SDA BS En17037 Analysis - Proposed Scheme Date of Analysis: 04/03/2024														
Floor Ref	Room Ref	Room Attribute	Property Type	Room Use	Room Area m2	Effective Area	Median Lux	Area Meeting Req Lux	% of Area Meeting Req Lux	Criteria				Meets Criteria
										Req Lux	Req % of Effective Area	Req % of Daylight Hours	Daylight Hours	
First	R1	Flat1	Residential	LKD	32.98	24.79	386	24.04	97%	200	50%	50%	4380	YES
	R2	Flat1	Residential	Bedroom	15.66	11.01	248	9.84	89%	100	50%	50%	4380	YES
	R3	Flat2	Residential	LKD	38.12	30.11	329	27.94	93%	200	50%	50%	4380	YES
	R4	Flat2	Residential	Bedroom	15.35	10.78	322	9.86	91%	100	50%	50%	4380	YES
	R5	Flat3	Residential	LKD	28.46	21.80	477	17.57	81%	200	50%	50%	4380	YES
	R6	Flat3	Residential	Bedroom	14.14	9.98	150	7.36	74%	100	50%	50%	4380	YES
	R7	Flat3	Residential	Bedroom	10.87	7.20	173	5.77	80%	100	50%	50%	4380	YES
	R8	Flat3	Residential	Bedroom	10.74	7.18	195	7.18	100%	100	50%	50%	4380	YES
	R9	Flat4	Residential	LKD	28.27	21.84	322	19.10	87%	200	50%	50%	4380	YES
	R10	Flat4	Residential	Bedroom	16.33	11.80	117	6.78	57%	100	50%	50%	4380	YES
Second	R1	Flat5	Residential	LKD	26.90	20.05	530	20.05	100%	200	50%	50%	4380	YES
	R2	Flat5	Residential	Bedroom	15.69	11.03	513	11.03	100%	100	50%	50%	4380	YES
	R3	Flat6	Residential	LKD	29.57	22.22	554	22.09	99%	200	50%	50%	4380	YES
	R4	Flat6	Residential	Bedroom	11.69	7.95	432	7.95	100%	100	50%	50%	4380	YES
	R5	Flat6	Residential	Bedroom	8.92	5.46	222	5.09	93%	100	50%	50%	4380	YES
	R6	Flat6	Residential	Bedroom	9.36	6.05	546	6.05	100%	100	50%	50%	4380	YES
	R7	Flat7	Residential	LKD	28.58	21.86	580	18.70	86%	200	50%	50%	4380	YES
	R8	Flat7	Residential	Bedroom	10.74	7.18	313	7.18	100%	100	50%	50%	4380	YES
	R9	Flat7	Residential	Bedroom	14.15	9.98	185	9.58	96%	100	50%	50%	4380	YES
	R10	Flat7	Residential	Bedroom	10.87	7.20	209	7.05	98%	100	50%	50%	4380	YES
	R11	Flat8	Residential	LKD	28.30	21.87	490	21.82	100%	200	50%	50%	4380	YES
	R12	Flat8	Residential	Bedroom	10.46	6.67	210	5.25	79%	100	50%	50%	4380	YES
	R13	Flat8	Residential	Bedroom	15.42	11.01	147	8.20	74%	100	50%	50%	4380	YES
Third	R1	Flat9	Residential	LKD	30.36	22.97	1090	22.97	100%	200	50%	50%	4380	YES
	R2	Flat9	Residential	Bedroom	14.45	10.19	491	10.19	100%	100	50%	50%	4380	YES
	R3	Flat9	Residential	Bedroom	8.40	5.18	1769	5.18	100%	100	50%	50%	4380	YES
	R4	Flat9	Residential	Bedroom	11.16	7.48	671	7.48	100%	100	50%	50%	4380	YES

Detailed Sunlight Results

Project Name: 20-24 Tolworth Broadway Project No.: 1 Report Title: Sunlight Exposure Analysis - Proposed Scheme Date: 04/03/2024								
Floor Ref	Room Ref	Room Attribute	Property Type	Room Use	Window Ref	Window Orientation	Proposed Sunlight Exposure (Hours)	Rating
First	R1	Flat1	Residential	LKD	W1	43°N	1.8	
					W2	43°N	1.8	
					W3	43°N	1.8	
					W10	223°	2.9	
							4.7	High
First	R2	Flat1	Residential	Bedroom	W9	313°N	2.4	
							2.4	Minimum
First	R3	Flat2	Residential	LKD	W4	43°N	1.8	
					W5	43°N	1.8	
					W6	43°N	2.1	
					W7	223°	5	
							7.2	High
First	R4	Flat2	Residential	Bedroom	W8	134°	6.1	
							6.1	High
First	R5	Flat3	Residential	LKD	W17	264°	4.7	
					W18	264°	4.8	
							4.8	High
First	R6	Flat3	Residential	Bedroom	W11	44°N	1.7	
							1.7	Minimum
First	R7	Flat3	Residential	Bedroom	W12	44°N	1.2	
							1.2	Failed
First	R8	Flat3	Residential	Bedroom	W50	224°	4.1	
							4.1	High
First	R9	Flat4	Residential	LKD	W14	174°	1.7	
					W15	264°	4.7	
							4.7	High
First	R10	Flat4	Residential	Bedroom	W13	44°N	0.7	
							0.7	Failed

Second	R1	Flat5	Residential	LKD	W1	43°N	2.1	
					W2	43°N	2.1	
					W3	43°N	2.1	
					W15	224°	4.2	
							6.3	High
Second	R2	Flat5	Residential	Bedroom	W13	224°	6.8	
					W14	313°N	2.4	
							6.8	High
Second	R3	Flat6	Residential	LKD	W9	134°	5.7	
					W10	134°	7	
					W11	224°	6.8	
					W12	224°	6.8	
							9.3	High
Second	R4	Flat6	Residential	Bedroom	W4	43°N	2.1	
					W5	43°N	2.1	
							2.1	Minimum
Second	R5	Flat6	Residential	Bedroom	W6	43°N	2.1	
							2.1	Minimum
Second	R6	Flat6	Residential	Bedroom	W7	43°N	2.1	
					W8	43°N	2.1	
							2.1	Minimum
Second	R7	Flat7	Residential	LKD	W20	264°	4.9	
					W21	264°	5.1	
							5.1	High
Second	R8	Flat7	Residential	Bedroom	W23	224°	5.9	
							5.9	
							5.9	High
Second	R9	Flat7	Residential	Bedroom	W16	44°N	2.2	
							2.2	
							2.2	Minimum
Second	R10	Flat7	Residential	Bedroom	W17	44°N	1.3	
							1.3	
							1.3	Failed
Second	R11	Flat8	Residential	LKD	W24	264°	5.1	
					W25	174°	6.2	
							6.2	High
Second	R12	Flat8	Residential	Bedroom	W18	44°N Inc	2.2	
							2.2	
							2.2	Minimum
Second	R13	Flat8	Residential	Bedroom	W19	44°N Inc	2.2	
							2.2	
							2.2	Minimum
Third	R1	Flat8	Residential	LKD	W4	224°	7.4	
					W5	134°	7.2	
							9.5	High
Third	R2	Flat8	Residential	Bedroom	W1	223°	5.4	
							5.4	
							5.4	High
Third	R3	Flat8	Residential	Bedroom	W2	313°N	2.4	
					W3	224°	7.1	
							7.1	High
Third	R4	Flat8	Residential	Bedroom	W6	224°	6.7	
							6.7	
							6.7	High

Detailed Amenity Results

Project Name: 20-24 Tolworth Broadway.1 Project No.: 1 Report Title: Two hours Sunlight to Amenity Analysis - Proposed Scheme Date of Analysis: 04/03/2024					
Floor Ref	Amenity Ref		Amenity Area	Lit Area Proposed	Meets BRE Criteria
First	Comunal	Area m2	185.00	169.46	YES
		Percentage		92%	
	Flat 1	Area m2	10.05	9.16	YES
		Percentage		91%	
	Flat 2	Area m2	12.36	12.35	YES
		Percentage		100%	
	Flat 3 Front	Area m2	5.95	0.03	NO
		Percentage		0%	
	Flat 3 Balcony	Area m2	8.20	8.20	YES
		Percentage		100%	
	Flat 4 Front	Area m2	14.89	13.81	YES
		Percentage		93%	
	Flat 4 Balcony	Area m2	8.89	8.89	YES
		Percentage		100%	
Second	Flat 5	Area m2	5.94	5.94	YES
		Percentage		100%	
	Flat 6	Area m2	7.00	7.00	YES
		Percentage		100%	
	Flat 7	Area m2	8.20	8.20	YES
		Percentage		100%	
	Flat 8	Area m2	8.89	8.89	YES
		Percentage		100%	
Third	Flat 9	Area m2	17.77	17.77	YES
		Percentage		100%	