3 Duke Street Richmond TW9 1HP

Daylight and sunlight report

Internal daylight
December 2023

Revision Schedule

Daylight and sunlight report
Dec 2023

Rev	Date	Details	Prepared by	Reviewed by	Approved by
0.1	May 2023	Draft	P Giesberg	S. Bamford	P Giesberg
1	Dec 2023	Final	P Giesberg	S Bamford	P Giesberg
2	Dec 2023	Rev layout	P Giesberg	S Bamford	P Giesberg

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1 Introduction

It is proposed to redevelop the site at 3 Duke Street Richmond TW9 1HP to create 3 residential units. This report has been prepared to support the planning application.

Site and development

The proposed development is situated in a densely build-up area and surrounded predominantly by non-residential properties (Fig. 1). The neigbouring pub includes a small designation for residential use, but close inspection shows that the rear rooms are not in residential use.

Figure 1. Site overview

2 Methodology and assessment criteria

2.1 Planning policy

The London Plan and Daylight and Sunlight Impacts

The London Plan 2021 includes a policy with regards to the daylight and sunlight impacts on neighbouring properties in "Chapter 3 Designs". Policy 6 Housing Quality and Standards states in clause D:

"*The design of development should provide sufficient daylight and sunlight to new and surrounding housing that is appropriate for its context, whilst avoiding overheating, minimising overshadowing and maximising the usability of outside amenity space."*

At this moment there are no revised guidelines in the London Plan on how to address this issue and the London Plan 2021 refers to the 2016 Housing SDP in this regard. In paragraph 1.3.45 it states:

"*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."*

Two stage approach

To address the flexibility that is required through the London Plan, a two-stage approach is often used. The two-stage approach is where both technical impacts and wider contextual considerations are considered together. It stems from the High Court decision on the application of Melanie Rainbird and the London Borough of Tower Hamlets Council (Rainbird, R (on the application of) v The Council of the London Borough of Tower Hamlets [2018] EWHC 657), commonly referred to in the industry as "the Rainbird judgement" and is provides good guidance on considering all projects.

From here the two stages can be identified as:

1. whether or not it would result in the material deterioration of those conditions
2. whether or not any such deterioration would be unacceptable.

Stage 1 itself also can be considered to comprise of two parts:

- An assessment against the very simplistic and well-known forms of analyses. For daylight, the VSC and NSL analyses and for sunlight, the APSH. A breach of these criteria may mean a noticeable reduction

in light and that daylight and sunlight may be adversely affected. However, that initial test would highlight whether a deeper dive into the overall impacts is required.

- Where a noticeable reduction in daylight and/or sunlight occurs, a deeper analysis of impact can be undertaken against the various supplementary assessments provided within the BRE Guidelines, such as retained daylight and sunlight values; room uses; relevant building design limitations e.g. balconies; and, more accurate methodologies such as radiance and climate-based data modelling (CBDM).

The second stage considers areas where stage 1 identified a material deterioration of the daylight and sunlight conditions. There are a number of items that should be considered to establish the acceptability of the deviations from the BRE guidelines. These items include, but are not limited to:

- The quality of retained light.
- The number and type of impacted rooms and spaces.
- The expectation of light levels in the given location.
- The development plan, site allocations and wider policy considerations.
- Relevant precedents and strategic guidance both historic and current.
- The strategic importance of the proposal and the benefits it brings.

2.2 Input data

A 3D model of 3 Duke Road and surrounding buildings was created using information provided by the client for the proposed development site, the planning portal for the neigbouring properties and a site visit to add further detail.

2.3 Effects on existing buildings

The effects of the proposed buildings on the availability of daylight on the existing buildings have been considered. The appraisal has been carried out using the methodology set out by Paul Littlefair and colleagues in BR209 "*Site layout planning for daylight and sunlight: a guide to good practice*" (2022) (BRE Trust)

Diffuse light from the sky

It is important to safeguard the daylight that is available for nearby buildings in living rooms, kitchens and bedrooms. The Vertical Sky Component (VSC) is a measure of available daylight on a particular surface or window. The guidelines in the BRE209 document state that where a window has a VSC of 27 % or more daylighting is unlikely to be affected. In cases where the VSC is less than 27%, it is unlikely that a change in daylighting will be noticeable if a reduction in VSC is not less than 0.8 times the original value. Where information

about internal layout is available a further test is the reduction in the area with a view of the sky is not more than 20%.

Where a room has more than 1 window the average weighted VSC could be used under certain circumstances, although care should be taken to use an average in extreme cases and where the windows are too far apart to be considered to provide daylight to the same habitable area.

The VSC has been determined using the Waldram module in MBS Software's version for SketchUp.

Sunlight Availability

If a living room of an existing dwelling has a window facing with 90 degrees of due south and any part of a new development subtends an angle of more than 25 degrees to the horizontal measured from the centre of the window in a vertical section perpendicular to the window then the sun lighting of the existing dwelling may be adversely affected. This will be the case if the centre of the window meets all of the following three criteria:

- It receives less than 25% of annual probable sunlight hours (ASHP) or less than 5% of the annual probable sunlight hours between 21 September and 21 March
- It receives less than 0.8 times its former sunlight hours during either period
- It has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours

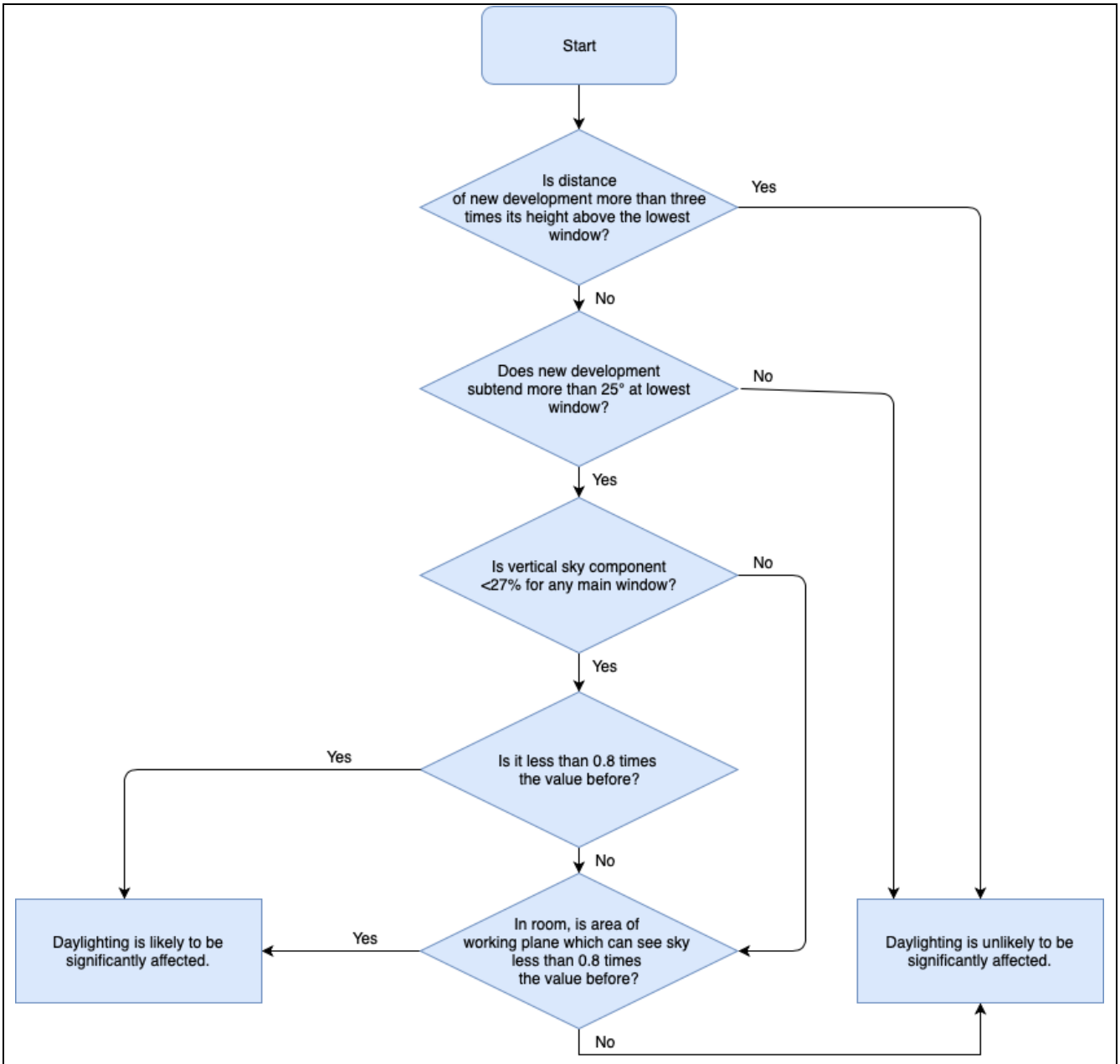


Figure 3. Decision chart daylight in existing buildings.

Sunlight and Gardens and open space

The BRE guidance recommends 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 which can receive two hours of sun on 21 March is less than 0.8 times its former value, then loss of sunlight is likely to be noticeable.

2.4 Daylight Provision Calculations

BS EN 17037:2018+A1:2021 recognises two methods to assess daylight provision to the interior. Both should be determine using specific software.

Method 1: Calculation method using daylight factors on the reference plane
Method 2 Calculation method of illuminance levels on the reference plane using climatic data for the given site and an adequate time step.

The central requirement of the standard is set out in table 1 below.

Table 1: Recommendations of daylight provision by daylight openings in vertical and inclined surface.

Level of recommendation for vertical and inclined daylight opening	Target illuminance E_T lx	Fraction of space for target level $F_{plane,\%}$	Minimum target illuminance E_{TM} lx	Fraction of space for minimum target level $F_{plane,\%}$	Fraction of daylight hours $F_{time,\%}$
Minimum	300	50 %	100	95 %	50 %
Medium	500	50 %	300	95 %	50 %
High	750	50 %	500	95 %	50 %
NOTE Table A.3 gives target daylight factor (D_T) and minimum target daylight factor (D_{TM}) corresponding to target illuminance level and minimum target illuminance, respectively, for the CEN capital cities.					

Using method 2 will directly provide these values. The daylight factor is a measure of the amount of daylight relative to the external daylight available. When using method 1, the requirement for the daylight factor will vary with the geographical location of the development site. So for instance to achieve a target of 300 Lux in Athens a Daylight Factor of 1.5% is required, whereas the same 300 Lux target would require a Daylight Factor of 2.6 in Reykjavik, Iceland.

There are some specific recommendations for dwellings in the UK. These are set out in the UK National Annex to the standard. The UK committee on BS EN 17037: 2018 believes that the recommendations as stated in the table 1 are not always achievable in all rooms of a dwelling. This could be the case for instance for rooms in basements, dwellings in dense urban areas or where existing buildings are being converted into dwellings.

The UK National Annex gives guidance on minimum daylight provision in all UK dwellings. The recommendations are 100 lux for bedrooms, 150 lux for living rooms and 200 lux for kitchens to be achieved in 50% of the time that daylight is available for 50 % of the assessment grid. The recommendations for 95% of the assessment grid do not apply for to dwellings in the UK.

2.5 Building parameters

The analysis that is described in this report was carried out using the Radiance system, which is a Climate Based Daylight Modelling approach.

The daylight in a room is determined by a wide range of factors. These factors can be external, such as nearby objects that provide both blocking of daylight and reflections. Other factors are internal and include size and shape of rooms as well as the light reflecting characteristics of walls, ceilings and floors. Finally, the light transmittance of the glazing is a determinant of the daylight levels in a building.

BRE209 provides guidance on the transmittance values of glazing as well as the light reflectance of internal and external surfaces.

In this study, we have modelled the glazing panes assuming a framing factor of 0.6.

For the light reflectance of the internal surfaces, values for the modern and light materials for the finishes of the interior were used: interior walls, 0.8, ceilings, 0.8, floors 0.4. External surfaces of the proposed development comprises yellow London brick and were assumed to have a reflectance value of 0.4. The reflectance value of existing structure was assumed to be 0.2 The majority of windows in the proposed new development were assumed to be standard double glazing with a diffuse transmittance value of 0.68. The bedrooms in flat 1 were assumed to have higher transmittance values. The specification for these windows should include a requirement to install double glazing made up of 4mm Pilkinton K glass inner pane, 16mm 90% argon filled cavity and 4 mm Optifloat Clear or similar. This has a reasonable U-value of 1.2 and a diffuse light transmittance of 0.75. Maintenance factor of 0.92 for windows and 0.0.76 for roof lights.

The available daylight hours were considered over the year over each full day.

As recommended in the BRE209 guidance document, an “Area of Interest” was defined as the internal room space offset by 30 cm from the inside of the walls. The working plane was set at 0.85 m and the distance between points in the assessment grid was 0.25 m.

3 Results

3.1 Scope

The proposed development comprises a change of use of an existing building and a vertical extension to provide additional residential units. Where a physical extension is included in the proposed development, there is a potential to affect the daylight and sunlight of neighbouring properties.

The impact on the availability of daylight and sunlight on habitable rooms should be considered. Certain non-residential properties should also be considered. These include hotels, schools and certain office spaces. To the rear of the proposed development there are no windows in the direct vicinity of the proposed development and therefore there is no impact to be expected there. There are some buildings with windows across the road of the proposed development. These are generally not considered light sensitive uses. There is office space present in one of the buildings. As this is general shared office space, there is no indication that this is sensitive to light. In addition, the proposed development matches the dominant height of the facades in this narrow inner city street, which the BRE guidelines suggest should be considered allowable.

The internal illuminance levels in all the habitable rooms in the proposed development were examined.

3.2 Illuminance levels

The illuminance level available in the selection of rooms was determined. The results are shown in table 2 below.

Table 2 Area of working plane receiving stated illuminance levels for 50% of the available daylight hours

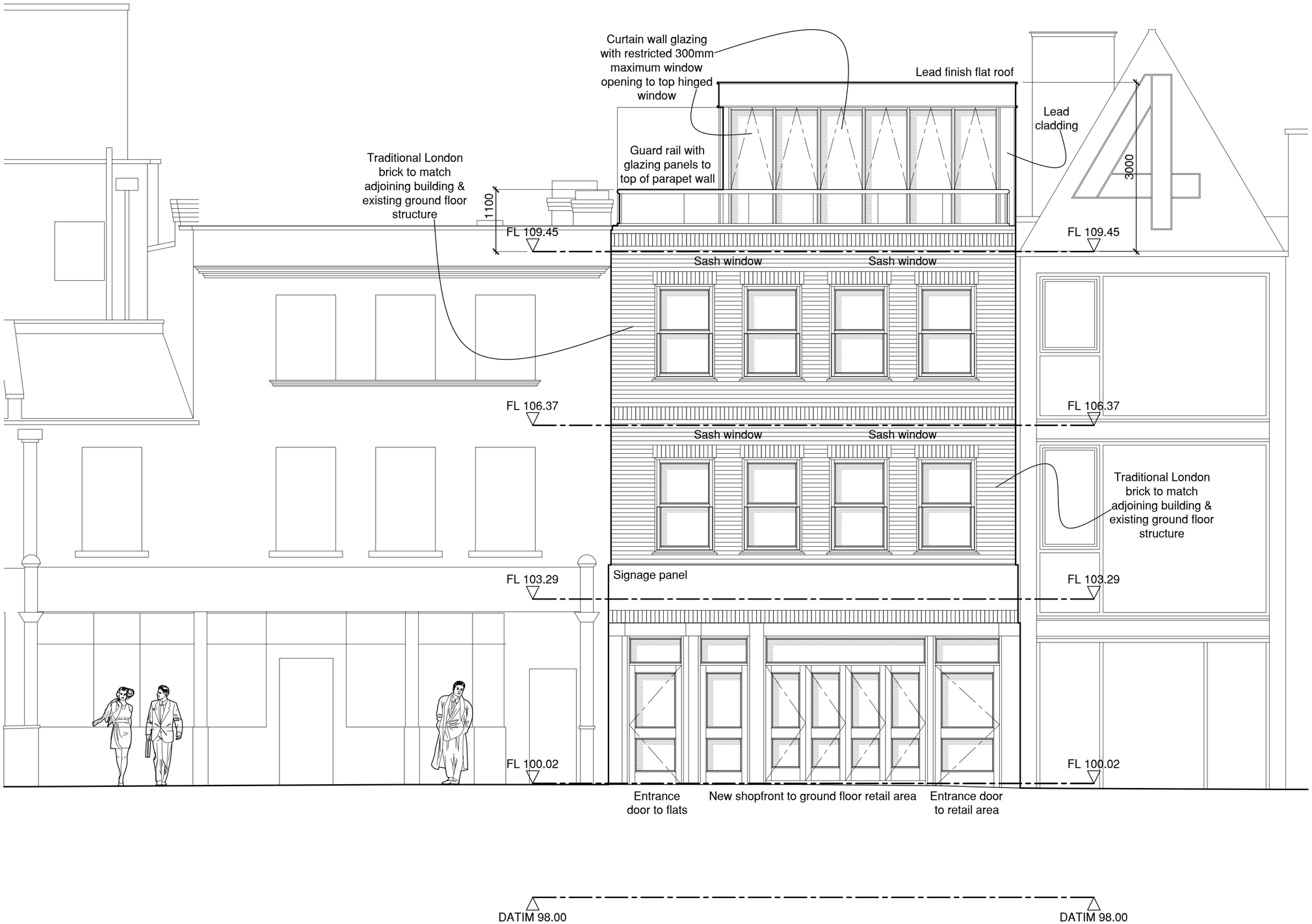
Flat	Room Use	Median Lux	Area	Req Lux	Result
Flat 1	Bedroom	105	55%	100	Yes
Flat 1	Bedroom	104	54%	100	Yes
Flat 1	Living Room	272	80%	150	Yes
Flat 2	Bedroom	582	100%	100	Yes
Flat 2	Living Room	358	99%	150	Yes
Flat 3	Bedroom	637	100%	100	Yes
Flat 3	Living Room	303	88%	150	Yes
Flat 4	Bedroom	1109	100%	100	Yes
Flat 4	Living Room	1307	100%	150	Yes

4 Discussion and conclusion

A daylight and sunlight assessment was carried out analysing the availability of adequate levels of daylight within the proposed development on neighbouring properties of 3 Duke Street in Richmond, London.

It is concluded that the design meets the BRE standard on daylight levels as described in the document "*Site layout planning for daylight and sunlight: a guide to good practice*" (2022) (BRE Trust), as well as with the planning requirements in the London Plan.

Appendix 1. Proposed Drawings



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IMPORTANT INFORMATION

REV	COMMENTS	BY	DATE
-	-	-	-

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CLIENT

Johanna Cumming

PROJECT

No. 3 Duke Street, Richmond, Greater London TW9 1HP

TITLE

Proposed Front Elevation

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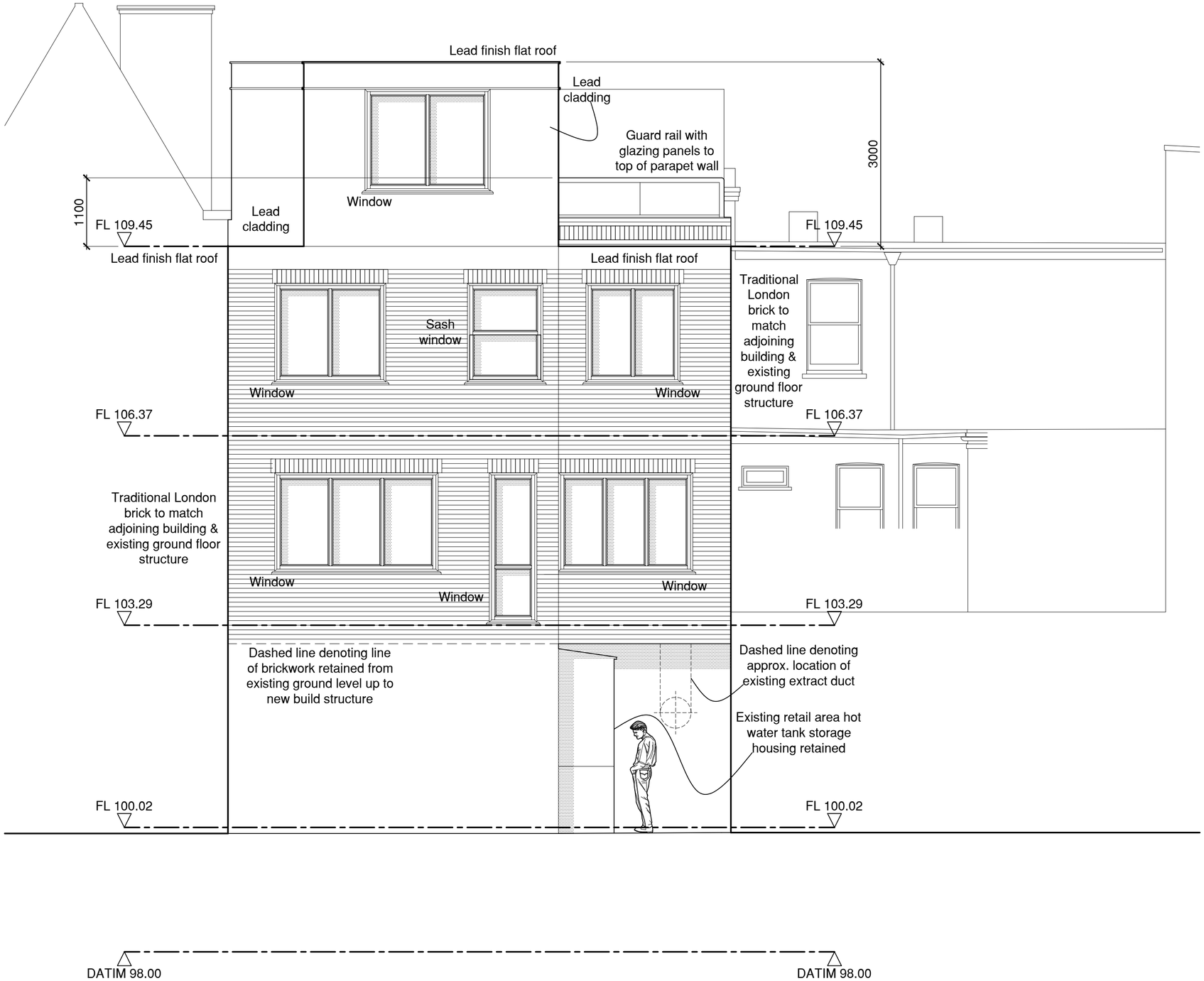
PROJECT DWG NO. DB67/PL/01		REVISION -



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IMPORTANT INFORMATION

REV	COMMENTS	BY	DATE
A	Rear elevation updated in line with layout changes	NM	04.12.23
B	Rear elevation updated in line with layout changes to first floor flats	NM	08.12.23

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No. 3 Duke Street, Richmond, Greater London TW9 1HP

TITLE

Proposed Rear Elevation

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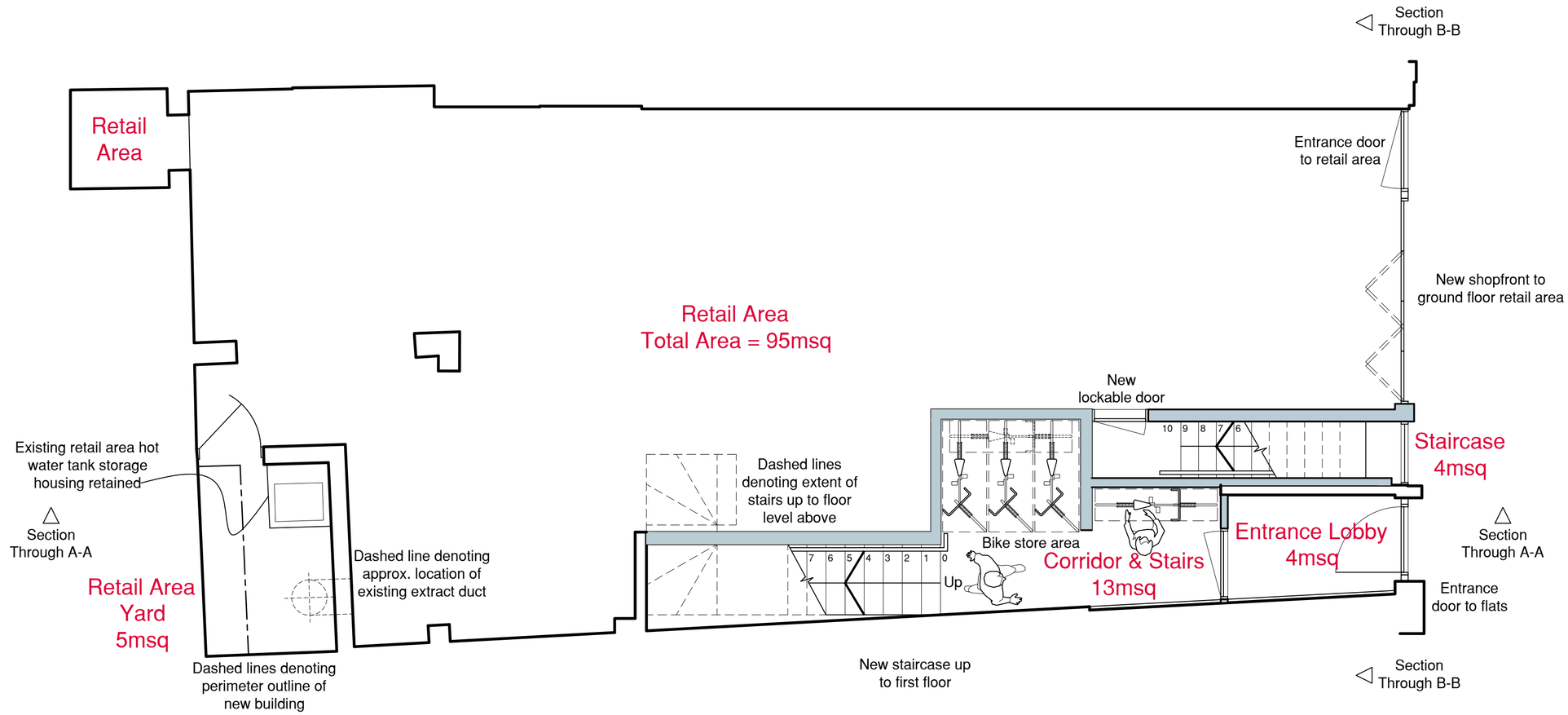

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TITLE

Proposed Ground Floor Layout Plan

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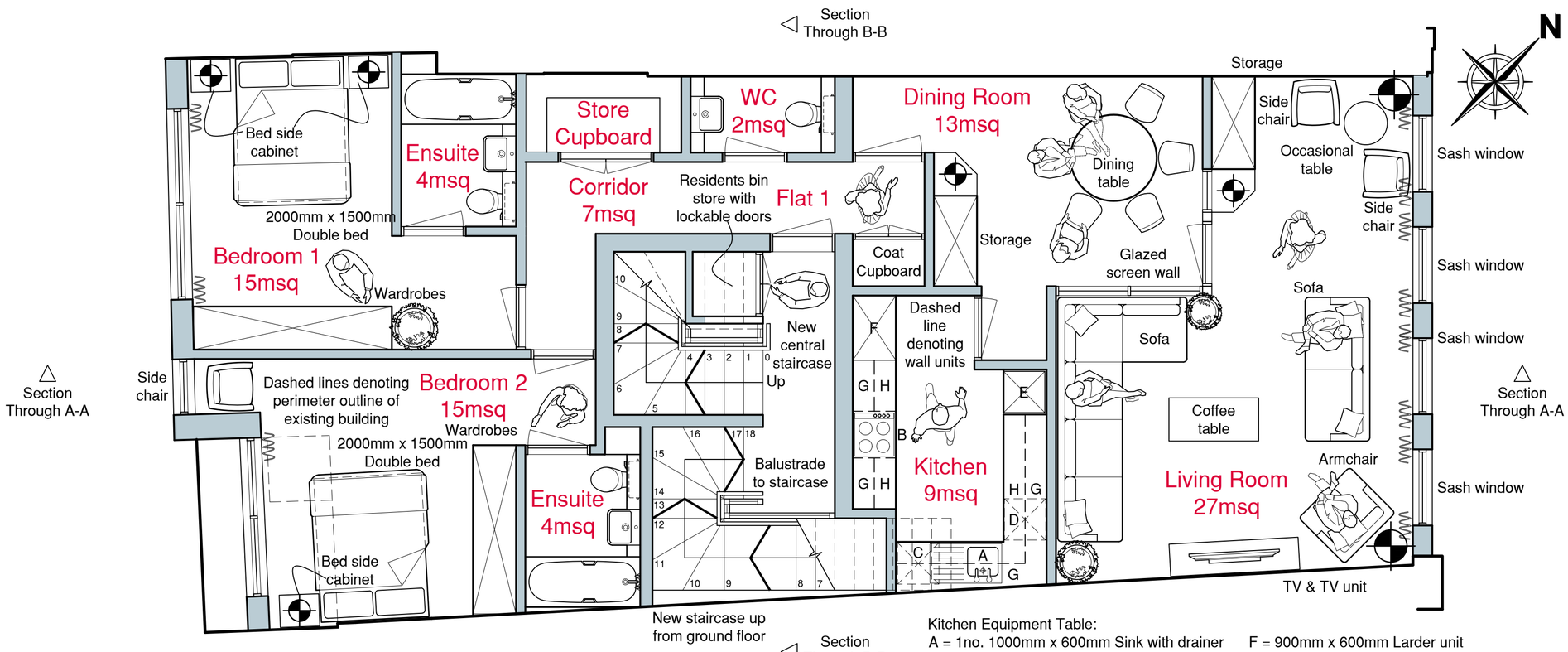

Kitchen Equipment Table:

A = 1no. 1000mm x 600mm Sink with drainer
B = 1no. 600mm x 600mm Cooker/Oven & hob
C = 1no. 600mm x 630mm Washing machine
D = 600mm x 630mm Dishwasher
E = 600mm x 600mm Fridge freezer
F = 900mm x 600mm Larder unit
G = 300mm Deep wall units = 5200mm Linear length available
H = 600mm Deep base units = 2500mm Linear length available

Housing Design Standards - London Planning Guide 2022

Type of space	Furniture required in each room	Furniture size (mm)	Number of items required (by bedspace) 1p	2p	3p	4p	5p	6p	7p	+
Living space	Armchair (or 'sofa seat' in addition to sofa where required below)	850 x 850	2	2	3	1	2	3	4	+1
	Settee - 2 seat (optional as above)	850 x 1300	(Item optional)							
	Settee - 3 seat (optional as above)	850 x 1850				1	1	1	1	1
	TV	220 x 650	1	1	1	1	1	1	1	1
	Coffee table	500 x 1050 (or 750 diameter)	1	1	1	1	1	1	1	1
	Occasional table	450 x 450					1	1	1	1
	Storage units	500 x length shown	1000	1000	1000	1500	2000	2000	2000	+1
Dining space	Dining chair	450 x 450	2	2	3	4	5	6	7	+
	Dining table	800 x length shown	800	800	1000	1200	1350	1500	1650	+
Double bedroom	Double bed in principle bedroom	2000 x 1500		1	1	1	1	1	1	1
	Double bed in other double bedroom	1900 x 1350		1	1	1	1	1	1	1
	Bedside table	400 x 400		2	2	2	2	2	2	2
	Desk and chair	500 x 1050 (+ chair)		1	1	1	1	1	1	1
	Chest of drawers	450 x 750		1	1	1	1	1	1	1
	Double wardrobe	600 x 1200		1	1	1	1	1	1	1
Twin bedroom	Single bed	1900 x 900				2	2	2	2	2
	Bedside table	400 x 400				2	2	2	2	2
	Chest of drawers	450 x 750				1	1	1	1	1
	Desk and chair	500 x 1050 (+ chair)				1	1	1	1	1
	Double wardrobe	600 x 1200				1	1	1	1	1

Type of space	Furniture required in each room	Furniture size (mm)	Number of items required (by bedspace) 1p	2p	3p	4p	5p	6p	7p	+
Single bedroom	Single bed	1900 x 900	1		1	1	1	1	1	1
	Bedside table	400 x 400	1		1	1	1	1	1	1
	Chest of drawers	450 x 750	1		1	1	1	1	1	1
	Desk and chair	500 x 1050 (+ chair)	1		1	1	1	1	1	1
	Single wardrobe	600 x 600	1		1	1	1	1	1	1
Kitchen			Length in mm							
	(1) Sink top with drainer	600 x 1000	1000	1000	1000	1000	1000	1000	1000	1000
	(2) Cooker (or oven + hob) space	600 x 600	600	600	600	600	600	600	600	600
	(3) Washing machine position / worktop	600 x 630	630	630	630	630	630	630	630	630
	(4) Other base units	600 x length shown	600	1200	1600	1600	1600	2700	2700	+
	(4a) Dishwasher / worktop (included in 4)	600 x length shown	(Item optional)							
	(5) Ancillary equipment space	600 x length shown					600	600	1200	1200
	(6) Fridge / freezer space	600 x 600	600	600	600	600	600	600	600	600
	(7) Recycling bins space	600 x length shown	300	300	300	300	600	600	600	600
	(8) Total length of fitments (Items 1 to 7)		3730	4330	4730	4730	5630	6730	7330	+
	(9) Wall cupboards		300 x maximum available length							
	Note: Item 3,5,7 may be in other rooms or spaces but should be close to kitchen									
Bathroom	W/C + cistern	500 x 700	1	1	1	1	1	1	1	1
	Bath	700 x 1700	1	1	1	1	1	1	1	1
	Hand wash basin	450 x 600	1	1	1	1	1	1	1	1
	Shower tray	750 x 750	(Item optional)							
WC/ Cloakroom	W/C + cistern	500 x 700	(Where required)							
	Hand rinse basin	250 x 350	(Where required)							

Scale - Metres

0 1 2 3 4 5

REV	COMMENTS	BY	DATE
A	Balconies omitted Bedrooms & En-suites reconfigured Bedroom area totals amended	NM	04.12.23
B	Bedroom 1 & 2 layouts amended Additional window added to Bedroom 2 Bedroom area totals amended	NM	08.12.23

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TITLE

Proposed First Floor Layout Plan

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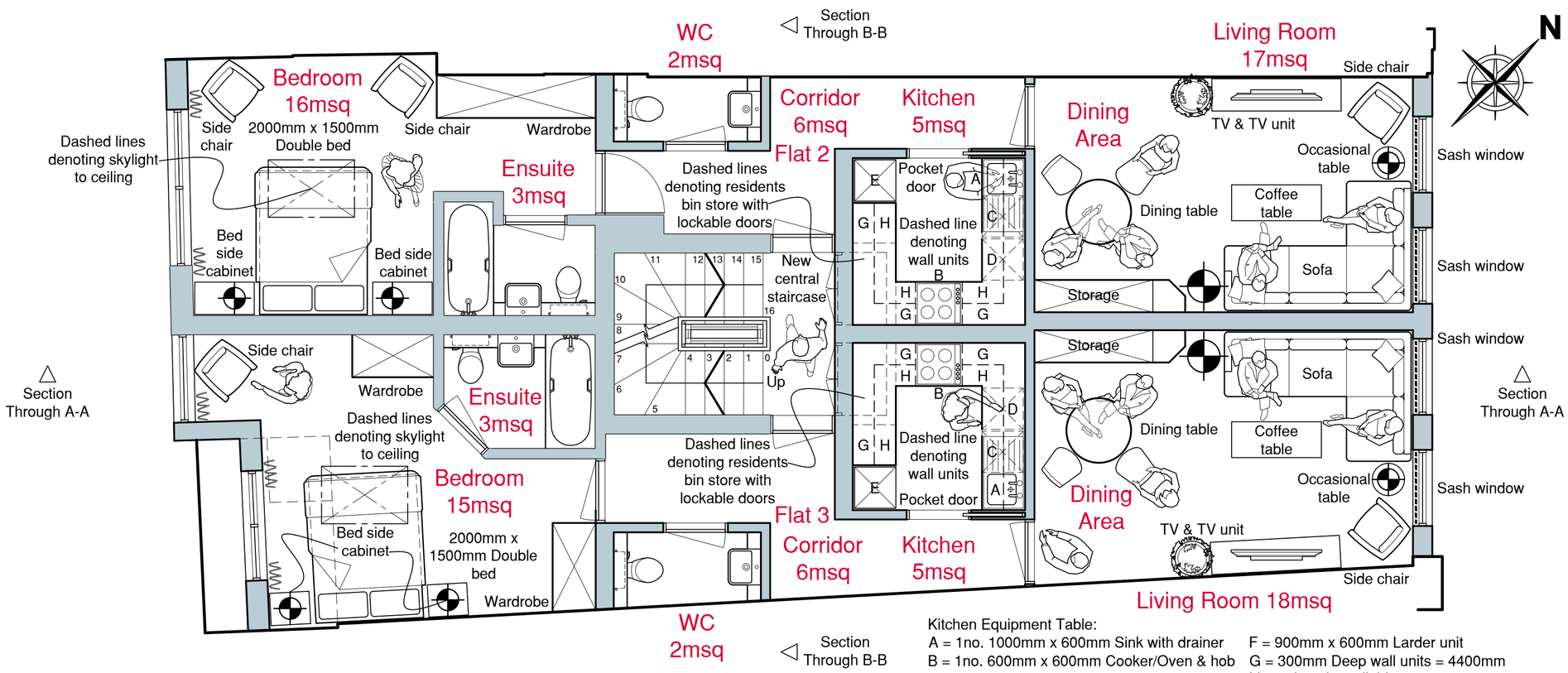

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E = 600mm x 600mm Fridge freezer
F = 900mm x 600mm Larder unit
G = 300mm Deep wall units = 4400mm Linear length available
H = 600mm Deep base units = 1500mm Linear length available

Housing Design Standards - London Planning Guide 2022

Type of space	Furniture required in each room	Furniture size (mm)	Number of items required (by bedspace) 1p	2p	3p	4p	5p	6p	7p	+
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	Coffee table	500 x 1050 (or 750 diameter)	1	1	1	1	1	1	1	1
	Occasional table	450 x 450					1	1	1	1
	Storage units	500 x length shown	1000	1000	1000	1500	2000	2000	2000	+1
Dining space	Dining chair	450 x 450	2	2	3	4	5	6	7	+
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	Chest of drawers	450 x 750	1		1	1	1	1	1	1
	Desk and chair	500 x 1050 (+ chair)	1		1	1	1	1	1	1
	Single wardrobe	600 x 600	1		1	1	1	1	1	1
Kitchen			Length in mm							
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	(2) Cooker (or oven + hob) space	600 x 600	600	600	600	600	600	600	600	600
	(3) Washing machine position / worktop	600 x 630	630	630	630	630	630	630	630	630
	(4) Other base units	600 x length shown	600	1200	1600	1600	1600	2700	2700	+
	(4a) Dishwasher / worktop (included in 4)	600 x length shown	(Item optional)							
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	Hand wash basin	450 x 600	1	1	1	1	1	1	1	1
	Shower tray	750 x 750	(Item optional)							
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0 1 2 3 4 5

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TITLE
Proposed Second Floor Layout Plan

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PROJECT DWG NO.	REVISION
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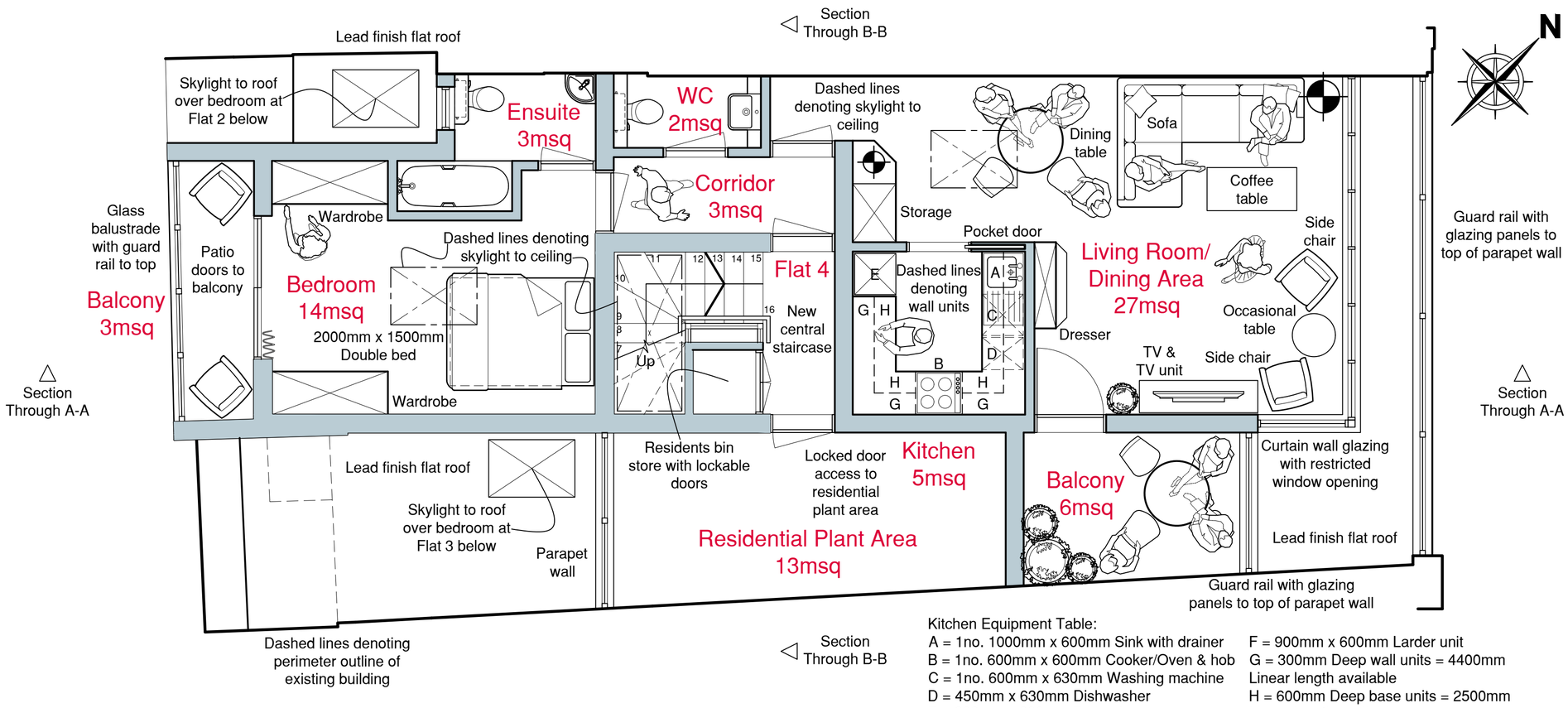

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G = 300mm Deep wall units = 4400mm Linear length available
H = 600mm Deep base units = 2500mm Linear length available

Housing Design Standards - London Planning Guide 2022

Type of space	Furniture required in each room	Furniture size (mm)	Number of items required (by bedspace) 1p	2p	3p	4p	5p	6p	7p	+
Living space	Armchair (or 'sofa seat' in addition to sofa where required below)	850 x 850	2	2	3	1	2	3	4	+1
	Settee - 2 seat (optional as above)	850 x 1300	(Item optional)							
	Settee - 3 seat (optional as above)	850 x 1850				1	1	1	1	1
	TV	220 x 650	1	1	1	1	1	1	1	1
	Coffee table	500 x 1050 (or 750 diameter)	1	1	1	1	1	1	1	1
	Occasional table	450 x 450					1	1	1	1
	Storage units	500 x length shown	1000	1000	1000	1500	2000	2000	2000	+1
Dining space	Dining chair	450 x 450	2	2	3	4	5	6	7	+
	Dining table	800 x length shown	800	800	1000	1200	1350	1500	1650	+
Double bedroom	Double bed in principle bedroom	2000 x 1500		1	1	1	1	1	1	1
	Double bed in other double bedroom	1900 x 1350		1	1	1	1	1	1	1
	Bedside table	400 x 400		2	2	2	2	2	2	2
	Desk and chair	500 x 1050 (+ chair)		1	1	1	1	1	1	1
	Chest of drawers	450 x 750		1	1	1	1	1	1	1
	Double wardrobe	600 x 1200		1	1	1	1	1	1	1
Twin bedroom	Single bed	1900 x 900				2	2	2	2	2
	Bedside table	400 x 400				2	2	2	2	2
	Chest of drawers	450 x 750				1	1	1	1	1
	Desk and chair	500 x 1050 (+ chair)				1	1	1	1	1
	Double wardrobe	600 x 1200				1	1	1	1	1

Type of space	Furniture required in each room	Furniture size (mm)	Number of items required (by bedspace) 1p	2p	3p	4p	5p	6p	7p	+
Single bedroom	Single bed	1900 x 900	1		1	1	1	1	1	1
	Bedside table	400 x 400	1		1	1	1	1	1	1
	Chest of drawers	450 x 750	1		1	1	1	1	1	1
	Desk and chair	500 x 1050 (+ chair)	1		1	1	1	1	1	1
	Single wardrobe	600 x 600	1		1	1	1	1	1	1
Kitchen			Length in mm							
	(1) Sink top with drainer	600 x 1000	1000	1000	1000	1000	1000	1000	1000	1000
	(2) Cooker (or oven + hob) space	600 x 600	600	600	600	600	600	600	600	600
	(3) Washing machine position / worktop	600 x 630	630	630	630	630	630	630	630	630
	(4) Other base units	600 x length shown	600	1200	1600	1600	1600	2700	2700	+
	(4a) Dishwasher / worktop (included in 4)	600 x length shown	(Item optional)							
	(5) Ancillary equipment space	600 x length shown					600	600	1200	1200
	(6) Fridge / freezer space	600 x 600	600	600	600	600	600	600	600	600
	(7) Recycling bins space	600 x length shown	300	300	300	300	600	600	600	600
	(8) Total length of fitments (Items 1 to 7)		3730	4330	4730	4730	5630	6730	7330	+
	(9) Wall cupboards		300 x maximum available length							
	Note: Item 3,5,7 may be in other rooms or spaces but should be close to kitchen									
Bathroom	W/C + cistern	500 x 700	1	1	1	1	1	1	1	1
	Bath	700 x 1700	1	1	1	1	1	1	1	1
	Hand wash basin	450 x 600	1	1	1	1	1	1	1	1
	Shower tray	750 x 750	(Item optional)							
WC/ Cloakroom	W/C + cistern	500 x 700	(Where required)							
	Hand rinse basin	250 x 350	(Where required)							

Scale - Metres
0 1 2 3 4 5

REV	COMMENTS	BY	DATE
-	-	-	-

SUITE 7A HOLLY HOUSE BUSINESS CENTRE
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PROJECT
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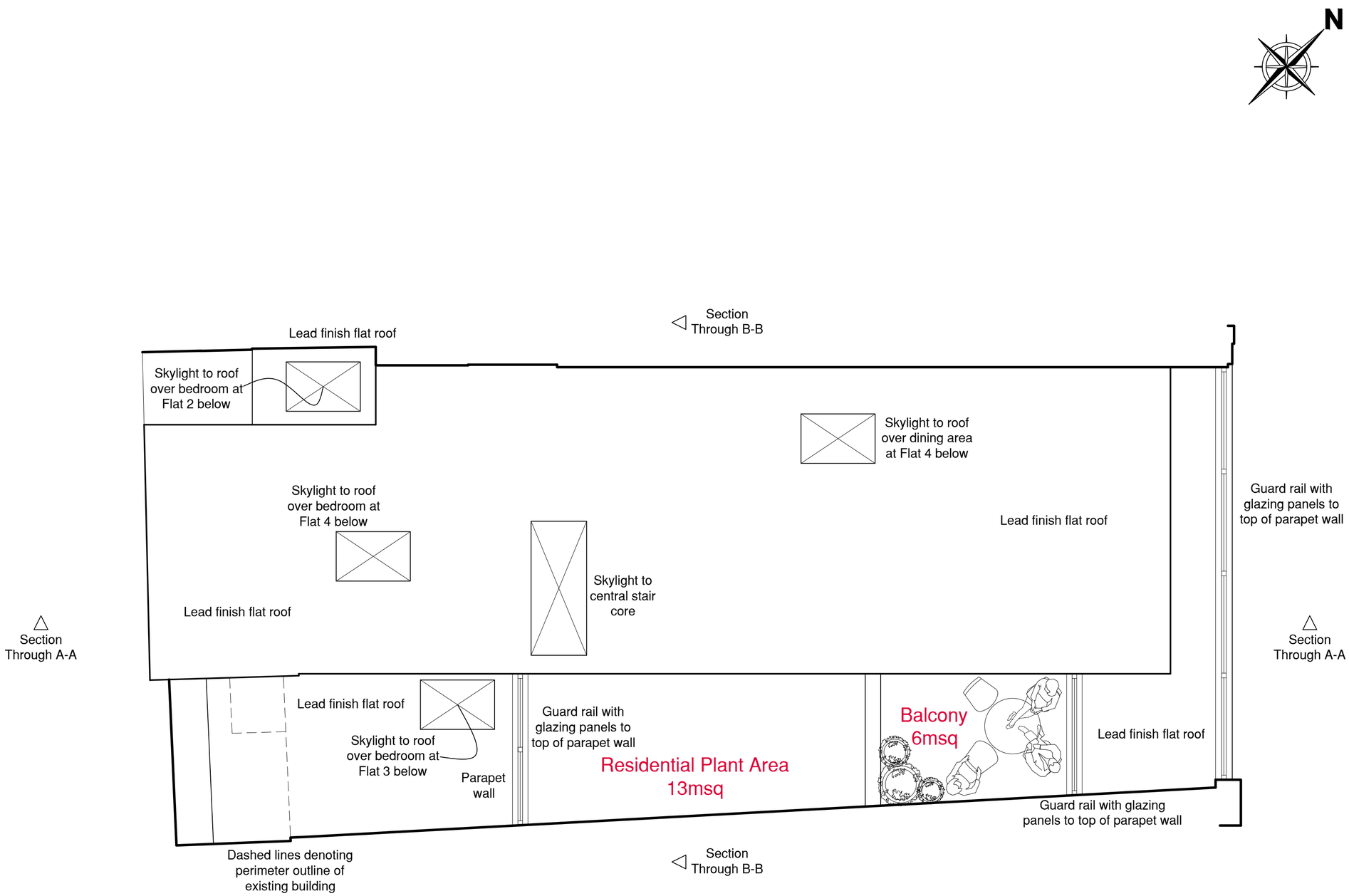
TITLE
Proposed Roof Flat Floor Layout Plan

SCALE @ A2	DRAWN BY	DATE
1:50	NM	Aug 23
PROJECT DWG NO. DB67/PL/09		REVISION -



Scale - Metres

0 1 2 3 4 5

IMPORTANT INFORMATION

REV	COMMENTS	BY	DATE
-	-	-	-

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Jo Cummins

PROJECT

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TITLE

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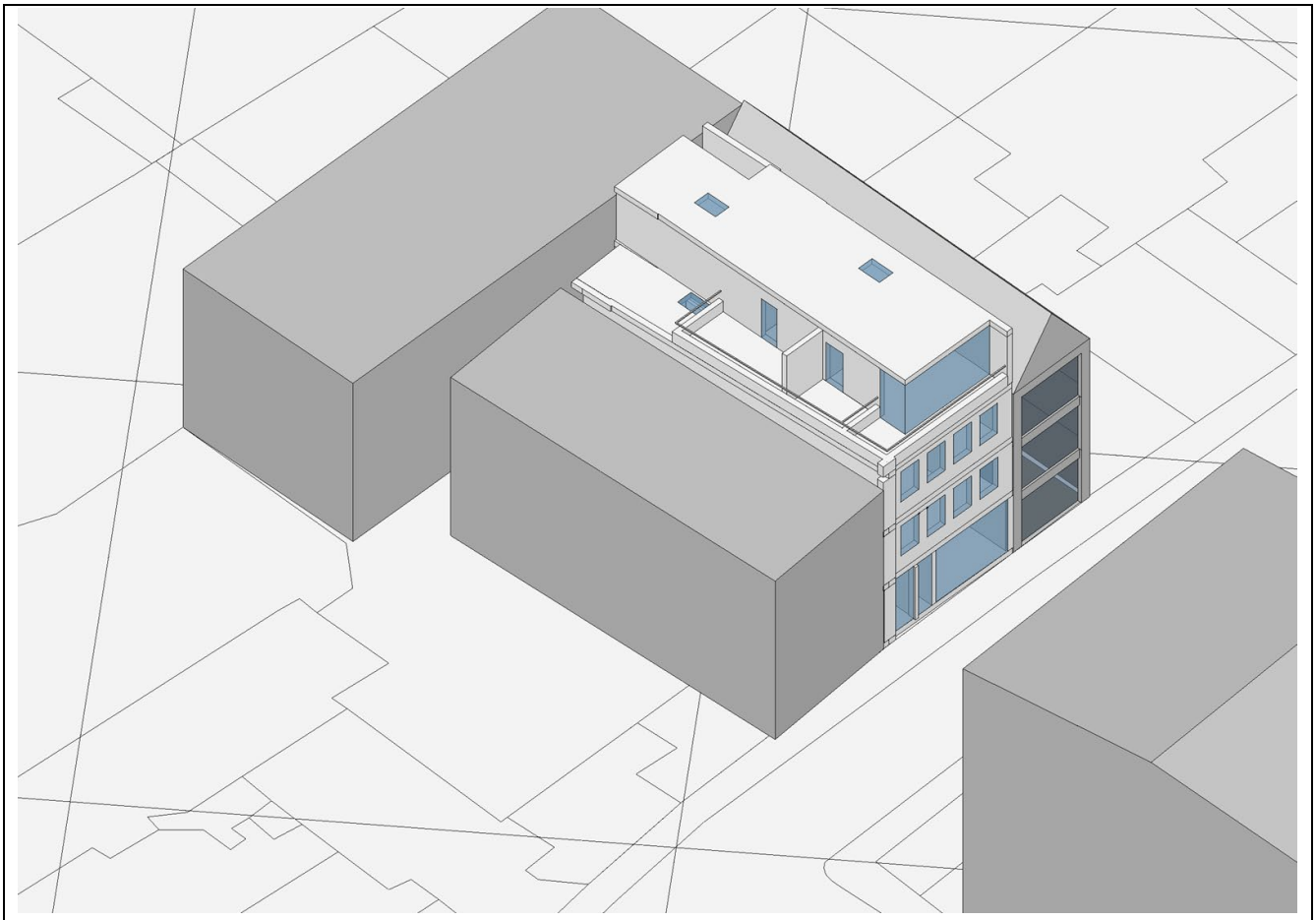
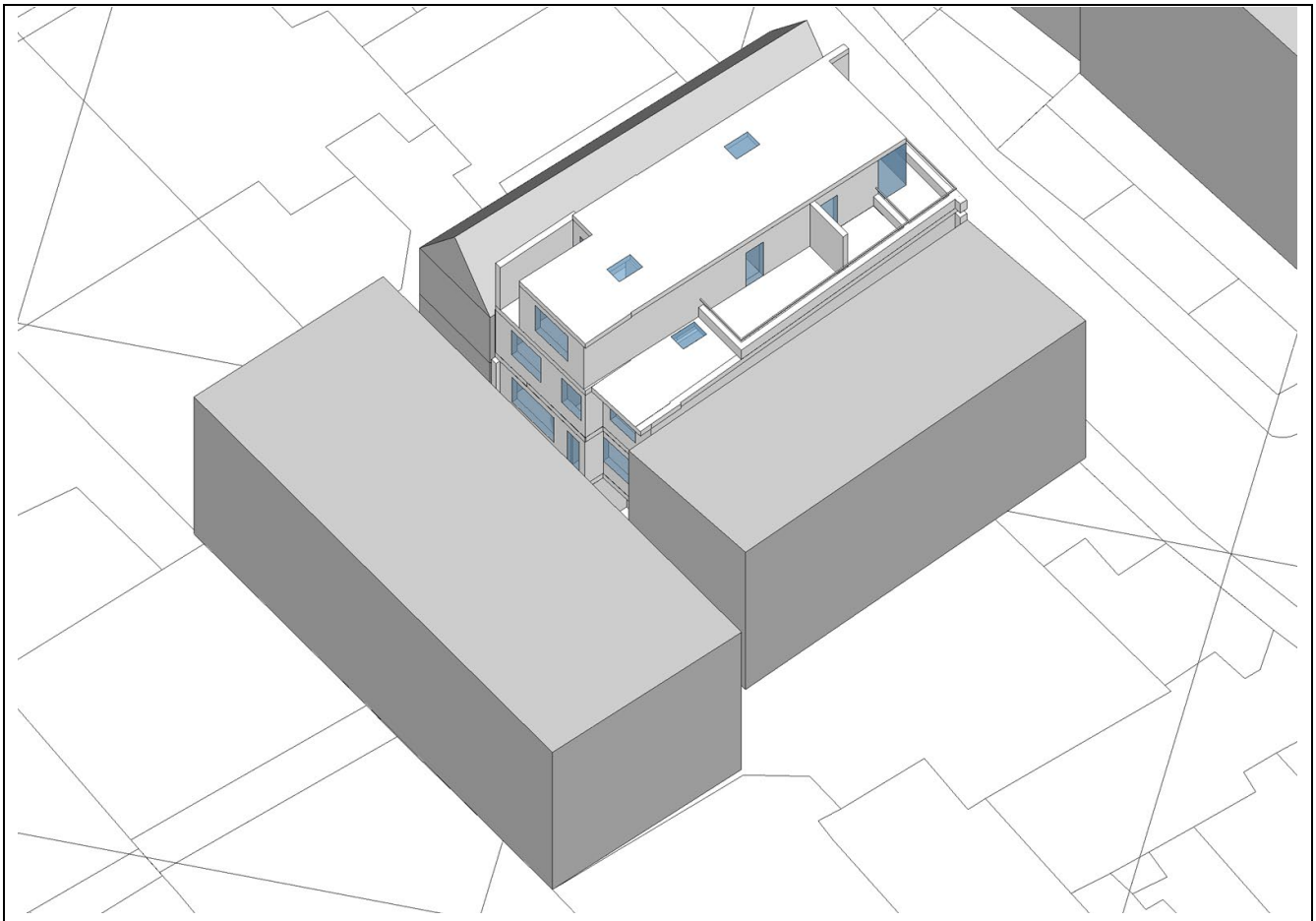
SCALE @ A2	DRAWN BY	DATE
1:50	NM	Aug 23
PROJECT DWG NO. DB67/PL/10		REVISION -

Appendix 2. Model Overview



Overview proposed development front view



Overview development rear view