NRG CONSULTING

12 Queensmead
London

Overheating Assessment

April 2025

CONTENTS

Document Control Sheet		Disclaimer
Report Reference	PP2638/QM/OH/202504-JT	The contents of this report are based on drawings, specifications, and information provided, supplemented by assumptions made by NRG to achieve compliance. NRG bears no responsibility to third parties for any use or interpretation of this report. Third parties act on the report's contents at their own risk. This report has been produced by NRG Consulting (NRG) to support a Planning Application. It should not be relied upon at construction stage, for Building Control compliance, or to be used in the discharge of Planning Conditions.
Issue Purpose	For Planning	
Report Prepared For	Mr Rami Cohen	
Report Author	Jiawei Tang	
Approved By	Alex Visintini	
Date of Issue	30th April 2025	

1 Executive Summary

NRG Consulting have been commissioned to undertake an Overheating Assessment to support a Planning Application at **12 Queensmead, St John's Wood Park, London, NW8 6RE**.

The proposed development consists of the renovation of a single residential property with rear garden.

This report has been prepared in support of a planning application for the installation of air conditioning within the habitable rooms of the dwelling.

The following guidelines have been followed to assess the proposed development:

- CIBSE TM59: 2017 – Design methodology for the assessment of overheating risk in homes.
- GLA Guidance on preparing Energy Statements (June 2022)

This assessment has been performed based on the follow specification, details of which are contained within this report:

- U-Values of thermal elements. (Obtained from the EPC and from the Design Team)
- Window specification including U-Value, G-Value and opening details.
- The ventilation strategy, infiltration and air permeability rates.

Based on the information and statement made within this report, we have run a dynamic thermal analysis of the proposed habitable rooms for the residential development in order to assess compliance against CIBSE TM59 (Part O version) without cooling. This assessment failed for the rooms with the proposed cooling. The cooling hierarchy was then reviewed before the assessment was re-run with mechanical cooling.

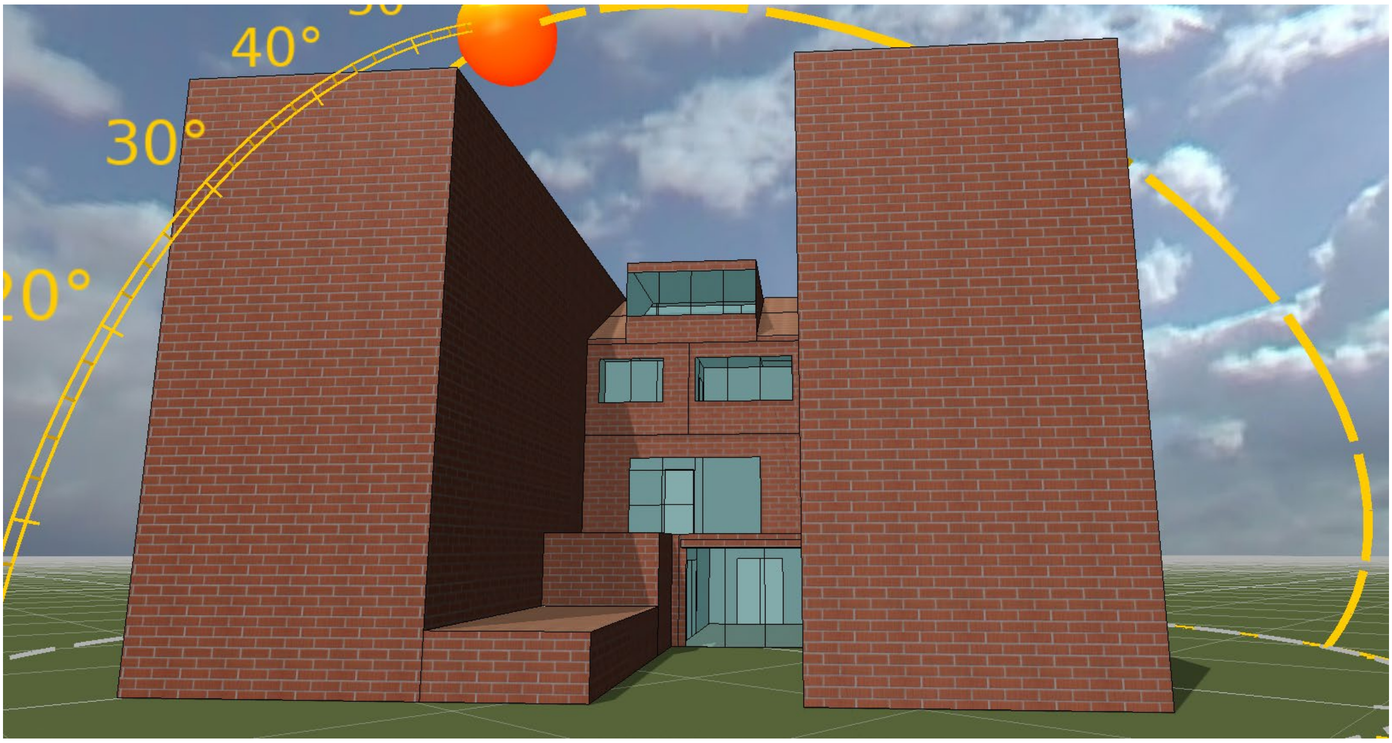


Figure 1: 3D model of the proposed building

2 Overheating Guidance for Homes

2.1 CIBSE TM59 (2017) and Approved Document O: Overheating

The Chartered Institute of Building Services Engineers guidance "*Design Methodology for the Assessment of Overheating Risk in Homes*" (CIBSE TM59) was published in 2017 and presents a standardised approach to predicting overheating risk for residential building using dynamic thermal analysis.

Approved Document O (Part O) of the Building Regulations (2021) was introduced in June 2022. The aim and reason for the introduction of Part O1: Overheating mitigation is to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures. This is met by designing and constructing the building to achieve both of the following:

(a) limit unwanted solar gains in summer.
(b) provide an adequate means to remove heat from the indoor environment.

Part O applies to new-build dwellings only so a formal assessment for Building Control is not required for this project.

2.2 CIBSE TM59: 2017 – Assessment Criterion

TM59:2017 provides a baseline in which to simulate overheating risk against which includes specific weather files, defined internal gains and a set of profiles that represent reasonable usage patterns for a home suitable for evaluating overheating risk.

It then has two criterion which deem whether it believes a habitable room within a dwelling is at risk of having issues with overheating. These are:

Test	Assessment Criterion	Acceptable Criterion	Investigated Period	Weather File
Criterion *a*	The frequency of the time when the operative temperature is higher than the maximum acceptable temperature	3% of occupied hours	May-September	Design Summer Year 1 DSY1, 2020s, High Emission, 50% percentile scenario
Criterion *b* (Bedrooms only)	Number of hours where temperature is above required	32 hours between 22:00 and 7:00	May-September	

Table 1: CIBSE TM59 – Assessment criteria for naturally ventilated buildings

2.3 Approved Document Part O – Amendments to the CIBSE TM59 Methodology

With the introduction of Part O, some clarifications were made within the modelling parameters when running the dynamic thermal simulations for compliance that supersede or clarify the CIBSE TM59 manual. These are highlighted below.

To demonstrate compliance using the dynamic thermal modelling method, all the following guidance should be followed:

- CIBSE's TM59 methodology for predicting overheating risk.
- The limits on the use of CIBSE's TM59 methodology set out in paragraphs 2.5 and 2.6. of ADO.
- The acceptable strategies for reducing overheating risk in paragraphs 2.7 to 2.11 of ADO.

All of the following limits on CIBSE's TM59, section 3.3, apply:

a. When a room is occupied during the day (8am to 11pm), openings should be modelled to do all of the following:
  i. Start to open when the internal temperature exceeds 22°C.
  ii. Be fully open when the internal temperature exceeds 26°C.
  iii. Start to close when the internal temperature falls below 26°C.
  iv. Be fully closed when the internal temperature falls below 22°C.
b. At night (11pm to 8am), openings should be modelled as fully open if both of the following apply.
  i. The opening is on the first floor or above and not easily accessible.
  ii. The internal temperature exceeds 23°C at 11pm.
c. When a ground floor or easily accessible room is unoccupied, both of the following apply.
  i. In the day, windows, patio doors and balcony doors should be modelled as open, if this can be done securely.
  ii. At night, windows, patio doors and balcony doors should be modelled as closed.
d. An entrance door should be included, which should be shut all the time.

This report incorporates these amendments.

2.4 Regional Planning Policy - GLA Guidance on Energy Statements

The GLA Guidance (June 2022) contains a section on overheating in-line with the requirements of Policy SI 4 of the London Plan (2021). This introduces the cooling hierarchy and the text states:

It is important to identify potential overheating risk, particularly in residential accommodation, early in the design process, and then incorporate suitable passive measures within the building envelope and services design to mitigate overheating and reduce cooling demand, in line with London Plan Policy SI 4. 8.2. Applicants should apply the cooling hierarchy in Policy SI 4 of the London Plan to the development. Whilst the cooling hierarchy applies to major developments, the principles can also be applied to minor developments. Measures that are proposed to reduce the demand for cooling should be set out under the following categories:

1. Reduce the amount of heat entering the building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure.
2. Minimise internal heat generation through energy efficient design:
3. Manage the heat within the building through exposed internal thermal mass and high ceilings:
4. Provide passive ventilation
5. Provide mechanical ventilation
6. Provide active cooling systems

2.5 Local Planning Policy

General Camden Council Guidance

This report has been written to address the following comment from Camden Council during determining of a similar application within the borough:

"Note that the Council typically resists the installation of air condition units unless it is demonstrated, through the submission of an Overheating Assessment, that the existing property cannot be actively cooled through passive measures (ie, not using air conditioning). Any proposal would need to be accompanied by an Overheating Assessment (thermal modelling), which would be reviewed by one of our Sustainability Officers, to ensure it meets policy and guidance. Please refer to Local Plan Policy CC2, para. 8.41 and Camden Planning Guidance: Energy efficiency and adaptation for further information and guidance."

3 Methodology Applied & Model Inputs

This section includes the model inputs used to assess the risk of overheating within the proposed development.

3.1 Scope of Assessment

All the habitable rooms of the proposed dwelling that are proposed to be supplied with cooling have been included within the overheating analysis.

3.2 Basis for Model

Project Information	
Building Category	Category II – New Builds*
Software	IES Virtual Environment - 2024
Weather File - Location	London Weather Centre
Weather File - Details	DSY1, DSY 2 and DSY3, 2020s, High Emission, 50% percentile scenario
Summer Days	May 1st to September 30th – 153 days
Drawing Issue Date	April 2024

Table 2: Project Information

*Please note that the simulation has been run under the thermal comfort Category II – New Builds as CIBSE TM59 advises that Cat. III for existing buildings should not be used for the purposes of this methodology.

3.3 Occupancy Patterns and Behaviour – CIBSE TM59 Data

In line with CIBSE guidance, realistic algorithms for occupant behaviour, the use of windows and other adaptive behaviour were used in the dynamic thermal model, as well as a realistic occupancy schedule.

Internal heat gains are based on '*Table 2 Occupancy and equipment gain description*' content in CIBSE TM59 (Appendix 1). These are replicated in the table below.

Room	Occupancy Heat Gain (W/person)		Light Heat Gain (W/m2)	(Other Small Power W/m2)
	Sensible	Latent		
Kitchen	75	55	2	300
Living Room	75	55	5	150
Bedroom	75	55	2	80

Table 3: Heat gain figures – Modelling & data inputs

3.4 Fabric Element and Ventilation Details

Thermal Elements	Proposed U-Value (W/m²K)
External Wall	0.18
Ground Floor	0.18
Roof	0.15
Ventilation Type	System 1 – Natural Ventilation
Air Permeability	
7 m³/(hm²) @50Pa	

Table 4: Fabric elements and ventilation details

For the fabric elements, GLA and Part L notional U-Values have been used to reflect the condition of the existing building along with information obtained from the EPC for the dwelling. This is with the exception of the U-Value and G-Value of the Windows (as highlighted below) which have come direct from the manufacturer as new windows are being installed as part of the proposals.

3.5 Windows and Internal Doors – Opening and Operation Details

Opening Type	Proposed U-Value (W/m²K)	Proposed G-Value (%)	Opening Hours
Window	1.4	0.63	As per CIBSE TM59. Windows have been modelled as openable taking into consideration noise and security considerations.
Rooflight	1.4	0.63	
Window Type	**Openable Area**	**Maximum Openable Angle**	
Fixed	-	-	
Side Hung (Red)	100%	90°	
Top Hung (Green)	100%	10°	
Sliding (Blue)	90%		
External Window Shading	No		
Internal Window Shading	**No** – While Internal Blinds will be installed, it is not considered reasonable to model as closed during daytime hours in summer when occupants would be home as this would block access to daylight & sunlight. It would also obstruct natural airflow limiting any benefits.		
Door Type	**Opening Hours**		
Internal Doors	Assumed open in the daytime and closed when the occupants are sleeping. The internal door between the lounge and the day room on the ground floor is assumed to be closed for privacy reasons.		

Table 5: Window and doors opening details

Figure 2: Front elevation

Figure 3: Rear elevation

4 Results

4.1 Without Cooling

The table below shows the results of the dynamic simulation based on the current design proposals against the CIBSE TM59 criteria for dwellings that are predominantly naturally ventilated. The results based on the current situation demonstrates that the habitable rooms as existing exceed the threshold outlined by CIBSE TM59 and therefore overheat during summer.

DSY 1

Plot - Room	CIBSE TM59 – Predominantly Naturally Ventilated Homes		
	Criterion A (%Hrs Top-Tmax>=1K) Pass with value < 3	Criterion B – Bedrooms only (Hrs Top>26°C) Pass with value < 33	Compliance
0.03 - Kitchen	3.3	-	No
0.06 – "R" Lounge	2.9	-	Yes
0.04 - Dining & Day Room	6.9	-	No
1.04 - "R" Bedroom	1	37	No
1.03 - "L" Lounge	2.1	-	Yes
2.03 - "R" Study	2.1	-	Yes
2.06 - "L" Bedroom	1.1	22	Yes
2.04 - "L" Study	2.2	-	Yes
3.01 - Guest Bedroom	1.3	27	Yes

Table 6: Overheating Results – Without Cooling (DSY 1)

DSY 2

Plot - Room	CIBSE TM59 – Predominantly Naturally Ventilated Homes		
	Criterion A (%Hrs Top-Tmax>=1K) Pass with value < 3	Criterion B – Bedrooms only (Hrs Top>26°C) Pass with value < 33	Compliance
0.03 - Kitchen	7.3	-	No
0.06 – "R" Lounge	5.1	-	No
0.04 - Dining & Day Room	9.9	-	No
1.04 - "R" Bedroom	2.7	76	No
1.03 - "L" Lounge	4.5	-	No
2.03 - "R" Study	4.8	-	No
2.06 - "L" Bedroom	2.6	54	No
2.04 - "L" Study	4.7	-	No
3.01 - Guest Bedroom	2.8	64	No

Table 7: Overheating Results – Without Cooling (DSY 2)

DSY 3

Plot - Room	CIBSE TM59 – Predominantly Naturally Ventilated Homes		
	Criterion A (%Hrs Top-Tmax>=1K) Pass with value < 3	Criterion B – Bedrooms only (Hrs Top>26°C) Pass with value < 33	Compliance
0.03 - Kitchen	13.1	-	**No**
0.06 – "R" Lounge	11	-	**No**
0.04 - Dining & Day Room	18.2	-	**No**
1.04 - "R" Bedroom	5.6	88	**No**
1.03 - "L" Lounge	9.5	-	**No**
2.03 - "R" Study	9.7	-	**No**
2.06 - "L" Bedroom	5.6	56	**No**
2.04 - "L" Study	9.5	-	**No**
3.01 - Guest Bedroom	5.5	61	**No**

Table 8: Overheating Results – Without Cooling (DSY 3)

Results Analysis

Based on the above, 3 out of 9 modelled habitable rooms fail the CIBSE TM59 assessment with the current build under the DSY 1 weather file. Under the DSY 2 and DSY 3 weather files, all the modelled habitable rooms fail to comply.

It should also be raised that 26 degrees is on the higher-end of acceptable temperatures for bedrooms at night-time with previous WHO and other academic studies suggesting 24 degrees is when people can begin to feel “uncomfortably warm at night”. *CIBSE Guide A (2015)* notes that sleep quality may be compromised when the indoor operative temperature rises above 24°C and recommends that peak bedroom temperatures should not exceed 26°C.

4.2 With Internal Blinds

The table below presents the results of the dynamic simulation based on the current design proposals, which include internal blinds and predominantly natural ventilation.

Compliance for kitchens and living rooms is based on passing Criterion A. Bedrooms must pass both criteria.

Plot - Room	CIBSE TM59 – Predominantly Naturally Ventilated Homes		
	Criterion A (%Hrs Top-Tmax>=1K) Pass with value < 3	Criterion B – Bedrooms only (Hrs Top>26°C) Pass with value < 33	Compliance
0.03 - Kitchen	2	-	**Yes**
0.06 – "R" Lounge	2	-	**Yes**
0.04 - Dining & Day Room	2.2	-	**Yes**
1.04 - "R" Bedroom	0.9	34	**No**
1.03 - "L" Lounge	1.7	-	**Yes**
2.03 - "R" Study	2	-	**Yes**
2.06 - "L" Bedroom	0.9	22	**Yes**
2.04 - "L" Study	1.8	-	**Yes**
3.01 - Guest Bedroom	1.1	24	**Yes**

Table 9: Overheating Results – With Internal Blinds (DSY 1)

Results Analysis

Although the results showed that internal blinds significantly improved the room's overheating situation, one bedroom still failed to comply. Additionally, the following reasons led to internal blinds not being seen as a reliable or enforceable part of a compliance strategy:

- Internal blinds rely heavily on occupant operation, and there is no guarantee that residents will use them consistently or appropriately (e.g. during the day when solar gains are highest).
- While blinds can reduce solar gains, they are generally less effective than high-performance glazing because heat has already entered the building before the blinds reflect it. Internal blinds also tend to trap heat inside.
- CIBSE TM59 (Part O) promotes robust, passive strategies that offer long-term, predictable performance. Internal blinds are considered removable and highly variable in type and usage.
- Blinds, modelled as close in the day, impact on the resident’s enjoyment of the natural daylight and sunlight levels during the summer months and the restriction of which could impact their health and wellbeing.
- Internal Blinds, when used with openable windows, impede airflow and reduce the effectiveness of cross-ventilation. This lowers the ACH rates and reduces the potential for cooling from natural ventilation.

4.3 With Cooling

The cooling hierarchy has been reviewed for the scheme as follows:

Cooling Hierarchy	Measures Undertaken
Reduce the amount of heat entering the building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure.	High albedo materials where possible but limited external changes.
	The dwelling does benefit from some insulation.
	No space for sufficient PV or a Green Roof (Dormer Roof)
Minimise internal heat generation through energy efficient design:	Individual heating so no internal pipework heat losses.
	LED lighting is proposed to reduce internal heat gains.
Manage the heat within the building through exposed internal thermal mass and high ceilings:	High thermal mass throughout based on construction.
	The Floor to Ceiling Height exceeds National Space Standards.
Provide Passive Ventilation	Openable Windows allow for nighttime purge ventilation if required.
	The dwelling benefits from the provision of cross-ventilation
Provide Mechanical Ventilation	No mechanical ventilation and infeasible to retrofit due to lack of ceiling height to add required void space.

As the above, all the feasible stages of the hierarchy were followed but due to the limited possibility to open the window due to falling protection issues, active cooling is required in order to mitigate the risks of overheating.

All the rooms modelled are proposed to have cooling installed and results are shown below:

Plot - Room	CIBSE TM59 – Predominantly Naturally Ventilated Homes		
	Criterion A (%Hrs Top-Tmax>=1K) Pass with value < 3	Criterion B – Bedrooms only (Hrs Top>26°C) Pass with value < 33	Compliance
0.03 - Kitchen	0	-	**Yes**
0.06 – "R" Lounge	0	-	**Yes**
0.04 - Dining & Day Room	0	-	**Yes**
1.04 - "R" Bedroom	0	0	**Yes**
1.03 - "L" Lounge	0	-	**Yes**
2.03 - "R" Study	0	-	**Yes**
2.06 - "L" Bedroom	0	0	**Yes**
2.04 - "L" Study	0	-	**Yes**
3.01 - Guest Bedroom	0	0	**Yes**

Table 10: Overheating Results – With Cooling (DSY 1)

4.4 Proposed Cooling System Details

VRV Information		
Outdoor Units	Daikin RXYSCQ-TV1 - RXYSCQ-TV1 | Daikin	
SCOP & SEER	4.6	7.1
Indoor Units	FXSQ-A ceiling unit	
Cooling Only	Yes	
Heating	Heating is via a separate Air Source Heat Pump system. No Gas Boilers.	
Table 11: VRF Information		

Product Features

- Compact & lightweight single fan design makes the unit almost unnoticeable.
- It covers all thermal needs, including accurate temperature control as well as heating and cooling.
- Incorporates VRV IV standards for increased seasonal efficiency and comfort.
- Connectable to all VRV control systems and Daikin Cloud Service for 24/7 monitoring.

5 Conclusion

Overall, based on the contents of this report, a dynamic overheating assessment has been undertaken on the dwelling and it shows that based on CIBSE TM59 (Part O & GLA version) that there is a risk of overheating.

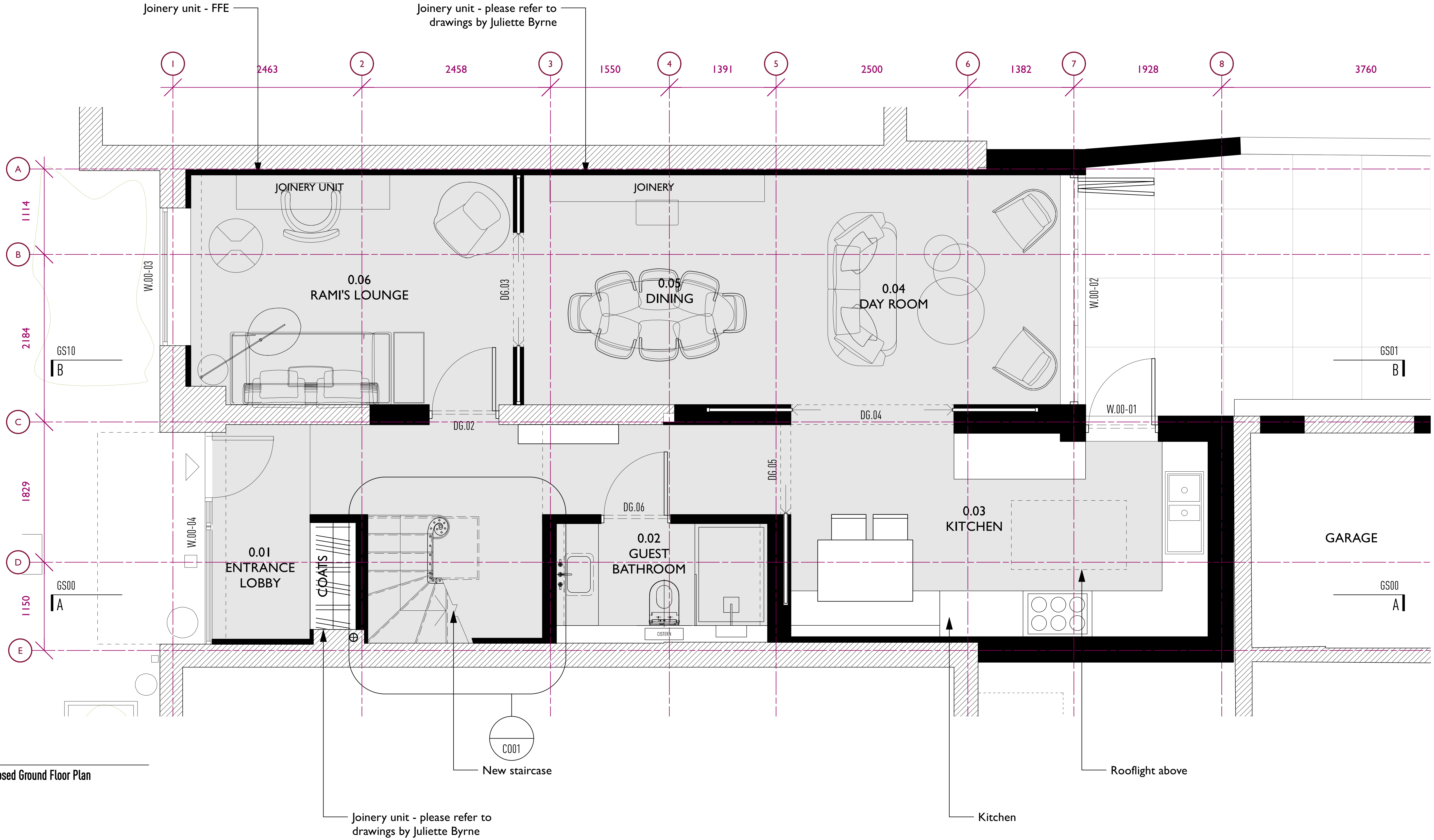
The cooling hierarchy has been reviewed in the context of the dwelling being existing and based on provided construction data along with the EPC data for the scheme.

As existing, 3 rooms fail DSY 1 and all the rooms fail DSY 2 and DSY 3 weather scenarios without cooling.

Therefore, in order to mitigate the risk of overheating, both today and in the future, a modern and stylish split system is proposed with industry leading cooling efficiency.

Based on this assessment, it is the authors opinion that the existing property cannot be actively cooled through passive measures and thus permission should be granted in terms of overheating and energy for the application.

Appendix 1



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Revisions

Notes

Existing building fabric retained

Proposed new building fabric

DRAWING TO BE READ IN COORDINATION WITH
INTERIOR DESIGNER'S DESIGN, PLANS AND SCHEDULES

Client
Mr Rami Cohen and Ms Louise Gilbert

Project
12 Queensmead
St Johns Wood Park
NW8 6RE

Project Number
171

Drawing Title
General Arrangements
Proposed

DOMINIC LAMB ARCHITECTS
134 Lots Road, London SW10 0RJ
studio@lamb.london
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Detailed Design / Tender	DL	DL

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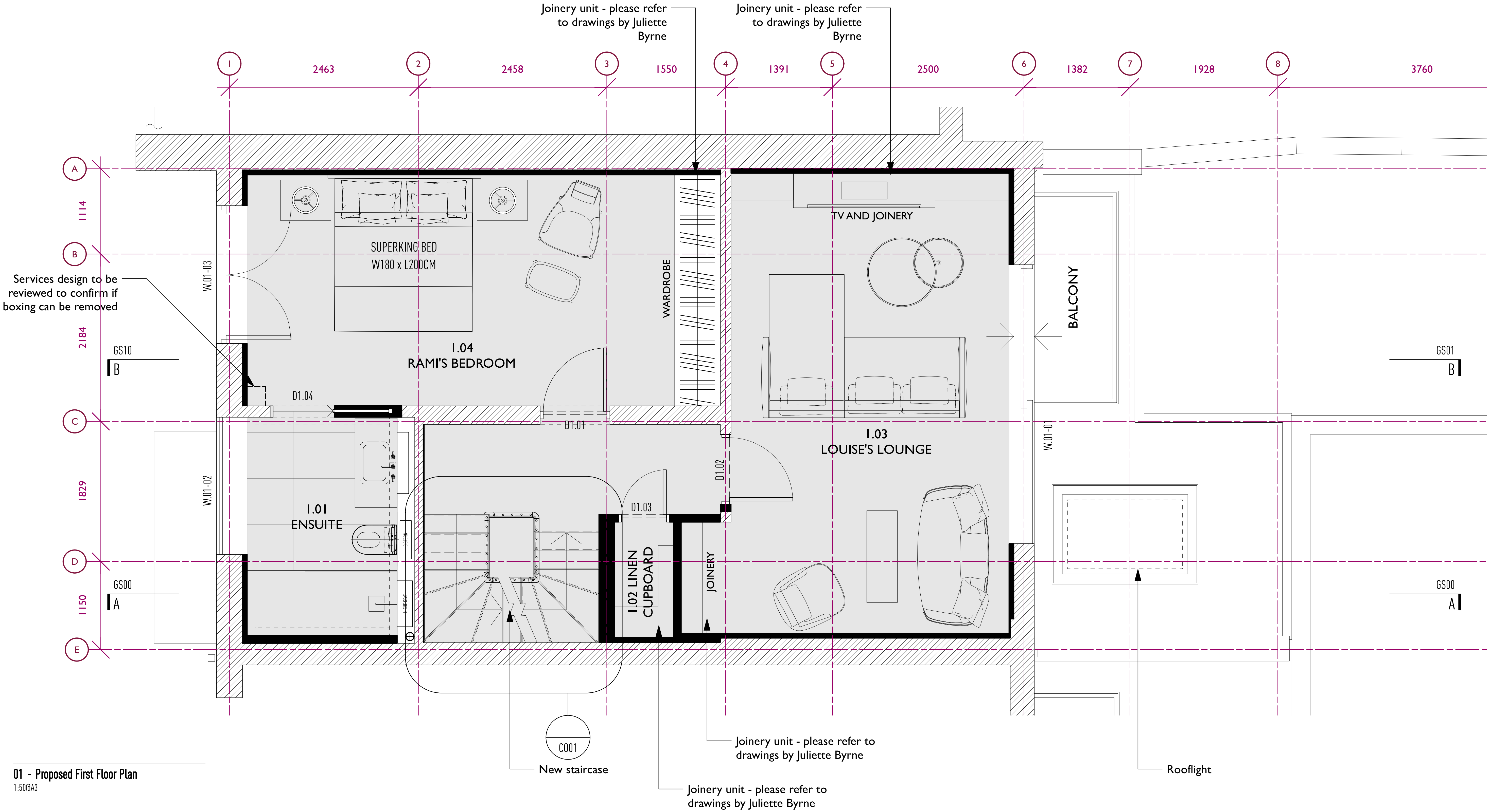

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Revisions

Notes

Existing building fabric retained

Proposed new building fabric

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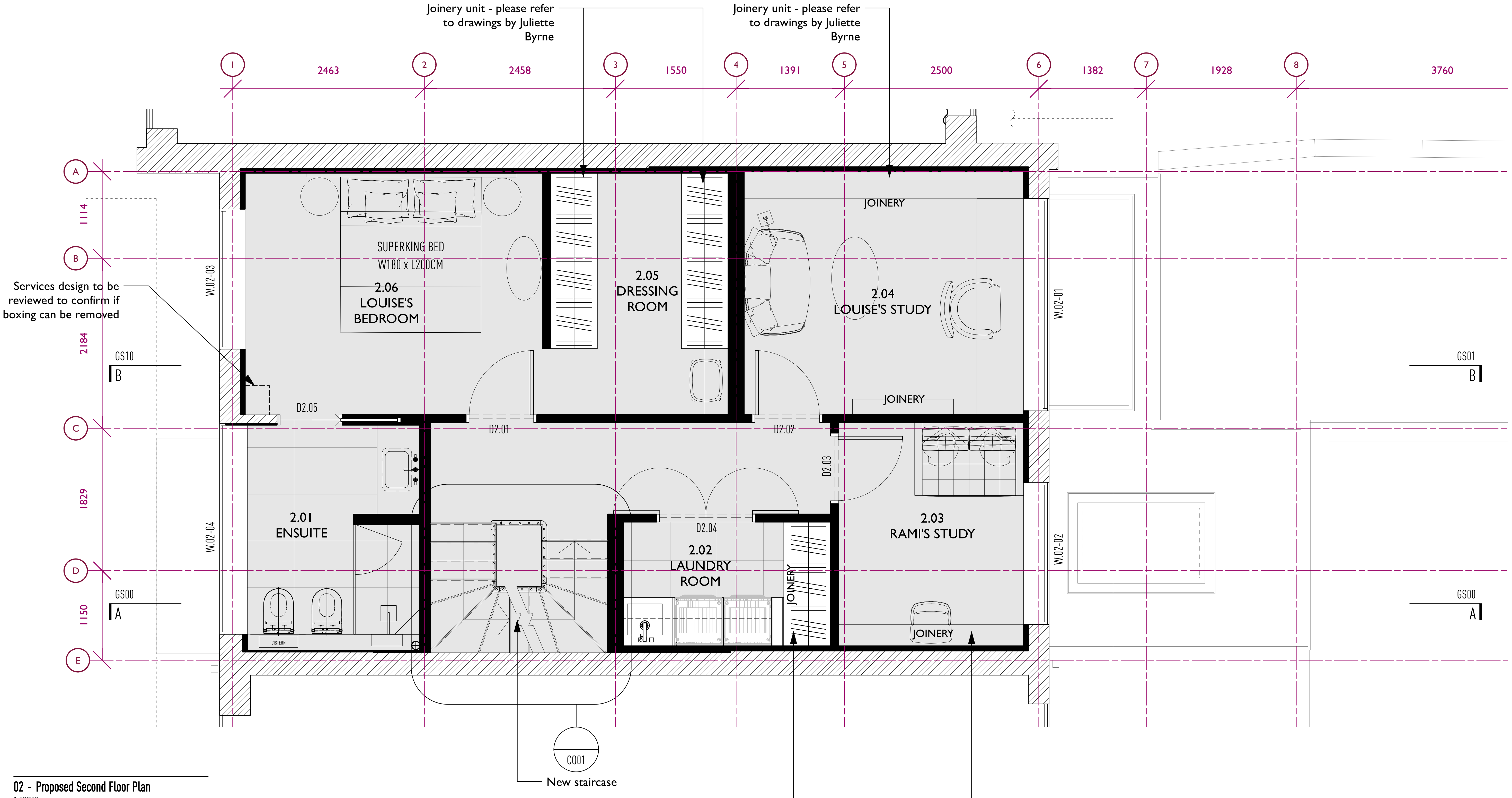

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Revisions

Notes

Existing building fabric retained

Proposed new building fabric

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Drawing Number	171-GA02
Revision	T1

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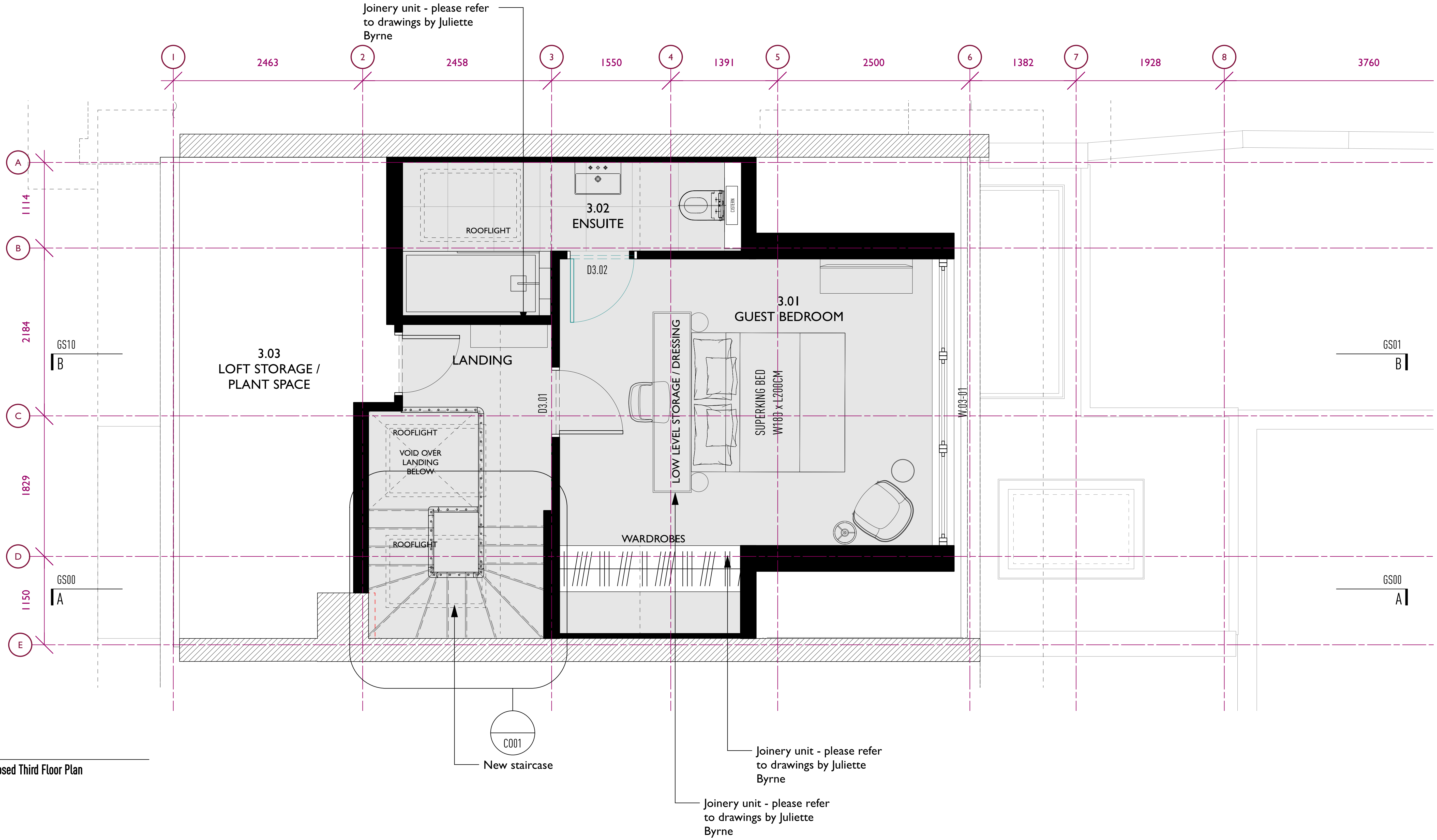

03 - Proposed Third Floor Plan

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Revisions

Notes

Existing building fabric retained

Proposed new building fabric

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INTERIOR DESIGNER'S DESIGN, PLANS AND SCHEDULES

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Project Number	171
Drawing Title	General Arrangements Proposed

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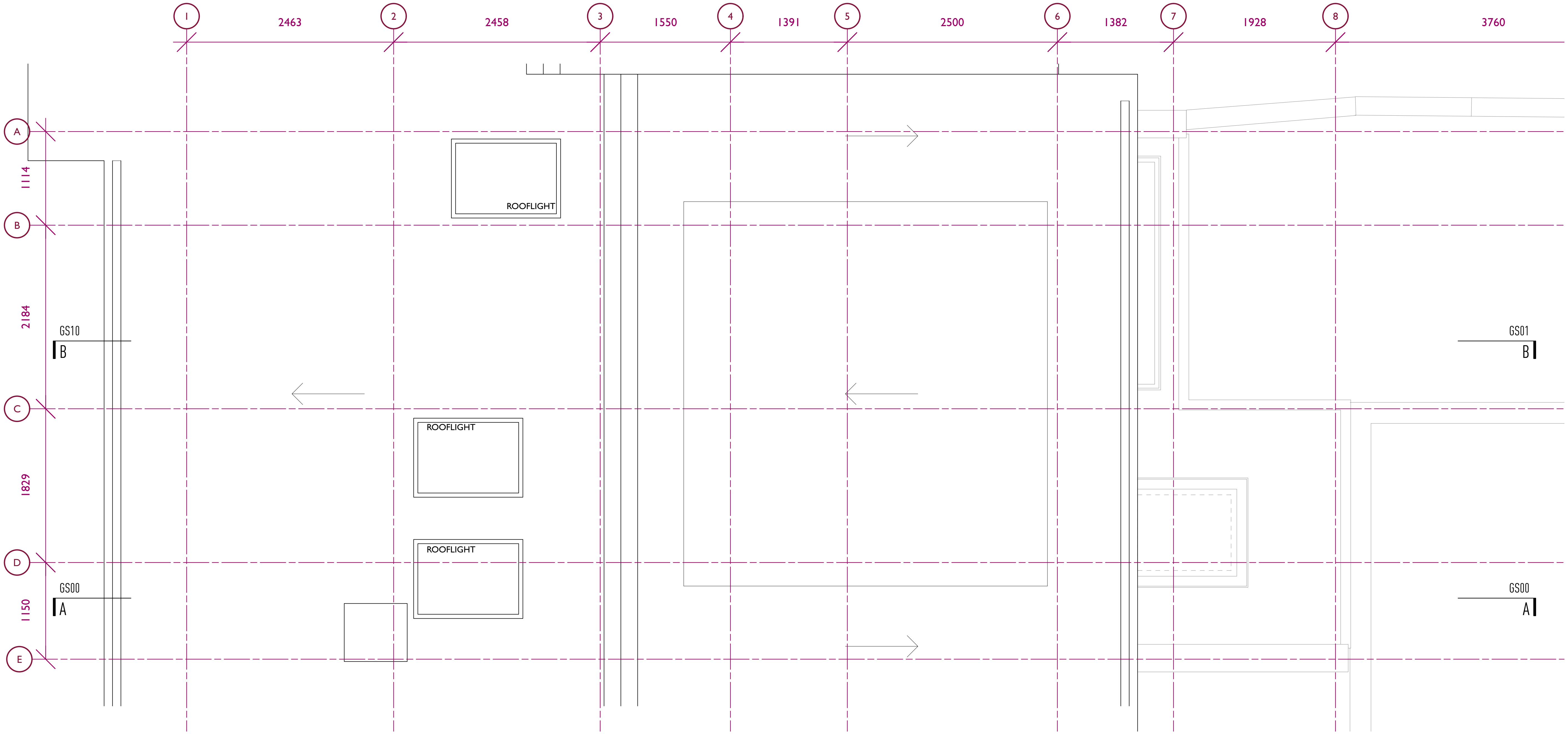

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Revisions

Notes

Existing building fabric retained

Proposed new building fabric

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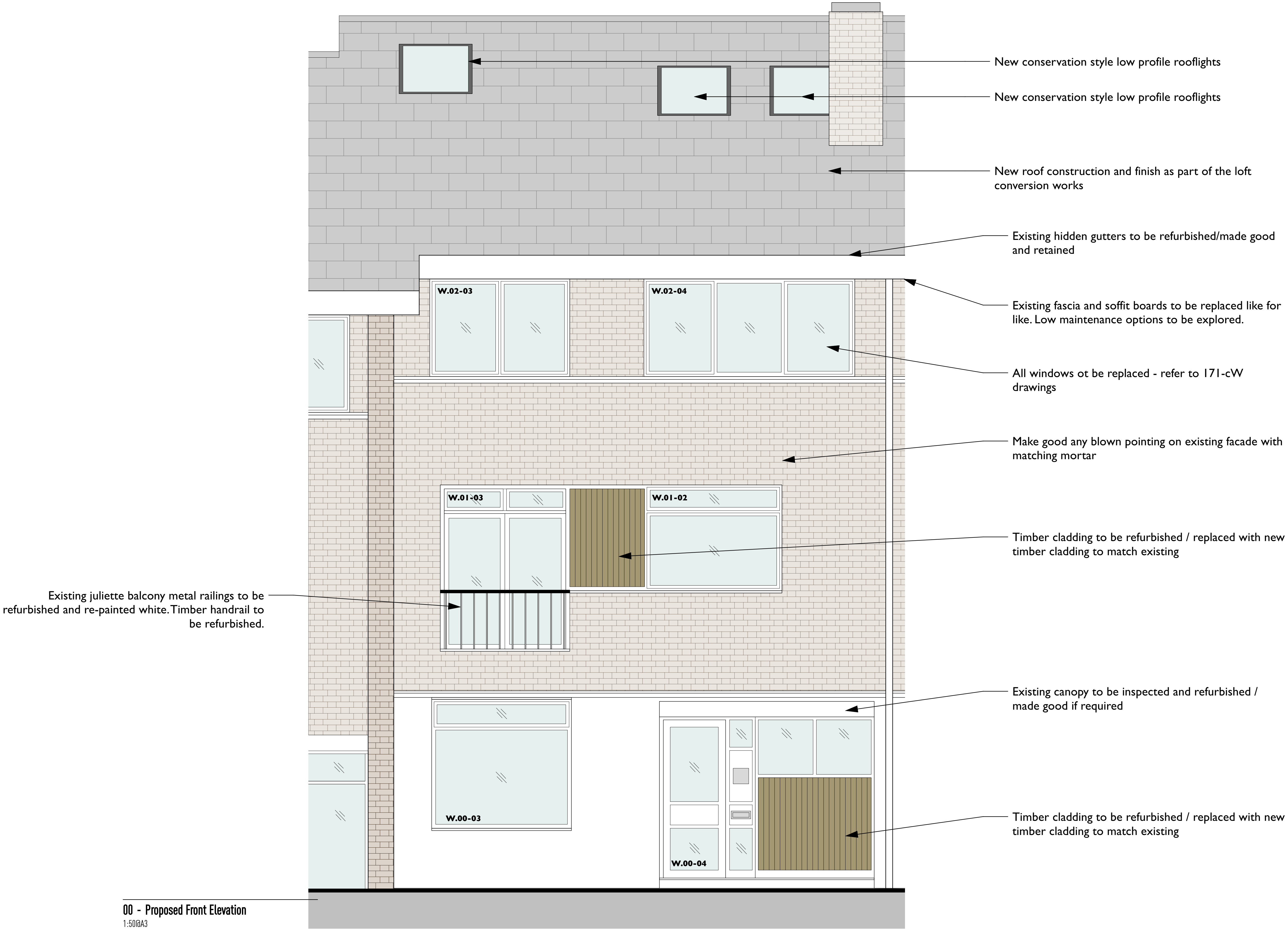

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Revisions

Notes

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12 Queensmead
St Johns Wood Park
NW8 6RE

Project Number
171

Drawing Title
General Elevations
Front Elevation
Proposed

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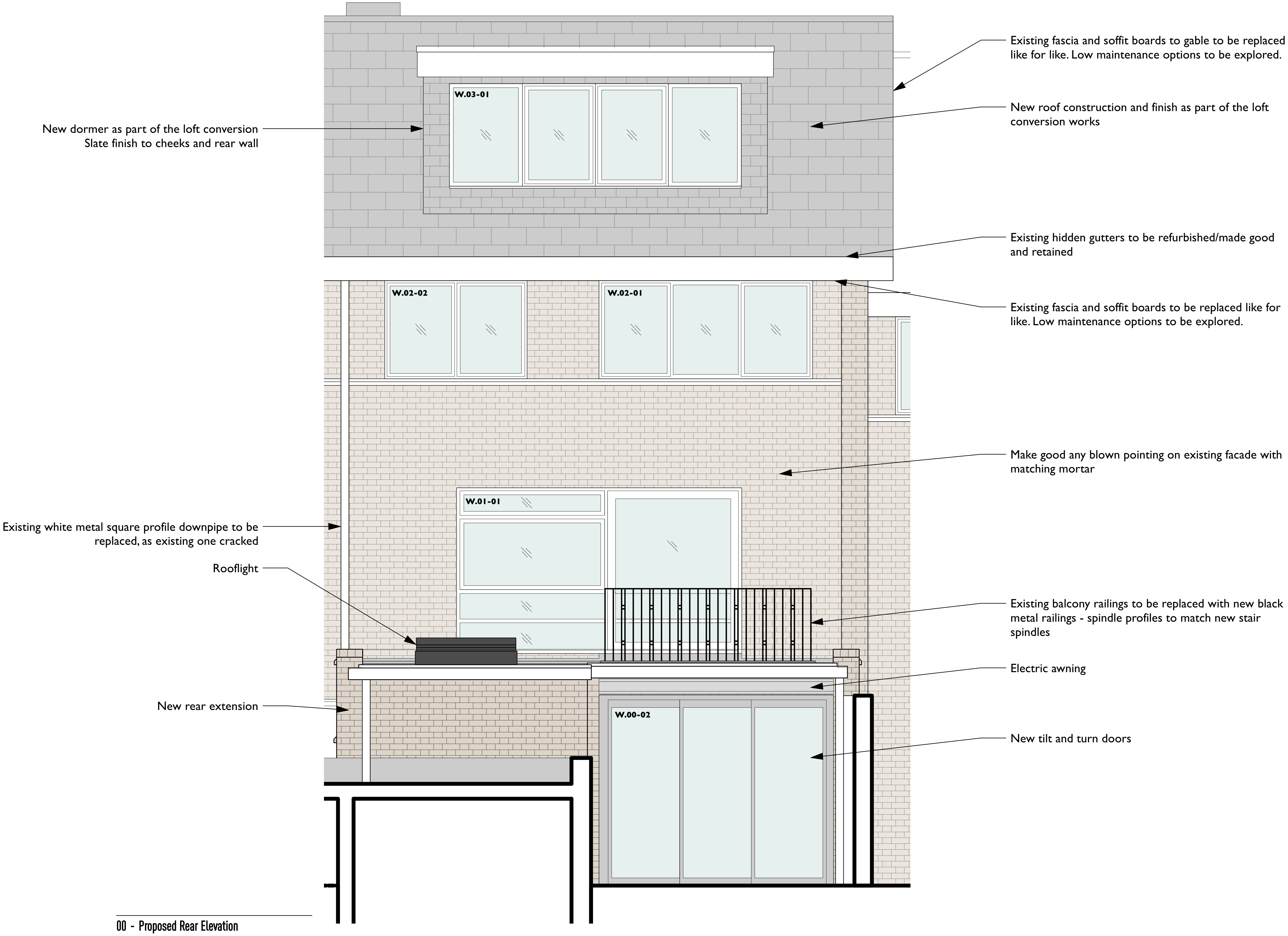

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Revisions

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Client
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Project: 12 Queensmead, St Johns Wood Park, NW8 6RE
Project Number: 171

Drawing Title
General Elevations
Rear Elevation
Proposed

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