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Surface Water and SuDS Assessment Rev2

613-615 Green Lanes,
Palmers Green,
London,
N13 4EP

30 November 2023

Appendices

Appendix A - Site Location Plan and Existing Site Layout Plans
Appendix B - Proposed Site Layout Plans
Appendix C - Greenfield Runoff (Total Site)
Appendix D - British Geological Survey Borehole Records
Appendix E - Micro Drainage Type C Permeable Paving Calculations

Prepared by	Checked by	Date
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This document has been prepared solely as a Surface Water and SuDS Assessment for Redgrave Investments Ltd. Base Energy accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

1. Introduction

This Surface Water and SuDS Assessment (Rev0) has been prepared to support the planning application for the proposed redevelopment at 613-615 Greens Lane, Palmers Green.

A site location plan is provided in **Appendix A.**

Existing Site

The application site is a mixed-use building in three sections. The front section is two storey with a shallow pitched roof set within the parapet, the middle section is also two storey with a pitched roof and the rear section is a single storey. The front element is purely commercial on the ground and the first floor, the middle section is predominantly residential on the ground and first floor and the rear section is residential with an element of commercial.

The existing site layout is also shown in **Appendix A.**

Development Proposals

Proposals are for the refurbishment, reconfiguration and extension works to an existing part single part two storey mix-use building consisting of part commercial and part residential, with the introduction of an additional floor level to the front building, raised roof ridge level and new dormers to the rear wing of the building and associated external and internal alterations to create a total of 8 x residential units (3 x 3 beds, 2 x 2 beds, 2 x 1 bed, 1x studio), with the retention and creation of 2 x commercial units. The scheme will introduce private amenity areas, a secure and enclosed cycle and a refuse/recycling store.

The proposed site layout is shown in **Appendix B.**

2. Planning Policy- Surface Water Management

The London Plan 2021

Policy SI 13 Sustainable drainage

A Lead Local Flood Authorities should identify – through their Local Flood Risk Management Strategies and Surface Water Management Plans – areas where there are particular surface water management issues and aim to reduce these risks. Increases in surface water run-off outside these areas also need to be identified and addressed.
B Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. There should also be a preference for green over grey features, in line with the following drainage hierarchy:
1) rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
2) rainwater infiltration to ground at or close to source
3) rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)
4) rainwater discharge direct to a watercourse (unless not appropriate)
5) controlled rainwater discharge to a surface water sewer or drain 6) controlled rainwater discharge to a combined sewer.
C Development proposals for impermeable surfacing should normally be resisted unless they can be shown to be unavoidable, including on small surfaces such as front gardens and driveways.
D Drainage should be designed and implemented in ways that promote multiple benefits including increased water use efficiency, improved water quality, and enhanced biodiversity, urban greening, amenity and recreation.

9.13.1 London is at particular risk from surface water flooding, mainly due to the large extent of impermeable surfaces. Lead Local Flood Authorities have responsibility for managing surface water drainage through the planning system, as well as ensuring that appropriate maintenance arrangements are put in place. Local Flood Risk Management Strategies and Surface Water Management Plans should ensure they address flooding from multiple sources including surface water, groundwater and small watercourses that occurs as a result of heavy rainfall.

9.13.2 Development proposals should aim to get as close to greenfield run-off rates as possible depending on site conditions. The well-established drainage hierarchy set out in this policy helps to reduce the rate and volume of surface water run-off. Rainwater should be managed as close to the top of the hierarchy as possible. There should be a preference for green over grey features, and drainage by gravity over pumped systems. A blue roof is an attenuation tank at roof or podium level; the combination of a blue and green roof is particularly beneficial, as the attenuated water is used to irrigate the green roof.

9.13.3 For many sites, it may be appropriate to use more than one form of drainage, for example a proportion of rainwater can be managed by more sustainable methods, with residual rainwater managed lower down the hierarchy. In some cases, direct discharge into the watercourse is an appropriate approach, for example rainwater discharge into the tidal Thames or a dock. This should include suitable pollution prevention filtering measures, ideally by using soft engineering or green infrastructure. In addition, if direct discharge is to a watercourse where the outfall is likely to be affected by tide-locking, suitable storage should be designed into the system. However, in other cases direct discharge will not be appropriate, for example discharge into a small stream at the headwaters of a catchment, which may cause flooding. This will need to be assessed on a case-by-case basis, taking into account the location, scale and quality of the discharge and the receiving watercourse. The maintenance of identified drainage measures should also be considered in development proposals.

9.13.4 The London Sustainable Drainage Action Plan complements this policy. It contains a series of actions to make the drainage system work in a more natural way with a particular emphasis on retrofitting.

Enfield Council

Enfield Council's Development Management Document (Adopted November 2014) provides detailed criteria and standard based policies which support the objectives of the Core Strategy.

DMD 61 – Managing Surface Water

DMD 61 states: *A Drainage Strategy will be required for all developments to demonstrate how proposed measures manage surface water as close to its source as possible and follow the drainage hierarchy in the London Plan. All developments must maximise the use of and, where possible, retrofit Sustainable Drainage Systems (SuDS) which meet the following requirements:*

1. Suitability a. SuDS measure(s) should be appropriate having regard to the proposed use of site, site conditions/context (including proximity to Source Protection Zones and potential for contamination) and geology.
2. Quantity a. All major developments must achieve greenfield run off rates (for 1 in 1 year and 1 in 100 year events). **b**. All other development should seek to achieve greenfield run off and must maximise the use of SuDS, including at least one 'at source' SuDS measure resulting in a net improvement in water quantity or quality discharging to sewer in-line with any SuDS guidance or requirements.
3. Quality a. Major developments must have regard to best practice and where appropriate follow the SuDS management train by providing a number of treatment phases corresponding to their pollution potential and the environmental sensitivities of the locality. **b**. Measures should be incorporated to maximise opportunities for sustainable development, improve water quality, biodiversity, local amenity and recreation value
4. Functionality a. The system must be designed to allow for flows that exceed the design capacity to be stored on site or conveyed off-site with minimum impact. **b**. Clear ownership, management and maintenance arrangements must be established.
5. Other a. Where appropriate, developments must incorporate relevant measures identified in the Surface Water Management Plan.

Non-Statutory Technical Standards for SuDS

The Non-Statutory Technical Standards for SuDS, (and accompanying Local Authority SuDS Officer Organisation (LASOO) Practice Guidance) sets out the details which should be addressed within a SuDS Report, including:

- Flood Risk Outside of the Development
- Peak Flow Control and Volume Control
- Flood Risk Within the Development
- Runoff Destinations
- Structural Integrity
- Designing for Maintenance Considerations
- Construction

3. Surface Water Management

The total site comprises approximately 470m².

Surface Water Runoff from the Existing Site

As shown in **Appendix A,** the existing site is composed entirely of hardstanding areas (roofs, concrete, pavers).

As previously noted, Policy 9.13.2 of the London Plan 2021 states*: Development proposals should aim to get as close to greenfield run-off rates as possible depending on site conditions. The well-established drainage hierarchy set out in this policy helps to reduce the rate and volume of surface water run-off. Rainwater should be managed as close to the top of the hierarchy as possible. There should be a preference for green over grey features, and drainage by gravity over pumped systems.*

As such, in the first instance the **ICP SuDS** method within Micro Drainage has been used to calculate flow rates from the total site (as detailed in **Appendix C** and shown in **Table 1**.

Table 1 – ICP SuDS – Site Greenfield Runoff Rates (l/s)

Return Period	Flow Rate for 470m² (l/s)
QBAR	0.2
1 in 30 year	0.5
1 in 100 year	0.6

Surface Water Runoff from the Redeveloped Site

Following redevelopment of the site, the areas will be as follows:

- **Roof areas - ~320m²**
- **Hardstanding (paved areas)– ~100m²**
- **Landscaped areas - ~50m²**

The proposals will result in a **decrease** in hardstanding areas which will provide betterment (in terms of surface water runoff) when compared with the existing situation.

The London Plan 2021 Hierarchy

The London Plan 2021 sets out the preferred hierarchy for the disposal of surface water runoff.

1*) Rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)*
There is the potential for simple rainwater harvesting. See the following section of this report.

2) *Rainwater infiltration to ground at or close to source*
At the time of writing, no ground investigation / infiltration testing has been carried out to confirm the suitability of the underlying ground conditions for infiltration.

The British Geological Survey (BGS) Geology Maps show that the site is underlain by London Clay.

BGS also provide borehole records, and there is a record available for the nearby Etheridge Road (see **Appendix D**). This confirms that beneath the made ground there is silty clay.

Given the presence of clay, we would not recommend a SuDS strategy based on full infiltration.

However, the areas of parking afford the opportunity for a non-infiltration (Type C) permeable paving to be installed which will provide a level of source control SuDS.

3) *Rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)*
As shown on the proposed site plans in **Appendix B**, areas of landscaping are being introduced. These areas can be used to convey surface water across the site.

4) *Rainwater discharge direct to a watercourse (unless not appropriate)*
There are no known watercourses in the immediate vicinity of the site.

5) *Controlled rainwater discharge to a surface water sewer or drain*
It is understood that surface water runoff from the existing site connects into the public sewer system.

It is therefore proposed that surface water runoff from hardstanding areas is released into the public sewer systems at a controlled rate, via Type C 'permeable' paving.

SuDS Option

Based on the proposed site layout and the desktop study of the underlying ground conditions, and in line with the London Plan drainage hierarchy, the following are the preferred options for the management of surface water runoff from hardstanding areas:

- Rainwater recycling (water butt)
- Landscaping
- Non-infiltration permeable paving (Type C)

Rainwater Recycling

In order to provide a level of rainwater recycling, a water butt will be provided. Water butts afford the opportunity for future occupants to reuse water collected in the water butt, for example when watering the garden/or washing cars etc. If this supply is used frequently this may also ensure that some additional storage is available during an extreme rainfall event.

The water butt will be connected to a downpipe, and an overflow will be provided. This could be via a perforated hose to allow the tank to empty after a rainfall event thus making capacity for the next event.

It is important to take the following into consideration when planning to install a water butt:

- it should be durable and opaque to sunlight sited in an area that can safely take the weight of the water
- in addition to a tap, an overflow should be provided which would route rainwater away from the sewer system (such as to a garden area)
- a child proof lid should be fitted
- means of detaching the rainwater downpipe to enable cleaning

Landscaping

The landscaped areas can provide conveyance of surface water.

Type C Permeable Paving

Type C Permeable Paving should be installed on the front driveway (see overleaf for indicative SuDS layout).

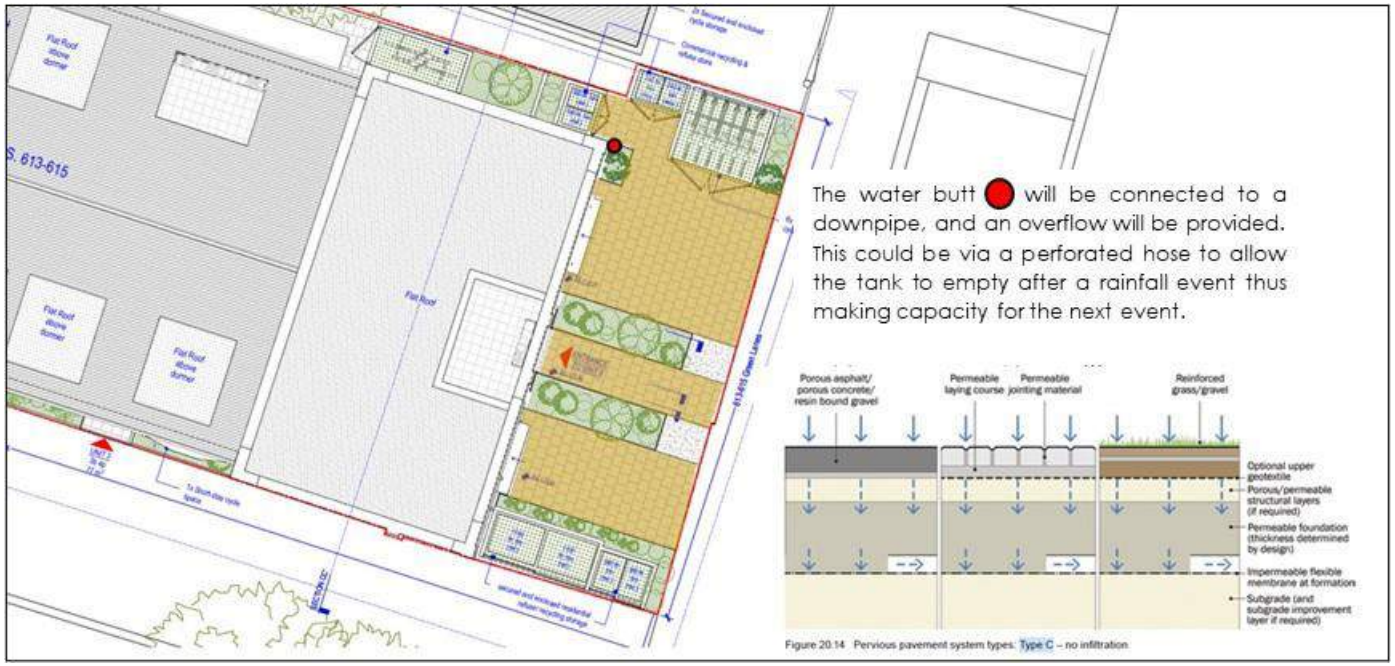
This type of system is suited to ground conditions where the infiltration rate is very low. In a Type C system the water enters the pavement but will exit by means of a restricted outfall pipe (or flow control device) into a storm water sewer system.

Micro Drainage has been used to calculate the Type C permeable paving system for surface water runoff from the remaining hardstanding areas (420~m^2) in up to the 1 in 100 year plus 40% allowance for climate change.

Flows have been restricted to 0.6l/s which is the existing 1 in 100 year greenfield rate of runoff.

A summary of the results is provided in **Appendix E**.

Indicative SuDS Layout



Please note:

- *Thames Water will be consulted to confirm capacity and agree the flow rates will be undertaken once planning permission has been granted.*
- *Detailed drainage drawings will be submitted at detailed drainage design stage.*
- *The SuDS strategy has been put together based on our understanding of the ground conditions and site layout. Building Control will need to be consulted on the siting of the SuDS, and the recommendations and advice of the SuDS manufacturer / installer should always be followed.*

4. SuDS Maintenance

Operation and maintenance schedules are provided below (taken from Ciria C753 The SuDS Manual): these should be adopted by the management company.

Water Butt

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	*The water butt should be routinely checked for litter – leaves can become trapped in the water butt which could lead to blockage of the taps and overflow*	*Monthly*
	Where appropriate, and if safe to do so, the water butt should be cleaned annually to prevent smells associated with stagnant water, and to remove any algae.	*Annually*

Type C Permeable Pacing

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where is may cause risks to performance)	Monthly
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial Actions	Repair/ rehabilitate inlets, outlet, overflow, and vents	As required
Monitoring	Inspect/ check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build up and remove if necessary	Every five years, or as required

5. Conclusions

This Surface Water and SuDS Assessment (Rev0) has been prepared to support the planning application for the proposed redevelopment at 613-615 Greens Lane, Palmers Green, and demonstrates (so far as is practicable) how surface water runoff will be managed over the lifetime of the development in line with the London Plan and local planning policies.

The application site is a mixed-use building in three sections. The front section is two storey with a shallow pitched roof set within the parapet, the middle section is also two storey with a pitched roof and the rear section is a single storey. The front element is purely commercial on the ground and the first floor, the middle section is predominantly residential on the ground and first floor and the rear section is residential with an element of commercial.

Proposals are for the refurbishment, reconfiguration and extension works to an existing part single part two storey mix-use building consisting of part commercial and part residential, with the introduction of an additional floor level to the front building, raised roof ridge level and new dormers to the rear wing of the building and associated external and internal alterations to create a total of 8 x residential units (3 x 3 beds, 2 x 2 beds, 2 x 1 bed, 1x studio), with the retention and creation of 2 x commercial units. The scheme will introduce private amenity areas, a secure and enclosed cycle and a refuse/recycling store.

The proposals will result in a decrease in hardstanding areas which will provide betterment (in terms of surface water runoff) when compared with the existing situation.

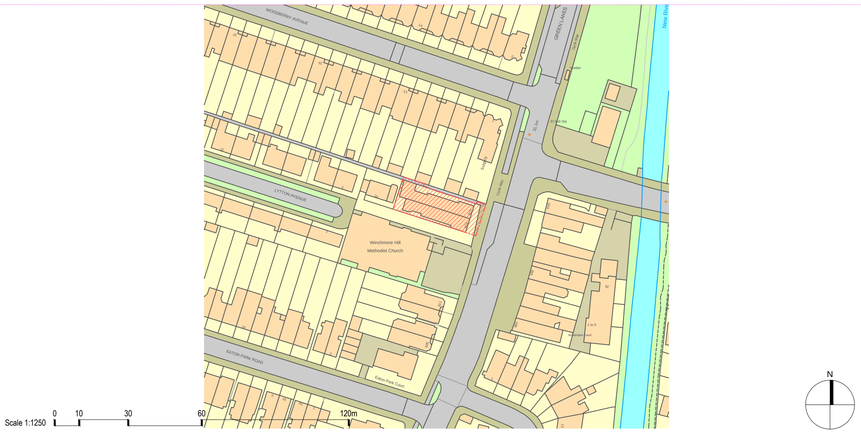
Based on the proposed site layout and the desktop study of the underlying ground conditions, and in line with the London Plan drainage hierarchy, the following are the preferred options for the management of surface water runoff from hardstanding areas:

- Rainwater recycling (water butt)
- Landscaping
- Non-infiltration permeable paving (Type C)

The SuDS strategy has been put together based on our understanding of the ground conditions and site layout. Building Control will need to be consulted on the siting of the SuDS, and the recommendations and advice of the SuDS manufacturer / installer should always be followed.

Appendices

Appendix A - Site Location Plan and Existing Site Layout Plans



[01] O.S. MAP (LOCATION PLAN) 1:1250 @ A1

[02] EXISTING BLOCK PLAN 1:500 @ A1

1. Aerial view from east

2. Aerial view from north

3. Aerial view from south

4. Aerial view from west

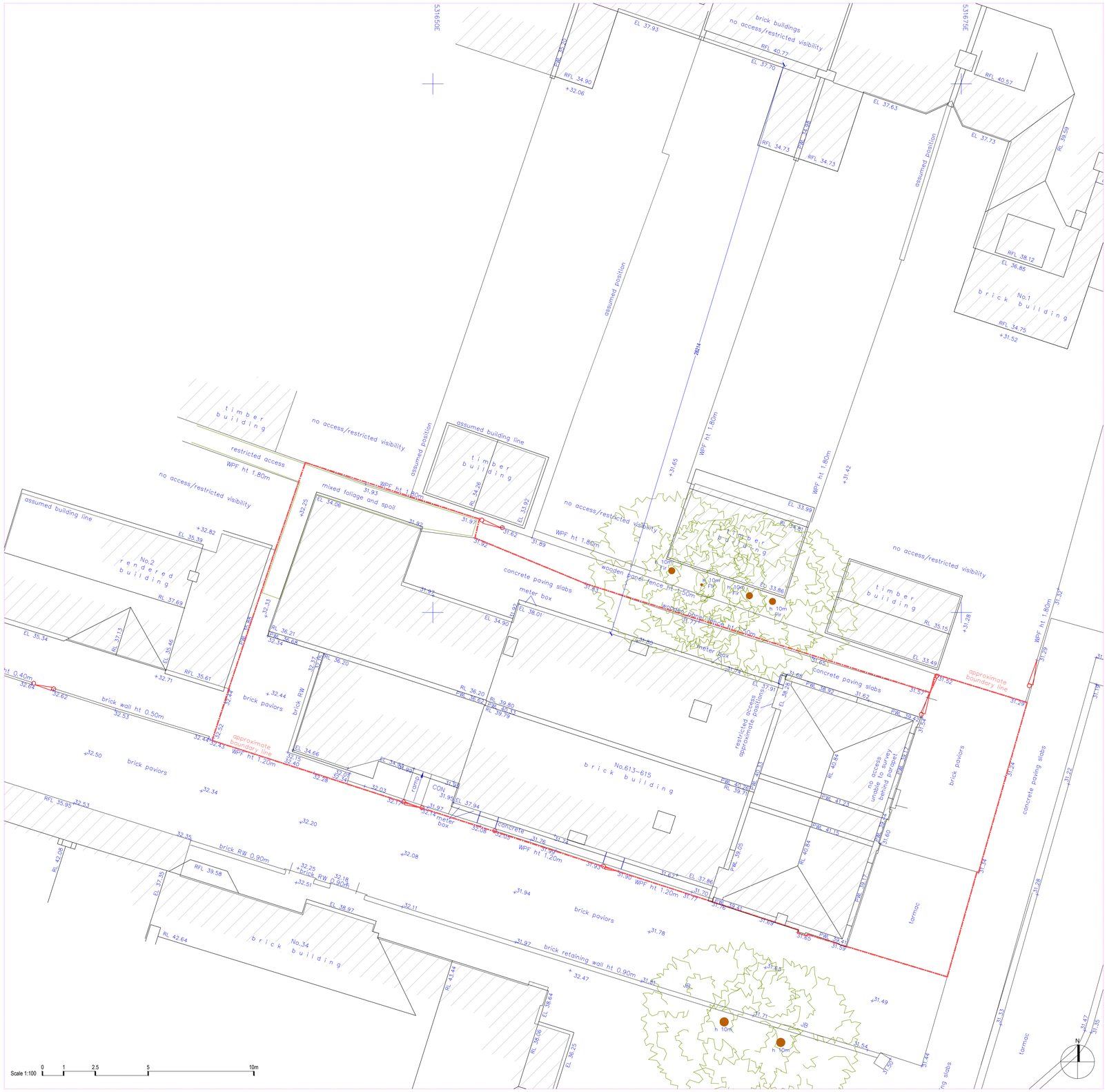
[03] AERIAL VIEWS N/A

1. View from the street

2. View from Lytton Avenue

3. View of the side pedestrian alley

[04] SITE VIEWS N/A



[05] EXISTING TOPOGRAPHICAL SURVEY 1:100 @ A1

NOTE:
DO NOT SCALE FROM DRAWINGS - EXCEPT FOR PLANNING PURPOSES.
ALL DISCREPANCIES TO BE REPORTED TO ARCHITECT IMMEDIATELY.
ALL DIMENSIONS TO BE VERIFIED BY CONTRACTOR ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORKS.

P1 15/11/22 Pre planning application issue

ISO-A1

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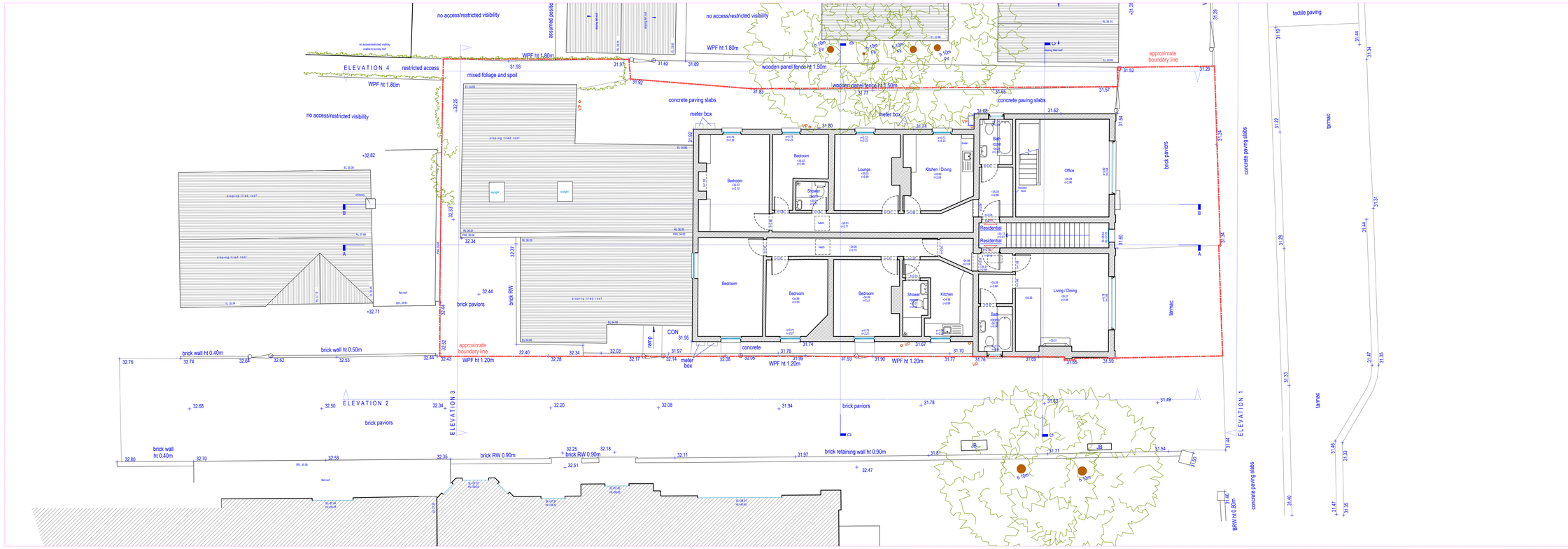
CLIENT: Mr. P. Joannou

DRAWN: RC
CHECKED: PK
ISSUED BY: PK
STATUS: PRE
SCALE AT A1: 1:100/1:500/1:1250
REVISION: P1

PROJECT TITLE: 613-615 Green Lanes, Palmers Green, London N13 4EP

DRAWING TITLE: Existing Ground Floor Plan

JOB AND DRAWING NO: 1849-E01-00



[02] EXISTING FIRST FLOOR PLAN — 1:100 @ A1

[01] EXISTING GROUND FLOOR PLAN — 1:100 @ A1

NOTE:
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Scale 1:100 0 1 2.5 5 10m

N

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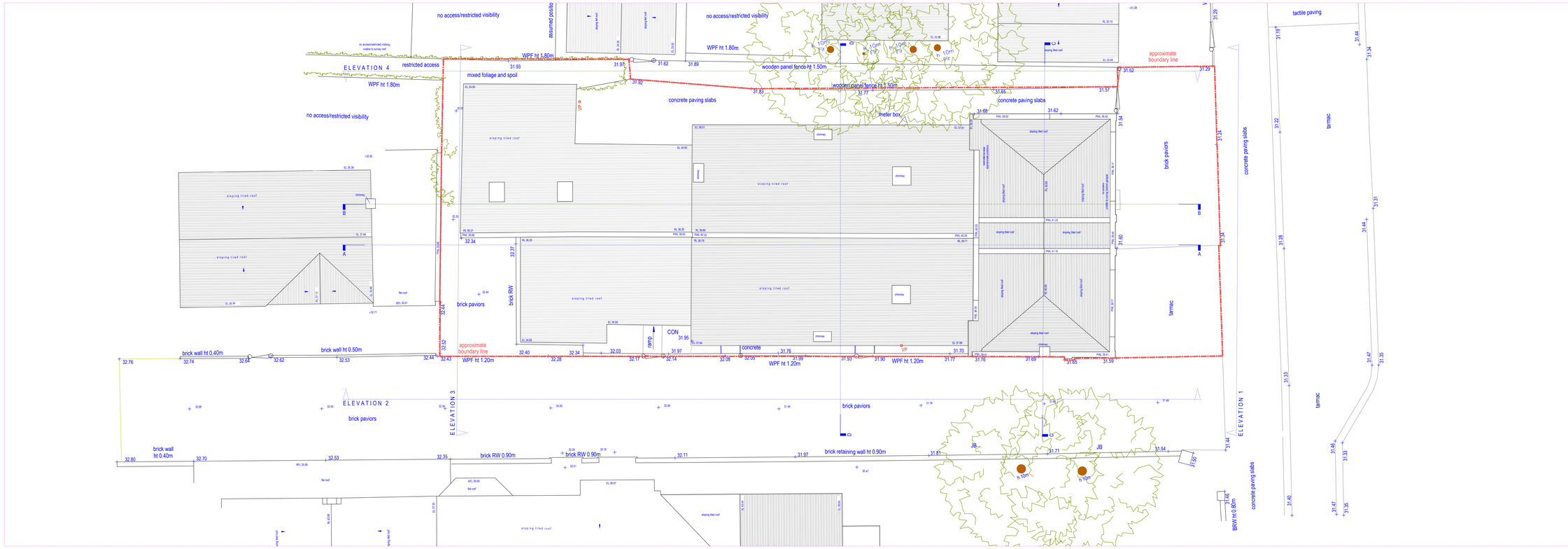
STATUS: PRE
SCALE AT A1: 1:100
REVISION: P1

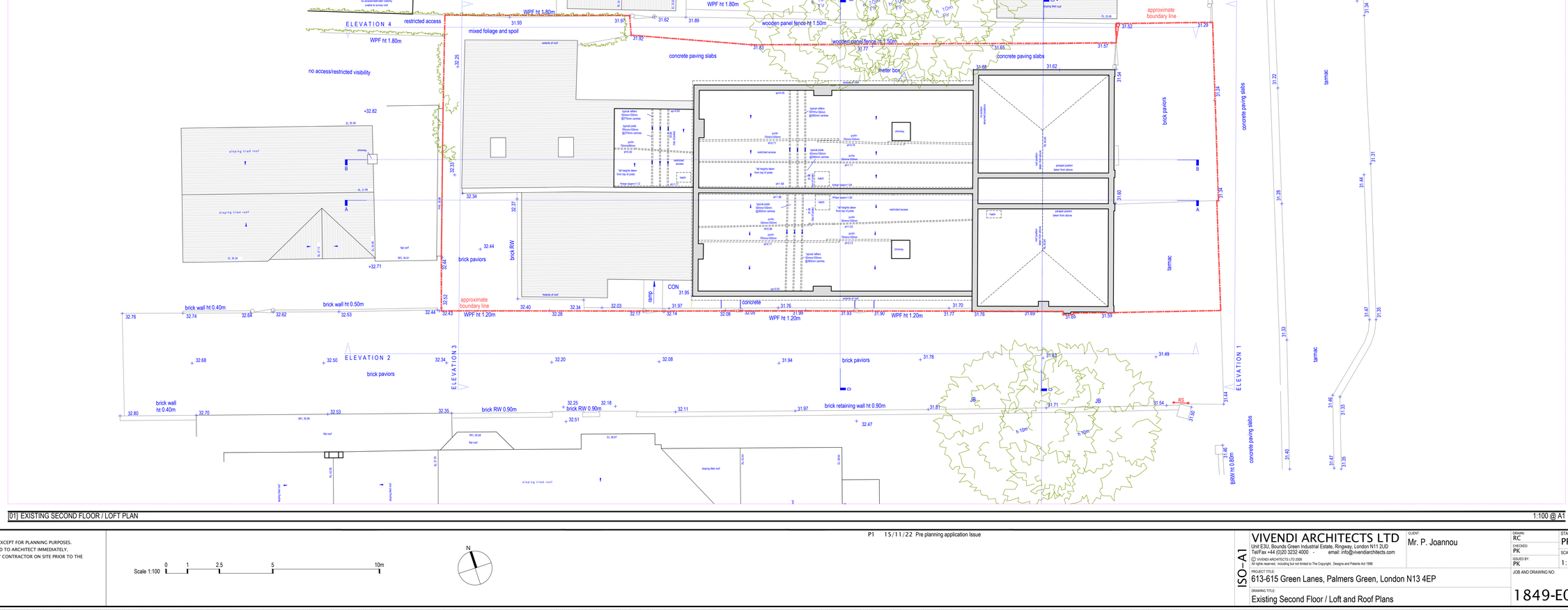
PROJECT TITLE: 613-615 Green Lanes, Palmers Green, London N13 4EP

DRAWING TITLE: Existing Ground and First Floor Plans

JOB AND DRAWING NO: 1849-E02-00



[02] EXISTING ROOF PLAN 1:100 @ A1



[01] EXISTING SECOND FLOOR / LOFT PLAN 1:100 @ A1

NOTE:
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Scale 1:100 0 1 2.5 5 10m

N

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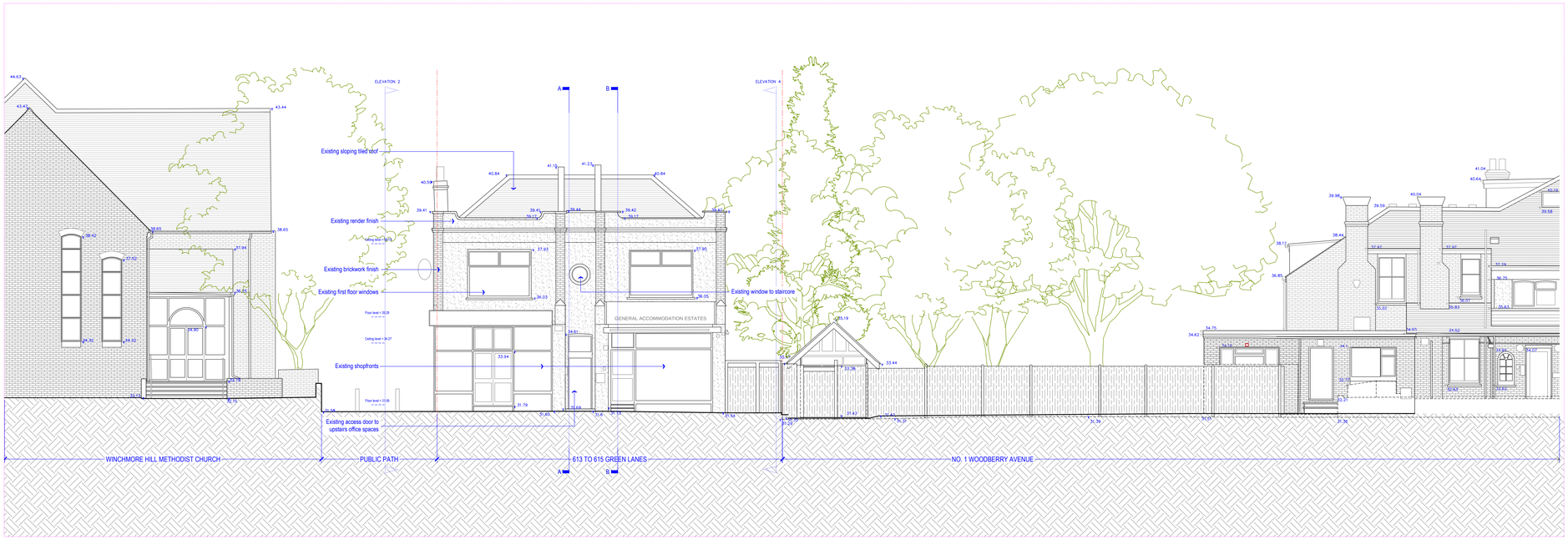
ISSUED BY: PK
STATUS: PRE
SCALE AT A1: 1:100
REVISION: P1

PROJECT TITLE: 613-615 Green Lanes, Palmers Green, London N13 4EP

DRAWING TITLE: Existing Second Floor / Loft and Roof Plans

JOB AND DRAWING NO: 1849-E02-01



[01] EXISTING FRONT ELEVATION (NO. 1) 1:100 @ A1

[02] EXISTING SIDE ELEVATION (NO. 2) 1:100 @ A1

NOTE:
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Scale 1:100 0 1 2.5 5 10m

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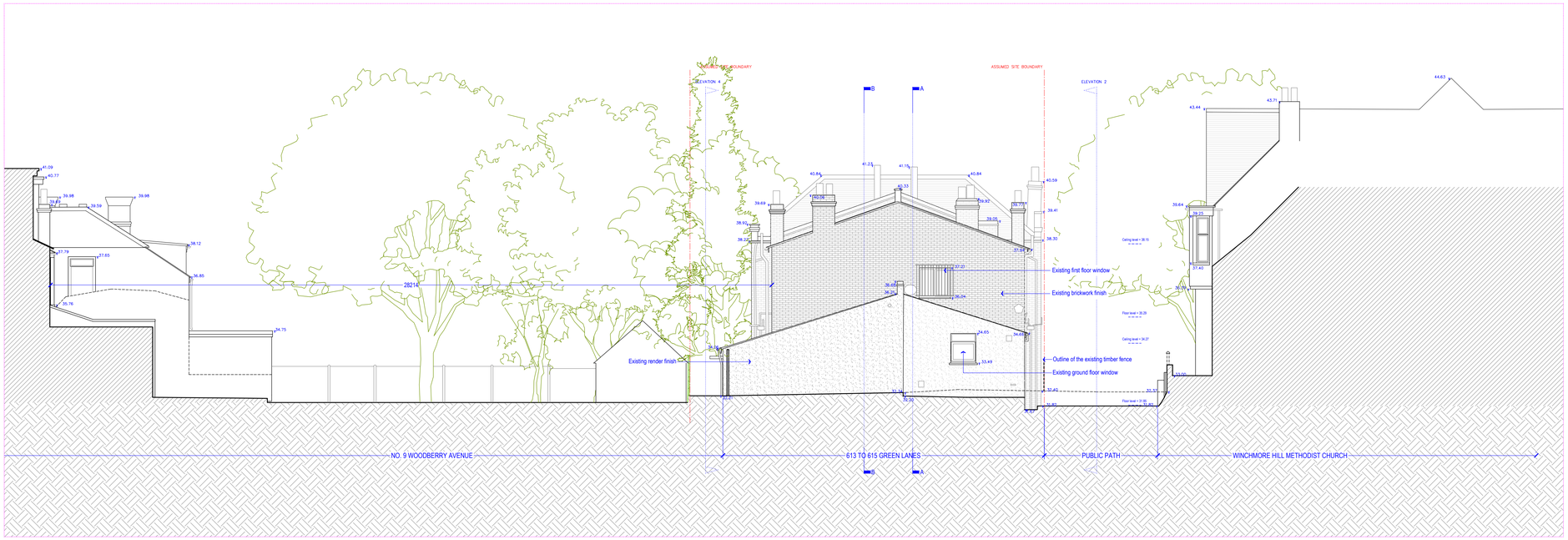
PROJECT TITLE: 613-615 Green Lanes, Palmers Green, London N13 4EP

DRAWING TITLE: Existing Front and Side Elevations (No. 1 & 2)

DRAWN: RC
CHECKED: PK
ISSUED BY: PK
STATUS: PRE
SCALE AT A1: 1:100
REVISION: P1
JOB AND DRAWING NO: 1849-E03-00



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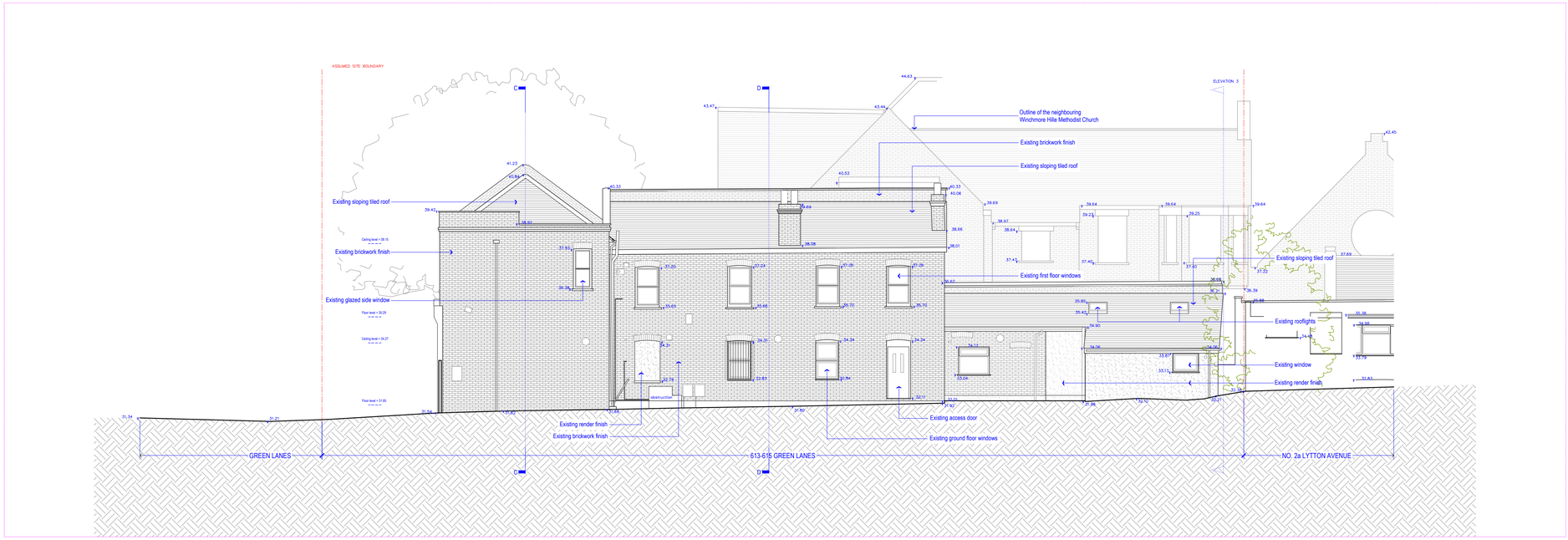

[02] EXISTING SIDE ELEVATION (NO. 4) 1:100 @ A1

NOTE:
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Scale 1:100 0 1 2.5 5 10m

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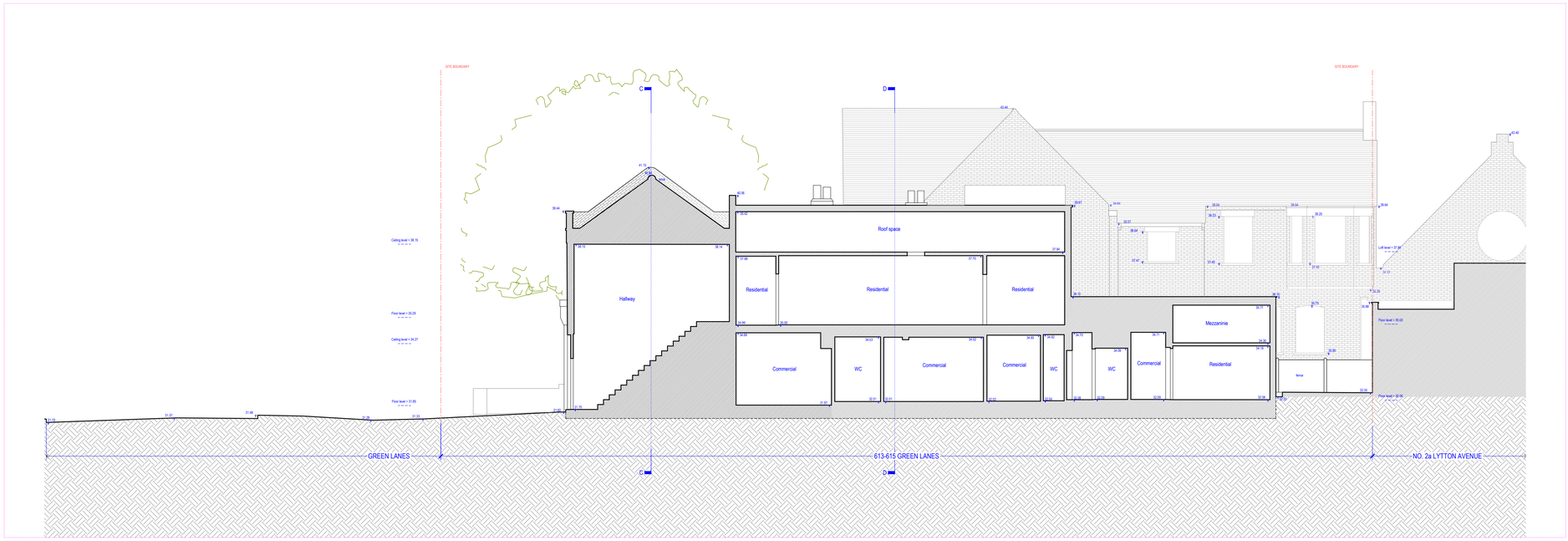
DRAWN: RC
CHECKED: PK
ISSUED BY: PK
STATUS: PRE
SCALE AT A1: 1:100
REVISION: P1

PROJECT TITLE: 613-615 Green Lanes, Palmers Green, London N13 4EP

DRAWING TITLE: Existing Rear and Side Elevations (No. 3 & 4)

JOB AND DRAWING NO: 1849-E03-01



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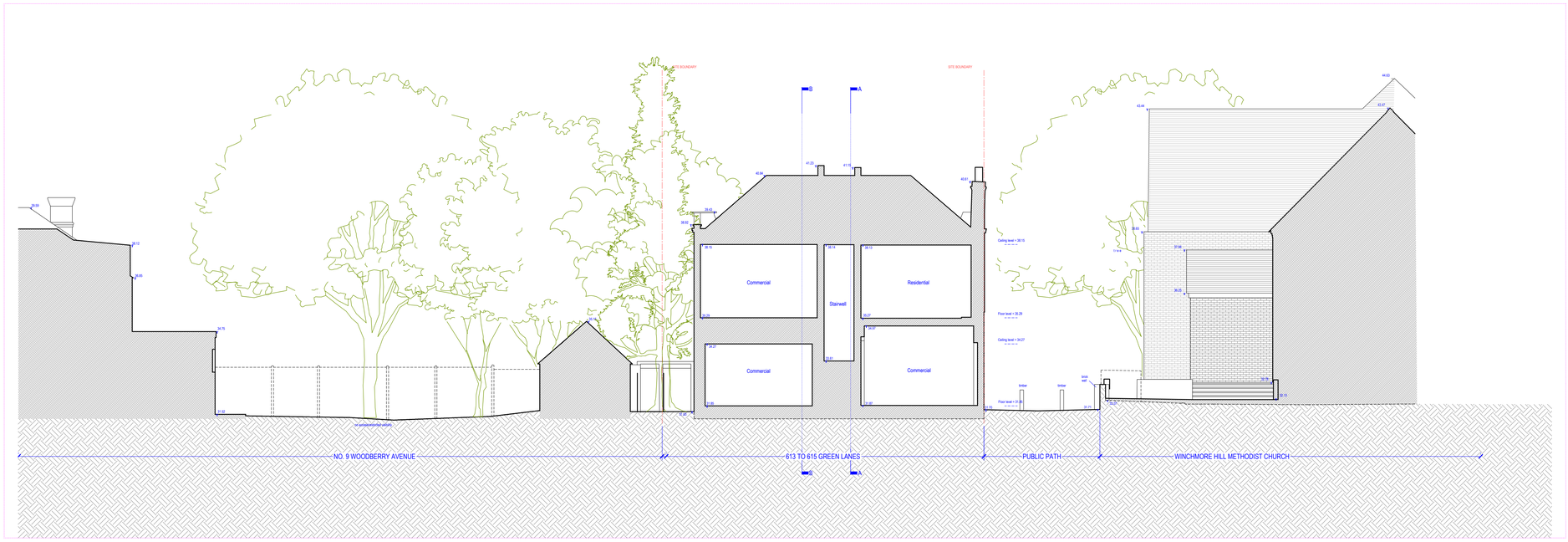

[02] EXISTING SECTION C-C 1:100 @ A1

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Scale 1:100 0 1 2.5 5 10m

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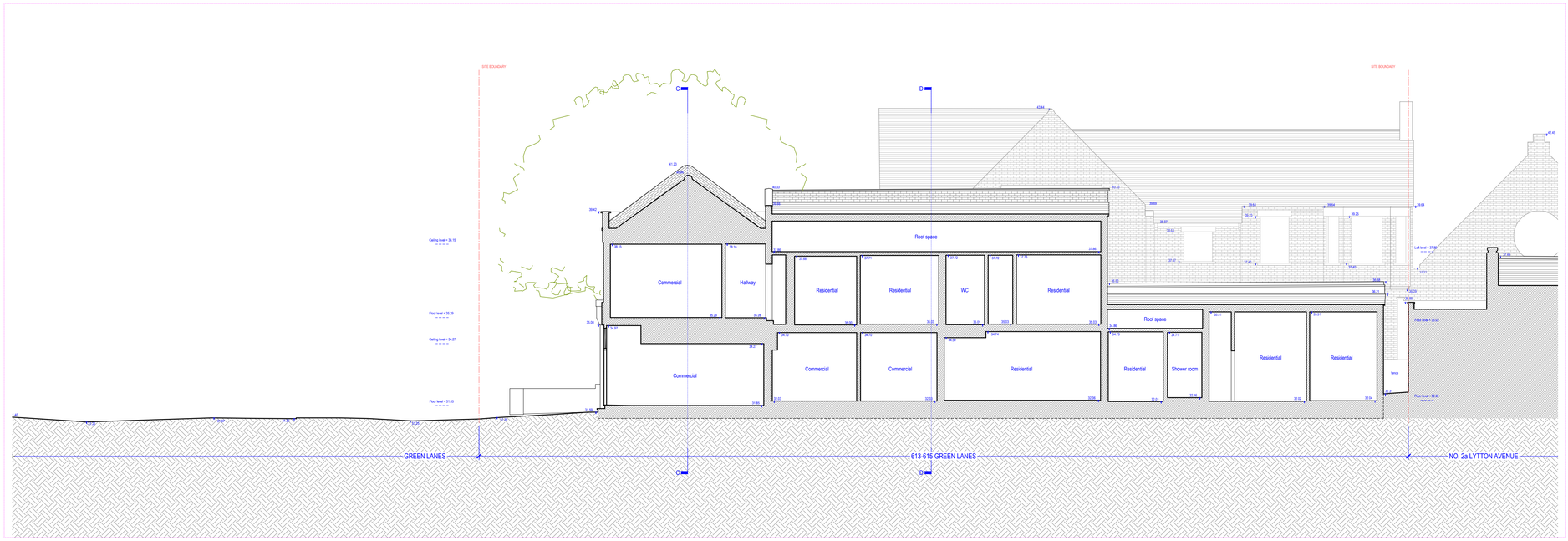
CLIENT: Mr. P. Joannou

PROJECT TITLE: 613-615 Green Lanes, Palmers Green, London N13 4EP

DRAWING TITLE: Existing Sections (A-A and C-C)

DRAWN: RC
CHECKED: PK
ISSUED BY: PK
STATUS: PRE
SCALE AT A1: 1:100
REVISION: P1
JOB AND DRAWING NO: 1849-E04-00



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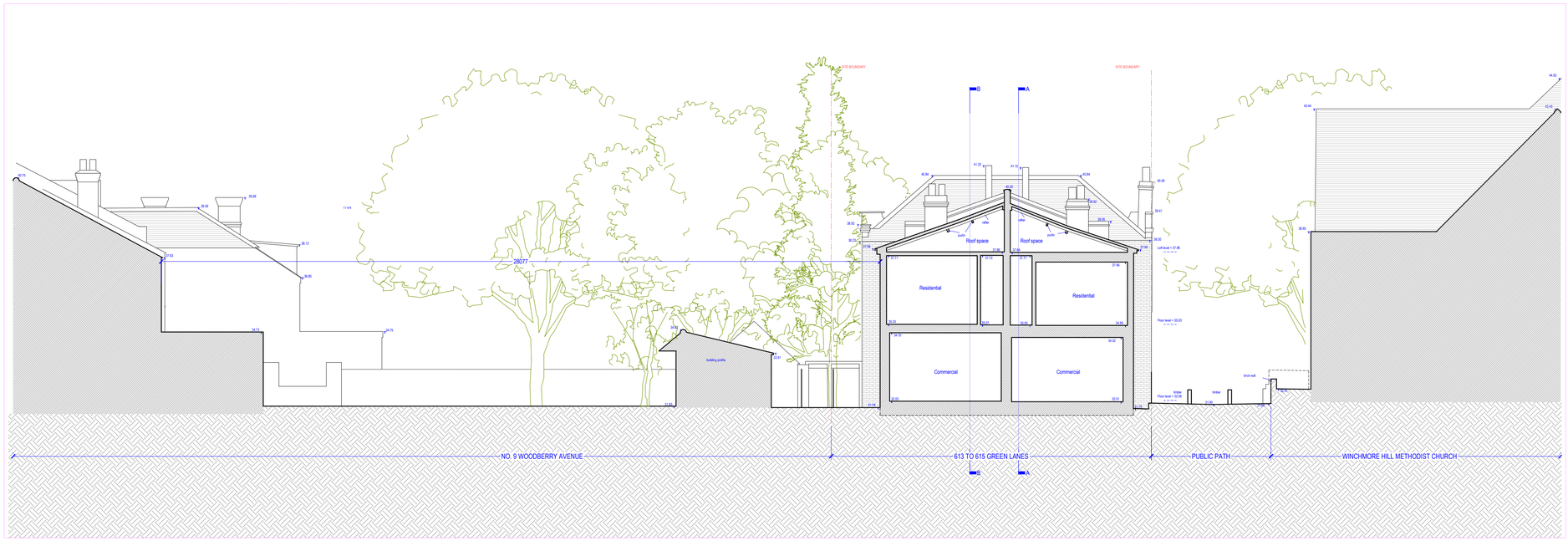

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Scale 1:100 0 1 2.5 5 10m

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Tel/Fax +44 (0)20 3232 4000 - email: info@vivendiarchitects.com

CLIENT: Mr. P. Joannou

PROJECT TITLE: 613-615 Green Lanes, Palmers Green, London N13 4EP

DRAWING TITLE: Existing Sections B-B and D-D

DRAWN: RC
CHECKED: PK
ISSUED BY: PK
STATUS: PRE
SCALE AT A1: 1:100
REVISION: P1
JOB AND DRAWING NO: 1849-E04-01

Appendix B - Proposed Site Layout Plans

[01] PROPOSED TOPOGRAPHICAL SURVEY

1:100 @ A1

NOTE:
DO NOT SCALE FROM DRAWINGS - EXCEPT FOR PLANNING PURPOSES.
ALL DISCREPANCIES TO BE REPORTED TO ARCHITECT IMMEDIATELY.
ALL DIMENSIONS TO BE VERIFIED BY CONTRACTOR ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORKS.

P1	15/11/22	Pre planning application Issue
P2	xx/xx/23	Full Planning Application Issue

ISO-A1

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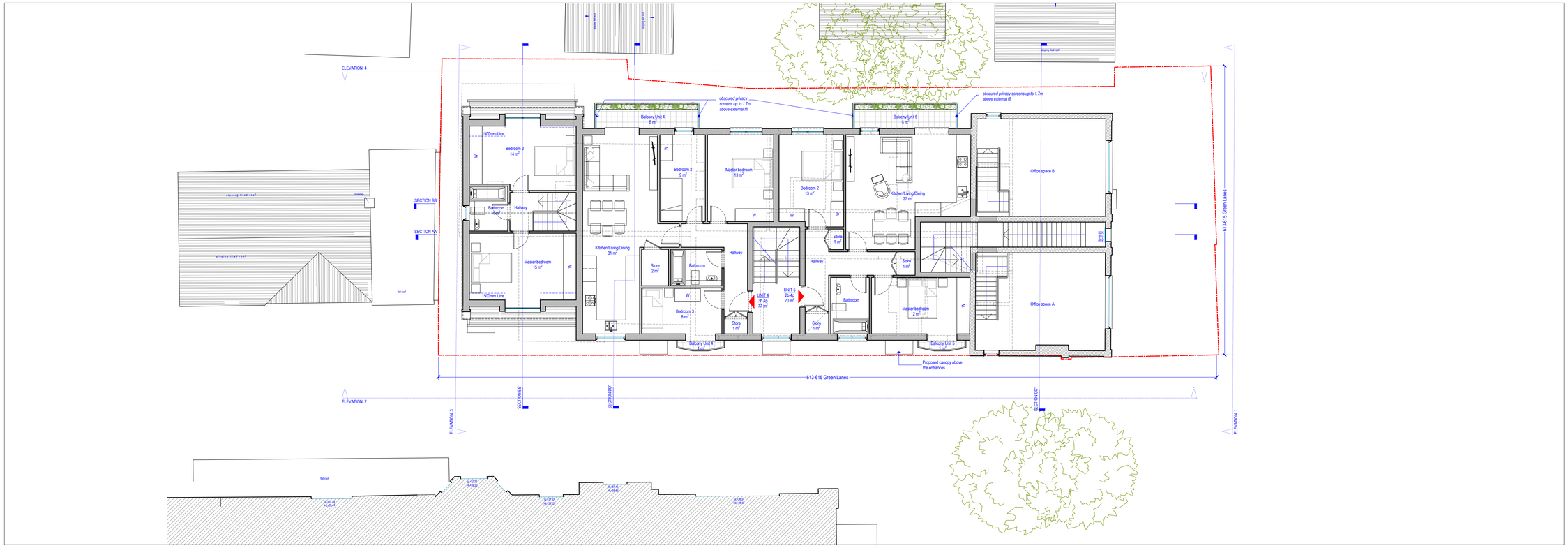
CLIENT: Mr. P. Joannou

DRAWN: SM
CHECKED: PK
ISSUED BY: PK
STATUS: PLA
SCALE AT A1: 1:100
REVISION: P2

PROJECT TITLE: 613-615 Green Lanes, Palmers Green, London N13 4EP

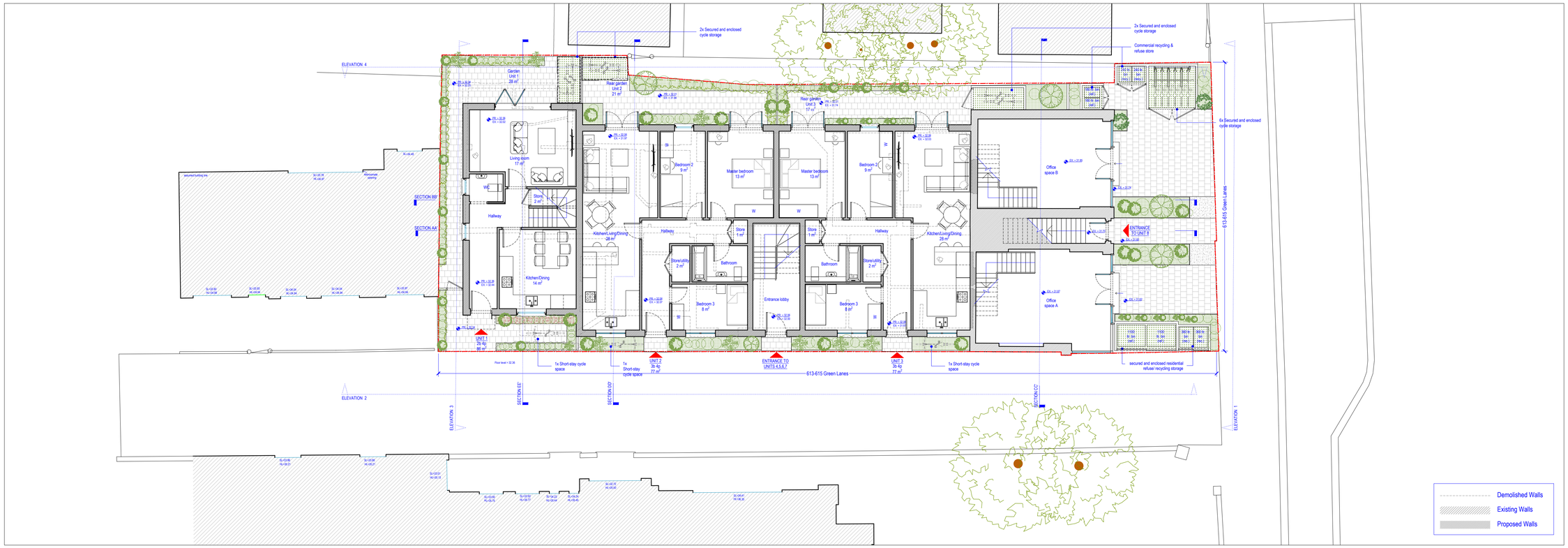
DRAWING TITLE: Proposed Topographical survey

JOB AND DRAWING NO: 1849-P01-00



[02] PROPOSED FIRST FLOOR PLAN

1:100 @ A1



[01] PROPOSED GROUND FLOOR PLAN

1:100 @ A1

NOTE:
DO NOT SCALE FROM DRAWINGS - EXCEPT FOR PLANNING PURPOSES.
ALL DISCREPANCIES TO BE REPORTED TO ARCHITECT IMMEDIATELY.
ALL DIMENSIONS TO BE VERIFIED BY CONTRACTOR ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORKS.

Scale 1:100 0 1 2.5 5 10m

N

P1	15/11/22	Pre planning application Issue
P2	xx/xx/23	Full Planning Application Issue

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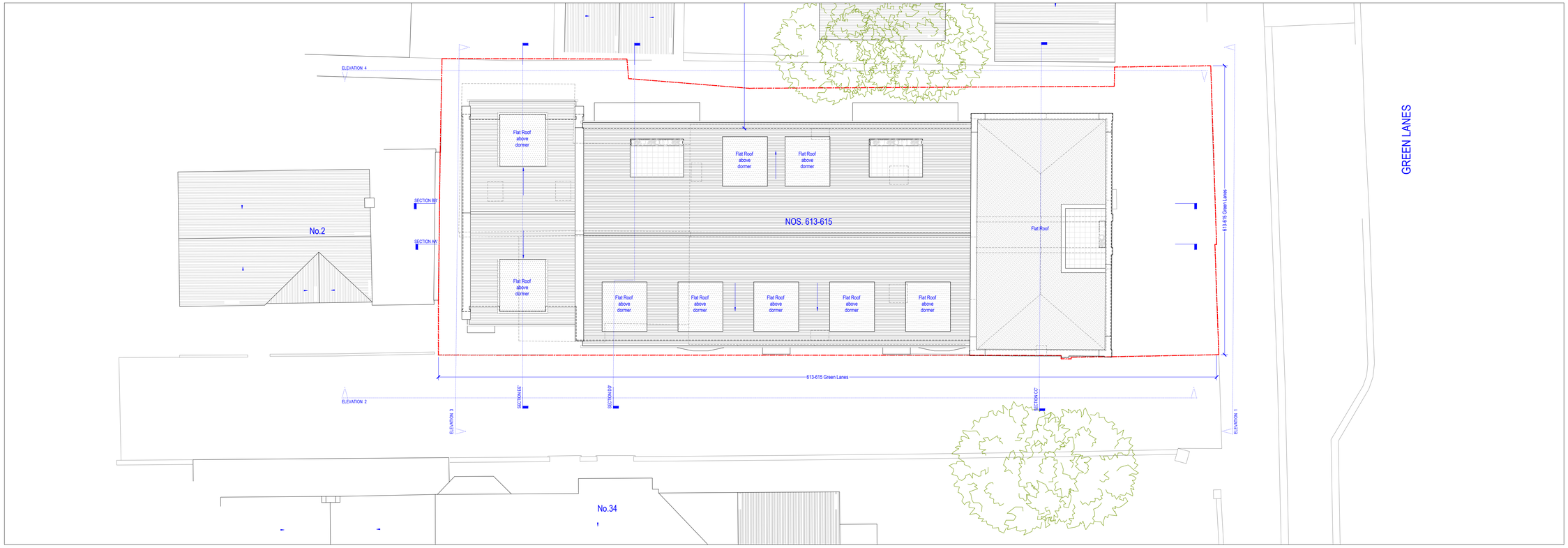
CLIENT: Mr. P. Joannou

DRAWN: SM
CHECKED: PK
ISSUED BY: PK
STATUS: PLA
SCALE AT A1: 1:100
REVISION: P2

PROJECT TITLE: 613-615 Green Lanes, Palmers Green, London N13 4EP

DRAWING TITLE: Proposed Ground and First Floor Plans

JOB AND DRAWING NO: 1849-P02-00



[02] PROPOSED ROOF PLAN

1:100 @ A1

[01] PROPOSED SECOND FLOOR PLAN

1:100 @ A1

Demolished Walls
Existing Walls
Proposed Walls

NOTE:
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Scale 1:100 0 1 2.5 5 10m

N

P1	15/11/22	Pre planning application Issue
P2	xx/xx/23	Full Planning Application Issue

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ISO-A1

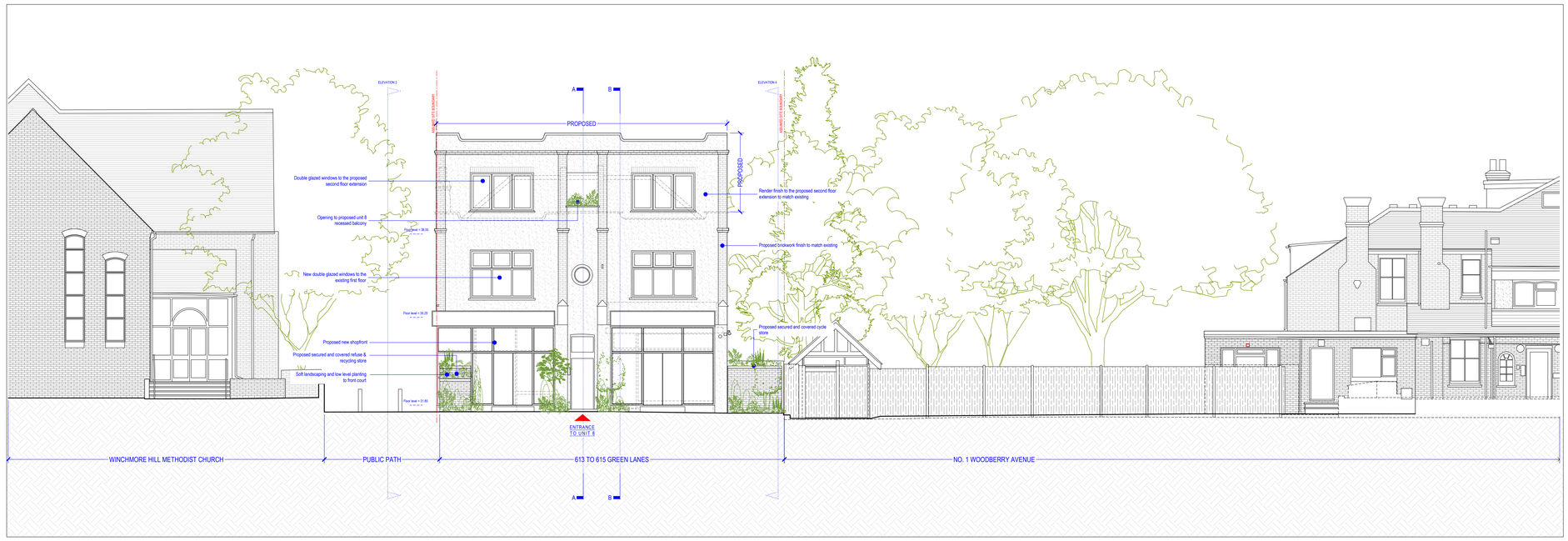
CLIENT: Mr. P. Joannou

DRAWN: SM
CHECKED: PK
ISSUED BY: PK
STATUS: PLA
SCALE AT A1: 1:100
REVISION: P2

PROJECT TITLE: 613-615 Green Lanes, Palmers Green, London N13 4EP

DRAWING TITLE: Proposed Second and Roof Plan

JOB AND DRAWING NO: 1849-P02-01



[01] PROPOSED FRONT ELEVATION (NO. 1)

1:100 @ A1

[02] PROPOSED SIDE ELEVATION (NO. 2)

1:100 @ A1

Demolished Walls

NOTE:
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Scale 1:100 0 1 2.5 5 10m

P1	15/11/22	Pre planning application Issue
P2	xx/xx/23	Full Planning Application Issue

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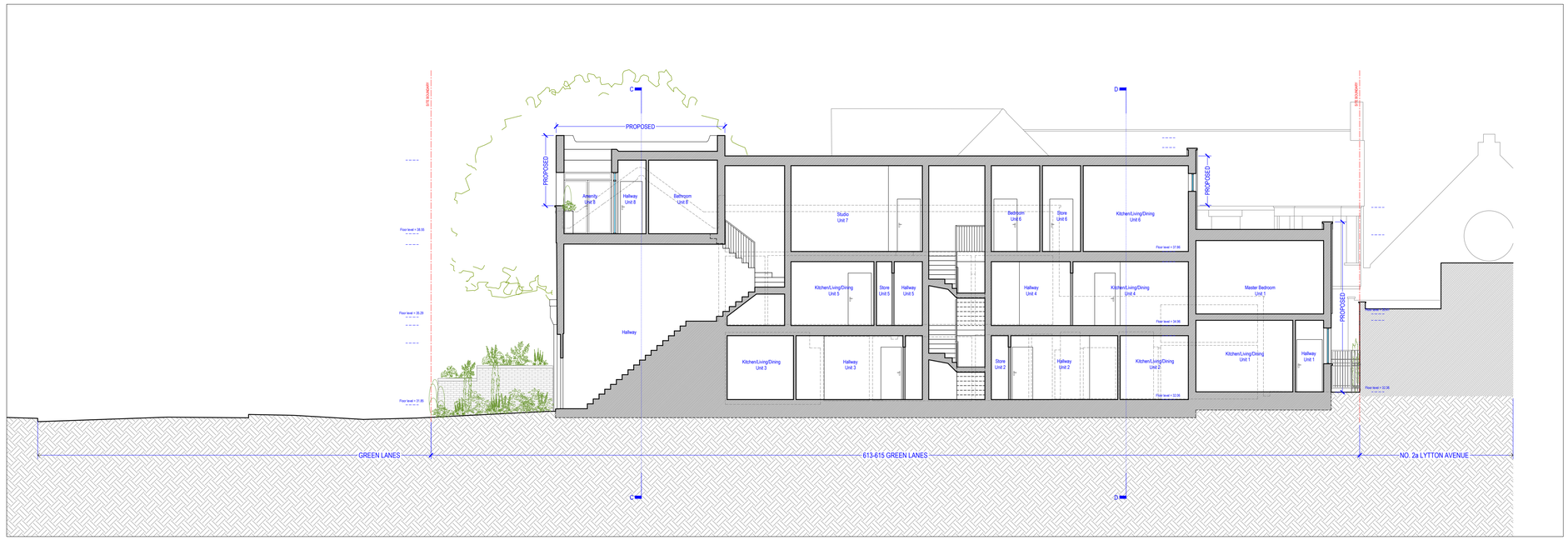
CLIENT: Mr. P. Joannou

DRAWN: SM
CHECKED: PK
ISSUED BY: PK
STATUS: PLA
SCALE AT A1: 1:100
REVISION: P2

PROJECT TITLE: 613-615 Green Lanes, Palmers Green, London N13 4EP

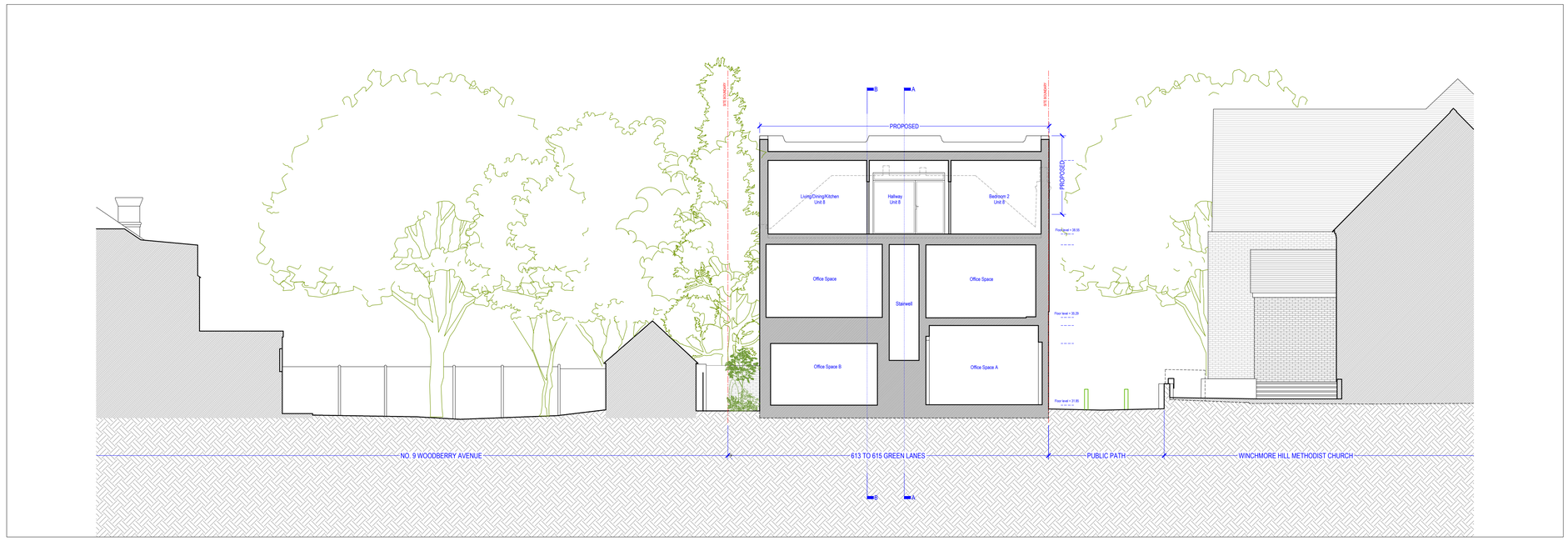
DRAWING TITLE: Proposed Front and Side Elevations (No. 1 & 2)

JOB AND DRAWING NO: 1849-P03-00



[01] PROPOSED SECTION A-A

1:100 @ A1



[02] PROPOSED SECTION C-C

1:100 @ A1

Demolished Walls

Existing Walls

Proposed Walls

NOTE:
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Scale 1:100 0 1 2.5 5 10m

P1	15/11/22	Pre planning application Issue
P2	xx/xx/23	Full Planning Application Issue

ISO-A1

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CLIENT: Mr. P. Joannou

DRAWN: SM
CHECKED: PK
ISSUED BY: PK

STATUS: PLA
SCALE AT A1: 1:100
REVISION: P2

PROJECT TITLE: 613-615 Green Lanes, Palmers Green, London N13 4EP

DRAWING TITLE: Proposed Sections A-A and C-C

JOB AND DRAWING NO: 1849-P04-00

[01] EXISTING BUILDING VISUAL 1

[02] PROPOSED BUILDING VISUAL 1

[03] EXISTING BUILDING VISUAL 2

[04] PROPOSED BUILDING VISUAL 2

NOTE:
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P1 15/11/22 Pre planning application Issue
P2 xx/xx/23 Full Planning Application Issue

ISO-A1

VIVENDI ARCHITECTS LTD
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CLIENT: Mr. P. Joannou

DRAWN: SM
CHECKED: SM
ISSUED BY: PK
STATUS: PLA
SCALE AT A1: N/A
REVISION: P2

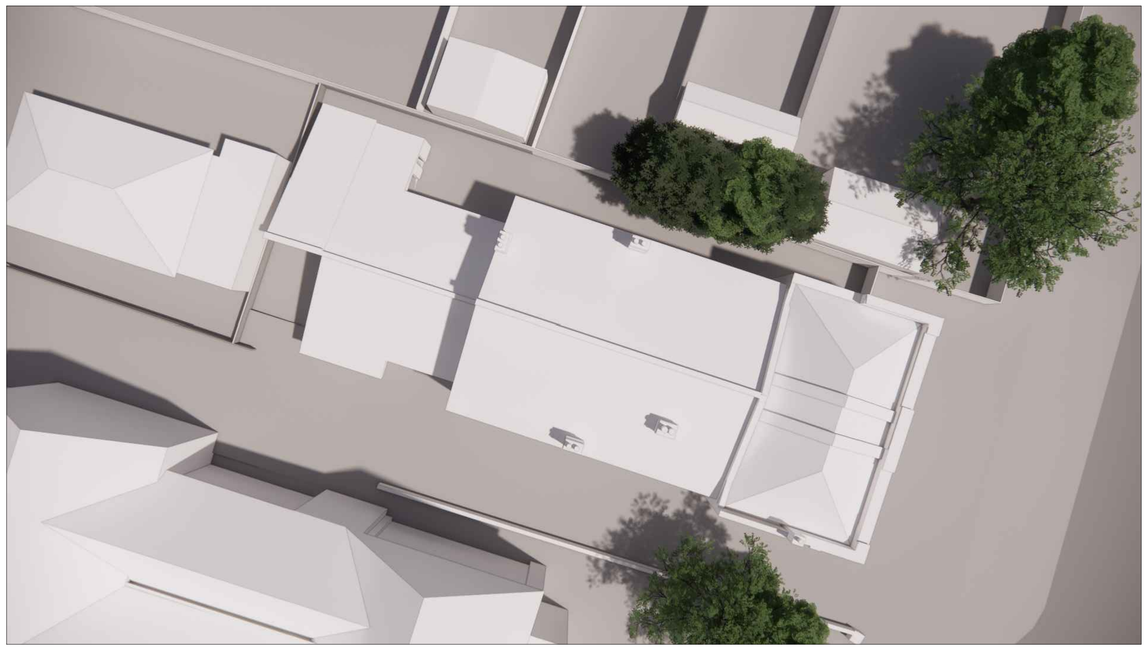
PROJECT TITLE: 613-615 Green Lanes, Palmers Green, London N13 4EP

DRAWING TITLE: Existing and Proposed 3D Visuals

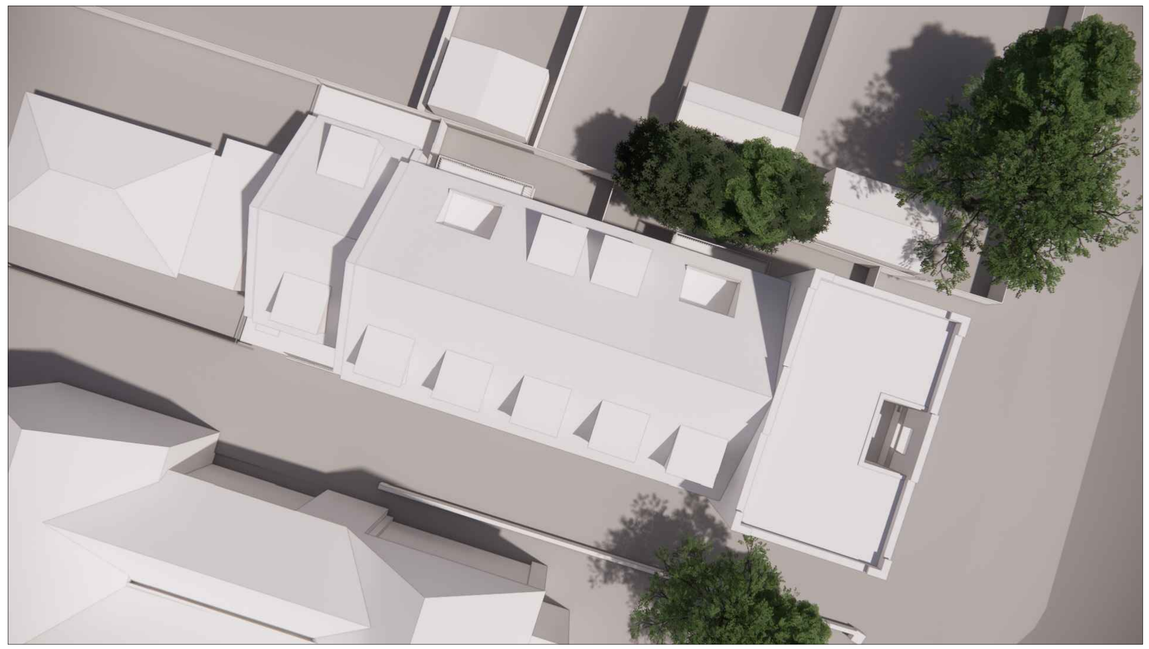
JOB AND DRAWING NO: 1849-VS-01

[01] EXISTING BUILDING VISUAL 3

[02] PROPOSED BUILDING VISUAL 3



[03] EXISTING BUILDING VISUAL 4



[04] PROPOSED BUILDING VISUAL 4

NOTE:
DO NOT SCALE FROM DRAWINGS - EXCEPT FOR PLANNING PURPOSES.
ALL DISCREPANCIES TO BE REPORTED TO ARCHITECT IMMEDIATELY.
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P1	15/11/22	Pre planning application Issue
P2	xx/xx/23	Full Planning Application Issue

ISO-A1

VIVENDI ARCHITECTS LTD
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CLIENT: Mr. P. Joannou

DRAWN: SM
CHECKED: PK
ISSUED BY: PK
STATUS: PLA
SCALE AT A1: N/A
REVISION: P2

PROJECT TITLE: 613-615 Green Lanes, Palmers Green, London N13 4EP

DRAWING TITLE: Existing and Proposed 3D Visuals

JOB AND DRAWING NO: 1849-VS-02

Appendix C - Greenfield Runoff (Total Site)

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.050	Urban	0.000
SAAR (mm)	652	Region Number	Region 6

Results l/s

QBAR Rural	0.2
QBAR Urban	0.2
Q100 years	0.6
Q1 year	0.2
Q30 years	0.5
Q100 years	0.6

Appendix D- British Geological Survey Borehole Records

INSIT EABLE

Ground Investigation and Piling Ltd.

BOREHOLE LOG

Borehole No. 1

Sheet 1 of 2

Ground Level ..... mA.O.D.

Date 10th and 11th July, 1991

Location 6 Etheridge Road, Bilston. 23737

Method of Boring Cable Percussion.

Client / Engineer Wolverhampton Metropolitan Borough Council.

Diameter of Borehole 150mm

Casing Depth 4.50m

DESCRIPTION OF STRATA	Legend	Depth b.g.l. (m)	Reduced Level (mA.O.D.)	Water Levels (m)	Samples / Tests Type	Depth (m)	(U100 blows) N / T.C.R.% (R.Q.D.%)
MADE GROUND - Recovered as light to dark grey sand to gravel sized fragments of very weak weathered mudstone in a silty clayey matrix.					B	0.00	
- - - becoming at 1.20m firm and in parts stiff to very stiff, light to dark grey very friable silty clay with many sand to gravel sized fragments of very weak weathered mudstone.					S/B	1.20	12
					S/B	2.30	14
- - - stiff from 3.25m and stiff to very stiff from 4.35m, in parts variably cohesive and granular with many mudstone fragments in a silty clay matrix [COLLIERY SPOIL].					S/B	3.25	16
					S/B	4.35	35
					S/B	5.90	25
		6.30		▼			
		6.90		▽	B	6.90	
Stiff red brown and occasionally light grey silty sandy CLAY with some fine to coarse gravel and in upper parts firm dark brown silty very sandy clay [GLACIAL TILL].		7.00			W	7.00	
					S	7.55	31
		8.00		▼	B	8.00	
					S/B	9.15	31

SAMPLES / TESTS

- U Undisturbed
- D Disturbed
- B Bulk
- W Water
- S/C S.P.T./C.P.T.
- ▽ Water strike
- ▼ Water level
- ✱ S.P.T. seating blows

OTHER INFORMATION (Groundwater, pits, hard strata, piezometers, etc.)

1. Hand dug pit to 1.20m to check for services 10/7/91 (see DRG. No. 2).
2. Seepage at 7.00m, casing 4.50m 11/7/91.
3. Standing water at 8.00m on completion after casing withdrawn 11/7391.
4. Water level at 6.30m, no casing 12/7/91.

GROUND INVESTIGATION AND PILING LTD. 153 DIBDALE ROAD DY1 2RN TEL. DUDLEY (0384) 455255

Ground Investigation and Piling Ltd.

BOREHOLE LOG

Borehole No. 1

Sheet 2 of 2

Ground Level ..... mA.O.D.

Date 10th and 11th July, 1991

Location Etheridge Road, Bilston.

Method of Boring Cable Percussion, 150mm

Client / Engineer Wolverhampton Metropolitan Borough Council.

Diameter of Borehole .....

Casing Depth 4.50m

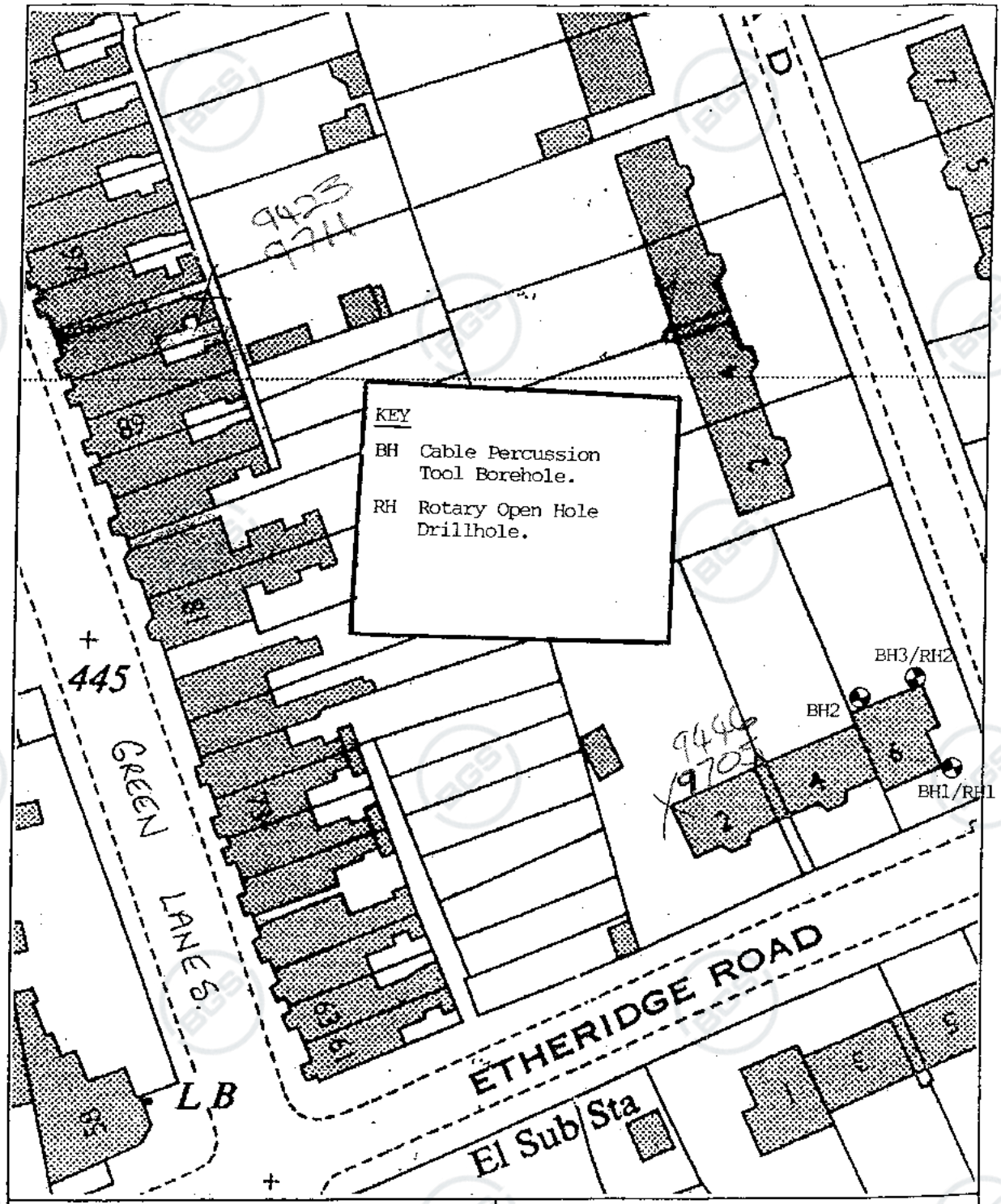
DESCRIPTION OF STRATA	Legend	Depth b.g.l. (m)	Reduced Level (mA.O.D.)	Water Levels (m)	Samples / Tests Type	Depth (m)	(U100 blows) N / T.C.R.% (R.Q.D.%)
As from 6.90m on sheet 1. [GLACIAL TILL].					S	10.55	38
		11.00					
Borehole complete.							

SAMPLES/ TESTS

- U Undisturbed
- D Disturbed
- B Bulk
- W Water
- S/C S.P.T./C.P.T.
- Water strike
- Water level
- S.P.T. seating blows

OTHER INFORMATION (Groundwater, pits, hard strata, piezometers, etc.)

GROUND INVESTIGATION AND PILING LTD. 153 DIBDALE ROAD DY1 2RN TEL. DUDLEY (0384) 455255



CLIENT/ENGINEER Wolverhampton Metropolitan Borough Council.	Ground Investigation and Piling Ltd. 153 Dibdale Road, Dudley DY1 2RN Telephone Dudley (0384) 455255

TITLE Ground Investigation at 6 Etheridge Road, Bilston.
Approximate Borehole Positions.

SO 99 NW

SCALE	DATE	CONTRACT	DRG. No.
N.T.S.	July, 1991	3320	1

Appendix E - Micro Drainage Type C Permeable Paving Calculations

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 375 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	0.431	0.431	0.0	0.4	0.4	10.5	O K
30 min Summer	0.552	0.552	0.0	0.5	0.5	13.4	O K
60 min Summer	0.658	0.658	0.0	0.5	0.5	16.0	O K
120 min Summer	0.735	0.735	0.0	0.5	0.5	17.9	O K
180 min Summer	0.754	0.754	0.0	0.5	0.5	18.3	O K
240 min Summer	0.751	0.751	0.0	0.5	0.5	18.3	O K
360 min Summer	0.725	0.725	0.0	0.5	0.5	17.6	O K
480 min Summer	0.700	0.700	0.0	0.5	0.5	17.0	O K
600 min Summer	0.675	0.675	0.0	0.5	0.5	16.4	O K
720 min Summer	0.651	0.651	0.0	0.5	0.5	15.8	O K
960 min Summer	0.606	0.606	0.0	0.5	0.5	14.7	O K
1440 min Summer	0.525	0.525	0.0	0.5	0.5	12.8	O K
2160 min Summer	0.422	0.422	0.0	0.4	0.4	10.2	O K
2880 min Summer	0.325	0.325	0.0	0.4	0.4	7.9	O K
4320 min Summer	0.162	0.162	0.0	0.4	0.4	3.9	O K
5760 min Summer	0.092	0.092	0.0	0.4	0.4	2.2	O K
7200 min Summer	0.063	0.063	0.0	0.4	0.4	1.5	O K
8640 min Summer	0.052	0.052	0.0	0.3	0.3	1.3	O K
10080 min Summer	0.044	0.044	0.0	0.3	0.3	1.1	O K
15 min Winter	0.486	0.486	0.0	0.4	0.4	11.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	143.954	0.0	10.9	26
30 min Summer	92.629	0.0	14.1	40
60 min Summer	56.713	0.0	17.4	68
120 min Summer	33.583	0.0	20.7	126
180 min Summer	24.424	0.0	22.6	182
240 min Summer	19.389	0.0	24.0	240
360 min Summer	13.924	0.0	25.8	302
480 min Summer	11.018	0.0	27.3	364
600 min Summer	9.182	0.0	28.4	430
720 min Summer	7.908	0.0	29.4	500
960 min Summer	6.245	0.0	30.9	638
1440 min Summer	4.471	0.0	33.1	914
2160 min Summer	3.197	0.0	35.5	1320
2880 min Summer	2.518	0.0	37.2	1728
4320 min Summer	1.796	0.0	39.6	2344
5760 min Summer	1.413	0.0	41.3	3008
7200 min Summer	1.172	0.0	42.7	3680
8640 min Summer	1.006	0.0	43.8	4408
10080 min Summer	0.884	0.0	44.6	5136
15 min Winter	143.954	0.0	12.3	26

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	0.623	0.623	0.0	0.5	0.5	15.1	O K
60 min Winter	0.745	0.745	0.0	0.5	0.5	18.1	O K
120 min Winter	0.837	0.837	0.0	0.6	0.6	20.3	O K
180 min Winter	0.865	0.865	0.0	0.6	0.6	21.0	O K
240 min Winter	0.867	0.867	0.0	0.6	0.6	21.1	O K
360 min Winter	0.840	0.840	0.0	0.6	0.6	20.4	O K
480 min Winter	0.809	0.809	0.0	0.5	0.5	19.6	O K
600 min Winter	0.778	0.778	0.0	0.5	0.5	18.9	O K
720 min Winter	0.746	0.746	0.0	0.5	0.5	18.1	O K
960 min Winter	0.683	0.683	0.0	0.5	0.5	16.6	O K
1440 min Winter	0.566	0.566	0.0	0.5	0.5	13.8	O K
2160 min Winter	0.415	0.415	0.0	0.4	0.4	10.1	O K
2880 min Winter	0.248	0.248	0.0	0.4	0.4	6.0	O K
4320 min Winter	0.087	0.087	0.0	0.4	0.4	2.1	O K
5760 min Winter	0.053	0.053	0.0	0.3	0.3	1.3	O K
7200 min Winter	0.042	0.042	0.0	0.3	0.3	1.0	O K
8640 min Winter	0.036	0.036	0.0	0.2	0.2	0.9	O K
10080 min Winter	0.032	0.032	0.0	0.2	0.2	0.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	92.629	0.0	15.9	40
60 min Winter	56.713	0.0	19.6	68
120 min Winter	33.583	0.0	23.3	124
180 min Winter	24.424	0.0	25.4	180
240 min Winter	19.389	0.0	26.9	236
360 min Winter	13.924	0.0	29.0	340
480 min Winter	11.018	0.0	30.6	384
600 min Winter	9.182	0.0	31.9	460
720 min Winter	7.908	0.0	32.9	536
960 min Winter	6.245	0.0	34.7	690
1440 min Winter	4.471	0.0	37.2	984
2160 min Winter	3.197	0.0	39.8	1412
2880 min Winter	2.518	0.0	41.7	1764
4320 min Winter	1.796	0.0	44.5	2340
5760 min Winter	1.413	0.0	46.5	2944
7200 min Winter	1.172	0.0	48.0	3680
8640 min Winter	1.006	0.0	49.2	4392
10080 min Winter	0.884	0.0	50.3	5120

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.450	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.042

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.014	4	8	0.014	8	12	0.014

Model Details

Storage is Online Cover Level (m) 1.500

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	9.0
Membrane Percolation (mm/hr)	1000	Length (m)	9.0
Max Percolation (l/s)	22.5	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	0.000	Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0036-6000-1000-6000
Design Head (m)	1.000
Design Flow (l/s)	0.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	36
Invert Level (m)	0.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	0.6
Flush-Flo™	0.156	0.4
Kick-Flo®	0.317	0.4
Mean Flow over Head Range	-	0.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.4	1.200	0.6	3.000	1.0	7.000	1.4
0.200	0.4	1.400	0.7	3.500	1.0	7.500	1.5
0.300	0.4	1.600	0.7	4.000	1.1	8.000	1.5
0.400	0.4	1.800	0.8	4.500	1.2	8.500	1.6
0.500	0.4	2.000	0.8	5.000	1.2	9.000	1.6
0.600	0.5	2.200	0.9	5.500	1.3	9.500	1.7
0.800	0.5	2.400	0.9	6.000	1.3		
1.000	0.6	2.600	0.9	6.500	1.4		