Sustainable Drainage Strategy

at

Frognal Garages, Frognal Lane, Hampstead, London NW3 7DX

for

Pollyshire Ltd

Reference: 21428/SDS_Rev1.1

May 2024

Control Document

Project
Frognal Garages, Frognal Lane, Hampstead, London NW3 7DX

Document Type
Sustainable Drainage Strategy

Document Reference
21428/SDS_Rev1.1

Status
Final

Date
May 2024

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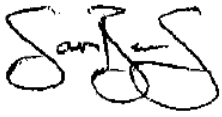

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This is not a valid document for use in the design of the project unless it is titled Final in the document status box.

Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Commission

This report comprises a Sustainable Drainage Strategy (SDS) at Frognal Garages, Frognal Lane, Hampstead, London NW3 7DX.

Commission Record	
Client:	Pollyshire Ltd
Site Name:	Frognal Garages, Frognal Lane, Hampstead, London NW3 7DX
Grid Reference:	525730, 185360
Soils Limited Quotation Ref:	Q28810 dated 17th April 2024
Clients Signed Order Form:	Q28810 dated 17th April 2024

The record of revision to this document is presented below:

Record Of Revisions		
Revision	Date	Reason
1.0	May 2024	Original to Client
1.1	May 2024	Updated with Client comments.

Note(s): The latest revised document supersedes all previous revisions of the SDS produced by Soils Limited.

Documents associated with this development that must be referred to are given below.

Record Of Associated Documents			
Reference	Type	Date	Creator
21109/BIA	Basement Impact Assessment	November 2023	Soils Limited
21334/PIR	Preliminary Investigation Report	March 2024	Soils Limited
21428/FRA_Rev1.1	Flood Risk Assessment	May 2024	Soils Limited

Caveats, Limitations and Disclaimers

Whilst reasonable skill and care has been taken to prepare this report within the time and other constraints applied by the project, it should be appreciated that uncertainties may occur owing to factors including return period of events, seasonal fluctuations in groundwater level and inherent uncertainty of the effect of climate change.

Without a drainage survey it is not possible to establish if the surface water drainage is to the main drainage system or soakaways. If there are soakaways on-site, they could act as a potential source. The geology on-site to an extent may determine if soakaways were likely to have been adopted.

This Report relates to the site located at Frognal Garages, Frognal Lane, Hampstead, London NW3 7DX and was prepared for the sole benefit of Pollyshire Ltd (The "Client") for the brief described in the Commission of this report.

The contents, recommendations and advice given in the report are subject to the Terms and Conditions given in Quotation Q28180 Rev.2 dated 13th October 2023 and accepted by the Client.

Soils Limited disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above.

This report has been prepared by Soils Limited, with all reasonable skill, care and diligence within the terms of the contract with the Client, incorporation of our General Conditions of Contract of Business and considering the resources devoted to us by agreement with the Client.

The report is personal and confidential to the Client and Soils Limited accept no responsibility of whatever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report wholly at its own risk.

The Client may not assign the benefit of the report or any part to any third party without the written consent of Soils Limited.

This report does not purport to provide definitive legal advice, nor can it be used to demonstrate that the site will never be subject to flood events in the future.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid considering changes in regulation and practice, or additional information obtained regarding the site.

Ordinary watercourses (OWs) are defined as rivers (which are not designated as main rivers), streams, ditches, drains, culverts, cuts and sewers (other than public sewers). This includes all OWs that are not mapped. Ordinary watercourse consent (OWC) is required from the Lead Local Flood Authority (LLFA) when changing/adapting/adding to the cross sections of OWs. Installations of any structure or obstruction into an OW that

impedes the flow without consent is prohibited by the Land Drainage Act 1991 Section 23.

Failure to remove obstructions may result in legal action by the LLFA with powers under Section 25 of the Land Drainage Act 1991.
Soils Limited suggest surveying the site for OW usually seen in rural areas as boundary ditches to avoid potential impacts to residents downstream and prosecution. OWC can be applied for from the LLFA.

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Section 1 General

1.1 Scope

This Sustainable Drainage Strategy (SDS) outlines the fundamental drainage principles and requirements in relation to the proposed development at Frognal Garages, Frognal Lane, Hampstead, London NW3 7DX.

The report provides an overview of the sustainable drainage strategy design for the proposed development based on site conditions and SuDS guidance: Building Regulations Approved Document Part H and CIRIA C753: The SUDS Manual 2015.

The Sustainable Drainage Strategy is a live document to be updated as additional information becomes available and the evolving detailed design progresses.

Section 2 Introduction and Site Setting

2.1 Introduction

Pollyshire Ltd commissioned Soils Limited in April 2024 to undertake an SDS for the proposed development at Frognal Garages, Frognal Lane, Hampstead, London NW3 7DX, referred to as 'the site' in this report.

This report has been prepared for Pollyshire Ltd and must not be relied upon by any other party without the explicit written permission of Soils Limited.

2.2 Site Details

A site walkover was undertaken in February 2024 by Soils Limited. The site was used as lockup garages for car parking and storage. The site's topography featured terraced sections, out of the existing slope, gently sloping downward at an average angle of 2.5° towards the southwest. While the terraced areas offered structured contours, the southwestern portion remains unterraced, gradually declining towards the southwest.

At the front, the site was covered with deteriorating tarmacadam and concrete, while the rear southwestern area includes soft landscaping. Additionally, clusters of shrubs adorn the rear of the garages, enhancing the greenery of the surroundings.

The site was located at or around TQ 22309 69640.

The total area of the site was 362m^2, with the existing building and hardstanding covering an area of 270m^2.

An aerial photograph of the site and its close environs has been included in Figure 2.

2.3 Proposed Development

The proposal comprised the demolition of the existing garages and the construction of a part two, part three-storey semi-detached residential property with basement and above-ground garages. The basement was proposed under the whole building and front garden/driveway footprint and was to extend to a depth of c.3.50m below ground level (plus slab). The total proposed area covered by the building footprint is 251m^2 and paved area was ~100m^2, with the remaining area comprising garden and planted areas.

In compiling this report reliance was placed on pre-application drawings are given below.

Record Of Associated Documents			
Reference	Type	Date	Creator
FGG-TOD-20-01-DR-A-20003 P02	Drawings	15th March 2024	TODD Architects
FGG-TOD-20-02-DR-A-20004 P02	Drawings	15th March 2024	TODD Architects
GG-TOD-20-LG-DR-A-20001 P02	Drawings	15th March 2024	TODD Architects
FGG-TOD-20-UG-DR-A-20002 P02	Drawings	15th March 2024	TODD Architects
FGG-TOD-30-ZZ-DR-A-30001 P02	Drawings	15th March 2024	TODD Architects
FGG-TOD-30-ZZ-DR-A-30002 P02	Drawings	15th March 2024	TODD Architects
FGG-TOD-30-ZZ-DR-A-30003 P02	Drawings	15th March 2024	TODD Architects
FGG-TOD-40-ZZ-DR-A-40001 P02	Drawings	15th March 2024	TODD Architects
FGG-TOD-40-ZZ-DR-A-40002 P02	Drawings	15th March 2024	TODD Architects

The recommendations provided within this report are made exclusively in relation to the scheme outlined above and must not be applied to any other scheme without further consultation with Soils Limited. Soils Limited must be notified about any change or deviation from the scheme outlined.

2.4 Anticipated Geology

The 1:50,000 BGS Geology map showed the site to be situated on the London Clay Formation bedrock with no overlying superficial deposits recorded.

2.4.1 Bedrock – London Clay

The London Clay Formation comprises stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay, and precautions against sulphate attack to concrete are sometimes required.

The upper boundary member of the London Clay Formation is known as the Claygate Member and marks the transition between the deep water, predominantly clay environment and succeeding shallow-water, sand environment of the Bagshot Formation.

The lower boundary is generally marked by a thin bed of well-rounded flint gravel and/or a glauconitic horizon. The formation overlies the Harwich Formation or where the Harwich Formation is absent the Lambeth Group.

In the north London area, the upper part of the London Clay Formation has been disturbed by periglacial action and may contain pockets of sand and gravel.

2.5 Hydrogeology

Information presented by the Environment Agency classifies the bedrock London Clay Formation as an Unproductive Strata. It is anticipated that groundwater is unlikely to be present in significant quantities in the underlying London Clay Formation, although may be present within granular lenses or horizons.

Any water infiltrating the cohesive London Clay Formation will generally tend to flow either with the topography or vertically downwards at a very slow rate towards the Intermediate and subsequently Lower Aquifer. Data for the London Clay Formation indicates horizontal permeability of between 10^{-7} m/s close to the surface decreasing to 10^{-11} m/s at depth.

Groundwater was anticipated to be flowing in a southwest direction in line with the topography of the immediate surrounding land.

The Arup's CGHHS maps, which refer to a compilation of ArcGIS StoryMaps created by Arup, confirmed the site to be set on Unproductive Strata and outside of any Source Protection Zones.

2.6 Hydrology

The nearest surface water feature was the Whitestone Pond, located at >1000m to north-east at an elevation of ~134m AOD.

Based on the Arup's CGHHS maps the site was outside the catchment of the pond chains on Hampstead Heath.

The site lies within the extent of the lost rivers of London mapping (Lost Rivers of London, N Barton). According to the map extract in the Arup's CGHHS the area of Frognal Lane was not affected by the presence of lost rivers, with branches of the Kilburn anticipated at >100m to both the north-west and southeast and at a lower elevation.

2.7 Previous Investigation

A site investigation undertaken at the site by Soils Limited (Report ref: 21109/BIA, dated November 2023) recorded Made Ground (1.30m) overlying the cohesive bedrock of the London Clay Formation, which persisted beyond the base of the investigatory holes (8.00m bgl). The London Clay Formation comprised very low permeable cohesive soils.

Groundwater was not encountered during the drilling of the boreholes but was observed at a minimum depth of 1.50m bgl during the monitoring visit undertaken.

Given the above, the use of infiltration for surface water discharge on site was unviable.

2.8 Flood Risk

A separate Flood Risk Assessment (Report ref: 21428_FRA_Rev1.1, dated April 2024) has been undertaken for the site. This demonstrated that there is a very low risk from Fluvial, Pluvial and groundwater flooding over time. As such, the potential for off-site impact is also considered very low, subject to suitable design and drainage strategy.

Section 3 Existing Drainage

3.1 Existing Surface Water Drainage

Asset Location Plans obtained from Thames Water show the nearest surface water sewer runs beneath Frognal Lane to the front of the property and is recorded as 125mm size. There is a connection joining this sewer just outside the southwest site boundary under the pedestrian entrance to the adjacent property. It is unclear whether the site drainage is directly connected to this pipe.

A drainage survey was not supplied by the Client at the time of preparing this report, so it is unknown whether a surface water connection is available on site related to the existing garages. Given the impermeable nature of the site surfacing and underlying ground conditions, it is anticipated that run-off currently drains to the existing surface water sewer network. It is unknown if this is directly from site or via the adjacent highway drainage system.

The Asset Location Plans are included in Appendix B.

3.2 Existing Foul Drainage

Asset Location Plans obtained from Thames Water show the nearest combined sewer runs beneath Frognal Lane to the front of the property, flowing in line with topography to the southwest. There is a connection from the neighbouring block of residential properties to the southwest. As would be expected given the current use of the site there is no direct connection to the combined sewer evident.

The Asset Location Plans are included in Appendix B.

3.3 Existing Surface Water Discharge Rates

The site is currently occupied by eight domestic garages and car parking areas covered by concrete hardstanding, so it is anticipated that any existing surface water input runs off into the existing surface water sewer network, although it is unclear whether this is on site or via the adjacent highway.

Table 3.1 Existing Pre-development Discharge Rates

Site Area	Existing Q (free discharge)
0.04Ha	0.5 l/s

Further calculations are included in Appendix C.

Section 4 Proposed Surface Water Drainage

4.1 General

The overarching principle of SuDS design is that surface water runoff should be managed for maximum benefit.

The SuDS Manual 2015 (CIRIA C753) and Building Regulations Approved Document Part H dictate that Sustainable Drainage System (SuDS) should be applied to all components of surface water management design and construction.

The SuDS hierarchy for the disposal of surface water to a receptor is set out as follows:

1. Via infiltration where ground conditions are suitable
2. Discharge to surface watercourse
3. Discharge to surface water sewers, highway drain or other drainage system
4. Discharge to combined sewer

It has been established by previous investigation that the shallow underlying soils on site are generally impermeable and not suitable for the use of soakaways or other forms of direct infiltration to ground. As such, disposal of surface water will need to be into the surface water sewer.

The Thames Water Asset Location plans show a connection is available to the southwest boundary of the site, although it is unclear if this already exists. A capacity check and points of discharge application should be made.

The surface water sewers are likely to be limited in capacity, so the SuDS systems on site must be designed accordingly, and to accommodate up to and including the 1:100-year event + 40% for Climate Change.

All SuDS features have been designed in accordance with the CIRA SuDS Manual.

4.2 Proposed Discharge Rates

The proposed discharge rates cannot realistically be limited to greenfield discharge rates but can be kept as low as reasonably practicable within a SuDS scheme.

The surface water generated from the development site is proposed to be discharged to at a rate of 2 l/s/ha rate on the impermeable area in the development. Given this area is approximately 250m^2 (0.025Ha), the Low Q_{bar} is 0.05 l/s.

For the purposes of this strategy, the discharge rate will be set at 2 l/s, as low as reasonably practicable.

It is noted that the estimated area of hardstanding is currently 270m^2, out of a total site area of 362m^2, so the proposal offers a net reduction in hard cover. As such, the volume of run-off directly from impermeable surfacing will be reduced as part of the development

and the use of SuDS will provide a betterment of existing surface water management, which in turn will reduce flood risk on the site.

4.3 Proposed SuDS Features

It is noted that the site has significant constraints with the proposed basement covering the footprint of the site. It is also noted that the current site is almost entirely hard cover, with minimal soft landscaping to the rear. As such, the adoption of any SuDS features will provide a net improvement over the existing conditions.

The proposed SuDS features will include lined permeable paving across the parking areas to the front of the properties and raised rainwater planters adjacent and within basement garden areas. Water butts will also be utilised to collect and store runoff from roof areas for re-use.

4.3.1 Rainwater Butts

Rainwater butts will collect and store run-off from roof areas, which can then be used in gardens and for maintenance and cleaning purposes.

4.3.2 Raised Rainwater Planters

The raised rainwater planters will include built-in storage and will be located to fit the proposed landscaping and service the proposed roofs. As well as providing effective interception for inflows from roof areas the planters will provide amenity and biodiversity benefit to the proposal.

The raised rainwater planters will account for the first 5mm rainfall over the roof areas and provide additional storage prior to discharge via surface water sewer.

4.3.3 Permeable Paving

Permeable paving is proposed over the driveway and parking areas to the front of the properties. The porous surfacing will allow water to soak into the underlying lined granular layer for storage prior to discharge via surface water sewer. The permeable paving will account for the first 5mm rainfall over the parking areas.

4.3.4 Sump and Pump

The garden areas to the basement flats comprise permeable paving, which will incorporate some storage and attenuation of surface water within the underlying granular layer. The area will be designed to drain toward the southwestern end where a sump will be installed to collect any excess runoff. A pump and pipework (100Ø) will then convey this water to the granular layer of the permeable paving at ground level and onwards through the SuDS management train.

4.4 Proposed SuDS Volume

The SuDS systems on site must be designed to accommodate up to and including the 1:100-year event + 40% for Climate Change.

The attenuation volumes have been calculated using the Surface water storage estimation tool available on www.uksuds.com, using the IH 124 method. Calculations are included in Appendix D.

Table 4.1 Proposed Storage Volume of SuDS Features

Proposed Rate (l/s)	Proposed SuDS Feature	Storage Volume (m^3)
2	Permeable paving	8
	Raised Rainwater Planters	

A proposed drainage layout drawing is provided as Figure 3. It must be noted that a drainage survey of the site was not provided so full details of existing drainage infrastructure were not known. The site was terraced with the wider area dipping down moderately to the southwest.

4.5 Pollution Control

The Environment Agency sets out guidelines for managing pollution issues in their pollution prevention guidelines (PPG). PPG3 states:

"*Techniques that control pollution close to the source, such as permeable surfaces or infiltration trenches, can offer a suitable means of treatment for run off from low risks areas such as roofs, car parks and non-operational areas.*"

Given the proposal, the permeable paving proposed will also treat pollutants in roadway and parking areas, and a separator will not be required. The raised rainwater planters will also provide suitable treatment for run-off from roof areas, which are considered low risk.

Section 5 Proposed Foul Drainage

5.1 General

A drainage survey was not provided by the Client. An asset location enquiry from Thames Water recorded the nearest combined sewer runs beneath Frognal Lane to the front of the property, flowing in line with topography to the southwest. There is a connection from the neighbouring block of residential properties to the southwest. As would be expected given the current use of the site there is no direct connection to the combined sewer evident.

An enquiry for drainage connection must be made to the local service provider including confirmation of adequate capacity.

Section 6 Conclusions and Residual Risk

6.1 General

This report has prepared in accordance with CIRIA C753: The SUDS Manual 2015 and Building Regulations Approved Document Part H. It has reviewed site conditions and considered the use of sustainable drainage techniques as part of the proposed redevelopment on site.

6.2 Key Findings

The proposed SuDS features will provide storage and attenuation of surface water flows over the site footprint prior to discharge to the surface water sewer.

The discharge rate will be set at 2 l/s, as low as reasonably practicable. A capacity check and points of discharge application should be made.

The foul drainage will discharge to the nearest combined sewer on Frognal Lane, subject to agreement with the local service provider including confirmation of adequate capacity.

6.3 Residual Risk

Given the proposal provides a net reduction in impermeable surface area compared to the existing site layout, it will provide a betterment of current conditions.

The addition of source control SuDS and storage features will provide a further net improvement to drainage conditions, contributing to a reduction in flood risk on and around the site.

Section 7 SuDS Maintenance Planning

7.1 General

Appropriate maintenance of SuDS features is crucial to their functionality and ongoing impact on surface water management.

All drainage systems should be subject to a schedule of regular inspection with additional checks required following any significant storm events to maintain optimum efficiency.

Inspections and maintenance works must be undertaken by suitably competent persons with correct equipment and following appropriate safety procedures.

7.1.1 Rainwater Butts

Bi-annual inspection and cleaning of collection systems, filters and outlets will be required. Additional inspection during autumn months and following storm events may be necessary.

7.1.2 Raised Rainwater Planters

Maintenance will comprise litter removal, cleaning of inlets and outlets and management of vegetation. This should be undertaken every three months, increasing to six months depending on levels of sediments and debris encountered.

7.1.3 Permeable Pavements

Permeable paving is to be used within driveway and parking bays as well as garden areas to the rear. These areas should be inspected every six months with jet washing at two yearly intervals to remove fine debris to maintain permeability of the surface. More frequent inspection may be required in areas adjacent to soft landscaping.

7.1.4 Pumping Station

The pumping station will require 6-monthly service and maintenance to ensure continued optimum performance, or in line with manufacturers guidelines. It should be undertaken by the pump manufacturer or similar specialist throughout the operational lifetime of the pumping station. An emergency call-out service must be provided and undertaken promptly, as required. If available, a telemetry system with integrated monitoring of the pump station should be adopted to provide automated response in case of emergency.

7.1.5 Catch Pits

Initially, these should be inspected at regular intervals (every three months) with all debris removed. Depending how much debris is accumulating, this can be reduced to every six months and following storm events. Debris and sediment could impact the wider drainage system if allowed to accumulate, so chambers must be kept clean and clear, which should be possible from surface.

7.1.6 Rainwater Downpipes, Gutters, Gullies and Channel Drains

These items must be kept clear of leaves and debris and inspected every three months and following storm events: in autumnal months greater frequency may be required. If necessary, jet washing should be used to unblock these features.

7.2 Health and Safety

Inspections and maintenance works must be undertaken by suitably competent persons with correct equipment and following appropriate safety procedures and management of hazards, which may include:

- Confined space working, as many drainage assets are below ground.
- Blocked manholes and catchpits
- Moving vehicles and other site users in locale of drainage asset access points

List of Figures

List of Appendices

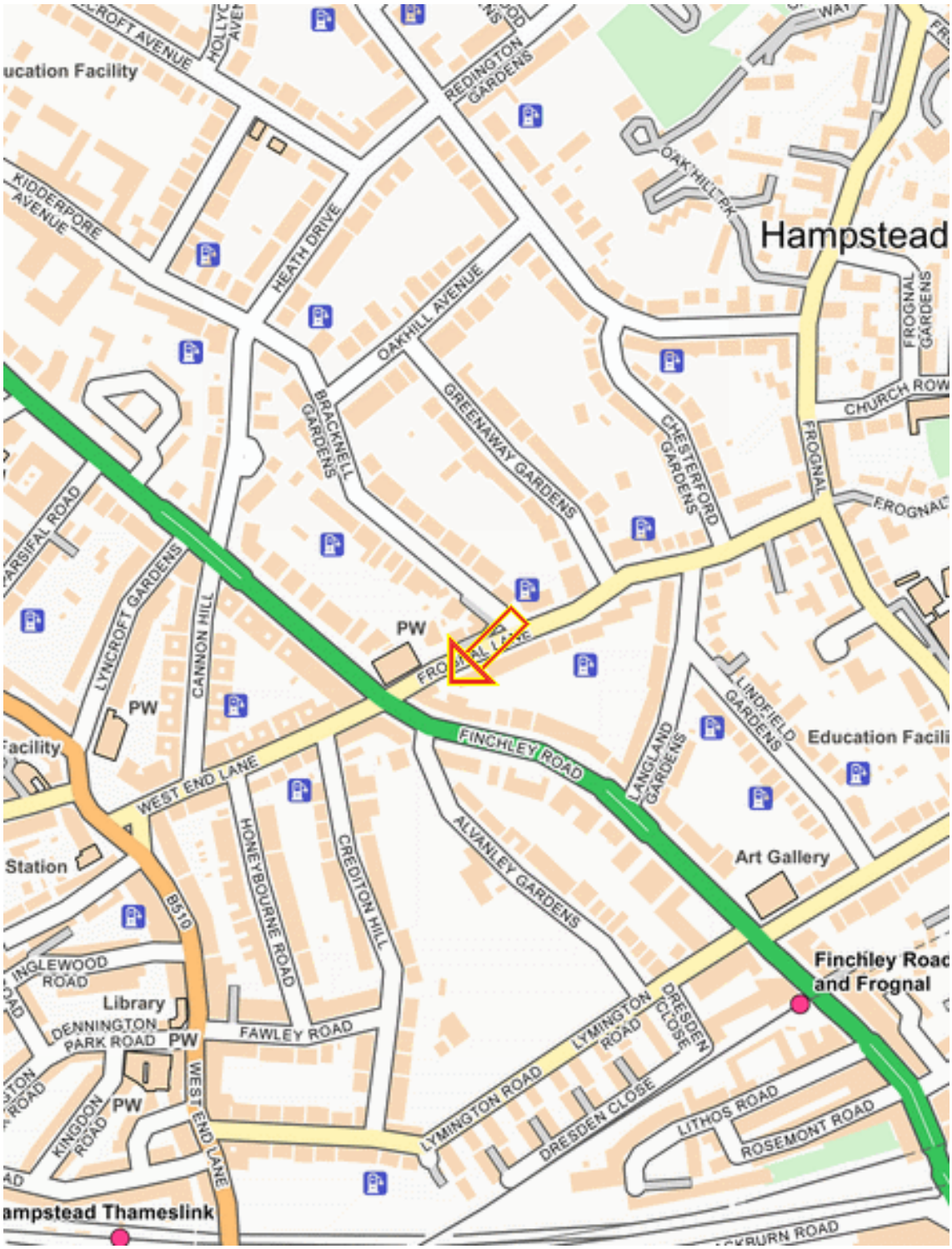


Figure 1 – Site Location Map

Job Number 21428	**Project** Frognal Garages, Frognal Lane, Hampstead, London NW3 7DX
Client Pollyshire Ltd	**Date** May 2024

Figure 2 – Aerial Photograph

Project
Frognal Garages, Frognal Lane, Hampstead, London NW3 7DX

Client
Pollyshire Ltd

Date
May 2024

Job Number
21428

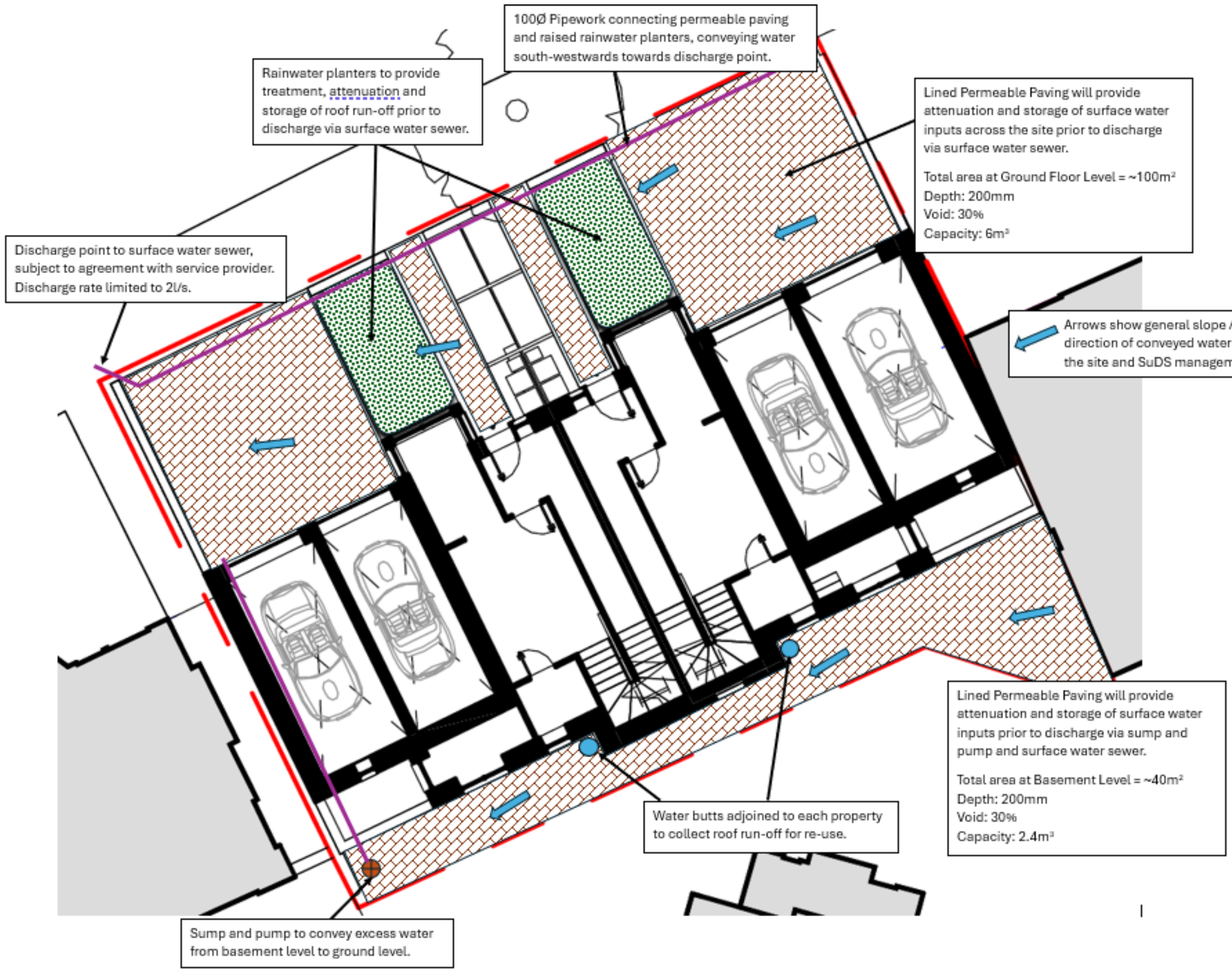


Figure 3 – Drainage Plan

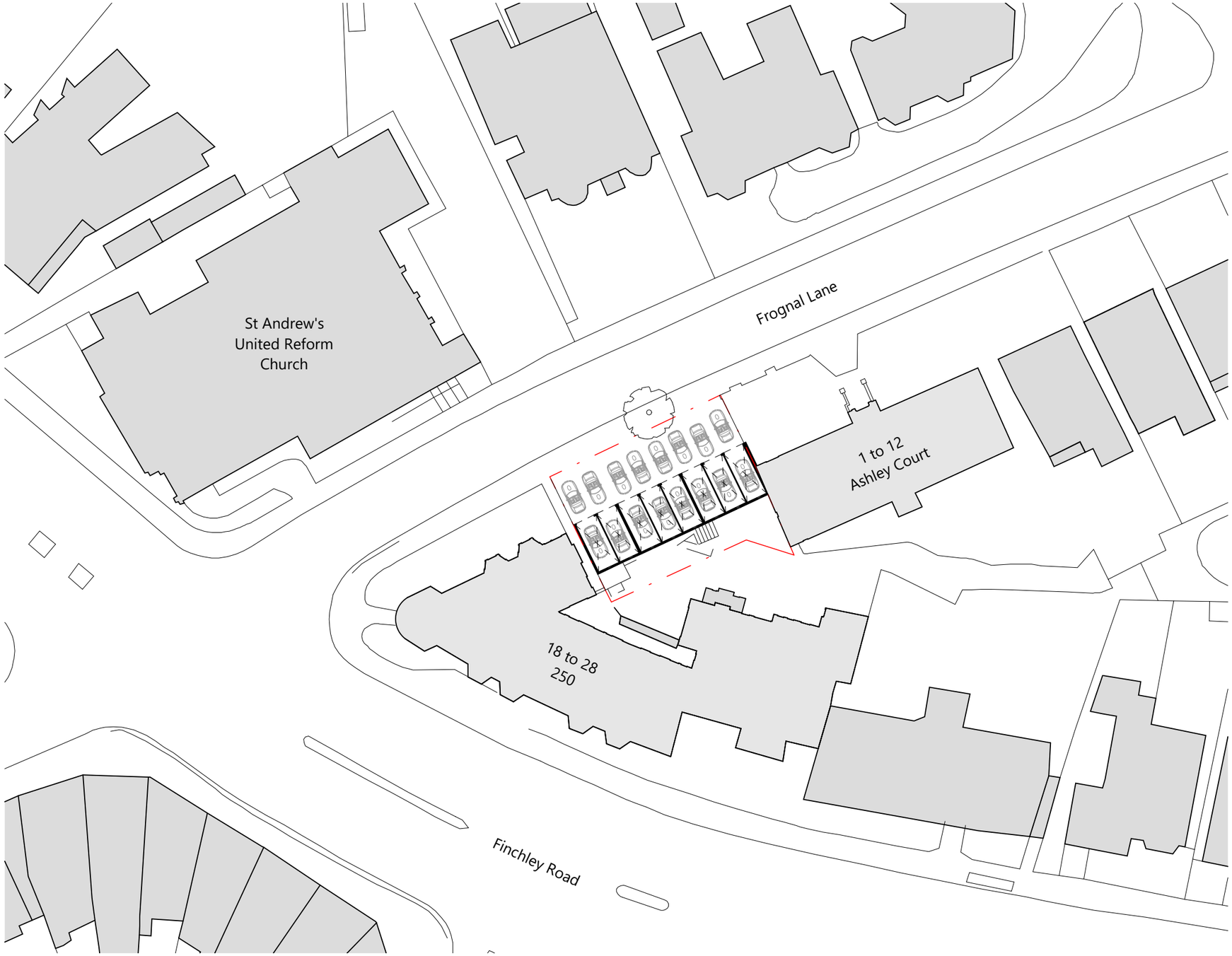
Project
Frognal Garages, Frognal Lane, Hampstead, London NW3 7DX

Client
Pollyshire Ltd

Date
May 2024

Job Number
21428

Appendix A Proposed Development Plans



01 Existing Site Plan

1 : 500

scale (m)

0 5 10 25

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key

- assumed site boundary
- parking bay
- main entrance

Rev:	Date:	Description:	Drwn by:	Chkd by:
P01	01/03/24	planning issue	JV	TB

Status: S2 - Information

Revision: P01

Dwn by: JV | Ckd by: TB

Scale: As indicated | Page: A3

Project No: 21033V

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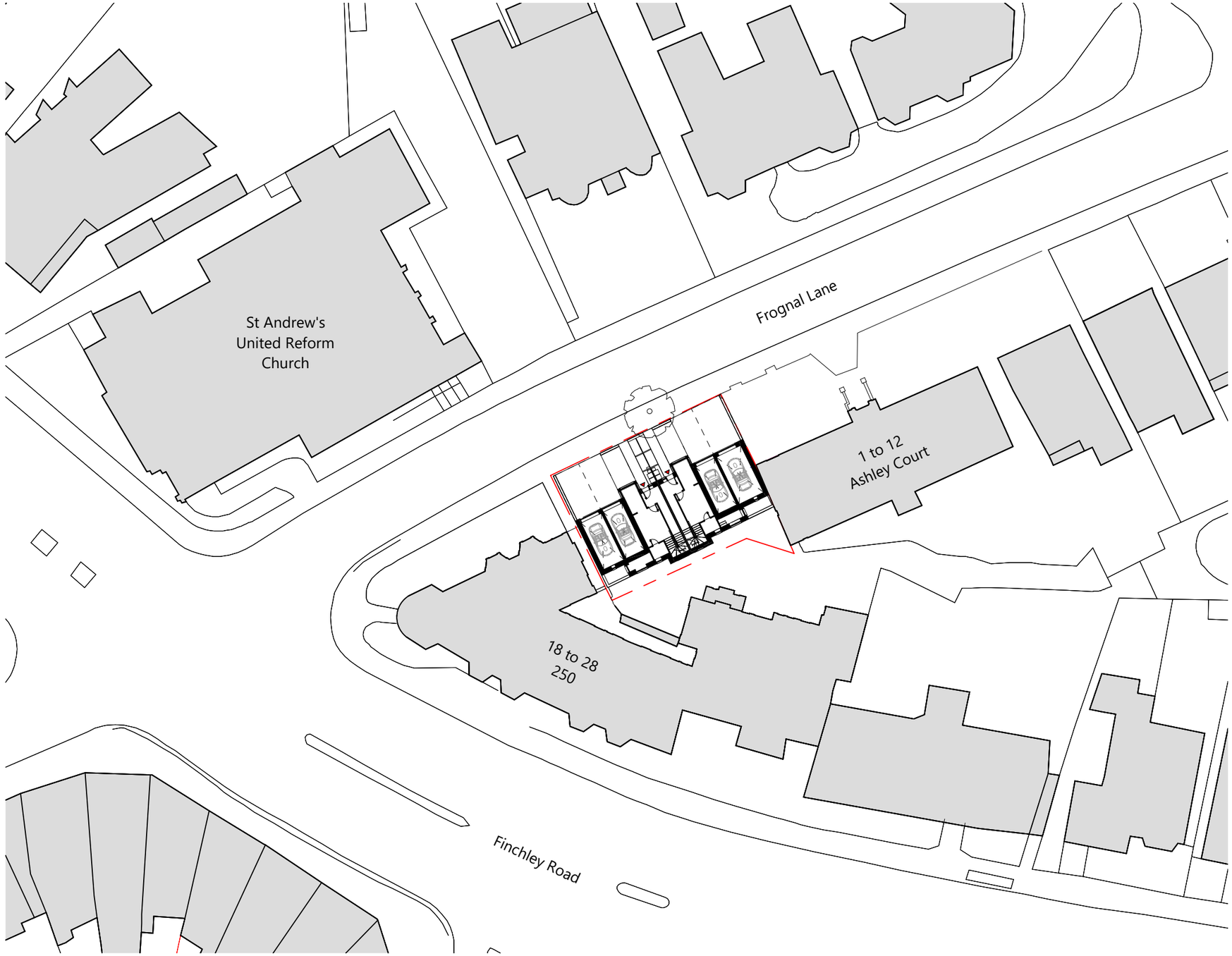
Project Name: Frognal Garages

Drawing Title: Existing Site Plan

Drawing Number: FGG-TOD-10-ZZ-DR-A-10001



01 Site Plan
1 : 500

scale (m)
0 5 10 25

key
- assumed site boundary
- parking bay
- main entrance

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P01	01/03/24	planning issue	JV	TB

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Client: Pollyshire Ltd
Project Name: Frognal Garages
Drawing Title: Site Plan
Drawing Number: FGG-TOD-10-ZZ-DR-A-10002

01 Site Location Plan

1 : 1250

scale (m)

0 12.5 25 62.5

key

assumed site boundary

Rev:	Date:	Description:	Drwn by:	Chkd by:
P01	15/03/24	planning issue	JV	TB

Status: S2 - Information
Revision: P01
Dwn by: JV
Ckd by: TB
Scale: As indicated
Page: A3
Project No: 21033V
Date: 15/03/24

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Client: Pollyshire Ltd
Project Name: Frognal Garages
Drawing Title: Site Location Plan
Drawing Number: FGG-TOD-10-ZZ-DR-A-10003

01 GA Plan - Level 01

1 : 100

- residential - unit 01, GIA 263m²
- residential - unit 02, GIA 202m²
- amenities
- retained car parking space for 1 Frognal Lane (on Long Leasehold)
- retained car parking space for 3 Frognal Lane (on Long Leasehold)
- retained car parking space
- frosted glass
- glass
- assumed site boundary
- main entrance

01 bin storage per dwelling containing at least:
120L for general waste or 'refuse'
140L for mixed dry recycling
23L of food waste
02 cycle storage per dwelling:
4no. of enclosed cycle spaces
03 privacy screen (min. 1.5m high)
04 green privacy screen (min. 1.5m high)
05 rooflight at high level
06 window at high level
07 roof area
08 planter

Rev:	Date:	Description:	Drwn by:	Chkd by:
P02	15/03/24	planning issue	JV	TB
P01	01/03/24	planning issue	JV	TB

Status: S2 - Information
Revision: P02
Dwn by: JV | Ckd by: TB
Scale: 1 : 100 | Page: A3
Project No: 21033V
Date: 01/03/24

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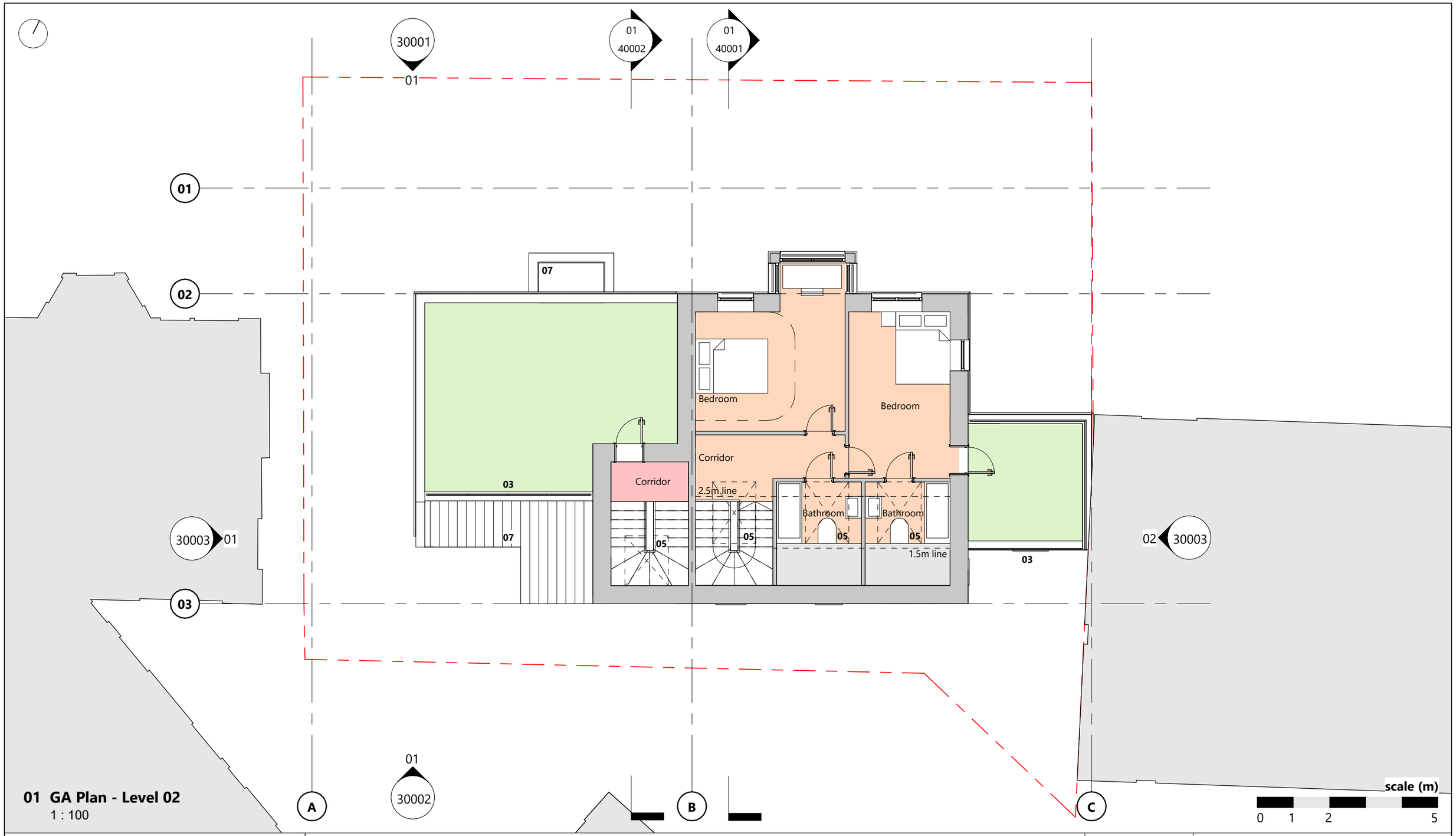
Client: Pollyshire Ltd
Project Name: Frognal Garages
Drawing Title: GA Plan - Level 01
Drawing Number: FGG-TOD-20-01-DR-A-20003



01 GA Plan - Level 02

1 : 100

- residential - unit 01, GIA 263m²
- residential - unit 02, GIA 202m²
- amenities
- retained car parking space for 1 Frognal Lane (on Long Leasehold)
- retained car parking space for 3 Frognal Lane (on Long Leasehold)
- retained car parking space
- frosted glass
- glass
- assumed site boundary
- main entrance

01 bin storage per dwelling containing at least:
120L for general waste or 'refuse'
140L for mixed dry recycling
23L of food waste
02 cycle storage per dwelling:
4no. of enclosed cycle spaces
03 privacy screen (min. 1.5m high)
04 green privacy screen (min. 1.5m high)
05 rooflight at high level
06 window at high level
07 roof area
08 planter

Rev:	Date:	Description:	Drwn by:	Chkd by:
P02	15/03/24	planning issue	JV	TB
P01	01/03/24	planning issue	JV	TB

Status: S2 - Information
Revision: P02
Dwn by: JV | Ckd by: TB
Scale: 1 : 100 | Page: A3
Project No: 21033V
Date: 01/03/24

TODD Architects
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6 Queens Road, Belfast, BT3 9DT
T: +44 (0) 28 9024 5587
E: info@toddarch.co.uk

Client: Pollyshire Ltd
Project Name: Frognal Garages
Drawing Title: GA Plan - Level 02
Drawing Number: FGG-TOD-20-02-DR-A-20004

01 GA Plan - Level LG

1 : 100

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Contractors are responsible for the verification of all dimensions on site and the architect is to be informed of any discrepancy.

Do not scale from this drawing.

Use figured dimensions only.

- residential - unit 01, GIA 263m²
- residential - unit 02, GIA 202m²
- amenities
- retained car parking space for 1 Frognal Lane (on Long Leasehold)
- retained car parking space for 3 Frognal Lane (on Long Leasehold)
- retained car parking space
- frosted glass
- glass
- assumed site boundary
- main entrance

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140L for mixed dry recycling
23L of food waste

02 cycle storage per dwelling:
4no. of enclosed cycle spaces

03 privacy screen (min. 1.5m high)

04 green privacy screen (min. 1.5m high)

05 rooflight at high level

06 window at high level

07 roof area

08 planter

Rev:	Date:	Description:	Drwn by:	Chkd by:
P02	15/03/24	planning issue	JV	TB
P01	01/03/24	planning issue	JV	TB

Status: S2 - Information

Revision: P02

Dwn by: JV | Ckd by: TB

Scale: 1 : 100 | Page: A3

Project No: 21033V

Date: 01/03/24

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6 Queens Road, Belfast, BT3 9DT
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E: info@toddarch.co.uk

Client: Pollyshire Ltd

Project Name: Frognal Garages

Drawing Title: GA Plan - Level LG

Drawing Number: FGG-TOD-20-LG-DR-A-20001

01 GA Plan - Level UG

1 : 100

- residential - unit 01, GIA 263m²
- residential - unit 02, GIA 202m²
- amenities
- retained car parking space for 1 Frognal Lane (on Long Leasehold)
- retained car parking space for 3 Frognal Lane (on Long Leasehold)
- retained car parking space
- frosted glass
- glass
- assumed site boundary
- main entrance

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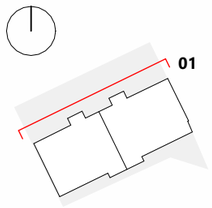
07 roof area
08 planter

Rev:	Date:	Description:	Drwn by:	Chkd by:
P02	15/03/24	planning issue	JV	TB
P01	01/03/24	planning issue	JV	TB

Status: S2 - Information
Revision: P02
Dwn by: JV | Ckd by: TB
Scale: 1 : 100 | Page: A3
Project No: 21033V
Date: 01/03/24

TODD Architects
2nd Floor Titanic House,
6 Queens Road, Belfast, BT3 9DT
T: +44 (0) 28 9024 5587
E: info@toddarch.co.uk

Client: Pollyshire Ltd
Project Name: Frognal Garages
Drawing Title: GA Plan - Level UG
Drawing Number: FGG-TOD-20-UG-DR-A-20002



key plan

01 GA Elevation - North

1 : 100

scale (m)

0 1 2 5

- residential - unit 01, GIA 263m²
- residential - unit 02, GIA 202m²
- amenities
- retained car parking space for 1 Frognal Lane (on Long Leasehold)
- retained car parking space for 3 Frognal Lane (on Long Leasehold)
- retained car parking space
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- glass
- assumed site boundary
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08 planter

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P02	15/03/24	planning issue	JV	TB
P01	01/03/24	planning issue	JV	TB

Status: S2 - Information
Revision: P02
Dwn by: JV
Ckd by: TB
Scale: 1 : 100
Page: A3
Project No: 21033V
Date: 01/03/24

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2nd Floor Titanic House,
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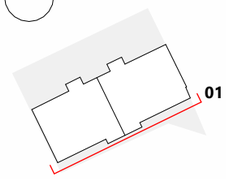
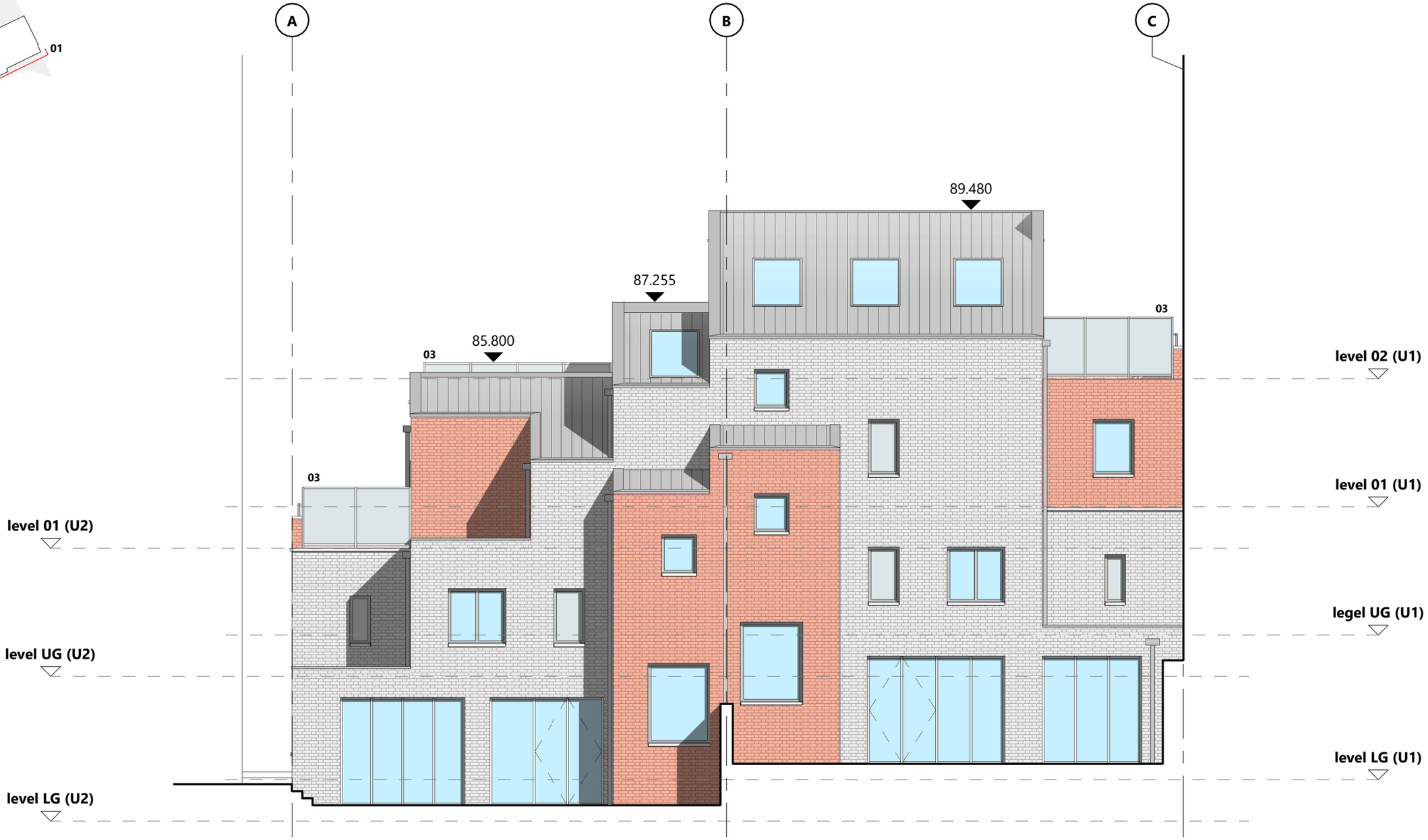
T: +44 (0) 28 9024 5587
E: info@toddarch.co.uk

Client: Pollyshire Ltd
Project Name: Frognal Garages
Drawing Title: GA Elevation - North
Drawing Number: FGG-TOD-30-ZZ-DR-A-30001



key plan



01 GA Elevation - South

1 : 100

scale (m)

0 1 2 5

- residential - unit 01, GIA 263m²
- residential - unit 02, GIA 202m²
- amenities
- retained car parking space for 1 Frognal Lane (on Long Leasehold)
- retained car parking space for 3 Frognal Lane (on Long Leasehold)
- retained car parking space
- frosted glass
- glass
- assumed site boundary
- main entrance

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05 rooflight at high level
06 window at high level
07 roof area
08 planter

Rev:	Date:	Description:	Drwn by:	Chkd by:
P02	15/03/24	planning issue	JV	TB
P01	01/03/24	planning issue	JV	TB

Status: S2 - Information
Revision: P02
Dwn by: JV | Ckd by: TB
Scale: 1 : 100 | Page: A3
Project No: 21033V
Date: 01/03/24

TODD Architects
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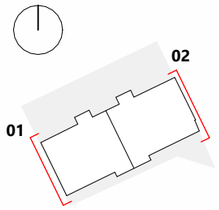
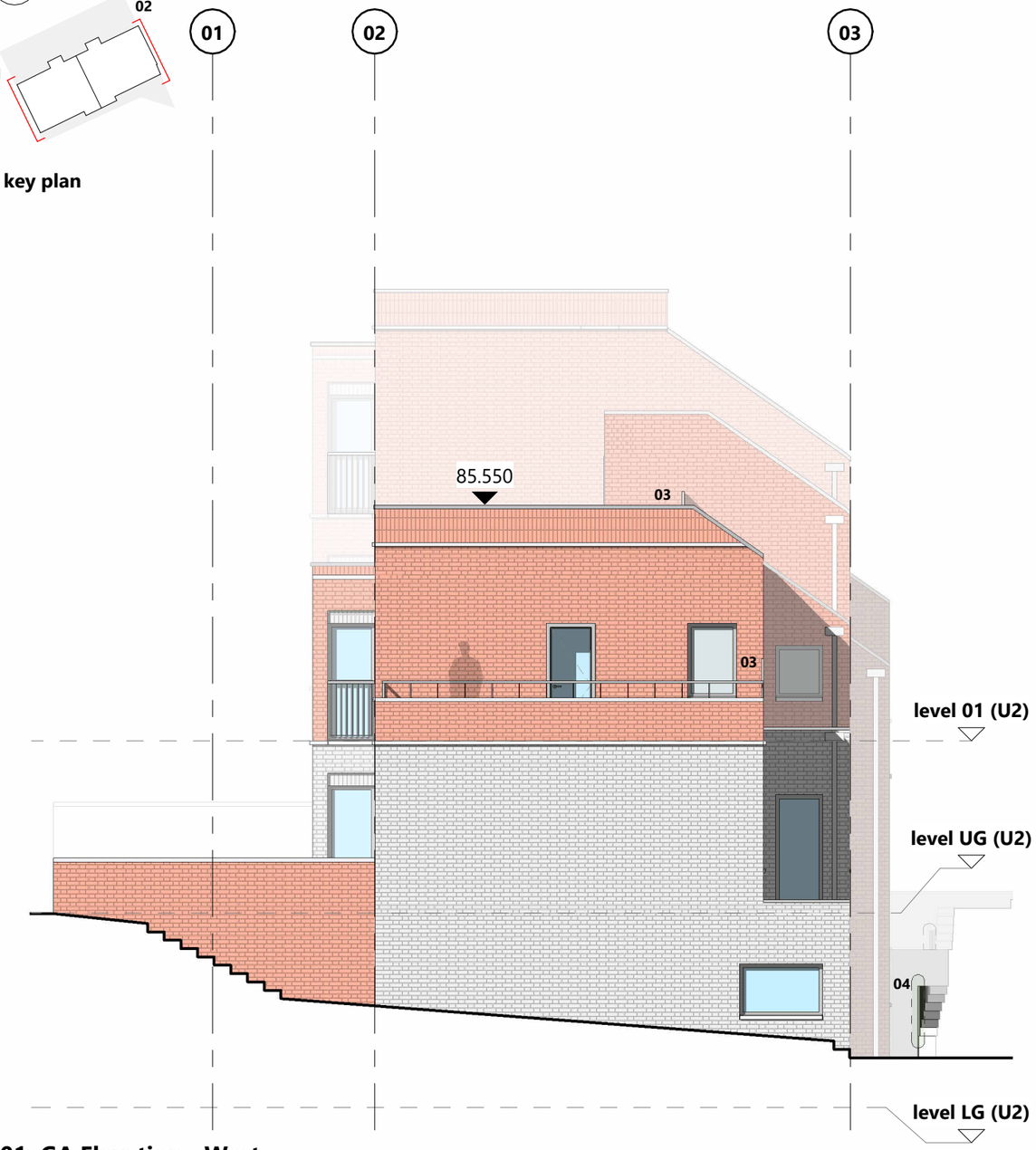
6 Queens Road, Belfast, BT3 9DT
T: +44 (0) 28 9024 5587
E: info@toddarch.co.uk

Client: Pollyshire Ltd
Project Name: Frognal Garages
Drawing Title: GA Elevation - South
Drawing Number: FGG-TOD-30-ZZ-DR-A-30002



key plan



01 GA Elevation - West

1 : 100

02 GA Elevation - East

1 : 100

scale (m)

0 1 2 5

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Do not scale from this drawing.

Use figured dimensions only.

- residential - unit 01, GIA 263m²
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- retained car parking space for 1 Frognal Lane (on Long Leasehold)
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- glass
- assumed site boundary
- main entrance

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140L for mixed dry recycling
23L of food waste

02 cycle storage per dwelling:
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04 green privacy screen (min. 1.5m high)

05 rooflight at high level

06 window at high level

07 roof area

08 planter

Rev:	Date:	Description:	Drwn by:	Chkd by:
P02	15/03/24	planning issue	JV	TB
P01	01/03/24	planning issue	JV	TB

Status: S2 - Information

Revision: P02

Dwn by: JV | Ckd by: TB

Scale: 1 : 100 | Page: A3

Project No: 21033V

Date: 01/03/24

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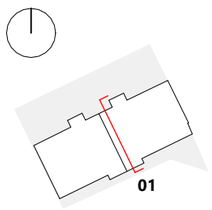
TODD

Client: Pollyshire Ltd

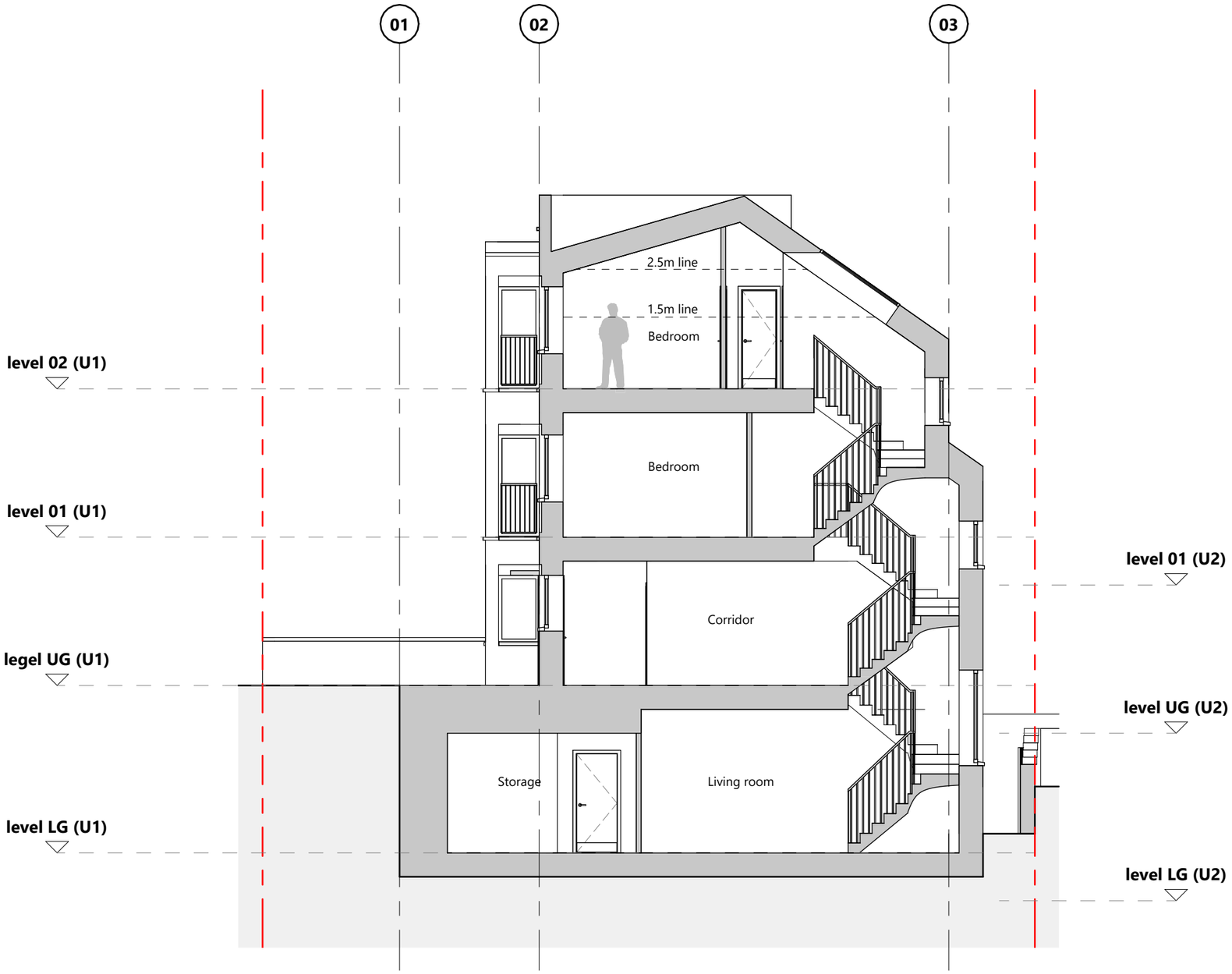
Project Name: Frognal Garages

Drawing Title: GA Elevation - East & West

Drawing Number: FGG-TOD-30-ZZ-DR-A-30003



key plan



01 GA Section AA

1 : 100

scale (m)

0 1 2 5

- residential - unit 01, GIA 263m²
- residential - unit 02, GIA 202m²
- amenities
- retained car parking space for 1 Frognal Lane (on Long Leasehold)
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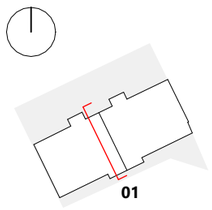
08 planter

Rev:	Date:	Description:	Drwn by:	Chkd by:
P02	15/03/24	planning issue	JV	TB
P01	01/03/24	planning issue	JV	TB

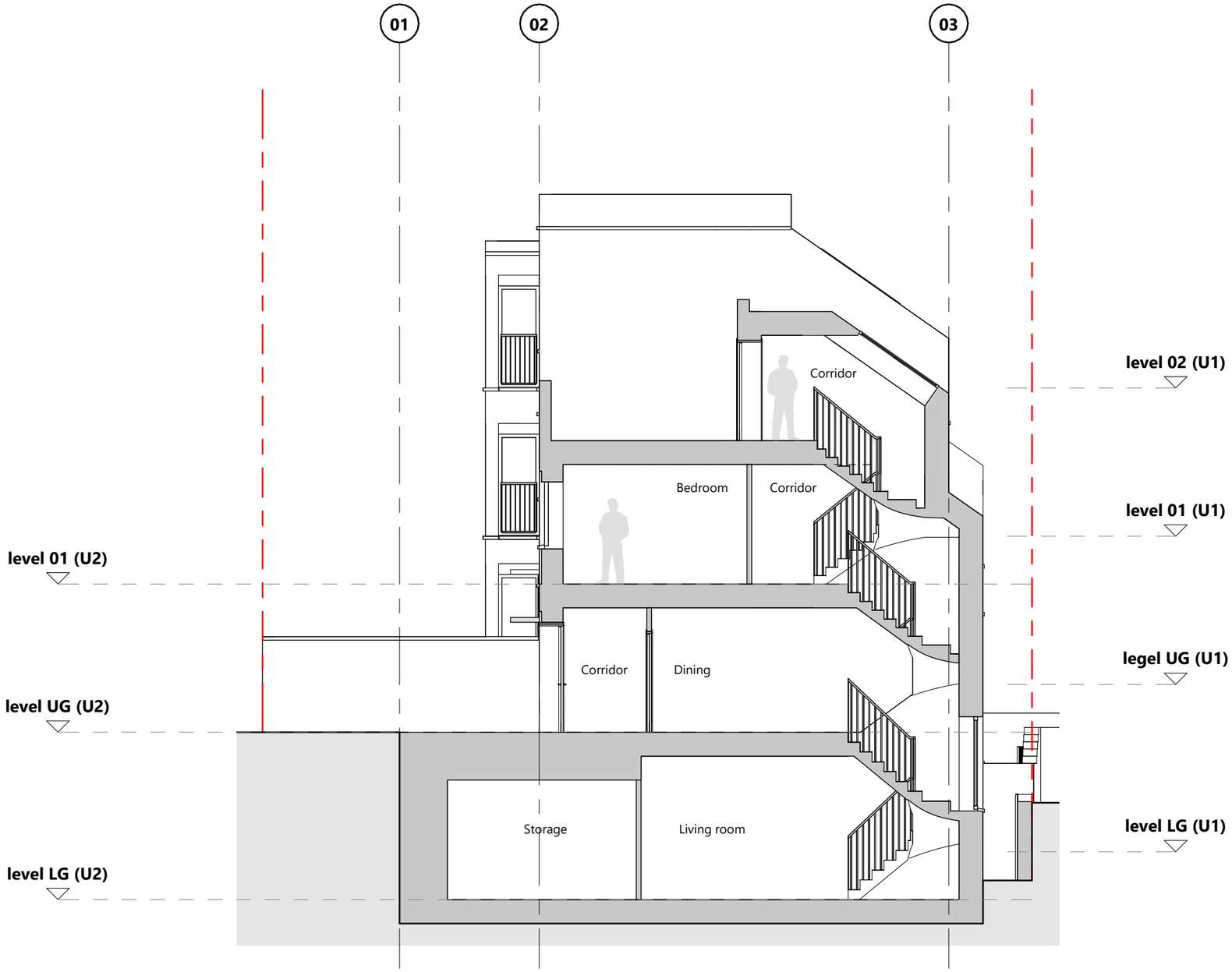
Status: S2 - Information
Revision: P02
Dwn by: JV | Ckd by: TB
Scale: 1 : 100 | Page: A3
Project No: 21033V
Date: 01/03/24

TODD Architects
2nd Floor Titanic House,
6 Queens Road, Belfast, BT3 9DT
T: +44 (0) 28 9024 5587
E: info@toddarch.co.uk

Client: Pollyshire Ltd
Project Name: Frognal Garages
Drawing Title: GA Section AA
Drawing Number: FGG-TOD-40-ZZ-DR-A-40001



key plan



01 GA Section BB

1 : 100

scale (m)

0 1 2 5

- residential - unit 01, GIA 263m²
- residential - unit 02, GIA 202m²
- amenities
- retained car parking space for 1 Frognal Lane (on Long Leasehold)
- retained car parking space for 3 Frognal Lane (on Long Leasehold)
- retained car parking space
- frosted glass
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05 rooflight at high level
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Rev:	Date:	Description:	Drwn by:	Chkd by:
P02	15/03/24	planning issue	JV	TB
P01	01/03/24	planning issue	JV	TB

Status: S2 - Information
Revision: P02
Dwn by: JV | Ckd by: TB
Scale: 1 : 100 | Page: A3
Project No: 21033V
Date: 01/03/24

TODD Architects
2nd Floor Titanic House,
6 Queens Road, Belfast, BT3 9DT
T: +44 (0) 28 9024 5587
E: info@toddarch.co.uk

Client: Pollyshire Ltd
Project Name: Frognal Garages
Drawing Title: GA Section BB
Drawing Number: FGG-TOD-40-ZZ-DR-A-40002

Appendix B Thames Water Asset Location Search

Asset Location Search

Thames Water Property Searches

Soils Limited
Newton House
Cross Road
TADWORTH
KT20 5SR

Search address supplied

Frognal Garages
Adj. Ashley Court
Frognal Lane
London
NW3 7DX

Your reference 21428

Our reference ALS/ALS Standard/2024_4982464

Search date 30 April 2024

Notification of Price Changes

From 1st April 2024 Thames Water Property Searches will be increasing the prices of its CON29DW Residential and Commercial searches along with the Asset Location Search. Costs will rise in line with RPI as per previous years, which is sat at 6%.

Customers will be emailed with the new prices by February 28th 2024.

Any orders received with a higher payment prior to the 1st April 2024 will be non-refundable. For further details on the price increase please visit our website at www.thameswater-propertysearches.co.uk.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0800 009 4540

Asset Location Search

Property Searches

Search address supplied: Frognal Garages, Adj. Ashley Court, Frognal Lane, London, NW3 7DX

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This search provides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and

pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

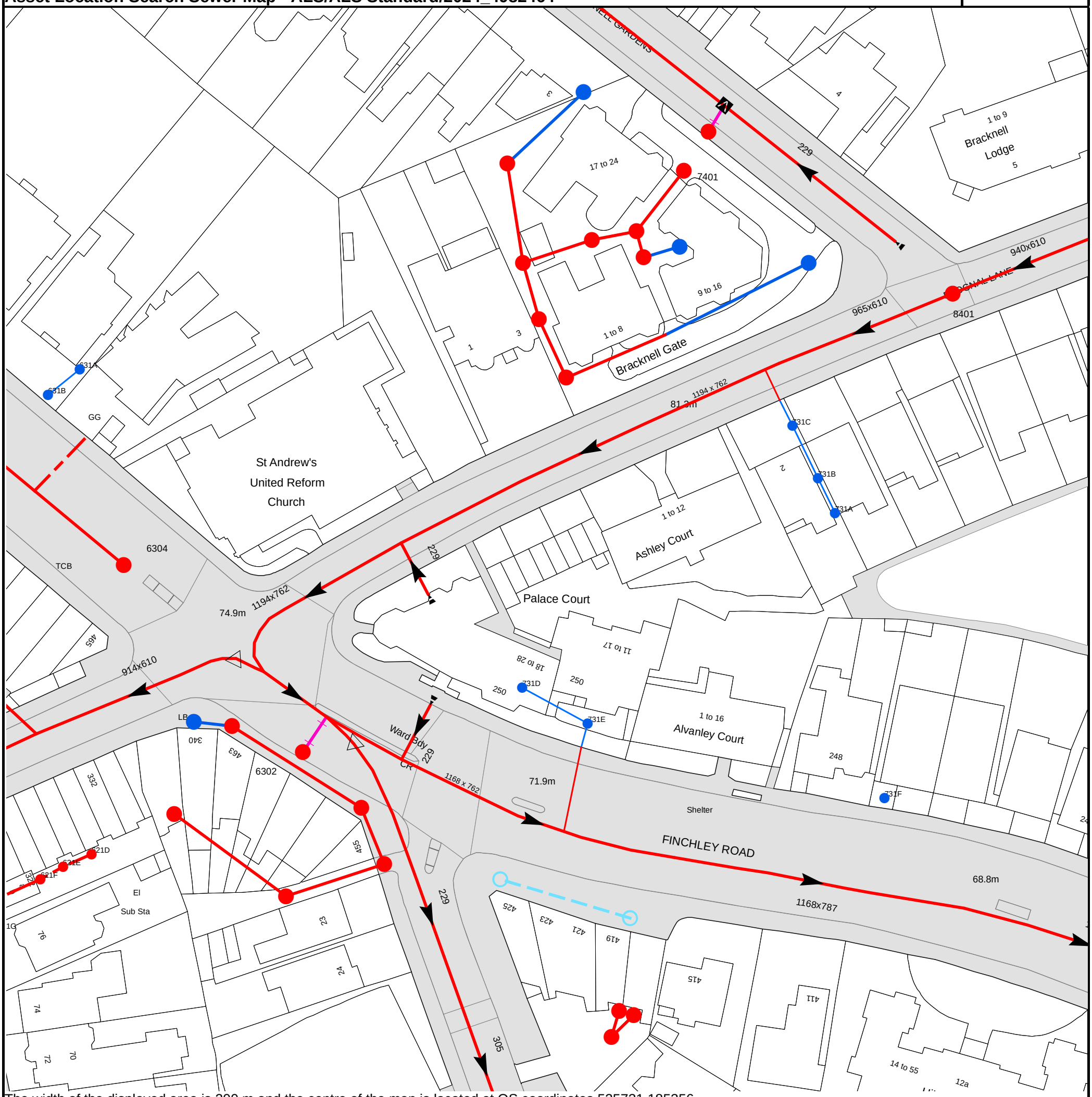
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2024_4982464



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 525731,185356

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
631B	n/a	n/a
631A	n/a	n/a
73AJ	n/a	n/a
74BH	n/a	n/a
74BD	n/a	n/a
731C	n/a	n/a
73BA	n/a	n/a
8401	83.05	76.4
74BG	n/a	n/a
74BF	n/a	n/a
74AH	n/a	n/a
74BC	n/a	n/a
74BB	n/a	n/a
74BI	n/a	n/a
7401	n/a	n/a
74BE	n/a	n/a
621F	n/a	n/a
621E	n/a	n/a
621D	n/a	n/a
6304	74.98	70.36
63CC	n/a	n/a
63DB	n/a	n/a
63DC	n/a	n/a
62BJ	n/a	n/a
6302	n/a	n/a
63DD	n/a	n/a
62CA	n/a	n/a
72BF	n/a	n/a
731D	n/a	n/a
731E	n/a	n/a
72BC	n/a	n/a
72BD	n/a	n/a
72BE	n/a	n/a
72BB	n/a	n/a
731B	n/a	n/a
731A	n/a	n/a
731F	n/a	n/a

Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

Foul Sewer: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water Sewer: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined Sewer: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

- Storm Sewer
- Sludge Sewer
- Foul Trunk Sewer
- Surface Trunk Sewer
- Combined Trunk Sewer
- Foul Rising Main
- Surface Water Rising Main
- Combined Rising Main
- Vacuum
- Thames Water Proposed
- Vent Pipe
- Gallery

Other Sewer Types (Not operated and maintained by Thames Water)

- Sewer
- Culverted Watercourse
- Proposed
- Decommissioned Sewer
- Content of this drainage network is currently unknown
- Ownership of this drainage network is currently unknown

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

- Air Valve
- Meter
- Dam Chase
- Vent
- Fitting

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

- Ancillary
- Drop Pipe
- Control Valve
- Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol. Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

- Inlet
- Outfall
- Undefined End

Other Symbols

Symbols used on maps which do not fall under other general categories.

- Change of Characteristic Indicator
- Public / Private Pumping Station
- Invert Level
- Summit

Areas

Lines denoting areas of underground surveys, etc.

- Agreement
- Chamber
- Operational Site

Ducts or Crossings

- Casement

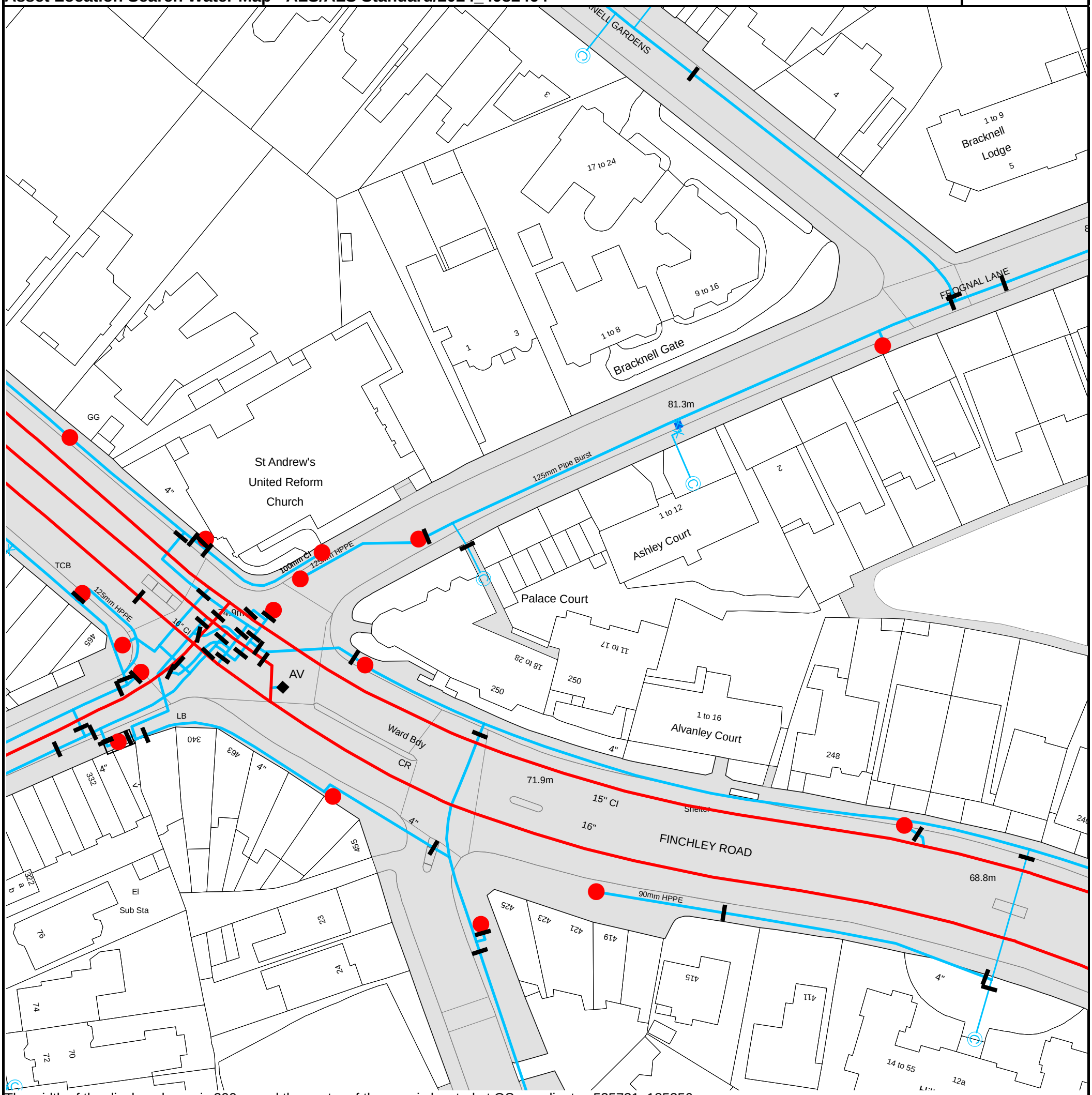
Ducts may contain high voltage cables. Please check with Thames Water.

- Conduit Bridge
- Subway
- Tunnel

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plan are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology, please contact Property Searches on 0800 009 4540.

Asset Location Search Water Map - ALS/ALS Standard/2024_4982464



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 525731, 185356.

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search - Water Key

Water Pipes (Operated & Maintained by Thames Water)

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

Casement: Ducts may contain high voltage cables. Please check with Thames Water.

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Payment Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment within 14 days of the date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service or will be held to be invalid.
4. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
5. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
6. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800.

If you are unhappy with our service, you can speak to your original goods or customer service provider. If you are still not satisfied with the outcome provided, we will refer the matter to a Senior Manager for resolution who will provide you with a response.

If you are still dissatisfied with our final response, and in certain circumstances such as you are buying a residential property or commercial property within certain parameters, The Property Ombudsman will investigate your case and give an independent view. The Ombudsman can award compensation of up to £25,000 to you if he finds that you have suffered actual financial loss and/or aggravation, distress, or inconvenience because of your search not keeping to the Code. Further information can be obtained by visiting www.tpos.co.uk or by sending an email to admin@tpos.co.uk.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0300 034 2222 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**
Please Call **0800 009 4540** quoting your invoice number starting CBA or ADS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number

Appendix C Run off Calculations

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Sam Bevins
Site name:	Frognal Garages
Site location:	Frognal Lane

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	51.55303° N
Longitude:	0.18785° W
Reference:	3740631238
Date:	May 02 2024 18:01

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	0.1

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	650	650
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited

Q_{BAR} (l/s):	0.44	0.44
1 in 1 year (l/s):	0.38	0.38
1 in 30 years (l/s):	1.02	1.02
1 in 100 year (l/s):	1.41	1.41
1 in 200 years (l/s):	1.66	1.66

Appendix D SuDS Attenuation Volume Calculations

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	Sam Bevins
Site name:	Frognal Garages
Site location:	Frognal Lane

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:	51.55301° N
Longitude:	0.18788° W
Reference:	2176887913
Date:	May 07 2024 15:32

Site characteristics

Total site area (ha):	0.04
Significant public open space (ha):	0
Area positively drained (ha):	0.04
Impermeable area (ha):	0.025
Percentage of drained area that is impermeable (%):	63
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	100
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	10
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	0.04
Net impermable area for storage volume design (ha):	0.03
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Methodology

esti	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
SPR:	0.47	0.47

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	63
Rainfall 100 yrs 12 hrs:	--	102.41
FEH / FSR conversion factor:	1.33	1.33
SAAR (mm):	650	650
M5-60 Rainfall Depth (mm):	20	20
'r' Ratio M5-60/M5-2 day:	0.4	0.4
Hydological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 10 year:	1.62	1.62
Growth curve factor 30 year:	2.3	2.3

Design criteria

Climate change allowance factor:	1.4		Growth curve factor 100 years:	3.19	3.19
Urban creep allowance factor:	1.1		Q_{BAR} for total site area (l/s):	0.18	0.18
Volume control approach	Use long term storage		Q_{BAR} for net site area (l/s):	0.18	0.18
Interception rainfall depth (mm):	5				
Minimum flow rate (l/s):	2				

Site discharge rates

	Default	Edited
1 in 1 year (l/s):	2	2
1 in 30 years (l/s):	2	2
1 in 100 year (l/s):	2	2

Estimated storage volumes

	Default	Edited
Attenuation storage 1/100 years (m^3):	8	8
Long term storage 1/100 years (m^3):	0	0
Total storage 1/100 years (m^3):	8	8

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