Paddington Green Police Station

2 – 4 Harrow Road, London, W2 1XJ

Below Ground Drainage Report

WSP

March 2021

Berkeley

Designed for life

Berkeley Homes (Central London) Ltd

PADDINGTON GREEN POLICE STATION

Below Ground Drainage Report

PGPS-WSP-XX-XX-RP-DR-0001 REVISION P03
MARCH 2021

CONFIDENTIAL

Berkeley Homes (**Central London) Ltd**

PADDINGTON GREEN POLICE STATION

Below Ground Drainage Report

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Berkeley **Homes (Central London) Ltd**

PADDINGTON GREEN POLICE STATION

Below Ground Drainage Report

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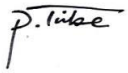
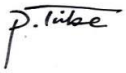
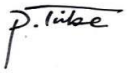
Signature				
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EXECUTIVE SUMMARY

WSP have undertaken this Outline Drainage Strategy (DS) to support the detailed planning application for the redevelopment of Paddington Green Police Station, London.

The proposed mixed-use development is located within the City of Westminster Borough. The Proposed Development will comprise of the demolition of the existing building and the development of three mixed-use buildings.

The proposed Outline Drainage Strategy will manage surface water runoff from the Site in line with policy and best practice, through the use of sustainable drainage systems (SuDS) where appropriate.

An assessment of the proposed foul water discharge has been made to understand the impact on the receiving public sewers and, is presented in this Report.

The Report has been produced in consultation with the Environmental Agency (EA), Thames Water (TW), and Lead Local Flood Authority (LLFA).

1

INTRODUCTION

1. INTRODUCTION

1.1. APPOINTMENT AND BRIEF

1.1.1. WSP have undertaken this Outline Surface Water and Foul Water Drainage Strategy (DS) to support a planning application for Paddington Green Police Station, London ('the Site').

1.1.2. Under an Appointment dated August 2020 between WSP and Berkeley Homes (Central London) Ltd., WSP were employed as Consultant to provide the below Report and in doing so has exercised reasonable skill and care. This report relates solely to the Paddington Green Police Station site.

1.1.3. This report is intended for the sole benefit of the parties named above and shall not be capable of assignment. WSP shall not be liable for any use of the Report for any reasons other than that for which the report was originally prepared and provided.

1.1.4. Although this report was prepared using the degree of skill and care ordinarily exercised by engineers practicing under similar circumstances, please note that WSP cannot take responsibility for errors in the information provided by third parties.

1.2. OBJECTIVE OF STUDY & METHODOLOGY

1.2.1. This report outlines the management of foul and surface water for the Proposed Development prior to discharge off-site, in accordance with Local Policy.

1.2.2. The appraisal process consisted of a desk study, and consultation with regulatory bodies and third parties. TW and the EA have provided background information to inform the production of this DS. Consultation with these regulatory bodies and third parties have been undertaken as part of the design of the Proposed Development

1.2.3. The DS has been produced taking into consideration the following Westminster City Council local policy documents:

- Westminster City Council – Local Flood Risk Management Strategy (2019);
- Westminster City Council – Surface Water Management Plan (2011);
- Westminster City Council – Preliminary Flood Risk Assessment (2011);
- Westminster City Council – Strategic Flood Risk Assessment (2010);

1.2.4. This Report makes partial use of third-party information and contains Environment Agency information ©.

2

EXISTING SITE

2. EXISTING SITE

2.1. SITE DETAILS

2.1.1. The Site is located in Paddington, London, within Westminster City Council. The Site is bounded by Newcastle Place to the north, Edgware Road to the east and Harrow Road to the south. (OS Grid Ref: 526942, 181741).

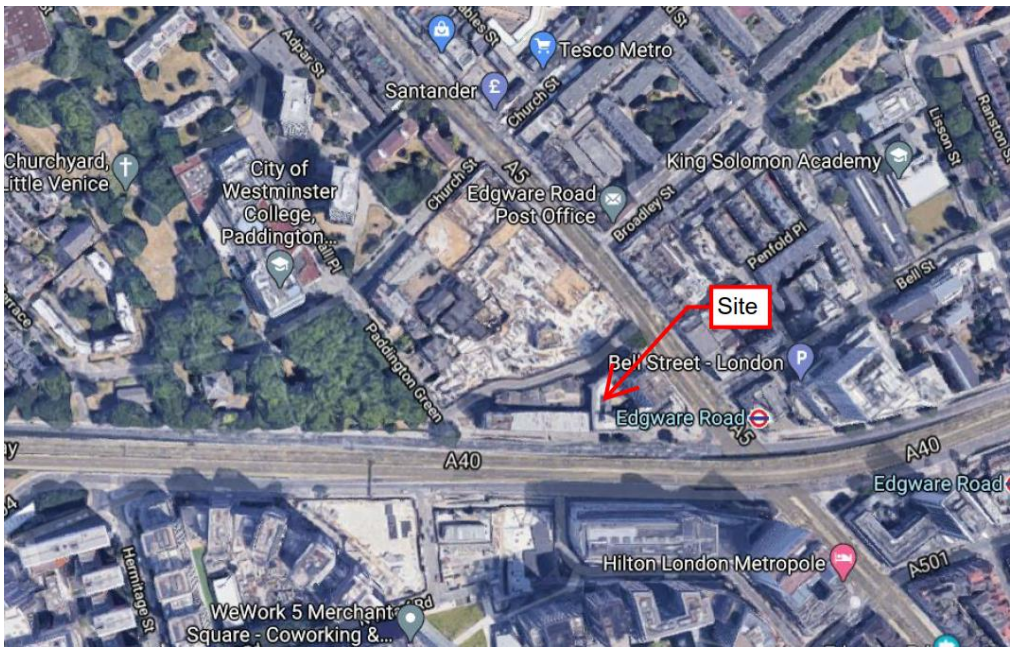

Figure 1 - Indicative Site Location Plan

2.1.2. Refer to Figure 1 above and to the location plan in Appendix A for location and an extent of the planning application site.

2.2. SITE DESCRIPTION AND SITE LEVELS

2.2.1. The blue line (legal site boundary) is approximately 0.50 hectare (ha) and planning boundary is larger in size at approximately 0.82 ha. The Site currently consists of a Police Station and associated landscaping.

2.2.2. To the north of the Site is the Paddington Green and West End Gate developments, there are retail units and Edgware Road Underground station beyond Edgware Road to the east and the Westway A40 run at high level to the south of the site.

2.2.3. Based on the topographical survey, levels outside of the site boundary are generally flat between 31.0 and 32.0mAOD. Levels are lower at the underpasses to the south of the site at approximately 28.4mAOD. Refer to Appendix B for the topographical survey.

2.3. GEOLOGY AND HYDROGEOLOGY

2.3.1. The online British Geological Survey (BGS) mapping indicates that the bedrock geology is London Clay Formation. The EA classify this bedrock geology as 'Unproductive Strata' (i.e. rock layers or drift

deposits with low permeability that have negligible significance for water supply or river base flow.) Superficial deposits are present on site and consist of Langley Silt Member – Clay and Silt.

2.3.2. Based on the EA's online Groundwater Vulnerability map, the site is identified to lie within a zone classified as 'Unproductive' i.e. they consist of bedrock or superficial deposits with a low permeability that naturally offer protection to any aquifers that may be present beneath.

2.4. EXISTING WATERCOURSES, FLOOD DEFENCES AND STRUCTURES

2.4.1. The nearest watercourse to the site is the Paddington Basin, which is approximately 140m south of the site. The River Thames is approximately 3.7km south east of the Site.

2.5. EXISTING SEWERS/ DRAINAGE

2.5.1. Based on TW Asset Records (2018) (Appendix C), there is a 457mm combined sewer running within the Newcastle Place carriageway from west to east, which connects to a larger 1989x914mm combined sewer running south east within Edgware Road.

2.5.2. The Newcastle Place sewer is proposed to be diverted and realigned to avoid any construction constraints posed by the WEG development at the north of Newcastle Place. Refer to Appendix D for drawings R137-D-Z-DR(52)-00-010 and R137-D-Z-DR(52)-00-011 which demonstrate the current Newcastle Place Sewer proposals.

2.5.3. In addition, the records show a 1499x787mm combined sewer running from north west to south east within the Paddington Green carriageway. Table 1 below summarises the Thames Water public sewers surrounding the site.

Table 1 - Thames Water Sewer Summary

Location	Type	Size (mm)	Depth (mbgl)
Newcastle Place	Combined Water	457	N/A
Edgware Road	Combined Water	1989x914 into a 1930x914	4.79
Paddington Green	Combined Water	1499x787	N/A

2.5.4. It is recommended that a CCTV drainage survey is undertaken at the next stage in design to confirm the location, alignment and size of sewers surrounding the site.

2.5.5. Refer to Appendix C for Thames Water public sewer information and CCTV drainage information for Newcastle Place.

3

PROPOSED DEVELOPMENT

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3. PROPOSED DEVELOPMENT

3.1.1. The proposed development consists of three buildings 18,15 and 32 storeys, respectively called blocks ‘‘I’’, ‘‘J’’ and ‘‘K’’. The entire footprint of the site boundary is covered with a new single basement level at 28.15mAOD, with the exception of the middle portion to the north where an additional second level basement structure at 25.15mAOD is proposed to serve access from WEG loading bay. The entire basement is covered with a podium / ground floor slab at approximately 31.5mAOD.

Figure 2 - Proposed development isometric view

3.1.2. The buildings are predominately residential with the ground floors dedicated to main lobbies and retail, with first and second floors areas dedicated to office spaces. Refer to Design and Access Statement for specific area schedule.

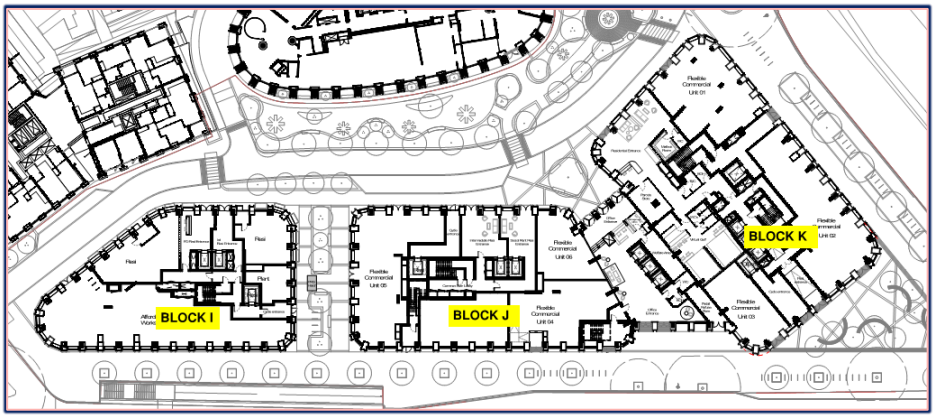

Figure 3 - Plan of proposed development

3.1.3. Block J and K are connected up to level 02 with landscape roof on top, these areas are office space with green roofs. Blocks I and J sit over the car park ramp, access road and basement car parking.

3.1.4. The majority of the building superstructure falls within the existing basement footprint, except the south east corner of block K which over sails the existing basement footprint by 2-3 metres.

3.1.5. To the north of the site across Newcastle Place are Blocks G & H which are yet to be constructed and Block A which has achieved practical completion and is in the process of being occupied. A proposed ground floor and basement floor plan, produced by Squire & Partners is attached in Appendix E.

4

PLANNING POLICY AND GUIDANCE

4. PLANNING POLICY AND GUIDANCE

4.1.1. This section of the Report summarises local policy and guidance relevant to this Outline Drainage Strategy for the Site.

4.2. NATIONAL PLANNING POLICY FRAMEWORK 2019

4.2.1. The revised National Planning Policy Framework (NPPF) was published on 19 February 2019 with the aim of protecting the environment and to promote sustainable growth. There is an overarching presumption in favour of sustainable development that should be the basis of every plan and every decision.

4.2.2. The following paragraphs/policies within the NPPF are considered relevant to this assessment:

- Paragraph 34: Explains that "plans should set out the contributions expected from development" including "flood and water management";
- Paragraph 149: Explains that "plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk";
- Paragraph 155: Requires that "inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk" but "where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere";
- Paragraph 157: Explains that "all plans should apply a sequential, risk-based approach to the location of development – taking into account the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property" and that "the aim of the sequential test is to steer new developments to areas with the lowest risk of flooding"; and
- Paragraph 165: States that "major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate".

4.3. THE LONDON PLAN

4.3.1. The London Plan (2021)

The London Plan (2021) has been set out to replace the previous London Plan (2016). The following policies are considered relevant to this assessment:

<u>Policy SI12 Flood Risk Management:</u>

- Policy SI12 Flood Risk Management - "Current and expected flood risk from all sources across London should be managed in a sustainable and cost-effective way in collaboration with the Environment Agency, the Lead Local Flood Authorities, developers and infrastructure providers.

<u>Policy SI13 Sustainable Drainage:</u>

- 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 in line with the following drainage hierarchy:
  - Rainwater harvesting (including a combination of green and blue roofs);
  - Infiltration techniques and green roofs;

- Rainwater attenuation in open water features for gradual release;
- Rainwater discharge direct to a watercourse (unless not appropriate);
- Rainwater attenuation above ground (including blue roofs);
- Rainwater attenuation below ground;
- Rainwater discharge to a surface water sewer or drain;
- Rainwater discharge to a combined sewer.

- Development proposals for impermeable paving should be refused where appropriate, including on small surfaces such as front gardens and driveways.
- Drainage should be designed and implemented in ways that address issues of water use efficiency, river water quality, biodiversity, amenity and recreation.

4.4. WESTMINSTER CITY COUNCIL – CITY PLAN 2019-2040

4.4.1. The Westminster City Council Plan June 2019 is the latest policy statement on future development available for Westminster City Council. The following policy 36 regarding flood risk is considered relevant to this assessment:

- Point a requires that "*All developments should be safe for their lifetime from the risk of flooding, complying with the council's Strategic Flood Risk Assessment (SFRA), Surface Water Management Plan (SWMP), Local Flood Risk Management Strategy (LFRMS) and the Mayor of London's Regional Flood Risk Appraisal (RFRA).*";

- Point b requires that "*A site-specific Flood Risk Assessment (FRA) must be submitted for:*
  1. developments of 1 hectare or greater;
  2. all developments in Flood Zones 2 and 3; and
  3. all developments within a Surface Water Flood Risk Hotspot" and;

- Point i requires that "*New development must incorporate Sustainable Drainage Systems (SuDS) to alleviate and manage surface water flood risk. Development should aim to achieve greenfield run-off rates and demonstrate how all opportunities to minimise site run-off have been taken*".

5

CLIMATE CHANGE

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5. CLIMATE CHANGE

5.1. BACKGROUND INFORMATION

5.1.1. As explained in the Climate Change Adaptation Sub-Committee Progress Report 2014, increased flood risk is the greatest threat to the UK from climate change. Models of the climate system suggest floods of the type experienced in England and Wales in autumn 2000, and between December 2013 and February 2014, have become more likely as a consequence of increased concentrations of greenhouse gases in the atmosphere.

5.1.2. More frequent short-duration, high intensity rainfall and more frequent periods of long-duration rainfall could be expected. Sea levels are also expected to continue to rise.

5.1.3. EA guidance “Flood risk assessments: climate change allowances” issued on the 19th February 2016, updated in April 2016 and February 2017, provides up to date information on expected changes in rainfall, river flows and sea level rise as a consequence of climate change.

5.1.4. A key change from the previous guidance is that the climate change allowances for peak river flows now are shown as variable on a regional basis; allowances are also now based on percentiles, whereby a percentile is a measure used in statistics to describe the proportion of possible scenarios that fall below an allowance level (e.g. a 50% percentile means that the allowance has 50% chances of not being exceeded).

5.1.5. Sea levels allowances reflect the previous guidance and vary on a regional basis and for each epoch as shown in Table 3 of the EA guidance. Present and future tidal levels along the Thames and its tributaries in London are controlled through the Thames Barrier.

5.1.6. For peak rainfall the EA guidance provides an upper end and central allowance depending on epoch; the guidance recommends assessing both the central and upper end allowances to understand the range of possible impacts.

5.2. DEVELOPMENT LIFESPAN AND APPLICABLE ALLOWANCES

5.2.1. A typical lifespan for residential developments is 100 years.

5.2.2. Based on this, the contingency allowances for climate change that are potentially applicable to this Site are, as set out in Table 4 of the EA’s “Adapting to Climate Change” the advice states:

- Upper End – 40% increase in peak rainfall by 2115; and
- Central – 20% increase in peak rainfall by 2115.

5.2.3. When undertaking the outline drainage strategy, the surface water attenuation calculations will be determined using the central and upper end estimates to prevent potential exceedance flows off site.

5.3. IMPACT OF CLIMATE CHANGE ON THE DEVELOPMENT

5.3.1. Surface water flood risk is generally expected to increase in the future as a consequence of climate change and the expected increase in extreme rainfall events. In order to take into account, the latest climate change guidance, the outline surface water drainage strategy has been designed to cater for the 1:100 year return period rainfall event including 40% climate change allowances.

6

OUTLINE SURFACE WATER DRAINAGE/ SUDS STRATEGY

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6. OUTLINE SURFACE WATER DRAINAGE/ SUDS STRATEGY

6.1. SURFACE WATER

SuDS Option Appraisal

6.1.1. Policy 5.13 Sustainable Drainage, indicates developers should utilise SuDS in line with the following drainage hierarchy:

- store rainwater for later use;
- use infiltration techniques, such as porous surfaces in non-clay areas;
- attenuate rainwater in ponds or open water features for gradual release;
- attenuate rainwater by storing in tanks or sealed water features for gradual release;
- discharge rainwater direct to a watercourse;
- discharge rainwater to a surface water sewer/drain;
- discharge rainwater to the combined sewer.

6.1.2. There is limited space on site to incorporate rainwater storage systems for reuse, therefore storing rainwater is considered unfeasible.

6.1.3. The use of infiltration techniques is not considered viable due to the basement extent of the site and the requirement for infiltration devices to be at least 5m away from permanent structures i.e. the building envelope lies within the majority of the Site area.

6.1.4. In addition, the geological strata is likely to be London Clay Formation, as indicated in Section 2. Therefore, due to the anticipated low permeability of the existing ground condition across the site, the use of soakaways is considered to be unsuitable for infiltration.

6.1.5. Furthermore, porous surface systems are not considered to be viable due to the limited external areas outside of the basement footprint that can host permeable paving and the limited build up available above the basement level.

6.1.6. The use of open water features such as ponds as a design feature is considered to be impractical given the limited size of the site and amount of external area, relative to building envelope areas.

6.1.7. It is proposed to include green roofs, as the primary SuDS feature for the development and will be provided on Blocks J and K as well as green areas on top of the podium slab.

6.1.8. Surface water attenuation will be in the form of two separate attenuation tank systems located on the basement B1 slab. Stored water from the two tanks will then be pumped at restricted rates to ground level.

6.1.9. The site it proposed to discharge surface water into the public sewer network located in the Newcastle Place carriageway. There is no surface water sewer in close proximity to the site, so the connection will be made into the combined sewer system.

6.1.10. As part of the DS, a capacity check enquiry has been submitted to TW (September 2020) to ensure that the local sewer network can accommodate the proposed discharge of the development. TW have advised that the site should discharge at greenfield runoff rates to ensure that the combined water system in Newcastle Place can accommodate the Site's surface water runoff. TW have noted that they are prepared to accept the same surface water proposals as the local authority (Westminster City Council) who have been consulted as part of the DS. However, a response from

the LLFA has not been received and therefore proposed rates have been based on the recommendation from Thames Water.The Proposed Development will aim to reduce surface water discharge to greenfield runoff rates.

6.1.11. The following subsection will detail the amount of reduction achieved through the use of onsite attenuation when compared to the existing scenario, as well as outline the location of drainage features on-site.

EXISTING SURFACE WATER RUNOFF CALCULATIONS

6.1.12. The existing Site is approximately 0.50ha in total size and is considered to be 100% impermeable, to ensure that we are considering the worst-case scenario, in terms of quantity of rainfall, at this stage of design. Based upon the Wallingford Procedure's Rational Method and rainfall intensity from FEH rainfall (obtained using point data and MicroDrainage), for a storm duration of 15 minutes, the existing flow rates have been calculated as shown in Table 2:

Q = 2.78 x Rainfall Intensity (mm/hour) x Area (ha)

Table 2 - Existing Runoff Rates

Drainage Catchment	Storm Event	Rainfall Intensity (15min Duration) (mm/hr)	Q - Existing Flow Rate (l/s) using Wallingford Procedure
Impermeable Site Area = 0.50 ha	1 in 2	37.746	50.47
	1 in 30	97.223	135.14
	1 in 100	129.104	179.45

6.1.13. Please refer to Appendix F for a copy of the rainfall intensities generated using FEH rainfall data.

PROPOSED SURFACE WATER RUNOFF CALCULATIONS

6.1.14. Based on the Proposed Development, the drainage strategy is to achieve a reduction to greenfield runoff rates. The greenfield runoff rates have been calculated using the latest FEH data and HR Wallingford's online SuDS Greenfield runoff estimation tool. The results are as shown in Table 3 below and are attached in Appendix F:

Table 3 - Calculated Greenfield Runoff Rates

Drainage Catchment	Storm Event	Greenfield Runoff Rate from HR Wallingford Greenfield Runoff Estimation Tool (l/s)
Applicable Site Area = 0.50 ha	1 in 1*	1.52
	1 in 30	3.50
	1 in 100	4.86

*1in1 runoff rate used as a conservative measure from UKSUDS.com, 1in2 runoff rate is not provided from online tool, which is the lowest storm period that can be applied with MicroDrainage software.

6.1.15. As previously stated, it is proposed that surface water runoff will be stored within two separate attenuation tank systems located on the basement B1 slab. Stored water from the two tanks will then be pumped at restricted rates to ground level via a rising main, where it will then discharge via gravity to the TW combined sewer in Newcastle Place via two demarcation chambers.

6.1.16. Based on the above, hydraulic modelling has been undertaken using MicroDrainage to calculate attenuation requirements for the site with the following parameters and assumptions:

- MicroDrainage software has been used for all hydraulic design;
- FEH 2013 point rainfall data has been used;
- CV values are set at 1.0 (100%) within Micro-Drainage, for conservative measures at this stage to account for 100% impermeable coefficient;
- The proposed drainage network has been designed to contain the 1 in 100 year return period plus 40% climate change event;
- Draining Area of the site is 0.50ha;
- Limiting discharge rate of 4.86 l/s for all events up to including the 1:100 year + 40% climate change event;
- Flow control: Pump;
  - 1 in 2 year return period event;
  - 1 in 30 year return period event; and
  - 1 in 100 year return period plus 40% climate change event
- All agreements, permits and applications for connections to the public sewer network will be made post planning submission when detailed drainage requirements are confirmed and approved.

6.1.17. Based on the parameters above, a worst-case scenario has been considered for this Outline Drainage Strategy and has been designed to ensure that sufficient attenuation volume space is allocated within the Site.

6.1.18. A series of rainfall events have been hydraulically modelled to ensure that for all storm events, the attenuation tank for the site will provide as close to greenfield runoff rates as possible. **Table 4** below summarises the Micro-Drainage outflow results for the Site, the amount of attenuation storage provided, as well as the amount of volume utilised for each associated Storm Event. Full calculations can be found in Appendix F.

Table 4 - Discharge/Attenuation Summary

Storm Event	Estimated Existing Brownfield Flow Rate (l/s) using Wallingford Procedure	Micro-Drainage Flow Rate Output (l/s)	Reduction (%)	Max. Attenuation Volume (m^3) Utilised)
1 in 2	50.47	1.2	97	150.6
1 in 30	135.14	2.4	98	302.3
1 in 100	179.45	3.5	98	429.3
1 in 100 + 40% climate change allowance	N/A	4.8	N/A	601.1

6.1.19. As a result of the hydraulic modelling, **Table 4** shows that the design achieves at least a 97% reduction for all storm events up to and including the 1:100 + 40% climate change allowance event, when limiting the Site to a greenfield runoff rate of 4.86 l/s.

DESIGN SUMMARY

6.1.20. Based on a greenfield runoff rate of 4.86 l/s as a limiting discharge rate for the Proposed Development, a total attenuation storage volume of approximately 603m^3 is required to achieve a greenfield runoff rate reduction for up to the 1 in 100 year + 40% Climate Change Storm event.

6.1.21. It is proposed that the total attenuation volume will be split into two storage systems located on top of the basement slab to accommodate the required attenuation storage. Stored rainwater will be pumped to a demarcation chamber at ground floor level.

6.1.22. Please refer to Appendix G for the Outline Drainage Strategy Drawings 70069424-DR-001, 70069424-DR-002 and 70069424-DR-003.

6.1.23. Further discussion with TW will be undertaken for the connection to the public sewer network via a S106 application

6.2. FOUL WATER

6.2.1. Foul water flows from above ground floor of the development will be conveyed to the boundaries of the building, before connecting to demarcation manhole(s) via soil and vent pipes. All demarcation manholes will subsequently discharge to the public combined sewers located around the Site.

6.2.2. A foul network on basement level, consisting of a number of plant and car park gullies and pipework, will then be pumped to ground level before connecting to demarcation manhole(s) via rising mains.

6.2.3. Confirmation of the demarcation manhole locations will be sought at detailed design stage.

6.2.4. To prevent any internal flooding as a result of overloaded public sewers, non-return valves/flap valves will be utilised to prevent sewer flooding entering the Site.

6.2.5. A capacity check enquiry has been undertaken with TW (September 2020) to confirm that there is adequate capacity of the receiving public sewers, in relation to the site's foul water discharge. A response has been received, to confirm the capacity for the proposed foul flow rates. The peak foul flow discharge rate has been calculated to be 7.41 l/s.

7

MAINTENANCE STRATEGY

7. MAINTENANCE STRATEGY

7.1.1. The following drainage maintenance and management strategy has been produced:

Table 5: Drainage Maintenance Requirements

DRAINAGE FEATURE	REGULAR MAINTENANCE	OCCASIONAL/REMEDIAL MAINTENANCE	MONITORING
Drainage channels/Gullies	- Inspections will include gratings; covers including their locking bolts; sumps and sump buckets; exposed concrete surround and adjacent surfacing. - Check for accumulation of debris and silt and cleaned as necessary - Gratings, frames and all associated locking parts to be checked for damage. - Exposed concrete and adjacent surfacing to be checked for cracking and general damage. - Check condition of inlet and outlet pipes, flow controls, baffles and isolation structures	- Channel cleaning will be by flushing with water or high pressure jetting (no boiling water or cleaning agent will be used). All silt buckets and sumps will be cleaned out replaced back into the units ensuring they are correctly fitted. - All channel surfaces and joints will be checked and repaired as necessary. - Repair/rehabilitation of inlets, outlet, overflows and vents, as required.	- Inspect every 4 months or after large storm.
Catchpit Manholes/Inspection Chambers	- Check for accumulation of debris and silt and cleaned as necessary. - Covers and frames to be checked for damage. - Exposed concrete and adjacent surfacing to be checked for cracking and general damage. - Check condition of inlet and outlet pipes, flow controls, baffles and isolation structures	- Clean as necessary. - All manhole and inspection chamber covers and frames to be replaced as necessary. - Repair exposed concrete and surfacing as necessary - Repair/rehabilitation of inlets, outlet, overflows and vents, as required.	- Inspect every 6 months or after large storm.
Attenuation Tanks	- Check for accumulation of debris and silt and cleaned as necessary. - Covers and frames to be checked for damage. - Exposed concrete and adjacent surfacing to be checked for cracking and general damage.	- Clean as necessary. - All manhole and inspection chamber covers and frames to be replaced as necessary. - Repair exposed concrete and surfacing as necessary. - Repair/rehabilitation of inlets, outlet, overflows and vents, as required.	- Inspect every 6 months or after large storm.

	- Check condition of inlet and outlet pipes, flow controls, baffles and isolation structures		
Petrol/Oil Interceptor	- Check for accumulation of debris and silt and cleaned as necessary. - Covers and frames to be checked for damage. - Exposed concrete and adjacent surfacing to be checked for cracking and general damage. - Check for any hydrocarbon build-up within the interceptor chambers and clear/remove as necessary - Check condition of inlet and outlet pipes of flow controls, baffles and isolation structures - Check condition and test alarm probe.	- Clean as necessary. - All manhole and inspection chamber covers and frames to be replaced as necessary. - Repair exposed concrete and surfacing as necessary. - Repair/rehabilitation of inlets, outlet, overflows and vents, as required.	- Inspect every 6 months or after large storm.
Pumps	- Check for accumulation of debris and silt and cleaned as necessary. - Check condition and test alarm probe. - Other regular maintenance to be undertaken as per manufacturer's guidelines.	- Clean as necessary. - Repair/rehabilitation of inlets, outlets, alarms and vents as required. - Other remedial maintenance to be undertaken as per manufacturers guidelines	- Frequency of monitoring to be undertaken as per manufacturers guidelines.

8

CONCLUSIONS

8. CONCLUSIONS

8.1.1. This Outline Drainage Strategy supports the planning submission for the development of Paddington Green Police Station.

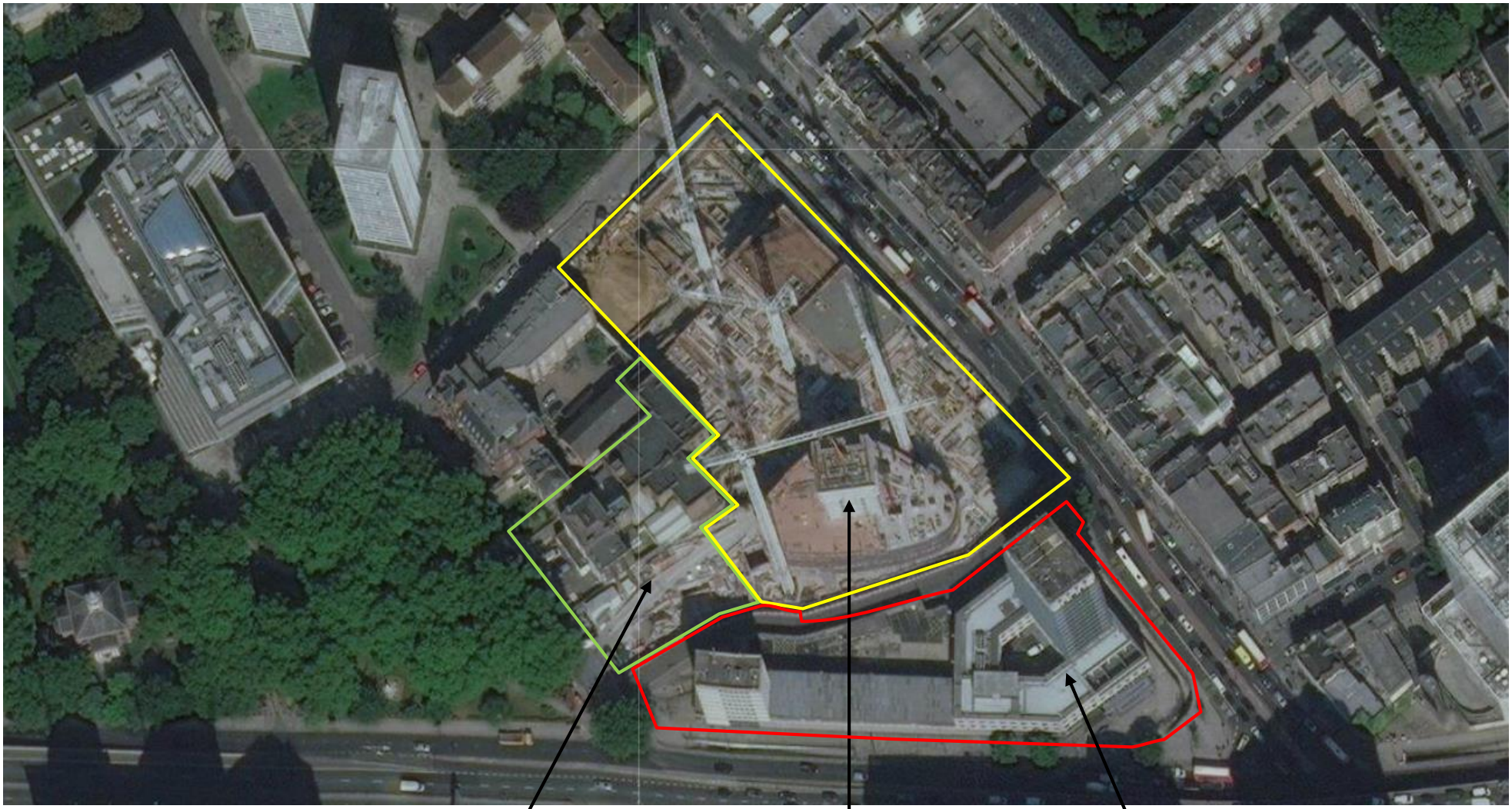
8.1.2. The proposed development will restrict surface water flows to the greenfield runoff rate of 4.86 l/s, for up to the 1:100 + 40% climate change allowance event. In order to achieve the required attenuation for this storm event, an attenuation storage of 601.1m³ will be provided within two separate tanks above the slab at basement level 1. Stored water from the two tanks will then be pumped at restricted rates to ground level where it will then discharge via gravity to the TW combined sewer in Newcastle Place via two demarcation chambers.

8.1.3. Foul water flows from above ground floor of the development will be conveyed to the boundaries of the building, before connecting to demarcation manhole(s) via soil and vent pipes. At basement level, a foul network consisting of plant and car park gullies and pipework, will be pumped to ground level before connecting to demarcation manhole(s). The proposed peak foul flow discharge rate is 7.41 l/s.

8.1.4. TW have been consulted as part of a pre-planning application, with regards to the capacity of the surface water network. In the latest correspondence to date, TW have advised that there is sufficient capacity within the combined sewer network in Newcastle Place to accommodate the proposed surface water flow rate of 4.86l/s. TW have also confirmed that there is sufficient capacity within the network for the proposed foul rates. As a result, this DS has been designed accordingly.

Appendix A

SITE LOCATION



WSP House
70 Chancery Lane
London, WC2A 1AF
Tel: 0207 314 5000
Fax: 0207 314 5111

Project No.	70069424	Scale	NTS
Client	Berkeley Homes (Central London) Ltd	Figure No.	Appendix A.3
Project	Paddington Green Police Station	Drawn by	JR
Title	Satellite View of the Site	Checked by	JR

Appendix B

TOPOGRAPHICAL SURVEY

CONFIDENTIAL

STANDARD ABBREVIATIONS

A/C	Air Conditioner	LB	Litter Bin
ATM	Automated Telling Machine	LP	Lamp Post
ASP	Aluminium security panelling	Max	Maximum
B	Bollard	Mk	Muddhole
BB	Bellsha Beacon	MH	Manhole
BH	Borehole	Min	Minimum
Br	Brick	Mkr	Marker
BrS	Brick Setts	NB	Notice Board
BRW	Brick Retaining Wall	NP	Name Plate
BS	Bus Stop	OBF	Open Boarded Fence
BT	British Telecom	OH	Overhead
BW	Brick Wall	OSBM	Ordnance Survey Bench Mark
CBF	Close Boarded Fence	P	Post
CBF	Close Boarded Fence	PB	Pillar Box
CCTV	Closed Circuit Television	PDM	Permanent Ground Marker
CF	Corrugated iron Fence	PLI	Pavement Light
CL	Cover Level	PM	Parking Meter
CLF	Chain Link Fence	PRF	Post and Rail Fence
Col	Column	PS	Paving Stones
Con	Concrete	PVF	Plastic Coated Fence
CoW	Cable on Wall	RE	Rocking Eye
CPS	Concrete Paving Slabs	RG	Road Gully
CTV	Cable Television IC	RS	Road Sign
d	depth	RSJ	Rolled Steel Joist
DC	Duct Cover	RWP	Rain Water Pipe
DH	Duct Height	s	spread
DP	Down Pipe Mark	SB	Stop Board
DR	Down Pipe	SBM	Site Bench Mark
DrC	Drainage Channel	SC	Stop Cock
EIC	Electrical Inspection Cover	SF	Security Fence
EJB	Electrical Junction Box	SNB	Shrub Bed
EP	Electricity Pole	SL	Sump Level
ER	Earthing Rod	SO	Smoke Outlet
ESG	Electrical Switchgear	SP	Sign Post
FB	Flower Bed	SV	Stop Valve
FH	Fire Hydrant	T	Telegraph
FL	Floor Level	Tac	Tactile Paving
FlI	Floodlight	TBM	Temporary Bench Mark
g	girth	TCB	Telephone Cat Box
G	Gully	TCP	Traffic Control Post
GC	Gas Cock	TIC	Telephone Inspection Cover
GM	Gas Meter	TJB	Telephone Junction Box
GP	Guard Post	TP	Tree Pit
GV	Gas Valve	TLCB	Traffic Light Control Box
h	height	TLIC	Traffic Light Inspection Cover
HR	Handrail	TP	Telephone Pole
IB	Illuminated Bollard	Typ	Typical
IC	Inspection Cover	V	Vent
IL	Invert Level	VP	Vent Pipe
IRF	Iron Railing Fence	W	Window
IRS	Illuminated Road Sign	WH	Wood panelling
JB	Junction Box	WM	Water Meter
KO	Kerb Outlet	WV	Water Valve
L	Light		

LEGEND

STAIR/STEP ARROWS POINT UP

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ISSUES & REVISIONS

Issue	Details	By	Date
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B	Supplied Coordinates Added	PCL	17/03/2016
C	Additional Data	PCL	21/04/2016

SHEET LAYOUT

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CLIENT

Berkeley Homes (Urban Developments) Limited

3rd Floor,
Ergon House,
Horseferry Road,
London,
SW1P 2AL

PROJECT TITLE

West End Green

London

2D Topographical Survey

SURVEYED AND DRAWN BY

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PRESENTATION SCALE	1:200 @ A0
DATE OF ORIGINAL SURVEY	05/03/2016
PC PROJECT No. 34043-001	CHECKED
DRAWING No.	34043-001T-01-1
ISSUE	C

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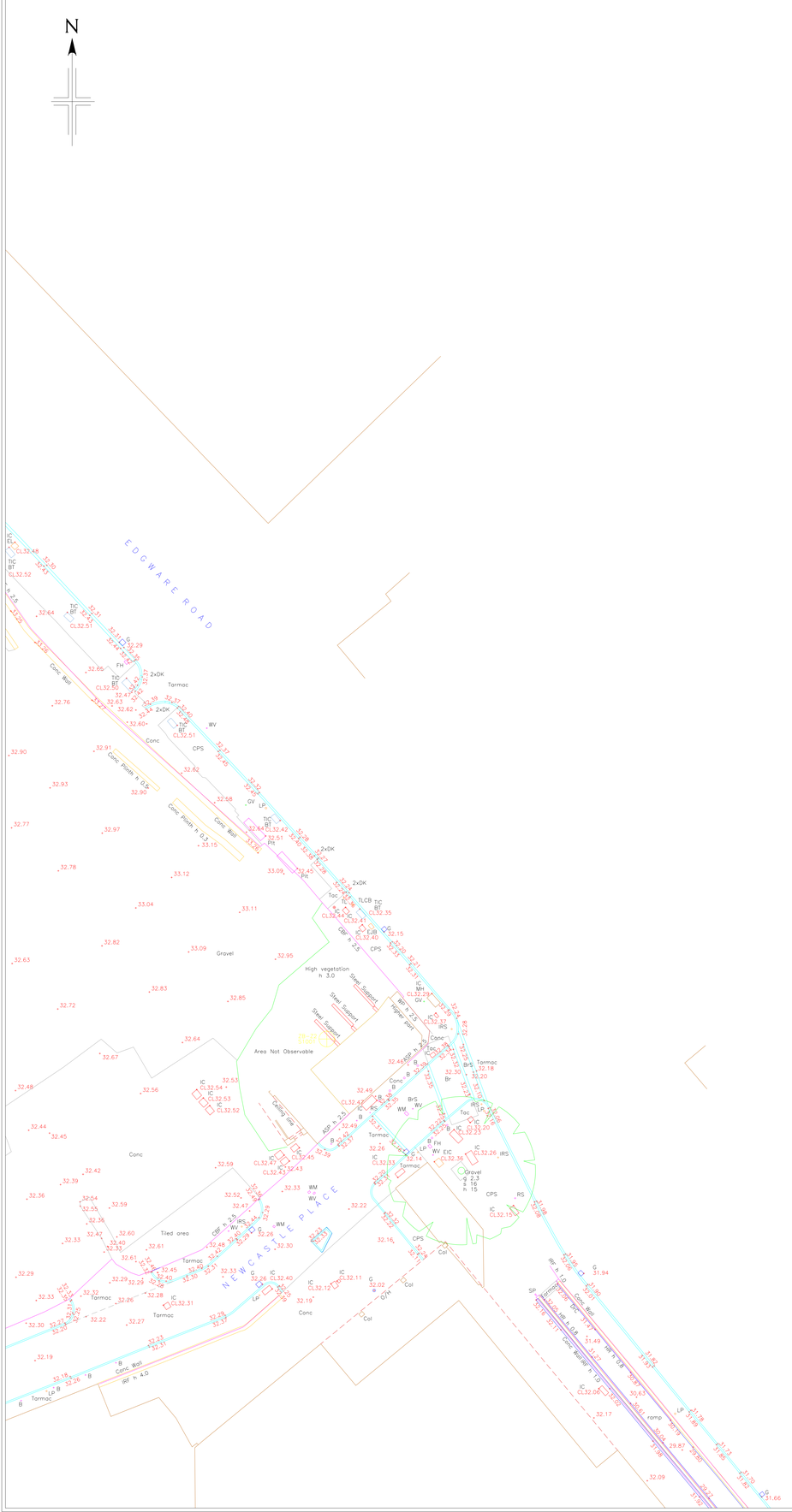

STANDARD ABBREVIATIONS

A/C	Air Conditioner	LB	Litter Bin
ATM	Automated Telling Machine	LP	Lamp Post
ASP	Aluminium security panelling	Max	Maximum
B	Bollard	Mk	Muddhole
BB	Bellstra Beacon	MH	Manhole
BC	Bellstra Column	Min	Minimum
Bi	Brick	Mkr	Marker
BrS	Brick Setts	NB	Notice Board
BRW	Brick Retaining Wall	NP	Name Plate
BS	Bus Stop	OBF	Open Boarded Fence
BT	British Telecom	OH	Overhead
BW	Brick Wall	OSBM	Ordnance Survey Bench Mark
CBF	Close Boarded Fence	P	Pole
CBF	Close Boarded Fence	PB	Pillar Box
CCTV	Closed Circuit Television	PGM	Permanent Ground Marker
CIF	Corrugated Iron Fence	PLI	Pavement Light
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DC	Duct Cover	RWP	Rain Water Pipe
DH	Duct Height	s	spread
DI	Drainage Inlet	SB	Setts Bedded
DP	Down Pipe	SBM	Site Bench Mark
DrC	Drainage Channel	SC	Stop Cock
EIC	Electrical Inspection Cover	SF	Security Fence
EJB	Electrical Junction Box	ShB	Shrub Bed
EP	Electricity Pole	SL	Sump Level
ER	Earthing Rod	SO	Smoke Outlet
ESG	Electrical Switchgear	SP	Sign Post
FB	Flower Bed	SV	Stop Valve
FH	Fire Hydrant	T	Telegraph
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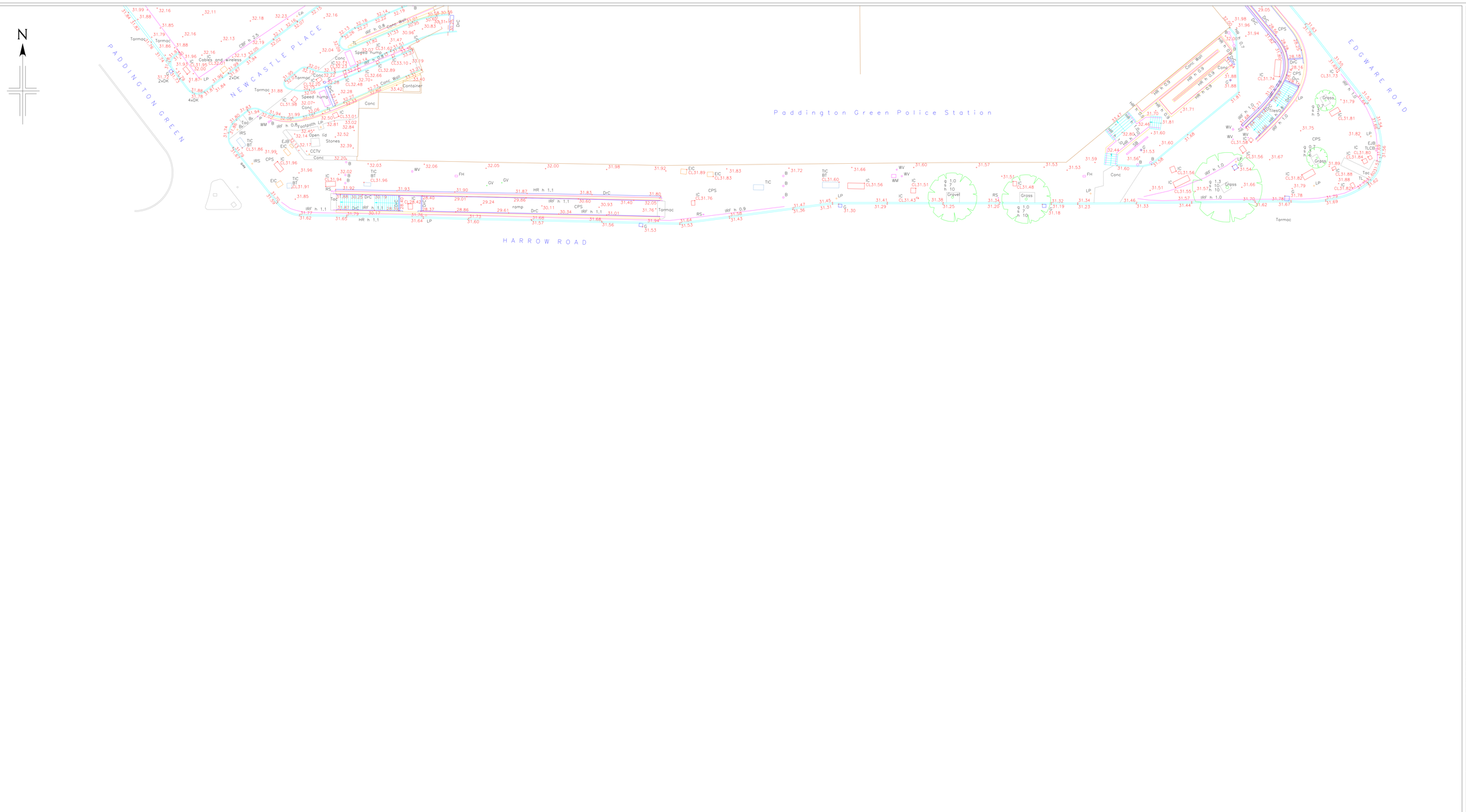

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SW1P 2AL

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West End Green

London

2D Topographical Survey

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DRAWING No.	34043-001T-01-1
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Appendix C

THAMES WATER SEWER RECORDS & CCTV SURVEY INFORMATION

Asset Location Search

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: 0845 850 2777
Email: developer.services@thameswater.co.uk

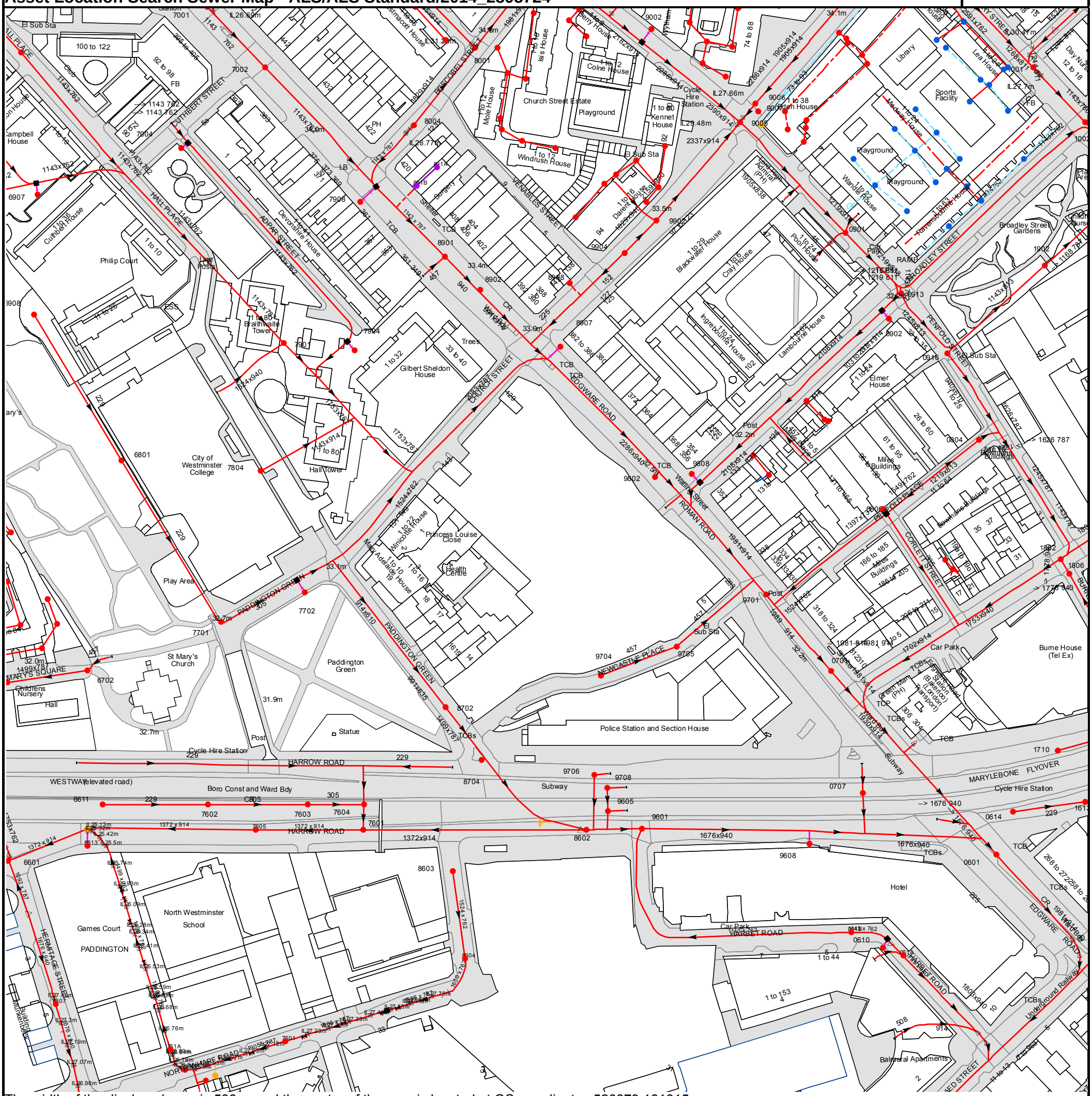
Clean Water queries

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: 0845 850 2777
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2014_2898724



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 526879,181815

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.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

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
0804	31.96	28.25
00CH	n/a	n/a
09BI	n/a	n/a
00CG	n/a	n/a
00CF	n/a	n/a
00CJ	n/a	n/a
00CE	n/a	n/a
09CA	n/a	n/a
1001	32.99	29.69
1902	32.71	27.34
1002	32.52	n/a
1806	n/a	n/a
08BD	n/a	n/a
08BC	n/a	n/a
1802	32.34	26.94
0806	n/a	n/a
061A	n/a	n/a
0610	n/a	n/a
0601	30.89	25.65
0614	n/a	29.37
1613	n/a	28.96
0707	n/a	26.56
1710	n/a	29.64
00BD	n/a	n/a
09CH	n/a	n/a
09DC	n/a	n/a
00AJ	n/a	n/a
00BE	n/a	n/a
09CG	n/a	n/a
0902	n/a	n/a
00CB	n/a	n/a
0913	32.31	28.51
09DB	n/a	n/a
09CF	n/a	n/a
00CA	n/a	n/a
09DA	n/a	n/a
00BJ	n/a	n/a
00CC	n/a	n/a
00CI	n/a	n/a
09CB	n/a	n/a
0916	32.48	27.72
09BH	n/a	n/a
09CJ	n/a	n/a
00CD	n/a	n/a
09CC	n/a	n/a
00DA	n/a	n/a
99AH	n/a	n/a
99BA	n/a	n/a
99BB	n/a	n/a
9002	n/a	n/a
99BC	n/a	n/a
90DA	n/a	n/a
90CI	n/a	n/a
90CE	n/a	n/a
90CD	n/a	n/a
90CJ	n/a	n/a
90CC	n/a	n/a
90CB	n/a	n/a
9005	33.7	29.36
9006	n/a	n/a
9007	n/a	n/a
90BA	n/a	n/a
90BF	n/a	n/a
90AJ	n/a	n/a
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90BC	n/a	n/a
90BD	n/a	n/a
00BB	n/a	n/a
00BA	n/a	n/a
8702	32.02	27.85
9704	n/a	29.21
0701	31.69	26.9
9705	n/a	28.4
7701	32.49	30.01
9701	n/a	n/a
7702	32.8	n/a
9802	32.45	n/a
98BI	n/a	n/a
9808	32.54	n/a
7804	n/a	30.39
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08AH	n/a	n/a
08AJ	n/a	n/a
98AE	n/a	n/a
7904	n/a	n/a
8907	32.94	n/a
7901	n/a	28.3
8902	33.27	28.37
8908	n/a	n/a
8901	33.47	28.53
9904	33.28	30.36

Manhole Reference	Manhole Cover Level	Manhole Invert Level
0901	32.53	28.78
9902	33.45	30.13
89AJ	n/a	n/a
99BD	n/a	n/a
7908	33.78	n/a
7507	n/a	n/a
7501	30.82	27.17
8604	30.87	28.02
061B	n/a	n/a
8603	31.15	28.37
9608	n/a	n/a
7601	n/a	26.33
8602	n/a	n/a
7605	n/a	n/a
9601	n/a	26.55
9605	n/a	30.1
7604	n/a	26.57
7603	n/a	29.68
7602	n/a	29.92
9708	n/a	30.4
9706	n/a	29.41
8704	n/a	n/a
7002	34.46	29.13
8004	34.47	31.35
891B	n/a	n/a
891A	n/a	n/a
80BD	n/a	n/a
8001	34.64	31.07
80CA	n/a	n/a
80CD	n/a	n/a
80CC	n/a	n/a
80BJ	n/a	n/a
80CF	n/a	n/a
80BI	n/a	n/a
80BH	n/a	n/a
80CE	n/a	n/a
80CH	n/a	n/a
80CI	n/a	n/a
80CG	n/a	n/a
6601	n/a	24.72
6607	30.55	27.45
6613	31.33	26.98
6611	n/a	30.18
751A	n/a	26.87
7502	30.66	26.82
6704	n/a	n/a
6702	32.12	29.56
67BG	n/a	n/a
67BB	n/a	n/a
67BF	n/a	n/a
67BE	n/a	n/a
67BA	n/a	n/a
68AC	n/a	n/a
6801	33.42	30.86
6908	34.11	33.73
6907	30.49	n/a
7004	n/a	n/a
6001	34.9	29.04

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.

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

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

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

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

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

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

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

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

Control Valve

Drop Pipe

Ancillary

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.

Outfall

Undefined End

Inlet

Other Symbols

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

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.

2) All measurements on the plans are metric.

3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.

4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

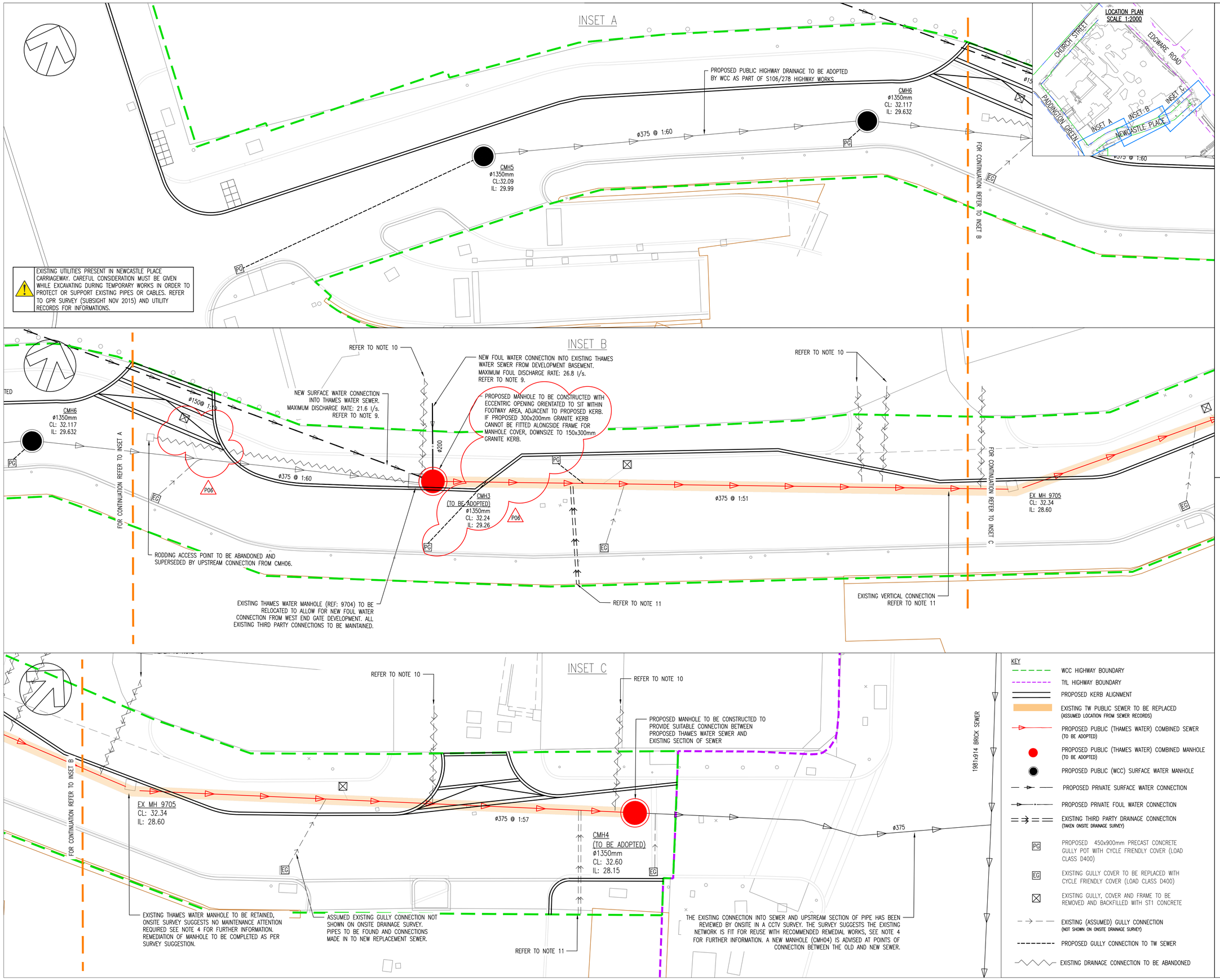
5) 'na' or '0' on a manhole level indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. 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 present on the plan, please contact a member of Property Insight on 0845 070 9148.

Appendix D

NEWCASTLE PLACE SEWER DIVERSION

CONFIDENTIAL



NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE.
3. REFER TO DRAWING R137-D-Z-DT(52)-00-010 FOR TYPICAL DETAILS
4. INVERT LEVELS OF EXISTING SEWERS ARE ESTIMATED FROM THAMES WATER ASSET LOCATION RECORDS AND NEWCASTLE PLACE CCTV SURVEY INFORMATION. ONSITE CENTRAL LTD CCTV SURVEY REF: 493098, MANHOLE CHAMBER RECORD REF: STC25, DATED: 14/12/2016.
5. THE NEW SEWER HAS BEEN DESIGNED AS A 'LIKE FOR LIKE' REPLACEMENT OF THE EXISTING E.G. LINE, LEVEL AND DIAMETER. THEREFORE THE HYDRAULIC PERFORMANCE HAS NOT BEEN ASSESSED AND IS ASSUMED TO MAINTAIN THE CURRENT FLOW REGIME/ CAPACITY.
6. THE BELOW GROUND DRAINAGE DESIGN IS SUBJECT TO APPROVAL FROM THAMES WATER.
7. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH SEWERS FOR ADOPTION AND SPECIFICATION FOR HIGHWAY WORKS.
8. PROPOSED CONNECTIONS INTO THE EXISTING PUBLIC SEWER AND THE ADOPTION OF PROPOSED DRAINAGE IS SUBJECT TO A SECTION 106 AND 104 AGREEMENT WITH THAMES WATER.
9. NEW CONNECTION FROM WEST END GATE DEVELOPMENT TO CONNECT INTO THAMES WATER SEWER. SUBJECT TO APPROVAL OF SEPARATE S106 AGREEMENT WITH THAMES WATER. REFER TO WSP DRAWING R137-D-Z-DR(52)-00-107 FOR FURTHER DETAILS,
10. EXISTING CONNECTION FROM DEVELOPMENT SITE ASSUMED REDUNDANT, TO BE CAPPED OFF. TO BE CONFIRMED BY CONTRACTOR ON SITE.
11. EXISTING CONNECTION, STATUS UNKNOWN. TO BE INVESTIGATED FURTHER BY CONTRACTOR TO DETERMINE NEED FOR CONNECTION TO BE MAINTAINED INTO NEW REPLACEMENT SEWER. ASSUME REQUIRED UNTIL DETERMINED OTHERWISE.
12. EXISTING GULLY CONNECTION SURVEY IS REQUIRED BY WCC AS PART OF THE S106 HIGHWAY WORKS. STATUS OF EXISTING CONNECTIONS (SEE NOTES 10 & 11) TO BE CONFIRMED BY THIS SURVEY.
13. ALL ADOPTABLE DRAINAGE WORKS TO BE CONSTRUCTED AS DETAILED IN THE CODE FOR ADOPTION AND CONSTRUCTION GUIDANCE AND THAMES WATER'S LOCAL PRACTICE.
14. ALL ABANDONED AND DIVERTED PUBLIC SEWERS AND MANHOLES ARE TO BE REMOVED FROM THE GROUND.
15. ALL ABANDONED AND DIVERTED PRIVATE SEWERS AND MANHOLES ARE TO BE REMOVED FROM THE GROUND.
16. ALL PROPOSED DRAINAGE PIPE WORK TO BE CONCRETE TO BS EN 1916 AND BS EN 5911.
17. ANY REMEDIATION WORKS REQUIRED WILL BE CARRIED OUT BY THE CONTRACTOR AS PER RECOMMENDATIONS ON THE CCTV SURVEY CARRIED OUT BY ONSITE CENTRAL LTD. REF: 493098 DATED 14/12/2016.

DENOTES REVISIONS FROM PREVIOUS DRAWING

Revision	Description	Date	Drawn	Approved
P0 6	UPDATED TO REFLECT DESIGN DEVELOPMENT	11/12/2020	SR	JOC
P0 5	UPDATED TO REFLECT DESIGN DEVELOPMENT	08/10/2020	JBH	AS
P0 4	UPDATED TO REFLECT TW COMMENTS	13/08/2020	JBH	JOC
P0 3	UPDATED TO REFLECT TW COMMENTS	11/08/2020	JBH	JOC
P0 2	FOR APPROVAL	30/07/2020	JBH	AS
P0 1	FOR INFORMATION	15/12/17	WF	JOC

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Client's Name
BERKELEY HOMES (CENTRAL LONDON) LTD

Job Title
WEST END GREEN

Drawing Title
TW SEWER DIVERSION NEWCASTLE PLACE GENERAL ARRANGEMENT

Scale @ A1
1:100

Drawing No
R137-D-Z-DR(52)-00-010

Rev
P06

Status
FOR APPROVAL

Originator Project Number
70013973

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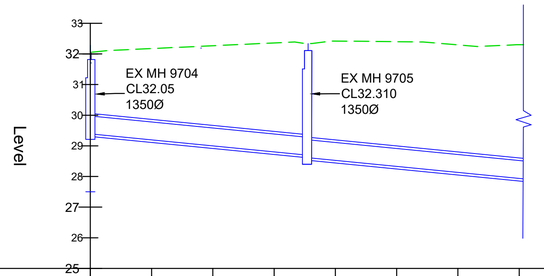
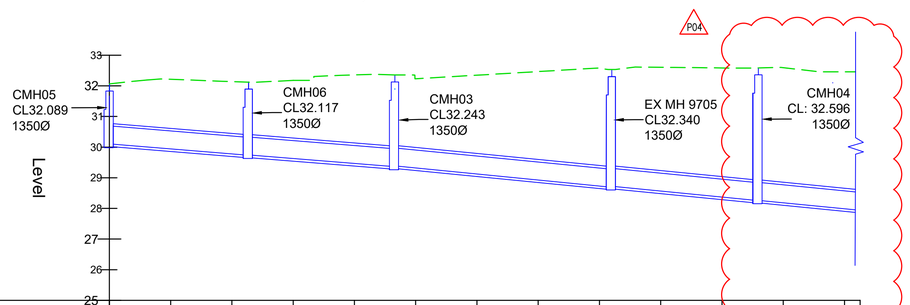


CHAINAGE (m)	00.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000
DOWNSTREAM PIPE INVERT LEVEL (m)	29.260				28.400				
UPSTREAM PIPE INVERT LEVEL (m)					28.400				
PIPE INNER DIAMETER (mm)	375				375				
PIPE GRADIENT	1:51				1:57				
PIPE AND BEDDING SPECIFICATION	PIPE MATERIAL: CONCRETE. PIPE BEDDING: TYPE S. TRENCH BACKFILL: CLASS 1 MATERIAL TO SHW 600 SERIES.								

TW EXISTING - LONG SECTION
SCALE: H 1:500,V 1:100. DATUM: 25.000



CHAINAGE (m)	00.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000
DOWNSTREAM PIPE INVERT LEVEL (m)	29.987		29.632			29.260			28.600			28.150	
UPSTREAM PIPE INVERT LEVEL (m)			29.632			29.260			28.600			28.150	
PIPE INNER DIAMETER (mm)	375		375			375			375			375	
PIPE GRADIENT	1:60		1:60			1:51			1:57			1:57	
PIPE AND BEDDING SPECIFICATION	PIPE MATERIAL: CONCRETE. PIPE BEDDING: TYPE S. TRENCH BACKFILL: CLASS 1 MATERIAL TO SHW 600 SERIES.												

TW PROPOSED - LONG SECTION
SCALE: H 1:500,V 1:100. DATUM: 25.000

NOTES:

1. FOR MH TYPES AND BEDDING REQUIREMENTS, REFER TO DRAINAGE DETAIL DRAWINGS R137-D-Z-DT(52)-00-010.
2. REFER TO DRAWING R137-D-Z-DR(52)-00-010 FOR GENERAL ARRANGEMENT.
3. ALL ADOPTABLE DRAINAGE WORKS TO BE CONSTRUCTED AS DETAILED IN THE CODE FOR ADOPTION AND CONSTRUCTION GUIDANCE AND THAMES WATER'S LOCAL PRACTICE.

DENOTES REVISIONS FROM PREVIOUS DRAWING

Revision	Description	Date	Drawn	Approved
P0 4	UPDATED TO REFLECT DESIGN DEVELOPMENT	08/10/2020	JBH	AS
P0 3	UPDATED TO REFLECT TW COMMENTS	13/08/2020	JBH	JOC
P0 2	UPDATED TO REFLECT TW COMMENTS	11/08/2020	JBH	AS
P0 1	FOR APPROVAL	30/07/2020	JBH	AS

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Client's Name
BERKELEY HOMES (CENTRAL LONDON) LTD

Job Title
WEST END GREEN

Drawing Title
TW SEWER DIVERSION
NEWCASTLE PLACE
LONG SECTIONS

Scale @ A1
1:100

Drawing No
R137-D-Z-DR(52)-00-011

Rev
P04

Status
FOR APPROVAL

Originator Project Number
70013973

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Appendix E

DEVELOPMENT PROPOSALS

Do not scale from this drawing. All dimensions to be checked on site. All omissions and discrepancies to be reported to the Architect immediately

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Key

	Proposed Planning Boundary
	TFL Proposed Junction
	Site Ownership boundary

Proposed Planning Boundary
8,286 sqm

Legal Site Boundary
4,999 sqm

32236
32293
32321
32173
32099
32748
32221
36514
36956
32259
32120
33244
33264
33234
33246
33214
31888
33410
31765
31732
31950
31590
31944
31934
32876
31784
31486
31338
31452
31675

N

0 10 20 30 40 50 m

Issued for Planning 26/03/21 P1

Description Date Chk Rev

SQUIRE & PARTNERS

Squire and Partners LLP
The Department Store
248 Ferndale Road, London SW9 8FR
T: 020 7278 5555

info@squireandpartners.com
www.squireandpartners.com

Project

Paddington Green Police Station
London, W2

Title

Existing Site Location Plan

Suitability S2

Status For Information

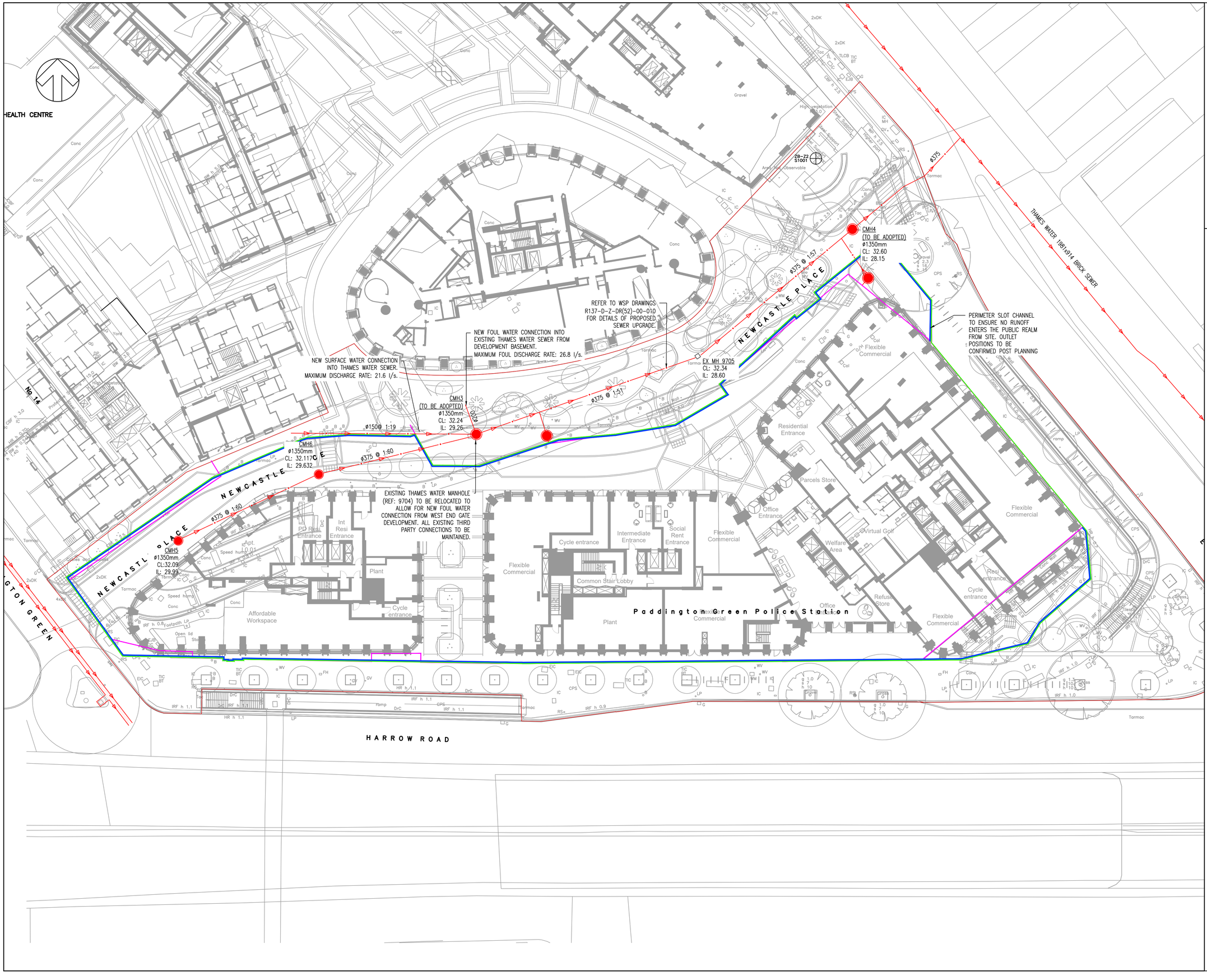
Date 11.09.20

Scale @ ISO A1 1:500

Job Number 15044

Drawing Number 15044-SQP-ZZ-ZZ-DR-A-PL01005

Revision P1



NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL STRUCTURAL, LANDSCAPE ARCHITECTS, ARCHITECTURAL AND PUBLIC HEALTH DRAWINGS.
4. THIS DRAWING IS BASED ON SQUIRES AND PARTNERS ARCHITECTURAL DRAWINGS. PLEASE REFER TO DRAWINGS FOR INFORMATION
5. DRAINAGE LAYOUT SUBJECT TO APPROVAL FROM RELEVANT APPROVING BODIES. UNTIL TECHNICAL APPROVAL HAS BEEN OBTAINED FROM THE RELEVANT LOCAL AUTHORITIES OR STATUTORY BODIES, IT SHOULD BE UNDERSTOOD THAT ALL DRAWINGS ARE ISSUED AS PRELIMINARY AND NOT FOR CONSTRUCTION. SHOULD THE CONTRACTOR AND/OR EMPLOYER COMMENCE WORK PRIOR TO APPROVAL BEING GIVEN, IT IS ENTIRELY AT THEIR OWN RISK
6. REFER TO DRAWING XXX BASEMENT B2 DRAINAGE GENERAL ARRANGEMENT
7. REFER TO DRAWING XXX FOR GROUND FLOOR DRAINAGE GENERAL ARRANGEMENT

KEY:

- PLANNING APPLICATION BOUNDARY
- SITE OWNDERSHIP BOUNDARY
- ASSUMED BASEMENT EXTENT LINE (BASED ON ARCHITECTS PLANS)
- PROPOSED COMBINED DEMARCATION MANHOLE
- PROPOSED COMBINED DRAINAGE RUN
- LOCATION OF EXISTING THAMES WATER SEWER BASED ON DRAINAGE SURVEY
- PROPOSED ACO MULTIDRAIN M100D CHANNEL WITH BRICKSLOT GRATING – UNIVERSAL SUMP OUTLET

Revision	Description	Date	Drawn	Approved
P 1	ISSUE FOR PLANNING	26/02/21	PT	JOC

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Client's Name
BERKELEY HOMES (CENTRAL LONDON) LTD

Job Title
PADDINGTON GREEN POLICE STATION

Drawing Title
O□TLINE DRAINAGE STRATEGY GRO□ND FLOOR

Scale @ A1
1:□□0

Drawing No
70069□2□-DR-001

Rev
P1

Status
FOR PLANNING

Originator Project Number
70069□2□

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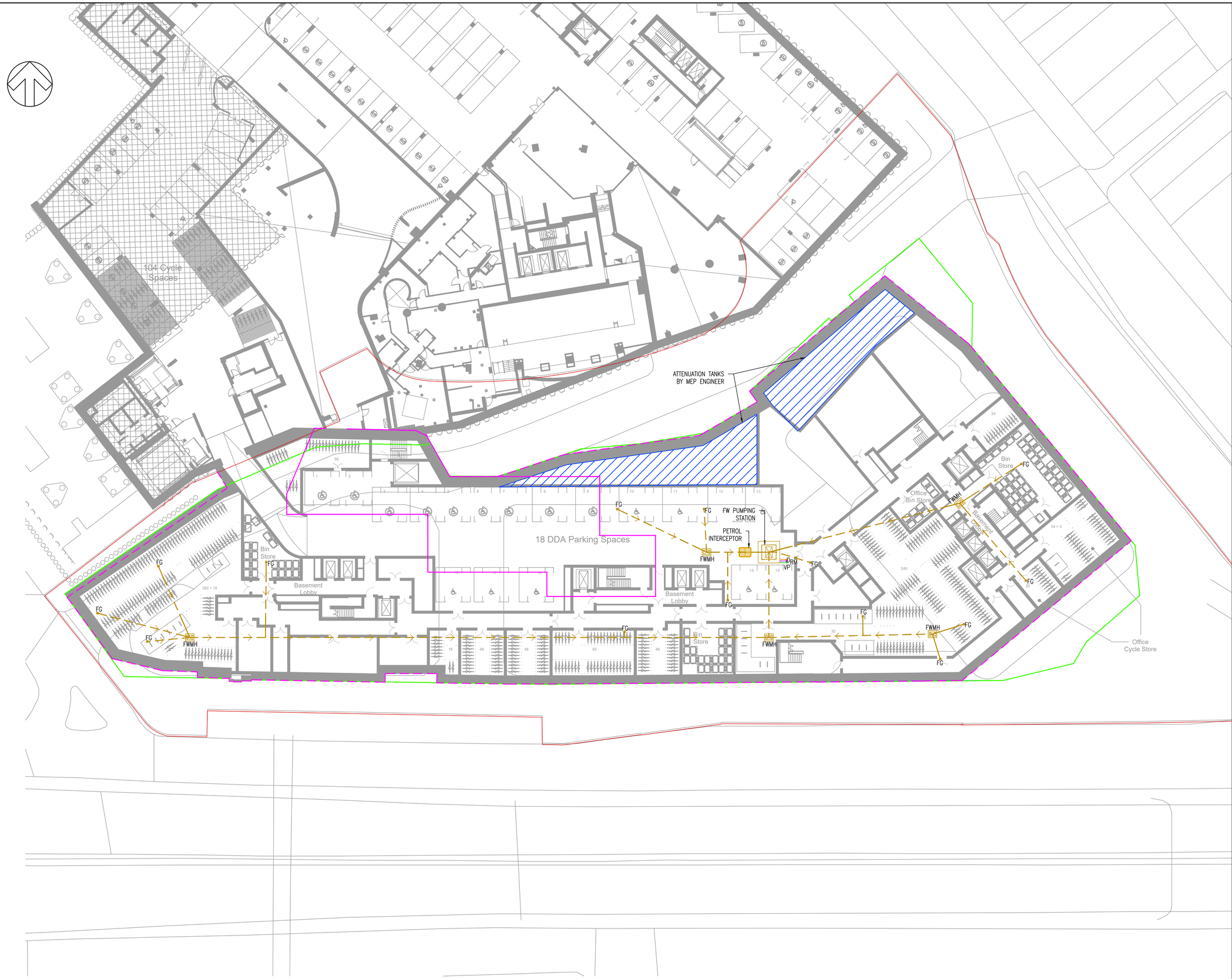

NOTES

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6. REFER TO DRAWING XXX BASEMENT B2 DRAINAGE GENERAL ARRANGEMENT
7. REFER TO DRAWING XXX FOR GROUND FLOOR DRAINAGE GENERAL ARRANGEMENT

KEY:

- PLANNING APPLICATION BOUNDARY
- SITE OWNDERSHIP BOUNDARY
- ASSUMED BASEMENT EXTENT LINE (BASED ON ARCHITECTS PLANS)
- ASSUMED B2 BASEMENT EXTENT LINE (BASED ON ARCHITECTS PLANS)
- PROPOSED FOUL WATER MANHOLE
- PROPOSED FOUL WATER DRAINAGE RUN
- FG PROPOSED FLOOR GULLY
- PROPOSED PETROL INTERCEPTOR
- PROPOSED FOUL WATER PUMPING STATION
- PROPOSED CONCRETE SURFACE WATER ATTENUATION TANK (ABOVE B1 SLAB)

Revision	Description	Date	Drawn	Approved
P 1	ISSUE FOR PLANNING	26/02/21	PT	JOC

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Job Title
PADDINGTON GREEN POLICE STATION

Drawing Title
O□TLINE DRAINAGE STRATEGY BASEMENT B1 LEVEL

Scale @ A1
1:□□0

Drawing No
70069□2□-DR-002

Rev
P1

Status
FOR PLANNING

Originator Project Number
70069□2□

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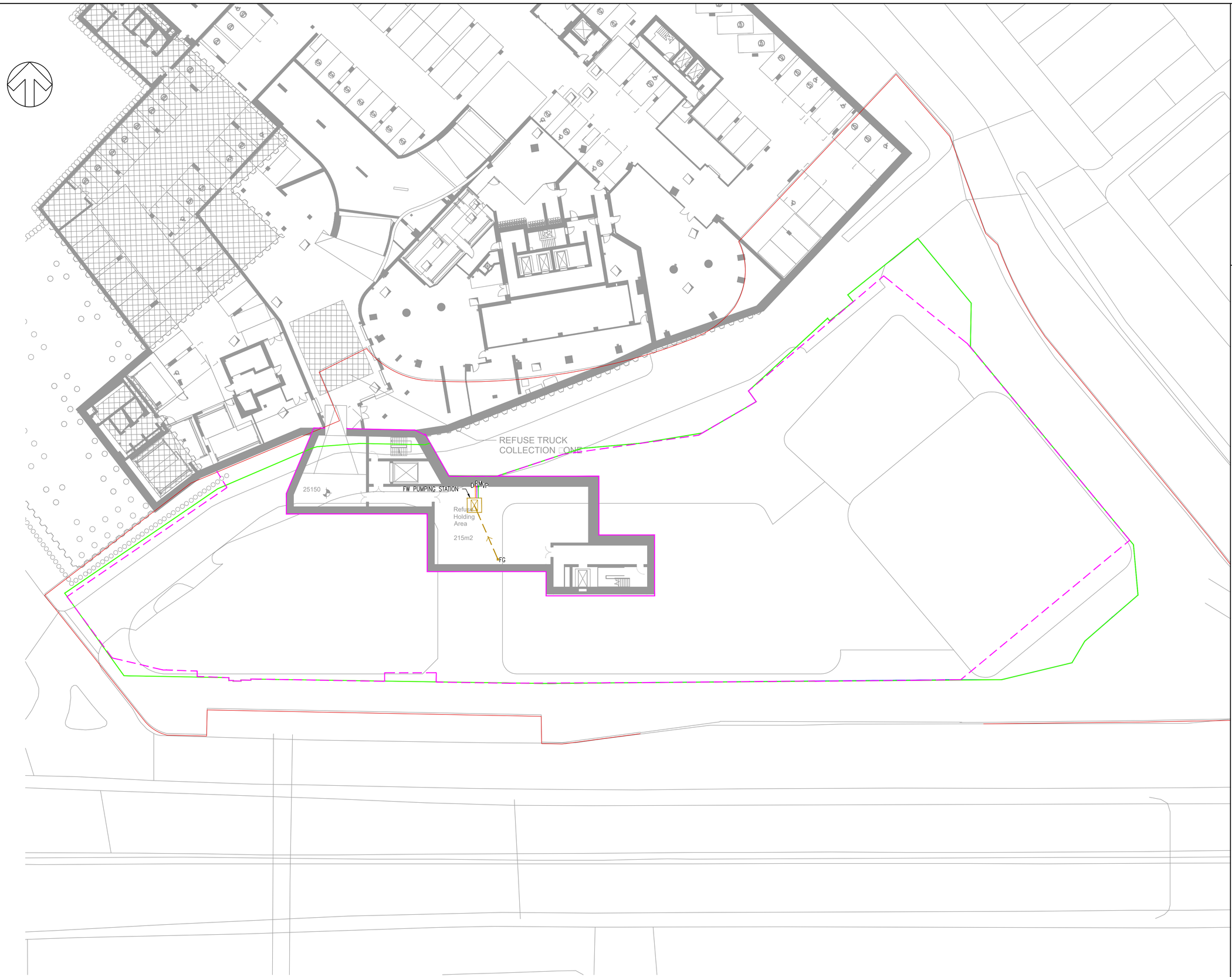

NOTES

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6. REFER TO DRAWING XXX BASEMENT B2 DRAINAGE GENERAL ARRANGEMENT
7. REFER TO DRAWING XXX FOR GROUND FLOOR DRAINAGE GENERAL ARRANGEMENT

KEY:

- PLANNING APPLICATION BOUNDARY
- SITE OWNDERSHIP BOUNDARY
- ASSUMED BASEMENT EXTENT LINE (BASED ON ARCHITECTS PLANS)
- ASSUMED B2 BASEMENT EXTENT LINE (BASED ON ARCHITECTS PLANS)
- PROPOSED FOUL WATER DRAINAGE RUN
- FG PROPOSED FLOOR GULLY
- PROPOSED FOUL WATER PUMPING STATION

Revision	Description	Date	Drawn	Approved
P 1	ISSUE FOR PLANNING	26/02/21	PT	JOC

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Job Title
PADDINGTON GREEN POLICE STATION

Drawing Title
O□TLINE DRAINAGE STRATEGY BASEMENT B□ LEVEL

Scale @ A1
1:□□0

Drawing No
70069□2□-DR-003

Rev
P1

Status
FOR PLANNING

Originator Project Number
70069□2□

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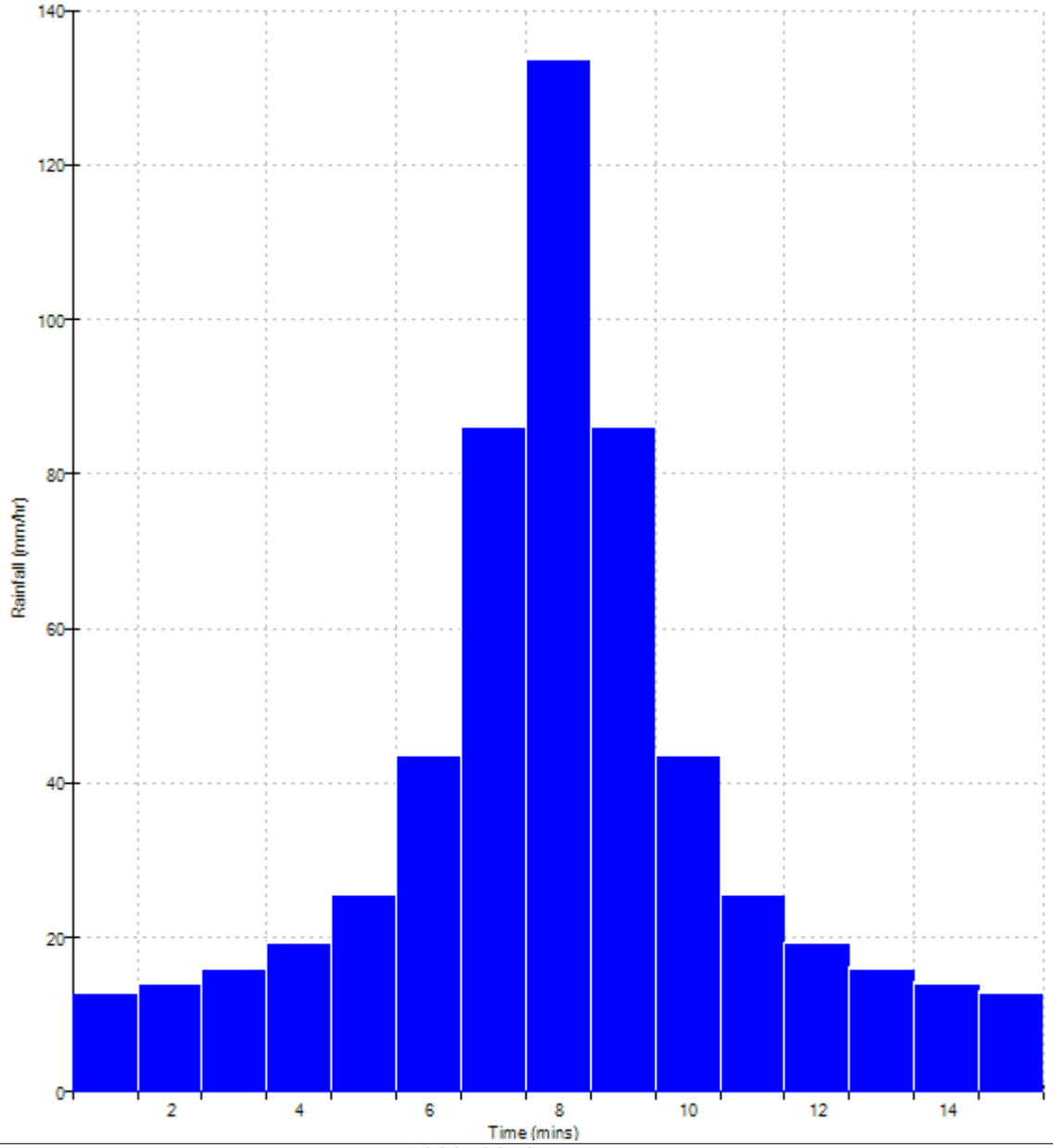
Appendix F

STRATEGY DATA

Rainfall profile

Storm duration (mins) 15

FEH Data	
FEH Rainfall Version	2013
Site Location	GB 526837 181781 TQ 26837 81781
Data Type	Point
Peak Intensity (mm/hr)	133.396
Ave. Intensity (mm/hr)	37.746
Return Period (years)	2.0



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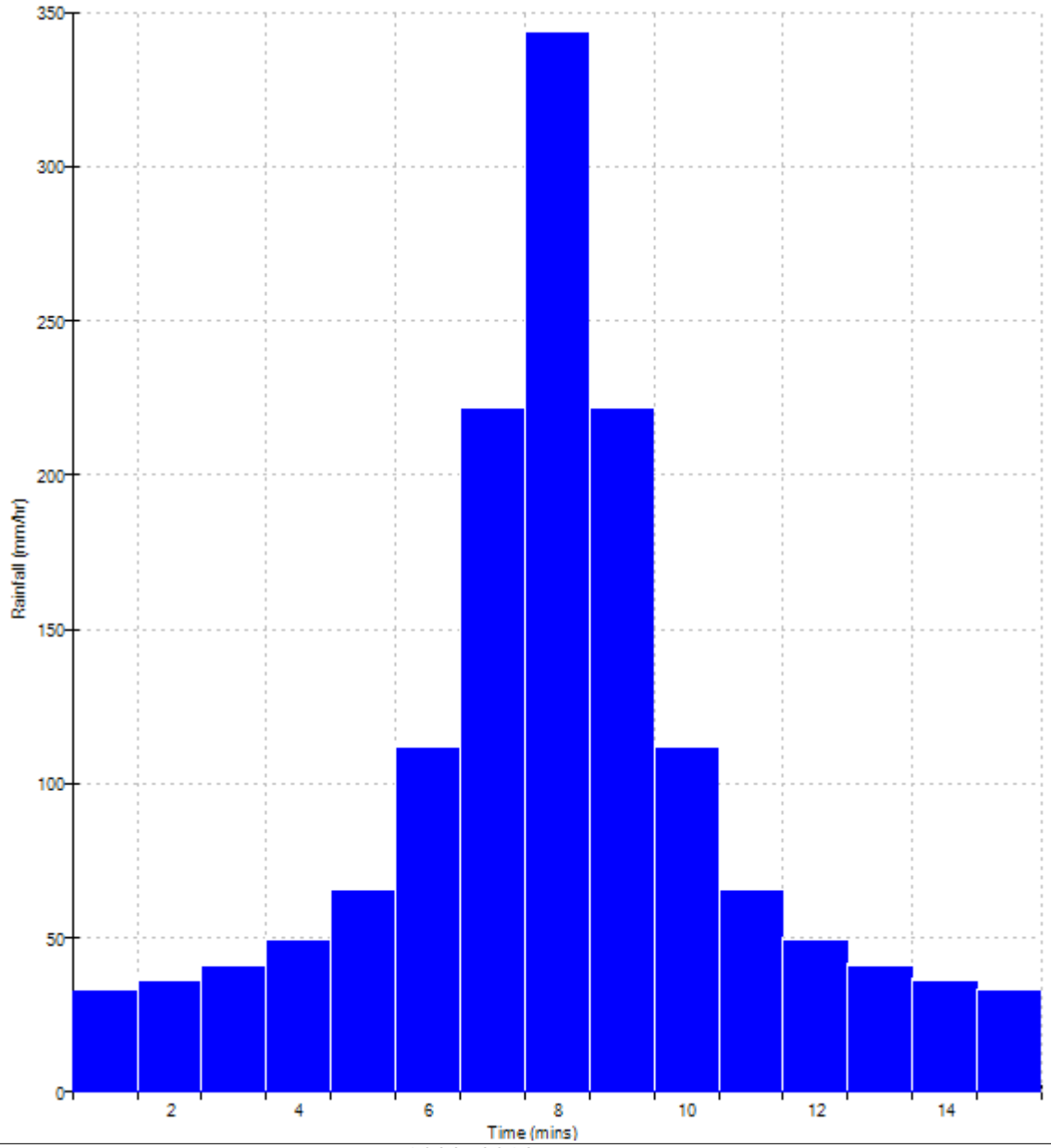
Rainfall profile

Storm duration (mins) 15

FEH Data	
FEH Rainfall Version	2013
Site Location	GB 526837 181781 TQ 26837 81781
Data Type	Point
Peak Intensity (mm/hr)	343.585
Ave. Intensity (mm/hr)	97.223
Return Period (years)	30.0



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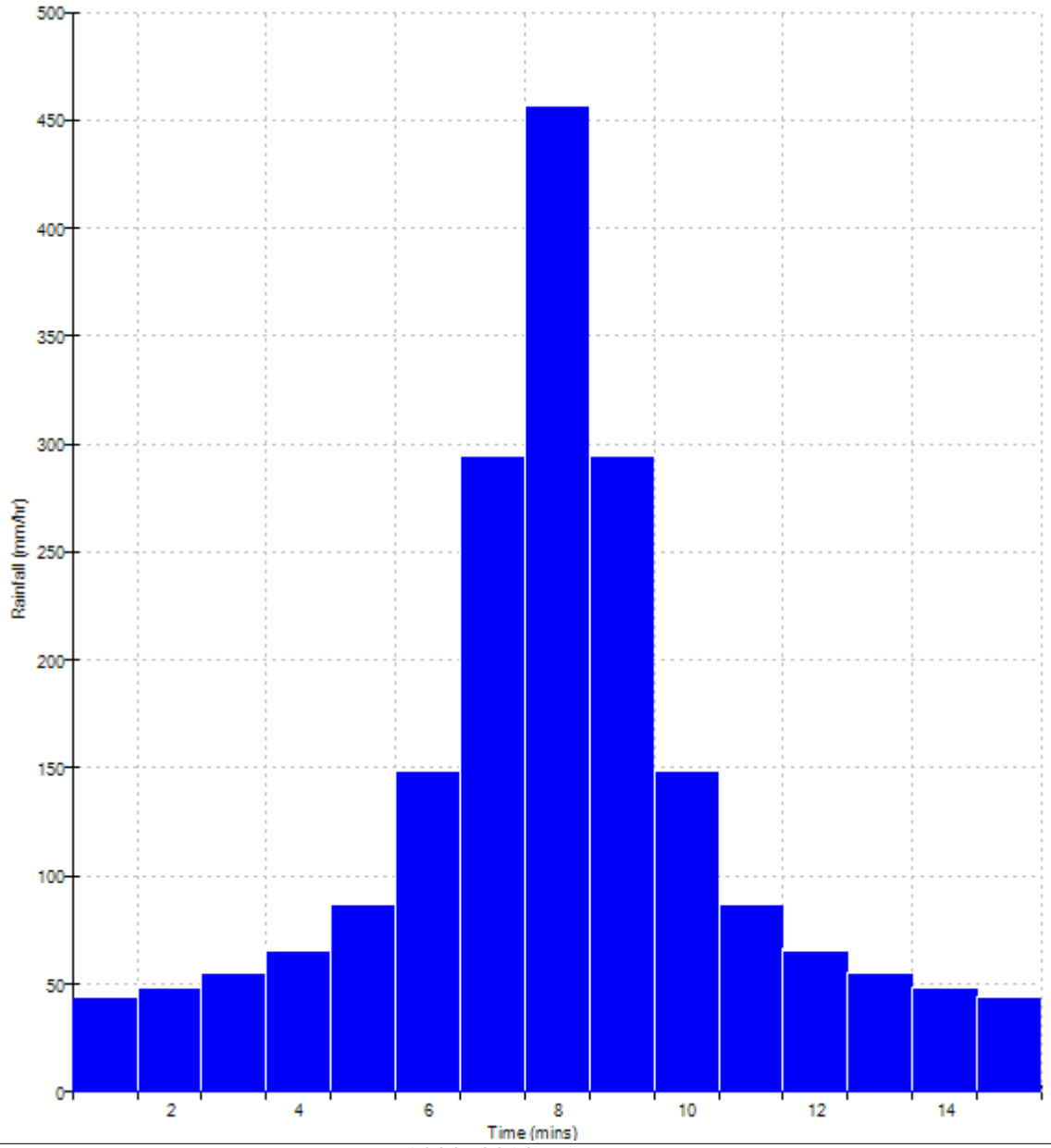
Rainfall profile

Storm duration (mins) 15

FEH Data	
FEH Rainfall Version	2013
Site Location	GB 526837 181781 TQ 26837 81781
Data Type	Point
Peak Intensity (mm/hr)	456.255
Ave. Intensity (mm/hr)	129.104
Return Period (years)	100.0



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Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Phoebe Tribe
Site name:	PGPS
Site location:	Paddington Green

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:	51.52031° N
Longitude:	0.17183° W
Reference:	247757178
Date:	Feb 16 2021 14:51

Runoff estimation approach

FEH Statistical

Site characteristics

Total site area (ha): 0.5

Methodology

Q_{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Specify BFI manually
HOST class:	N/A
BFI / BFIHOST:	0.413
Q_{MED} (l/s):	
Q_{BAR} / Q_{MED} factor:	1.14

Hydrological characteristics

	Default	Edited
SAAR (mm):	619	622
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):		1.52
1 in 1 year (l/s):		1.29
1 in 30 years (l/s):		3.5
1 in 100 year (l/s):		4.86
1 in 200 years (l/s):		5.69

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	24.969	1.119	1.8	224.9	O K
30 min Summer	25.284	1.434	2.3	288.3	O K
60 min Summer	25.591	1.741	2.8	349.9	O K
120 min Summer	26.062	2.212	3.6	444.6	O K
180 min Summer	26.337	2.487	4.0	499.9	O K
240 min Summer	26.515	2.665	4.3	535.7	O K
360 min Summer	26.712	2.862	4.6	575.3	Flood Risk
480 min Summer	26.795	2.945	4.8	592.0	Flood Risk
600 min Summer	26.823	2.973	4.8	597.7	Flood Risk
720 min Summer	26.821	2.971	4.8	597.2	Flood Risk
960 min Summer	26.775	2.925	4.7	587.9	Flood Risk
1440 min Summer	26.676	2.826	4.6	568.0	Flood Risk
2160 min Summer	26.543	2.693	4.4	541.4	O K
2880 min Summer	26.427	2.577	4.2	517.9	O K
4320 min Summer	26.230	2.380	3.9	478.3	O K
5760 min Summer	26.068	2.218	3.6	445.9	O K
7200 min Summer	25.939	2.089	3.4	419.9	O K
8640 min Summer	25.832	1.982	3.2	398.3	O K
10080 min Summer	25.742	1.892	3.1	380.2	O K
15 min Winter	24.969	1.119	1.8	224.9	O K
30 min Winter	25.284	1.434	2.3	288.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	180.746	0.0	112.8	19
30 min Summer	116.269	0.0	144.6	34
60 min Summer	71.075	0.0	265.8	64
120 min Summer	45.815	0.0	340.9	124
180 min Summer	34.840	0.0	386.9	182
240 min Summer	28.398	0.0	418.3	242
360 min Summer	20.919	0.0	457.3	362
480 min Summer	16.612	0.0	478.8	482
600 min Summer	13.802	0.0	491.5	600
720 min Summer	11.821	0.0	499.0	720
960 min Summer	9.203	0.0	504.6	858
1440 min Summer	6.401	0.0	495.4	1096
2160 min Summer	4.429	0.0	712.7	1492
2880 min Summer	3.412	0.0	713.9	1904
4320 min Summer	2.371	0.0	691.5	2724
5760 min Summer	1.840	0.0	867.6	3520
7200 min Summer	1.520	0.0	887.5	4328
8640 min Summer	1.307	0.0	900.8	5104
10080 min Summer	1.154	0.0	903.5	5856
15 min Winter	180.746	0.0	112.8	19
30 min Winter	116.269	0.0	144.6	34

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	25.591	1.741	2.8	349.9	O K
120 min Winter	26.064	2.214	3.6	444.9	O K
180 min Winter	26.340	2.490	4.0	500.5	O K
240 min Winter	26.518	2.668	4.3	536.4	O K
360 min Winter	26.718	2.868	4.6	576.5	Flood Risk
480 min Winter	26.805	2.955	4.8	594.0	Flood Risk
600 min Winter	26.838	2.988	4.8	600.5	Flood Risk
720 min Winter	26.840	2.990	4.8	601.1	Flood Risk
960 min Winter	26.799	2.949	4.8	592.8	Flood Risk
1440 min Winter	26.677	2.827	4.6	568.1	Flood Risk
2160 min Winter	26.518	2.668	4.3	536.2	O K
2880 min Winter	26.371	2.521	4.1	506.7	O K
4320 min Winter	26.122	2.272	3.7	456.7	O K
5760 min Winter	25.923	2.073	3.4	416.8	O K
7200 min Winter	25.766	1.916	3.1	385.0	O K
8640 min Winter	25.636	1.786	2.9	359.1	O K
10080 min Winter	25.529	1.679	2.7	337.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	71.075	0.0	265.8	64
120 min Winter	45.815	0.0	340.9	122
180 min Winter	34.840	0.0	386.9	180
240 min Winter	28.398	0.0	418.3	238
360 min Winter	20.919	0.0	457.3	356
480 min Winter	16.612	0.0	478.8	470
600 min Winter	13.802	0.0	491.5	584
720 min Winter	11.821	0.0	499.0	694
960 min Winter	9.203	0.0	504.5	904
1440 min Winter	6.401	0.0	495.3	1126
2160 min Winter	4.429	0.0	712.6	1584
2880 min Winter	3.412	0.0	713.8	2044
4320 min Winter	2.371	0.0	691.0	2900
5760 min Winter	1.840	0.0	867.6	3752
7200 min Winter	1.520	0.0	887.4	4608
8640 min Winter	1.307	0.0	900.6	5368
10080 min Winter	1.154	0.0	903.2	6160

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 526837 181781 TQ 26837 81781
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	1.000
Cv (Winter)	1.000
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.500

Time (mins) From:	To:	Area (ha)
0	4	0.500

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Appendix G

OUTLINE DRAINAGE STRATEGY DRAWINGS

CONFIDENTIAL

HEALTH CENTRE

No 14

NEWCASTLE PLACE

PADDINGTON GREEN

HARROW ROAD

Paddington Green Police Station

THAMES WATER 1981x914 BRICK SEWER

NEW SURFACE WATER CONNECTION INTO THAMES WATER SEWER. MAXIMUM DISCHARGE RATE: 21.6 l/s.

NEW FOUL WATER CONNECTION INTO EXISTING THAMES WATER SEWER FROM DEVELOPMENT BASEMENT. MAXIMUM FOUL DISCHARGE RATE: 26.8 l/s.

REFER TO WSP DRAWINGS R137-D-Z-DR(52)-00-010 FOR DETAILS OF PROPOSED SEWER UPGRADE.

PERIMETER SLOT CHANNEL TO ENSURE NO RUNOFF ENTERS THE PUBLIC REALM FROM SITE. OUTLET POSITIONS TO BE CONFIRMED POST PLANNING

CMH3
(TO BE ADOPTED)
ø1350mm
CL: 32.24
IL: 29.26

CMH4
(TO BE ADOPTED)
ø1350mm
CL: 32.60
IL: 28.15

CMH5
ø1350mm
CL:32.09
IL: 29.99

CMH6
ø1350mm
CL: 32.117C
IL: 29.632

EX MH 9705
CL: 32.34
IL: 28.60

EXISTING THAMES WATER MANHOLE (REF: 9704) TO BE RELOCATED TO ALLOW FOR NEW FOUL WATER CONNECTION FROM WEST END GATE DEVELOPMENT. ALL EXISTING THIRD PARTY CONNECTIONS TO BE MAINTAINED.

ø375 @ 1:57

ø375 @ 1:51

ø150@ 1:19

ø375 @ 1:60

ø375 @ 1:60

ø375

ø225

ø300

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL STRUCTURAL, LANDSCAPE ARCHITECTS, ARCHITECTURAL AND PUBLIC HEALTH DRAWINGS.
4. THIS DRAWING IS BASED ON SQUIRES AND PARTNERS ARCHITECTURAL DRAWINGS. PLEASE REFER TO DRAWINGS FOR INFORMATION
5. DRAINAGE LAYOUT SUBJECT TO APPROVAL FROM RELEVANT APPROVING BODIES. UNTIL TECHNICAL APPROVAL HAS BEEN OBTAINED FROM THE RELEVANT LOCAL AUTHORITIES OR STATUTORY BODIES, IT SHOULD BE UNDERSTOOD THAT ALL DRAWINGS ARE ISSUED AS PRELIMINARY AND NOT FOR CONSTRUCTION. SHOULD THE CONTRACTOR AND/OR EMPLOYER COMMENCE WORK PRIOR TO APPROVAL BEING GIVEN, IT IS ENTIRELY AT THEIR OWN RISK
6. REFER TO DRAWING XXX BASEMENT B2 DRAINAGE GENERAL ARRANGEMENT
7. REFER TO DRAWING XXX FOR GROUND FLOOR DRAINAGE GENERAL ARRANGEMENT

KEY:

- PLANNING APPLICATION BOUNDARY
- SITE OWNDERSHIP BOUNDARY
- ASSUMED BASEMENT EXTENT LINE (BASED ON ARCHITECTS PLANS)
- PROPOSED COMBINED DEMARCATION MANHOLE
- PROPOSED COMBINED DRAINAGE RUN
- LOCATION OF EXISTING THAMES WATER SEWER BASED ON DRAINAGE SURVEY
- PROPOSED ACO MULTIDRAIN M100D CHANNEL WITH BRICKSLOT GRATING – UNIVERSAL SUMP OUTLET

Revision	Description	Date	Drawn	Approved
P 1	ISSUE FOR PLANNING	26/02/21	PT	JOC

Berkeley
Designed for life

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Client's Name
BERKELEY HOMES (CENTRAL LONDON) LTD

Job Title
PADDINGTON GREEN POLICE STATION

Drawing Title
O□TLINE DRAINAGE STRATEGY GRO□ND FLOOR

Scale @ A1
1:□□0

Drawing No
70069□2□-DR-001

Rev
P1

Status
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Originator Project Number
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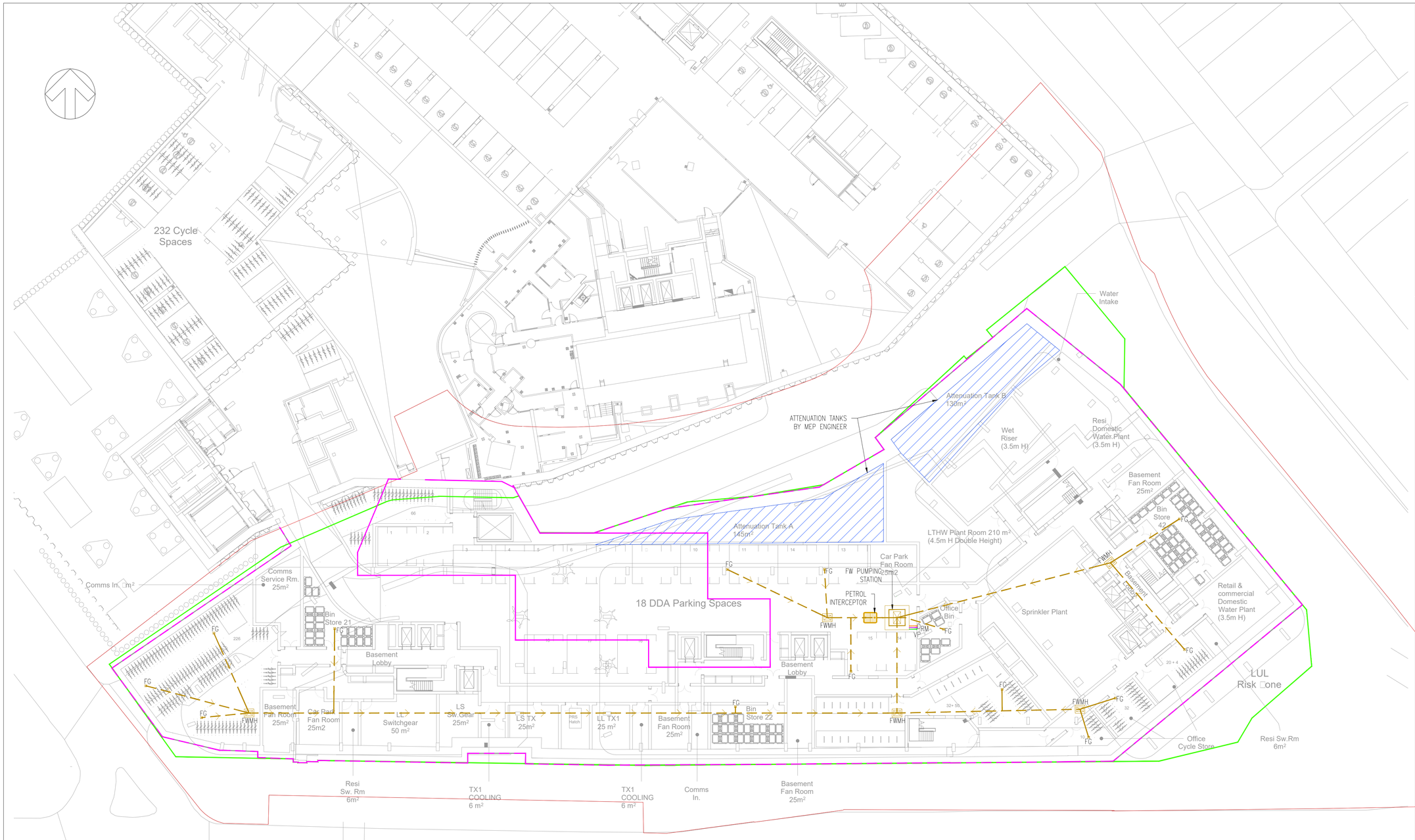

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- PROPOSED FOUL WATER MANHOLE
- PROPOSED FOUL WATER DRAINAGE RUN
- FG PROPOSED FLOOR GULLY
- PROPOSED PETROL INTERCEPTOR
- PROPOSED FOUL WATER PUMPING STATION
- PROPOSED CONCRETE SURFACE WATER ATTENUATION TANK (ABOVE B1 SLAB)

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Job Title
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Drawing Title
O□TLINE DRAINAGE STRATEGY
BASEMENT B1 LEVEL

Scale @ A1
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Drawing No
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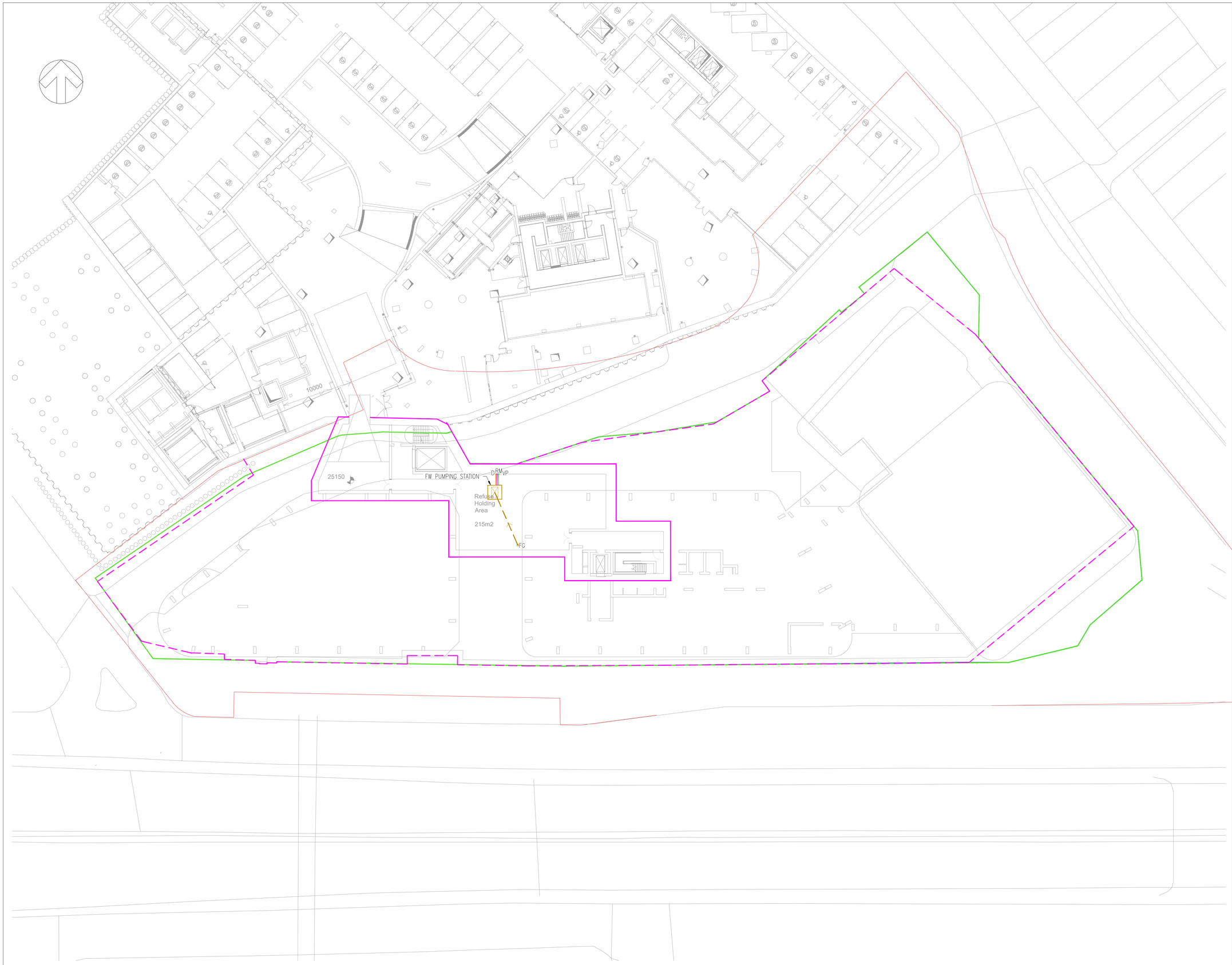

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- PROPOSED FOUL WATER DRAINAGE RUN
- FG PROPOSED FLOOR GULLY
- PROPOSED FOUL WATER PUMPING STATION

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Job Title
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Drawing Title
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