

B&Q Cricklewood

Flood Risk Assessment

Montreaux Cricklewood Developments Limited

July 2020

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Acronyms

Acrony	Description
AEP	Annual Probability of Exceedance
AOD	Above Ordnance Datum
CS	London Borough of Barnet Local Plan, Core
DEFRA	Department for Environment, Food and Rural
EA	Environment Agency
FFL	Finished Floor Level
FRA	Flood Risk Assessment
FSUA	Foul Sewerage and Utilities Assessment
GEI	Geo-environmental Investigation
ha	Hectare
LBB	London Borough of Barnet
LLFA	Lead Local Flood Authority (i.e. LBB)
LPA	Local Planning Authority
m	metres
mAOD	meter Above Ordnance Datum
m ²	square metres
MP	London Borough of Barnet Management
NPPF	National Planning Policy Framework
RMA	Reserved Matters Application
SFRA	Strategic Flood Risk Assessment
SPZ	Source Protection Zones
SWDS	Surface Water Drainage Strategy
SWMP	Surface Water Management Plan
SuDS	Sustainable urban Drainage System
TWUL	Thames Water Utilities Limited

Executive Summary

AECOM have been commissioned by Montreaux Cricklewood Developments Limited to undertake a Site-specific Flood Risk Assessment (FRA) for the Proposed Development, B&Q Cricklewood. This report has been prepared to support the outline planning application for the Proposed Development to London Borough of Barnet (LBB).

The Site is located within the administrative jurisdiction of the London Borough of Barnet (LBB), adjacent to Cricklewood railway station (postcode NW2 1ES, National Grid Reference TQ 23857 85892). The Site is bounded by Kara Way and Campion Terrace to the north, national railway lines and Cricklewood railway station to the east, Cricklewood Lane to the south and Cricklewood Broadway (A5) to the west. The Site area is approximately 2.78 hectares (ha).

The Proposed Development consists of:

“Outline planning application for the demolition of existing buildings and comprehensive redevelopment of the Site for a mix of uses including residential and flexible commercial and community floorspace in uses classes A3/B1/D1 and D2; associated access; car and cycle parking; landscaping; and associated works.”

The FRA has assessed the Site in terms of topography, geology, hydrogeology and climate change by reviewing the available information and aims to identify the potential sources of flooding and how residual flood risk will be managed without causing flood risk elsewhere.

Planning policy with respect to development and flood risk in areas in England is contained within The National Planning Policy Framework (NPPF) and its accompanying Planning Practice Guidance. This Site-specific FRA has been prepared in accordance with those documents, regional and local planning policy and in consultation with the EA, LBB and TWUL.

The FRA can be summarised as follows:

- The Proposed Development is categorised as “more vulnerable”;
- The EA confirmed the Site is in Flood Zone 1 and therefore, the fluvial/tidal flood risk is assessed as low;
- The flood risk from groundwater is assessed as low;
- The flood risk from surface water is assessed as low to medium. However, it is recommended that the proposed drainage strategy is designed in accordance to the LBB’s policy, national policy and good practice design codes e.g. Building Regulations Part H;
- The flood risk from surface water sewer is assessed as low and foul water sewer is assessed as medium. However, it is recommended that during the next design stage a further assessment of the existing public sewer network via completion of drainage and CCTV survey is undertaken; and
- The flood risk from reservoir is assessed as very low.

1 Introduction

1.1 Background

- 1.1.1 AECOM have been commissioned by Montreaux Cricklewood Developments Limited. to undertake a Site-specific Flood Risk Assessment (FRA) for the Proposed Development, B&Q Cricklewood. This report has been prepared to support the outline planning application for the Proposed Development to London Borough of Barnet (LBB).
- 1.1.2 The Proposed Development consists of:
- “Outline planning application for the demolition of existing buildings and comprehensive redevelopment of the Site for a mix of uses including residential and flexible commercial and community floorspace in uses classes A3/B1/D1 and D2; associated access; car and cycle parking; landscaping; and associated works.”*
- 1.1.3 The Proposed Development Parameter Plans are provided in Appendix B.
- 1.1.4 The Site is approximately 2.78 hectares (ha) and currently occupied by a range of retail outlets, including a large B&Q DIY Store, Pound Stretcher and Tile Depot. These large warehouse buildings are situated in the south-west of the Site. The northern and eastern parts of the Site mainly consist of car parking associated with the previously identified retail outlets, as well as soft landscaping adjacent to the railway lines, and the southern entrance to the Site.
- 1.1.5 The FRA aims to identify any potential sources of flooding or surface water management issues related to the Proposed Development and to demonstrate how residual flood risk will be managed. The FRA will describe the Site in terms of topography, geology and hydrology and review the following existing available information:
- West London Strategic Flood Risk Assessment Level 1(2018);
 - North London Strategic Flood Risk Assessment Level 1(2008);
 - London Borough of Barnet Surface Water Management Plan (SWMP) (2011);
 - LBB Local Flood Risk Management Strategy;
 - Thames Water Asset Data;
 - Thames Water Sewer Flooding History;
 - British Geological Survey Map;
 - Department for Environment, Food and Rural Affairs (DEFRA) Magic Map – online groundwater vulnerability mapping;
 - Topographical Survey;
 - Environment Agency Flood Maps Service;
 - Planning Policy set out in Section 3;
 - Geo-environmental investigation by Capita (GEI);
 - AECOM Surface Water Drainage Strategy (SWDS) – standalone document;
 - AECOM Foul Sewerage and Utilities Assessment (FSUA) – standalone document; and
 - Meinhardt UK Outline Energy Assessment – standalone document.

1.2 Consultation

- 1.1.1 Consultation with the Environment Agency (EA), Thames Water Utilities Limited (TWUL) and LBB have been undertaken to obtain information on flood risk, sewer capacity and SuDS requirements. The EA confirmed flood zone and surface water flood risk for the Site. As the Site is located in flood zone 1, the EA did not hold any detailed flood modelling data. Further details of correspondence with the EA can be found in Appendix C.
- 1.1.2 TWUL manages the sewers in Cricklewood Lane where the nearest public sewers are located. TWUL provided records from their DG5 flood register for the past 10 years that indicates the number of flooding

issues as a result of surcharging of the foul and combined sewer network that have been recorded within the postcode areas. 24 incidents of sewer flooding has been recorded within the postcode area NW2 1ES where the Site is located.

- 1.1.3 LBB were also contacted to confirm the SuDs requirements for the proposed development. In absence of response from LBB, SuDS are proposed in line with the NPPF and regional and local planning policies.

2 Site Description

2.1 Site Location

- 2.1.1 The Proposed Development Site covers approximately 2.78 ha and exists currently as developed brownfield land that contains a B&Q DIY store, Pound Stretcher and Tile Depot store warehouse buildings and car parks for these. It is bounded by A407 (Cricklewood Lane) and the green space to the South, A5 (Cricklewood Broadway) and Depot Approach to the West and North of the Site, and Cricklewood train station and railway to the East (see Figure 1 below). The OS grid reference for the Site is TQ238859.



Figure 1: Site Boundary

2.2 Topography

- 2.2.1 A topographic survey of the Site can be viewed in Appendix A. The survey indicates a high point of approximately 56.08m Above Ordnance Datum (AOD) towards the north of the Site adjacent to the railway line and a low point of approximately 52.10m AOD at the southern entrance to the Site. The Site is mainly brownfield land comprising of warehouse buildings and car parks with soft landscaping areas adjacent to the railway lines and southern entrance to the Site.

2.3 Geology

- 2.3.1 A review of 'The British Geological Survey' (BGS) online Geological Map shows no record of superficial deposits within the Site. The nearest superficial deposits recorded is the Dollis Hill Gravel Member (sand and gravel) approximately 1 km north west of the Site. The BGS bedrock geological map indicates the Site is underlain by London Clay Formation (clay, silt and sand). The GEI and Assessment by Capita (2018) also found there to be no superficial deposits and the bedrock to be London Clay Formation.
- 2.3.2 An intrusive ground investigation was undertaken by Capita in August 2018 this comprised of three 25m deep cable percussion boreholes and nine windowless sample boreholes to a maximum of 5.0m depth. The encountered stratigraphy comprised of either tarmac or concrete surfacing over typically 1 to 2m of Made Ground, over the London Clay Formation. The London Clay comprised firm becoming stiff fissured silty clay and its base was not reached. Perched groundwater was recorded in most of the monitoring wells at depths of between 0.6 and 4.9m.

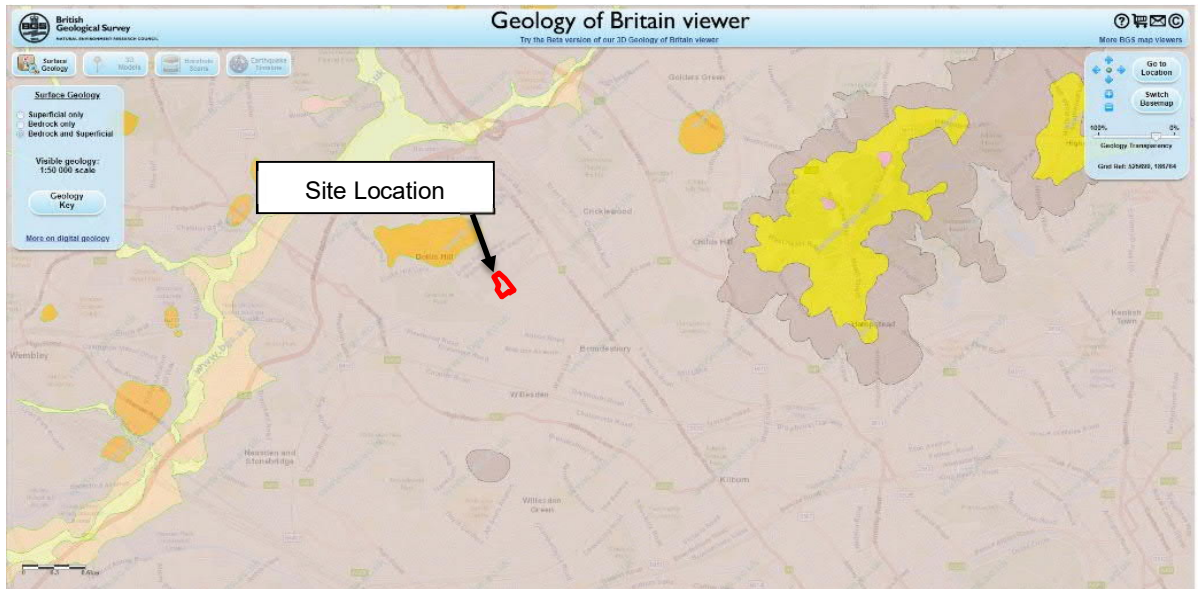


Figure 2: Geological Map of the area

Bedrock geology
 Superficial deposits ✕

1:50 000 scale bedrock geology description:
 London Clay Formation - Clay, Silt And Sand.
 Sedimentary Bedrock formed approximately 48 to 56 million years ago in the Palaeogene Period. Local environment previously dominated by deep seas.

Setting: deep seas. These sedimentary rocks are marine in origin. They are detrital and comprise coarse- to fine-grained slurries of debris from the continental shelf flowing into a deep-sea environment, forming distinctively graded beds.

[Further details](#) [What is Bedrock Geology?](#)

[To purchase detailed geological reports for this area, try our GeoReports service](#)

Bedrock geology
 Superficial deposits ✕

None recorded

[What are Superficial Deposits?](#)

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Figure 3: Geological Map descriptions of the area

(<http://mapapps.bgs.ac.uk/geologyofbritain/home.html?>)

2.4 Hydrogeology

2.4.1 The Site does not lie in a source protection zone (SPZ) and there are no recorded groundwater abstractions within 1km of the Site. The bedrock and superficial hydrogeology are classified as unproductive stratum (i.e. non-aquifer). Unproductive strata are defined as rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. The borehole records from included in the GEI do not record any groundwater encountered but perched groundwater from intrusive ground investigation monitoring wells found depths of between 0.6m and 4.9m. The nearby borehole records from the British Geological Survey (BGS) map also do not record any groundwater encountered.

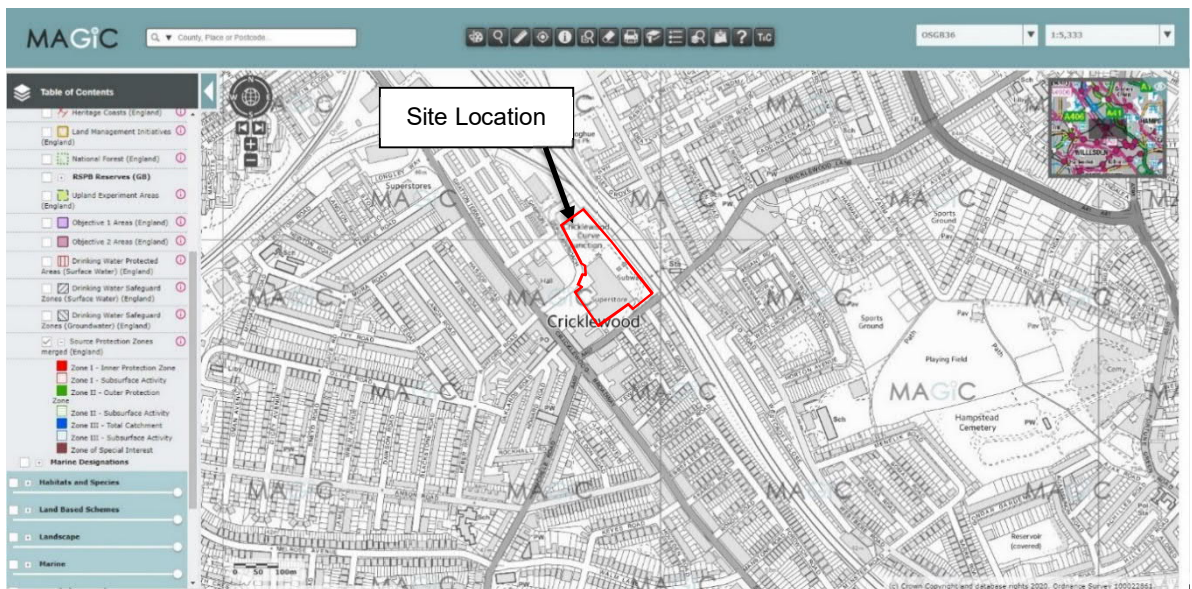


Figure 4: Source Protection Zone Map (magic.defra.gov.uk/MagicMap)

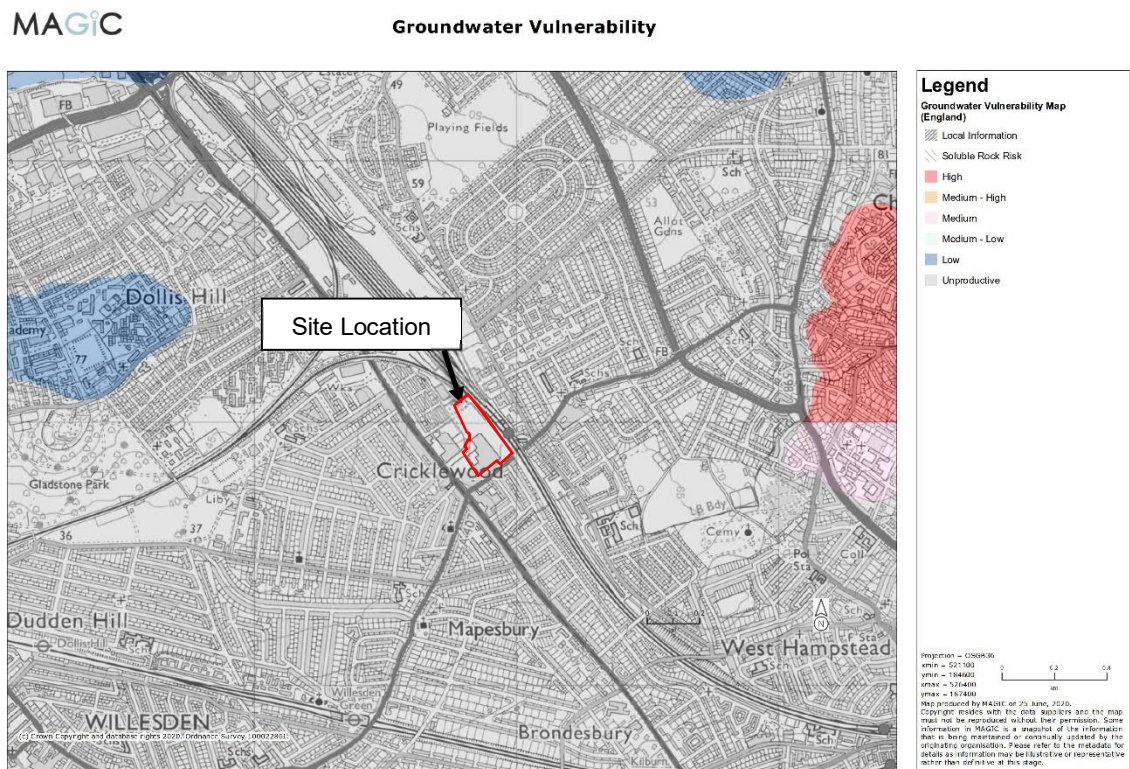


Figure 5: Groundwater Vulnerability Map (magic.defra.gov.uk/MagicMap)

- 2.4.2 The GEI by Capita includes groundwater vulnerability maps show the vulnerability of groundwater to a pollution discharged at ground level based on hydrological, geological, hydrogeological and soil properties within a one kilometre buffer. The map shows that there is no aquifer within the one kilometre buffer of the Site meaning that the groundwater vulnerability is negligible. The DEFRA Magic Maps confirm this to be true.
- 2.4.3 The EA classifies the areas of one kilometre squares into five risk categories; High, Medium-High, Medium, Medium-Low and Low which is based on the likelihood of a pollutant reaching the groundwater (i.e. vulnerability), the type of aquifers present and the potential impact (i.e. the aquifer designation). The simplified groundwater vulnerability map shows that the B&Q Cricklewood Site is classified as Low.

2.5 Hydrology

- 2.5.1 The GEI produced by Capita states that for the Site's hydrology, there are no known significant surface water features within 500m of the Site boundary so low risk of flooding is examined. This includes watercourses and reservoirs. There are also no recorded groundwater abstractions within 1km of the Site but perched groundwater from intrusive ground investigation monitoring wells found depths of between 0.6m and 4.9m.

2.6 Public Sewers

- 2.6.1 The TWUL Asset Locations Search can be found in Appendix E
- 2.6.2 There is a TWUL foul water sewer running along Cricklewood Lane that is DN300mm (2.5m to 3m deep). This sewer flows from East to West and discharges into the foul water sewer within Cricklewood Broadway A5. There are no public sewer runs within the Site boundary.
- 2.6.3 The TWUL surface water sewer running along Cricklewood Lane varies from DN300mm to DN825mm (approximately 1m to 3.5m deep). This sewer conveys water from both sides of Cricklewood Lane until the junction with Elm Grove where, it flows from Northwest to Southeast.

3 Planning Policy

3.1 Planning Policy Summary

3.1.1 The planning policies and guidance that are relevant to the Proposed Development of B&Q Cricklewood with regards to flood risk and surface water management are outlined below, and further details of the relevant policies provided in Appendix D.

National Planning Policy

- The 2019 revised National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance (PPG) published in 2019 and 2016 by the Ministry of Housing, Communities and Local Government;
- CIRIA publication 'C624 Development and Flood Risk Guidance for the Construction Industry';
- The Flood and Water Management Act 2010;
- Environment Agency Standing Advice;
- Flood Risk Regulations 2009; and
- National Strategy for Flood and Coastal Erosion Risk Management.

Regional Policy and Strategy

- Thames Catchment Flood Management Plan;
- The London Plan (2016);
- Intend to Publish London Plan (2019); and
- Sustainable Design and Construction, Supplementary Planning Guidance (2014).

Local Planning Policy

- London Borough of Barnet Local Plan, Core Strategy (CS);
- London Borough of Barnet Development Management Policies (MP);
- Local Flood Risk Management Strategy;
- Surface Water Management Plan;
- London Borough of Barnet Supplementary Planning Documents; and
- Brent Cross and Cricklewood Regeneration Plan.

3.1.2 Based on the above policies, the key requirements in relation to the surface water management and flood risk for the Development are considered to be as follows:

- *National Planning Policy Framework: "A Site-specific FRA is required for Site >1ha and in Flood Zone 1. A Site-specific FRA is required for development proposals located in Flood Zone 2 and 3. A Site-specific FRA should identify and assess the risks of all sources of flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe for its lifetime, taking climate change into account";*
- *CIRIA 624 – Development and Flood Risk Guidance for Construction Industry: "This report consists of a Level 2 Scoping Study due to the size of the development Site and the identified Flood Zone 1 designation of the proposed Site. FRA level 2: Scoping Study to be undertaken if the Level 1 FRA indicates that the Site may lie within an area that is at risk of flooding or that the Site may increase flood risk due to increased run-off";*
- *Environment Agency Standing Advice: "The surface water management needs to meet requirements set out in either your local authority's Surface Water Management Plan (SWMP), Strategic Flood Risk Assessment (SFRA) and Building Regulations Part H. The emergency escape plans for any parts of a building that are below the estimated flood level is required";*
- *London Plan 2016 and Intend to Publish London Plan 2019: "Development proposals should utilise sustainable drainage system unless there are practical reasons for not doing so. The Development*

should aim to achieve the greenfield run-off rates and ensure that the surface water run-off is managed as close as to its source as possible. SuDS design should have a preference for green over grey features, in line with the drainage hierarchy stipulated in London Plan (2016) and the Intend to publish London Plan (2019)".

3.2 Sequential Test

- 3.2.1 The NPPF aims to ensure that flood risk is taken into account at all stages of the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas of highest risk. The Sequential Test encourages Local Planning Authorities (LPA) to steer development to areas of lowest flood risk on a borough/district wide level and only develop in flood risk areas where absolutely necessary. The LPA should apply the Sequential Test based on information presented in their Strategic Flood Risk Assessment (SFRA). The NPPF Sequential Test evaluates the risk of flooding, based on EA Flood Zones, against the vulnerability of the Proposed Development.
- 3.2.2 According to the Planning Practice Guidance¹, the proposed B&Q Cricklewood Site has a vulnerability classification of "More Vulnerable" as the Site will include residential units. Based on Figure 6 extracted from the Planning Practice Guidance, the Proposed Development would be deemed appropriate and an exception test is not required.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	x	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	x	x	x	✓*

Figure 6: Flood Risk Vulnerability and Flood Zone Compatibility

- 3.2.3 The Site falls within the area known as LBB Brent Cross Cricklewood, West Hendon Development Framework and the Brent Cross Cricklewood Regeneration Area. The extent of this area is found within Chapter 1 of the Brent Cross Cricklewood Development SPG.
- 3.2.4 The LBB and Greater London Authority have identified Cricklewood, Brent Cross and West Hendon area as a major opportunity for regeneration in the borough in the future. The Council is seeking to promote this area to take advantage of its strategic location in north London. The Council has confirmed its support for the area by including a chapter within the Unitary Development Plan expressly devoted to enabling the regeneration of Cricklewood, Brent Cross and West Hendon to be delivered. In July 2004, the Framework was endorsed by the Mayor of London as an Opportunity Area Planning Framework to the London Plan. Brent Cross Shopping Centre is defined as a regional shopping centre.
- 3.2.5 On account of the above information and taking all sources of flooding and the recommendations from Sequential Test within the policies into consideration, the Proposed Development is deemed as appropriate and the Exception Test is not required.

¹ Ministry of Housing, Communities & Local Government, (2016); Planning Practice Guidance. Available online at: <https://www.gov.uk/government/collections/planning-practice-guidance>

3.3 Climate Change

- 3.3.1 The “Flood Risk Assessments: Climate Change Allowances Guidance” published in February 2016 by the EA indicates that climate change is currently expected to result in increased peak rainfall and rising sea levels. Table 1 shows anticipated changes in extreme rainfall intensity in small and urban catchments within England. 60 years is an appropriate design life for the Proposed Development which corresponds to the ‘2080s’ in Table 1 below.

Table 1: Peak Rainfall Intensity Allowance in Small and Urban Catchments

Applies across all of England	Total potential change anticipated for the ‘2020s’ (2015 to 2039)	Total potential change anticipated for the ‘2050s’ (2040 to 2069)	Total potential change anticipated for the ‘2080s’ (2070 to 2115)
Upper End	10%	20%	40%
Central	5%	10%	20%

- 3.3.2 Table 2 indicates the peak river flow allowances by Thames river basin district. Due to the Site being located in Flood Zone 1 and the more vulnerable use classification of the Proposed Development, the FRA should use the central and higher central allowances to assess a range of climate change allowances. The 60-year assumed design life for the Proposed Development corresponds to the ‘2080s’ and 35% climate change in the table below.

Table 2: Peak River Flow Allowances by River Basin District (use 1961 to 1990 baseline)

River basin district	Allowance category	Total potential change anticipated for the ‘2020s’ (2015 to 2039)	Total potential change anticipated for the ‘2050s’ (2040 to 2069)	Total potential change anticipated for ‘2080s’ (2070 to 2115)
Thames	Upper end	25%	35%	70%
	Higher central	15%	25%	35%
	Central	10%	15%	25%

Source: Government Website <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

4 Flood Risk

This section of the report identifies the existing risks from the different forms of flooding identified in NPPF.

4.1 *Fluvial and Tidal* Flood Risk Categories

4.1.1 Categories of risk have been qualitatively defined as:

- 'High' Risk: flooding is likely to result in significant damage to property and pose a significant risk to life;
- 'Medium' Risk: flooding may result in possible minor damage to property, but flood progress would allow adequate time for residents to be warned and safely evacuated to higher ground or appropriate places of safety;
- 'Low' Risk: flooding is unlikely to result in any damage to property and pose little or no risk to life; and
- 'Very Low' Risk: flooding is very unlikely to occur.

Fluvial & Tidal

4.1.2 The Environment Agency's (EA) flood map shows that the entire Site is in flood zone 1 which is defined as having less than 0.1% (or 1 in 1000 year) probability of flooding each year and can be regarded as not being affected by fluvial/tidal flooding. The Site is not protected by flood defences as it does not fall within an area at risk of flooding from rivers or the sea. The EA further confirmed there are no historic flood events from rivers and/or sea in areas local to the Site (Appendix C).

4.1.3 Following Consultations with EA, they have stated that *'Because this Site does not fall within an area at risk of flooding from rivers or the sea, we do not hold any detailed flood modelling data that would impact your Site. As such we are unable to provide a flood risk product. We do not hold records of historic flood events from rivers and/or the sea affecting the area local to this Site. However, please be aware that this does not necessarily mean that flooding has not occurred here in the past, as our records are not comprehensive. As the Site is about 2km away from Flood Zone 2, any data we have for the nearest watercourse are not relevant for the Site.'*

4.1.4 There are no nearby watercourses within the vicinity of the Site which can cause fluvial or tidal flooding picked up from the EA mapping. This is also confirmed by the West London SFRA Mapping showing the closest watercourse being over 1.6km away. Therefore, fluvial and tidal flooding does not affect the Site and the risk can therefore be considered low.

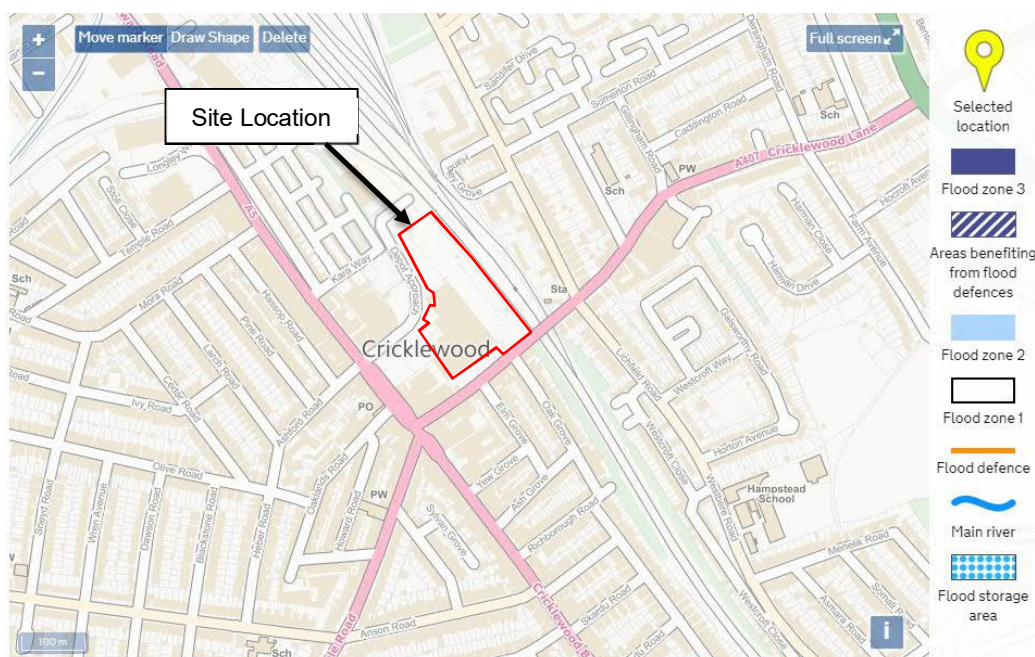


Figure 7: EA Fluvial/Tidal Flood Zone Map

4.2 Groundwater

- 4.2.1 The West London Strategic Flood Risk Assessment (SFRA) mapping tool shows no records of historical groundwater flooding occurrences or any susceptibility to groundwater flooding either shown in the GEI and SFRA maps. The Site is not within a Source Protection Zone (SPZ) designated by the EA for the protection of potable water supply. Map 12 in the North London SFRA shows the groundwater table contour map which indicates the Site to be in an area where the groundwater table is approximately 60m below ground level.
- 4.2.2 There may be risk of perched groundwater as within the GEI by Capita an intrusive ground investigation was undertaken which included monitoring wells. These monitoring wells found depths of between 0.6m and 4.9m of perched groundwater from a maximum of 5m deep boreholes. This groundwater was not identified in historical borehole records due to the limited boreholes near the Site. However, the Proposed Development does not include basements.
- 4.2.3 It is therefore considered that the Site is at low risk of flooding from groundwater.

4.3 Surface Water (Pluvial) Surface Water Flood Risk

- 4.3.1 Historic surface water systems are designed to standards as low as 1 in 2 years. Therefore, high intensity rainfall in developed areas cannot drain to the sewers and flows overland following the topography, often following kerb and channel lines. This is known as surface water or pluvial flooding.
- 4.3.2 The EA Long Term Flood Risk Maps indicates that for the medium event (1 in 30 to 1 in 100 year), surface water flooding occurs locally at the centre and north of the Site with depths below 300mm (Figure 8 below). The LBB Surface Water Management Plan (SWMP) Volume II does not show the Site to be within a Critical Drainage (CDA). No historical flooding has been reported in the area.

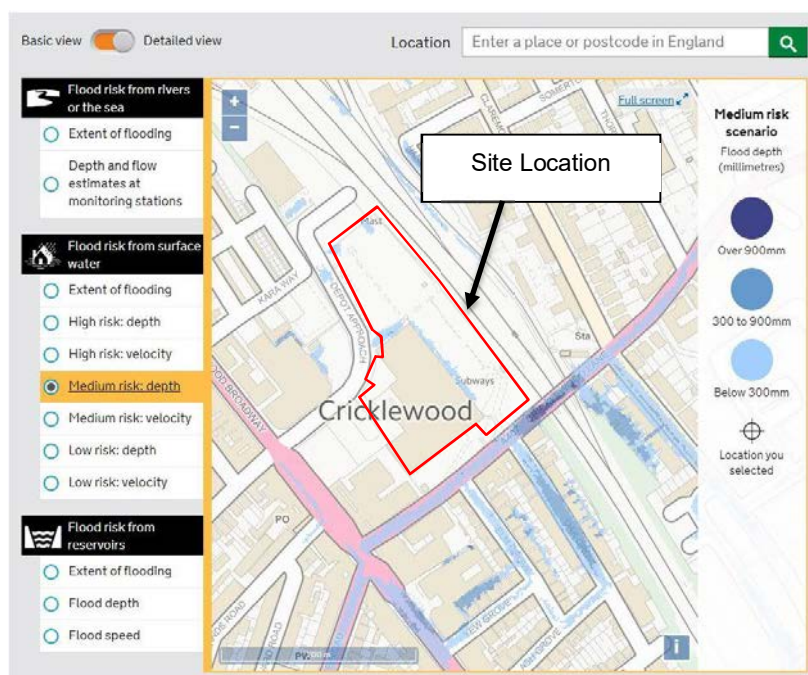


Figure 8: Surface Water flooding map

4.3.3 The surface water drainage strategy proposes to restrict the surface water runoff to Greenfield run off rate using Sustainable Drainage Systems (SuDS) in line with the London Plan and LBB Local Plan. Biodiverse roof, raingardens, permeable paving and increased soft landscaping areas are proposed to control runoff at source and reduce runoff volume. Refer to the AECOM Surface Water Drainage Strategy for further details.

4.3.4 Based on the information available, surface water flood risk is considered to be low to medium.

Mitigation Measures – Surface Water

4.3.5 Surface water runoff from development Sites should be managed and minimised through the use of SuDS

4.3.6 SuDS will be used where practicable throughout the Proposed Development to provide source control, improve water quality, reduce flood risk and provide amenity and biodiversity.

4.3.7 The strategy for design of surface water drainage system should respect the hierarchical approach contained within London Plan.

4.3.8 Greenfield runoff rates should be implemented in accordance with LBB SuDS Proforma.

4.3.9 The external levels will be designed to fall away from the building to ensure overland flows are routed away from the building during extreme rainfall events with intensity in excess of the drainage system.

4.3.10 The Environment Agency operates a flood warning service in all areas at risk of flooding. The Site is not located within an Environment Agency Flood Warning Area, however it is recommended that the Site still signs up to receive Flood Alerts issued by the Environment Agency, to aid with the evacuation of all occupants on Site. Should flooding occur on Site, safe egress can be achieved from all floors to the ground floor via internal staircases.

4.3.11 From reviewing the proposed SuDS, it is considered that the surface water flood risk has been suitably mitigated within the Proposed Development and flood risk from this source has been reduced to low.

4.4 Surface Water Sewer

4.4.1 Public surface sewer systems are generally designed for no flooding during storm events up to a return period of 3.3% (1 in 30 years). There have been no storm water attenuation devices identified within the existing Site drainage. Consequently, there is potential for surface water surcharge within the existing network and, in extreme storm events, flooding occurs, which is when the runoff discharge is greater than the capacity of the outfall. When this occurs, flood water will pond or flow overland to exit the Site in an uncontrolled manner via the low points on the Site boundary.

- 4.4.2 The TWUL asset records show 300mm and 825mm diameter surface water sewer in Cricklewood Lane (Appendix E). The Site does not have any Thames Water assets running within the Site boundary. It is assumed that the existing Site discharges into the surface water sewers on Cricklewood Lane and is to be confirmed following a drainage and CCTV survey of the Site at the future Reserved Matters Applications (RMA) stage.
- 4.4.3 The Site is currently mainly hardstanding and there does not appear to be attenuation or flow control devices within the Site to restrict runoff rate or runoff volume. The proposed surface water drainage strategy proposes that the surface water will discharge at Greenfield Runoff Rate to the TWUL surface water sewer in Cricklewood Lane which provides significant betterment on existing surface water discharge rate.
- 4.4.4 Therefore, the overall flood risk from surface water sewers is considered to be low.

4.5 Foul Water Sewer

- 4.5.1 The TWUL asset records show a 300mm diameter foul water sewer in Cricklewood Lane (Appendix E). The Site does not have any Thames Water assets running within the Site boundary. It is assumed that the existing Site discharges into the sewers on Cricklewood Lane and is to be confirmed following a drainage and CCTV survey of the Site at the RMA stage.
- 4.5.2 Thames Water provided records from their DG5 flood register for the past 10 years that indicates the number of flooding issues as a result of surcharging of the foul and combined sewer network that have been recorded within the postcode areas. 24 incidents of sewer flooding has been recorded within the postcode area NW2 1ES where the Site is located. A sewer flooding history search was further carried out for the Site. Based on information by TWUL there are no incidents of sewer flooding in the Site's postcode NW2 1ES as a result of surcharging public sewers (Appendix F). Moreover, the Site is located approximately 3m higher than Cricklewood Lane where the TWUL sewers are located. Any sewer flooding would be channelled between the kerbs located on Cricklewood Lane, should it occur.
- 4.5.3 The Site is currently occupied by several retail units and car parks. The Proposed Development includes residential units and commercial spaces where proposed foul water discharge rate is expected to be higher. A preplanning application was submitted to TWUL to confirm the capacity of the surface and foul water sewer. TWUL confirmed foul water sewer capacity to serve the first 100 properties and advised offsite reinforcement will be required to serve the whole development (Appendix F). Refer to AECOM Foul Sewage and Utilities Assessment report for further information on foul drainage.
- 4.5.4 Therefore, the overall flood risk from foul water sewers is considered to be medium.

Mitigation Measures – Sewers

- 4.5.5 It is recommended that the developer proceeds to the detailed assessment stage and liaison on modelling and reinforcement works is continued with TWUL throughout the RMA stage.

4.6 Artificial Sources i.e. Reservoirs

- 4.6.1 The nearest extent of flooding from reservoirs is 1km west of the Site near Dollis Hill sourced from Brent Reservoir. The EA Flood map, shown in Figure 9, indicates the Site is not affected by the reservoir flood risk.
- 4.6.2 The provision of the reservoir inundation map is a legal requirement under the Flood and Water Management Act (2010). The risk of reservoir flooding is extremely low with current and historic reservoir legislation ensuring reservoirs are properly maintained.
- 4.6.3 Therefore, the risk of flooding from reservoirs is considered very low and will not be discussed further in this report.

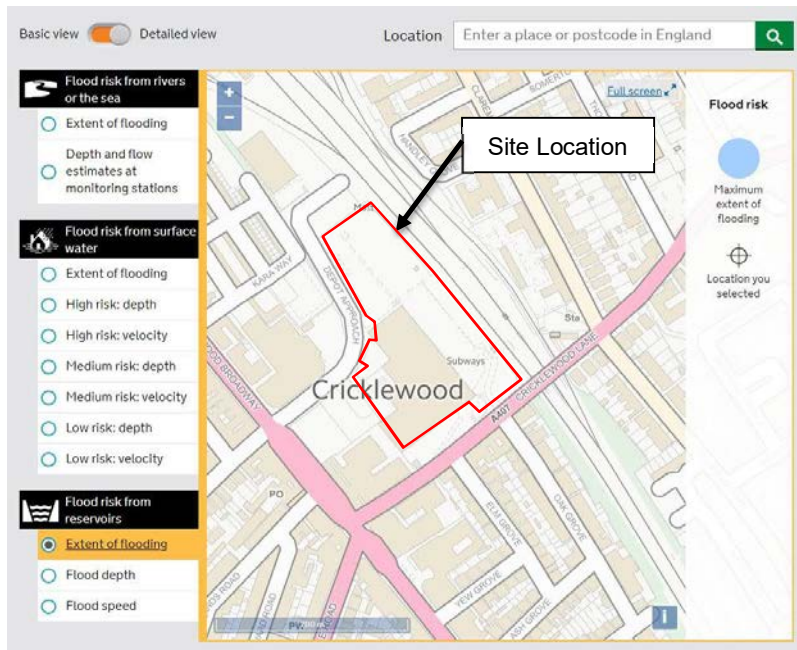


Figure 9: EA Reservoir Flood Map

5 Residual Flood Risk

5.1.1 Table 3 outlines the initial qualitative assessment of risk posed by the potential source of flooding, the mechanisms for flooding and the likely consequences. Table 3 also includes a review of possible mitigation measures and what effect, if any, the mitigation measures are likely to have on the residual risk posed by the potential flood source.

Table 3 Summary of Existing and Residual Flood Risk to the Site

Flood Hazard	Flood Mechanism and Possible Consequence	Initial Assessment of Risk	Mitigation Measures	Residual Risk
Fluvial/Tidal	Site is located in Flood Zone 1, low risk of fluvial flooding	Low	N/A	Low
Groundwater	Groundwater level over 60m below ground level and no historical records of groundwater flooding	Low	N/A	Low
Surface Water (Pluvial)	Localised surface water flooding on Site. Proposed surface water runoff will be restricted to Greenfield runoff rate	Low to Medium	Surface Water Drainage Strategy will reduce the peak discharge rate to equivalent greenfield runoff rate, reducing the risk of surface water flooding.	Low
Surface Water Sewer	Surface water runoff from the Proposed Development to be attenuated on Site to reduce discharge to public surface water sewer.	Low	Surface water drainage strategy to be developed in detail at next stage.	Low
Foul Water Sewer	No historical sewer flooding has occurred at the Site. TWUL confirmed insufficient foul sewer capacity to serve the Proposed Development	Medium	Developer to continue liaison on modelling and offsite reinforcement works with TWUL	Low
Reservoir	The risk of reservoir flooding is extremely low with current and historic legislation ensuring reservoirs are properly maintained	Very Low	N/A	N/A

6 Conclusion & Recommendations

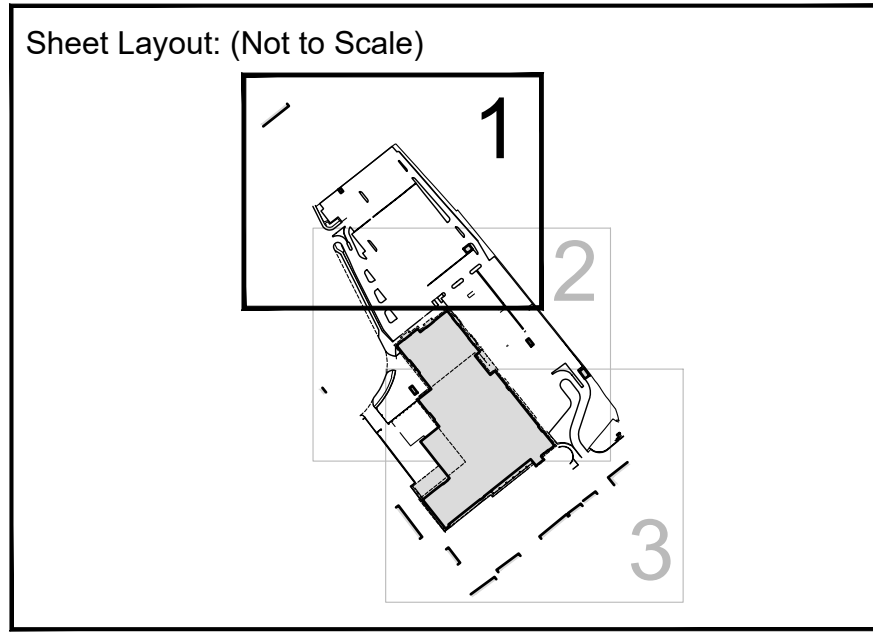
- 6.1.1 AECOM have been commissioned by Montreaux Cricklewood Developments Limited. to undertake a Site-specific Flood Risk Assessment (FRA) for the Proposed Development, B&Q Cricklewood. This report has been prepared to support the outline planning application for the Proposed Development to London Borough of Barnet (LBB).
- 6.1.2 The FRA has assessed the Site in terms of topography, geology, hydrogeology and climate change by reviewing the available information and aims to identify the potential sources of flooding and how residual flood risk will be managed without causing flood risk elsewhere.
- 6.1.3 Planning policy with respect to development and flood risk in areas in England is contained within The National Planning Policy Framework (NPPF) and its accompanying Planning Practice Guidance. This Site-specific FRA has been prepared in accordance with those documents, regional and local planning policy and in consultation with the EA, LBB and TWUL.
- 6.1.4 The FRA can be summarised as follows:
- The Proposed Development is categorised as “more vulnerable”;
 - The EA confirmed the Site is in Flood Zone 1 and therefore, the fluvial/tidal flood risk is assessed as low;
 - The flood risk from groundwater is assessed as low;
 - The existing flood risk from surface water is assessed as low to medium. However, it is recommended that the proposed drainage strategy is designed in accordance to the LBB’s policy, national policy and good practice design codes e.g. Building Regulations Part H. The residual flood risk from surface water will be assessed as low;
 - The flood risk from surface water sewer is assessed as low and foul water sewer is assessed as medium. However, it is recommended that during the next design stage a further assessment of the existing public sewer network via completion of drainage and CCTV survey is undertaken; and
 - The flood risk from reservoir is assessed as very low.
- 6.1.5 It is concluded that the Proposed Development is in accordance with the planning policies and based on the information provided by AECOM within this FRA are considered sustainable and acceptable in terms of flood risk.

Appendix A : Topographical Survey

Notes:
 1. GRID AND LEVELS BASED ON ORDNANCE DATUM, DERIVED FROM THE NATIONAL GRID NETWORK. LOCAL SCALE FACTOR IS 0.999793 APPLIED.
 2. TREE AND HEDGE SPECIES HAVE BEEN IDENTIFIED AS ACCURATELY AS POSSIBLE BUT SHOULD BE CROSS CHECKED IN CRITICAL AREAS.

Coordinate Table				
Station	Description	Easting	Northing	Level
S1	ROAD NAIL	523804.640	186038.220	55.489
S2	ROAD NAIL	523787.213	186010.378	55.740
S3	ROAD NAIL	523816.879	186030.266	55.773
S4	ROAD NAIL	523815.054	186069.484	55.385
S5	ROAD NAIL	523815.540	186011.484	55.862
S6	ROAD NAIL	523917.286	185961.702	55.883
S7	ROAD NAIL	523943.433	185919.143	55.139
S8	FGS	523972.774	185887.401	55.814
S9	ROAD NAIL	523940.509	185856.120	54.725
S10	ROAD NAIL	523951.477	185848.080	52.087
S11	ROAD NAIL	523915.040	185829.551	53.676
S12	ROAD NAIL	523889.342	185803.368	51.443
S14	ROAD NAIL	523784.477	185888.228	53.302
S15	ROAD NAIL	523810.678	185890.207	54.123
S16	ROAD NAIL	523821.793	185868.457	54.220
S17	ROAD NAIL	523871.917	185863.387	55.018
S19	ROAD NAIL	523816.752	185899.858	54.422

TOPOGRAPHICAL KEY	
	GENERAL ABBREVIATIONS
	ACU
	AV
	BE
	BS
	BSL
	BSL
	BSL
	BSL
	BSL
	BSL
	BSL
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	BSL
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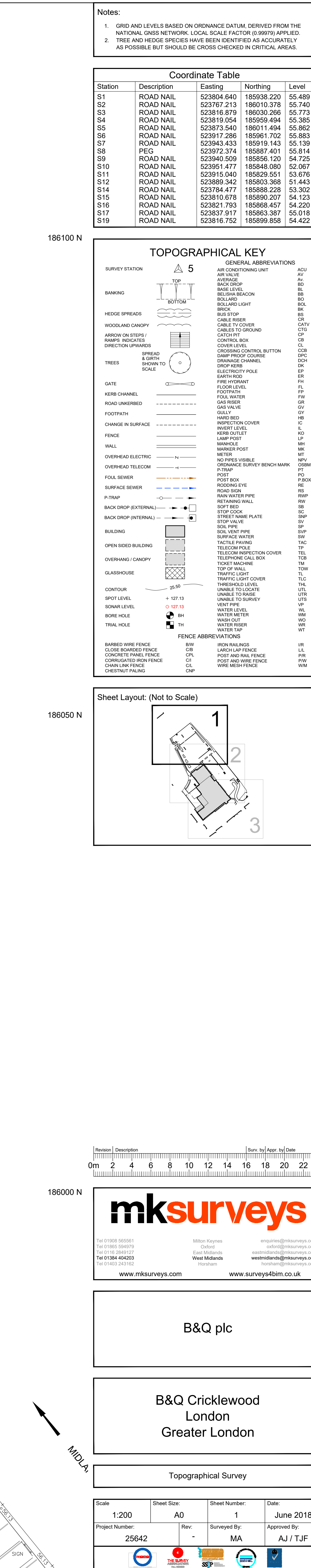
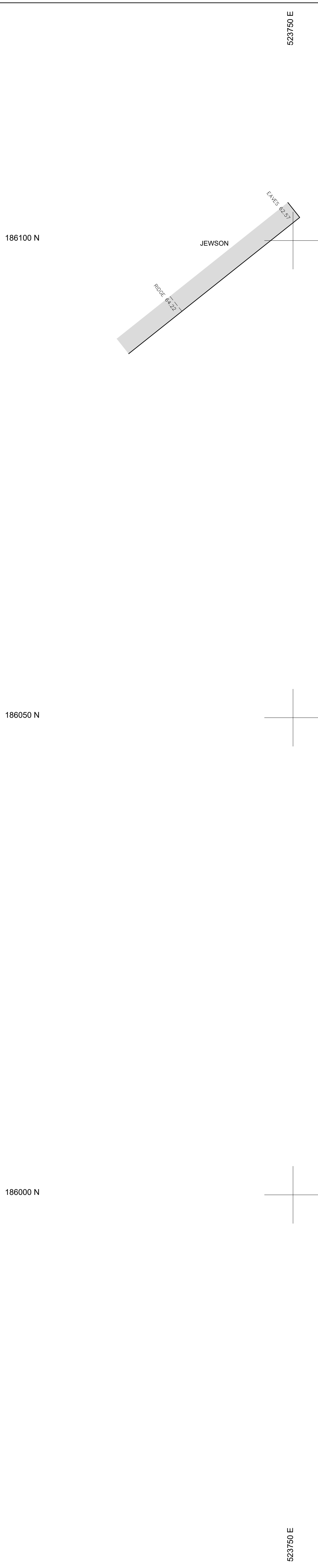


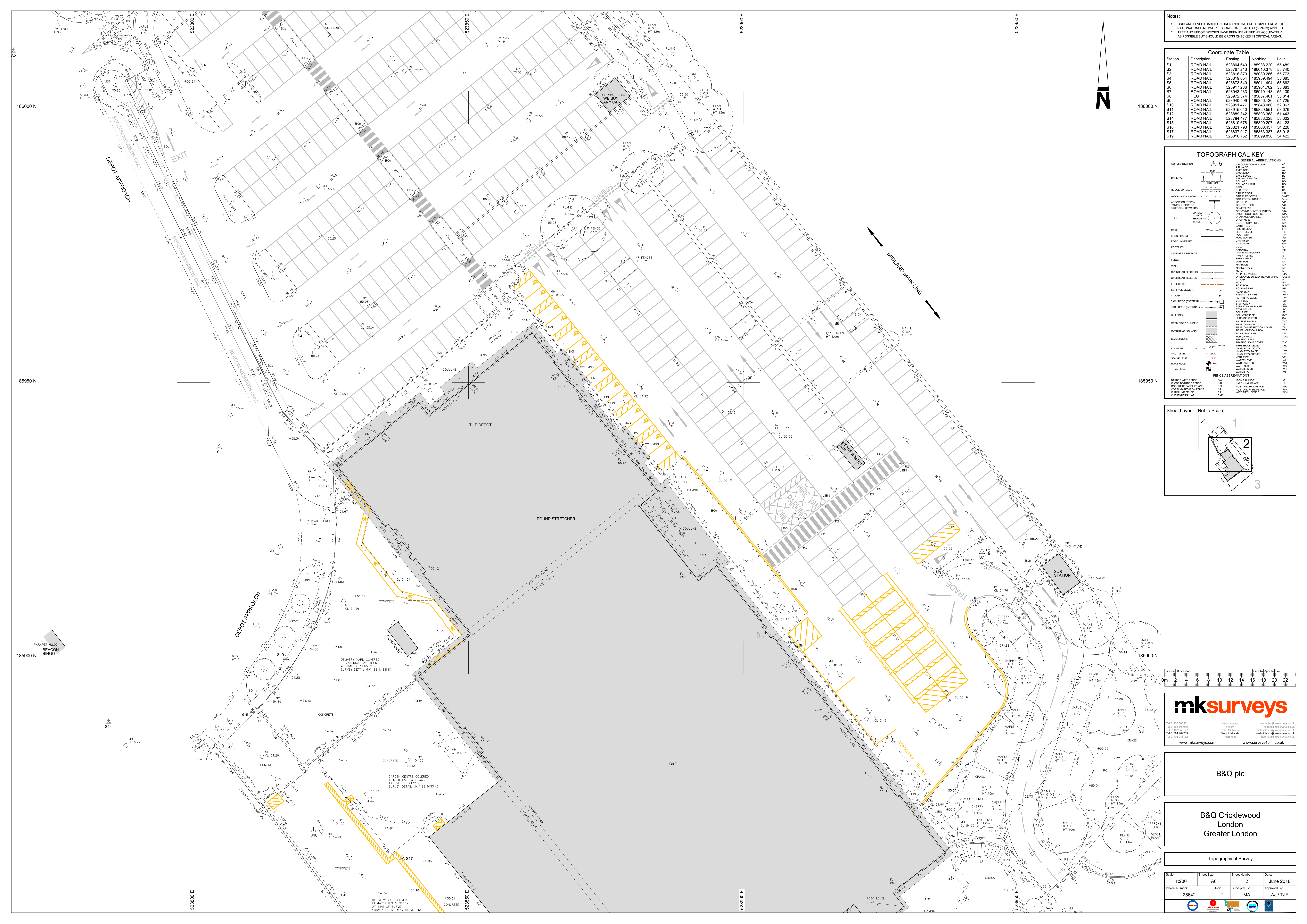
mk surveys
 Tel: 01803 241192
 Email: info@mk-surveys.co.uk
 www.mk-surveys.com

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B&Q Cricklewood
 London
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Topographical Survey

Scale: 1:200	Sheet Size: A0	Sheet Number: 1	Date: June 2018
Project Number: 25642	Rev: MA	Surveyed By: AJ / T/JF	Approved By: AJ / T/JF

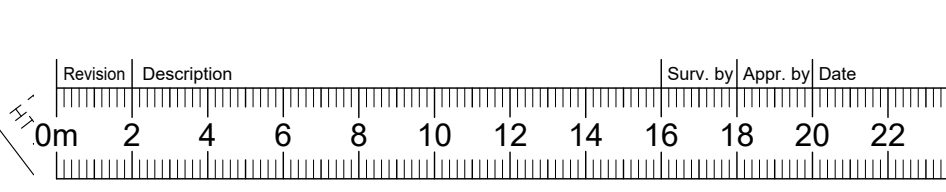
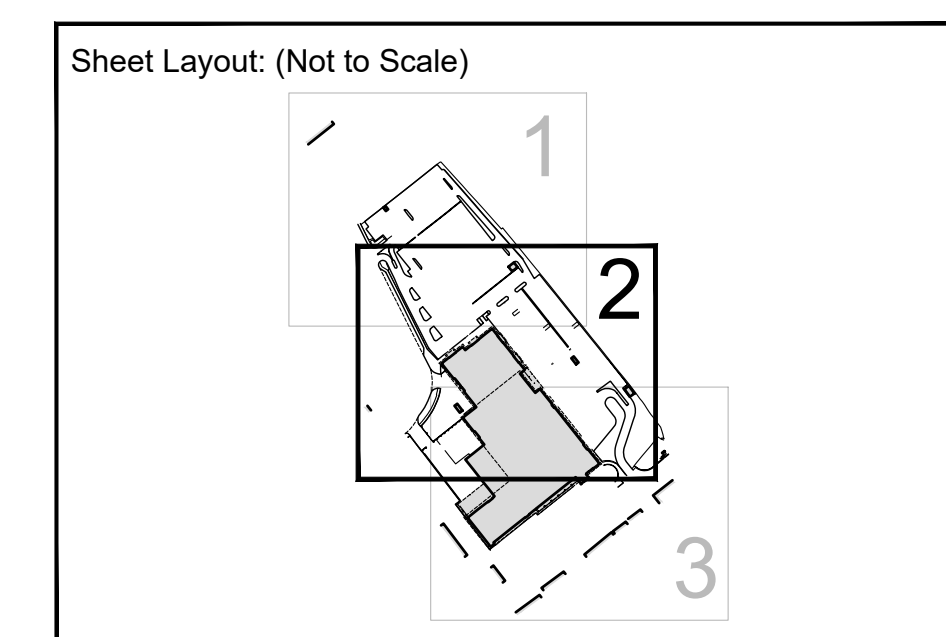




Notes:
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S3	ROAD NAIL	523816.879	186030.266	55.773
S4	ROAD NAIL	523815.054	185969.494	55.385
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S7	ROAD NAIL	523943.443	185919.143	55.139
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S17	ROAD NAIL	523837.917	185883.387	55.018
S19	ROAD NAIL	523816.752	185899.858	54.422

GENERAL ABBREVIATIONS	
SURVEY STATION	5
BANKING	TOP
HEDGE SPRINGS	VEG
WOODLAND CHIPPY	WOODLAND
JUNCTION (ON STRIPS)	JUNCTION
RAMPS INDICATES	RAMP
DIRECTION PRISM	PRISM
TREES	TREE
GATE	GATE
KERB CHANNEL	KERB CHANNEL
ROAD UNPAVED	ROAD UNPAVED
FOOTPATH	FOOTPATH
CHANGE IN SURFACE	CHANGE IN SURFACE
FENCE	FENCE
WALL	WALL
OVERHEAD ELECTRIC	OVERHEAD ELECTRIC
OVERHEAD TELECOM	OVERHEAD TELECOM
FOUL SEWER	FOUL SEWER
SURFACE SEWER	SURFACE SEWER
PI-TOP	PI-TOP
BACK DROPP INTERNAL	BACK DROPP INTERNAL
BACK DROPP EXTERNAL	BACK DROPP EXTERNAL
BUILDING	BUILDING
OPEN SIDED BUILDING	OPEN SIDED BUILDING
OVERHANG / CANDY	OVERHANG / CANDY
GLASSHOUSE	GLASSHOUSE
CONTOUR	CONTOUR
SPOT LEVEL	SPOT LEVEL
SOAKAWAY	SOAKAWAY
TRIAL HOLE	TRIAL HOLE
ARCH	ARCH
SKELTON	SKELTON
WATER METER	WATER METER
WATER RESERVOIR	WATER RESERVOIR
WELL	WELL
WET	WET
WT	WT
BARRIED WIRE FENCE	BARRIED WIRE FENCE
CLOSE BARRIED FENCE	CLOSE BARRIED FENCE
CONCRETE PAVEMENT	CONCRETE PAVEMENT
CONCRETE ROAD FENCE	CONCRETE ROAD FENCE
CROWN WIRE FENCE	CROWN WIRE FENCE
DRINKING WATER	DRINKING WATER
CHESTNUT PALMS	CHESTNUT PALMS
RICH HAZELNS	RICH HAZELNS
LANGLIFF FENCE	LANGLIFF FENCE
POST AND RAIL FENCE	POST AND RAIL FENCE
RUST AND WIRE FENCE	RUST AND WIRE FENCE
WIRE MESH FENCE	WIRE MESH FENCE



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 14 01908 290070
 14 01908 494020
 14 01908 201192

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B&Q plc

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Topographical Survey

Scale	Sheet Size	Sheet Number	Date
1:200	A0	2	June 2018
Project Number	Rev	Surveyed By	Approved By
25642		MA	AJ / TJF



Notes:

- GRID AND LEVELS BASED ON EXISTING TOPOGRAPHICAL SURVEY PRODUCED BY MK SURVEYS JOB No. 25642, DATE JULY 2018. NO SITE VERIFICATION OF ORIGINAL SURVEY WAS CARRIED OUT DURING THIS PROJECT.
- SURVEY EXTENDED TO THE SOUTH OF THE B&Q BUILDING, LAYERS PREFIRED WITH AUGUST 2019.
- TREE AND HEDGE SPECIES HAVE BEEN IDENTIFIED AS ACCURATELY AS POSSIBLE BUT SHOULD BE CROSS CHECKED IN CRITICAL AREAS.

TOPOGRAPHICAL KEY

GENERAL ABBREVIATIONS	
AIR CONDITIONING UNIT	ACU
AIR VALVE	AV
AVERAGE	AV
BACK DRAIN	BD
BASE LEVEL	BL
BELISHA BEACON	BB
BOLLARD	BO
BOLLARD LIGHT	BOL
BRICK	BK
BUS STOP	BS
CABLE RISER	CR
CABLE TV COVER	CATV
CABLES TO GROUND	CTG
CATCH PIT	CP
CONTROL BOX	CB
COVER LEVEL	CL
CROSSING CONTROL BUTTON	CCB
DAMP PROOF COURSE	DPC
DRAINAGE CHANNEL	DCH
DROP KERB	DK
ELECTRICITY POLE	EP
EARTH ROD	ER
FIRE HYDRANT	FH
FLOOR LEVEL	FL
FOUL WATER	FW
GAS RISER	GR
GAS VALVE	GV
GULLY	GY
HARD BED	HB
INSPECTION COVER	IC
INVERT LEVEL	IL
KERB OUTLET	KO
LAMP POST	LP
MANHOLE	MH
MARKER POST	MP
METER	MT
NO PIPES VISIBLE	NPV
ORDNANCE SURVEY BENCH MARK	OSBM
PIT	PT
POST	PO
POST BOX	PBOX
RODDING EYE	RE
ROAD SIGN	RWS
RAIN WATER PIPE	RWP
RETAINING WALL	RW
SOFT BED	SB
STOP COCK	SC
STREET NAME PLATE	SNP
STOP VALVE	SV
SOIL PIPE	SP
SOIL VENT PIPE	SVIP
SURFACE WATER	SW
TACTILE PAVING	TAC
TELECOM POLE	TP
TELECOM INSPECTION COVER	TEL
TELEPHONE CALL BOX	TGB
TICKET MACHINE	TM
TOP OF WALL	TOW
TRAFFIC LIGHT	TL
TRAFFIC LIGHT COVER	TLC
THRESHOLD LEVEL	THL
UNABLE TO LOCATE	UTL
UNABLE TO RAISE	UTR
VENT PIPE	VP
WATER LEVEL	WL
WATER METER	WM
WASH OUT	WO
WATER RISER	WR
WATER TAP	WT

FENCE ABBREVIATIONS	
BARBED WIRE FENCE	BWF
CLOSE BOARDED FENCE	C/B
CONCRETE PANEL FENCE	CPL
CORRUGATED IRON FENCE	C1
CHAIN LINK FENCE	CL
CHESTNUT PALING	CNP
IRON RAILINGS	IR
LARCH LAF FENCE	LL
POST AND RAIL FENCE	PR
POST AND WIRE FENCE	PWF
WIRE MESH FENCE	WM



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MONTREUX

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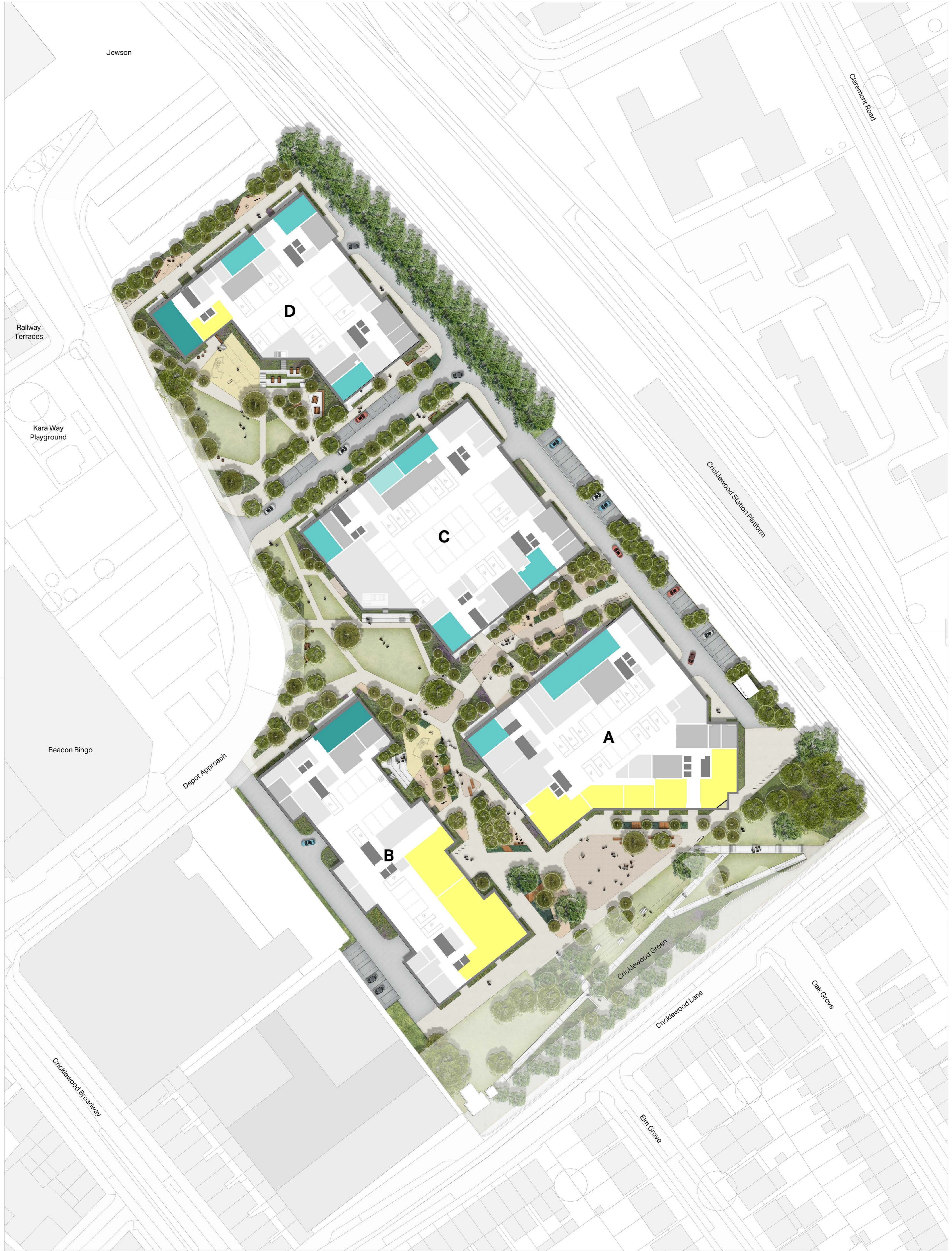
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Project Number	Rev	Surveyed By	Approved By
27528	-	JM	AJ / CP

Coordinate Table

Station	Description	Easting	Northing	Level
S1	ROAD NAIL	523804.640	185938.220	55.489
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S17	ROAD NAIL	523837.917	185863.387	55.018
S19	ROAD NAIL	523816.752	185899.858	54.422
J1	HILTI NAIL	523930.059	185842.602	54.641

Appendix B : Proposed Development



Jewson

Claremont Road

Railway Terraces

Kara Way Playground

Cricklewood Station Platform

Beacon Bingo

Depot Approach

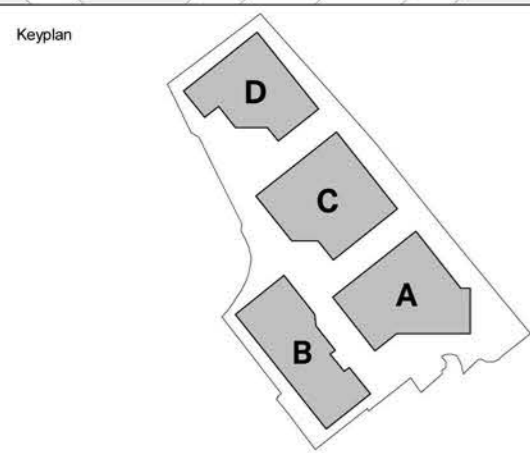
Cricklewood Green

Cricklewood Lane

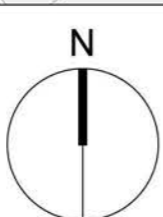
Oak Grove

Elm Grove

Cricklewood Broadway



North



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No.	Revision	Date	Initial	Chk'd
1	For Information	202371	SN	JE

	Residential - C3 - 1B1P Studio		Flexible commercial - A3, B1, D1, D2
	Residential - C3 - 1B2P		Ancillary (Cycle store, BOH)
	Residential - C3 - 2B4P		Ancillary (Plant, MEP)
	Residential - C3 - 3B5P		Core (Lift, Stairs)

NOTE:
 All site boundaries and legal demises are indicative and shown for information only, based on desktop studies of land registry and record information, and are subject to survey and verification on site.

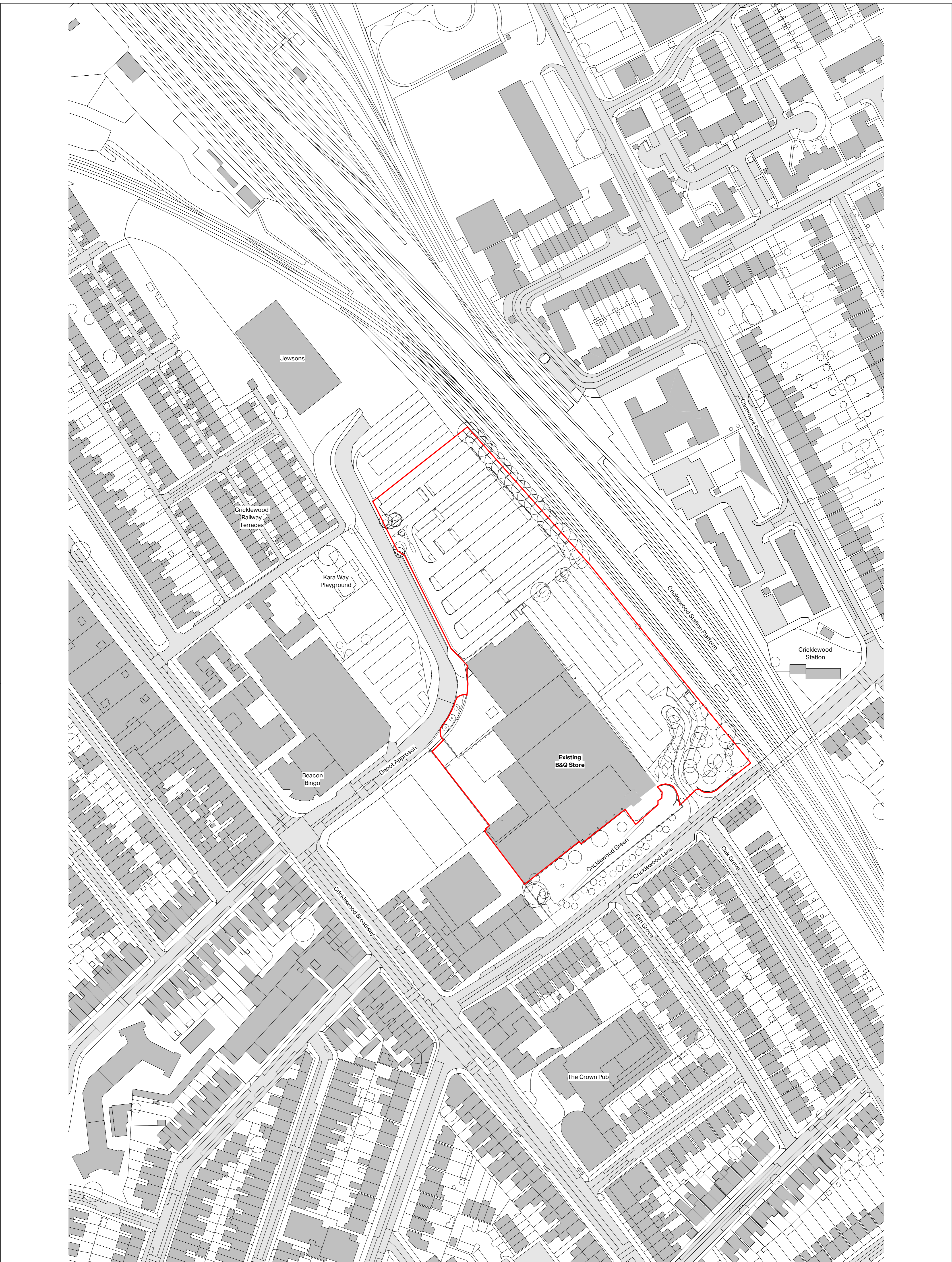
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 +44(0)20 73327093
 www.epr.co.uk

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 NW2 1ES

Illustrative Masterplan
 Ground Floor

Scale	Status	Suitability	Revision
1:500	For Information	S2	P1

Project Code: 10965 - EPR - XX - GF - DR - A - TP-0200



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No.	Revision	Date	Initial	Chk'd
1	For Approval	2023/1	SN	JE

NOTE:

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- Outline Application boundary
- Existing building
- Existing road

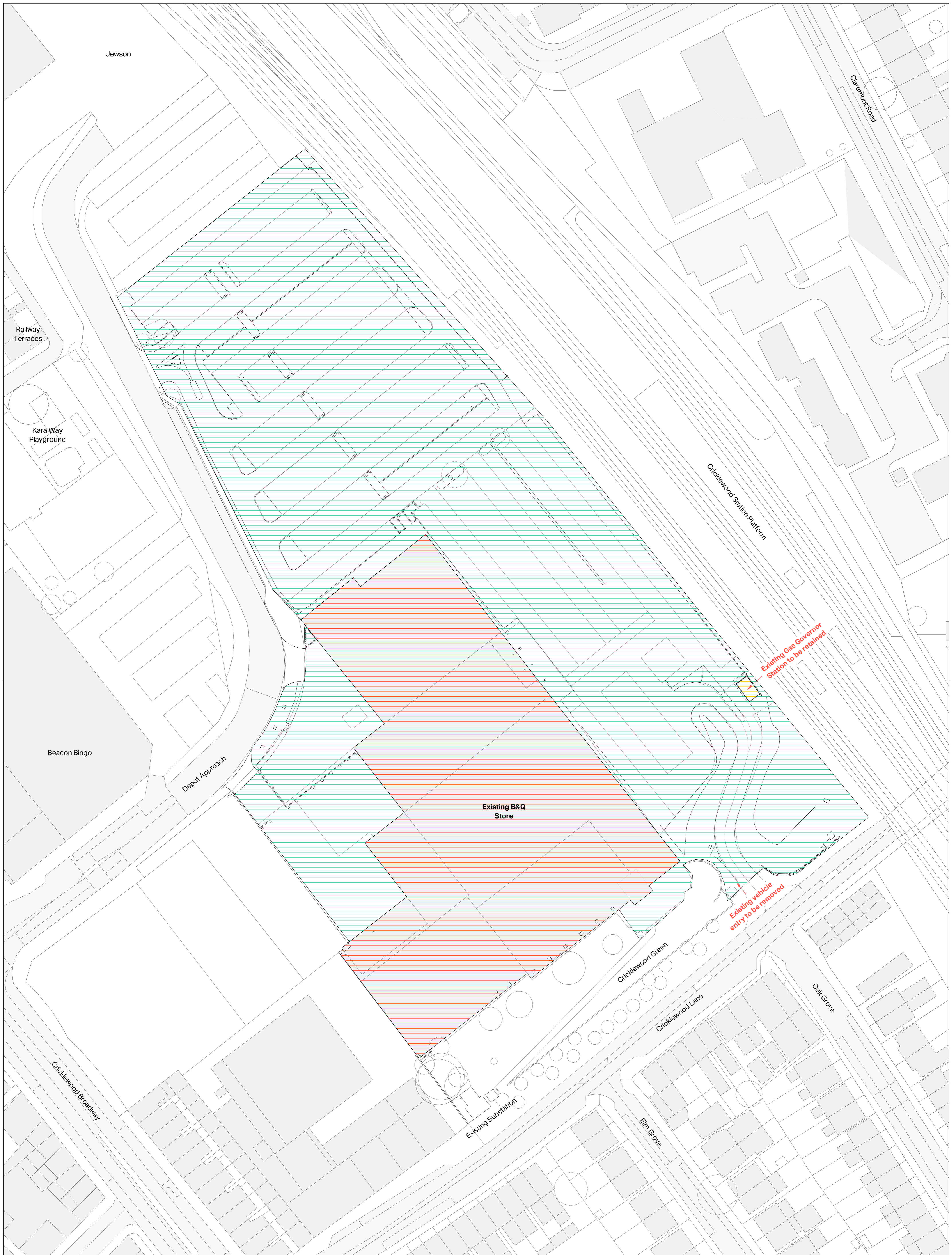
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 For Approval
 Status
 S4 - P1

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Location Plan
 Outline Application Boundary

Project Code: 10965 - EPR - XX - DR - A - TP-0100



Keyplan

North

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No.	Revision	Date	Initial	Chk'd
1	For Approval	2023/1	SN	JE

No.	Revision	Date	Initial	Chk'd
1	For Approval	2023/1	SN	JE

Legend:

- Existing building to be retained
- Existing building to be removed
- Existing surface to be levelled and re-landscaped

NOTE:

- All site boundaries and legal demises are indicative and shown for information only based on desktop studies of land registry and record information, and are subject to survey and verification on site.

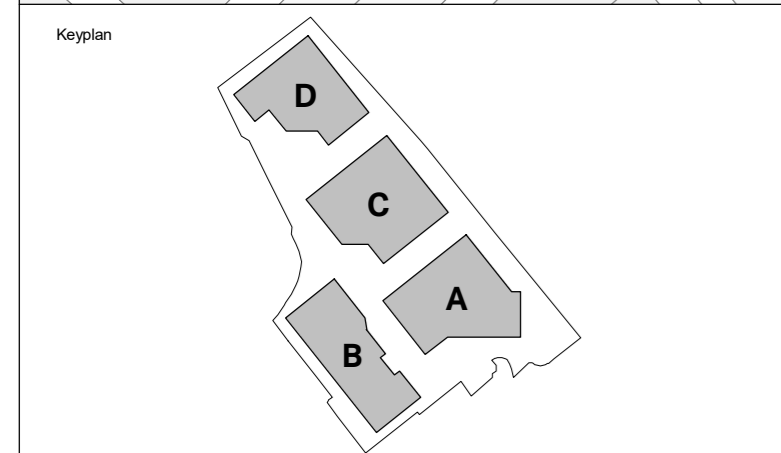
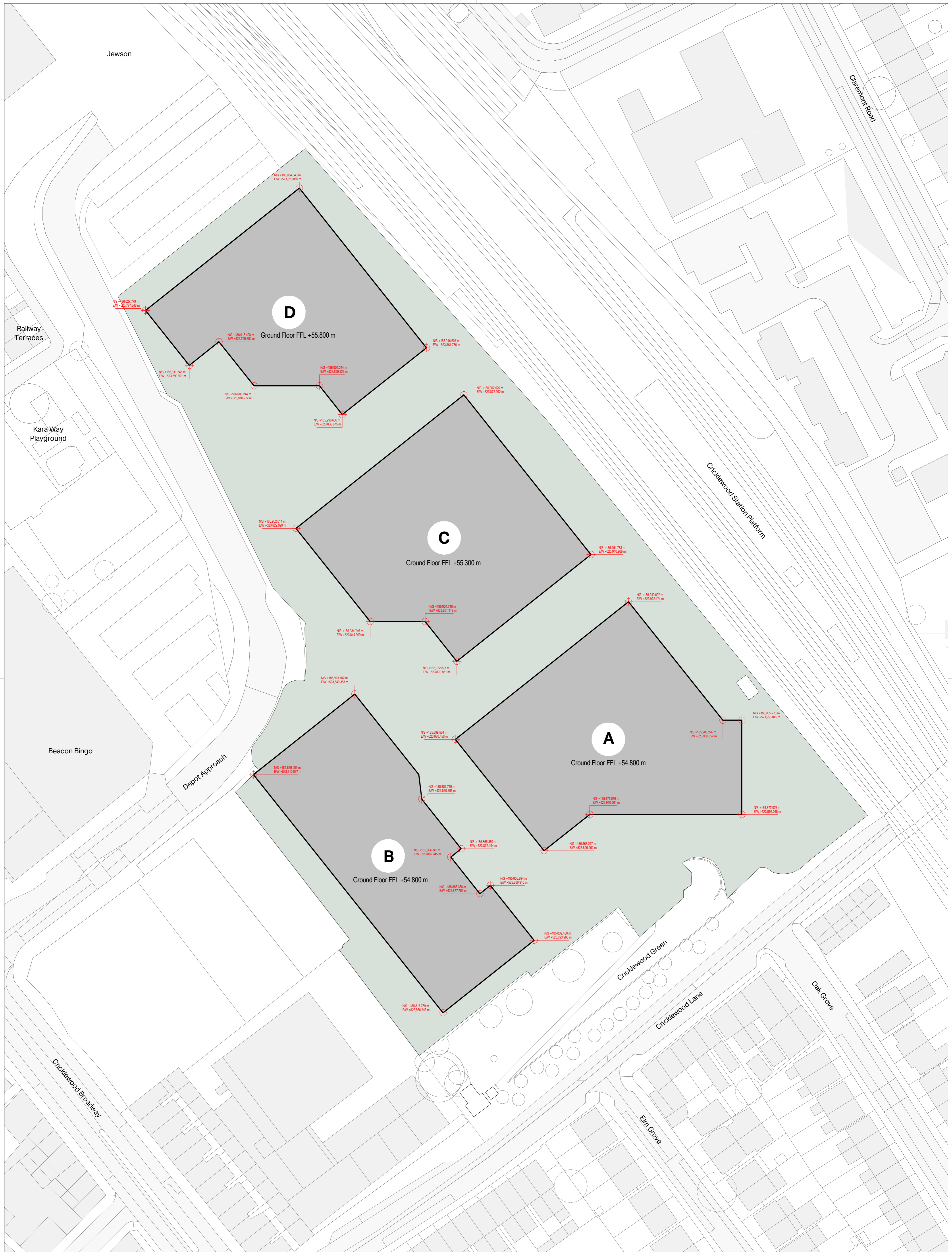
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Parameter Plan Demolition

Scale	Status	Suitability	Revision
1:500	For Approval	S4	P1

Project Code: 10965 - EPR-XX-XX-DR-A-TP-0101



North

N

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No.	Revision	Date	Initial	Chk'd
1	For Approval	2023/1	SN	JE

Legend:

- Ground floor public realm, roads and infrastructure
- Development Parcels including enhancement zone for balconies and defensible planting at ground floor
- OS Northing and Easting coordinates

NOTE:

- All site boundaries and legal demises are indicative and shown for information only, based on desktop studies of land registry and record information, and are subject to survey and verification on site.

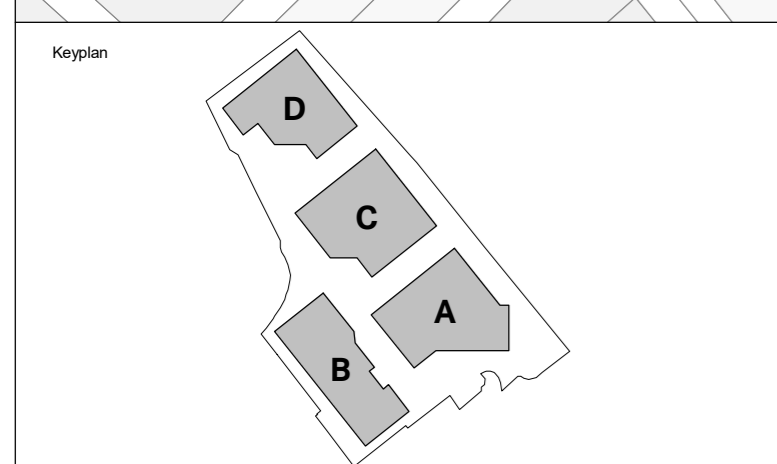
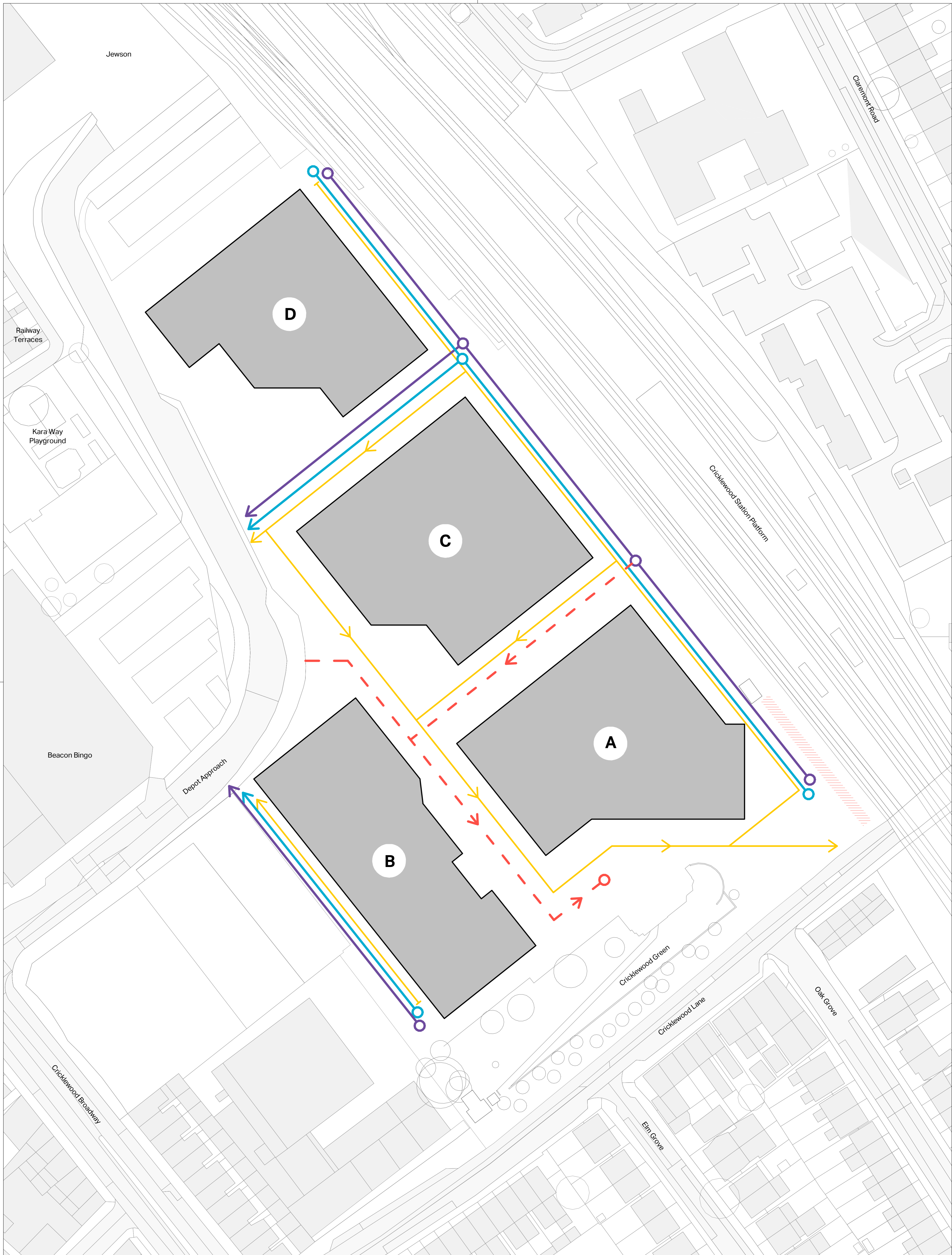
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 +44(0)20 73277000
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B&Q Cricklewood Lane NW2 1ES

Parameter Plan Development Parcels

Scale	Status	Suitability	Revision
1:500	For Approval	S4	P1

Project Code: 10965 - EPR - XX - DR - A - TP-0102



North

N

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5. This drawing does not contain shared coordinates and is not issued for coordination purposes.

No.	Revision	Date	Initial	Chk'd
1	For Approval	2023/1	SN	JE

	Two way vehicular route		Development Parcels
	Two way service route		Safeguarded zone for future pedestrian link to station
	Two way emergency route		Turning head for non-service vehicles
	Pedestrian / cycle route		Turning head for service and emergency vehicles

NOTE:

- All site boundaries and legal demises are indicative and shown for information only, based on desktop studies of land registry and record information, and are subject to survey and verification on site.

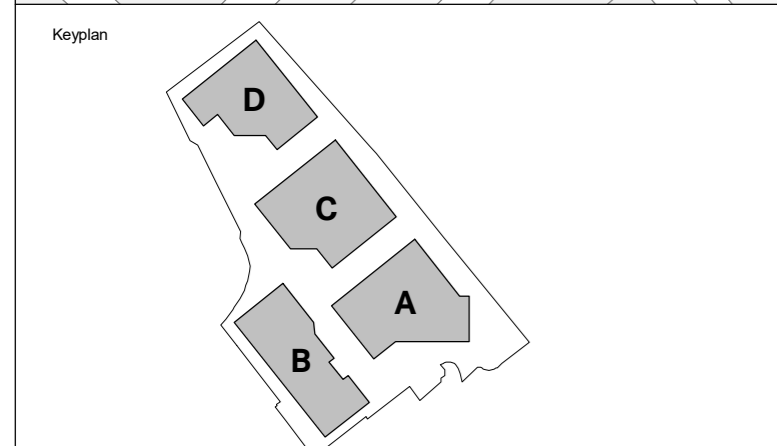
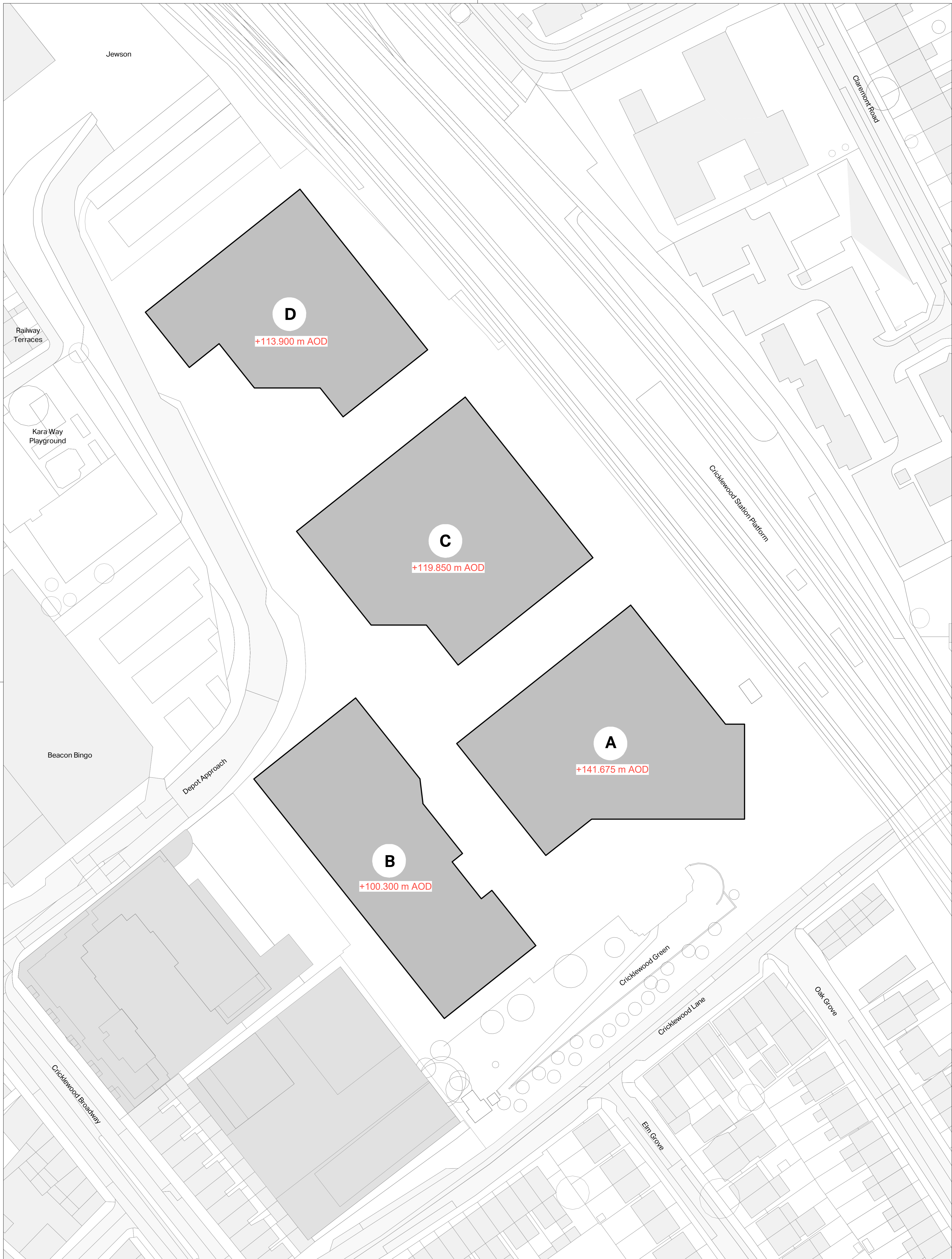
EPR Architects
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 +44(0)20 7332 7000
 www.epr.co.uk

**B&Q Cricklewood Lane
 NW2 1ES**

**Parameter Plan
 Key Points of Access and Circulation**

Scale	Status	Suitability	Revision
1:500	For Approval	S4	P1

Project Code: 10965 - EPR-XX-XX-DR-A-TP-0103



North

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No.	Revision	Date	Initial	Chk'd
1	For Approval	2023/1	SN	JE

Development Parcels including enhancement zone for balconies and defensible planting at ground floor

NOTE:
 • All site boundaries and legal demises are indicative and shown for information only, based on desktop studies of land registry and record information, and are subject to survey and verification on site.
 • Ordnance Datum levels are used to define the maximum Development Heights expressed as a height above mean sea level (AOD).
 • Maximum Development Heights have been measured from indicative ground floor levels of the specific Development Parcels as set out in Parameter Plan 10965-EPR-XX-XX-DR-A-TP-0102.
 • Maximum Development Heights are inclusive of parapets, other architectural features, lift/star overruns and/or plant.

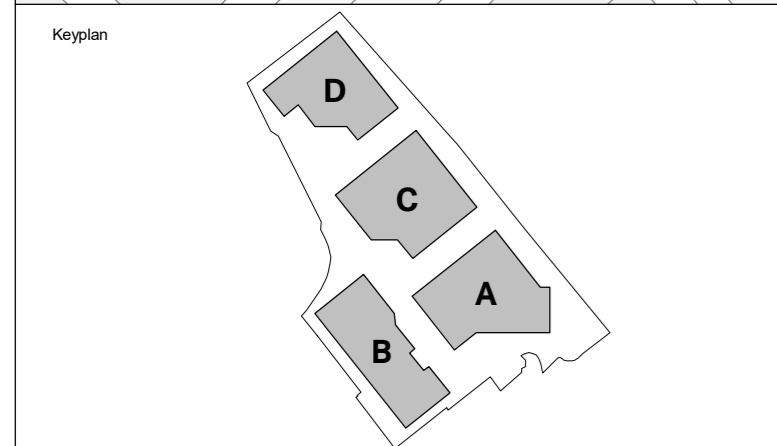
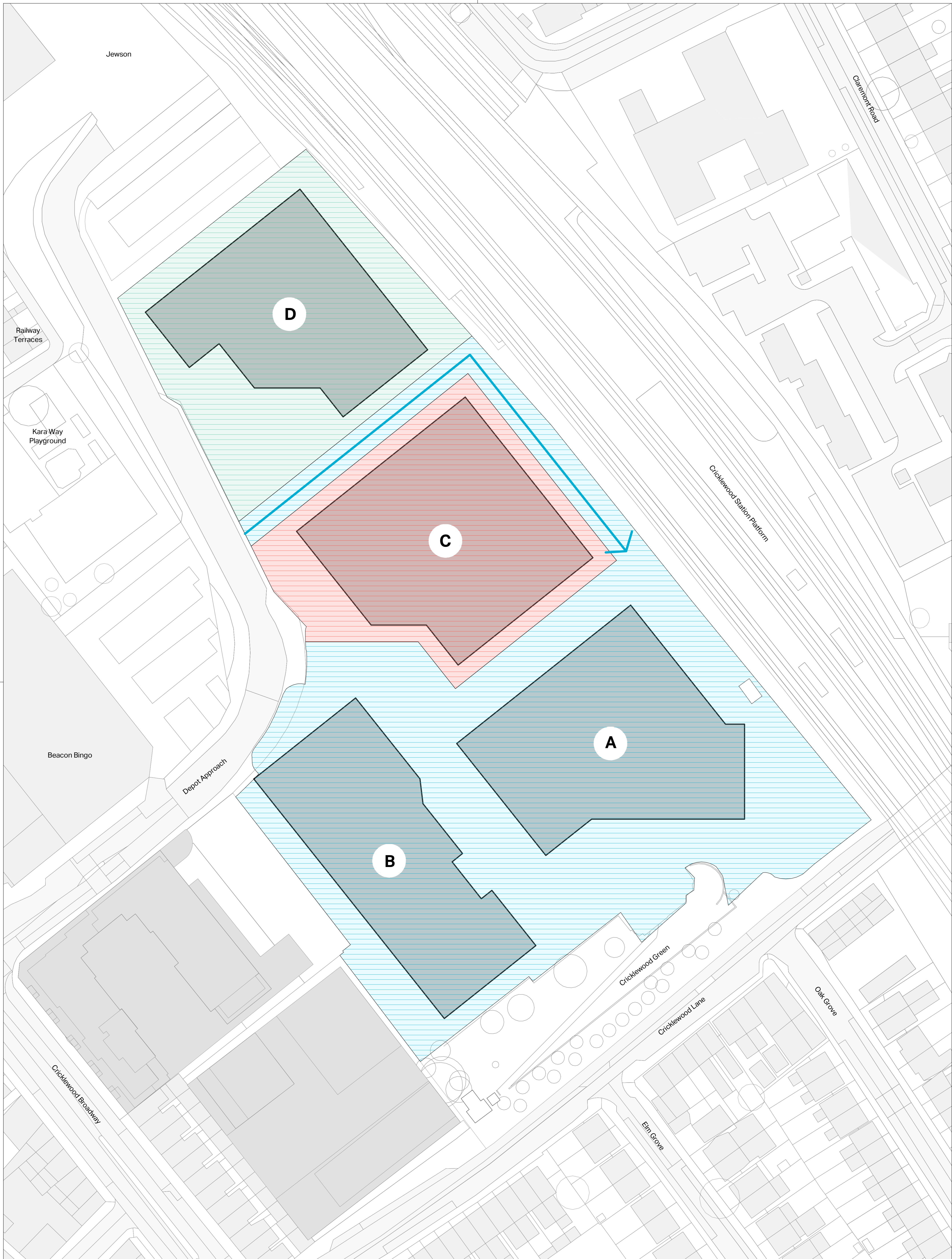
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 +44(0)20 7332 7800
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**B&Q Cricklewood Lane
 NW2 1ES**

**Parameter Plan
 Development Heights**

Scale @A1	Status	Suitability	Revision
1:500	For Approval	S4	P1

Project Code: 10965 - EPR - XX - XX - DR - A - TP-0104
 Originator: Zone: Level: Type: Role: Class: Number



North

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 5. This drawing does not contain shared coordinates and is not issued for coordination purposes.

No.	Revision	Date	Initial	Chk'd
1	For Approval	2023/1	SN	JE

Site and operational access required for Phase 1
 Phase 1 – Development Parcels A and B
 Phase 2 – Development Parcel C
 Phase 3 – Development Parcel D

NOTE:
 • All site boundaries and legal demises are indicative and shown for information only, based on desktop studies of land registry and record information, and are subject to survey and verification on site.

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B&Q Cricklewood Lane NW2 1ES

Parameter Plan Phasing

Scale	Status	Suitability	Revision
1:500	For Approval	S4	P1

Project Code: 10965 - EPR - XX - XX - DR - A - TP-0105

C:\USERS\ALISON\DRIVE - EXTERIOR ARCHITECTURE LTD\1939_CRICKLEWOOD LANE\01 CAD\02 SHEET LAYOUT\EXA_1939_100.DWG



LEGEND

--- APPLICATION BOUNDARY

HARD SURFACES

- SURFACE TYPE 01 TYPICAL PAVING - SITE-WIDE
- SURFACE TYPE 02 TYPICAL PAVING - ACCENTED
- SURFACE TYPE 03 PERMEABLE PAVING
- SURFACE TYPE 04 SELF-BINDING GRAVEL
- SURFACE TYPE 05 WET POUR PLAY SURFACE
- SURFACE TYPE 06 CARRIAGEWAY PAVING
- SURFACE TYPE 07 RESIDENTIAL TERRACES

SOFT LANDSCAPE

- SPECIES RICH LAWN
- BIO-DIVERSE INGROUND PLANTING
- BIO-DIVERSE RAINGARDEN PLANTING
- PROPOSED SPECIMEN TREE
- EXISTING TREE TO BE RETAINED

INDICATIVE FURNITURE

- TIMBER SEAT
- RECLINER SEAT
- PICNIC TABLE
- CYCLE STAND
- 'SHEFFIELD' CYCLE STAND
- SUPPLIER: CYCLEHOCKP

PLAY MATERIALS AND STRUCTURES ARE SHOWN AS INDICATIVE ONLY.

AREA FOR BIN PRESENTATION

EXTERIOR ARCHITECTURE

LONDON
Unit 17.1, The Leather Market, 11-13 Weston Street, London, SE1 3ER

MANCHESTER
Studio 537, The Royal Exchange, St Anns Square, Manchester, M2 7DH

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Client
MONTREAUX

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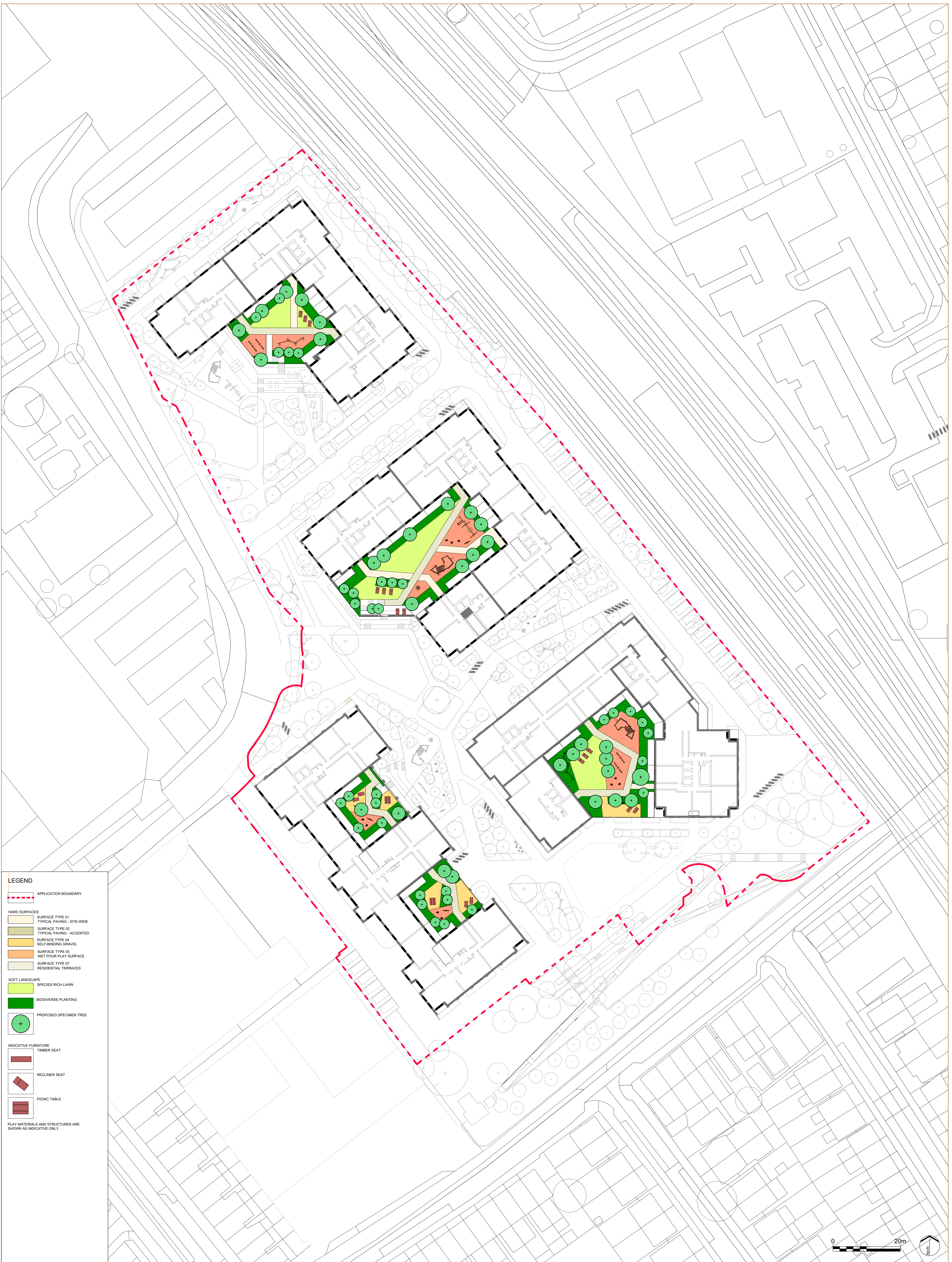
Rev	Description	Date
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D	FOR INFORMATION	30.07.2020
C	FOR INFORMATION	15.07.2020
B	FOR INFORMATION	08.07.2020
A	FOR INFORMATION	11.06.2020
-	DRAFT - FOR INFORMATION	13.12.2019

Project title
Cricklewood Lane

Drawing title
GENERAL ARRANGEMENT PLAN - GROUND FLOOR

Issued By London	Scale 1:500 @ A1	T: 020 7978 2101
Status FOR INFORMATION	Date 13.12.2019	Drawn ExA
		Checked HS
		Approved SM
Drawing number ExA_1939_100		Revision D

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LEGEND

--- APPLICATION BOUNDARY

HARD SURFACES

- SURFACE TYPE 01 TYPICAL PAVING - SITE-WIDE
- SURFACE TYPE 02 TYPICAL PAVING - ACCENTED
- SURFACE TYPE 04 SELF-BINDING GRAVEL
- SURFACE TYPE 05 WET FOUR PLAY SURFACE
- SURFACE TYPE 07 RESIDENTIAL TERRACES

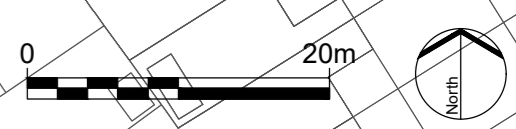
SOFT LANDSCAPE

- SPECIES RICH LAWN
- BIO-DIVERSE PLANTING
- PROPOSED SPECIMEN TREE

INDICATIVE FURNITURE

- TIMBER SEAT
- RECLINER SEAT
- PICNIC TABLE

PLAY MATERIALS AND STRUCTURES ARE SHOWN AS INDICATIVE ONLY



EXTERIOR ARCHITECTURE

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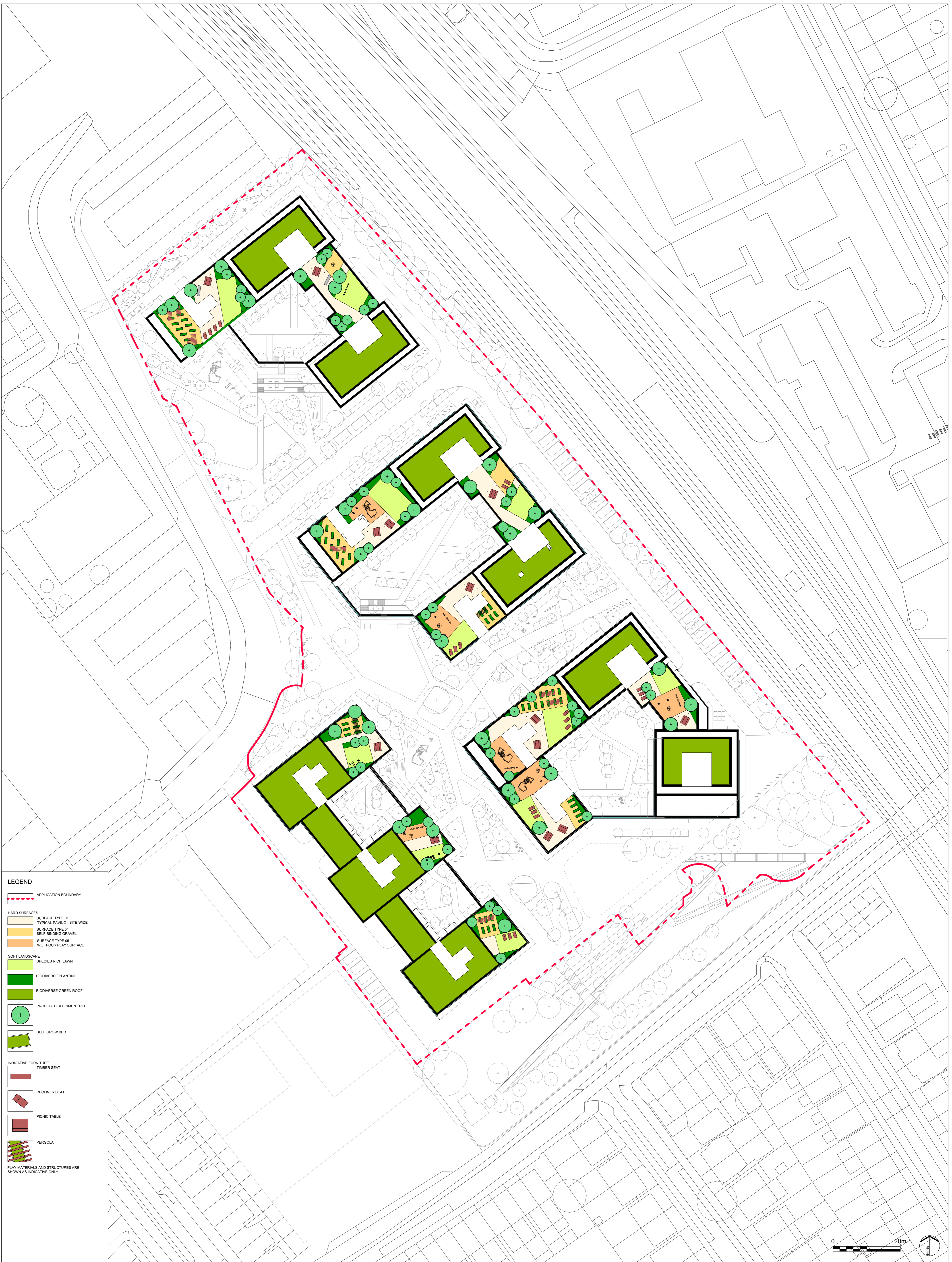
Rev	Description	Date
C	FOR INFORMATION	30.07.2020
B	FOR INFORMATION	17.07.2020
A	FOR INFORMATION	11.06.2020
-	DRAFT - FOR INFORMATION	13.12.2019

Project title
Cricklewood Lane

Drawing title
GENERAL ARRANGEMENT PLAN - PODIUM LEVEL

Issued By London	Scale 1:500 @ A1	T: 020 7978 2101
Status FOR INFORMATION	Date 13.12.2019	Drawn ExA
		Checked HS
		Approved SM
Drawing number ExA_1939_101		Revision C

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LEGEND

- APPLICATION BOUNDARY
- HARD SURFACES**
 - SURFACE TYPE 01 TYPICAL PAVING - SITE-WIDE
 - SURFACE TYPE 04 SELF-BINDING GRAVEL
 - SURFACE TYPE 05 WET POUR PLAY SURFACE
- SOFT LANDSCAPE**
 - SPECIES RICH LAWN
 - BIO-DIVERSE PLANTING
 - BIO-DIVERSE GREEN ROOF
 - PROPOSED SPECIMEN TREE
 - SELF GROW BED
- INDICATIVE FURNITURE**
 - TIMBER SEAT
 - RECLINER SEAT
 - PICNIC TABLE
 - PERGOLA
- PLAY MATERIALS AND STRUCTURES ARE SHOWN AS INDICATIVE ONLY



EXTERIOR ARCHITECTURE

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Rev	Description	Date
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C	FOR INFORMATION	30.07.2020
B	FOR INFORMATION	15.07.2020
A	FOR INFORMATION	11.06.2020
-	DRAFT - FOR INFORMATION	13.12.2019

Project title
Cricklewood Lane

Drawing title
GENERAL ARRANGEMENT PLAN - ROOF LEVEL

Issued By	London	T: 020 7978 2101
Scale	1:500 @ A1	Drawn ExA
Status	FOR INFORMATION	Checked HS
Date	13.12.2019	Approved SM
Drawing number	ExA_1939_102	Revision
		C

Appendix C : The EA Correspondence and mapping

Limbu, Bimarsha

From: NET Enquiries <HNLenquiries@environment-agency.gov.uk>
Sent: 23 August 2019 11:43
To: Bacon, George
Subject: HNL 139753 CB- 190820/BD05 RE: Product 4 - B&Q Cricklewood - NW2 1ES

Dear George

Thank you for your request dated 16 August 2019 for a Product 4 produced with Environment Agency data.

The information on Flood Zones in the area relating to Broadway Retail Park, Cricklewood Lane, Cricklewood, London NW2 1ES is as follows:

The property is in an area located within Flood Zone 1 shown on our Flood Map for Planning (Rivers and Sea).

Note - This information relates to the area that the above named site is in and is not specific to the property/proposed development itself.

Because this site does not fall within an area at risk of flooding from rivers or the sea, we do not hold any detailed flood modelling data that would impact your site. As such we are unable to provide a flood risk product.

We do not hold records of historic flood events from rivers and/or the sea affecting the area local to this site. However, please be aware that this does not necessarily mean that flooding has not occurred here in the past, as our records are not comprehensive. As the site is about 2km away from Flood Zone 2, any data we have for the nearest watercourse are not relevant for the site.

This address is in an area at High risk of surface water flooding. Following the Flood and Water Management Act 2010, Lead Local Flood Authorities are responsible for the management of groundwater and surface water flooding. They also maintain a register of property flooding incidents. You may want to seek further advice from the London Borough of Barnet who may have further information.

This site is not currently protected by flood defences as it does not fall within an area at risk of flooding from rivers or the sea.

Please follow this link to find more information about groundwater levels:
<https://www.gov.uk/government/collections/groundwater-current-status-and-flood-risk>

Please follow this link and use the map layers to find more information about whether the site is in a source protection zone: <https://magic.defra.gov.uk/MagicMap.aspx>

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments

<https://www.gov.uk/planning-applications-assessing-flood-risk>
<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

You can also view and print surface water flood maps online at: <http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfsw#x=357683&y=355134&scale=2>

This information is provided subject to the [Open Government Licence](#), which you should read.

We respond to requests for recorded information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

Data Available Online

Many of our flood datasets are available online:

- **You can view and download flood risk maps from our website at:**
<http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=floodmap#x=357683&y=355134&scale=2>
- **Flood Map For Planning** ([Flood Zone 2](#), [Flood Zone 3](#), [Flood Storage Areas](#), [Flood Defences](#), [Areas Benefiting from Defences](#))
- [Risk of Flooding from Rivers and Sea](#)
- [Historic Flood Map](#)
- [Current Flood Warnings](#)
- [Open data](#)

I hope that we have correctly interpreted your request. If you are not satisfied with our response to your request for information you can contact us within 2 calendar months to ask for our decision to be reviewed.

Kind regards

Chloe Byrne

Customers and Engagement Officer

Environment Agency, Hertfordshire and North London

Alchemy, Bessemer Road, Welwyn Garden City, Hertfordshire, AL7 1HE

Direct dial 0203 025 9210

Direct email HNLenquiries@environment-agency.gov.uk

Did you know that the Environment Agency publishes most of its data via www.data.gov.uk? Using this site you can search for our data alongside other environmental data providers from the Defra Network and local authorities.

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We have checked this email and its attachments for viruses. But you should still check any attachment before opening it.

We may have to make this message and any reply to it public if asked to under the Freedom of Information Act, Data Protection Act or for litigation. Email messages and attachments sent to or from any Environment Agency address may also be accessed by someone other than the sender or recipient, for business purposes.

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Flood map for planning

Your reference
Site

Location (easting/northing)
523895/185861

Created
8 Nov 2019 14:41

Your selected location is in flood zone 1, an area with a low probability of flooding.

This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

The Open Government Licence sets out the terms and conditions for using government data.
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Flood map for planning

Your reference

Site

Location (easting/northing)








523895/185861

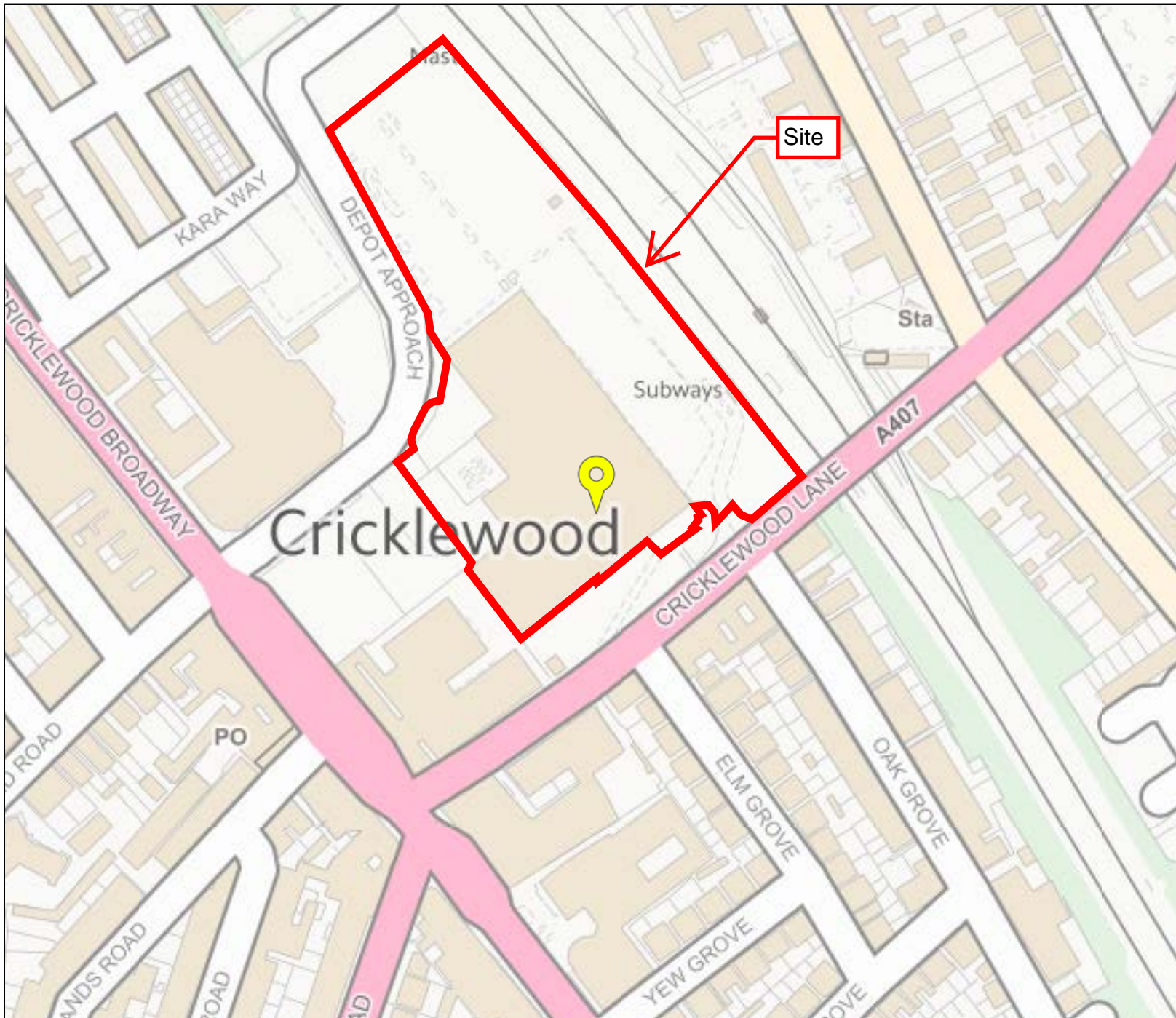
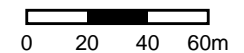
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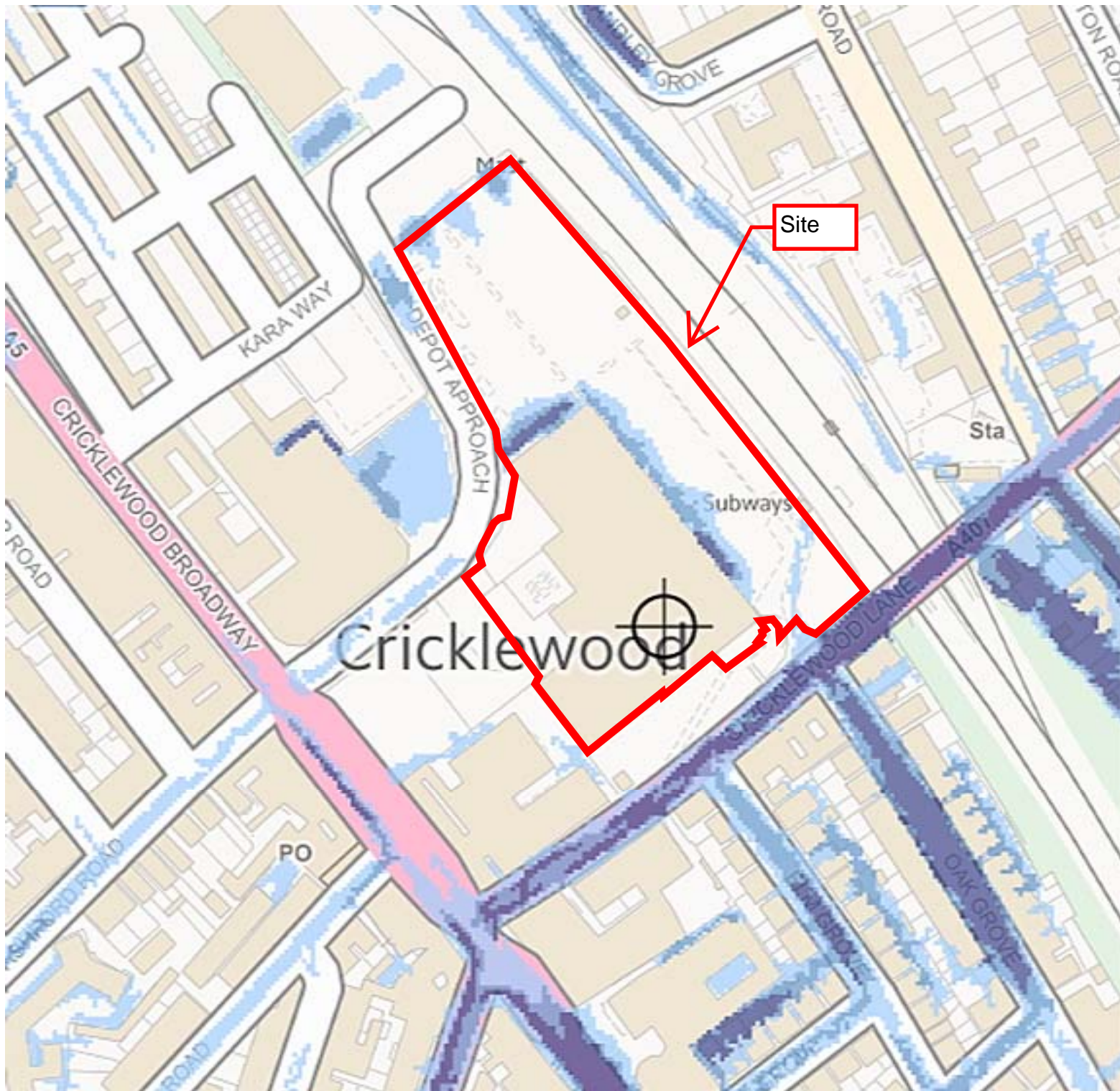
1:2500

Created

8 Nov 2019 14:41

-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefiting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area





High



Medium



Low



Very low



Location you selected

Appendix D : Planning Policy Review

Planning Policy Review

The following planning policies and guidance are relevant to the proposed development of B&Q Cricklewood with regards to flood risk and surface water management.

1. National Planning Policy

1.1 National Planning Policy Content

National Planning Policy Framework

The revised National Planning Policy Framework (NPPF) published in February 2019 is supported by the Planning Practice Guidance (PPG), an online resource published in 2016. The PPG supersedes the PPS25 Practice Guide¹ and the Technical Guidance to the National Planning Policy², as detailed in the Ministerial Statement 'Making the planning system work more efficiently and effectively'³.

The NPPF and PPG must be taken into account in the preparation of local and neighbourhood plans, and are a material consideration in planning decisions. They constitute guidance for local planning authorities (LPAs) and decision-takers, both in drawing up plans and as a material consideration in determining applications.

The NPPF and PPG recommend that Local Plans should be supported by a SFRA and develop policies to manage flood risk from all sources, taking account of advice from the EA and other relevant flood risk management bodies, such as LLFAs and Internal Drainage Boards (IDBs). Paragraph 157 of the NPPF states "All plans should apply a sequential, risk-based approach to the location of development – taking into account the current and future implications of climate change – so to avoid, where possible, flood risk to people and property, they should do this, and manage any residual risk, by:

- Applying the Sequential Test and then, if necessary, the Exception Test;
- Safeguarding land from development that is required, or likely to be required, for current and future flood management;
- Using opportunities provided by new development to reduce the causes and impacts of flooding (where appropriate through the use of natural flood management techniques); and
- Where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations".

The Sequential and Exception Tests

The overall aim of the Sequential Test is to steer new development to areas designated as Flood Zone 1. Where there are no reasonably available sites in Flood Zone 1 areas, LPAs allocating land in Local Plans or determining planning applications for development at any particular location should take into account the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2 areas, applying the Exception Test if required. Only where there are no reasonably available sites in Flood Zone 1 or 2 areas should the suitability of sites in Flood Zone 3 be considered, taking into account the flood risk vulnerability of land uses and applying the Exception Test if required.

The NPPF (paragraph 160) states that for the Exception Test to be passed:

- "It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared; and,
- A site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere and, where possible, will reduce flood risk overall".

Both elements of the test will have to be passed for development to be allocated or permitted.

¹ Communities and Local Government, (2012); Planning Policy Statement 25: Development and Flood Risk, Practice Guidance.

² Communities and Local Government, (2012); Technical Guidance to the National Planning Policy Framework.

³ Communities and Local Government, (2014); Making the planning system work more efficiently and effectively.

Flood Risk Vulnerability Classification

The NPPF considers the vulnerability of different forms of development to flooding and classifies proposed uses accordingly.

Table 2 of PPG Flood Risk and Coastal Change describes the vulnerability classifications as follows:

- 'Essential Infrastructure (road network and bridges etc.);
- 'Highly Vulnerable' (Police stations, basements, caravans etc.);
- 'More Vulnerable' (residential, health care and education etc.);
- 'Less Vulnerable' (employment development, local centres, centre for community sport and car park areas etc); and
- 'Water Compatible' (Public open space, recreation areas, and play areas);

1.2 CIRIA 624 Development and Flood Risk Guidance for Construction Industry

CIRIA publication 'C624 Development and Flood Risk Guidance for the Construction Industry'⁴, define three levels of FRA which can be undertaken:

- FRA level 1: Screening Study to identify whether there are any flooding or surface water management issue related to a development site that may warrant further consideration. This should be based readily available existing information, including the SFRA, Environment Agency Flood Map and Standing Advice. The Screening Study will ascertain whether a FRA is required.
- FRA level 2: Scoping Study to be undertaken if the Level 1 FRA indicates that the site may lie within an area that is at risk of flooding or that the site may increase flood risk due to increased run-off. This Study should confirm the source of flooding which may affect the Site and should include the following:
 - an appraisal of the availability and adequacy of existing information;
 - a qualitative appraisal of the flood risk posed to the site, and potential impact of the development on flood risk elsewhere;
 - an appraisal of the scope of possible measures to reduce the flood risk to acceptable levels.
- Detailed Study to be undertaken if the Level 2 FRA concludes that further quantitative analysis is required to assess flood risk issues related to the development site. They Study should include:
 - quantitative appraisal of the potential flood risk to the development;
 - quantitative appraisal of the potential impact of Development Site on flood risk elsewhere;
 - quantitative demonstration of the effectiveness of any proposed mitigation measures.

This report consists of a Level 2 Scoping Study due to the size of the development site and the identified Flood Zone 3 designation of the proposed site.

1.3 The Flood and Water Management Act 2010

The Flood and Water Management Act 2010 implements the recommendations from Sir Michel Pitt's Review of the floods in 2007 and places a series of responsibilities on local authorities with the primary aim of improving flood risk management. The Act was also a response to the need to develop better resilience to climate change. It gives a new responsibility to the Environment Agency for developing a National Flood and Coastal Risk Management Strategy and to Lead Local Flood Authorities to coordinate flood risk management in their area.

⁴ CIRIA Publication, (2004); C624 Development and Flood Risk – Guidance for Construction Industry.

1.4. Environment Agency Standing Advice

For all relevant vulnerable developments (for example, more vulnerable, less vulnerable and water compatible), you should follow the advice for surface water management, access and evacuation, floor levels.

Surface water management

Your plans for the management of surface water need to meet the requirements set out in either your local authority's:

- surface water management plan where available
- strategic flood risk assessment

They also need to meet the requirements of the approved building regulations Part H: drainage and water disposal. Read section H3 rainwater drainage.

You need to get planning permission to use a material that cannot absorb water (for example impermeable concrete) that is larger than 5 m² in a front garden.

Access and evacuation

You need to provide details of your emergency escape plans for any parts of a building that are below the estimated flood level.

Make sure your plans show:

- single storey buildings or ground floors that do not have access to higher floors can access a space above the estimated flood level (for example higher ground nearby)
- basement rooms have clear internal access to an upper level (for example a staircase)
- occupants can leave the building if there's a flood and there's enough time for them to leave after flood warnings

Floor levels

You need to provide both the:

- average ground level of your building
- finished floor level of the lowest habitable room in your building

Ground floor levels should be a minimum of whichever is higher of:

- 300mm above the general ground level of the site
- 600mm above the estimated river or sea flood level

State in your assessment all levels in relation to Ordnance Datum (also known as height above average sea level). You may be able to get this information from the Ordnance Survey. If not, you'll need to get a land survey carried out by a qualified surveyor.

If you cannot raise floor levels above the estimated flood level, you need to consider extra flood resistance and resilience measures.

1.5 Flood Risk Regulations 2009

The Flood Risk Regulations transposes the European Commission (EC) Floods Directive (2007/60/EC) into domestic law in England and Wales and implements its provisions.

The key objective of the Floods Directive is to coordinate the assessment and management of flood risks within Member States. Specifically, it requires LLFAs of Member States to assess if all watercourses and coast lines are at risk from flooding, map the flood extent and assets and humans at risk in these areas, and take adequate and coordinated measures to reduce this flood risk.

1.6 National Strategy for Flood and Coastal Erosion Risk Management

The Environment Agency's National Strategy for Flood and Coastal Erosion Risk Management (FCERM) sets out how the Environment Agency intends on meeting their obligations under the Flood and Water Management Act to 'develop, maintain, apply and monitor a strategy for flood and coastal erosion risk management in England'.

The National Strategy describes what needs to be done by all organisations involved in flood and coastal erosion risk management. These include local authorities, internal drainage boards, water and sewerage companies, highways authorities, and the Environment Agency.

The National Strategy also sets out a statutory framework that will help communities, the public sector and other organisations to work together to manage flood and coastal erosion risk. It will make sure that risks are managed in a co-ordinated way across catchments and along each stretch of coast. This includes the development of the Local Flood Risk Management Strategy (LFRMS) by LLFAs, as well as the Environment Agency's strategic overview of all sources of flooding and coastal erosion.

2. Regional Policy and Strategy

2.1 Thames Catchment Flood Management Plan

The Thames Region Catchment Flood Management Plan (CFMP)⁵ covers fluvial and non-tidal sections of the River Thames, i.e. the River Thames upstream of Teddington weir and tributaries of the River Thames (e.g. River Mole).

The proposed development is within Sub-area 8, 'Heavily populated floodplain', here the preferred policy option is 'Policy option 5: Areas of moderate to high flood risk where we can generally take further action to reduce flood risk. We recognise the challenge of this policy and that we will not be able to reduce the risks everywhere'.

2.3 The London Plan (2016)

The London Plan (2016)⁶ contains a number of relevant policies to flood risk:

Policy 5.11 – Green roofs and development site environs

Planning Decision

"A: Major development proposals should be designed to include roof, wall and site planting, especially green roofs and walls where feasible, to deliver as many of the following objectives as possible:

- a. Adaptation to climate change (i.e. aiding cooling);
- b. Sustainable urban drainage;
- c. Mitigation of climate change (i.e. aiding energy efficiency);
- d. Enhancement of biodiversity;
- e. Accessible roof space;
- f. Improvements to appearance and resilience of the building;
- g. Growing food."

Policy 5.12 – Flood Risk Management

Strategic

⁵ Environment Agency, (2009); Thames Catchment Flood Management Plan, Summary Report.

⁶ Greater London Authority, (2016); The London Plan - Spatial Development Strategy for Greater London.

- A. "The Mayor will work with all relevant agencies including the Environment Agency to address current and future flood issues and minimise risks in a sustainable and cost-effective way."

Planning decisions

- B. "Development proposals must comply with the flood risk assessment and management requirements set out in the NPPF and the associated technical Guidance on flood risk¹ over the lifetime of the development and have regard to measures proposed in Thames Estuary 2100 (TE2100 – see paragraph 5.55) and Catchment Flood Management Plans.
- C. Developments which are required to pass the Exceptions Test set out in the NPPF and the Technical Guidance will need to address flood resilient design and emergency planning by demonstrating that:
- a. the development will remain safe and operational under flood conditions
 - b. a strategy of either safe evacuation and/or safely remaining in the building is followed under flood conditions
 - c. key services including electricity, water etc. will continue to be provided under flood conditions
 - d. buildings are designed for quick recovery following a flood
- D. Development adjacent to flood defences will be required to protect the integrity of existing flood defences and wherever possible should aim to be set back from the banks of watercourses and those defences to allow their management, maintenance and upgrading to be undertaken in a sustainable and cost effective way."

Policy 5.13 - Sustainable drainage

Planning decisions

"Development should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and 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:

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

Drainage should be designed and implemented in ways that deliver other policy objectives of this Plan, including water use efficiency and quality, biodiversity, amenity and recreation."

2.4 New London Plan – Intend to Publish

The New London Plan (2019)⁷ contains a number of relevant policies to flood risk:

Policy SI 12 Flood risk management

- A. Current and expected flood risk from all sources (as defined in paragraph 9.12.2) 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.
- B. Development Plans should use the Mayor's Regional Flood Risk Appraisal and their Strategic Flood Risk Assessment as well as Local Flood Risk Management Strategies, where necessary, to identify areas where particular and cumulative flood risk issues exist and develop actions and policy approaches aimed at reducing these risks. Boroughs should co-operate and jointly address cross-boundary flood risk issues including with authorities outside London.

⁷ Greater London Authority, (2019); The New London Plan (Intend to Publish)- Spatial Development Strategy for Greater London.

- C. Development proposals should ensure that flood risk is minimised and mitigated, and that residual risk is addressed. This should include, where possible, making space for water and aiming for development to be set back from the banks of watercourses.
- D. Developments Plans and development proposals should contribute to the delivery of the measures set out in Thames Estuary 2100 Plan. The Mayor will work with the Environment Agency and relevant local planning authorities, including authorities outside London, to safeguard an appropriate location for a new Thames Barrier.
- E. Development proposals for utility services should be designed to remain operational under flood conditions and buildings should be designed for quick recovery following a flood.
- F. Development proposals adjacent to flood defences will be required to protect the integrity of flood defences and allow access for future maintenance and upgrading. Unless exceptional circumstances are demonstrated for not doing so, development proposals should be set back from flood defences to allow for any foreseeable future maintenance and upgrades in a sustainable and cost-effective way.
- G. Natural flood management methods should be employed in development proposals due to their multiple benefits including increasing flood storage and creating recreational areas and habitat.

Policy SI 13 Sustainable drainage

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

2.5 Sustainable Design and Construction, Supplementary Planning Guidance (2014)

The Greater London Authority has produced the Sustainable Design and Construction SPG⁸ which offers recommendations to developers and sets out expectations. It establishes the expectation to incorporate Sustainable Urban Drainage Systems (SuDS) as a means to reduce flood risk and mitigate increases in surface water run-off.

The following clauses provide relevant information regarding flooding and surface water:

Clause 3.4.2

⁸Greater London Authority, (2014); Sustainable Design and Construction, Supplementary Planning Guidance.

“It is important to incorporate sustainable drainage in all developments to prevent the increasing volume of surface water runoff during heavy rainfall. Surface water flooding is the most likely form of flooding that development may be exposed to. Surface water flooding is likely to increase due to the anticipated increased intensity in rainfall events as well as the continuing urbanisation of London. For small developments, including those that do not require planning permissions, simple measures can include draining impervious surfaces to a landscaped area of the garden or to a soak away or installing a water butt to collect water from an existing or new impervious roof. It is essential to consider how SuDS measures will be incorporated at the initial design stage, especially when the National Standards for SuDS are introduced.”

Clause 3.4.12

“The capture and storage of rainwater for later use is always the priority in order to also meet the objective of making efficient use of water resources. Where there are no opportunities to collect and reuse rainwater, the site, where practical should drain to the ground to recharge groundwater resources. Where infiltration is not possible, surface water should be stored on-site in open water features such as ponds and wetlands and then released at a controlled rate. The final option is to store surface water in tanks or cellular storage before it is released at a controlled rate. This is the least preferable storage option as it does not provide wider sustainability benefits such as habitat provision or water quality improvements.”

Clause 3.4.13

“Development should utilise SuDS unless there are practical reasons for not doing so. The aspiration is to deliver SuDS schemes that provide multiple benefits, in addition to reducing flood risk. The most beneficial schemes will successfully contribute to the delivery of the Water Framework Directive by reducing water pollution and providing additional valuable habitat to improve the status of our water bodies. SuDS schemes should also aim to improve amenity, and therefore the quality of life of Londoners, as well as contribute to the wider goals relating to green infrastructure, biodiversity, water efficiency and recreation.”

Clause 3.4.18

“Drainage designs incorporating SuDS measures should include details of how each SuDS feature, and the scheme as a whole, will be managed and maintained throughout its lifetime. When published the National Standards for sustainable drainage systems should be followed with additional consideration given to the issues associated with the constrained nature and abundance of below ground services on London sites. These SuDS will be reviewed by and require permission from SuDS Approval Bodies administered by the boroughs.”

3. Local Planning Policy

3.1 London Borough of Barnet Preliminary Flood Risk Assessment

The Barnet Preliminary Flood Risk Assessment (PFRA) (2009) was undertaken on behalf of Barnet London Borough Council as part of the Drain London programme.

The PFRA identifies a number of historic flooding incidents that have occurred within the borough. This includes a major event in September 1992 that affected 293 properties including the Edgware Road that runs along the western boundary of the Site, caused by surface runoff and fluvial flooding, including to the area immediately upstream of the Site (as seen in Figure 4-2 of the PFRA). There have also been 8 occurrences of property flooding as a result of the Silk Stream and its tributaries overtopping since 1947.

3.2 London Borough of Barnet Local Plan, Core Strategy

18.12 Flooding and water management

18.12.1 One of the major impacts of climate change will be to increase risk of flooding from watercourses (known as fluvial flooding) and sewers (known as surface water flooding). The risk based Sequential Test as set out in the NPPF (paras 100 to 104) should be applied at all stages of planning. Its aim is to steer new development to areas with the lowest probability of flooding. Barnet has 14kms of streams and brooks and the North London Strategic Flood Risk Assessment identified fluvial flooding from Dollis Brook, Silk Stream, Pymmes Brook and their associated tributaries as the primary source of flood risk in the borough. Surface water flooding in Barnet presents a low to moderate risk to the borough while sewer flooding is also noted for being low risk. Groundwater flooding was found to be a relatively low risk due to the impermeable geology (primarily London Clay) and depth of the groundwater table.

18.12.2 The Pitt Review recommended that the Environment Agency, supported by local authorities and water companies should urgently identify the areas that are at highest risk from surface water flooding. In 2009 the Environment Agency published maps highlighting those areas where a more detailed study of surface water flooding may be appropriate within strategic flood risk assessments and Surface Water Management Plans (SWMPs).

18.12.3 In August 2009 the Department for Environment, Food and Rural Affairs (DEFRA) estimated that 10,800 properties in Barnet are at risk of surface water flooding due to severe rainfall. According to DEFRA Barnet is the 25th most susceptible local authority to surface water flooding.

18.12.4 We have full responsibility for managing flood risk from surface water, groundwater and ordinary watercourses. The Flood and Water Management Act 2010 provides for better, more comprehensive management of flood risk for people, homes and businesses, helps safeguard community groups from unaffordable rises in surface water drainage charges and protects water supplies to the consumer. The Act implements the Pitt Review following the 2007 floods.

18.12.5 We form part of the Drain London Forum, a partnership including London boroughs, the Environment Agency and the Mayor of London which ensures that the requirements from the Flood and Water Management Act 2010 to produce a SWMP are met. The SWMP includes the Preliminary Flood Risk Assessment and a Flood Risk Management Plan which will help us to investigate (by 2015) and address flood risk problems and maintain a public register of Flood Risk Management assets. The output from these assessments should help to inform development allocations within the Site Allocations DPD and outline the requirements for site-specific Flood Risk Assessments (FRAs) to be carried out by developers.

18.12.6 We are also required to establish a Sustainable Urban Drainage Systems (SUDS) Approving Body (the "SAB") for the approval of proposed drainage systems in new developments and redevelopments, subject to exemptions and thresholds. In order to be approved, the proposed drainage system would have to meet new national standards for sustainable drainage. The SPD on Sustainable Design and Construction provides guidance on the use of SUDS to enable better control of water during periods of peak rainfall.

18.12.7 The Act requires the Secretary of State to issue guidance about how authorities are to discharge their duties under the Act.

Policy CS13: Ensuring the efficient use of natural resources

We will seek to minimise Barnet's contribution to climate change and ensure that through the efficient use of natural resources the borough develops in a way which respects environmental limits and improves quality of life.

- We will promote the highest environmental standards for development and through our SPDs on Sustainable Design and Construction and Green Infrastructure we will continue working to deliver exemplary levels of sustainability throughout Barnet in order to mitigate and adapt to the effects of a changing climate.
- We will expect all development to be energy efficient and seek to minimise any wasted heat or power.
- In line with London Plan Policy 5.2 – Minimising Carbon Dioxide Emissions we will expect major development in accordance with the Mayor's energy hierarchy to reduce carbon dioxide emissions beyond the 2010 Building Regulations.
- We will maximise opportunities for implementing new district-wide networks supplied by decentralised energy (including renewable generation) in partnership with key stakeholders in areas of major mixed-use growth including town centres. Where feasible we will expect all development to contribute to new and existing frameworks.
- We will support solutions that minimise or avoid harm to a heritage asset's significance while delivering improved energy performance or generation.
- We will make Barnet a water efficient borough and minimise the potential for fluvial and surface flooding by ensuring development does not cause harm to the water environment, water quality and drainage systems. Development should utilise Sustainable Urban Drainage Systems (SUDS) in order to reduce surface water run-off and ensure such run-off is managed as close to its source as possible subject to local geology and ground water levels.
- We will improve air and noise quality by requiring Air Quality Assessments and Noise Impact Assessments from development in line with Barnet's SPD on Sustainable Design and Construction.

3.3 London Borough of Barnet Development Management Policies

5.9 Surface water run off and drainage

5.9.1 Reducing or slowing the amount of rainfall (run off) entering the drainage network is important to help reduce flood risk both in Barnet and further downstream. The borough has 14kms of streams and brooks. The North London Strategic Flood Risk Assessment identified fluvial flooding from Dollis Brook, Silk Stream, Pymmes Brook and their associated tributaries as the primary source of flood risk in the borough. Surface water flooding in Barnet presents a low to moderate risk, and sewer flooding as low risk. Groundwater flooding was also found to be a relatively low risk due to the impermeable geology (primarily London Clay) and depth of the groundwater table.

5.9.2 In line with national policy a sequential risk-based approach to determining the suitability of land for development in flood risk areas will be applied. Flood risk assessments will be expected on all applicable sites to inform the sequential approach. Sustainable Urban Drainage techniques such as porous paving should be used where possible to reduce flood risk and the Mayor's drainage hierarchy applied. The principle of the Mayor's drainage hierarchy is for a greenfield rate of run off to be maintained. A greenfield run-off rate is one that reflects the natural rate of water runoff from a site before development. Further detail is provided in the Sustainable Design and Construction SPD.

5.9.3 The Surface Water Management Plan (SWMP) for Barnet, Brent and Harrow is designed to fulfil the requirements of the Flood Risk regulations 2009 and to identify areas more at risk from surface water flooding. Proposals which create impact in these areas identified at risk will need to demonstrate through hydrological investigations and modelling how they will reduce that risk. Where they require permission, front garden alterations for parking or basement developments are examples which can impact local run off. Further guidance on basement development is set out in Design Guidance Note 5 – Extensions to Houses which seeks to ensure that such development does not harm the established architectural character of buildings and surrounding areas.

Policy DM04: Environmental considerations for development

a. All major development will be required to demonstrate through an Energy Statement compliance with the Mayor's targets for reductions in carbon dioxide emissions within the framework of the Mayor's energy hierarchy.

b. Where Decentralised Energy (DE) is feasible or planned, major development will either provide:

- i. suitable connection
- ii. the ability to connect in future
- iii. a feasibility study
- iv. a financial contribution to a proposed feasibility study.

c.

- i. Where there is a localised source of air pollution, buildings should be designed and sited to reduce exposure to air pollutants.
- ii. Development proposals will ensure that development is not contributing to poor air quality and provide air quality assessments where appropriate.

d. Proposals to locate development that is likely to generate unacceptable noise levels close to noise sensitive uses will not normally be permitted. Proposals to locate noise sensitive development in areas with existing high levels of noise will not normally be permitted. Mitigation of noise impacts through design, layout, and insulation will be expected where appropriate.

e. Proposals on land which may be contaminated should be accompanied by an investigation to establish the level of contamination in the soil and/or groundwater/surface waters and identify appropriate mitigation. Development which could adversely affect the quality of groundwater will not be permitted.

f. Proposals for Notifiable Installations or developments near to existing Notifiable Installations will only be permitted provided that:

- i. There is no unacceptable risk to an individual's health and safety; and

ii. There will be no significant threat to environmental quality.

g. Development should demonstrate compliance with the London Plan water hierarchy for run off especially in areas identified as prone to flooding from surface water run off. All new development in areas at risk from fluvial flooding must demonstrate application of the sequential approach set out in the NPPF (paras 100 to 104) and provide information on the known flood risk potential of the application site.

h. Development proposals will wherever possible be expected to naturalise a water course, ensure an adequate buffer zone is created and enable public accessibility. Where appropriate, contributions towards river restoration and de-culverting will be expected.

3.4 Local Flood Risk Management Strategy

3.5 Surface Water Management Plan

The Barnet Surface Water Management Plan found approximately 142,500 properties in the borough of Barnet could be at risk of surface water flooding greater than 0.1 metres depth during a 1% AEP rainfall event, and 1,120 properties could be at risk of flooding greater than 0.5 metres depth during the same event, with the majority of those being residential properties.

The report emphasised the need to mitigate the impact of future development on the existing infrastructure, including the drainage systems throughout the Borough, to assess the impact future development could have, and explore what provisions could be made to help reduce the current susceptibility in the area.

In terms of groundwater flood risk, the report summarised:

“The risk of groundwater flooding is low across a majority of LBB due to the thick London Clay geology beneath the borough. There is a moderate risk of groundwater flooding in Finchley, Hendon and north Hampstead where there is a chalk and gravel outcrop which makes these areas more susceptible to groundwater recharge.

The areas at highest risk of groundwater flooding within the borough are those adjacent to watercourses. The surface geology in these areas is prone to groundwater re-charge and lateral groundwater flow.”

3.6 London Borough of Barnet Supplementary Planning Documents

The Supplementary document ‘Sustainable Design and Construction’ Following adoption of the Core Strategy and Development Management Policies documents in September 2012 Barnet has one of the most up to date Local Plans in the country. With the support of a robust planning framework with clearly set out priorities of protection, enhancement and consolidated growth, the council is in a strong position to produce more detailed local guidance.

Barnet’s Sustainable Design and Construction Supplementary Planning Document (SD&C SPD) was first published in 2007 and was subsequently updated in 2013. Its main purpose is to provide clarification on Barnet’s local interpretation of sustainable development in light of national and regional policy and the context of the Three Strands Approach (Protection, Enhancement, Growth). Since 2013, the London Plan has undergone a review with the Further alterations to the London Plan adopted in March 2016. The Government has also established national standards for housing.

It is therefore now timely to update the SD&C SPD. The SPD has been revised to focus on the design standards required for different scales of development as well as the performance standards of buildings. The refocused SPD captures changes on space standards as well as new standards that address accessibility, security, energy, noise and water conservation.

2.15 – Flood Risk, Sustainable Urban Drainage Systems and Water Quality

2.15.1 Water is an essential resource and its quality is a key measure of the overall quality of the local environment. The resource comprises surface water and ground water, where the latter may be made up of more than one unconnected aquifer at different depths below ground. Surface water flooding is more of an issue than ground water flooding in Barnet.

2.15.2 Managing surface water flows and drainage is essential to prevent flooding and resultant damage to property and infrastructure. If flood events cause sewers to overflow then this can also become a health hazard.

2.15.3 National standards for SUDs¹⁵ require the Council as Lead Local Flood Authority (LLFA) to be satisfied that major development meets the minimum standards of operation and that there are clear arrangements in place for ongoing maintenance over the lifetime of the development. SUDs aim to use drainage methods which mimic the natural environment rather than using conventional methods of drainage to slow down the rate at which water flows from a site. Retaining or incorporating existing biodiversity on a site, in particular trees can also help regulate the rate rainfall reaches the ground.

2.15.4 SUDs can have an additional benefit through helping to remove pollution from rainwater. ¹⁵ Non statutory technical standards for Sustainable Drainage Systems were published in March 2015 and apply to major developments of 10 units or more <https://www.gov.uk/government/publications/sustainable-drainage-systems-nonstatutory-technical-standards> SPD – Sustainable Design and Construction July 2016 Page 35 Local Plan runoff. The Water Framework Directive sets a target that all main river waterbodies identified in the Thames River Basin Management Plan should achieve a „good“ ecological potential by 2027. There are three main rivers in Barnet identified in the Thames River Basin Management Plan; the Pymmes Brook (moderate water quality) and its tributaries, the Dollis Brook (poor water quality) and the Silk Stream and Edgware Brook (moderate water quality) and their tributaries. The main reasons for failure are linked to pollution – point source (e.g. sewer misconnections), diffuse (e.g. urban runoff), and intermittent pollution incidents. SUDs can help reduce impacts from urban runoff.

2.15.5 The NPPF identifies a sequential approach to the location of development to ensure that inappropriate development in areas of flood risk is avoided. Paragraph 101 states “The aim of the Sequential Test is to steer development to areas with the lowest probability of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding.” To carry out a sequential test a geographic area will need to be defined. This will usually be the entire borough unless a local need can be justified. Housing need will not be considered a local need to justify a smaller search area. A list of sites with unimplemented planning consents which are broadly equivalent to the development sites proposal can be made available on request. In the absence of a publicly available Strategic Housing Land Availability Assessment unimplemented planning consents are considered suitable, developable and deliverable and therefore reasonably available.

2.15.6 The Environment Agency is the regulatory body which provides flood risk advice to local planning authorities on development. They provide guidance and advice on how to assess flood risk as part of a Flood Risk Assessment (FRA) and how to design in flood resilience to a development.

3.7 Brent Cross Cricklewood and West Hendon Regeneration Plan

Sustainable Development - All buildings will be required to incorporate a range of best practice energy saving and environmental features, drawing on technologies and techniques that promote sustainable development. As building continues over the period of the Development Framework, best practice standards will be reviewed and enhanced. Ensure all new commercial premises attain a BREEAM rating of ‘very good’ including energy use, low water use, pollution, health and the use of materials, with an aspiration to achieve an excellent rating.

Policy C4 – Sustainable Design

The council will seek to ensure that the redevelopment of the Regeneration Area pursues the highest standards of environmental design. Development should:

- Meet high performance standards for environmentally sustainable design and construction;
- Create an integrated network of open spaces and pedestrian and cycle routes to meet leisure, access, urban design and ecological needs both within the Regeneration Area and through enhanced connections to the surrounding area; and
- Ensure the restoration and enhancement of the River Brent and its corridor in order to provide both amenity and nature conservation to the area; development which would be directly or indirectly detrimental to the nature conservation value of the Brent Reservoir Site of Special Scientific Interest will not be permitted.

Development proposals must also ensure that:

- There is an adequate buffer zone;
- Appropriate protection is afforded to legally protected species; and

- Opportunities are taken to enhance the biodiversity of the area.

Appendix E : TWUL Asset Location Search

Asset location search



Property Searches

CHECKED

Atkins Telecoms
Stats Enquiries Team The Hub
500 Park Avenue
BRISTOL
BS32 4RZ

Search address supplied Site off Cricklewood Lane, Brent Cross
NW2 1ES

Your reference 77572

Our reference ALS/ALS Standard/2019_4038957

Search date 12 July 2019

Keeping you up-to-date

Notification of Price Changes

From 1 September 2018 Thames Water Property Searches will be increasing the price of its Asset Location Search in line with RPI at 3.23%.

For further details on the price increase please visit our website: www.thameswater-propertysearches.co.uk
Please note that any orders received with a higher payment prior to the 1 September 2018 will be non-refundable.



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



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



0845 070 9148



Search address supplied: Site off Cricklewood Lane, Brent Cross, NW2 1ES

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 0845 070 9148, 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.

The following quartiles have been printed as they fall within Thames' sewerage area:

TQ2386SW
TQ2486SW
TQ2385NE
TQ2485NW
TQ2386SE

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.

The following quartiles have been printed as they fall within Thames' water area:

TQ2386SW



TQ2486SW
TQ2385NE
TQ2485NW
TQ2386SE

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

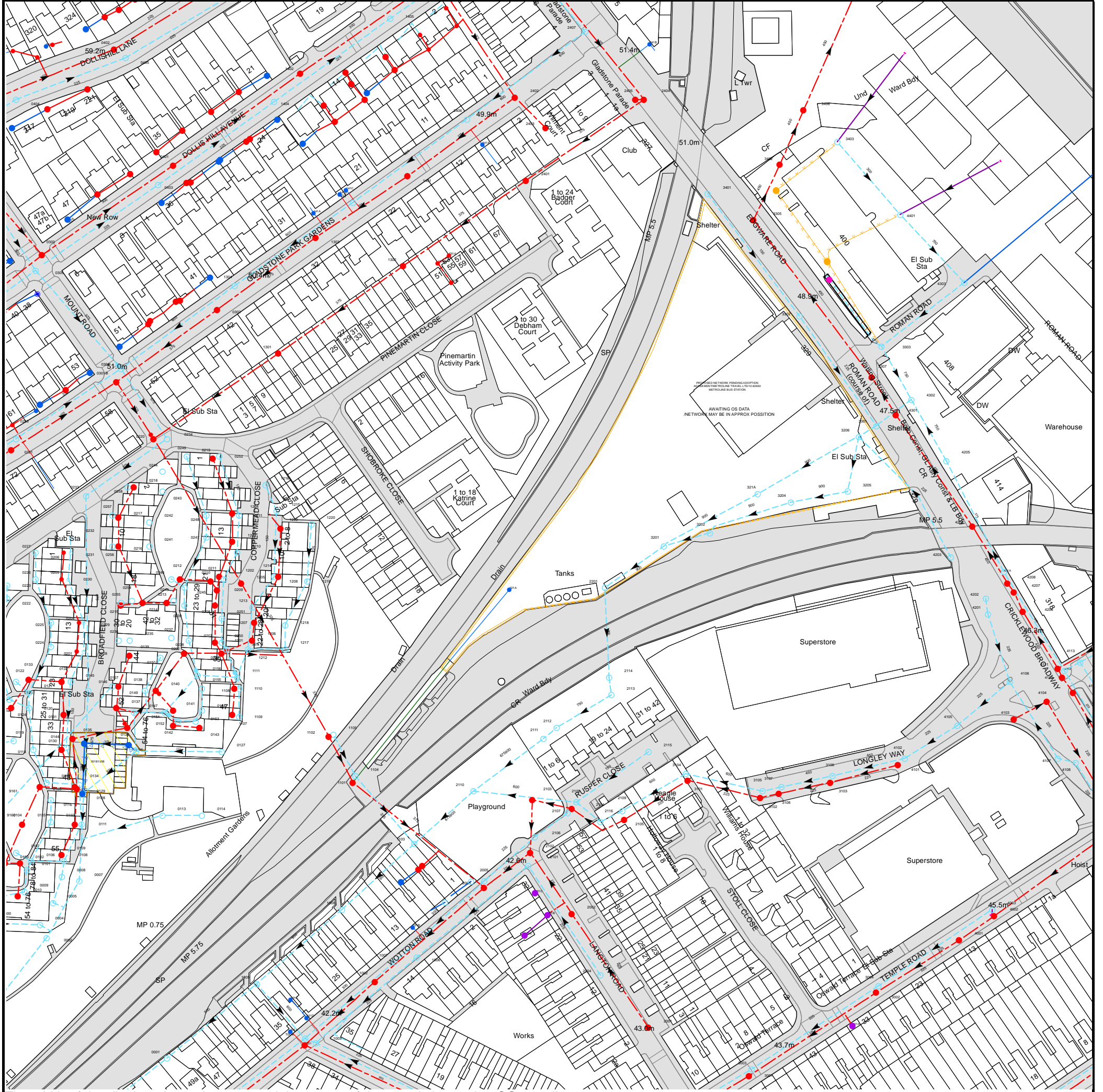
Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

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



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 523250,186250

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

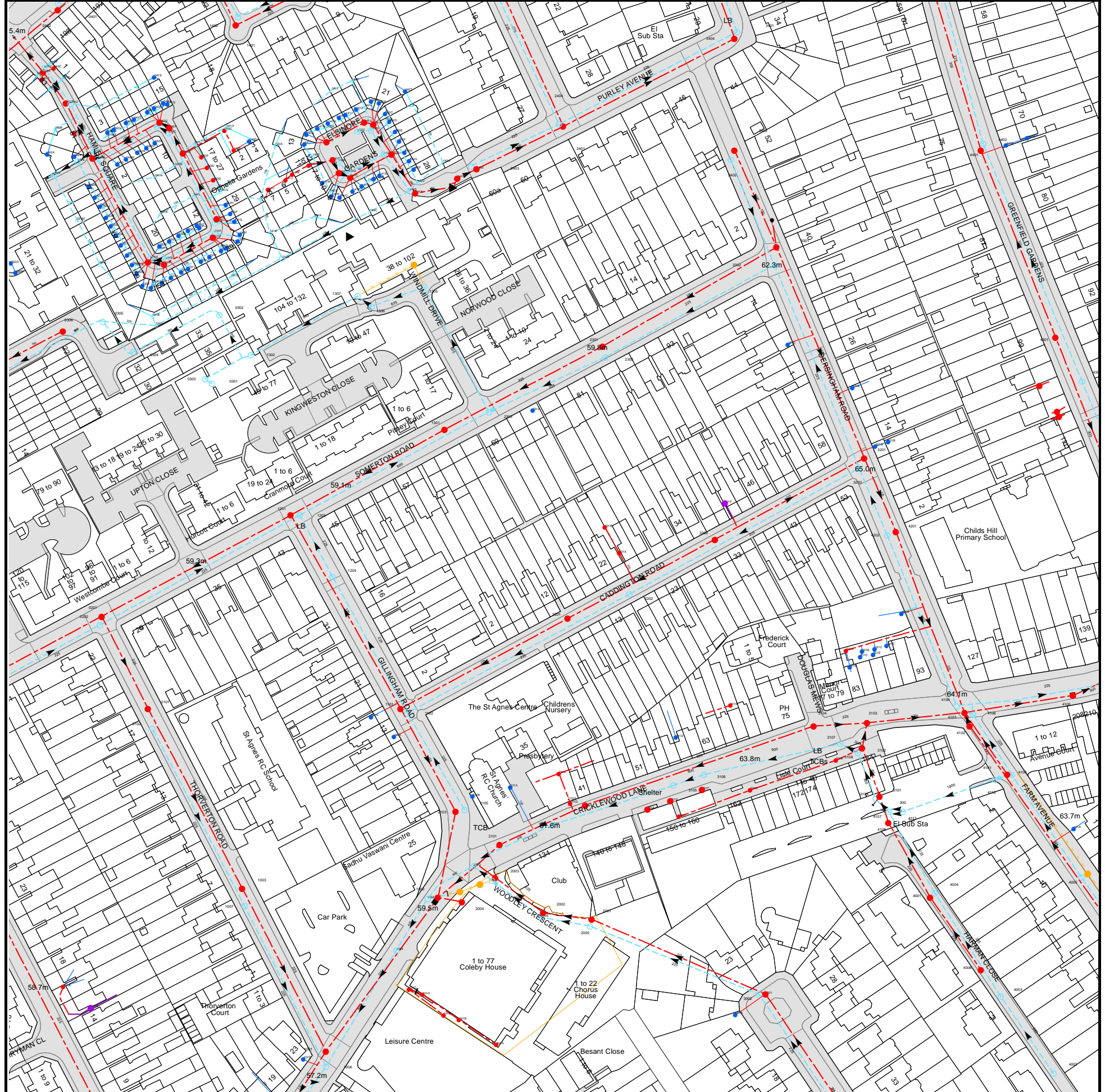
Manhole Reference	Manhole Cover Level	Manhole Invert Level
4101	45.58	42.68
4108	46.9	45.89
4107	46.63	45.12
4102	45.65	43.15
4105	45.69	43.53
4103	n/a	n/a
4104	46.48	44.7
4109	46.51	45.69
4106	46.11	43.87
4110	.01	n/a
4112	46.7	45.02
4111	46.43	45.68
4113	47.35	45.05
101D	n/a	n/a
1003	42.15	40.78
1102	44.49	40.58
1105	44.48	42.3
1008	n/a	n/a
1101	n/a	n/a
1104	n/a	n/a
1002	42.29	39.9
1007	n/a	n/a
10CE	n/a	n/a
101B	n/a	n/a
1103	n/a	n/a
1006	42.35	41
11BC	n/a	n/a
11BD	n/a	n/a
20CH	n/a	n/a
20CA	n/a	n/a
2110	43.95	41.45
2005	n/a	n/a
2003	42.6	40.19
201A	n/a	n/a
2101	42.62	41.27
2102	42.59	40.41
2103	n/a	n/a
2106	n/a	n/a
201C	n/a	n/a
2111	43.7	n/a
201B	n/a	n/a
2112	43.39	41.99
2107	n/a	n/a
2002	42.72	40.66
2104	43.14	39.99
2108	43.24	42.46
2004	42.85	41.58
2116	n/a	n/a
2114	45.02	42.27
2113	43.49	41.89
2109	44.73	41.69
2105	44.73	42.45
2001	43.05	41.12
2115	n/a	n/a
3104	n/a	n/a
3101	n/a	n/a
3001	43.6	41.77
3003	43.55	42.23
3102	45.59	42.08
3105	45.57	42.53
3108	n/a	n/a
3107	n/a	n/a
3103	45.6	42.43
3106	45.63	42.86
301A	n/a	n/a
3002	44.46	42.66
3004	44.43	43.11
4001	45.04	43.21
4002	45.32	43.47
4003	45.31	43.96
04FH	n/a	n/a
04EB	n/a	n/a
04FA	n/a	n/a
04EC	n/a	n/a
0402	n/a	n/a
04ED	n/a	n/a
0405	58.7	57
04EE	n/a	n/a
04DB	n/a	n/a
14GG	n/a	n/a
14GF	n/a	n/a
1404	52.66	50.7
14FH	n/a	n/a
1402	52.35	49.5
14DD	n/a	n/a
14DG	n/a	n/a
14DF	n/a	n/a
14DE	n/a	n/a
14EB	n/a	n/a
14EE	n/a	n/a
1405	51.56	50.04

Manhole Reference	Manhole Cover Level	Manhole Invert Level
14ED	n/a	n/a
14EH	n/a	n/a
14EG	n/a	n/a
24CC	n/a	n/a
24CB	n/a	n/a
2406	49.82	48.01
2402	50.25	47.56
2407	51.26	48.52
2405	51.18	n/a
2404	51.11	41.48
241B	n/a	n/a
3406	n/a	n/a
14DA	n/a	n/a
1219	n/a	n/a
1220	n/a	n/a
141A	n/a	n/a
1303	50.39	47.27
14DC	n/a	n/a
141B	n/a	n/a
141C	n/a	n/a
1403	50.1	47.3
1302	n/a	n/a
1401	50.03	47.39
131A	n/a	n/a
231A	n/a	n/a
231B	n/a	n/a
241A	n/a	n/a
221A	n/a	n/a
2401	n/a	n/a
2403	49.66	47.83
2201	44.66	42.83
3201	44.85	43.3
3401	50.57	49.43
3202	n/a	n/a
3305	50.01	45.21
321A	45.6	43.72
3402	n/a	n/a
3204	45.57	43.94
3302	49.04	47.85
0212	n/a	n/a
0239	n/a	n/a
0245	n/a	n/a
0249	n/a	n/a
0247	n/a	n/a
0248	n/a	n/a
0210	n/a	n/a
0219	n/a	n/a
0208	n/a	n/a
0209	n/a	n/a
0211	n/a	n/a
0252	n/a	n/a
0251	n/a	n/a
1202	n/a	n/a
1204	n/a	n/a
1203	n/a	n/a
1210	n/a	n/a
1211	n/a	n/a
1205	46.92	40.75
1213	n/a	n/a
1207	n/a	n/a
1216	n/a	n/a
1214	n/a	n/a
1215	n/a	n/a
1208	n/a	n/a
1209	n/a	n/a
1218	n/a	n/a
3310	n/a	45.54
3403	50.8	45
3205	46.2	44.14
3206	46.55	44.28
3307	48	45.34
3301	47.76	44.33
3303	48.51	44.83
4301	47.559	45.069
4401	50.98	45.22
4302	47.94	44.64
4205	47.22	n/a
4203	n/a	n/a
4303	51	45.03
4209	46.44	45.52
4202	46.18	44.66
4201	46.05	44.19
421A	n/a	n/a
4208	46.21	45.6
4207	46.23	45.62
4206	46.27	45.64
0132	n/a	n/a
0130	n/a	n/a
0131	n/a	n/a
0144	n/a	n/a
0145	n/a	n/a
0135	45.71	42.69
0129	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
0201	n/a	n/a
0128	44.64	42.71
0134	44.92	43.35
n/a	n/a	n/a
0228	n/a	n/a
n/a	n/a	n/a
0146	46.93	43.6
0157	47.18	n/a
0137	n/a	n/a
0138	n/a	n/a
0236	n/a	n/a
0136	46.11	42.6
n/a	n/a	n/a
0235	n/a	n/a
0139	n/a	n/a
0147	46.4	44.05
0126	45.68	43.9
0149	n/a	n/a
0140	46.07	41.93
0150	n/a	n/a
0113	n/a	n/a
0151	46.62	44.89
0237	n/a	n/a
0142	n/a	n/a
0141	n/a	n/a
0152	n/a	n/a
0202	47.12	42.37
0238	n/a	n/a
0153	n/a	n/a
0156	46.75	44.41
0143	n/a	n/a
0154	n/a	n/a
0114	n/a	n/a
0155	n/a	n/a
0207	n/a	n/a
0127	n/a	n/a
0250	n/a	n/a
0203	46.86	42.19
1201	n/a	n/a
1107	n/a	n/a
1108	n/a	n/a
1111	46.51	44.53
1109	n/a	n/a
1110	n/a	n/a
1212	46.44	44.71
1206	n/a	n/a
1217	n/a	n/a
0123	n/a	n/a
0124	n/a	n/a
0119	n/a	n/a
0122	n/a	n/a
0133	n/a	n/a
0121	n/a	n/a
0120	n/a	n/a
0118	n/a	n/a
0105	44.5	42.95
0117	44.42	43.66
0224	n/a	n/a
0116	n/a	n/a
0002	n/a	n/a
0004	43.56	42.85
0005	43.33	42.16
0010	n/a	n/a
0009	n/a	n/a
0007	43.51	41.58
0008	43.39	42.4
0101	n/a	n/a
0102	n/a	n/a
0103	43.89	42.44
0108	43.63	42.46
0106	43.87	42.73
0109	n/a	n/a
0107	n/a	n/a
0110	n/a	n/a
0111	n/a	n/a
0104	44.07	43.1
0115	n/a	n/a
0001	n/a	n/a
1001	42.09	39.73
1004	42.08	40.38
101A	n/a	1.4
101C	n/a	n/a
1005	n/a	n/a
03ED	n/a	n/a
0301B	51.18	46.89
03EC	n/a	n/a
0304	51.19	45.8
1301	n/a	n/a
03CA	n/a	n/a
03CB	n/a	n/a
03CC	n/a	n/a
0302	50.77	47.11
03CD	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
03EA	n/a	n/a
1304	50.56	46.57
03DI	n/a	n/a
03EH	n/a	n/a
04BB	n/a	n/a
04DG	n/a	n/a
0403	54.14	52.67
04BF	n/a	n/a
04BG	n/a	n/a
04DF	n/a	n/a
0401	53.92	50.34
04BC	n/a	n/a
04BI	n/a	n/a
04DD	n/a	n/a
14GA	n/a	n/a
14GB	n/a	n/a
04DC	n/a	n/a
0205	n/a	n/a
0206	n/a	n/a
0230	n/a	n/a
0231	n/a	n/a
0232	n/a	n/a
0204	n/a	n/a
0229	n/a	n/a
0233	49.2	44.88
0257	n/a	n/a
0256	n/a	n/a
0217	n/a	n/a
0216	n/a	n/a
0215	n/a	n/a
0255	n/a	n/a
0258	n/a	n/a
0254	n/a	n/a
0218	n/a	n/a
0214	n/a	n/a
0241	n/a	n/a
0242	n/a	n/a
0220	49.42	40.96
0243	n/a	n/a
0244	n/a	n/a
0234	49.35	45.26
0213	n/a	n/a
0246	n/a	n/a
0240	n/a	n/a
0305	55.54	53.43
03BF	n/a	n/a
0303	55.59	51.17
04EI	n/a	n/a
04EJ	n/a	n/a
0404	60.97	59.17
04FG	n/a	n/a
04FF	n/a	n/a
041A	n/a	n/a
0225	n/a	n/a
0222	n/a	n/a
0223	n/a	n/a
0226	n/a	n/a
0227	n/a	n/a
0221	51.01	47.3
0253	51.02	46.9
03DB	n/a	n/a
03CJ	n/a	n/a
03CF	n/a	n/a

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The width of the displayed area is 500m and the centre of the map is located at OS coordinates 524250,186250

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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
4004	62.19	60.89
4104	63.81	62.48
4103	63.766	58.296
4102	63.58	59.24
4106	63.71	61.96
4006	62.44	61.39
4110	63.5	60.35
4003	62.6	61.6
4101	.01	n/a
4109	63.48	61.63
4002	63.44	62.64
4105	n/a	n/a
411A	n/a	n/a
4005	64.02	62.3
301A	n/a	n/a
3001	61.44	58.84
3002	61.43	59.73
2005	61.52	59.52
2001	61.52	58.42
1001	57.38	54.83
1006	.01	52.93
201B	n/a	n/a
201A	n/a	n/a
142O	56.44	55.777
142N	56.44	55.601
141V	56.505	55.705
142M	56.555	56.1
2401	60	56.85
141H	56.44	55.222
2404	59.99	57.14
141W	56.505	55.705
141G	56.44	55.222
142D	56.755	55.955
142Z	56.755	56.155
141X	56.505	55.705
141Y	56.505	55.705
142C	56.755	55.955
141Z	56.505	55.705
142L	56.505	55.772
142B	56.655	55.855
142A	56.655	55.855
142T	56.705	56.25
142J	56.505	56.2
142K	56.555	56
042D	56.405	55.172
042N	56.355	55.405
143E	56.505	55.705
042O	56.355	55.405
041I	56.505	55.734
042P	56.355	55.405
143D	56.505	55.705
041C	56.13	54.805
042C	56.505	55.705
042F	56.13	54.939
041H	56.555	56
041B	56.14	54.689
042U	111.61	56.205
042G	56.14	54.839
042T	111.61	56.205
042S	111.61	56.205
042R	111.61	56.205
041Q	56.205	55.6
042Q	111.61	56.205
041S	56.255	55.6
1401	56.8	55
1402	56.87	55.33
041Z	55.9	55.3
043B	56.905	55.105
043A	56.905	55.105
041V	56.105	55.055
042A	56.255	55.6
041W	55.9	55.3
041Y	55.9	55.3
043C	56.905	55.105
042B	56.255	55.4
0401	55.5	53.1
0402	55.43	53.78
041X	55.9	55.3
042Z	56.105	54.029
041U	56.105	54.705
042X	56.205	55.405
042Y	56.205	55.405
041E	56.205	54.086
042E	55.105	54.306
041D	55.105	54.144
041T	56.225	55.1
041A	55.105	54.189
041R	56.205	55.067
042W	56.205	56.205
042V	111.61	56.205

Manhole Reference	Manhole Cover Level	Manhole Invert Level
142W	56.805	56.005
141J	56.655	55.855
141R	56.805	56.005
241A	n/a	n/a
141C	56.555	55.456
141S	56.805	56.005
141K	56.655	55.855
141D	56.555	55.539
142Q	56.555	55.785
2402	59.32	57.32
142F	56.755	55.955
2403	59.27	57.72
141L	56.655	55.855
142U	56.505	55.617
142R	56.555	55.885
142G	56.755	55.955
141E	56.555	55.456
142Y	56.665	56.25
142P	56.59	55.574
141B	56.59	54.939
142H	56.755	55.955
143A	56.555	56
141T	56.505	55.705
141F	56.555	55.605
142I	56.755	55.955
141U	56.505	55.705
142E	56.755	55.955
031C	56.655	56.1
032D	56.355	55.855
032J	56.355	55.555
032C	56.355	55.855
131E	56.655	55.855
031O	56.555	55.755
032B	56.355	55.855
131F	56.655	55.855
031F	n/a	55.605
032A	56.355	55.855
031J	56.655	56.1
031Z	56.355	55.855
031G	56.555	55.605
131G	56.255	55.855
031N	56.555	55.755
041K	56.705	56.1
143F	56.255	55.855
042H	56.255	55.855
041L	56.355	53.8
041G	56	55.684
043D	56.505	55.705
041N	56.405	55.8
043E	56.505	55.705
041M	56.405	55.634
042L	56.355	55.405
042M	56.355	55.405
043F	56.505	55.705
032O	n/a	n/a
032N	n/a	n/a
041F	56.255	53.92
0306	57.12	55.49
031M	56.405	55.417
042K	56.355	55.555
042J	56.355	55.555
031L	56.405	55.8
042I	56.355	55.555
0305	57.22	53.25
041J	56.355	55.184
032M	56.355	55.555
032L	56.355	55.555
032K	56.355	55.555
0301	57.35	55.15
0303	57.38	55.15
0304	57.31	53.43
031A	56.565	54.809
031B	56.565	55.417
0302	57.47	53.96
032E	56.615	55.705
032F	56.615	55.705
031D	n/a	n/a
031Y	56.655	55.855
031X	56.655	55.855
131D	56.705	56.1
032G	56.355	55.555
031W	56.655	55.855
031V	56.655	55.855
031K	56.355	55.7
032H	56.355	55.555
031P	56.48	55.339
031Q	56.255	55.262
031U	56.655	55.855
031E	56.48	55.189
031H	56.255	55.056
031T	56.655	55.855
032I	56.355	55.555
031S	56.655	55.855

Manhole Reference	Manhole Cover Level	Manhole Invert Level
031I	56.655	55.75
031R	56.655	55.855
421A	n/a	n/a
2202	61.77	59.12
221A	n/a	n/a
3202	63	59.8
4202	65.32	62.9
4201	65.31	58.74
221B	n/a	n/a
321F	n/a	n/a
3203	64.96	62.81
3201	64.91	58.87
421B	n/a	n/a
4305	n/a	n/a
4304	n/a	n/a
331B	n/a	n/a
4303	n/a	n/a
2302	60.01	57.91
4301	63.06	59.31
3302	62.44	59.79
3301	62.33	58.89
3403	61.34	60.19
3402	61.37	59.62
4401	.01	n/a
441B	n/a	n/a
4402	.01	n/a
441A	n/a	n/a
3401	59.91	56.06
3404	59.8	56.3
2201	61.05	58.05
1204	59.47	57.47
1203	59.08	56.68
1201	59.05	56.6
1301	58.94	56.94
2303	59.06	55.6
231A	n/a	n/a
1302	57.45	54.13
2301	60.01	57.86
1306	58.25	54.74
1307	58.33	54.66
1305	58.17	54.97
131C	56.855	55.149
131B	56.705	55.301
131A	56.705	56.1
143C	56.855	55.364
143B	56.705	55.584
141O	56.655	55.855
141N	56.655	55.855
141A	56.59	54.695
142X	n/a	n/a
141P	56.805	56.005
142S	56.59	55.46
141I	56.655	55.855
141Q	56.805	56.005
141M	56.655	55.855
142V	56.755	55.524
0202	59.55	57.4
0201	59.58	56.18
4302	.01	n/a
211D	n/a	n/a
2102	.01	n/a
211E	n/a	n/a
311G	n/a	n/a
3105	.01	n/a
311D	n/a	n/a
311F	n/a	n/a
3106	.01	n/a
311E	n/a	n/a
3104	64.46	58.86
3107	64.45	58.55
311E	n/a	n/a
321A	n/a	n/a
311B	n/a	n/a
3108	64.19	59.29
311C	n/a	n/a
321B	n/a	n/a
3102	64.22	59.49
3103	64.22	58.43
321E	n/a	n/a
321C	n/a	n/a
3109	63.51	59.88
3101	63.45	59.84
321D	n/a	n/a
4107	63.41	60.12
4108	63.45	60.5
4112	63.45	60.15
4001	62.14	60.89
001A	n/a	n/a
001B	n/a	n/a
0101	59.97	55.82
0102	59.95	57.2
101B	n/a	n/a
101A	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
101C	n/a	n/a
1004	59	n/a
2006	.01	n/a
2002	.01	n/a
1007	59.48	56.63
2004	60.11	59.21
1103	60.12	54.77
1002	59.83	58.52
2008	59.97	58.47
1003	59.72	55.47
201C	n/a	n/a
2003	.01	n/a
2007	60.69	59.34
n/a	n/a	n/a
n/a	n/a	n/a
2101	60.8	59.25
2104	61.34	56.29
2103	60.69	57.19
2105	60.64	59.09
211B	n/a	n/a
211A	n/a	n/a
211C	n/a	n/a
111A	n/a	n/a
111A	n/a	n/a
1102	60.37	58.62
1101	60.33	57.43

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