



Kings Meadow View

Flood Risk Assessment and Drainage Strategy

October 2025

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1. Introduction

1.1 Background

This Flood Risk Assessment and Drainage Strategy report has been prepared by Waterman Infrastructure & Environment Limited to accompany an outline planning application for the redevelopment of the Forbury Retail Park in Reading, including the demolition of existing buildings and erection of a residential-led mixed-use development. The proposed buildings will be residential-led mixed use. The application is submitted on behalf of ABRDN Property Income Trust.

The planning application ref. 230822 was originally submitted on 8th June 2023 and confirmed as valid on 14th September 2023.

Consultation comments have been received and reviewed including requests for conditions as well as comments that requested amendments to the application.

A number of meetings have also been held with the case officer in relation to the design of the outline scheme. As a result of responding to the consultation comments and discussion with Reading Borough Council, a design review has been undertaken by the project team. This has led to a number of key changes which can be summarised as follows:

- Reduction in maximum building heights adjacent to the railway and facing Kings Meadow;
- Improved variation in heights of the blocks;
- Reduction of block footprints, reorientation of the spaces within the development and an increased sense of enclosure;
- Reduction in the size of the basement car park and therefore removal of the podium to the east allowing seamless integration of the site with surrounding areas;
- Reduction in commercial floorspace.

A Flood Risk Assessment and Drainage Strategy was submitted with the previous revision of the scheme, and the LLFA (comments received 9th November 2023) raised no objections subject to two standard conditions in relation to SuDS. The revised FRA and DS provides an updated assessment and strategy for the revised proposals aligning with the principles of the previously accepted strategy.

The purpose of this Flood Risk Assessment and Drainage Strategy report is to provide an assessment of flood risk from all sources and details of how the foul and surface water drainage from the proposed development would be managed in consideration of the surface water drainage hierarchy and appropriate discharge points.

Reading Borough Council is the Lead Local Flood Authority (LLFA) for the area. Thames Water (TW) is the sewerage undertaker.

1.2 Site Description

The Site is located within Reading City Centre and currently consists of the Forbury Retail Park, a KFC drive-thru restaurant and car parking. The existing building footprint (retail and restaurant) is approximately 9,818m² in area. The Site boundary extends to an area of approximately 2.69ha.

The Site is bound by Forbury Road and Kenavon Drive to the south, the remaining part of Forbury Retail Park to the east and commercial office development to the west, and Network Rail railway tracks to the north.

The Site is located at the grid reference SU 72123 73709 with coordinates X:472123, Y:173709 and the nearest postcode, RG1 3HP. A Site location plan is shown below in Figure 1-1.

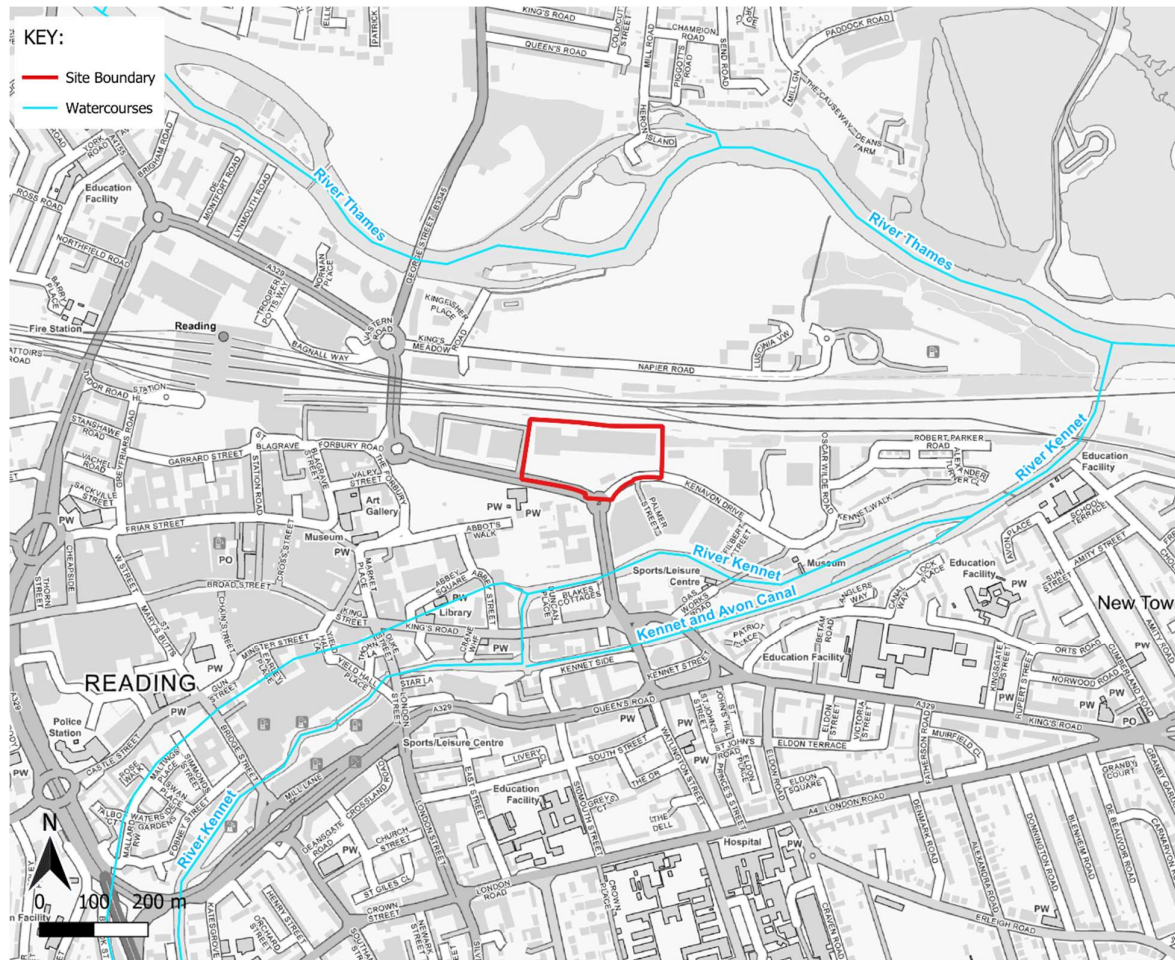


Figure 1-1: Site Location Plan

1.3 Development Proposals

Outline application with all matters reserved with the exception of access, for site redevelopment involving the demolition of all existing structures & a residential-led mixed use proposal for up to 700 residential units (Class C3) & up to 3,000 sqm (GEA) of commercial uses (Class E), together with various associated works including replacement pedestrian and vehicle access routes, open spaces, hard & soft landscaping & sewer works, partial basement excavation, up to 130 basement level car parking spaces, up to 53 separate car parking spaces for Class E uses, up to 600 cycle parking spaces & servicing facilities. This application is accompanied by an Environmental Statement.

The proposed layouts are provided in Appendix B.

1.4 Topography

The Site has a slight fall from north to south and from west to east. The levels across the site remain fairly consistent varying from 39mAOD to 39.5mAOD; Forbury Road to the southwest of the Site has a higher elevation of approximately 42mAOD. The current site surface is currently occupied by the Forbury Retail Park. The topography of the site is shown on Figure 1-2 below.

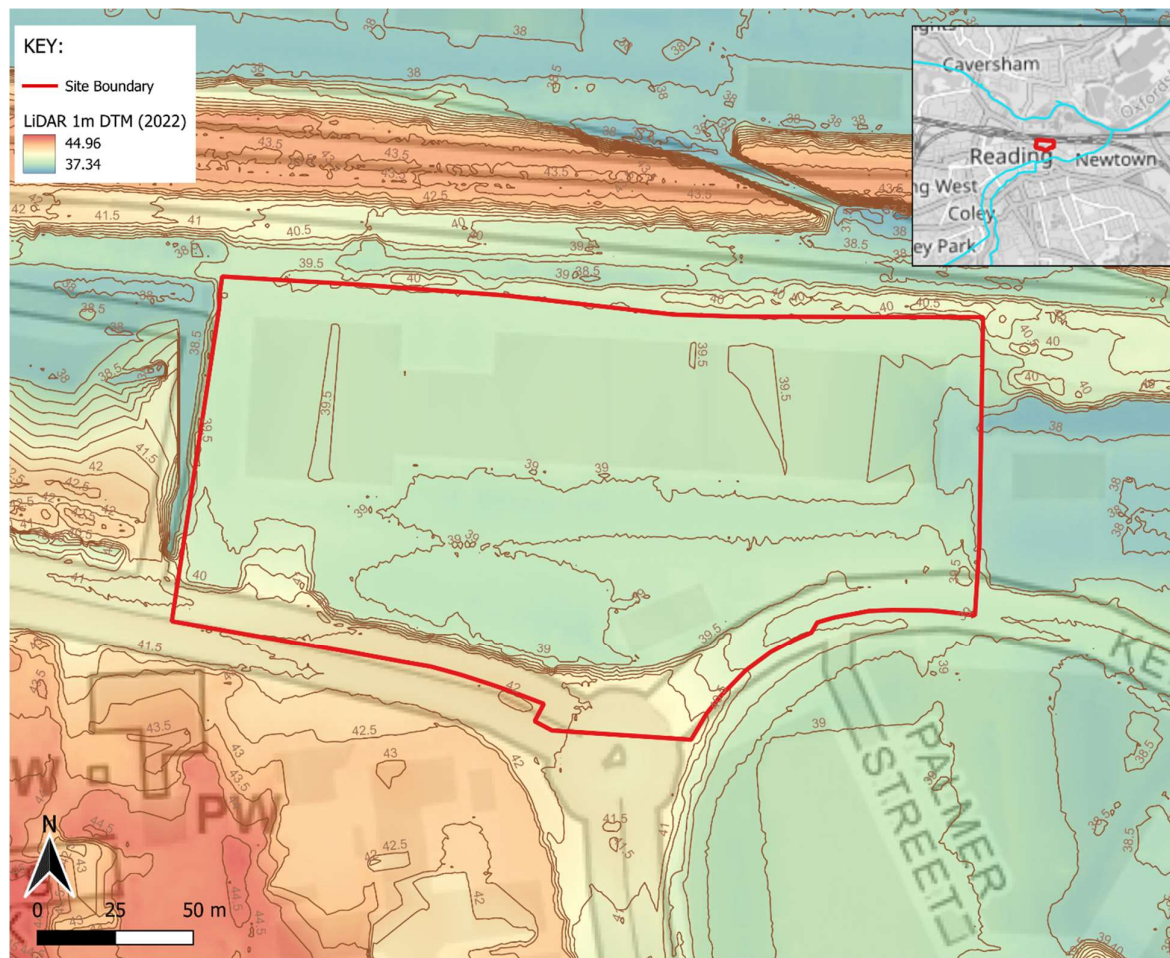


Figure 1-2: LiDAR DTM 1m (2022)

1.5 Geology

1.5.1 Geology

Geological information and maps have been extracted from the British Geological Survey (BGS) Digital Geological map of Great Britain at 1:50,000 scale, to be used for a geological assessment of the Site.

Bedrock geology is a term used for the main mass of rocks forming the Earth, which are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water. The bedrock geology at the Site is found to be Seaford Chalk Formation and Newhaven Chalk Formation - Chalk.

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, which extends back about 2.58 million years from the present. They rest on older deposits or rocks referred to as Bedrock. The BGS dataset describes the superficial deposits as Taplow Gravel Member – Sand and gravel.

1.5.2 Borehole Data

There are three BGS borehole records located on Forbury Road just outside the south of the Site from 1987 (references SU77SW127, SU77SW128, and SU77SW129) that all show the ground conditions to be consistent with the BGS Geology data. There were water strikes at all boreholes at depths ranging between 3.4m and 4.4m. Refer to the borehole data in Appendix D.

1.5.3 Groundwater Vulnerability

Based on the Groundwater Vulnerability Maps from Magic Maps, the Site classed as an area of 'medium - high' groundwater vulnerability. The Maps show the vulnerability of groundwater to a pollutant discharged at the ground level based on the hydrological, geological, hydrogeological and soil properties within a single square kilometre. The 'High and Medium' zones are areas able to easily transmit pollution to groundwater. They are characterised by high leaching soils and the absence of low permeability superficial deposits. The Site is also within an area classed as 'Soluble Rock Risk'. Medium - high groundwater vulnerability and soluble rock risk indicates that discharging surface water run-off through infiltration would not be suitable as this would increase the risk of groundwater pollution.

1.5.4 Groundwater Source Protection Zone

Based on the Groundwater Source Protection Zone from Magic Maps, the Site is currently not within the Ground Source Protection Zone.

2. Planning Policy and Guidance

2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF), last updated in December 2024 with minor amendments in February 2025, states that *inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.*

Development should only be allowed in areas at risk of flooding where, in the light of a site-specific flood risk assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- a) within the Site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
- b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
- c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*
- d) any residual risk can be safely managed; and*
- e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.*

Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:

- a) take account of advice from the lead local flood authority;*
- b) have appropriate proposed minimum operational standards;*
- c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and*
- d) where possible, provide multifunctional benefits.*

NPPF Annex 3: Flood risk vulnerability classification is provided in Appendix C.

2.2 Planning Practice Guidance

The NPPF supporting Planning Practice Guidance (PPG), which was first published in November 2016 and updated August 2022 and September 2025, states that developers and LPAs should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of SuDS. Referencing EA guidance, the PPG provides recommended contingency allowances for climate change over the anticipated lifetime of development. It also advises on flood resilience and resistance measures when dealing with the residual risks remaining after applying the sequential approach and mitigating actions.

The PPG also includes advice on flood risk vulnerability and flood zone compatibility. The following flood zones refer to the probability of river and sea flooding, without the presence of defences:

- Zone 1 - low probability: less than 1 in 1000 annual probability of river or sea flooding (<0.1%) in any year;

- Zone 2 - medium probability: between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% to 0.1%) or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% to 0.1%) in any year;
- Zone 3a - high probability: 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability flooding from the sea (>0.5%) in any year; and
- Zone 3b - the functional floodplain: where water has to flow or be stored in times of flood; identification should take account of local circumstances but would typically flood with an annual probability of 1 in 30 (3.3%) or greater in any year or is designed to flood in an extreme 1 in 1,000 (0.1%) flood.

Flood risk vulnerability is split into five classifications in Table 2 of the PPG, as follows, and the compatibility of these within each Flood Zone is set out in Table 3 of the PPG:

- Essential Infrastructure, e.g. essential transport and utility infrastructure, wind turbines;
- Highly Vulnerable, e.g. emergency services (those required to be operational during flooding), basement dwellings;
- More Vulnerable, e.g. residential dwellings, hospitals, schools, hotels, drinking establishments;
- Less Vulnerable, e.g. retail, offices, storage and distribution, leisure, restaurants; and
- Water-Compatible Development, e.g. docks, marinas, wharves.

2.3 Water Industry Act

Thames Water is the local Sewerage Undertaker and provides sewerage services under the guidance of the Water Industry Act 1991.

Under Section 106 of the Water Industry Act, the developer currently maintains the automatic right to 'communicate' with the public foul water sewer system.

2.4 National Standards for Sustainable Drainage Systems (SuDS)

The National Standards for Sustainable Drainage Systems (SuDS) was published June 2025 and last updated 30 July 2025 as an update to the previous Non-Statutory Technical Standards for SuDS published in 2015. These updated standards are the current guidance for the design, maintenance and operation of SuDS in England.

The standards set out that the peak runoff rates should be as close as is reasonably practicable to the greenfield rate but should never exceed the pre-development runoff rate.

The standards also set out that the drainage system should be designed so that flooding does not occur on any part of the Site for a 1 in 30-year rainfall event, and that no flood of a building (including basement) would occur during a 1 in 100-year rainfall event.

It is also noted within the standards that pumping use shall be by exception only and agreed with the approving body, and should only be used when it is not reasonably practicable to discharge by gravity.

2.5 Local Planning Policy

2.5.1 Reading Borough Local Plan

The Reading Borough Local Plan was adopted in November 2019 and sets out planning policies for development in Reading until 2036. A review of the Local Plan was carried out in March 2023, which concluded the need to undertake a Partial Update of the Local Plan. A pre-submission draft Local Plan Partial Update was subject to consultation (under Regulation 19) in November and December 2024, and

submitted to Secretary of State in May 2025.

Policy EN18 relating to Flooding and Sustainable Drainage Systems is as follows:

- Planning permission will only be granted where proposals have fully considered the effects of flooding from all sources (fluvial, surface water, reservoir, groundwater, and sewer flooding) over the lifetime of the development and accounting for climate change.
- Development will be directed to areas at lowest risk of flooding in the first instance, following the Sequential and Exception Test set out in the NPPF.
- Where development in areas at risk of flooding is necessary, it will not be permitted unless a strategic or site-specific Flood Risk Assessment in line with the Government's technical standards demonstrates that for the lifetime of the development:
 - a) It will not increase flood risk;
 - b) Provide safety for future occupants in times of flooding;
 - c) Provide safe access and egress in the event of a flood; and
 - d) Clearly illustrate that all necessary mitigation measures have been implemented
- All development must incorporate sustainable drainage systems (SuDS) in line with the Government's technical standards unless this is not viable or feasible.
- Runoff rates should aim to reflect greenfield conditions and, in any case, must be no greater than the existing conditions of the site.
- Schemes should ensure that the movement of water through vertical infiltration as well as horizontal run-off does not worsen contamination effects.
- SuDS provision should maximise ecological benefits, link into the existing Green Network, incorporate tree planting and landscaping and avoid damage to existing significant trees, including through changes to the site hydrology.
- Surface water must not drain to the foul sewer, as this is a major cause of sewer flooding.
- A SuDS maintenance plan must be submitted alongside planning applications to demonstrate how schemes will be managed and remain effective over the lifetime of the development. The implementation of the SuDS maintenance plan may be secured by planning condition.

2.5.2 Reading Borough Council Strategic Flood Risk Assessment (SFRA)

The Reading Borough Council Level 1 SFRA and Level 2 SFRA were published in November 2024 and May 2025, respectively.

The Level 1 and Level 2 SFRAs produced in 2017 informed the existing Reading Borough Council Local Plan adopted in November 2019. As the Council are undergoing a partial update to the Local Plan, the SFRAs produced in 2024 and 2025 were updated to inform this partial update.

The dominant flooding mechanism in Reading tends to be fluvial in origin associated with flooding from the River Thames and River Kennet with associated tributaries.

The Level 1 SFRA states that sustainable drainage principles should be followed at every site to safeguard against increasing flood risk both onsite and to third party land downstream.

For greenfield development sites runoff rates should be controlled to be no greater than the existing greenfield rate of runoff from the site. For developments on previously developed brownfield sites the rate of runoff should not exceed the runoff of the site in its previously developed condition, and should seek a betterment on pre-existing rates, especially in locations where drainage is poor.

The Level 2 SFRA was produced in May 2025 analysing 24 sites identified as needing a Level 2 more-detailed assessment, given that a significant amount of land for development cannot be allocated outside flood risk areas. The Site was not included as one of these 24 sites that underwent further assessment.

2.5.3 Reading Borough Council Local Flood Risk Management Strategy (LFRMS)

Reading Borough Council produced this LFRMS to provide the vision and the direction required to enable local flood risk management in Reading in a manner consistent with the National Flood and Coastal Erosion Risk Management Strategy (FCERM) published by DEFRA and the EA.

The strategy identifies the existing areas of flood risk in Reading, establishes priorities for managing local flood risk, and identifies how RBC will work with other neighbouring authorities, stakeholders, and local communities to manage flood risk. The report provides an overview of on-going flood risk mitigation work underway across Reading and set out the long term strategy for flood risk management.

3. Sources of Potential Flooding

3.1 Rivers and Sea

3.1.1 Flood Map for Planning

The Site is located inland a considerable distance from the sea. The River Thames located to the north of the Site over the railway tracks is not considered to be tidal at this point. Flood risk from tidal sources is considered to be very low.

According to the Environment Agency, Flood Map for Planning, the Site lies wholly within Flood Zone 1 (less than 1 in 1000 annual probability of river or sea flooding in any year). The map to show the extent of flooding from rivers or the sea is presented in Figure 3-1.

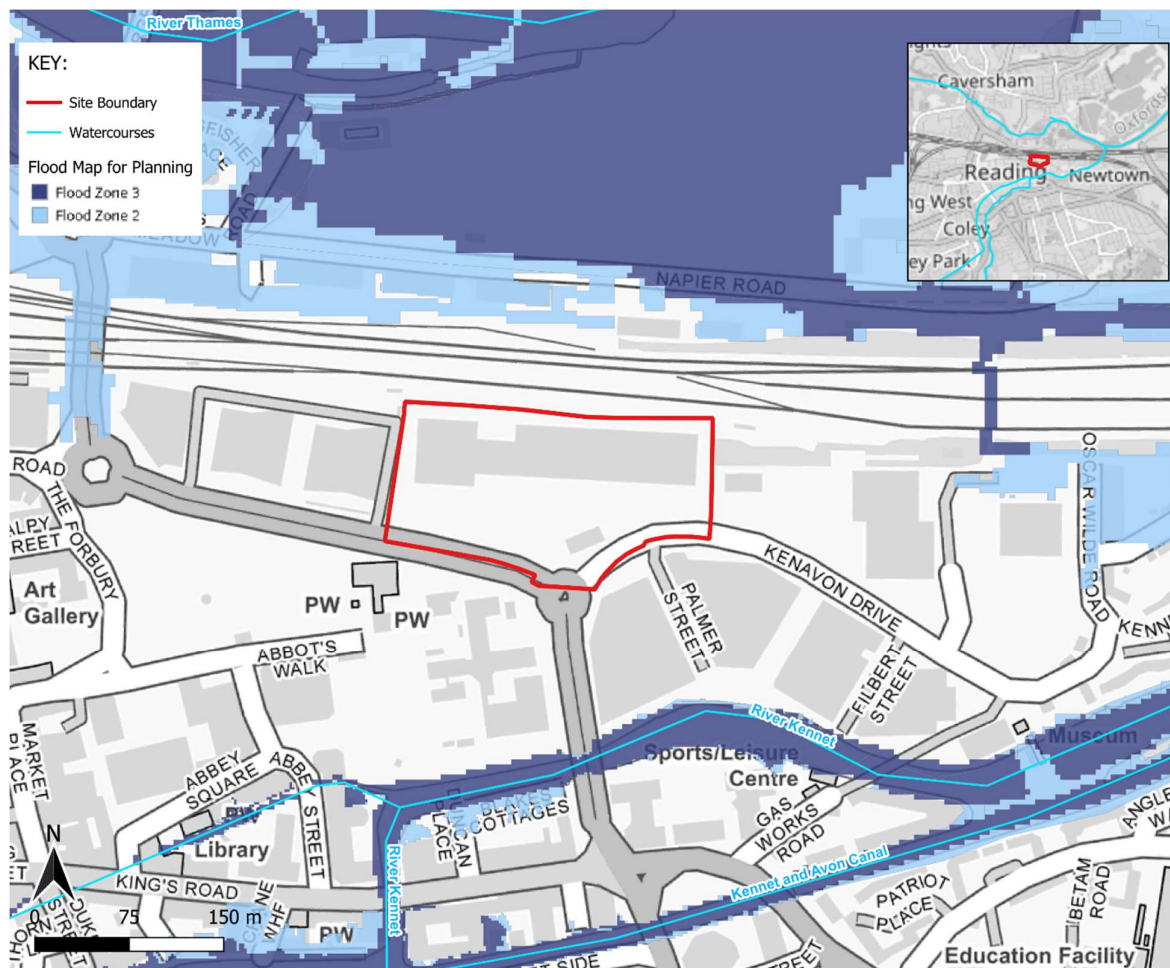


Figure 3-1: EA's Flood Map for Planning

3.1.2 Climate Change

The Site is wholly within Flood Zone 1. The Flood Map for Planning dataset from the Environment Agency was updated in August 2025 to include future scenarios accounting for climate change. The Site lies wholly outside the extent for the yearly chance of flooding between 2070 and 2125 showing Very Low risk from climate change of fluvial sources as shown in Figure 3-2.

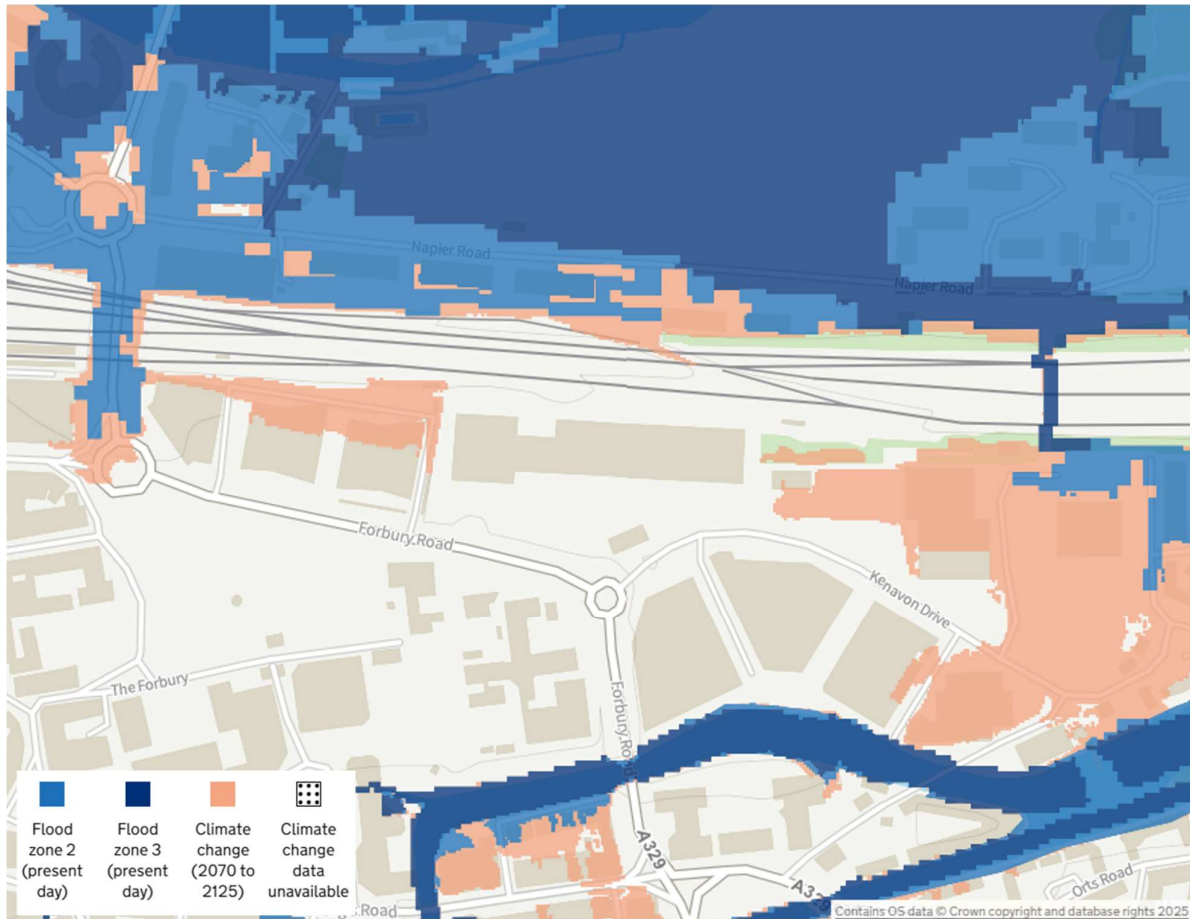


Figure 3-2: Climate Change Rivers and Sea Extent (EA Flood Map for Planning)

Climate Change Allowances

The NPPF (2024) sets out that flood risk should be managed for the lifetime of a development taking into account climate change.

The range of allowances included is based on percentiles. A percentile describes the proportion of possible scenarios that fall below an allowance level. The 50th percentile is the point at which half of the possible scenarios for peak flows fall below it, and half fall above it.

- The central allowance is based on the 50th percentile,
- The higher central allowance is based on the 70th percentile, and
- The upper end allowance is based on the 95th percentile.

The Site falls on the boundary of the Thames and South Chilterns, and the Kennet and tributaries Management Catchments, and the associated peak river flow allowances that apply for the fluvial risk are displayed in Table 3-1. The central allowance should be used for all developments except essential infrastructure, for which the higher central allowance should be used. The epoch considered is dependent upon the anticipated lifetime of the development. The PPG states *“Residential development can be assumed to have an anticipated lifetime of at least 100 years, unless there is specific justification for considering a different period. The anticipated lifetime of a non-residential development depends on the*

characteristics of that development but a period of at least 75 years is likely to form a starting point for assessment”.

Table 3-1: Peak river flow climate change allowances

	Allowance Category	Total potential change anticipated for ‘2020s’ (2015 to 2039)	Total potential change anticipated for ‘2050s’ (2040 to 2069)	Total potential change anticipated for ‘2080s’ (2070 to 2125)
Thames and South Chilterns	Upper end	30%	42%	76%
	Higher central	17%	22%	43%
	Central	12%	14%	31%
Kennet and tributaries	Upper end	32%	39%	76%
	Higher central	16%	16%	35%
	Central	10%	8%	21%

3.2 Surface Water

Surface water flooding in urban areas can sometimes occur during extreme, high-intensity, low-duration summer rainfall events which overwhelm the local surface water drainage system, or in rural areas during medium-intensity, long-duration events where saturated ground conditions prevent infiltration into the subsoil. The floodwater would be conveyed via overland flow routes as dictated by the local topography.

The Environment Agency (EA) Risk of Flooding from Surface Water map, as shown in Figure 3-3 indicates that there are small areas of ‘high’ chance of surface water flooding that are associated with the existing building footprints which are proposed to be demolished and low spots in the existing topography of the site.

The flood risk ratings for the EA Flood Risk for Surface Water map are as follows:

- ‘High’ – more than 3.3% chance of a flood each year
- ‘Medium’ – between 1% and 3.3% chance of a flood each year
- ‘Low’ – between 0.1% and 1% chance of a flood each year
- ‘Very Low’ – less than 0.1% chance of a flood each year

The surface water runoff as a result of the proposed development will be managed by the Site surface water drainage as outlined in the drainage strategy in Section 6.

Based on the information currently available, while the baseline risk is high, given the pockets of surface water risk originate on site and will be sufficiently managed actively through the incorporation of the drainage strategy, the risk in the future will be low.

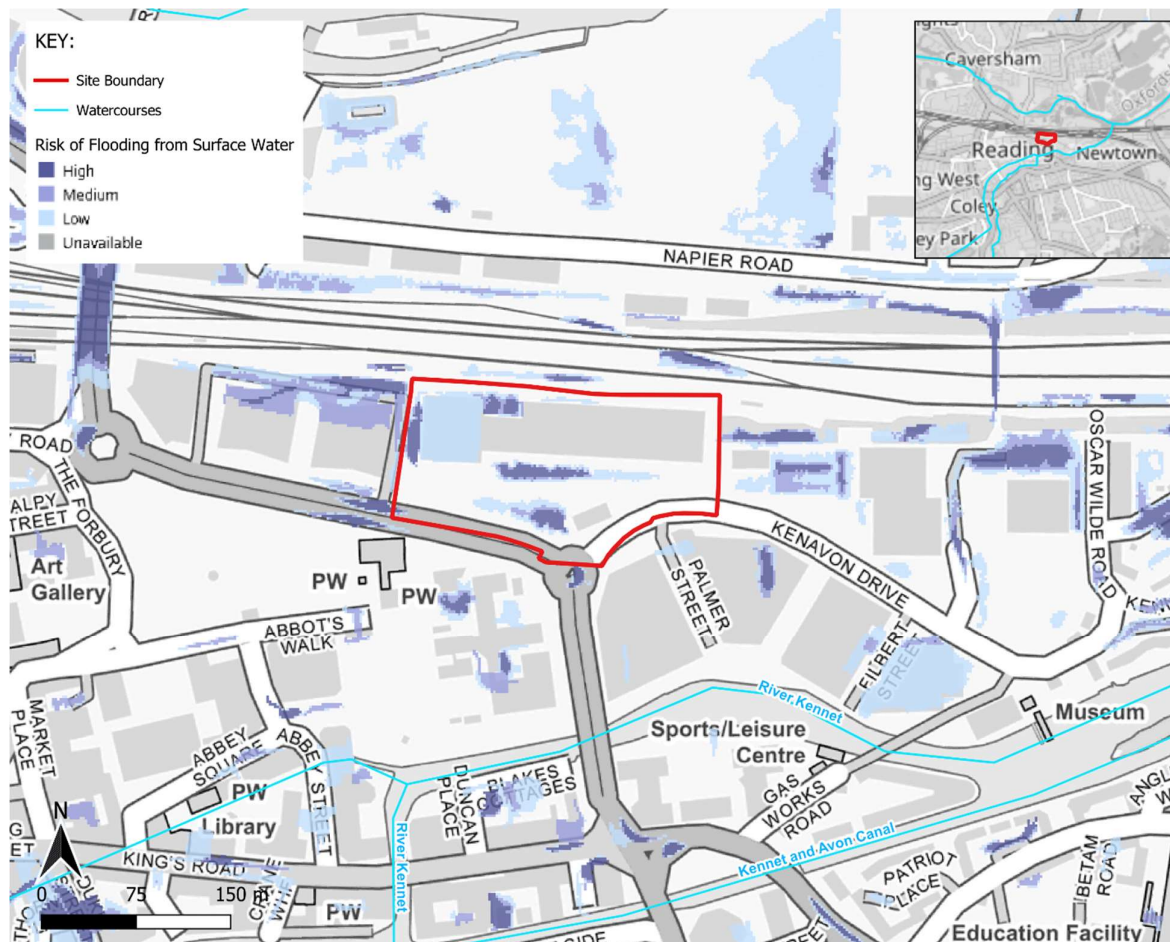


Figure 3-3: EA's Risk of Flooding from Surface Water

3.3 Groundwater

Groundwater flooding occurs when water levels in the ground rise above surface levels; Groundwater flooding generally emerges as 'seepage'. Groundwater will behave as surface water and so it would be dealt with by general drainage. They do pose a risk to basement and low areas if adequate surface water drainage is not provided.

Based on the 'Areas Susceptible to Groundwater Flooding' dataset within the Reading Borough Council Level 1 SFRA, the Site lies within the greater than 75% likelihood extent as shown in Figure 3-4.



Figure 3-4: Areas Susceptible to Groundwater Flooding (Level 1 SFRA)

However, borehole data from the Huntley Wharf Berkeley Homes/L&Q development south east of the site (viewed on Reading Borough Council's Planning Portal) suggests that groundwater was encountered below ground at relatively shallow depths of between 2.0-3.0m and this could provide an indication of possible conditions on the development Site. If so, this would suggest that existing groundwater levels on the development Site could be at shallow depths, possibly as low as 1.0-2.0m, given the existing site topography is typically lower than the Berkeley Homes/L&Q development. Actual groundwater levels, and their direction of flow across the site, must be substantiated by a series of exploratory boreholes.

Therefore, owing to the residual risk set out in this section, mitigation is proposed for the basement and mitigation measures are discussed in Section 4.

3.4 Flooding from Drainage Systems

Sewer flooding poses the highest risk of frequent flooding. Flooding from the drainage system occurs when flow entering a system exceeds its discharge capacity, the system becomes blocked or, in the case of surface water sewers, it cannot discharge due to high water level in the receiving watercourse. Sewer flooding is often caused by sewer capacity being exceeded in large rainfall events causing a backup of floodwaters within properties or through manholes.

Thames Water is responsible for the management of urban drainage (surface water) and sewerage.

According to the Level 1 SFRA (2024) Thames Water detailed a total of seven external flood incidents and seven internal flood incidents for the RG1 postcode area where the Site lies since 1989. The exact locations of these incidents are unknown.

The risk of sewer flooding will be managed through the surface water drainage strategy outlined in Section 6 of this report. Through the management of surface water flood risk on-site, the risk of sewer flooding would be reduced.

3.5 Flooding from Canals and Artificial Sources

The Kennet and Avon Canal runs approximately 300m south of the site located on the other side River Kennet and therefore the risk of flooding from breach of canal embankments or walls, and artificial sources is therefore considered to be low.

3.6 Flooding from Reservoirs

The EA Flood Risk from Reservoirs mapping (Figure 3-5) shows that the centre and east of the Site (outside the existing building footprint) is located within the 'Wet Day' scenario outline.

The 'Dry Day' scenario shows the flood extent in the event that the reservoir were to fail and release the water held on a "dry day" when local rivers are at normal levels. The 'Wet Day' scenario shows the flood extent in the event that the reservoir were to fail and release the water held on a "wet day" when local rivers had already overflowed their banks. However, the data represents as prediction of a credible worst case scenario with it being unlikely any actual flood would be this large. The data gives no indication of likelihood or probability of reservoir flooding however given the stringent control and management of reservoirs, the probability is considered to be very low.

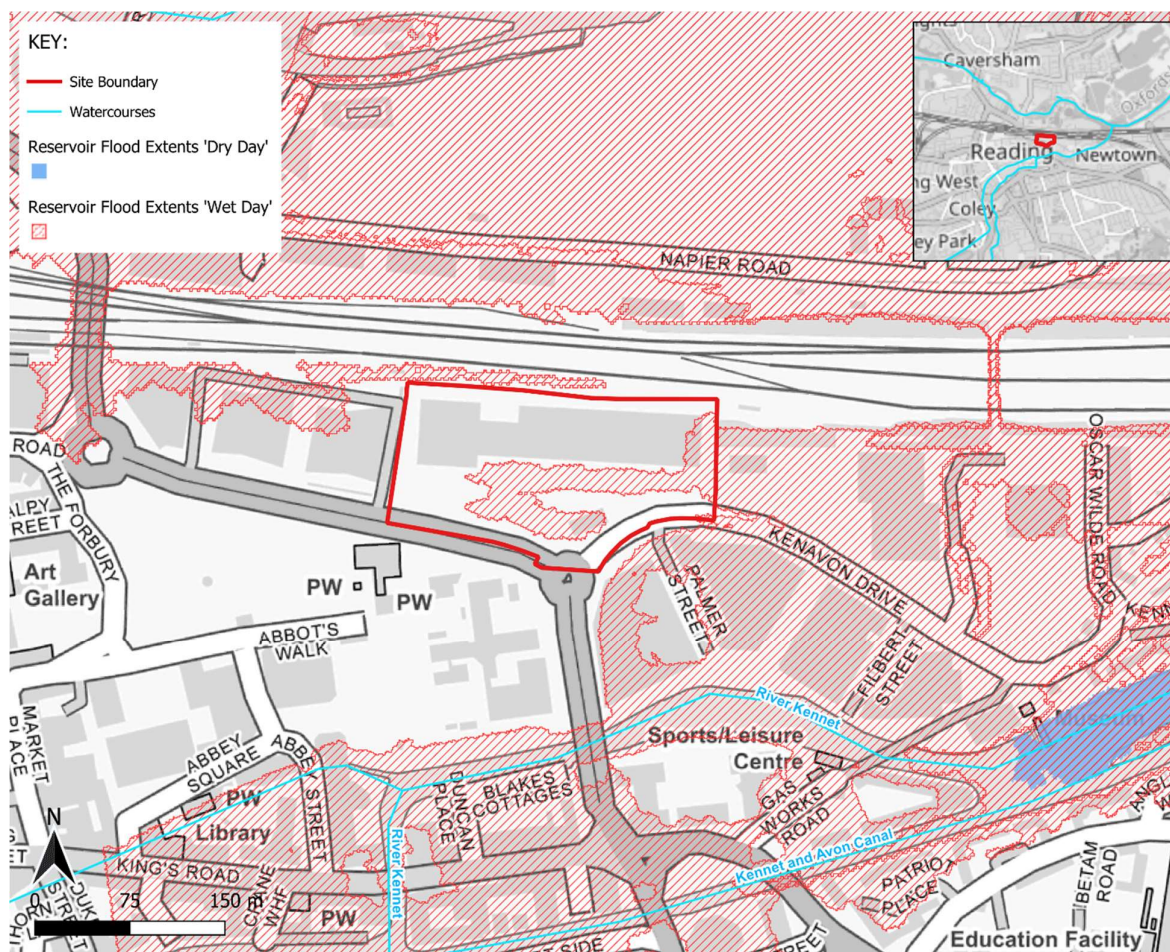


Figure 3-5: EA's Risk of Flooding from Reservoirs

4. Flood Risk Management

4.1 Flood Resistance Measures

The basement level is proposed for car parking. The basement will be sufficiently waterproofed to protect from potential groundwater flooding. Specifications to be decided by the Architect and structural engineers at detailed design stage.

With the proposed flood resistance measures, it is considered that the risk of flooding at the Site is low.

4.2 Residual Flood Risks

Future maintenance for any private drainage systems would be under the responsibility of the Site owner or an appointment management company. Residual risk of flooding due to collapse or blockage of sewers would be mitigated via regular maintenance of the drainage and the design of the development layout and finished levels.

5. The Sequential and Exception Test

5.1 National Planning Policy Framework

The NPPF sets out the approach LPAs should take when determining planning applications. LPAs should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a site-specific flood risk assessment following the Sequential Test, and if required the Exception Test, it can be demonstrated that:

- Within the Site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and
- Development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems.

Table 5-1: Flood Risk Vulnerability and Flood Zone Compatibility (extract from PPG)

Flood Risk Vulnerability Classification (NPPF Table 2)		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone (NPPF Table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	X	Exception Test Required	✓
	Zone 3b (Functional Floodplain)	Exception Test Required	✓	X	X	X
Key: ✓ Development is appropriate				X Development should not be permitted		

The Site lies wholly within Flood Risk Vulnerability Zone 1. This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%). As shown in Table 5-1, it is considered that all uses of land are appropriate in this zone.

5.2 The Sequential Test¹

NPPF paragraph 174 states:

“The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.”

The Site was allocated through the Local Plan Partial Update 2025 as site CR13b Forbury Retail Park and went through the Sequential Test in May 2025 (ref ST227). The conclusion was that the development passes the Sequential Test for allocation for residential use, due to the fact that the identified development

¹ [Sequential and Exception Test Local Plan Partial Update 2025](#)

needs cannot be accommodated on sequentially preferable sites.

5.3 The Exception Test

Paragraph 177 of the NPPF states that:

“If it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in Annex 3”.

Annex 3: Flood risk Vulnerability Classification classes the proposed mixed-use development as ‘More Vulnerable’. According to Table 5-1 above, ‘More Vulnerable’ development in Flood Zone 1 is appropriate and, therefore, the Site does not require to undergo the Exception Test.

Table 1 of the PPG: Definition of Flood Zones, Table 2 of the PPG: Flood risk vulnerability and flood zone ‘incompatibility’, and NPPF Annex 3: Flood risk vulnerability classification are provided in Appendix C.

6. Surface Water Drainage Strategy

6.1 Existing Surface Water Drainage

6.1.1 Thames Water

Thames Water (TW) is the statutory sewerage undertaker and is responsible for the public sewer systems in the area. Based on the TW sewers record map, there are existing surface water public sewers located in the vicinity of the Site and are summarised below.

Existing public sewers

- An existing surface water public sewer system is located to the southeast of the Site over Kenavon Drive with an existing manhole (ref 2653) receiving an existing private surface water connection from the existing development on Site.

Refer to Appendix F for the TW sewer Maps and Pre-Development Enquiry Response. The SuDS methods are further analysed in Section 6.2.2.

The existing site is covered by retail units, a KFC drive-thru restaurant and at grade car parking. The existing retail terrace footprint is 9,114m², the existing restaurant building footprint is approximately 333m², the car parking area is approximately 17,026m². Both buildings (retail and restaurant) and car parking are currently positively drained with outfall to the Thames Water sewer system in Kenavon Drive (Appendix F). These buildings are due to be demolished for the proposed development.

6.1.2 Greenfield Runoff Rates

The greenfield runoff rates have been calculated using the UK SuDS Online Tool which uses the IH124 method. The calculated rates based on 1ha are shown in Table 6-1 and Appendix E.

Table 6-1: Greenfield Runoff Rates (IH124)

Flood Event	Discharge Rate (l/s/ha)
QBAR	0.83
Q1 Year	0.85
Q30 Year	2.3
Q100 Year	3.19

6.1.3 Brownfield Runoff Rates

Runoff from the existing Site has been calculated using the Modified Rational Method based on a total Site area of 2.689 ha, shown in Table 5 2 below. Refer to Appendix E for full calculations.

Table 6-2: Brownfield Runoff Rates for 60 minute storm (Modified Rational Method)

Flood Event	Discharge Rate (l/s)
Q2 Year	79.1
Q30 Year	248.9
Q100 Year	328.1
Q100 Year +40%CC	459.4

6.2 Surface Water Drainage Strategy

6.2.1 Surface Water Discharge Hierarchy

Part H of the Building Regulations 2010 recommends that surface water run-off shall discharge to one of the following, listed in order of priority:

- a) An adequate soakaway or some other adequate infiltration system, or where that is not reasonably practicable.
- b) A watercourse, or, where that is not reasonably practicable.
- c) A sewer.

In accordance with guidance, the surface water discharge options are considered based on the surface water drainage hierarchy stated in the National Standards for Sustainable Drainage Systems. This consideration of the drainage hierarchy is summarised in Table 6-3.

Table 6-3: Surface Water Discharge Hierarchy

Drainage Hierarchy		Consideration	✓/✗
1	Store rainwater for later use	Recycling of attenuated rainwater is considered unfeasible for use within the buildings because of the additional cost and complexity of the system when compared against the water-saving benefits. A duplication of the internal piping system would be required as well as the provision of storage tanks and pumps which increase the operational and capital cost investments against the benefits. While a formal RWH system is not proposed for the development, every roof will be made up of blue / green extensive roof, and downpipes where possible will be diverted to landscaped areas to allow for some rainwater reuse for irrigation purposes.	✗
2	Into the ground by infiltration	Due to the urban nature of the Site and the lack of available external space with proximity to proposed buildings and neighbouring infrastructure including the Network Rail railway tracks, it is not deemed appropriate for infiltration techniques to be utilised.	✗
3	Into a surface water body such as a river, ditch, pond or stream	The River Kennet lies approximately 160m south of the development, however a connection would be across third party land and the Network Rail tracks therefore not considered appropriate.	✗
4	Into a surface water sewer	There is an existing private surface water network on-site that connects to an existing public surface water sewer in Kenavon Drive which the existing development discharges into, to the south of the Site.	✓
5	Into a combined sewer	No surface water runoff will be discharged to the public combined sewer network due to higher discharge hierarchy priorities being met.	✗

Based on the hierarchy above, the proposed drainage strategy will therefore consist of a combination of discharge to a green/blue roof (1), be attenuated through tanks and permeable paving on-site before discharging to a surface water sewer (4).

6.2.2 Sustainable Drainage Systems

Sustainable drainage (SuDS) techniques will be used for the disposal and management of surface water runoff from the proposed development, taking into account Site-specific constraints.

SuDS mimic the natural drainage system and provide a method of surface water drainage which can decrease the quantity of water discharged and hence reduce the risk of flooding. In addition to reducing flood risk, SuDS features can improve water quality and provide biodiversity and amenity benefits.

A variety of SuDS are available to reduce or temporarily hold back the discharge of surface water runoff. The potential for SuDS was considered throughout the design development. Table 6-4 outlines the potential SuDS devices and their constraints and opportunities at the Site.

Table 6-4: Sustainable Drainage Techniques

Device	Description	Constraints/Comments	✓/✗
Green/Blue Roofs	Provide soft landscaping at roof level with attenuation storage which reduces surface water runoff	Green / blue roofs are provided on all buildings.	✓
Infiltration devices & Soakaways (source control)	Store runoff and allow water to percolate into the ground via natural infiltration	Due to the urban nature of the Site and the lack of available external space with proximity to proposed buildings and neighbouring infrastructure including the Network Rail railway tracks, it is not deemed appropriate for infiltration techniques to be utilised.	✗
Pervious surfaces (source control)	Stormwater is allowed to infiltrate through the surface into a storage layer, from which it can either infiltrate and/or slowly release to sewers	It is recommended that pervious surfaces be included wherever possible within the Site such as hardstanding areas although these will be lined due to proximity to buildings and to prevent groundwater seepage and contamination.	✓
Rainwater harvesting (source control)	Reduces the annual average rate of runoff from the Site by reusing water for non-potable uses e.g., toilet flushing or water butts	While a formal RWH system is not proposed for the development, downpipes where possible will be diverted to landscaped areas to allow for some rainwater reuse	✓
Swales (permeable conveyance)	Broad shallow channels that convey / store runoff, and allow infiltration (ground conditions permitting)	Swales are not deemed feasible at the Site due to the nature of the proposed development and limited space. It is considered not feasible.	✗
Filter drains & perforated pipes (permeable conveyance)	Trenches filled with granular materials (which are designed to take flows from adjacent impermeable areas) that convey runoff while allowing infiltration (ground conditions permitting)	Filter drains are not suitable due to the nature of the proposed development, and limited space. It is considered not feasible.	✗
Filter Strips (permeable conveyance)	Wide gently sloping areas of grass or dense vegetation that remove pollutants from runoff from adjacent areas	Filter strips are not suitable due to the nature of the proposed development, and limited space. It is considered not feasible.	✗

Device	Description	Constraints/Comments	✓/✗
Infiltration basins (end of pipe treatment)	Depressions in the surface designed to store runoff and allow infiltration through the base	Infiltration basins are not deemed feasible at the Site due to space constraints, and proximity to proposed buildings and neighbouring infrastructure including the Network Rail railway tracks.	✗
Bio-retention Systems / Rain Garden (end of pipe treatment)	A shallow landscaped depression which allows runoff to pond temporarily on the surface before filtering through vegetation and underlying soils.	Rain gardens are proposed throughout the south and east of the Site, with other soft landscaping areas being included throughout.	✓
Detention Basins (end of pipe treatment)	Depressions in the surface designed to store runoff without infiltration through the base	Detention basins are not suitable due to the nature of the proposed development, and limited space. It is considered not feasible.	✗
Attenuation Underground/Podium (end of pipe treatment)	Oversized pipes or geo-cellular tanks designed to store water below ground level or at podium level.	Attenuation tanks will be incorporated throughout the development to store water.	✓

Considering all SuDS techniques, the appropriate and site-specific SuDS features that could be incorporated into the drainage system are green/blue roofs, rain gardens, permeable paving and attenuation tanks.

6.2.3 Climate Change Allowance

The NPPF and PPG place emphasis on the need to fully consider – and design for – the impacts of climate change as set out in the planning guidance. The potential increase in peak rainfall intensity needs to be considered in the surface water drainage strategy for new developments.

The EA's online Guidance Flood risk assessments: climate change allowances (2022) states to consider development to have a minimum lifetime of a 100 years.

The proposed surface water drainage strategy should be designed so that for the upper end allowance in the 3.3% and 1% annual exceedance probability event:

- There is no increase in flood risk elsewhere
- The Proposed Development will be safe from surface water flooding

The Site is located on the boundary of two Management Catchments: Thames and South Chilterns, and the Kennet and tributaries. The central and upper end allowances for the 3.3% and 1% annual exceedance rainfall events for both Management Catchments are shown in Table 6-5 and Table 6-6.

Table 6-5: 3.3% annual exceedance peak rainfall allowances

Management Catchment	Allowance	2050s	2070s
Thames and South Chilterns	Central	20%	35%
	Upper End	25%	35%
Kennet and tributaries	Central	20%	35%
	Upper End	25%	35%

Table 6-6: 1% annual exceedance peak rainfall allowances

Management Catchment	Allowance	2050s	2070s
Thames and South Chilterns	Central	20%	40%
	Upper End	25%	40%
Kennet and tributaries	Central	20%	40%
	Upper End	25%	40%

As the allowances are the same for both Management Catchments, within the proposed drainage strategy the 35% allowance will be used for the 30 year event and 40% allowance will be used for the 100 year event.

6.2.4 Proposed Drainage Strategy

The proposed surface water drainage system would be designed to convey surface water only, with foul water being discharged separately. The design would be in accordance with BS EN 752 – Drain and Sewer Systems Outside Buildings, BS EN 12056 – Gravity Drainage Systems Inside Buildings and Approved Document H of Building Regulations.

In accordance with the requirements of the NPPF and the National Standards for SuDS, ‘post development’ runoff rates will be restricted to those rates generated by the ‘pre-developed’ site, or less, for up to and including the critical 1% annual probability storm event taking into account the impacts of climate change (applied as a 40% uplift in peak rainfall intensity) for the lifetime of the development.

Refer to Appendix I for the full drainage layout drawing 21855-WAT-XX-XX-DR-D-920001.

The National Standards for SuDS guidance states *“the peak allowable discharge rate from the development for the 1% AEP event shall be limited to the 50% AEP greenfield runoff rate or 3l/s/ha, whichever is greater”*.

Based on the impermeable area of 1.942ha for the proposed Site (refer to catchment drawing in Appendix I, 21855-WAT-XX-XX-DR-D-920003). Using the above guidance of using the 3 l/s/ha rate (as higher than the calculated greenfield QBar rate of 0.83 l/s/ha), this provides a discharge rate of 5.8 l/s to restrict all events up to and including the 100 year plus 40% climate change event. This provides approximately a 99% betterment on the brownfield 100 year plus 40% climate change rate of 459.4l/s.

The attenuation storage was calculated using InfoDrainage software (Quick Storage Estimate). The Site attenuation storage results for the 1 in 100 year with 40% climate change equated to an average required attenuation volume of 1960.5m³. The calculations are presented in Appendix G.

The attenuation requirements will be delivered through blue roofs on the buildings, permeable paving, raingardens and attenuation tanks.

Flow control will be provided to ensure that excess surface water runoff is released in a managed and controlled manner for design storm events taking into account future climate change allowances. The design flow rate will be 5.8 l/s. Final product and specification should be confirmed at detailed design.

The proposed surface water flows will be discharged via an existing private surface water sewer on-site which connects to the existing Thames Water surface water sewer (nearest manhole 2653) in Kenavon Drive. This should be CCTV surveyed at the next stage of design. A pre-development enquiry was submitted to Thames Water in which they confirm approval of the proposals to discharge at 5.8l/s. The full Thames Water response is located in Appendix F.

Water quality benefits will be gained via integration of green roofs, raingardens and permeable paving. These are discussed in detail in the next Section.

6.2.5 Exceedance Routes

In the unlikely event of a storm greater than the 1 in 100 years plus 40% climate change design storm, the proposed drainage system could exceed its capacity and overflow. These exceedance flow routes, and flooded areas must be managed to minimise risks to the development and adjacent areas.

During an exceedance event, any flooding will be managed safely on-Site. In an event that the capacity of the proposed surface water drainage network is exceeded, flood water escaping from the drainage system will be routed away from the buildings until there is sufficient capacity to allow it back into the system. Flows will be directed to the soft landscaping areas. See extract of the exceedance plan in Figure 6-1 and Appendix I for the full drawing 21855-WAT-XX-XX-DR-D-920002.

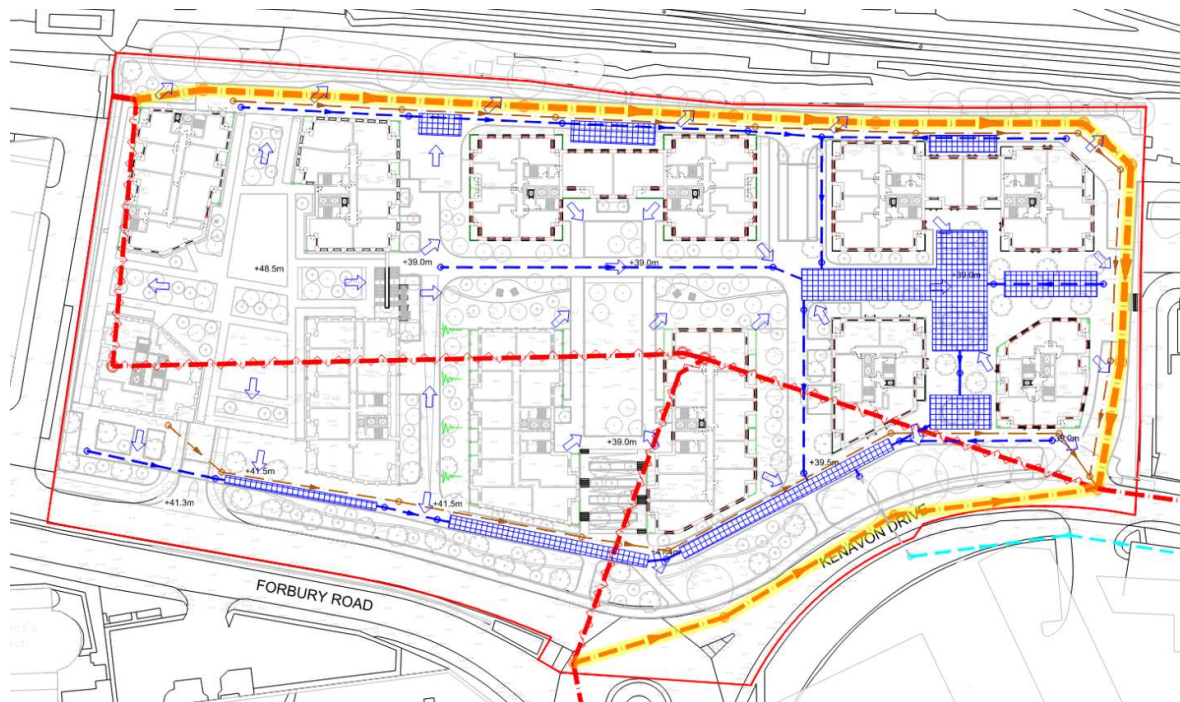


Figure 6-1: Exceedance flow routes

7. Water Quality and Simple Index Approach

The risk posed by surface water runoff to the receiving environment is a function of:

- The pollution hazard at a particular site (i.e., the pollutant source)
- The effectiveness of SuDS treatment components in reducing levels of pollutants to environmentally acceptable levels, (i.e., the pollutant pathway).
- The sensitivity of the receiving environment (i.e., the environment receptor).

The CIRIA C753 SuDS Manual, Table 26.1 suggests a Simple Index Approach for low-risk developments, which follows a three-step process, namely:

- Allocate suitable pollution hazard indices for the proposed land use.
- Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index.
- Where the discharge is protected surface waters or groundwater, consider the need for a more precautionary approach.

To successfully deliver adequate treatment, the chosen SuDS components should have a total pollution mitigation index that equals or exceeds the pollution hazard index.

Where the mitigation index of an individual components is insufficient, two components (or more) in series will be required, where: Total SuDS mitigation index = mitigation index 1 + 0.5(mitigation index)

The Simple Index Approach states that if the land use varies across the “runoff area”, either:

- Use the land use type with the highest pollution hazard index
- Apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all.

7.1 Pollution Hazard Indices

The Pollution Hazard Indices for the SuDS used in this development in different land use classifications are presented in Table 7-1 below.

Table 7-1: Pollution Hazard Indices for the development

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential roofing	Very low	0.2	0.2	0.05
Low traffic roads (e.g. residential roads and general access roads, <300 traffic movement per day)	Low	0.5	0.4	0.4
Total		0.7	0.6	0.45

7.2 Pollution Mitigation Indices

The SuDS strategy for the proposed Site will include rain gardens and permeable paving to provide water quality uplift in accordance with the CIRIA C753 SuDS manual. A SuDS Management Train is a robust pollutant removal strategy. Using a number of different SuDS components in series will help target a good range of particulate-bound and dissolved pollutants, will deliver gradual improvement in water quality and will act as a buffer for accidental spills and intermittent high pollutant loads.

Where two components (or more) in series are utilised for the Site, the

Total SuDS mitigation index = mitigation index 1 + 0.5(mitigation index)

Note, a factor of 0.5 is used to account for the reduced performance of secondary or tertiary components associated with already reduced inflow concentrations.

To successfully deliver adequate treatment, the chosen SuDS components should have a total pollution mitigation index that equals or exceeds the pollution hazard index for each contaminant type.

The associated pollution mitigation indices are shown below in Table 7-2 and exceed the pollution hazard indices are stated above in Table 7-1.

Table 7-2: SuDS Mitigation Indices for SuDS used in development

Type of SuDS Component	TSS	Metals	Hydrocarbons
Pervious pavement (where not infiltrating)	0.7	0.6	0.7
Bioretention system (where not infiltrating)	0.8	0.8	0.8
300mm minimum depth of soils with good contamination attenuation potential	0.4	0.3	0.3
Total	1.9	1.7	1.8

Sediment should be removed as far upstream in the drainage system as possible. Sediment control components that are located close to the runoff surface allow sediment build-up to occur gradually in dry features and at shallow depths, facilitating the breakdown and degradation of the organic particulates and straightforward and cost-effective sediment removal. Sediment trapping provides important removal of a range of contaminants that are adsorbed onto sediment surfaces and upstream sediment controls protect downstream components from damage or poor performance due to sediment build-up either on the surface or within subsurface media or soils.

8. SuDS Management and Maintenance Plan

The ongoing management and maintenance of the proposed surface water drainage systems will fall under the responsibility of the landowner or their appointed agent. If the drainage network is adopted by the water authority under a Section 104 Agreement, then it will be their responsibility. It is likely, all surface water drainage onsite and SuDS features will remain under management of the Applicant whereas the foul drainage network run in the public highway will be adopted by Thames Water.

Best practice maintenance information is provided within the CIRIA C753 SuDS Manual, extracts of which have been included below for the SuDS features proposed for the Development. The Tables below detail indicative plans for the maintenance of the proposed surface water drainage features including the type of activity and its frequency and who will be responsible for carrying out these tasks.

8.1.1 Piped Drainage and Manholes Maintenance

Drainage infrastructure covered in this section includes all privately-owned manholes, manhole fittings and surrounding pipework, gullies and kerb drainage. Correct operation of this drainage infrastructure allows collection and transportation of water but requires regular maintenance as outlined in Table 8-1.

Table 8-1: Maintenance schedule for piped drainage and manholes (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Frequency
Before Start up	Removal of any inappropriate material from within the chamber and dispose off-site to a suitable licenced site.	At Start
	All pipelines to be flushed with water to remove silt and check for blockages	At Start
Regular Maintenance	Removal of debris (which could include leaves, rubbish, branches) from areas served by drainage (where it may cause risk to performance)	Monthly
Remedial Actions	For blockages resulting in flooded manhole chambers, drain down manhole chamber and unblock.	As required
	For pipe blockages, rod or jet clean between access points to unblock	As required
Monitoring	Lift covers and inspect chambers. Inspect covers, surrounding gullies and drainage channels for signs of damage and incorrect operation. If required, undertake remedial action.	As required

8.1.2 Flow Control Maintenance

A flow control device is located at the discharge point of the drainage network to restrict the flow rate of surface water from the proposed development into the existing sewer network. Table 8-2 below shows a typical maintenance schedule for a flow control device. At detailed design, the civils specification will set out the suitable flow control device for the drainage network and therefore the manufacturer specific maintenance guidance should be adhered to.

Table 8-2: Maintenance schedule for flow control devices (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Frequency
Before start	Removal of any inappropriate material from within the chambers and dispose off-site	At start
Regular maintenance (as per manufacturer's requirements)	Removal of debris (which could include leaves, rubbish, and branches) from areas served by the drainage (where it may cause risk to performance)	Monthly

Maintenance Schedule	Required Action	Frequency
Remedial Actions	For blockages, resulting in flooded manhole chambers, drain down manhole chamber and unblock	As required
Monitoring	Inspect unit and hose down is required	Monthly at the start for three months, then six monthly

8.1.3 Permeable Paving Maintenance

Permeable paving underlain by a porous subbase can treat and attenuate surface water runoff from hardstanding areas including roads and parking. Table 8-3 shows a typical maintenance schedule for permeable paving storage system.

Table 8-3: Maintenance schedule for permeable paving systems (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of parking	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

8.1.4 Green roof maintenance

The function of vegetated roofs is to provide pre-treatment to the surface water before it enters the below ground surface water system, whilst also providing attenuation at roof level. Table 8-4 shows a typical maintenance schedule for green roof system.

Table 8-4: Maintenance schedule for green roof systems (CIRIA C753, 2015)

Maintenance schedule	Required action	Typical frequency
Regular inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability.	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources.	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system.	Annually and after severe storms
	Inspect underside of roof for evidence of leakage.	Annually and after severe storms
Regular maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth.	Six monthly and annually or as required
	During establishment (i.e., year one), replace dead plants as required.	Monthly (but usually responsibility of manufacturer)
	Post establishment, replace dead plants as required (where > 5% of coverage).	Annually (in autumn)
	Remove fallen leaves and debris from deciduous plant foliage.	Six monthly or as required
	Remove nuisance and invasive vegetation, including weeds.	Six monthly or as required
	Mow grasses, prune shrubs and manage other plantings (if appropriate) as required – clippings should be removed and not allowed to accumulate.	Six monthly or as required
Monitoring	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled.	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate.	As required

8.1.5 Bioretention Systems (Rain Gardens) Maintenance

Bioretention systems attenuate and treat the surface water runoff. They will require maintenance to ensure continuing operation to design performance standards. Table 8-5 shows the typical operation and maintenance requirements for bioretention systems.

Table 8-5: Maintenance schedule for bioretention systems (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Frequency
Regular inspections	Inspect infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary.	Quarterly
	Check operation of underdrains by inspection of flows after rain	Annually

	Assess plants for disease infection, poor growth, invasive species etc and replace as necessary	Quarterly
	Inspect inlets and outlets for blockage	Quarterly
Regular maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required.	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
Remedial actions	Remove and replace filter medium and vegetation above	As required but likely to be >20 years

8.1.6 Attenuation Tank Maintenance

Attenuation tank systems create a below-ground void space for the temporary storage of surface water before infiltration, controlled release or use. They will require maintenance to ensure continuing operation to design performance standards. Table 8-6 shows the typical operation and maintenance requirements for attenuation tank systems.

Table 8-6: Maintenance schedule for attenuation tank systems (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial Actions	Repair / rehabilitate inlets, outlets, overflows and vents	As required
Monitoring	Inspect / check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

8.1.7 Trees

Trees can help protect and enhance the urban environment by contributing to effective surface water management strategies while adding beauty and character to the urban landscape. They will require maintenance with Table 8-7 showing the typical operation and maintenance requirements for trees.

Table 8-7: Maintenance schedule for trees (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)

	Inspect inlets and outlets	Inspect monthly
Occasional maintenance	Check tree health and manage tree appropriately	Annually
	Remove silt build-up from inlets and surface and replace mulch as necessary	Annually, or as required
	Water	As required (in periods of drought)
Monitoring	Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly

9. Foul Drainage Strategy

9.1 Existing Foul Drainage

Based on the Thames Water (TW) sewer record map, which can be found in Appendix F, there are existing foul water public sewers located on and in the vicinity of the Site. These are summarised as follows:

- There are existing foul sewer runs (Ø900x600mm) that run across the Site which are due to be decommissioned and diverted.
- There is an existing foul sewer network located in Kenavon Drive of diameters ranging from 150mm to 225mm

9.2 Proposed Foul Drainage

The proposed foul drainage would be designed in accordance with BS EN 752 – Drain and Sewer Systems Outside Buildings, BS EN 12056 – Gravity Drainage Systems Inside Buildings, and Approved Document H of Building Regulations.

A pre-development enquiry was submitted to Thames Water in which Thames Water have confirmed sufficient capacity in their system for the development.

The proposed foul water flows will be discharged to the existing Thames Water foul sewer located in Kenavon Drive (manhole 2601). The foul network will then connect existing manhole 0708 in northwest corner to existing manhole 2601 in southeast corner via a new Ø1200mm run, followed by two Ø1400mm runs. There will also be a new Ø900x600mm foul run located in Kenavon Drive to connect existing manhole 1602 located on the roundabout to existing manhole 2603. This should be CCTV surveyed at the next stage of design.

New connections made to the public sewer system would be made through a Section 106 New Sewer Connection Agreement with Thames Water, under the Water Industry Act 1991. This should be completed at the next stage of design.

10. Conclusions

This Flood Risk Assessment and Drainage Strategy report has been prepared by Waterman Infrastructure & Environment Limited to accompany an outline planning application for the redevelopment of the Forbury Retail Park in Reading, including the demolition of existing buildings and erection of a residential-led mixed-use development. The proposed buildings will be residential-led mixed use. The application is submitted on behalf of Abrdn Property Income Trust.

Based on the assessment in this report, our conclusions are as follows:

- The Site is a brownfield site which currently houses the Forbury Retail Park and KFC drive-thru with associated car parking. Its boundary extends to an area of approximately 2.69ha.
- The Site lies a considerable distance from the sea and the River Thames is not considered to be tidal at this stage; therefore is at very low risk of tidal flooding.
- The Site lies wholly within Flood Zone 1. It is deemed that the fluvial flood risk is low.
- There are small areas of 'high' chance of surface water flooding that are associated with the existing building footprints which are proposed to be demolished and low spots in the existing topography of the site. The risk of flooding from surface water is deemed as low.
- The risk of flooding from sewers, groundwater and artificial sources is low.
- Considering all SuDS techniques, the appropriate and site-specific SuDS features that could be incorporated into the drainage system are permeable paving, raingardens, attenuation tanks and blue / green roofs.
- The runoff from impermeable surfaces will be discharged into the proposed permeable paving and raingardens which will provide both attenuation storage and improve water quality prior to discharging into attenuation tanks and ultimately the existing surface water network at the maximum rate of 5.8 l/s (in line with the National Standards for SuDS maximum rate of 3l/s/ha).
- The proposed surface water discharge rate of 5.8 L/s for all events up to and including the 1 in 100 year with 40% climate change rainfall event, is a significant betterment to existing brownfield rates by over 90%. Therefore, providing a betterment to the downstream sewer network capacity and reducing flood risk downstream.
- A pre-development enquiry has been sent to Thames Water for surface water and foul connections in which they have confirmed sufficient capacity.
- Future maintenance for any private drainage systems would be under the responsibility of the Site owner or an appointment management company, these matters will be agreed pre-commencement.

This Flood Risk Assessment and Drainage Strategy demonstrates that the residual flood risks are manageable over the lifetime of the Proposed Development. The proposals are deemed to be 'safe' and sustainable in flood risk terms and in line with the requirements of local and national policies and guidance. The proposed Drainage Strategy is in line with local and National Standards, providing a betterment to the existing site's drainage regime and reduces risk of flood risk off-site.

A previous Flood Risk Assessment and Drainage Strategy was submitted (2023) with the previous revision of the scheme, and the LLFA raised no objections subject to two standard conditions in relation to SuDS. The revised FRA and DS provides an updated assessment and strategy for the revised proposals aligning with the principles of the previously accepted strategy.

Appendices

A. Site Location Plan



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Key

- Extent of Application Site
- Existing Retail Units

Notes

- All levels should be interpreted as AOD.

Planning Submission	22/08/25	JCo	P2
Planning Submission	31/05/23	ST	P1
Description	Date	Chk	Rev

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Title
Parameter Plan 03
Existing Site Levels Plan

Status

Planning

Drawn	Date	Scale @ ISO A1	Job Number
SQP	22/05/23	1:500	18111
Drawing Number			Revision
18111-SQP-ZZ-GF-DR-A-PL00003			P2

B. Proposed Layouts

Appendices

Kings Meadow View

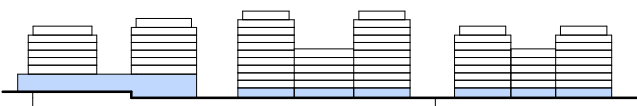
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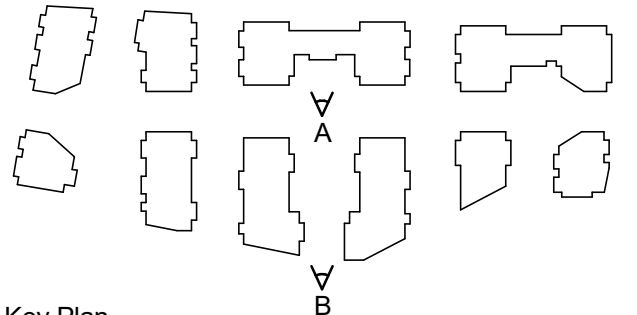


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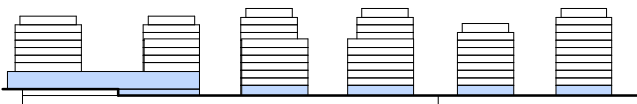
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Elevation A



Key Plan



Elevation B

Key:

- Refuse Store
- Bike Store
- Entrance
- Retail
- Units
- Delivery / Post Room
- Fire Escape

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Title

Ground Floor Illustrative Plan

Status

S2 - Issued for Information

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SQP 22/08/25 1:500 18111

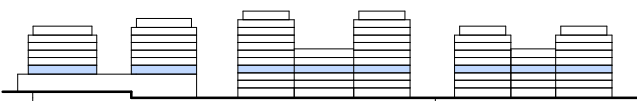
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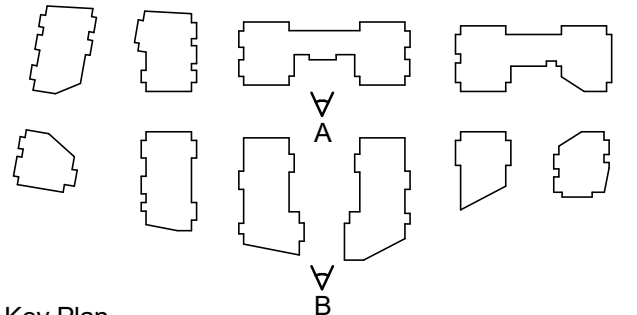
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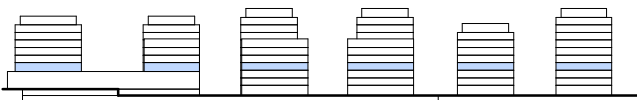
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Elevation A



Key Plan



Elevation B

- Key:
- Refuse Store
 - Bike Store
 - Entrance
 - Retail
 - Units
 - Delivery / Post Room
 - Fire Escape

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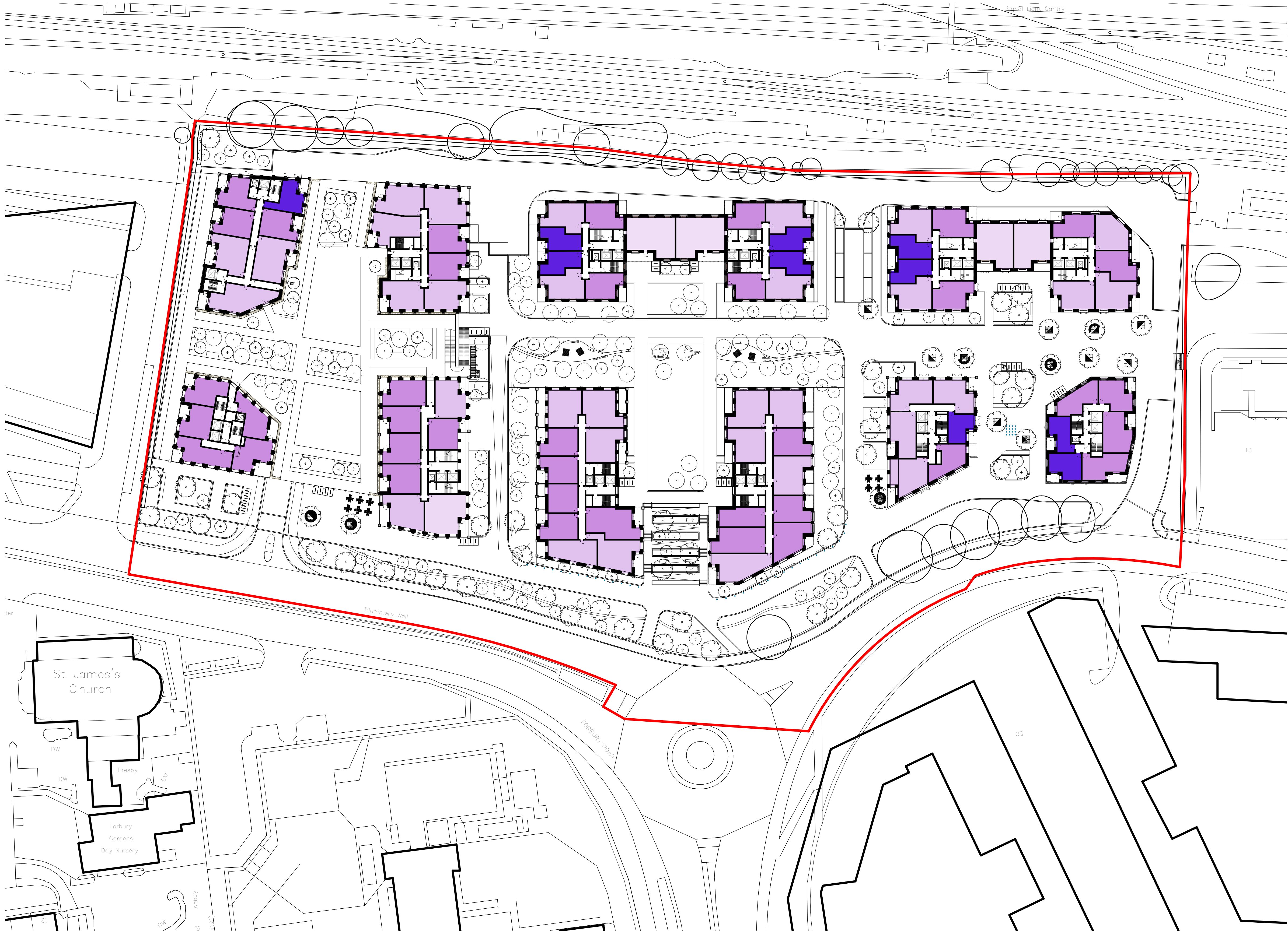
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Title
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Status
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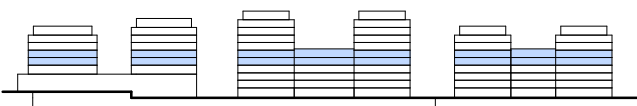
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Drawing Number	Revision
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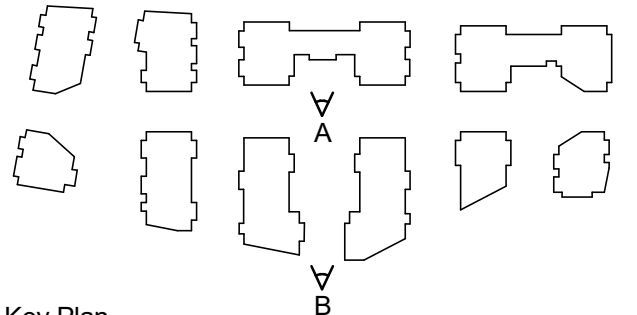


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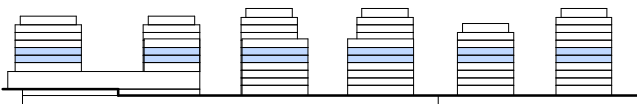
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Elevation A



Key Plan



Elevation B

- Key:
- Refuse Store
 - Bike Store
 - Entrance
 - Retail
 - Units
 - Delivery / Post Room
 - Fire Escape

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Title
Level 04 & Level 05 Illustrative Plan

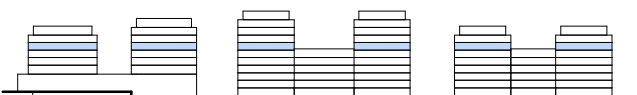
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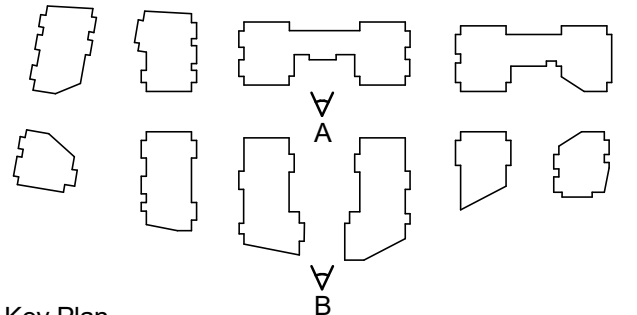
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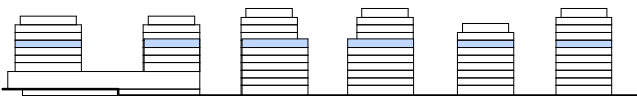
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Elevation A



Key Plan



Elevation B

- Key:
- Refuse Store
 - Bike Store
 - Entrance
 - Retail
 - Units
 - Delivery / Post Room
 - Fire Escape

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Title
Level 06 Illustrative Plan

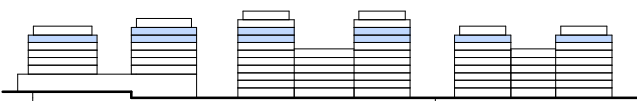
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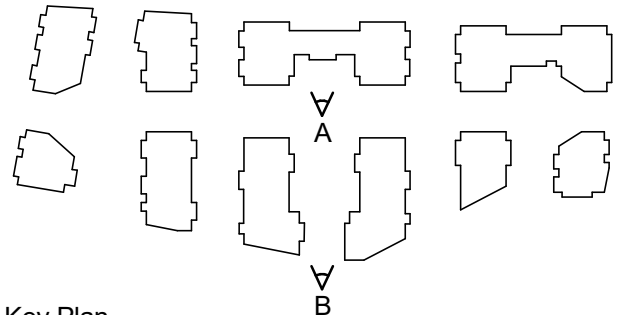
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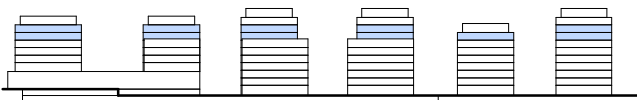
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Elevation A



Key Plan



Elevation B

- Key:
- Refuse Store
 - Bike Store
 - Entrance
 - Retail
 - Units
 - Delivery / Post Room
 - Fire Escape

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Title
Level 07 Illustrative Plan

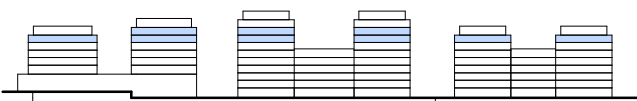
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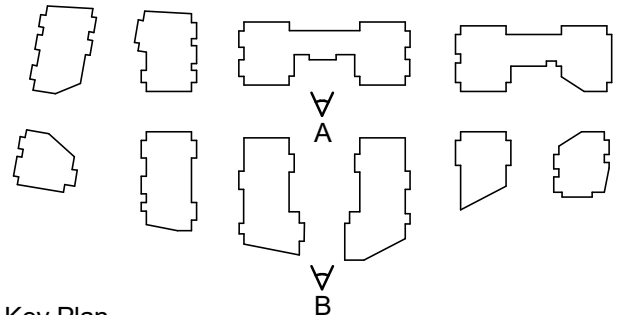
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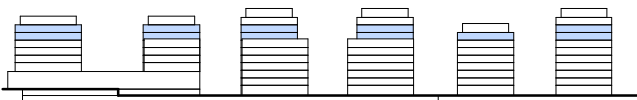
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Elevation A



Key Plan



Elevation B

- Key:
- Refuse Store
 - Bike Store
 - Entrance
 - Retail
 - Units
 - Delivery / Post Room
 - Fire Escape

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Description	Date	Chk	Rev
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Title
Level 08 Illustrative Plan

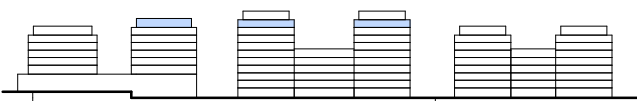
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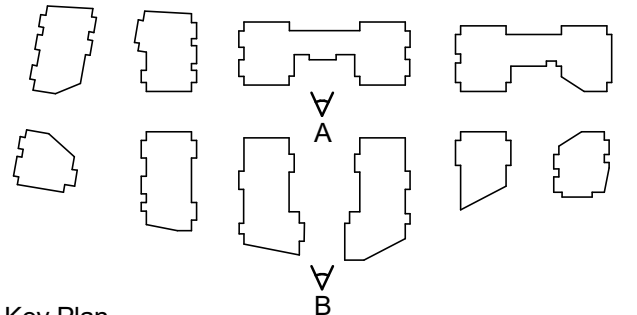
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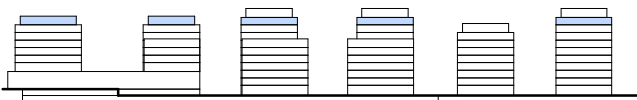
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Elevation A



Key Plan



Elevation B

- Key:
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 - Bike Store
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 - Retail
 - Units
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 - Fire Escape

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Level 09 Illustrative Plan

Status
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Drawing Number	Revision
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