



# FLOOD RISK ASSESSMENT

22&24 St.Annes Road, London Colney, AL2 1LJ

Reference: 497 FRA-v1

Jul-24



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## Report Limitations

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## Purpose of this report

- 1.1 Urban Water has been appointed to undertake a Level 2 – Scoping Study Flood Risk Assessment for a development located at AL2 1LJ.

## Objectives

- 1.2 The objectives of this FRA are to demonstrate the following:
- Whether the proposed development will likely be affected by current or future flooding.
  - Whether the proposed development will increase flood risk elsewhere.
  - Whether the flood risks associated with the proposed development can be satisfactorily managed.
  - Whether the measures proposed to deal with the flood risk are sustainable.

## Documents Consulted

- 1.3 To achieve these objectives, the following documents have been consulted and referenced:

The National Planning Policy Framework (NPPF)  
CIRIA C753 document The SuDS Manual, 2015  
Local Flood Risk Management Strategy (LFRMS)  
Level 1 Strategic Flood Risk Assessment (SFRA)  
Aerial photographs and topographical survey of the site  
British Geological Society Records  
Local Council flood Maps  
Environment Agency flood maps  
The CIRIA publication 'C635 Designing for exceedance in urban drainage Good practice'



## Development Site and Location

- 2.1 The site is located at St. Annes Road, London Colney. The nearest postcode is AL2 1LJ. Refer to appendix A for site location plan.
- 2.2 The current use of the site is occupied by two dwellings. The current use vulnerability classification of the site is More vulnerable . The site is located in the River Flood Zone 3. Refer to Appendix B for more details.

## Development Proposals

- 2.3 The proposed development includes the demolition of the two buildings and construction of five homes. Refer to Appendix B for the layout of the proposed development.
- 2.4 The vulnerability classification of the proposed development is More vulnerable with an estimated lifetime between 50 and 100 years.

## Site Hydrology and Hydrogeology

- Hydrology 2.5 The River Colne is located approximately 200 m away from the development.
- Aquifer 2.6 The development is located within a secondary aquifer type A. Aquifers type A consist of permeable layers capable of supporting water supplies at a local rather than strategic scale. They are generally aquifers formerly classified as minor aquifers.
- Source Protection Zone 2.7 The site is located within the source protection zone 2. This zone is defined by a 400 day travel time from a point below the water table. This zone has a minimum radius of 250 or 500 metres around the source.
- Groundwater Levels 2.8 The ground water levels for this site are unknown.

## Site Geology

- Bedrock 2.9 The British Geological Survey records of the site show that it is located within



the Lewes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated) - Chalk.

Superficial Deposits 2.10 The British Geological Survey records show that the superficial deposits are River Terrace Deposits (Undifferentiated) - Sand and Gravel.



## National Planning Policy Framework (NPPF)

- 3.1 The NPPF and its technical guidance is a set of planning policies with the key objective of contributing to sustainable development. As part of it, they ensure that flood risk and sustainability are considered during the planning process. This ensures that developments are not located in flood risk areas and directs developments to lower risk areas. The NPPF applies a sequential risk-based approach to determining land suitability for development in flood risk areas. The NPPF also encourages developers to seek opportunities to reduce the overall level of flood risk through the development layout and the application of Sustainable Drainage Systems (SuDS).

## The Flood and Water Management Act (2010)

- 3.2 The Flood and Water Management Act aims to reduce the flood risk associated with extreme weather events. It provides robust flood risk management for people, homes and businesses and encourages using SuDS for developments. A robust SuDS strategy should consider the recommendations in this Flood Risk Assessment.

## Strategic Flood Risk Assessment (SFRA)

- 3.3 Planning policy with regard to development and flood risk in the area is detailed in the Strategic Flood Risk Assessment (SFRA) which was published in 2007. The proposed development site is located within the administrative boundary of the Dacorum Borough Council, St. Albans City & District Council, Three Rivers District Council, Watford Borough Council.
- 3.4 The SFRA commits to direct new development to locations at the lowest flood risk. The SFRA provides information on the levels and flood hazards that could result from flooding. The Environment Agency flood zone maps and the SFRA ignore the presence of existing flood defences when defining the potential extent of flooding.
- 3.5 This report follows the guidance given in the Strategic Flood Risk Assessment by evaluating the flood risk and providing relevant flood mitigation.



4.1 The NPPF guidance states that the sequential test "is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. This means avoiding, so far as possible, development in current and future medium and high flood risk areas considering all sources of flooding including areas at risk of surface water flooding."

## Applicability of the Sequential Test

4.2 The flood risks were determined by identifying all the sources of flooding and assessing their possible impact and likelihood to development. It is confirmed that the development is:

- In Flood Zone 3, based on the Planning Flood Risk Map
- In Flood Zone 3, based on the Flood Level information Provided by the Environment Agency
- At Low risk of surface flooding
- At medium risk of groundwater flooding
- Outside of a critical drainage area
- Outside of an area with sewer flooding

4.3 Due to the flood risk on the development, a sequential test is required. For this development, the sequential assessment was completed for the area within the red line of the planning application. The development has been located at the lowest flood risk. Regarding looking at other reasonably available sites, it is unlikely that other areas are available in lower flood risk probability as the development is small and can only be located within the proximity of the existing land use and land ownership. It is concluded that the current proposals pass the sequential test.



## Exception Test

- 4.4 Fluvial flood risk was assessed using the Environment Agency Flood Zone Maps and the sequential risk-based approach recommended in the NPPF guidance. The exception test requirement considers the flood risk vulnerability of land uses about the flood zone categorisation. These parameters are assessed to determine whether the development requires an exception test or is inappropriate.
- Step 1**  
Flood Zone  
categorisation
- 4.5 The proposed development falls within The Environment Agency (EA) Flood Zone 3. The Flood Zone 3 is considered to have a high probability of flooding with a 100 years or greater annual probability or >1%AEP.
- Step 2**  
Flood risk vulnerability
- 4.6 Within Table 2 (Flood Risk Vulnerability Classification) of the NPPF Planning Practice Guide, the proposed development is classified as 'More vulnerable '.
- Step 3**  
Flood Zone  
incompatibility
- 4.7 The Flood Risk vulnerability and Flood Zone incompatibility table of the NPPF Planning Practice Guide states that More vulnerable developments are required to pass the Exception Test in this area.

### The Exception Test

- 4.8 The development requires passing the Exception Test. To pass the exception test, they should be demonstrated the following:
- (a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and
  - (b) 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 exception test should be satisfied for development to be allocated or permitted.





- 4.9 The development reduces flood risk to the wider community through the provision of or financial contribution to flood risk management infrastructure. It also offers multifunctional Sustainable Drainage Systems that integrate with green infrastructure, significantly exceeding the National Planning Policy Framework policy requirements for Sustainable Drainage Systems.
- 4.10 The development reduces the flood risk overall and demonstrates that the measures go beyond just managing the flood risk resulting from the development. Reductions could be achieved, for example by:
- Incorporating green infrastructure within the layout and form of development to make additional space for the flow and storage of flood water;
  - Providing Sustainable Drainage Systems that manage flood risk beyond the proposed site and above the usual standard, such as by removing surface water from existing combined sewers;
  - Providing or making contributions to flood risk management infrastructure that will provide additional benefits to existing communities and/or safeguarding the land needed to deliver it.
- 4.11 The following sections of this flood risk assessment demonstrate that the proposed development can be safely established with an adequate standard of flood protection, including allowance for climate change, and that proposed surface water management provisions may contribute to the reduction in flood risk elsewhere. On this basis, it is concluded that the proposed development passes the Exception Test.



- 5.1 The development has been assessed for the following potential flood risks, river and tidal flood risk, surface water flooding, flooding from groundwater, reservoir flood risk and drainage systems.

## Flood Defence and Historic Flooding

- 5.2 The Environment Agency records show that the site does not benefit from flood defences. They also show that the area around the site has not been flooded in the past. See Appendix C for details.

## Flooding from river and sea

- 5.3 The site is affected by River Flooding. The proposed development falls within The Environment Agency (EA) Flood Zone 3. The Flood Zone 3 is considered to have a high probability of flooding with a 100 years or greater annual probability or >1%AEP.
- 5.4 The climate change allowance has been taken from the EA peak river flow map. The vulnerability of the development, the design life of the building, and the flood zone classification were used to determine it. The climate change allowance for this site is 21%. The nearest climate change allowance of 26% provided by the EA was used as the most representative to complete this assessment.
- 5.5 The levels provided by the Environment Agency are shown in table 1 below. Further details are provided in Appendix D.

### Flood levels in site

Return Period	Flood Level (m AOD)
1 in 20 (5%)	NIL
1 in 50 (2%)	65.95
1 in 100 (1%)	65.97
1 in 100 + 26%(CC)	66.03
1 in 1000 (0.1%)	66.14



- 5.6 The river flood risk level is 66.03m AOD. This level is 0.03 m higher than the estimated average site level.

## Surface water (overland flows) flood risk

- 5.7 The Environment Agency maps show that the flood risk from surface water is low. A residual risk of localised shallow ponding remains likely. The Environment Agency surface water flood risk maps are defined by applying a specific procedure based on digital terrain models and assumptions regarding infiltration and urban drainage losses. The surface water flood maps are determined by the Environment Agency as follows:

- 5.8 *"The nationally produced surface water flood mapping only indicates where surface water flooding could occur due to local rainfall. It does not fully represent flooding that occurs from:*

- Ordinary watercourses
- Drainage systems or public sewers caused by catchment-wide rainfall events
- Rivers
- Groundwater

*Due to the modelling techniques, the mapping picks out depressions in the ground surface. It simulates some flow along natural drainage channels, rivers, low areas in floodplains, and flow paths between buildings. Although the maps appear to show flooding from ordinary watercourses, they should not be taken as definitive mapping of flood risk from these as the conveyance effect of ordinary watercourses or drainage channels is not explicitly modelled. Also, structures (such as bridges, culverts and weirs) and flood risk management infrastructure (such as defences) are not represented.*

*The nationally produced surface water flood mapping does not consider the effect of pumping stations in catchments with pumped drainage. No allowance is made for tide locking, high tidal or fluvial levels where sewers cannot discharge into rivers or the sea."*

- 5.9 The strategic flood risk for the Dacorum Borough Council, St. Albans City & District Council, Three Rivers District Council, Watford Borough Council confirms that the flood risk for the site is Low. The surface water flood data has not been produced to determine the flood levels at individual properties. This data does not contain the climate change allowances for depth levels.



Therefore, the Design flood level given below is an assumption. The new development may have greater or lower surface water flood depths.

- 5.10 Based on the Environment Agency and the Strategic flood risk assessment's surface water mapping, together with the presence of surface water drainage systems at the site and surrounding area, it is concluded that the site is at Low risk of flooding from surface water sources. The depth of water is potentially between 300mm and 900mm. For this assessment, a depth of water of 0.6m with a climate change allowance of 0.15m has been taken as the most appropriate depth to the site. The average ground level at the site is 66m AOD. The surface water flood level on this site could be in the region of 66.53m AOD.

### **Flooding from drainage systems in adjacent areas**

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- 5.11 The council records have been reviewed. The flooding from drainage incidents maps were not found in the Strategic Flood Risk Assessment. Therefore, for the purpose of this report, it has been assumed that the risk of flooding from drainage systems is low.

### **Reservoirs Risks**

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- 5.12 The Reservoir Flood Map (RFM) produced by the Environment Agency do not show the risk to individual properties of dam breach flooding. The maps do not indicate or relate to any particular probability of dam breach flooding. The maps were prepared for emergency planning purposes. They can be used to help reservoir owners produce on-site plans, and the Local Resilience Forum produce off-site plans and to prioritise areas for evacuation/early warning in the event of a potential dam failure. The RFM shows that the development could be outside of the possible dam breach flooding path. See Appendix C.

### **Groundwater flood risk**

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- 5.13 The British Geological Survey's flood risk susceptibility maps show that the development has the potential for groundwater flooding below ground level.



Groundwater levels vary seasonally and are influenced by ground and meteorological conditions and proximity to water features. The groundwater flooding risk for this site is considered to be medium. It is recommended that further site investigation is undertaken to confirm this risk. Refer to Appendix C for record drawings.

### Critical Drainage Areas

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- 5.14 The Strategic Flood Risk Assessment was reviewed as part of this assessment. However, it does not show the critical drainage areas within the council. For this report, it has been assumed that the site is outside of a notified critical drainage area.



6.1 The Flood hazard assessment has demonstrated that the site is:

- In Flood Zone 3, based on the Planning Flood Risk Map
- In Flood Zone 3, based on the Flood Level information Provided by the Environment Agency
- At Low risk of surface flooding
- At medium risk of groundwater flooding
- Outside of a critical drainage area
- Outside of an area with sewer flooding

6.2 Under the NPPF it is necessary to demonstrate that, for any new development on the site, it is possible to provide an adequate level of flood protection for personnel working or living at the development.

## Design Flood Level

6.3 The design flood level is the maximum estimated water level during the design storm event including an allowance for climate change in line with current best practice and the national planning policy guidance.

6.4 The Design Flood Level for this development has been determined by evaluating the levels from the Pluvial/Sea, Surface Water and Groundwater flood levels.

6.5 For this site, the Design Flood Level is 66.53m AOD. This is the highest level and corresponds to the Surface Water Flood Level.

## Flood Protection

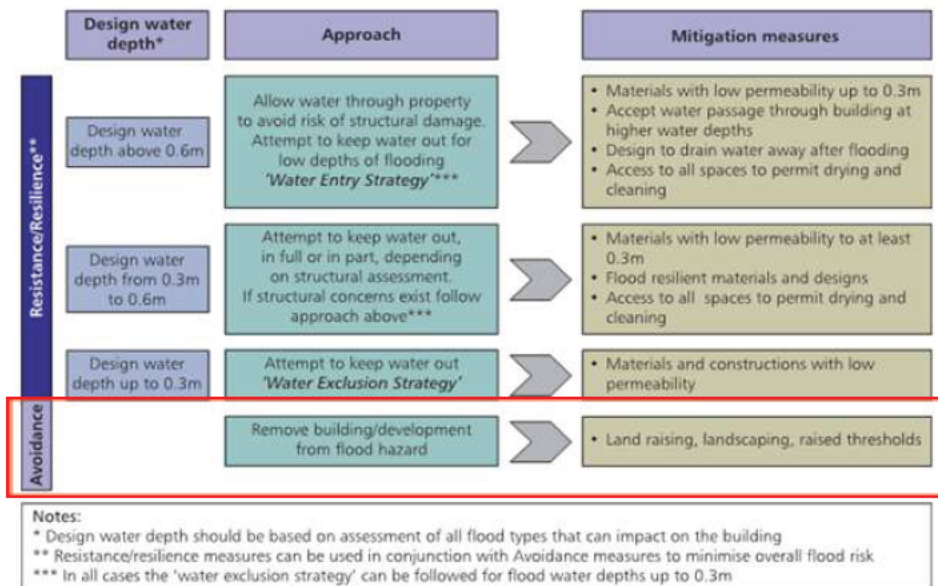
6.6 The National Planning Guidance standing advice and Environment Agency recommends that where possible, flood avoidance is provided by establishing the development's finished floor level 600mm above (freeboard) the design flood level. However, this level can be reduced if there is a high level of certainty about the estimated flood level. For this site the estimated free board has been estimated to be 0.3m above the Design Flood Level due to the quality of the flood risk information



available and the type of risk. The finished floor should be 66.83m AOD. It would involve a height differential of 0.83m. This is the distance between the average external level (66m AOD) and the potential Finished Floor Level.

- 6.7 It is possible to achieve this FFL.. A finished level of 66.83m has been proposed. This level is as per the flood avoidance approach calculations. Therefore, the following flood mitigation interventions should be provided.
  
- 6.8 The flood mitigation strategies for the development has been based on the CLG 2007 Improving the Flood Performance of New Buildings. See the figure below for the strategy highlighted in red. The strategy is based on the water level within the proximity to the building.

**Rationale for flood resilient and/or resistant design strategies**



## Flood resilience characteristics of building materials (based on laboratory testing)

Material	Resilience characteristics*		
	Water penetration	Drying ability	Retention of pre-flood dimensions, integrity
<b>Bricks</b>			
Engineering bricks (Classes A and B)	Good	Good	Good
Facing bricks (pressed)	Medium	Medium	Good
Facing bricks (handmade)	Poor	Poor	Poor
<b>Blocks</b>			
Concrete (3.5N, 7N)	Poor	Medium	Good
Aircrete	Medium	Poor	Good
<b>Timber board</b>			
OSB2, 11mm thick	Medium	Poor	Poor
OSB3, 18mm thick	Medium	Poor	Poor
<b>Gypsum plasterboard</b>			
Gypsum Plasterboard, 9mm thick	Poor	Not assessed	Poor
<b>Mortars</b>			
Below d.p.c. 1:3(cement:sand)	Good	Good	Good
Above d.p.c. 1:6(cement:sand)	Good	Good	Good

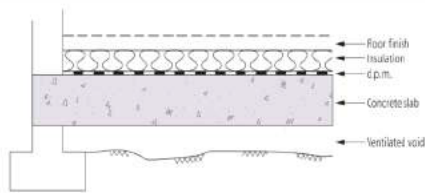
\*Resilience characteristics are related to the testing carried out and exclude aspects such as ability to withstand freeze/thaw cycles, cleanability and mould growth

- 6.9 New services and fittings (communications wiring, heating systems, electrical services, water, electricity and gas meters) should be placed at above the level of 67.13m AOD. All service entries should be sealed (e.g. with expanding foam or similar closed cell material).
  
- 6.10 Closed-cell insulation should be used for pipes. Sealed PVC external framed doors or good fit and sealed wooden frames should be used.
  
- 6.11 Hollow core timber internal doors should not be used unless sufficient flood warning is given, butt hinges, can be used to allow internal doors to be easily removed and stored.
  
- 6.12 Suspended concrete floor slab at least 150mm thick is the preferred option. Beam and Block slabs with geomembrane and 75mm min screed can also be used. There should be a minimum space of 150mm ventilated void between the ground level and the bottom of the floor slab. Damp proof membranes should be included in the design. Floor insulation should be of the closed-cell type. Under floor services using ferrous materials should be avoided. Ceramic/concrete-based floor tiles, sitting on a bed of sand, cement render and water resistant grout can be used. Ground-bearing slabs are also an option. See figures below.



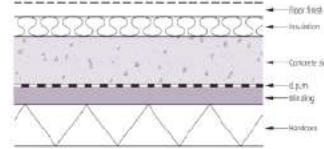


## Suspended Concrete Slab detail



- Reinforced concrete slab at least 150mm thick and complying with structural requirements for uplift forces
- Damp proof membrane of polythene at least 1200 gauge
- Insulation as rigid closed-cell material
- Ceramic tiles or stone floor finishes and including skirting boards.

## Ground bearing Concrete Slab detail

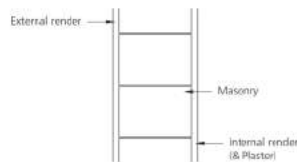


- Hardcore bed at least 100mm thick of well compacted (over material), bladed with fine inert material to provide a smooth base
- Damp proof membrane of polythene at least 1200 gauge
- Concrete slab at least 150mm thick
- Insulation as rigid closed-cell material
- Ceramic tiles or stone floor finishes and skirting boards.

6.13 Concrete blocks used in foundations should be sealed with an impermeable material or encased in concrete to prevent water movement from the ground to the wall construction. In new walls use extended periscope subfloor ventilators or fit removable airbrick covers; fix plasterboard sheets horizontally rather than vertically, or split sheets mid-height with a dado rail, to reduce the extent of replacement; specify lime- or cement-based renovating plasters or renders rather than gypsum-based, with water-resistant paint finishes. The use of water-proof, water-resistant or micro-porous surface coatings on masonry should be avoided as they can inhibit the drying-out of the building fabric.

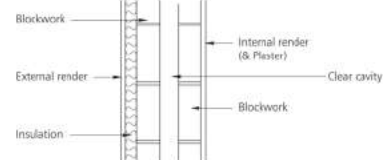
6.14 Good quality facing bricks or external renders with water-repellent properties can be used for the external face. See the examples below of external walls that can be used.

## Solid External Wall



- External cement based render, preferably with lime content. Composition depends on masonry. The following mixes have good resilient properties:
  - 1 cement : 6 sand on bricks;
  - 1 cement : 4 sand : 1/2 lime on concrete blockwork or bricks;
  - 1 cement : 6 sand : 1 lime on Aircrete blocks.
- Masonry with minimum thickness of 300mm (thin mortar joint construction using Aircrete blocks is effective as demonstrated in laboratory tests) or alternatively reinforced concrete wall
- Internal cement-based render, preferably with lime content. Composition depends on masonry, the following mix is effective for flood resilience:
  - 1 cement : 6 sand : 1 lime on Aircrete.
- Apply external and internal renders, following good practice guidance, ensuring minimum total thickness of 20mm and at least two coats.
- Use external insulation in preference to internal insulation.

## Cavity External Walls – Clear cavity

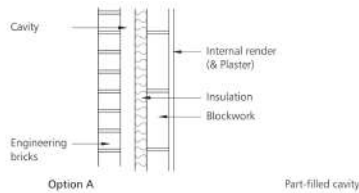


### Clear cavity

- External cement based render, preferably with lime content. Composition depends on masonry; the following mixes are effective for flood resilience:
  - 1 cement : 4 sand : 1/2 lime on concrete blockwork (or bricks);
  - 1 cement : 6 sand : 1 lime on Aircrete.
- Apply render following good practice guidance, ensuring minimum total thickness of 20mm and two coats.
- Internal cement based render, preferably with lime content. Composition depends on masonry. The following mix works well:
  - 1 cement : 6 sand : 1 lime on Aircrete.
- Stainless steel wall ties should be used to minimise corrosion and consequent staining.



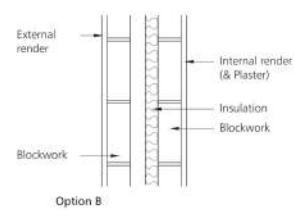
## Cavity External Walls- Part fill Option A



### Part-filled cavity – Option A

- External face consisting of engineering bricks up to required level for flood protection (up to 0.6m maximum above floor level plus one course). Other external facing materials can be used above this level, but ensure interface is watertight.
- Rigid insulation.
- Internal face consisting of blocks.
- Internal cement based render, preferably with lime content. Composition depends on masonry; the following mix is effective:
  - 1 cement : 6 sand: 1 lime on Aircrete.
- Ensure stainless steel wall ties are used to minimise corrosion and consequent staining.
- Sacrificial plasterboard can be used, but it needs to be removed between ground floor and flood level. The board should be fitted horizontally to make removal easier. In some cases a dado rail can be used to cover the joints.

## Cavity External Walls- Part fill Option B



### Part-filled cavity – Option B

- External cement based render, preferably with lime content. Composition depends on masonry; the following mixes are effective:
  - 1 cement : 4 sand: 1/2 lime on concrete blockwork
  - 1 cement : 6 sand: 1 lime on Aircrete.
- External face consisting of blocks.
- Rigid insulation.
- Internal face consisting of blocks.
- Internal cement based render, preferably with lime content. Composition depends on masonry; the following mix is effective for flood resilience:
  - 1 cement : 6 sand: 1 lime on Aircrete.
- Ensure stainless steel wall ties are used to minimise corrosion and consequent staining.

6.15 The general precautionary measures to mitigate the risk of groundwater flooding in this development, which is potentially below ground, are:

- Flow paths are provided around the proposed development, which groundwater will take in the event of groundwater emergence.
- It is proposed to add a tanking membrane up to 300mm above the ground level.

6.16 The Strategic Flood Risk Assessment shows that the site is outside of an area of sewer flooding, therefore no mitigation on sewer flood is required.

6.17 The Development Management Procedure Order (2015) requires that the Environment Agency is consulted on developments within Areas with Critical Drainage Problems (ACDPs). The Strategic Flood Risk Assessment does not show the development within a Critical Drainage Area.



7.1 The NPPF specifically stipulates that consideration should be given to potential off-site flood impacts of any proposed development. These off-site impacts are in relation to the following:

- Surface water management
- Flood flow conveyance, storage and climate change

### Surface Water Management

7.2 The surface water run-off will be disposed of using SuDS techniques. The aim is to provide a sustainable design that accommodates the proposed attenuation volume and replicates the existing drainage regime using the SuDS hierarchy, is shown in the figure below.

7.3 The Landis Top Soil classification is freely draining. The SuDS techniques highlighted in red below could be used on-site. This assessment is based on the LANDIS Top Soil infiltration, ground conditions and available potential discharge points.

The SuDS Hierarchy (Source:EA Thames region, SuDS a practical guide)

Most Sustainable	SUDS technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
	Living roofs	✓	✓	✓
	Basins and ponds - Constructed wetlands - Balancing ponds - Detention basins - Retention ponds	✓	✓	✓
	Filter strips and swales	✓	✓	✓
	Infiltration devices - soakaways - infiltration trenches and basins	✓	✓	✓
	Permeable surfaces and filter drains - gravelled areas - solid paving blocks - porous paviers	✓	✓	
Least Sustainable	Tanked systems - over-sized pipes/tanks - storms cells	✓		

7.4 With no increase in the rate of surface water discharge from the site, compared to the site in its current configuration, the proposed development



would have no adverse impact on surface water flood risk at the site or surrounding area. The SuDS should be designed at the detailed project stage.

### **Flood Flow conveyance and storage**

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- 7.5 The proposed development fully compensates for the flood volume taken from the flood zone. See Appendix D for details.
- 7.6 The new development contributes positively to the flood zone by increasing its capacity.



- 8.1 This flood risk assessment has identified the potential flooding mechanisms that could affect the site. As part of this, the following residual risks have been evaluated.

## Public safety and Site Access




- 8.2 This assessment has demonstrated that the proposed development will have no adverse impact on flood risk in the area surrounding the site. Available evidence indicates that the development would not change surface water generation. Therefore, there is no basis to indicate that, with respect to flood risk, the proposed development would adversely impact public safety.
- 8.3 It will be necessary to ensure that all building users are fully informed of procedures to be implemented during the threat of imminent flooding.

## Flood Warning and evacuation

- 8.4 The site is located outside an area covered by the Environment Agency Flood Alert service. It is recommended that a site-specific evacuation plan is provided.
- 8.5 The Flood Management and Evacuation Plan should be tailored to the site's use and be in place before the site's occupation. The paragraphs below give basic information on evacuation, and the table below shows the actions that will be taken for each flood warning.
- 8.6 Action to be taken in the event of an Alarm being Raised or a Flood Warning Received:
- Raise the alarm and evacuate the site following the established Fire Drill procedures. The main assembly is as per the main house fire drill assembly point.
  - Contact Emergency Fire Services (999) if necessary and Environment Agency Floodline: (0845 988 1188) if the event is unexpected.
  - If safe to do so, locate and turn off critical services, e.g. water, gas & electricity.
  - Follow the routes below to evacuate the site altogether.













## Actions that will be taken for each flood warning

Warning	Message	Timing	Action
 <b>FLOOD ALERT</b>	<p>Flooding is possible.</p> <p>Be prepared.</p>	2 hours to 2 days in advance of flooding.	<ul style="list-style-type: none"> <li>- Be prepared for flooding.</li> <li>- Prepare a flood kit.</li> </ul>
 <b>FLOOD WARNING</b>	<p>Flooding is expected.</p> <p>Immediate action required.</p>	Half an hour to 1 day in advance of flooding.	<ul style="list-style-type: none"> <li>- Act now to protect your property.</li> <li>- Block doors with flood boards or sandbags and cover airbricks and other ventilation holes.</li> <li>- Move pets and valuables to a safe place.</li> <li>- Keep a flood kit ready.</li> <li>- Move any critical equipment and information to a safe location</li> </ul>
 <b>SEVERE FLOOD WARNING</b>	<p>Severe flooding.</p> <p>Danger to life.</p>	When flooding poses a significant threat to life and different actions are required.	<ul style="list-style-type: none"> <li>- Be ready should you need to evacuate from the property.</li> <li>- Co-operate with the emergency services and call 999 if you are in immediate danger.</li> </ul>
<b>Warning Removed</b>	No further flooding is currently expected for your area.	Issued when a flood warning is no longer in force.	<ul style="list-style-type: none"> <li>- Flood water may still be around and could be contaminated.</li> <li>- If you've been flooded, ring your buildings and contents insurance company as soon as possible.</li> </ul>

## Useful local phone numbers

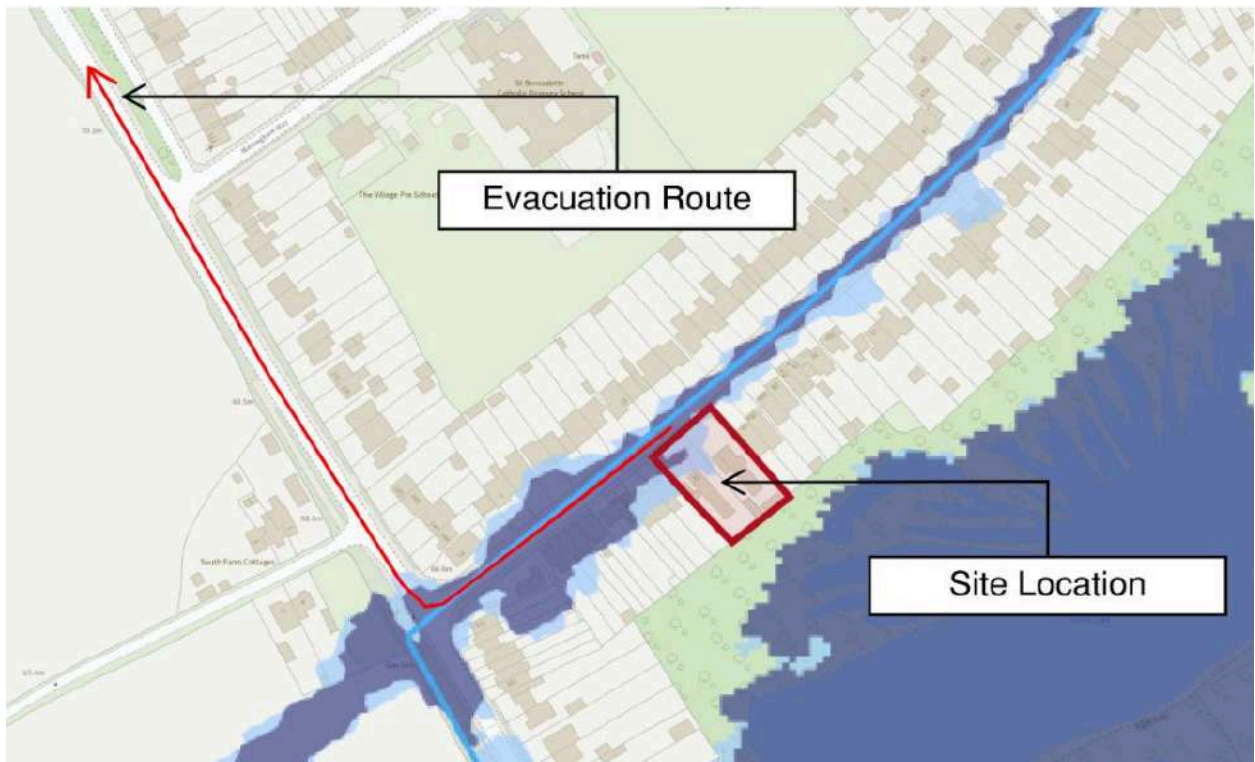
Please write your local phone numbers in the space provided below. Make sure they are easy to find in the event of a flood.

	Local authority:
	Local police:
	Gas and electricity company:
	Insurance company and policy details:
	Doctor:
	Pharmacy:
	Electrician:
	Gas safe engineer:
	Plumber:
	Builder:



8.7 Safe egress is achievable by following St. Annes Road up to Shenley Lane, which is shown to be beyond the extent of flooding. See figure below for details.

Evacuation Route



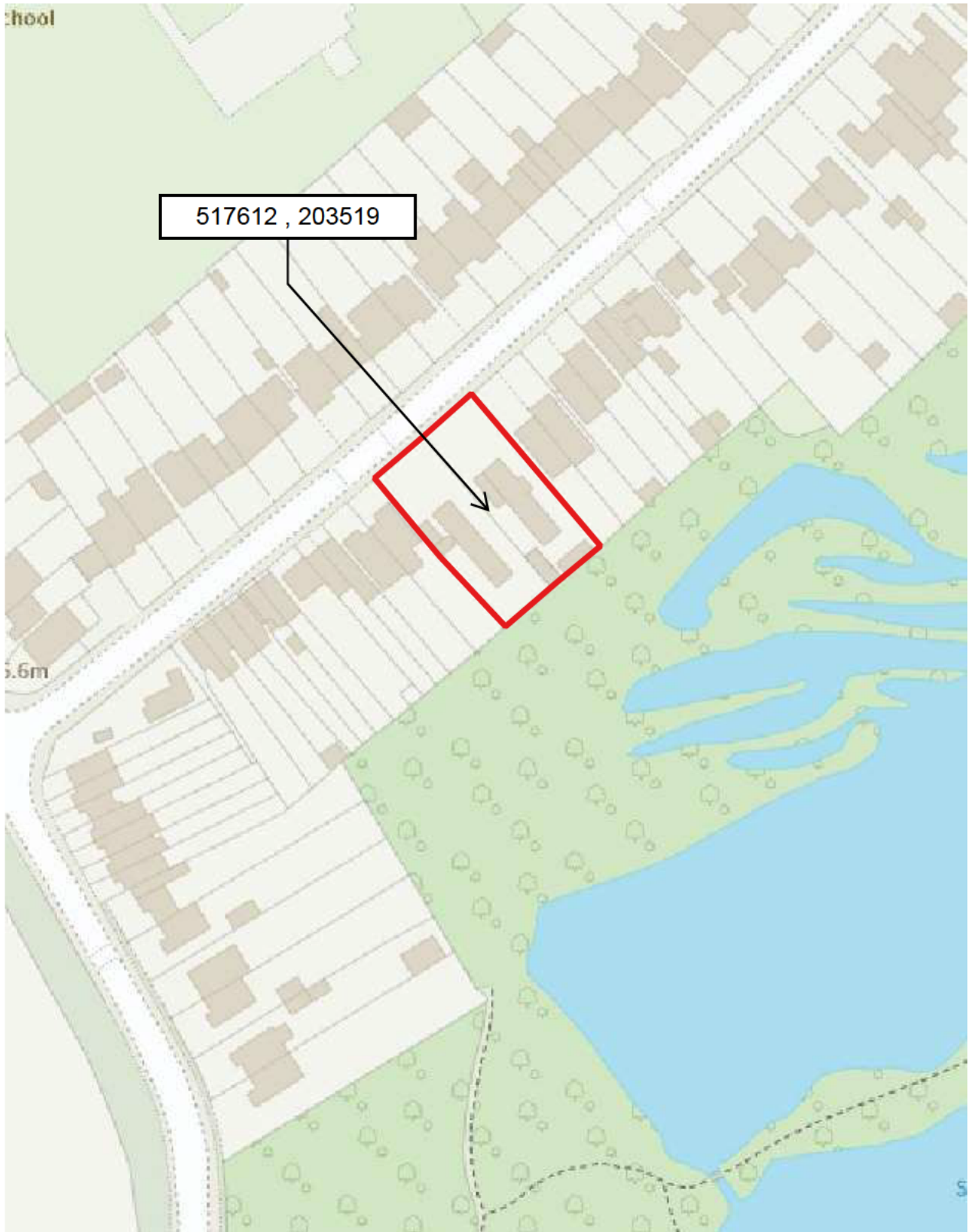
- 9.1 It is concluded that subject to the proposed mitigation measures, the site can be developed in accordance with the provisions of the NPPF and the requirements of the Environment Agency and the local planning authority.
- 9.2 This report demonstrates that the proposal will be safe, in terms of flood risk, for its design life and will not increase the flood risk elsewhere.
- 9.3 It is proposed that a formal Flood Warning and Emergency Response Plan is developed for the proposed development to communicate flood emergency response procedures to all the occupants of the site.
- 9.4 It is assumed that the development passes the sequential test. Further consultation with the local planning department is required to determine if additional information is required.







# Appendix A





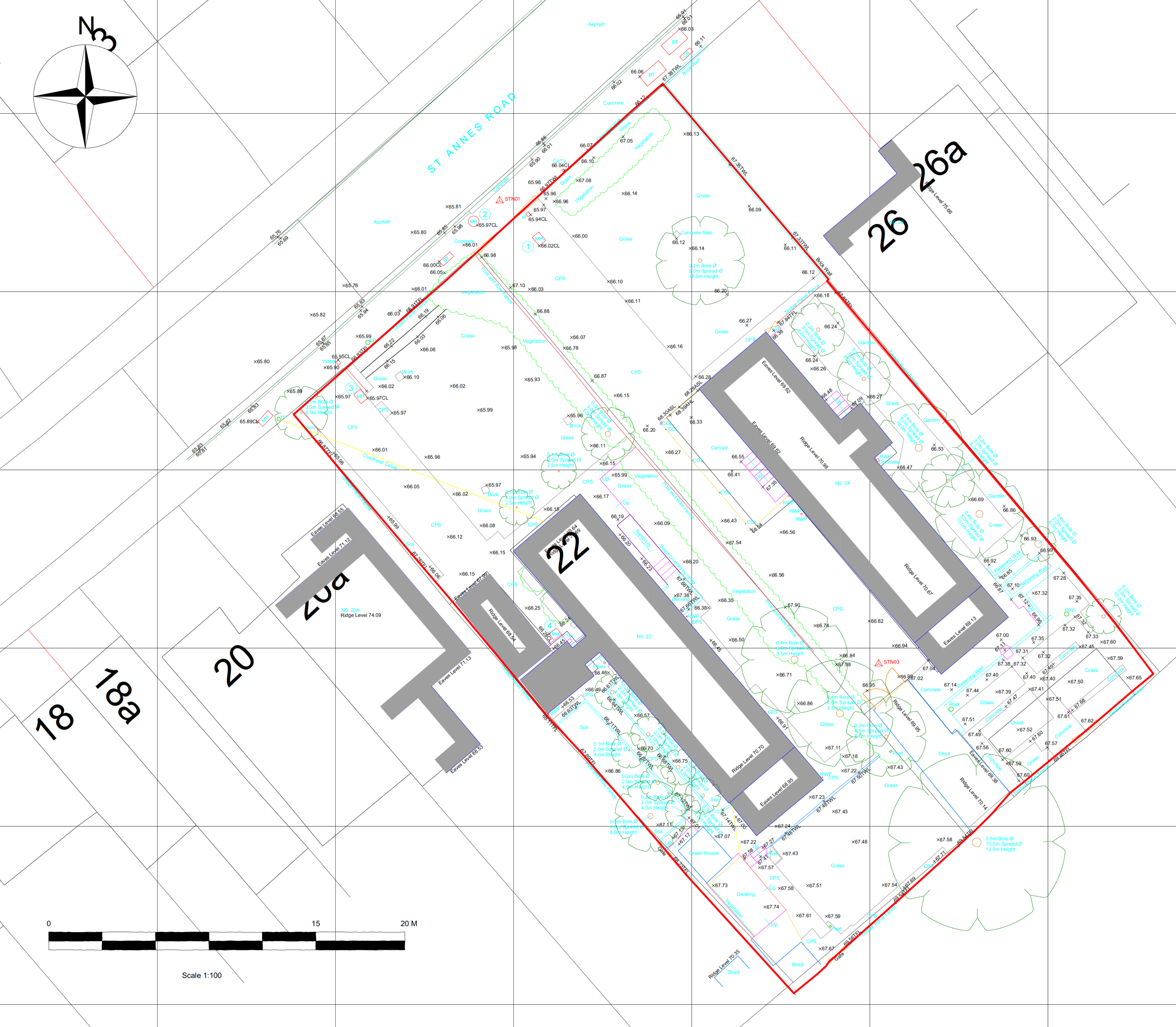
# Appendix B




MANHOLE SCHEDULE	
①	
②	65.97CL
③	65.97CL
④	66.28CL

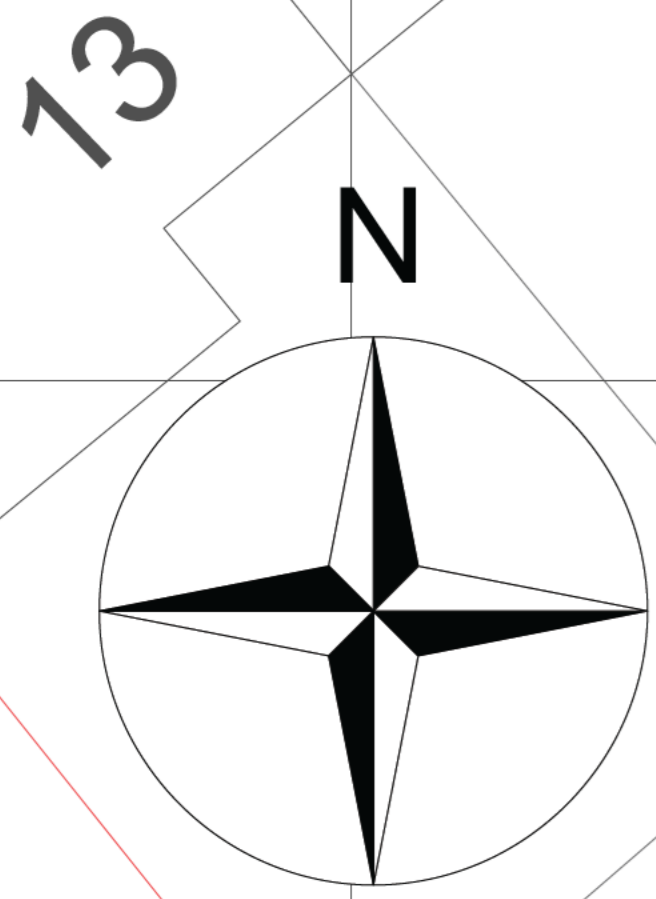


Scale 1:100



Planning

Project title		 <p><b>CHANTRY ARCHITECTS</b> Tel: 07147 024011 Email: graham.peel@chantryarchitects.com Web: www.chantryarchitects.com Plot: Chantry Cottage, 4 Waring Street, St Albans, Herts, AL1 2PT</p>
22&24 St. Annes Road, London Colney, AL2 1LJ		
Drawing title		
Existing Site Plan		
Drawing no.	23008su.1.01	
Scale	Date	Rev
1:100@A1	May 2024	-



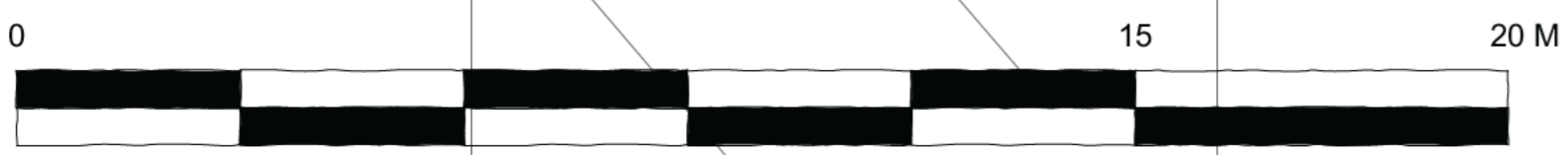
18 18a

20

20a

26 26a

ST ANNES ROAD

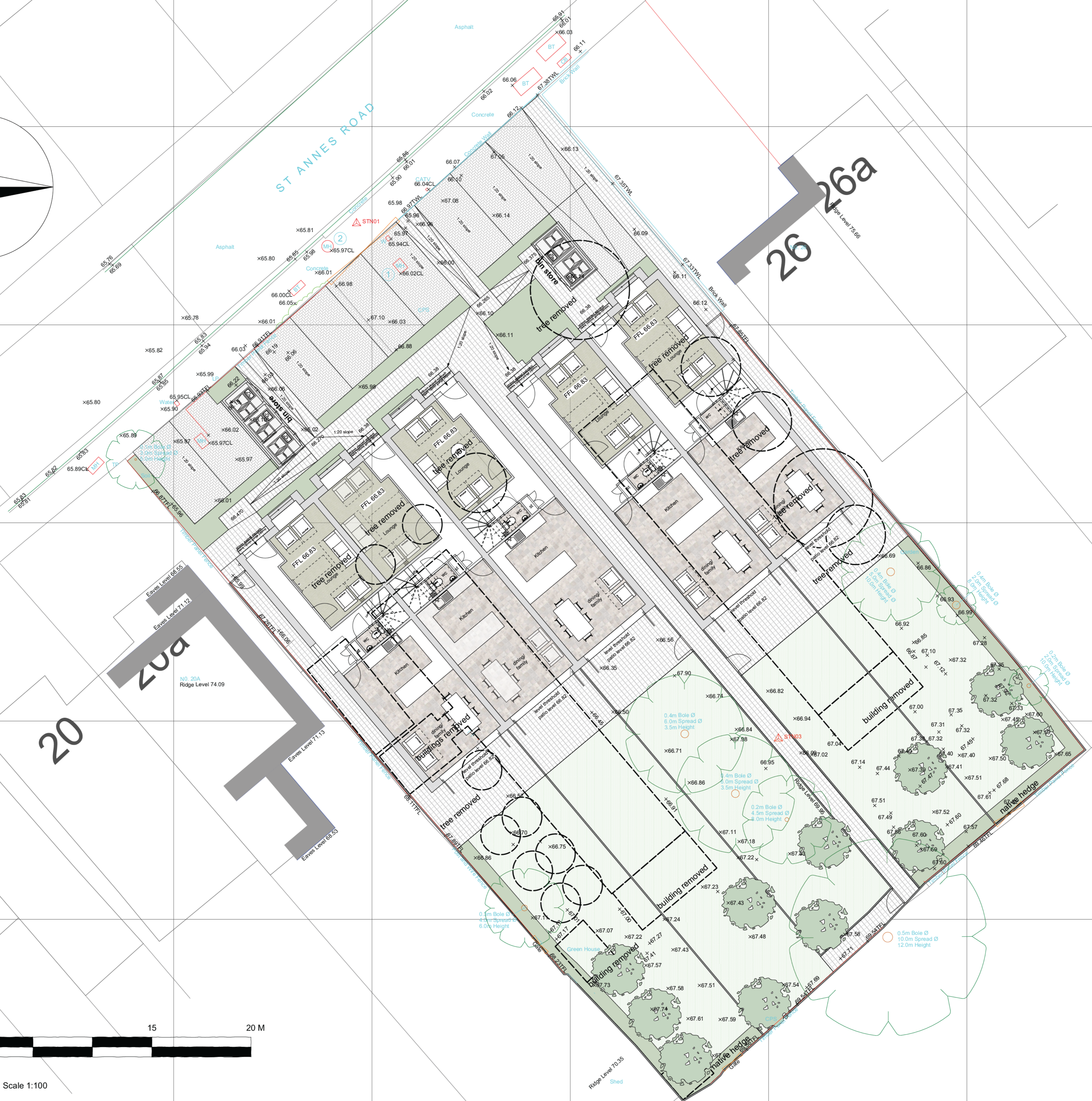


Scale 1:100

MANHOLE SCHEDULE	
①	
②	65.97CL
③	65.97CL
④	66.28CL

Materials Key

- Parking bays  
Permeable block paving
- Paths and Patios  
Permeable paving
- New lawn/ private garden area
- New Planting and hedging  
- refer to landscape Proposals
- New Tree  
- refer to landscape Proposals



Planning

Project title		22&24 St. Annes Road, London Colney, AL2 1LJ	
Drawing title		Proposed Site Plan	
Drawing no.	23008wd2.01		
Scale	1:100@A1	Date	May 2024
Rev			

**CHANTRY ARCHITECTS**  
 Tel: 01747 024611  
 Email: [graham.pee@chantryarchitects.com](mailto:graham.pee@chantryarchitects.com)  
 Web: [www.chantryarchitects.com](http://www.chantryarchitects.com)  
 Post: Chantry Cottage, 6 Watling Street, St. Albans, Herts, AL1 1PT



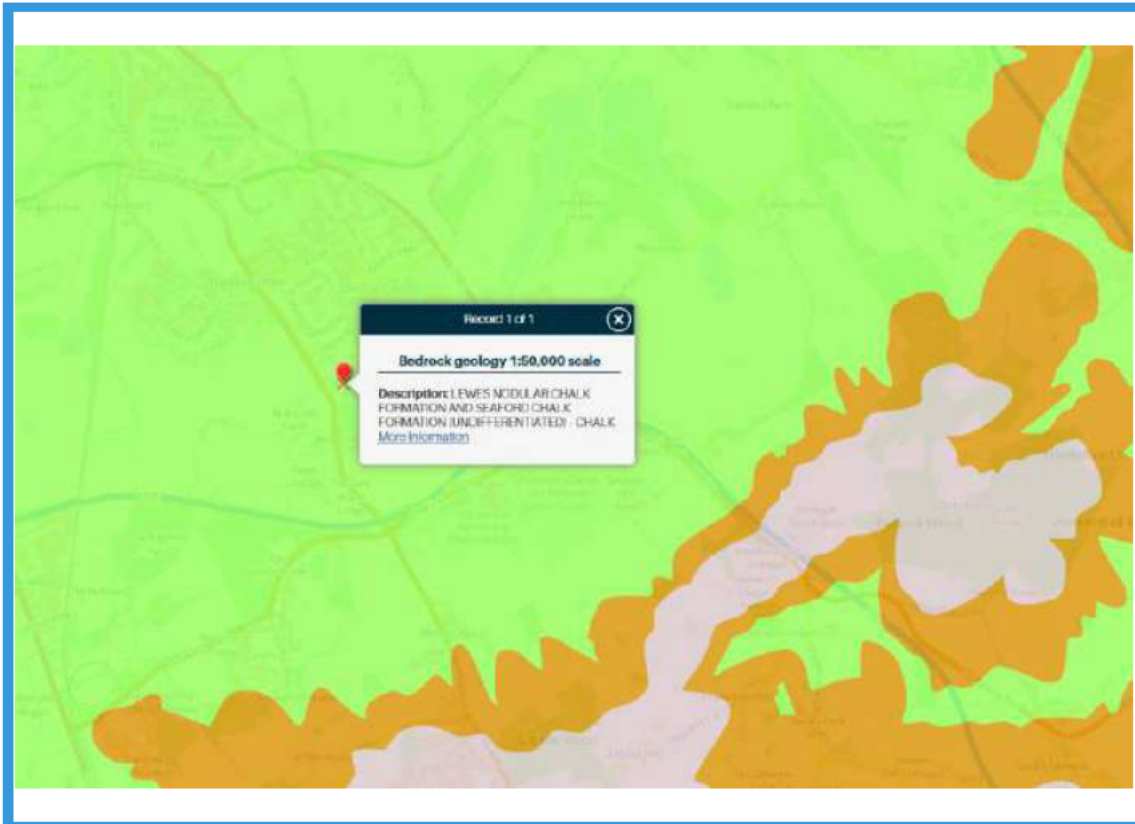
# Appendix C

# SITE GEOLOGY

**GEOINDEX  
ONSHORE**



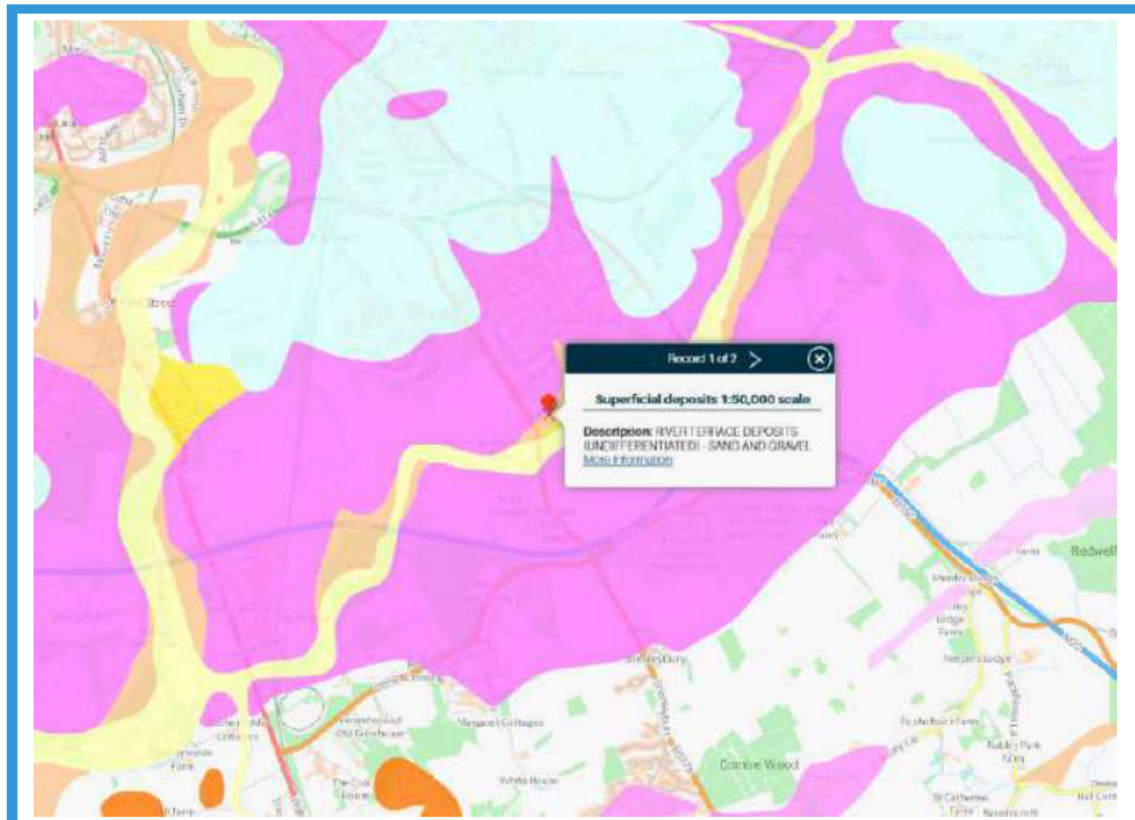
**GEOLOGY - BEDROCK - LEWES NODULAR CHALK FORMATION AND SEAFORD CHALK FORMATION (UNDIFFERENTIATED) - CHALK**

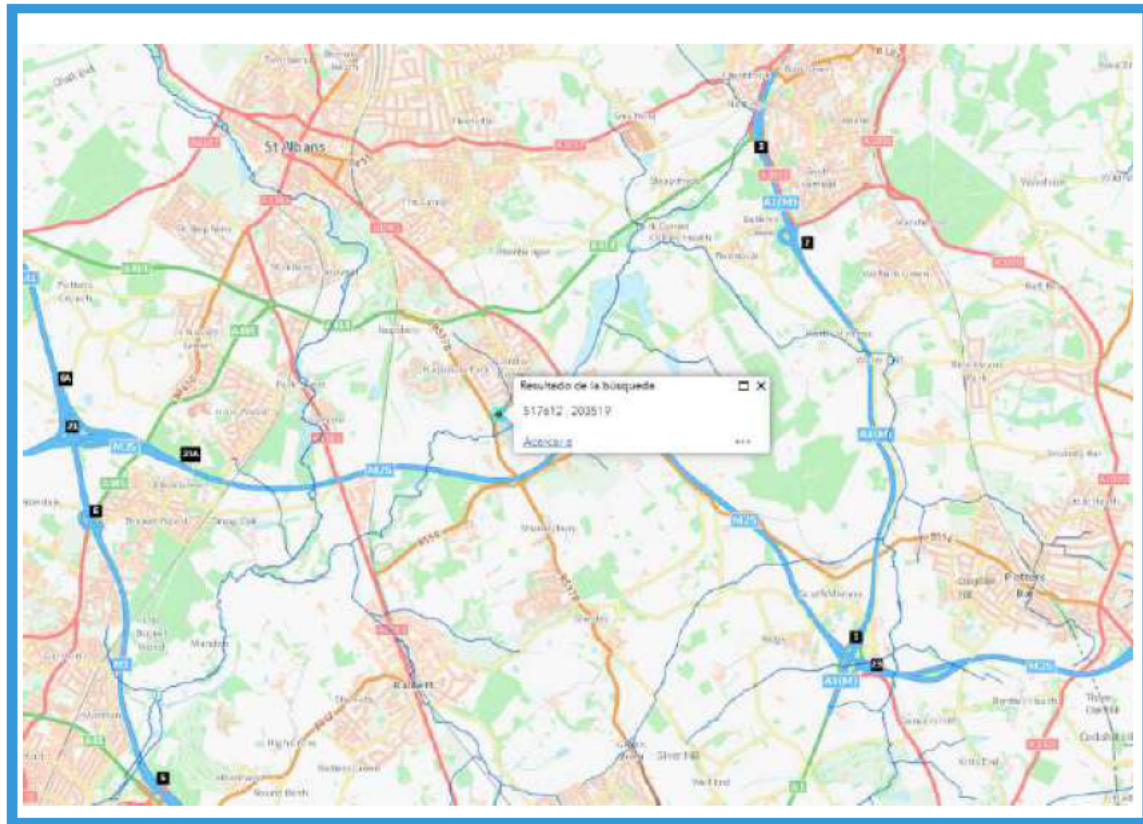



**GEOINDEX  
ONSHORE**




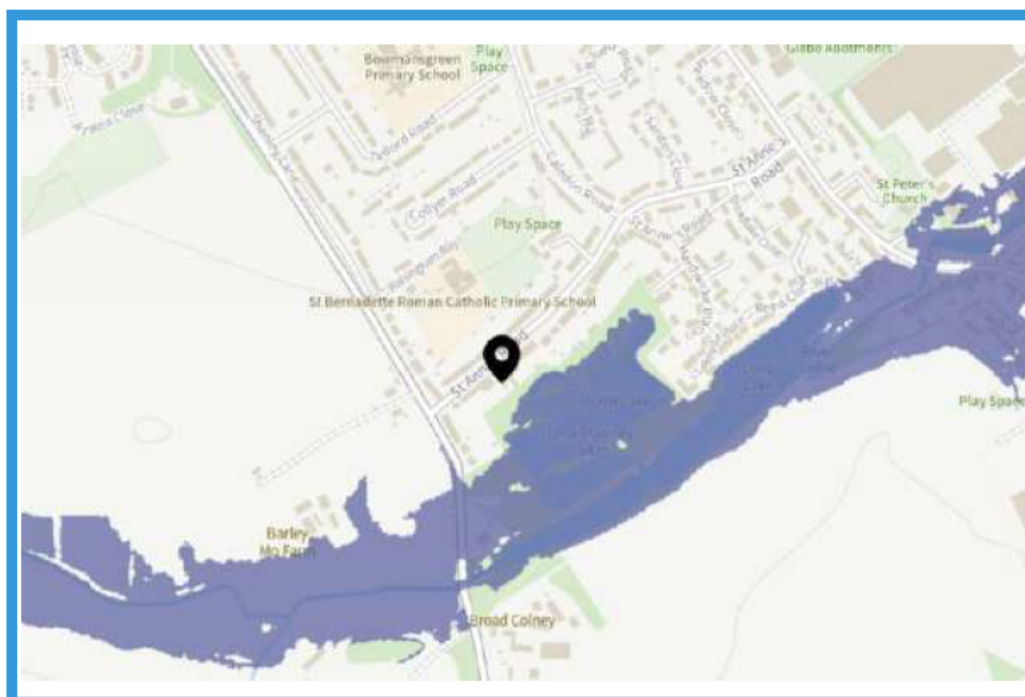
**GEOLOGY - SUPERFICIAL DEPOSITS - RIVER TERRACE DEPOSITS (UNDIFFERENTIATED) - SAND AND GRAVEL**







 Flood risk from reservoirs

 Extent of flooding



-  When river levels are normal
-  When there is also flooding from rivers

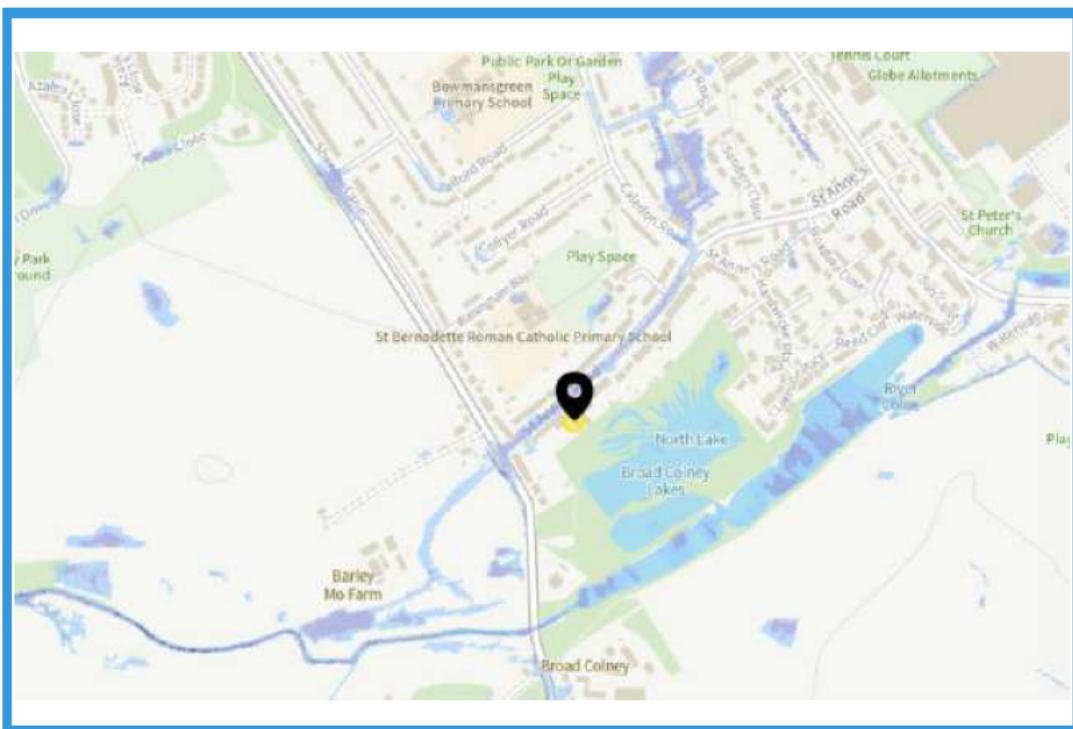


# SITE SURFACE WATER FLOOD RISK

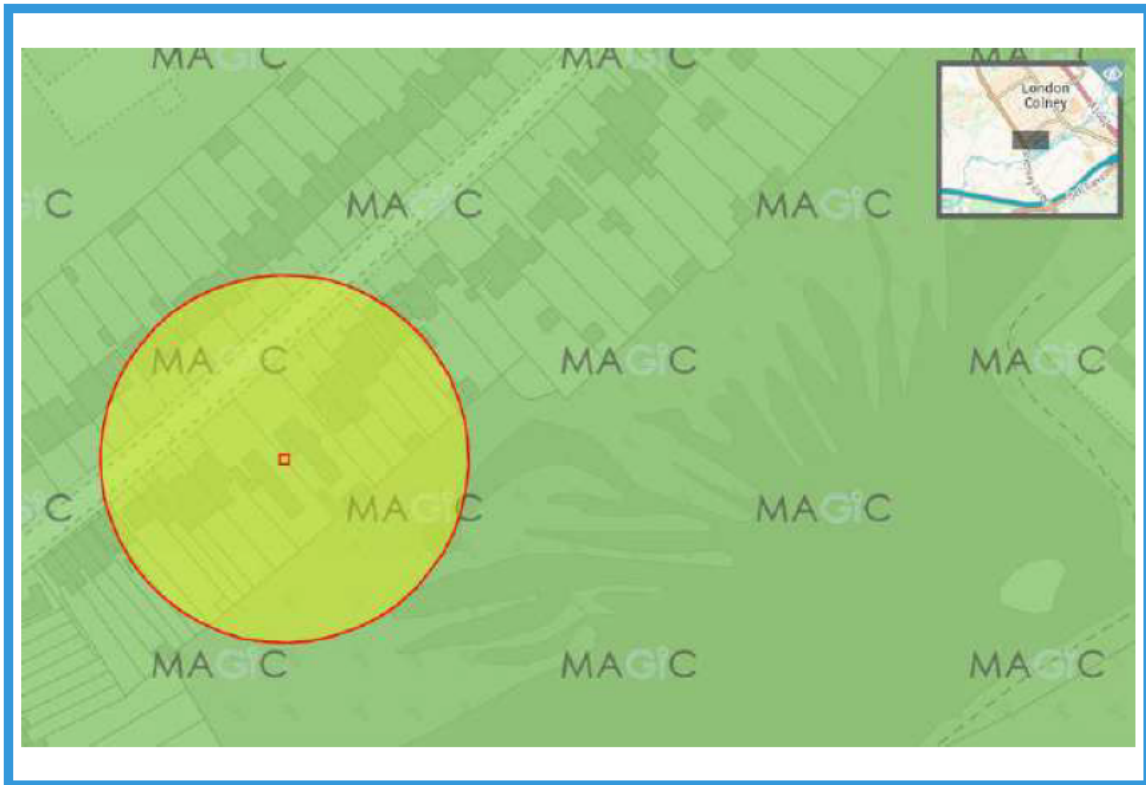
Flood risk from surface water

Extent of flooding

High risk means a chance of flooding greater than 3.3% (1:30)  
 Medium risk means a chance of flooding of btw 1% (1:100) and 3.3%  
 Low risk means a chance of flooding of btw 0.1% (1:1000) and 1%  
 Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding



# MAGIC RESULTS

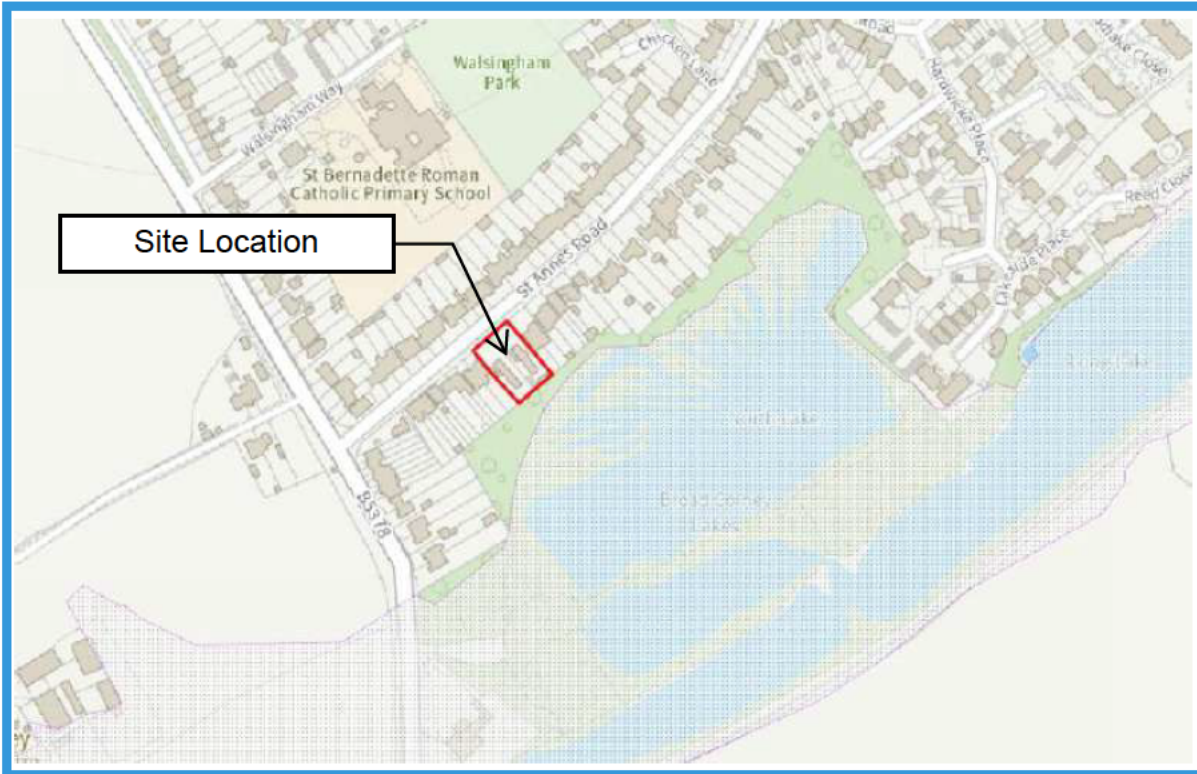


**Site Check Results** ✕

Site Check Report Report generated on Mon Jun 10 2024  
**You selected the location:** Centroid Grid Ref: TL17610351  
 The following features have been found in your search area:

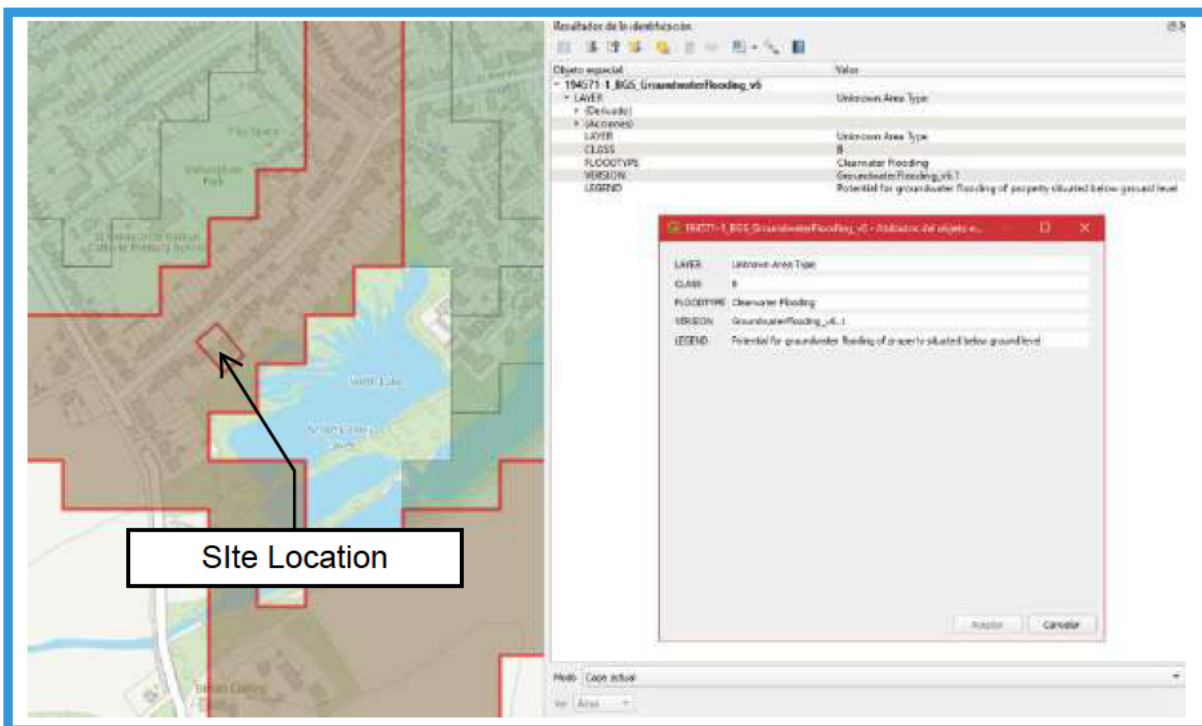
Source Protection Zones merged (England)	
Zone	3
Zone	2
Aquifer Designation Map (Bedrock) (England)	
Typology	Principal
Aquifer Designation Map (Superficial Drift) (England)	
Typology	Secondary A

# FLOOD WARNING AREA



 Flood Warning areas

# GROUND WATER FLOOD RISK



# HISTORIC FLOOD MAP



 Historic Flood Outline

# Flood map for planning

Your reference  
<Unspecified>

Location (easting/northing)  
517612/203516

Created  
10 Jun 2024 19:32

**Your selected location is in flood zone 3, an area with a high probability of flooding.**

## This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see [www.gov.uk/guidance/flood-risk-assessment-standing-advice](http://www.gov.uk/guidance/flood-risk-assessment-standing-advice))

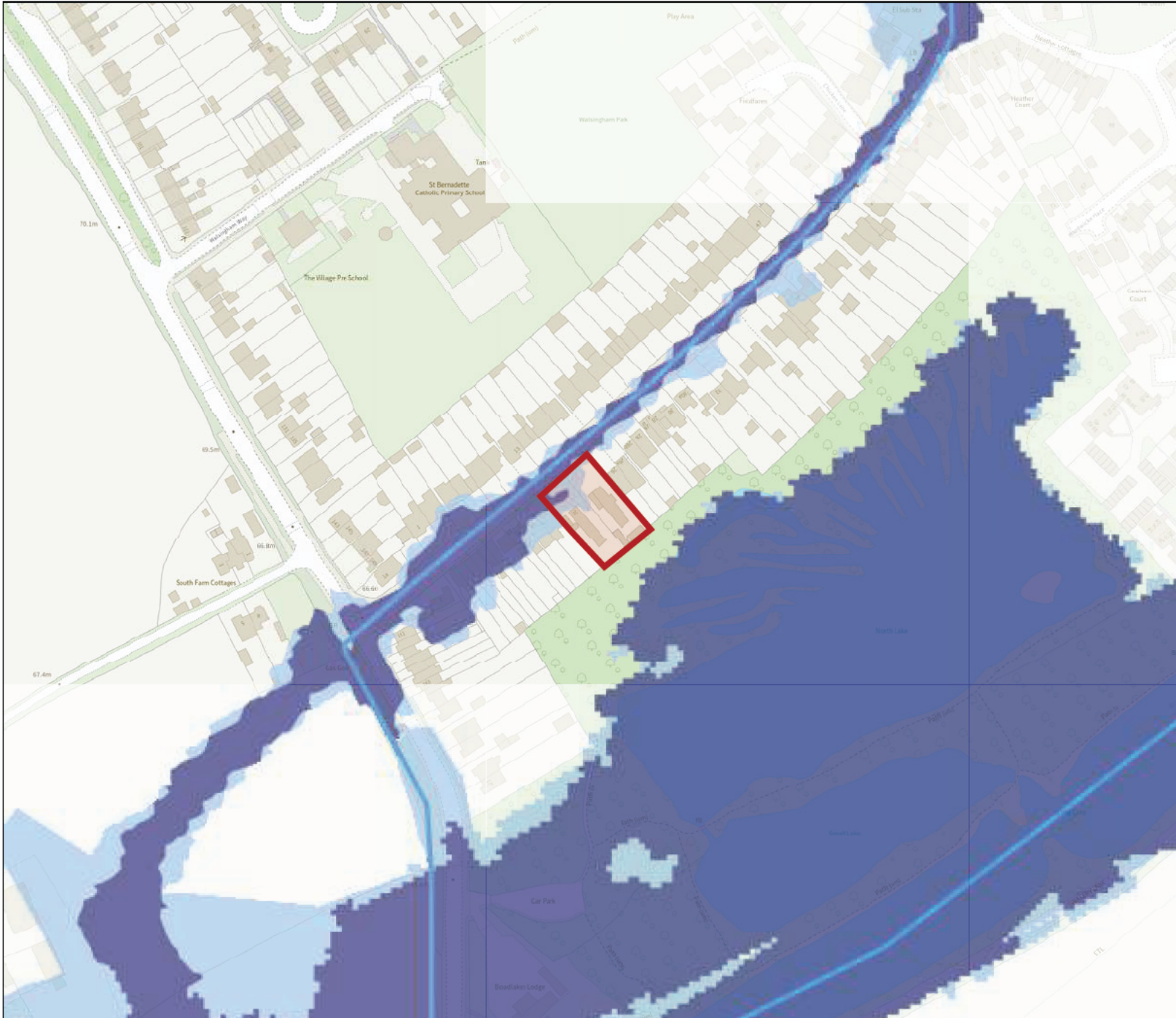
## Notes

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.

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

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>










### Flood map for planning

Your reference  
**<Unspecified>**

Location (easting/northing)  
**517612/203516**

Scale  
**1:2500**

Created  
**10 Jun 2024 19:32**

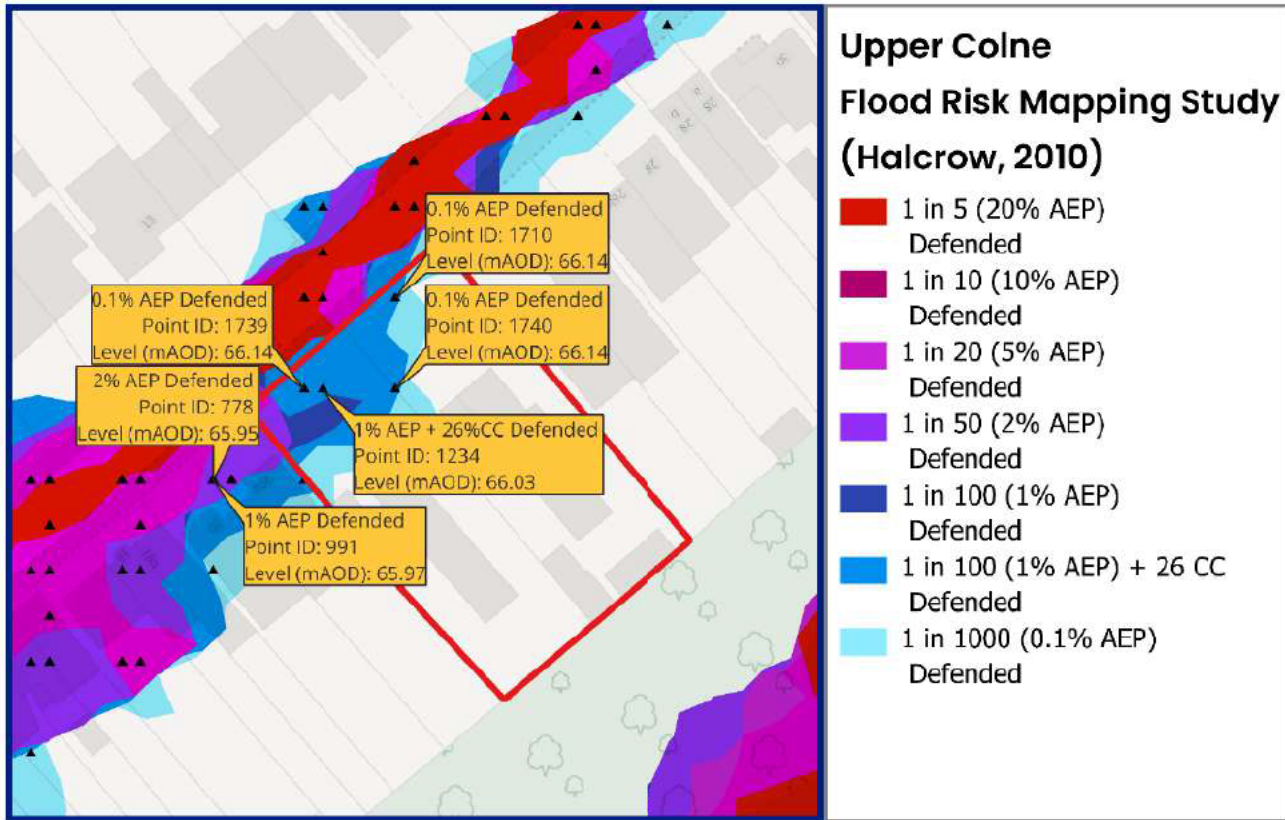
-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area





# Appendix D

# PROD. 6 Levels



Node	1 in 2	1 in 5	1 in 10	1 in 20	1 in 50	1 in 100	1 in 100 + CC	1 in 200	1 in 1000
1739									66.14
1710									66.14
1740									66.14
1234							66.03		
991						65.97			
65.95					65.95				