



FLOOD RISK ASSESSMENT

**Millennium Seed Bank, Wakehurst, Ardingly,
Haywards Heath, Sussex, RH17 6TN**

Reference: U0806 FRA-v1

Mar-26

www.urban-water.co.uk

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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 1 – Screening Study Flood Risk Assessment for a development located at RH17 6TN.

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 Wakehurst, Ardingly. The nearest postcode is RH17 6TN. Refer to appendix A for site location plan.
- 2.2 The current use of the site comprises the Millennium Seed Bank facility within the Wakehurst estate. The site contains buildings accommodating laboratories, offices and seed processing and storage facilities. The buildings are arranged within a managed compound with associated access routes, hardstanding areas and landscaped grounds. The facility is used for plant conservation, research and long-term seed storage. The current user vulnerability classification of the site is Water compatible. The site is located in the River Flood Zone 1. Refer to Appendix B for more details.

Development Proposals

- 2.3 The proposed development includes the installation of a replacement cold room plant and associated external equipment serving the Millennium Seed Bank. Key infrastructure includes new refrigerant pipework, cable ducting and an external pit for extract ductwork. The proposed infrastructure will be located within the existing service area adjacent to the main building. Refer to Appendix B for the layout of the proposed development.
- 2.4 The vulnerability classification of the proposed development is Water compatible with an estimated lifetime between 50 and 100 years.

Site Hydrology and Hydrogeology

- | | | |
|------------------------|-----|---|
| Hydrology | 2.5 | The Ardingly Brook is located approximately 500 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 not located within a Source Protection Zone. |
| 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 Cuckfield Stone Bed-Calcareous sandstone. |
| Superficial Deposits | 2.10 | The British Geological Survey records show that the superficial deposits are not present at the site. |



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 2024. The proposed development site is located within the administrative boundary of the Mid Sussex District 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 1, based on the Planning Flood Risk Map
- At High risk of surface flooding in the north area of the proposal
- At very low risk of groundwater flooding
- Outside of a critical drainage area
- Outside of an area with sewer flooding

- 4.3 In accordance with the NPPF, a Sequential Test is required given the identified flood risk at the site. The assessment has been undertaken within the red line boundary of the planning application, and the proposed development has been located in the area of lowest flood risk available within the site. With regard to alternative reasonably available sites, it is considered unlikely that opportunities exist in areas of lower flood probability, given the small scale of the scheme and its requirement to be delivered in proximity to the established land use and ownership. On this basis, it is concluded that the proposed development satisfies the requirements of the Sequential Test. Notwithstanding this, further engagement with the Local Planning Authority is recommended to confirm the proportionality of this approach.



Exception Test

4.4 Fluvial flood risk has been assessed using the Environment Agency Flood Map for Planning, in accordance with the sequential risk-based approach set out in the NPPF and Planning Practice Guidance. The requirement for the Exception Test is determined by the vulnerability classification of the proposed land use in relation to the mapped Flood Zone designation. This ensures that the need for an Exception Test is based on the statutory flood map, while more detailed datasets are used within the FRA to refine site-specific risk and mitigation measures.

Step 1
Flood Zone
categorisation

4.5 The proposed development is greater than 1 ha and falls within the Environment Agency (EA) Flood Zone 1. Therefore, a Site Specific Flood Risks Assessment is required under the NPPF. Flood Zone 1 is considered to have a low probability of flooding, with an annual probability of flooding of <0.1%. The chance of flooding is 1 in 1000 years or lower.

Step 2
Flood risk vulnerability

4.6 In Annex 3: Flood risk vulnerability classification of the NPPF Planning Practice Guide, the proposed development is classified as 'Water compatible'.

Step 3
Flood Zone
incompatibility

4.7 The Flood Risk vulnerability and Flood Zone incompatibility table 2 of the NPPF Planning Practice Guide states that Water compatible developments do not require an exception test.

The Exception Test

4.8 The exception test is not required.



- 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 proposed development is greater than 1 ha and falls within the Environment Agency (EA) Flood Zone 1. Therefore, a Site Specific Flood Risks Assessment is required under the NPPF. Flood Zone 1 is considered to have a low probability of flooding, with an annual probability of flooding of <0.1%. The chance of flooding is 1 in 1000 years or lower.
- 5.4 The climate change allowance is not applicable for this site.
- 5.5 The site is located in an area outside of fluvial flooding flood risk.
- 5.6 It is concluded that the site is not affected by fluvial/sea flood risk.

Surface water (overland flows) flood risk

- 5.7 The Environment Agency maps show that the flood risk from surface water is high. The residual risk of localised deep ponding remains highly likely. The Environment Agency surface water flood risk maps are defined through 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 *"Once we combined the data from local detailed models and the national model, we removed flooding to a depth of less than 75mm. This is because in surface water flood modelling, most land is covered by some water as rain falls across the area. While this*



very shallow floodwater may be an inconvenience, it is generally unlikely to prevent access or cause flooding to properties.

Building footprints are raised above their surroundings as part of the modelling process. We have used an uplift of 30cm above the 'zero' elevation of the building. This means that in the raw model outputs, buildings can look like they are not at risk of flooding.

The map does not provide property-specific data and cannot specify whether individual buildings are themselves at risk. However, it is important that the RoFSW maps indicate where buildings are considered to be in a flood risk area.

To do this, we infill building footprints, based on how much of the building's exterior wall and area of the property is wet.

We used building outlines from the OS MasterMap layer to do this.

Finally, we infill small dry areas (less than 50m²) surrounded by floodwater and remove small wet areas (less than 100m²). This is an important step in cleaning our data."

- 5.9 The strategic flood risk for the Mid Sussex District Council confirms that the flood risk for the site is High. 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 High risk of flooding from surface water sources. The depth of water is taken from the future flood risk of the RoFSW dataset. This dataset shows future flood risk based on UKCP18 climate projections and the high-emission RCP 8.5 scenario. It uses the 'Central' allowance for the 2050s (2040–2060), accounting for increased peak rainfall and surface water flooding. The potential depth of water is 600 mm with a high probability of occurrence in the north area of the proposal. The average ground level at the location of the surface water flooding is 122.1 m AOD. The surface water flood level on this site could be in the region of 122.7 m AOD.



Flooding from drainage systems in adjacent areas

- 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

- 5.12 The Reservoir Flood Map (RFM) produced by the Environment Agency does 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

- 5.13 The British Geological Survey's flood risk susceptibility maps show that the development has limited susceptibility to groundwater flooding. The risk of groundwater flood to the site is considered very low. Refer to appendix C for record drawings.

Critical Drainage Areas

- 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 1, based on the Planning Flood Risk Map
- At High risk of surface flooding in the north area of the proposal
- At very low 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 Fluvial/Sea, Surface Water and Groundwater flood levels.

6.5 For this site, the Design Flood Level is 122.7m AOD. This is the highest level and corresponds to the Surface Water Flood Level.

Flood Protection

6.6 The proposed development area consists of a new external compound cabling. The cabling is located in the north. This area is identified as being at high risk of surface water flooding. This risk is localised and primarily affects below-ground electrical cabling. However, the critical refrigeration infrastructure including the proposed chiller and desuperheater, is not exposed to this hazard, as it is located in the southern area. Consequently, no further mitigation interventions are recommended for these structures.



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, as shown in the figure below.

7.3 The Landis Top Soil classification is slightly impeded drainage. 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)

	SUDS technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
Most Sustainable ↑	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	✓	✓	
	Tanked systems - over-sized pipes/tanks - storms cells	✓		
Least Sustainable ↓				

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

- 7.5 Due to the size of the development and its location in the flood risk zone, flood compensation for this development is not required.

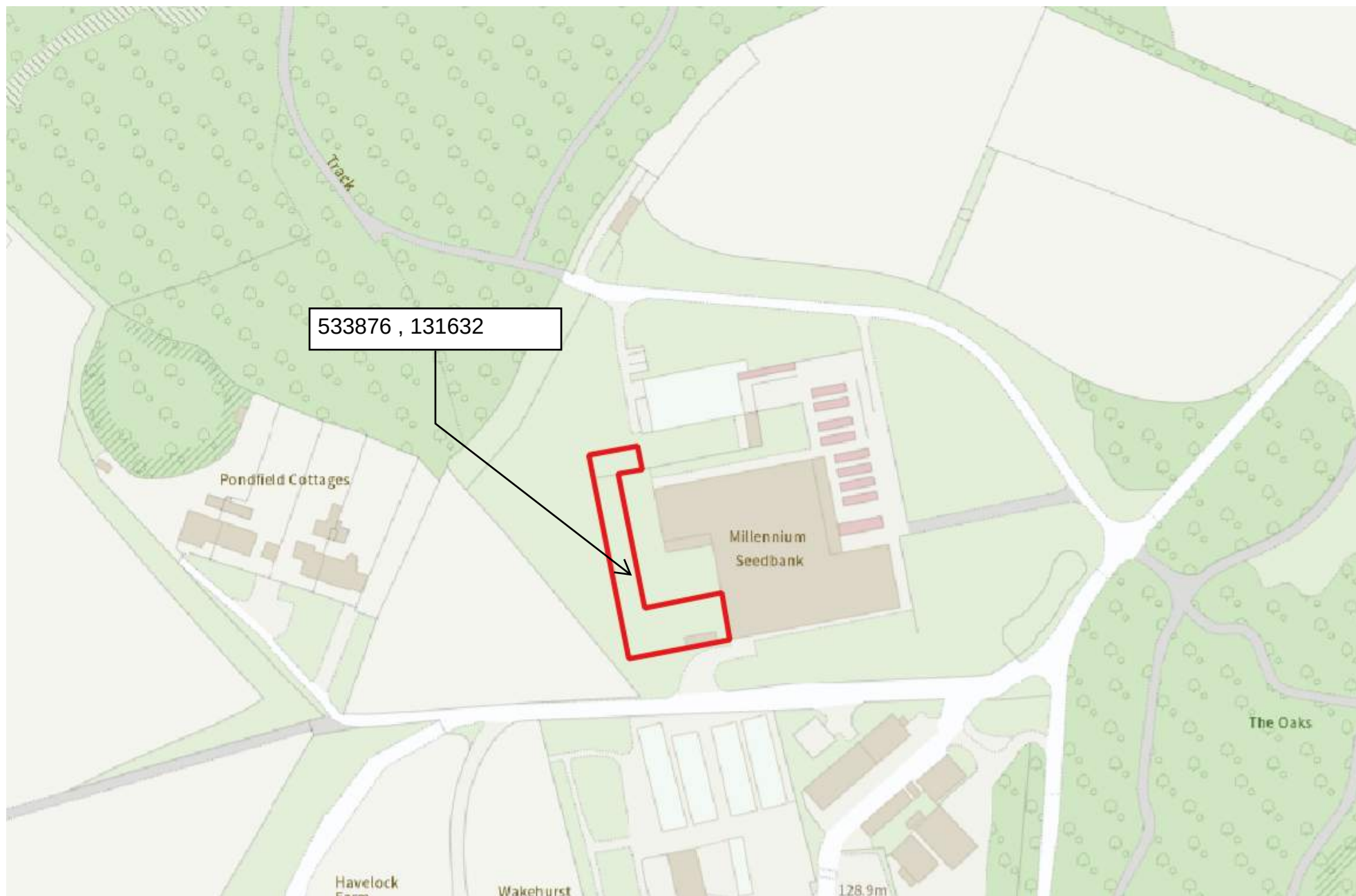


- 8.1 It is concluded that subject to the proposed mitigation measures, the site can be developed in accordance with the provisions of the NPPF and the requirements of the Environment Agency and the local planning authority.
- 8.2 This report demonstrates that the proposal will be safe, in terms of flood risk, for its design life and will not increase the flood risk elsewhere.





Appendix A

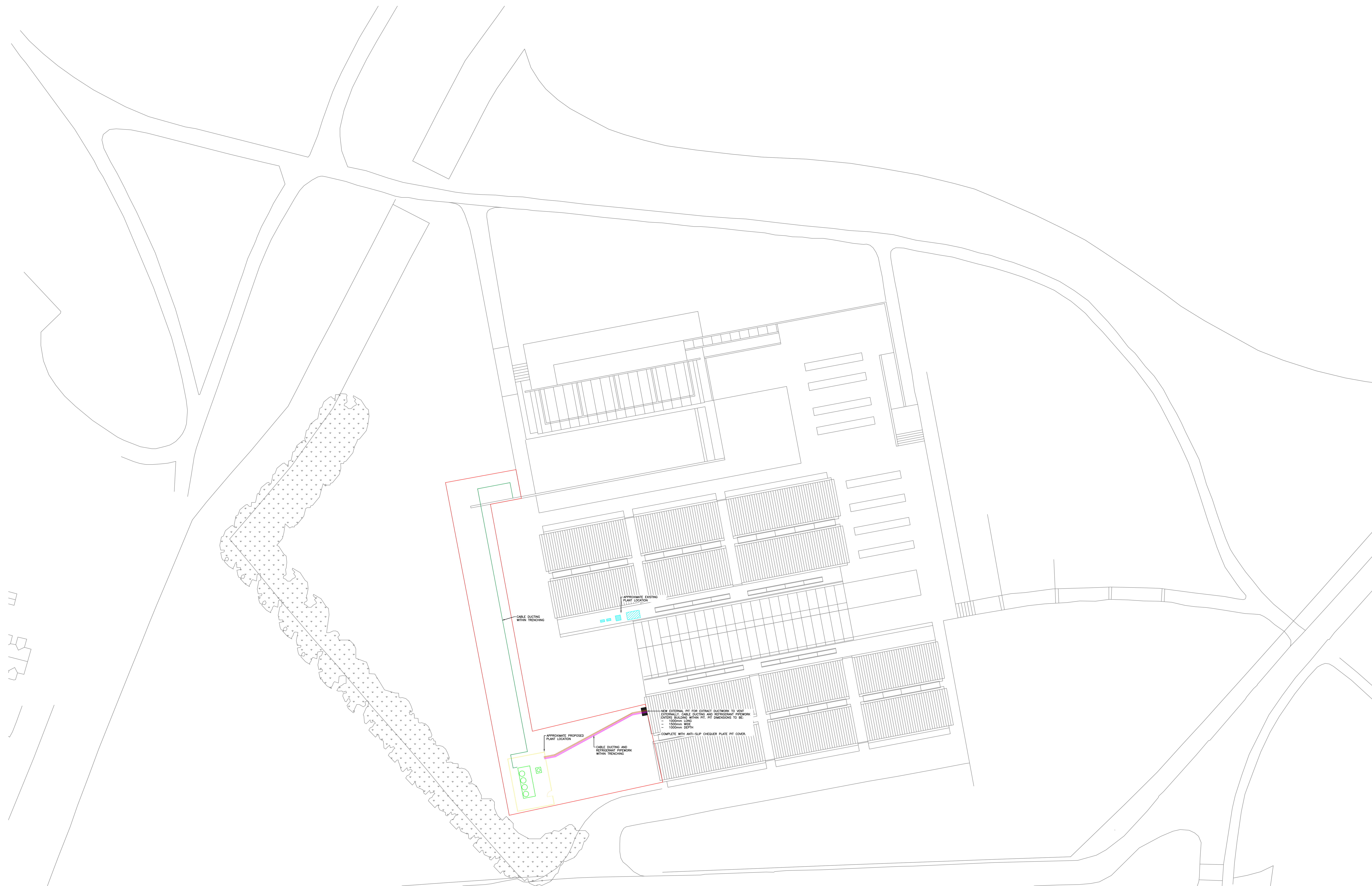




Appendix B

NOTE:
1. This drawing shall be read in conjunction with all other contract documentation.
2. Do not scale from this drawing.

LEGEND:
MAIN WORKS BOUNDARY



15	EH	03/03/25	PLANNING ISSUE
14	EH	26/01/25	PLANNING ISSUE
13	EH	21/01/25	PLANNING ISSUE
12	EH	19/01/25	PLANNING ISSUE
1	EH	23/12/25	PLANNING ISSUE
REV	CHECKED	DATE	DESCRIPTION

REVISION SCHEDULE

CLIENT
ROYAL BOTANIC GARDENS
KEW
RICHMOND
SURREY
TW9 2AE

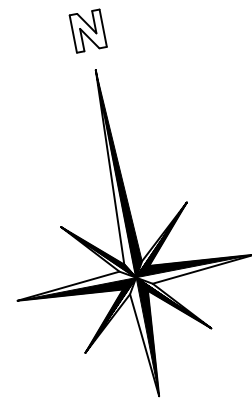
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MILLENNIUM SEED BANK, WAKEHURST
COLD ROOM PLANT REPLACEMENT

DRAWING TITLE
PROPOSED SITE PLAN

Sheet Size:	A0L	Scale:	1:250	Date:	23/12/2025
Project No:	2084	Planning Issue		Rev:	15
Drawing No:	2084-HDE-XX-DR-ME-00001				

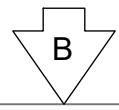
HEATON
DESIGN & ENGINEERING

4 Meadow Court, 41143 High Street,
Witley, West Sussex, PO20 1ER
Tel: +44(0) 1903 357337 www.heatonde.co.uk



- NOTE:
1. This drawing shall be read in conjunction with all other contract documentation.
 2. Do not scale from this drawing.

NORTH ELEVATION

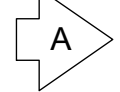


EXISTING QUANTER AMBIENT REJECTOR
GGHC CD 050.1/11-42-201828M
TO REMAIN

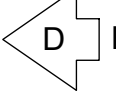
EXISTING EXTERNAL
COMFORT COOLING LINES
TO REMAIN

EXISTING QUANTER GAS COOLER
GGHC OF 060.1/12-45-34473M
TO REMAIN

WEST ELEVATION



EAST ELEVATION



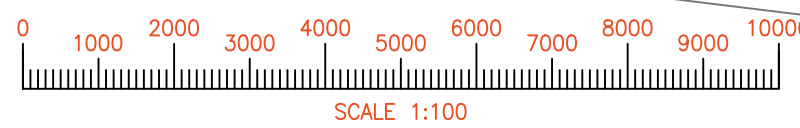
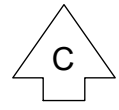
NEW EXTERNAL PIT FOR EXTRACT DUCTWORK TO VENT
EXTERNALLY CABLE DUCTING AND RETROGRADE PIPING
ENTERS BUILDING WITHIN PIT. PIT DIMENSIONS TO BE:
- 1200mm LONG
- 1200mm WIDE
- 1000mm DEPTH
COMPLETE WITH ANTI-SLIP CHECKER PLATE PIT COVER.

EXTERNAL ACOUSTIC ENCLOSURE WITH HIT AND MISS
FENCE, BESPANNABLE
DIMENSIONS AS FOLLOWS:
- 10000mm LONG
- 7000mm WIDE
- 1000mm HIGH

PROPOSED CHILLER
& GAS COOLER

PROPOSED
DESUPERHEATER

SOUTH ELEVATION



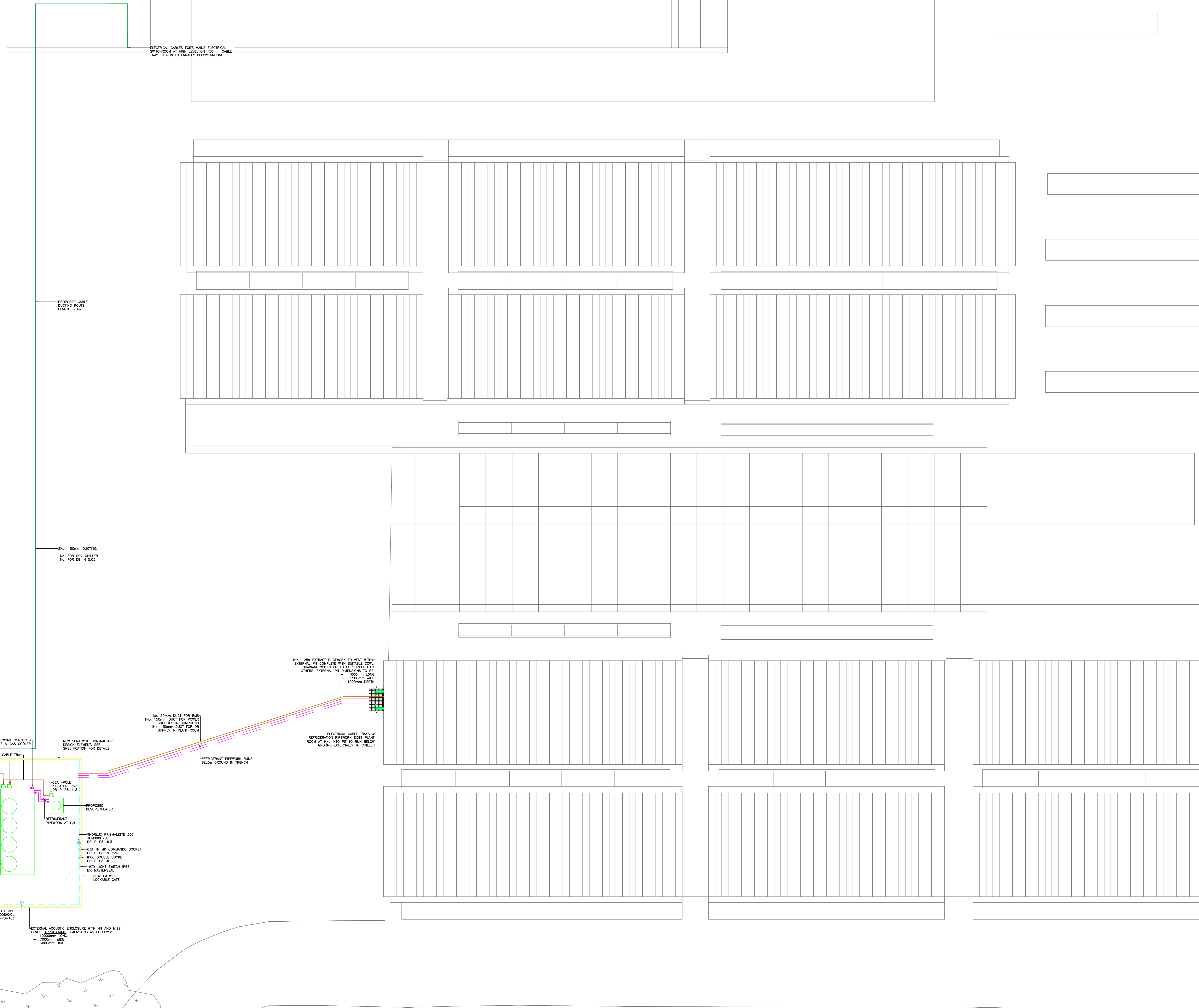
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REVISION SCHEDULE			

CLIENT
ROYAL BOTANIC GARDENS
KEW
RICHMOND
SURREY
TW9 2AE

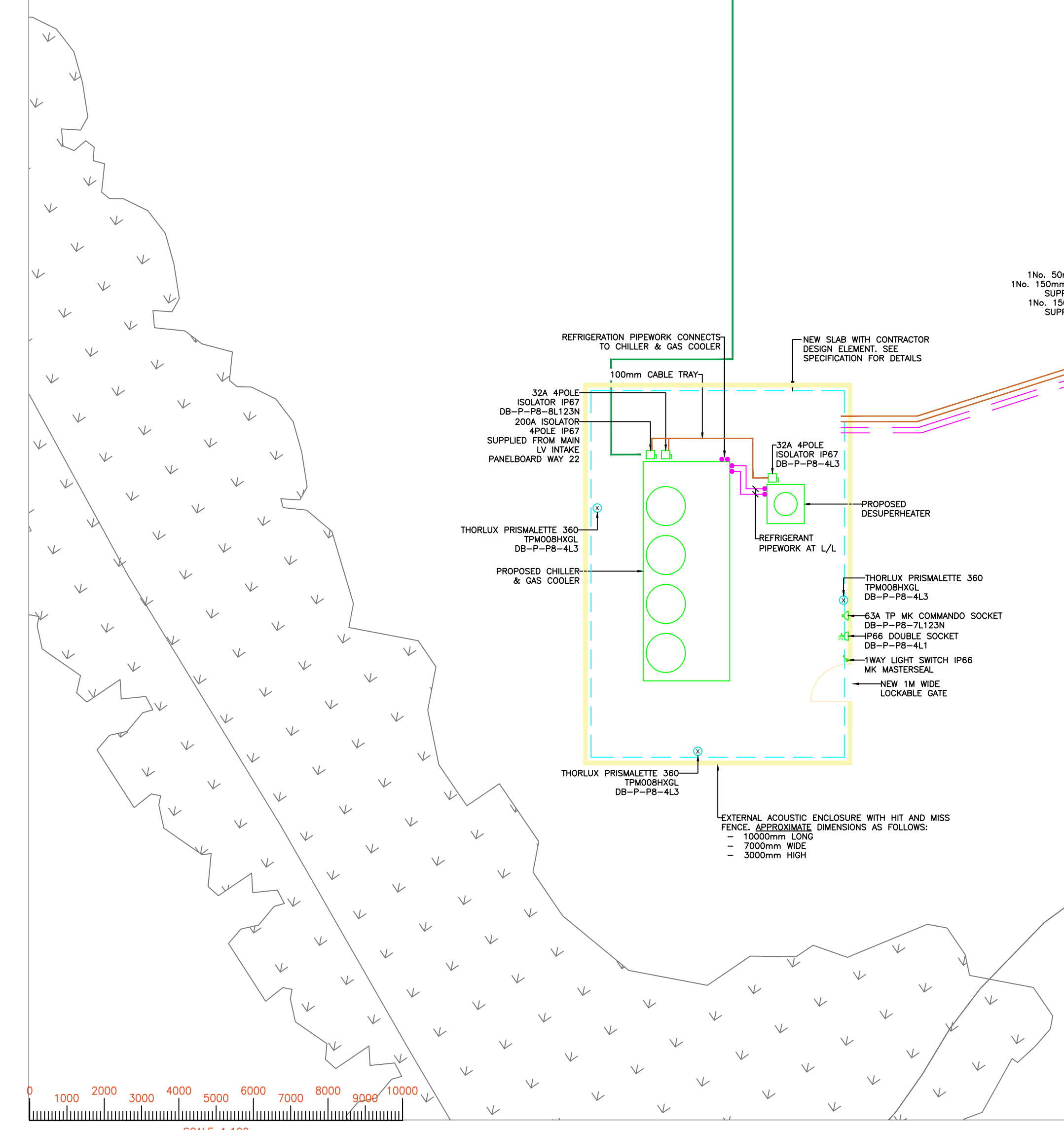
PROJECT TITLE
MILLENNIUM SEED BANK, WAKEHURST
COLD ROOM PLANT REPLACEMENT

DRAWING TITLE
PROPOSED ELEVATION LAYOUT

Sheet Size: A0L Scale: 1:100 Date: 03/03/2026
Project No: 2084 Planning Issue Rev: I
Drawing No: 2084-HDE-XX-DR-ME-00010



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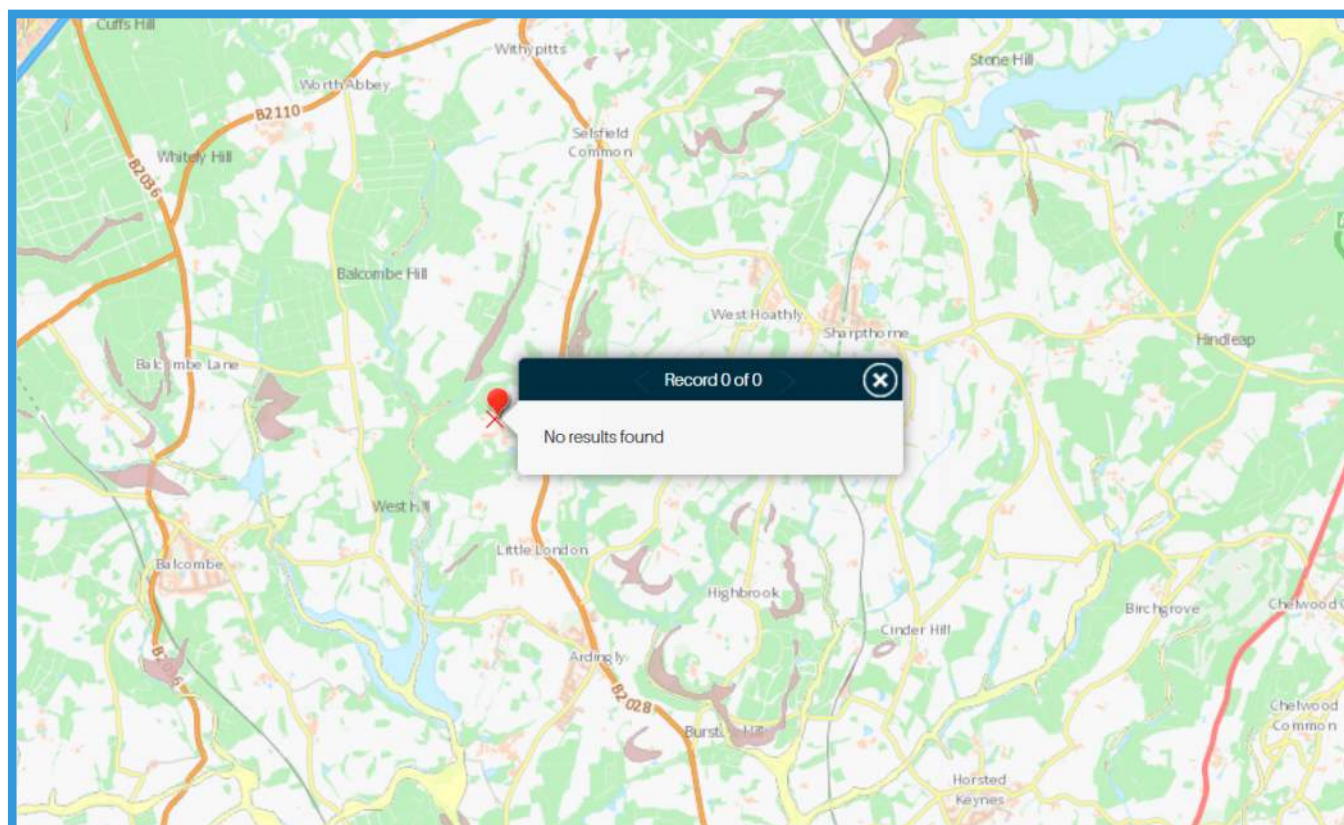


Appendix C

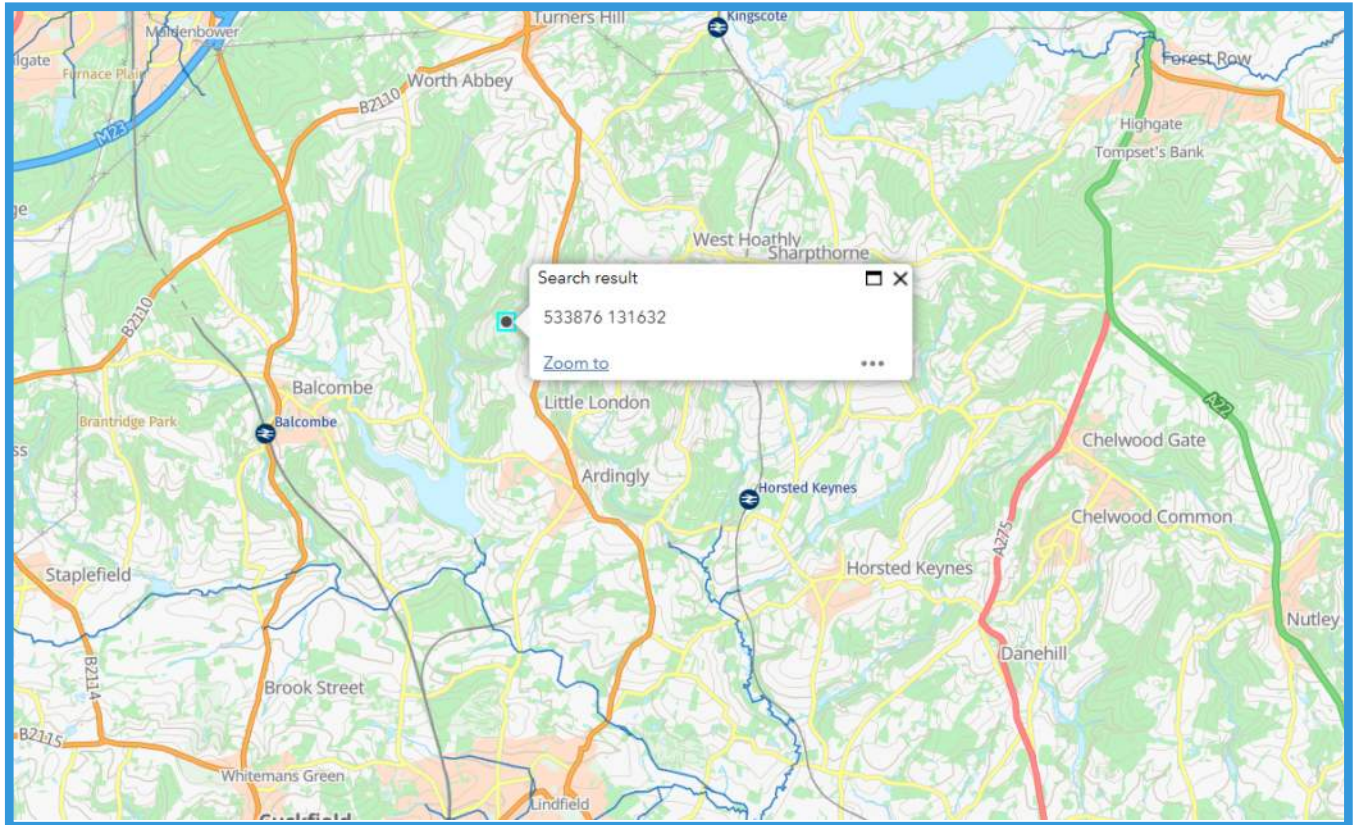
GEOLOGY - BEDROCK - Cuckfield Stone Bed-Calcareous sandstone



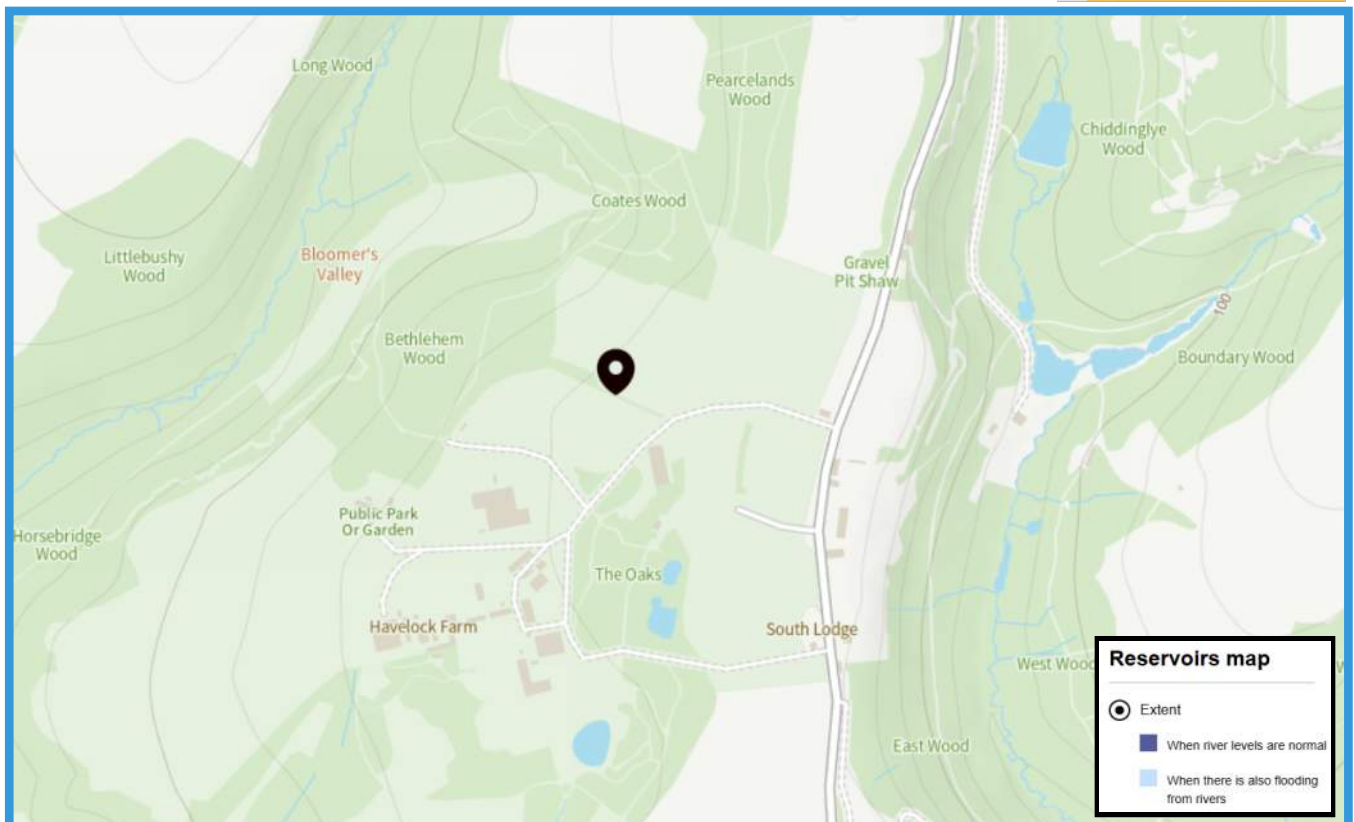
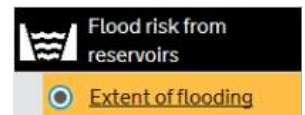
GEOLOGY - SUPERFICIAL DEPOSITS - No results found



Main River Map

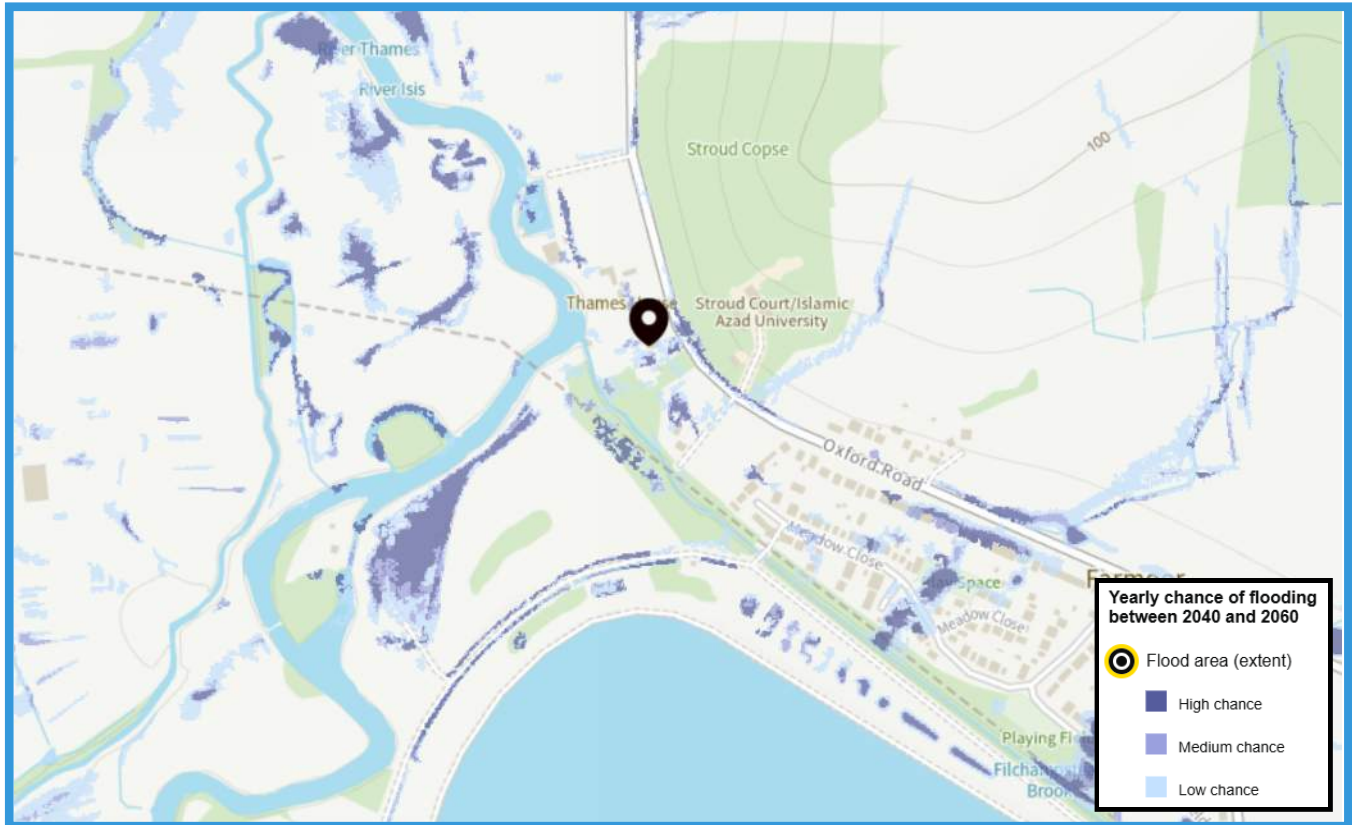


Reservoirs Map

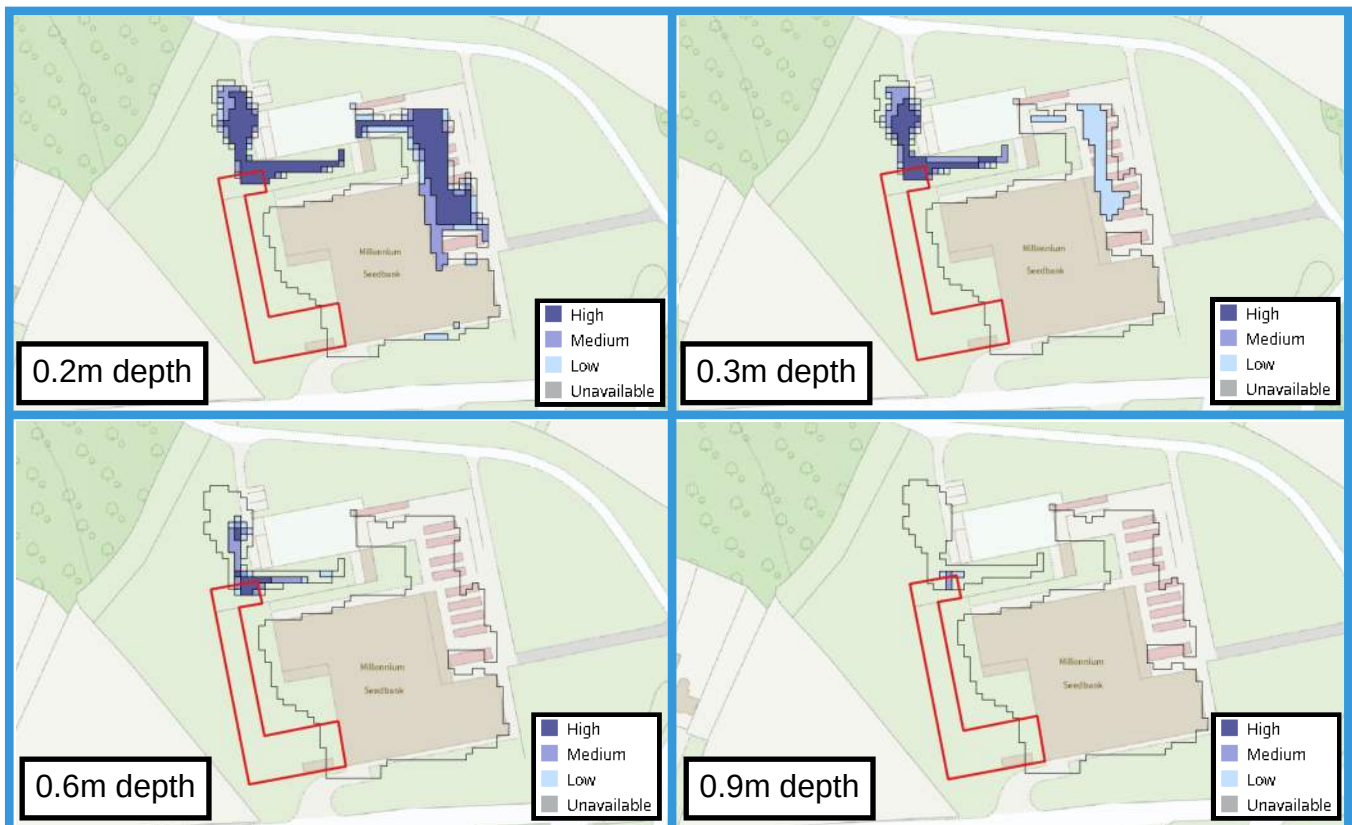


SITE SURFACE WATER FLOOD RISK

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

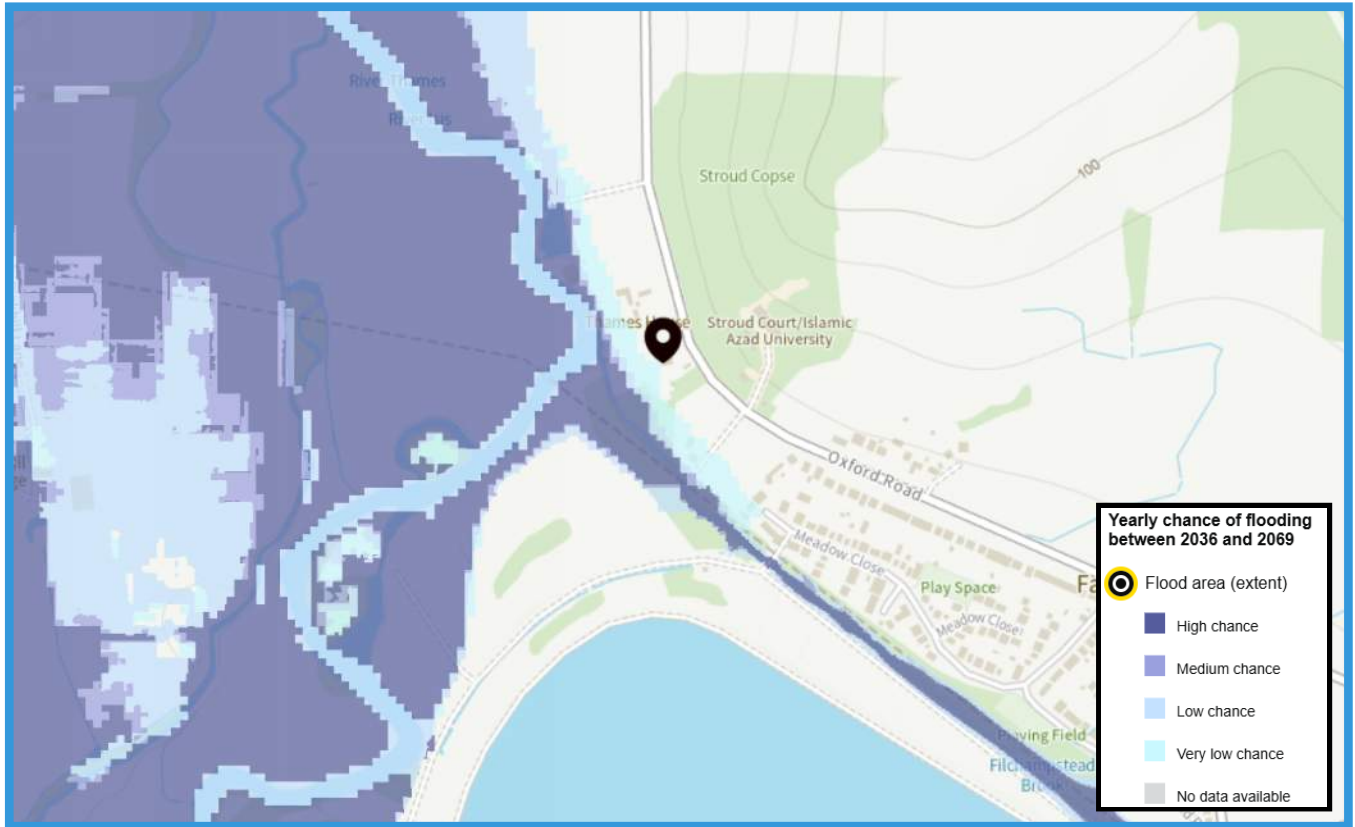


DEPTH

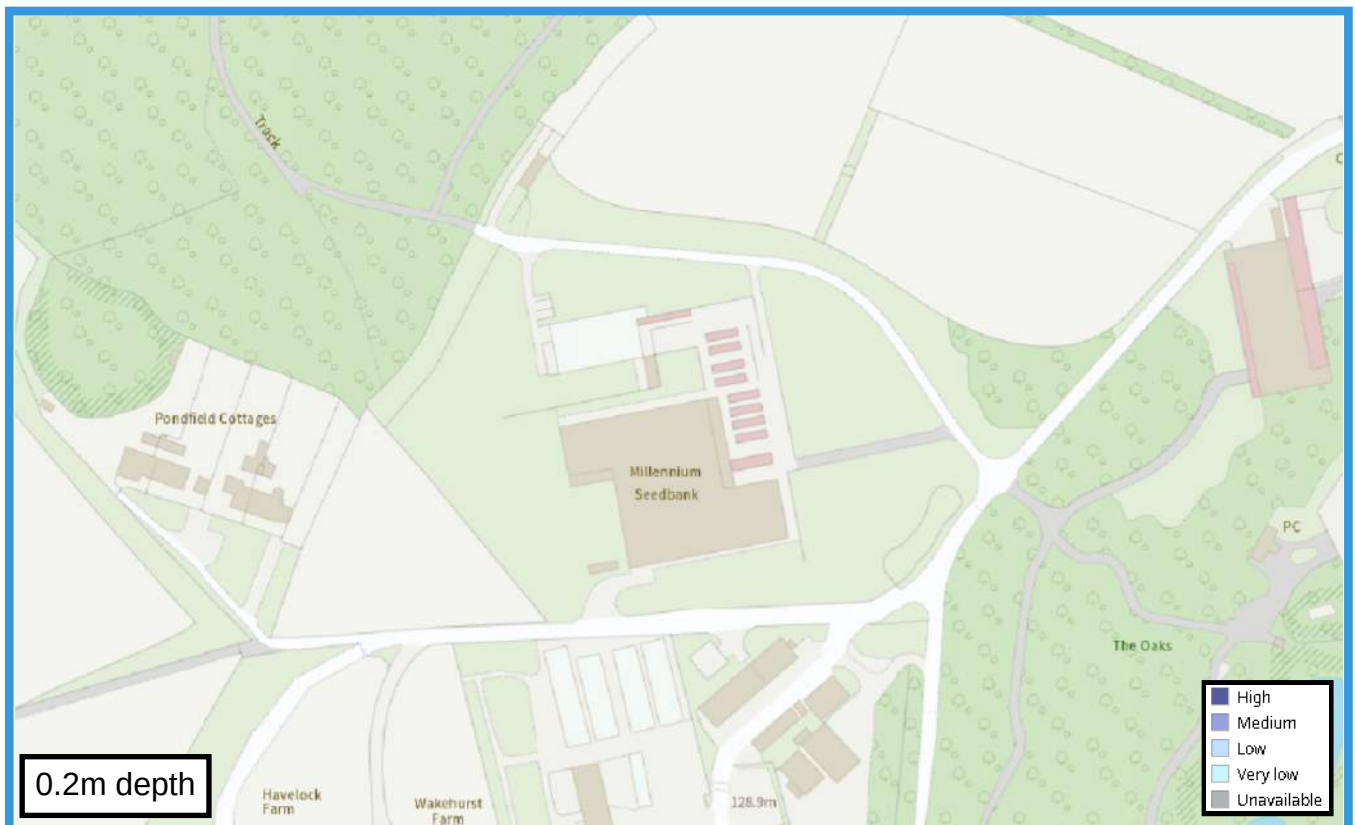


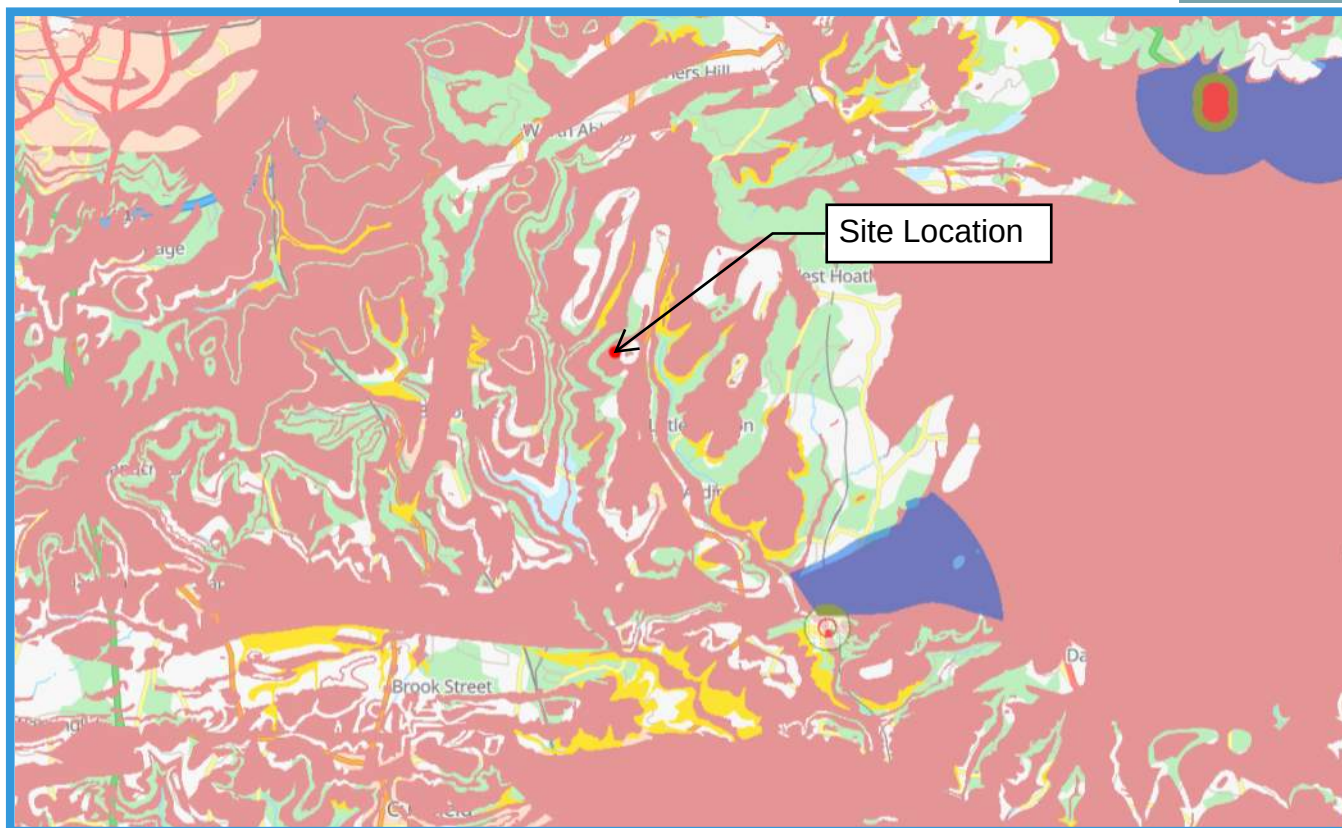
RIVER AND SEA FLOOD RISK MAP

- High - greater than or equal to 1 in 30 (3.3%) chance of flooding in any year
- Medium - Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance of flooding in any given year
- Low - Less than 1 in 100 (1%) but greater than or equal to 1 in 1000 (0.1%) chance of flooding in any given year
- Very low - less than 1 in 1000 (0.1%) chance of flooding in any given year



DEPTH





Site Check Results

Site Check Report generated on Thu Mar 05 2026

The following features have been found in your search area:

You selected the location: Centroid Grid Ref: TQ33903163

Aquifer Designation Map (Bedrock) (England)

TPOLOGY

Secondary A

Aquifer Designation Map (Superficial Drift) (England)

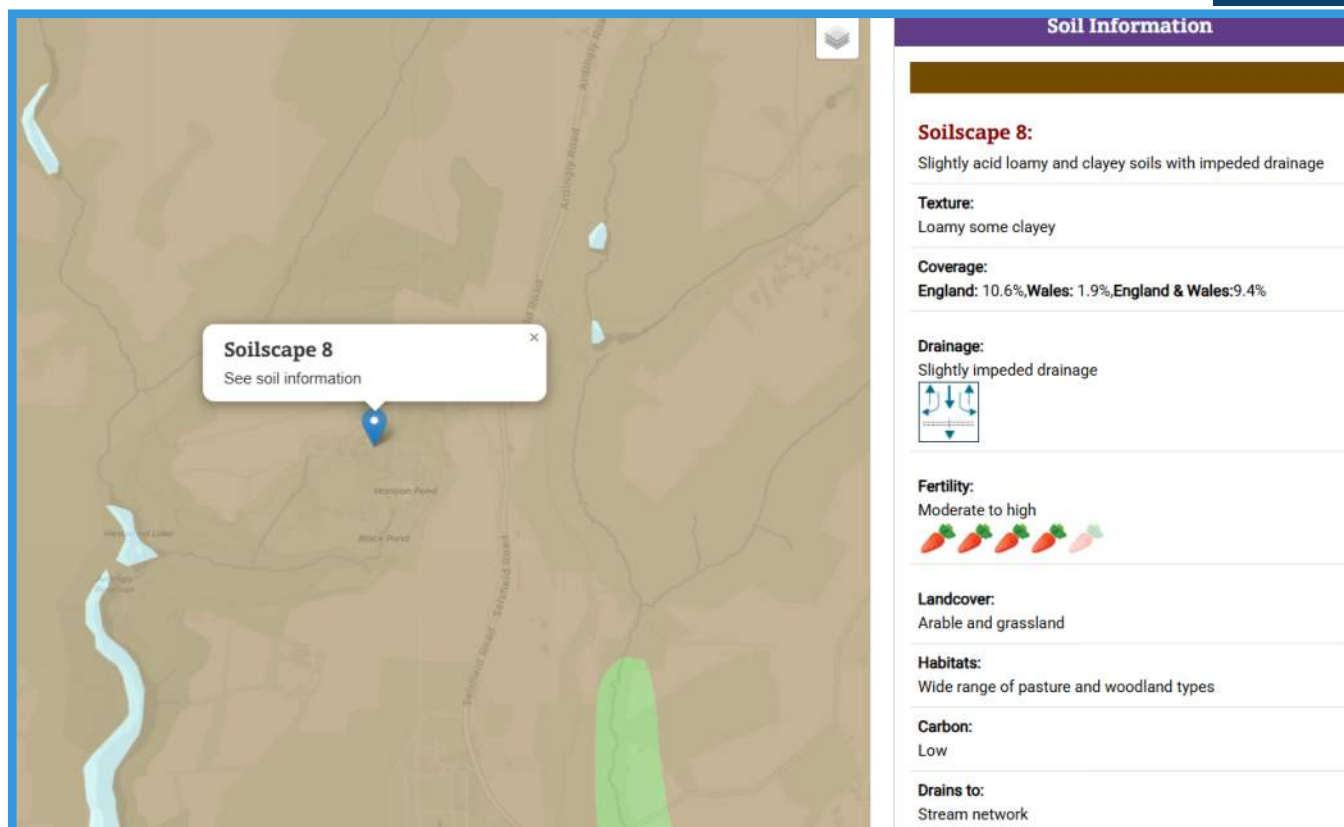
No Features found

Source Protection Zones merged (England)

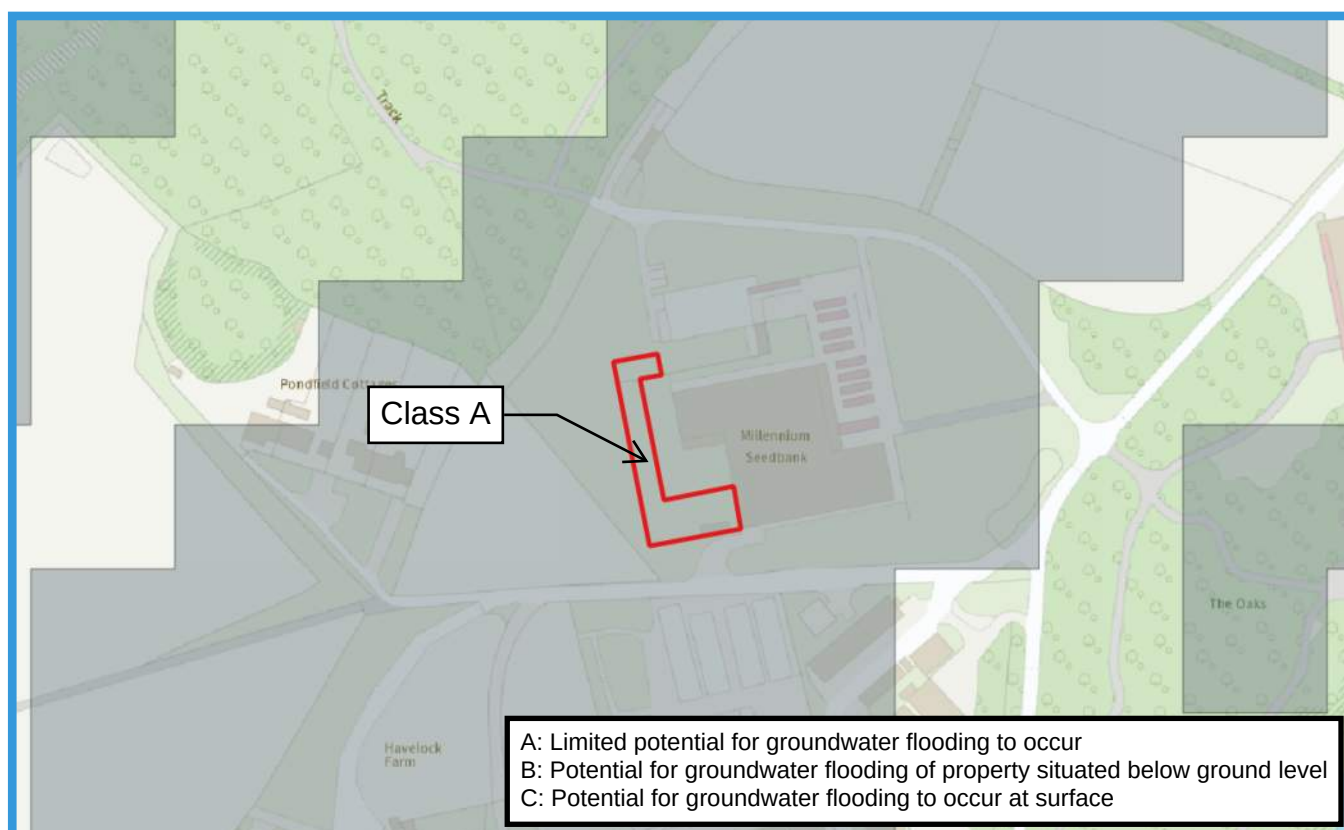
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SOILSCAPES MAP

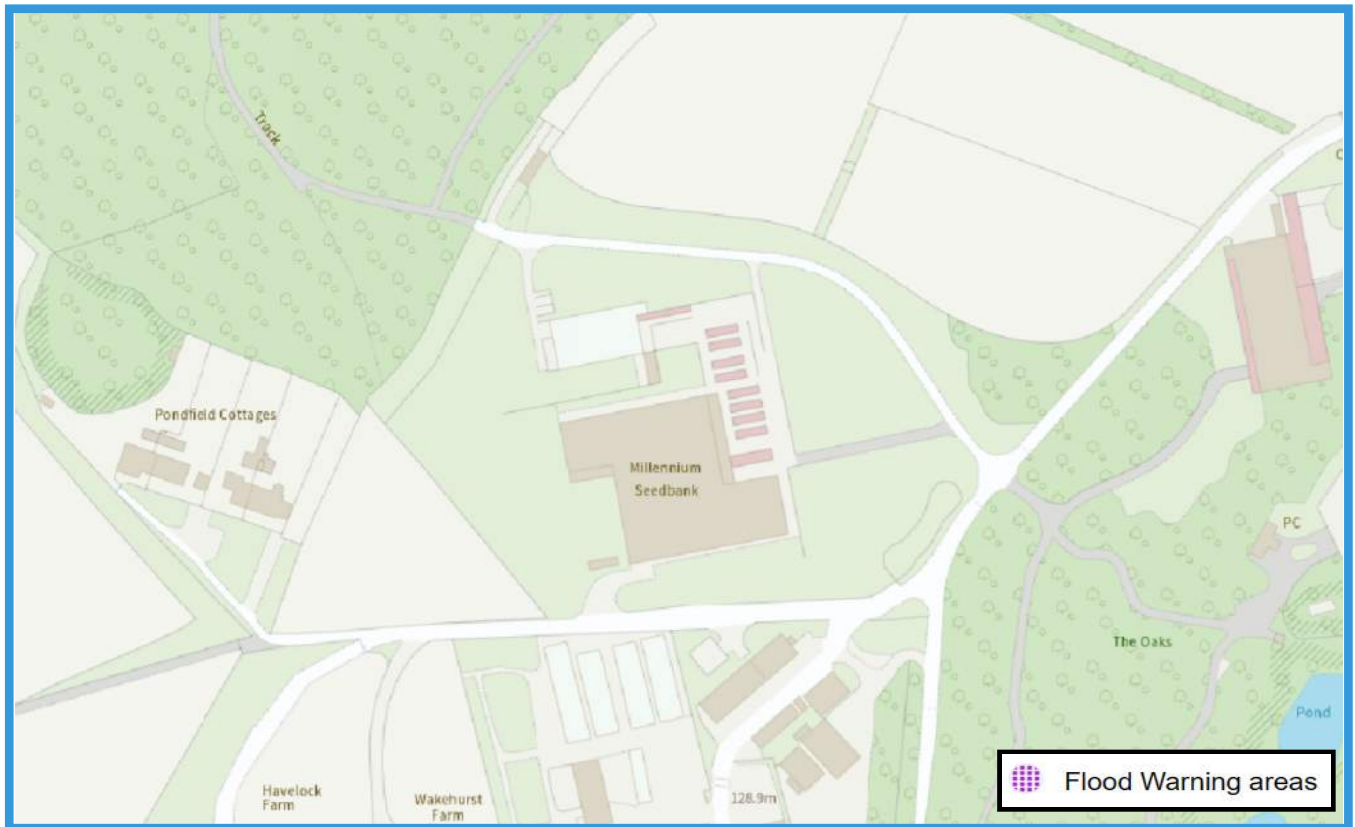
LandIS®



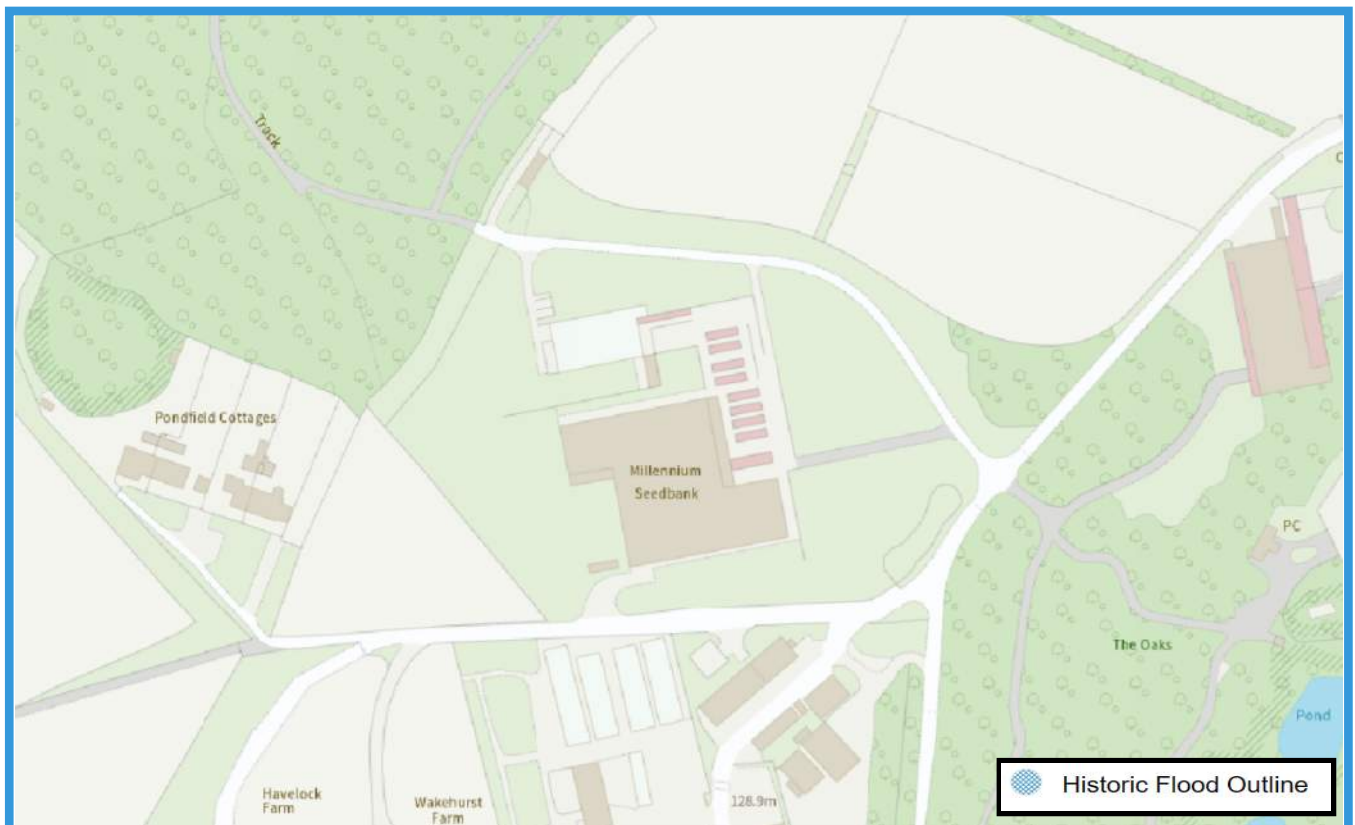
GROUND WATER FLOOD RISK



FLOOD WARNING AREA



HISTORIC FLOOD MAP



Flood map for planning

Your reference
Unspecified

Location (easting/northing)
533872/131617

Created
13 March 2026 16:02

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

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- in an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

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 2026 AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference

Unspecified

Location (easting/northing)
533872/131617

Scale
1:2,500

Created
13 Mar 2026 16:02

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



0 20 40 60m