



Flood Risk Assessment for Planning

Prepared for:

Michael Coffey

September 2024

Our reference:

94593-Smith-ScoursLane

Location:

Riverview Manor (formerly Cosy Kennels)
Scours Lane
Tilehurst
Reading
RG30 6AX



Document Issue Record

Project:	Flood Risk Assessment for Planning
Client:	Michael Coffey
Application:	Change of use of the Land from Commercial (sui generis) premises previously trading as 'Cosy Kennels' with emphasis for dog breeding and grooming having onsite accommodation consisting of a detached 2 Bedroom Bungalow, to Residential Use. Residential Use to consist of the erection of a Detached Chalet Style 4 Bedroom Dwelling following the demolition of the existing bungalow, the installation of a Cycle and Refuse/Recycle Bin Store, a packaged Sewage Treatment Plant, hardstanding's including parking for 3 vehicles and 2 cycles, and external lighting, together with the Retrospective approval for the Retention of a 2 Bedroom 'Regent Kensington' Luxury Mobile Home and new entrance.
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Our reference:	94593-Smith-ScoursLane
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Lead Consultant:	Miss Freya Pott
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1. Key Facts

1.1 Flood Risk Posed:

- EA Flood Zone 2 (Medium Risk) and EA Flood Zone 3 (High Risk).
- The risk would appear to be predominantly fluvial and originate from the River Thames located approximately 50m to the north of the site.
- Product 4 modelled flood levels and extents have been requested from the Environment Agency for use within this report.
- There are no flood storage areas in the vicinity of the site or surrounding area.
- The site is currently defended by Natural High Ground which is maintained by a private individual, company or charity.
- According to EA records, the site has previously flooded in Spring 1947 due to channel capacity exceeded (no raised defences). Flooding has also occurred in close proximity to the site due to channel capacity exceeded (no raised defences) in Winter 2000 and Winter 2013/2014. The Reading Borough Council Strategic Flood Risk Assessment 2017 confirms that flooding occurred at the site in March 1947, August 1977 and the winter of 2013/2014.
- The EA Risk of Flooding from Surface Water Map suggests that the site lies in an area of "Very Low" risk from surface water.
- The site is located in an area that has between 50% and 75% susceptibility to groundwater flooding.
- The postcode in which the site is located (RG30 6) has experienced over 101 flood incidents recorded in Thames Water DG5 Register.
- The site is inside the maximum inundation extent when there is also flooding from rivers on the EA Reservoir Inundation Map. The EA also advise on their website that there is a risk of flooding from reservoirs in this area.

1.2 Flood Risk Mitigation:

- The proposed development is for the change of use of the Land from Commercial (sui generis) premises previously trading as 'Cosy Kennels' with emphasis for dog breeding and grooming having onsite accommodation consisting of a detached 2 Bedroom Bungalow, to Residential Use. Residential Use to consist of the erection of a Detached Chalet Style 4 Bedroom Dwelling following the demolition of the existing bungalow, the installation of a Cycle and Refuse/Recycle Bin Store, a packaged Sewage Treatment Plant, hardstanding's including parking for 3 vehicles and 2 cycles, and external lighting, together with the Retrospective approval for the Retention of a 2 Bedroom 'Regent Kensington' Luxury Mobile Home and new entrance.
- Finished ground floor levels will be set at least 600mm above the 1:100 year + climate change allowance flood level.

- Flood proofing of the development will be incorporated as appropriate.
- To ensure that there will be no loss of fluvial flood storage, the applicant has agreed that the finished floor level will be elevated on voids covering the whole footprint.
- A flood warning and evacuation plan will be implemented post development.
- The applicant will register with the Environment Agency Floodline Alert/Warnings Direct service.
- Due to the scale of the development, a full Surface Water Drainage Strategy is not required at this stage of planning.

Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

2. Introduction

Unda Consulting Limited have been appointed by Michael Coffey (hereinafter referred to as “the applicant”) to undertake a Flood Risk Assessment for the proposed development at Riverview Manor (formerly Cosy Kennels), Scours Lane, Tilehurst, Reading, RG30 6AX (hereinafter referred to as “the site”). The FRA has been undertaken in accordance with the National Planning Policy Framework (NPPF) and the associated technical guidance.

The site appears to be located within Flood Zones 2 and 3 as defined by the Environment Agency (EA) on their Flood Map for Planning. Under the National Planning Policy Framework (NPPF), a FRA is required if a proposed development:

- includes building or engineering works in Flood Zone 2 or 3;
- includes building or engineering works on land classified by the Environment Agency as having critical drainage problem;
- changes the use of land or buildings in a location at risk of flooding from rivers or the sea, or with critical drainage problems;
- changes the use of land or buildings in a way that increases the flood vulnerability of the development where it may be subject to other sources of flooding;
- is larger than 1 hectare.

The assessment should demonstrate to the Local Planning Authority (LPA) and EA how flood risk will be managed now and over the development’s lifetime, taking climate change into account, and with regard to the vulnerability of its potential users.

- whether the proposed development is likely to be affected by current or future flooding from any source;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate.

3. Existing Situation

3.1 Site Usage:

The site consists of a dilapidated 2 bedroom bungalow of a non-standard construction and a 2 bedroom 'Regent Kensington' Luxury Mobile Home. The site has Commercial (sui generis) usage, with planning permission for a detached 2 Bedroom Bungalow in connection with that business, approved by Reading Borough Council on 16th January 1981 under Planning Application 901082.

Existing plans are provided in the report Appendix.



Figure 1: Aerial View of the Site and Immediate Surrounding Area (Source: Google Earth)



3.2 Topography:

Environment Agency LiDAR has been used to assess the topography across the site and wider area. Light Detection and Ranging (LIDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground surface. Up to 100,000 measurements per second are made of the ground, allowing highly detailed terrain models to be generated at high spatial resolutions. The EA's LIDAR data archive contains digital elevation data derived from surveys carried out by the EA's specialist remote sensing team. Accurate elevation data is available for over 70% of England. The LiDAR technique records an elevation accurate to +0.15m every 1m. This dataset is derived from a combination of our full dataset which has been merged and re-sampled to give the best possible coverage. The dataset can be supplied as a Digital Surface Model (DSM) produced from the signal returned to the LIDAR (which includes heights of objects, such as vehicles, buildings and vegetation, as well as the terrain surface) or as a Digital Terrain Model (DTM) produced by removing objects from the Digital Surface Model. 1.0m horizontal resolution DTM LiDAR data has been used for the purposes of this study.

LiDAR remotely sensed digital elevation data suggests that the ground topography on the site ranges between approximately 38.47mAOD to 39.32mAOD.

3.3 Geology and Soil:

The British Geological Survey (BGS) Map indicates that the bedrock underlying the site is Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated) – Chalk.

The superficial deposits underlying the site are Alluvium – Clay, Silt, Sand and Gravel.

The soil type taken from the UK Soil Observatory website shows relatively deep soils from River Clay and Floodplain Sands and Gravel soil parent material, with Clay to Sandy Loam soil texture.

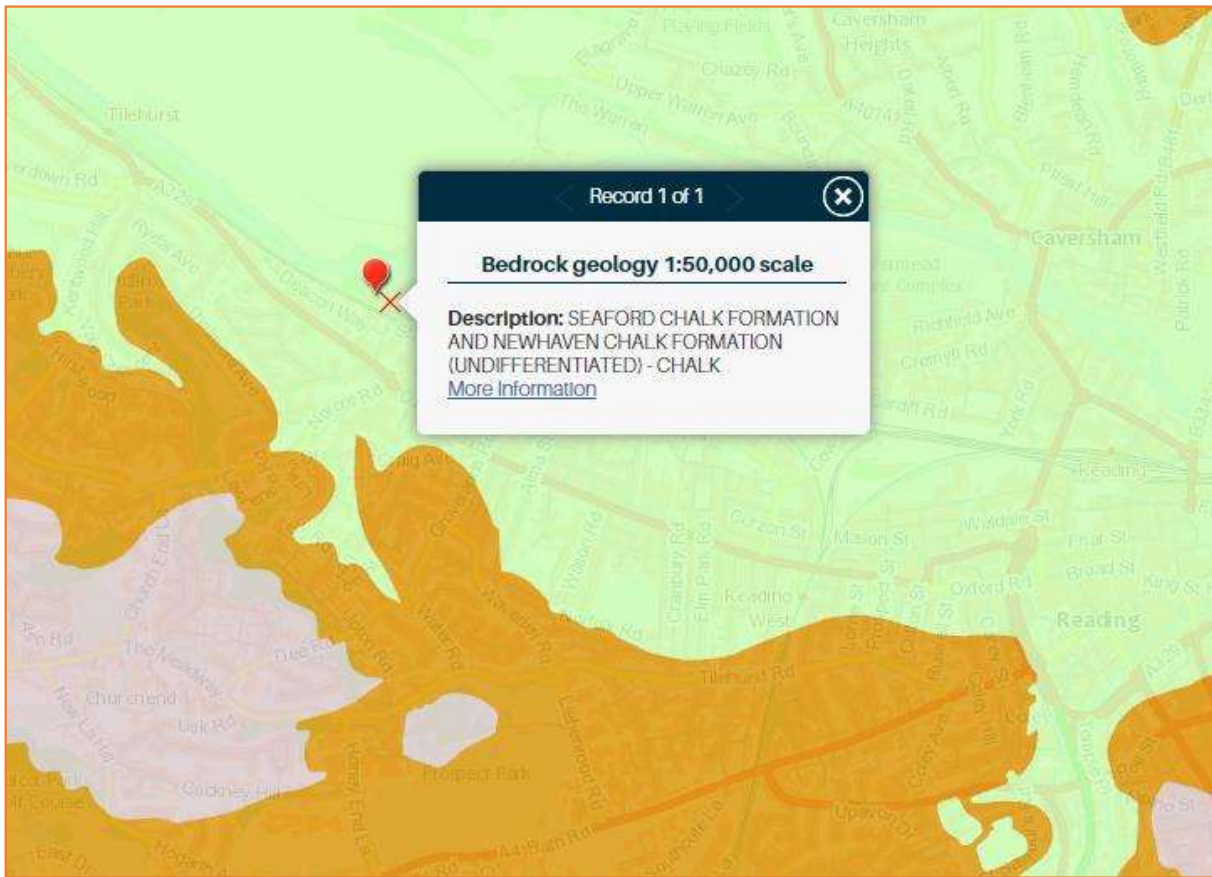


Figure 4: Local Bedrock Geology (Source: BGS)

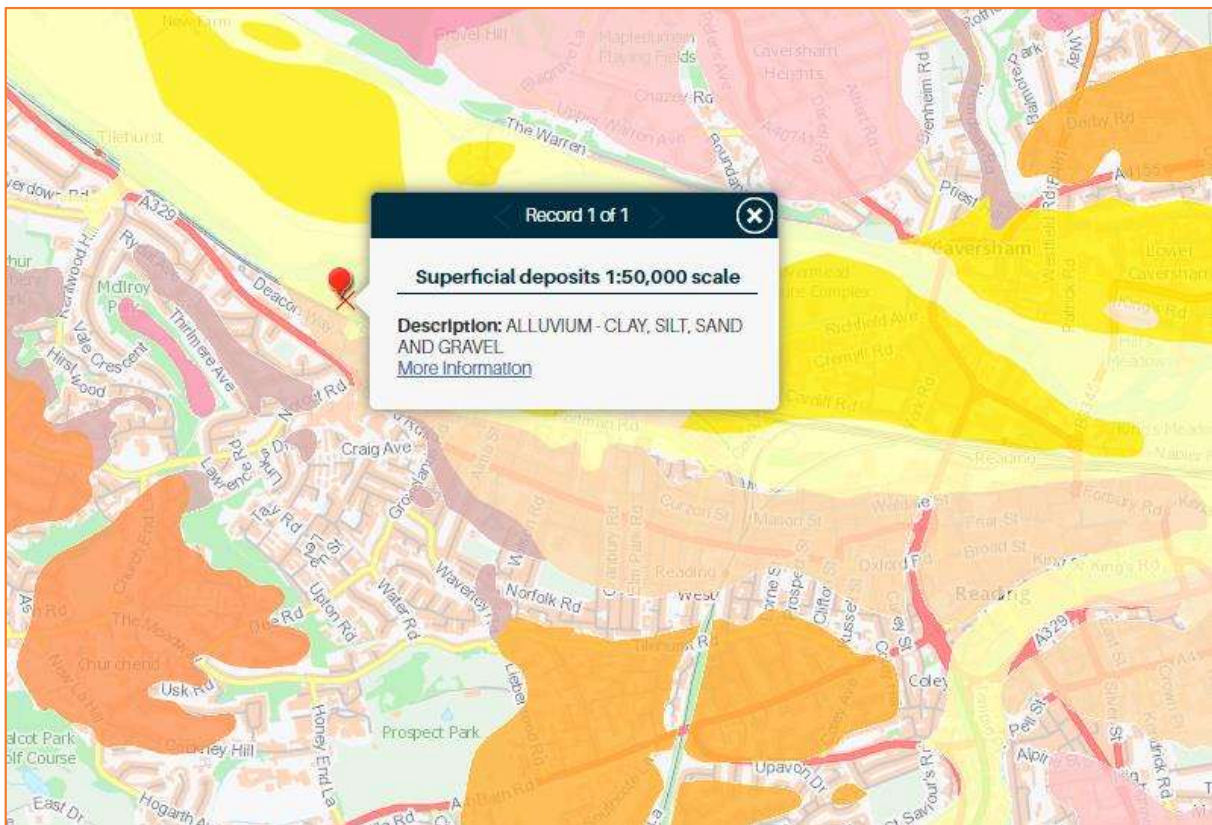


Figure 5: Local Superficial Deposits (Source: BGS)



Figure 6: Local Soil Types (Source: UKSO)

4. Development Proposal

The proposed application is for the change of use of the Land from Commercial (sui generis) premises previously trading as 'Cosy Kennels' with emphasis for dog breeding and grooming having onsite accommodation consisting of a detached 2 Bedroom Bungalow, to Residential Use. Residential Use to consist of the erection of a Detached Chalet Style 4 Bedroom Dwelling following the demolition of the existing bungalow, the installation of a Cycle and Refuse/Recycle Bin Store, a packaged Sewage Treatment Plant, hardstanding's including parking for 3 vehicles and 2 cycles, and external lighting, together with the Retrospective approval for the Retention of a 2 Bedroom 'Regent Kensington' Luxury Mobile Home and new entrance.

No new bedrooms are proposed on the ground floor. Internal access will be provided from the ground floor to the first floor of the property.

Proposed plans are provided in the report Appendix.

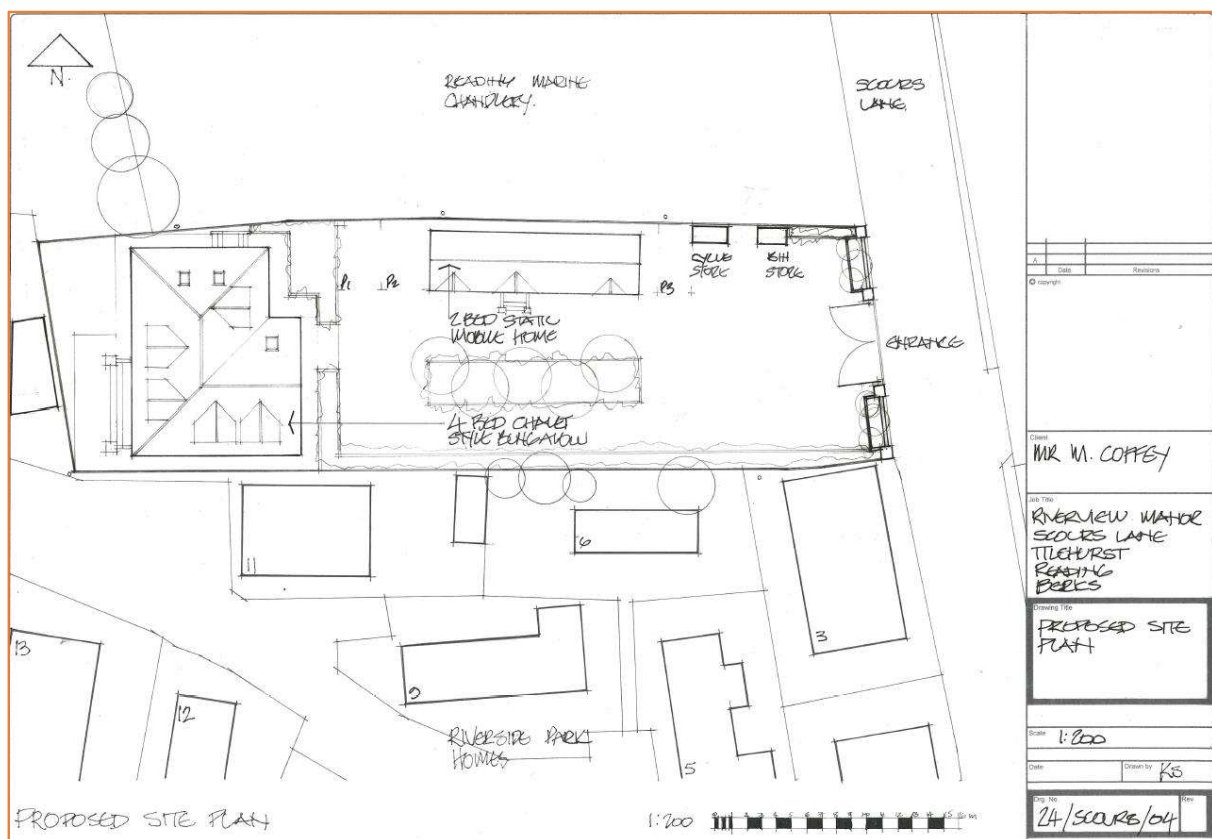


Figure 7: Proposed Site Plan (Source: Applicant)

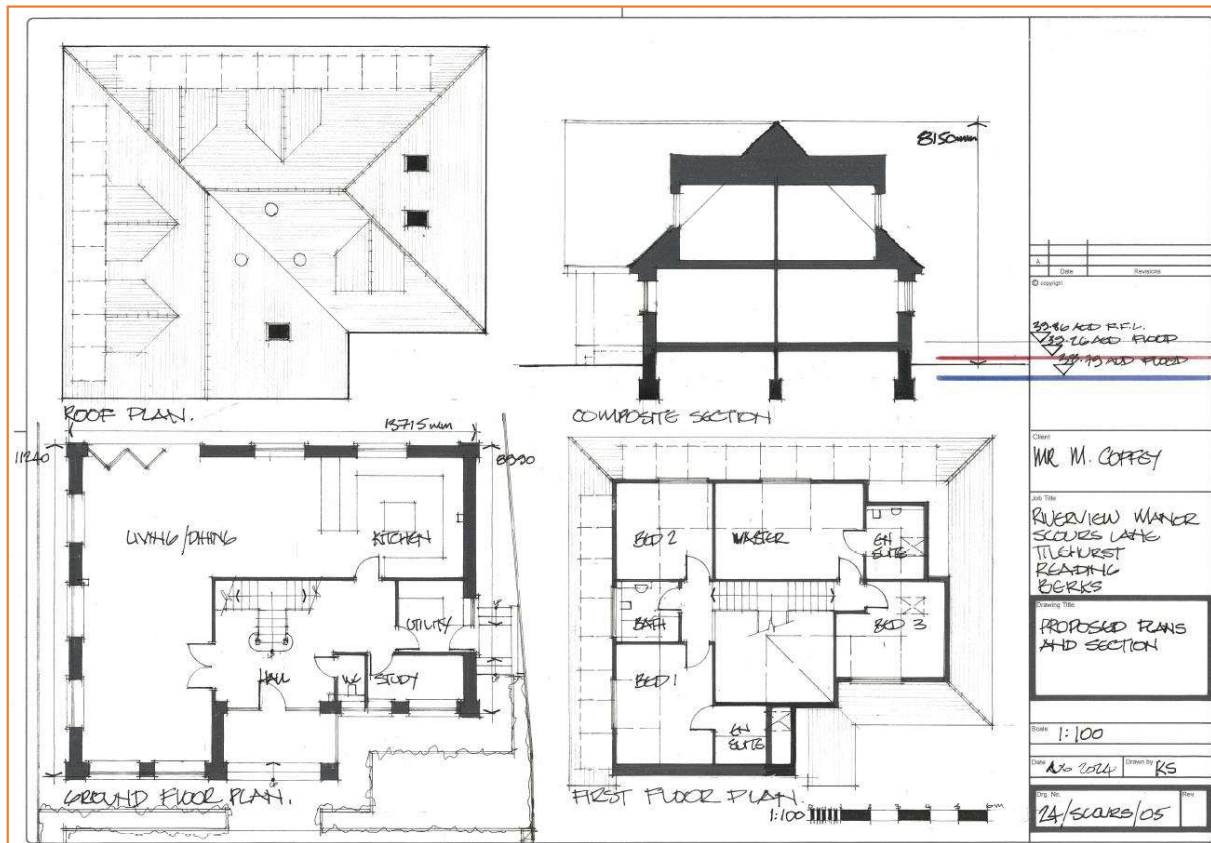


Figure 8: Proposed Plans and Section (Source: Applicant)



Figure 9: Proposed Elevations (Source: Applicant)

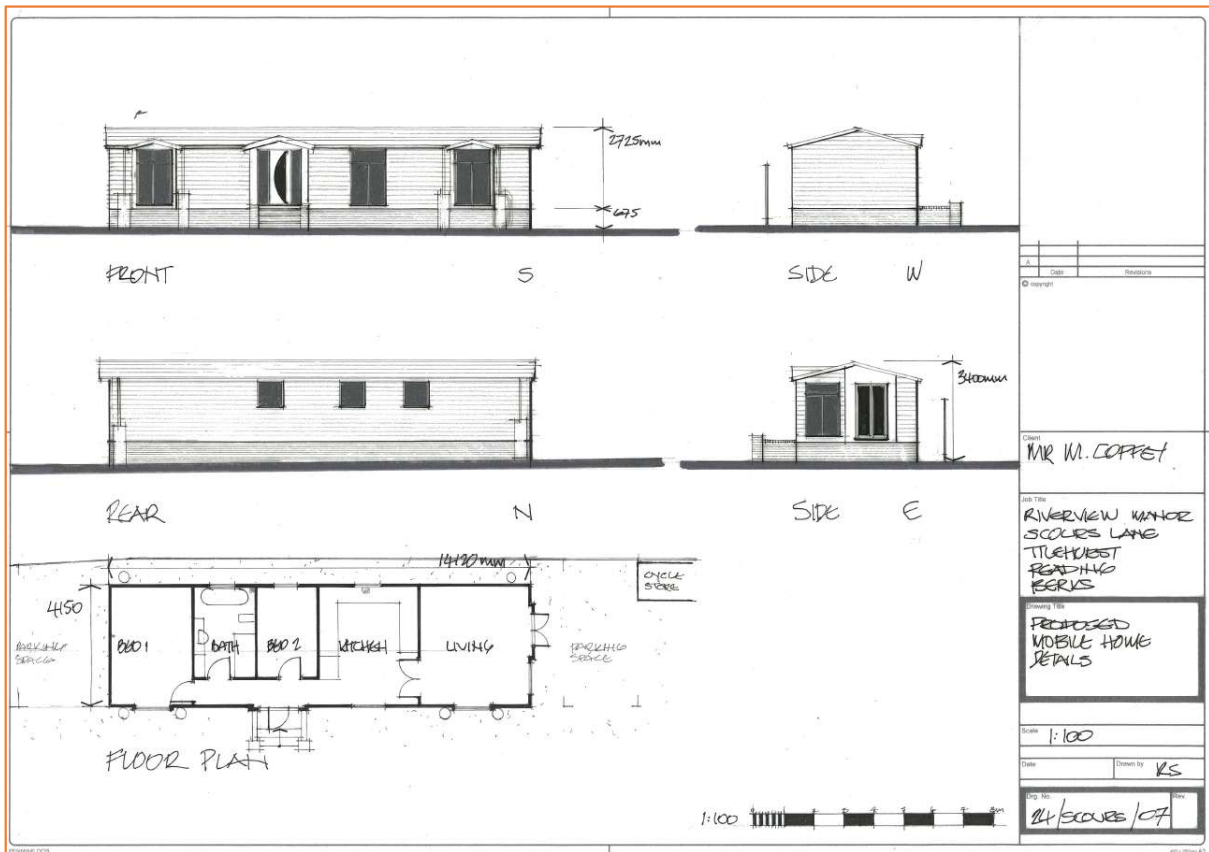


Figure 10: Proposed Mobile Home Details (Source: Applicant)

5. Assessment of Flood Risk

5.1 Flood Zones:

Within planning, Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood Map for Planning (Rivers and Sea), available on the Environment Agency's website.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Table 1: Flood Zones

The Flood Zones shown on the Environment Agency's Flood Map for Planning (Rivers and Sea) do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding.

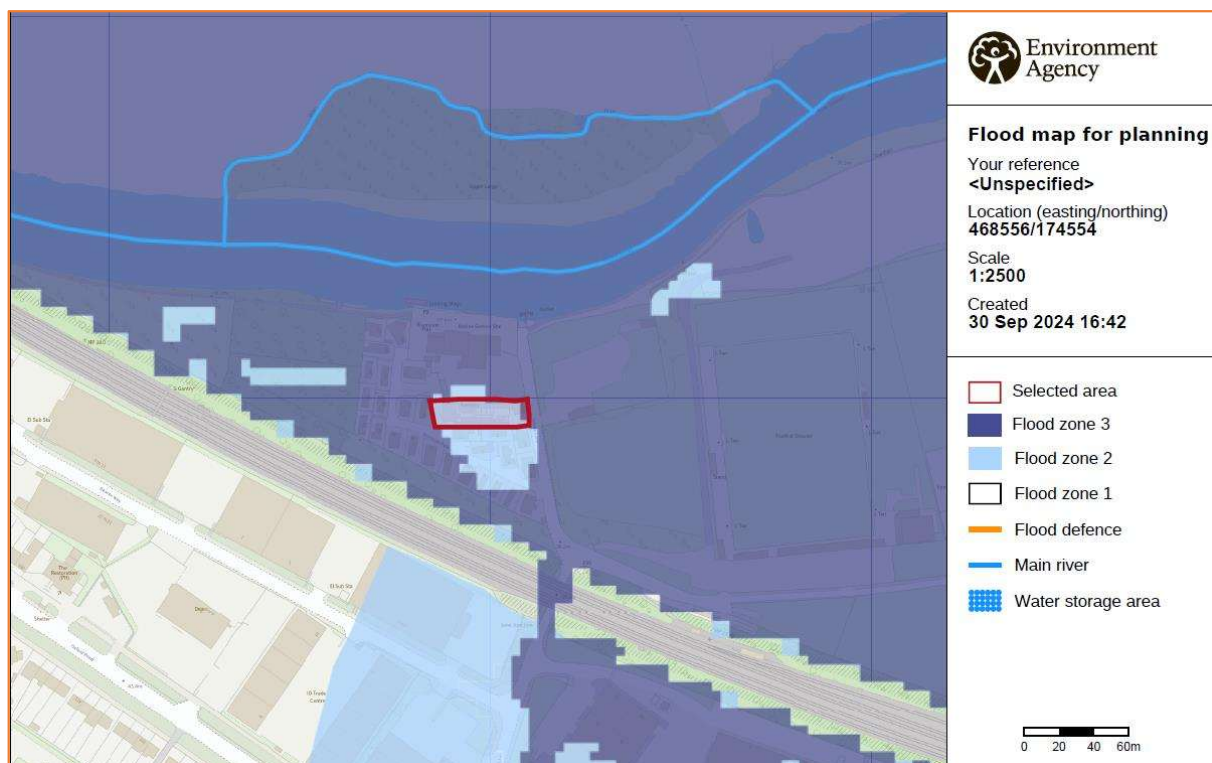


Figure 11: Environment Agency Flood Map for Planning (Rivers and Sea) (Source: EA)

The site is located partially within Flood Zone 2 (Medium Probability), which means it is defined as land having between a 1 in 100 and 1 in 1000 annual probability of river and sea flooding and is located partially within Flood Zone 3 (High Probability), which means it is defined as land having at least a 1:100 annual probability of fluvial flooding.

The risk would appear to be predominantly fluvial and originate from the River Thames located approximately 50m to the north of the site.

5.2 Fluvial (River Thames):

The River Thames is a river that flows through southern England. It is the longest river entirely in England and the second longest in the United Kingdom, after the River Severn. While it is best known for flowing through London, the river also flows alongside other towns and cities, including Oxford, Reading, Henley-on-Thames, and Windsor.

The usually quoted source of the Thames is at Thames Head. This is about 1.2km north of Kemble parish church in southern Gloucestershire, near the town of Cirencester, in the Cotswolds. Seven Springs near Cheltenham, where the river Churn rises, is also sometimes quoted as the Thames' source, as this location is furthest from the mouth, and adds 23km to the length.

The Thames River Basin District, including the Medway catchment, covers an area of 16,133km². The river basin includes both rural and heavily urbanised areas in the east and northern parts while the western parts of the catchment are predominantly rural. The area is among the driest in the United Kingdom. Water resources consist of groundwater from aquifers and water taken from the Thames and its tributaries, much of it stored in large bank-side reservoirs.

Brooks, canals and rivers, within an area of 9,950km², combine to form 38 main tributaries feeding the Thames between its source and Teddington Lock. This is the usual tidal limit; however, high spring tides can raise the head water level in the reach above Teddington and can occasionally reverse the river flow for a short time. In these circumstances, tidal effects can be observed upstream to the next lock beside Molesey weir. Before Teddington Lock was built in 1810–12, the river was tidal at peak spring tides as far as Staines upon Thames.

Below Teddington Lock (89km upstream of the Thames Estuary), the river is subject to tidal activity from the North Sea. Before the lock was installed, the river was tidal as far as Staines, 26km upstream.

The principal tributaries of the River Thames on the Tideway include the rivers Brent, Wandle, Effra, Westbourne, Fleet, Ravensbourne (the final part of which is called Deptford Creek), Lea, Roding, Darent and Ingrebourne. At London, the water is slightly brackish with sea salt, being a mix of sea and fresh water. This part of the river is managed by the Port of London Authority.

5.2.1 Modelled Flood Levels and Extents:

Product 4 modelled flood levels and extents have been requested from the Environment Agency for use within this report.

The EA has provided modelled flood levels from the Thames (Pangbourne to Sonning) 2019 flood model. The information provided is from the Reading and Caversham Flood Alleviation Scheme

Baseline Modelling Report undertaken by Jacobs in May 2021. The study was carried out using 1D-2D modelling software (Flood Modeller Pro-TUFLOW).

The site is located within Flood Zones 2 and 3, and will be classified as “more vulnerable” and “highly vulnerable” post development. The Flood Risk Assessments: climate change allowances guidance – updated May 2022, states that the Central climate change allowance based on the 50th percentile should be applied. The site falls within the Thames and South Chilterns Management Catchment, where the Central climate change allowance for the 2080s is a 31% increase in river flows. As such, the most suitable modelled flood data provided is a 35% increase in flows, which will thus be used for this assessment.

The EA have provided modelled flood levels for the present day 1:100 and 1:1000 year events. Modelling has also been provided for the 1:100 year plus 35% climate change allowance event. The site lies partially within the 1:100 year extent and entirely within the 1:100 year plus 35% and 1:1000 year extents.

	Modelled Flood Levels in meters AOD		
Return Period	1:100yr	1:100yr +35% Climate Change	1:1000yr
Modelled Flood Levels	38.79m AOD	39.26m AOD	39.35m AOD

Table 2: Modelled Flood Levels (Source: EA 2019)

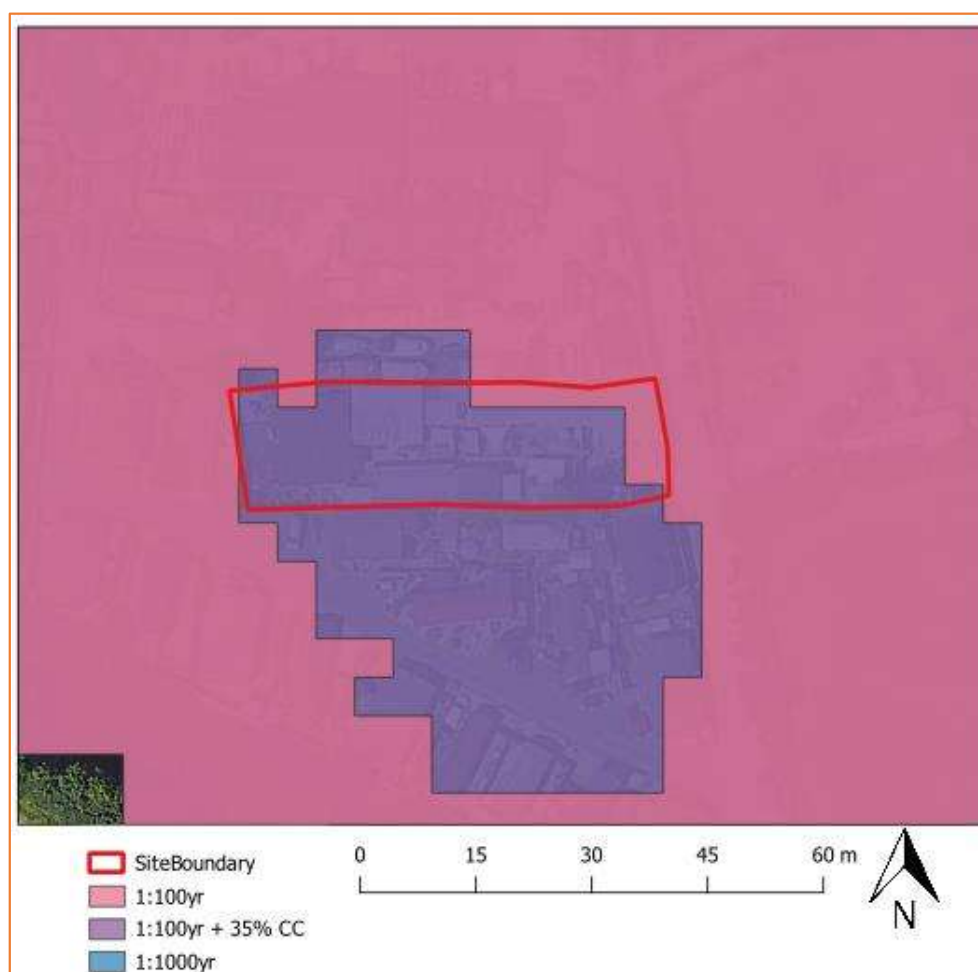


Figure 12: Modelled Flood Extents (Source: EA)

Based on the comparison of topographic site levels (38.47mAOD to 39.32mAOD) with the modelled 1:100 year flood level (38.79mAOD), shows the site is partially below the flood level. The site is between 0.32m below and 0.53m above the flood level. Comparison of modelled flood levels for the 1:100 year plus 35% climate change event (39.26mAOD) with site topographic levels (38.47mAOD to 39.32mAOD) show the site is partially below the flood level. The site is between 0.79m below and 0.06m above the flood level.

5.2.2 Flood Storage Areas:

Flood Storage Areas are areas that act as a balancing reservoir, storage basin or balancing pond. Their purpose is to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel. It may also delay the timing of a flood peak so that its volume is discharged over a longer time interval. Flood storage areas do not completely remove the chance of flooding and can be overtopped or fail in extreme weather conditions.

According to the EA, there are no flood storage areas in the vicinity of the site or surrounding area.

5.2.3 Flood Defences:

Flood defences are typically raised structures that alter natural flow patterns and prevent floodwater from entering property in times of flooding. They are generally categorised as either 'formal' or 'informal' defences. A 'formal' flood defence is a structure that was built specifically for the purpose of flood defence, and is maintained by its respective owner, which could be the Environment Agency, Local Authority, or an individual. An 'informal' flood defence is a structure that has not been specifically built to retain floodwater, and is not maintained for this specific purpose, but may afford some protection against flooding. The structural integrity and design standard is unknown for these types of defences, and their existence cannot always be guaranteed for the lifetime of a proposed development. These defences can include boundary walls, industrial buildings, railway embankments and road embankments situated immediately adjacent to rivers.

According to the EA, the site is currently defended by Natural High Ground which is maintained by a private individual, company or charity.

5.2.4 Residual Risk (breach or overtopping of flood defences):

Breaching of flood defences can cause rapid inundation of areas behind flood defences as flow in the river channel discharges through the breach. A breach can occur with little or no warning, although they are much more likely to concur with extreme river levels or tides when the stresses on flood defences are highest. Flood water flowing through a breach will normally discharge at a high velocity, rapidly filling up the areas behind the defences, resulting in significant damage to buildings and a high risk of loss of life. Breaches are most likely to occur in soft defences such as earth embankments although poorly maintained hard defences can also be a potential source of breach.

Overtopping of flood defences occurs when water levels exceed the protection level of raised flood defences. The worst case occurs when the fluvial or tidal levels exceed the defence level as this can lead to prolonged flooding. Less severe overtopping can occur when flood levels are below defence levels, but wave action causes cyclic overtopping, with intermittent discharge over the crest level of the defence. Flood defences are commonly designed with a freeboard to provide protection against overtopping from waves. The risk from overtopping due to exceedance of the flood defence level is much more significant than the risk posed by wave overtopping. Exceedance

of the flood defence level can lead to prolonged and rapid flooding with properties immediately behind the defences at highest risk.

Flood defences act to defend the site from direct inundation, but there is a residual risk from each (failure) and overtopping (exceedance) of flood defences.

5.2.5 Historical Flood Events:

The EA hold records of historic flood events from rivers and the sea. The EA map flooding to The EA hold records of historic flood events from rivers and the sea. The EA map flooding to land, not individual properties. Their historic flood event record outlines are an indication of the geographical extent of an observed flood event. Their historic flood event outlines do not give any indication of flood levels for individual properties. They also do not imply that any property within the outline has flooded internally.

According to EA records, the site has previously flooded in Spring 1947 due to channel capacity exceeded (no raised defences). Flooding has also occurred in close proximity to the site due to channel capacity exceeded (no raised defences) in Winter 2000 and Winter 2013/2014.

The Reading Borough Council Strategic Flood Risk Assessment 2017 confirms that flooding occurred at the site in March 1947, August 1977 and the winter of 2013/2014.

5.3 Pluvial (Surface Water):

Pluvial (surface water) flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.

In 2013 the EA, working with Lead Local Flood Authorities (LLFAs), produced an updated Flood Map for Surface Water. It is considered to represent a significant improvement on the previous surface water flood maps available, both in terms of method and representation of the risk of flooding. The modelling techniques and data used are considerably improved, and also incorporated locally produced mapping where this is available to represent features best modelled at a local scale.

The Flood Map for Surface Water assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year (annual probability of flooding is shown in brackets):

- High: Greater than or equal to 3.3% (1 in 30) chance in any given year (3.3%)
- Medium: Less than 3.3% (1 in 30) but greater than or equal to 1% (1 in 100) chance in any given year
- Low: Less than 1% (1 in 100) but greater than or equal to 0.1% (1 in 1,000) chance in any given year
- Very Low: Less than 0.1% (1 in 1,000) chance in any given year

The mapping below shows the Risk of Flooding from Surface Water centred on the postcode. Please note that the EA do not consider this information suitable to be used to identify the risk to individual properties or sites. It is useful to raise awareness in areas which may be at risk and may require additional investigation.

The EA Risk of Flooding from Surface Water Map suggests that the site lies in an area of "Very Low" risk from surface water.

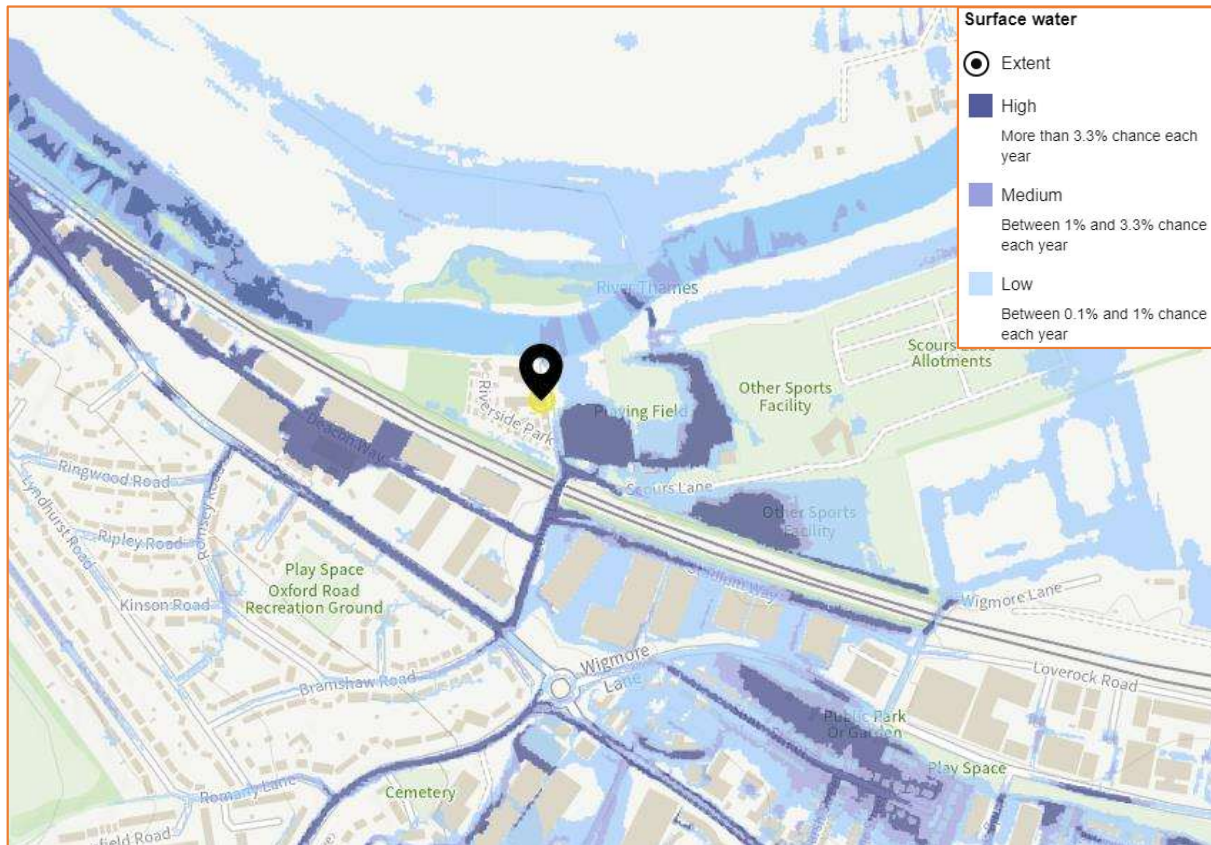


Figure 13: Extract from Environment Agency Surface Water Flood Map (Source: EA)

5.4 Groundwater:

Groundwater flooding occurs as a result of water rising up from the underlying rocks or from water flowing from abnormal springs. This tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas, the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). These may be extensive, regional aquifers, such as chalk or sandstone, or may be localised sands or river gravels in valley bottoms underlain by less permeable rocks. Groundwater flooding takes longer to dissipate because groundwater moves much more slowly than surface water and will take time to flow away underground.

According to the Reading Borough Council Strategic Flood Risk Assessment 2017, the site is located in an area that has between 50% and 75% susceptibility to groundwater flooding.

No further information has been provided to suggest that the site has been affected by groundwater flooding previously. The EA advise on their website that flooding from groundwater is unlikely.

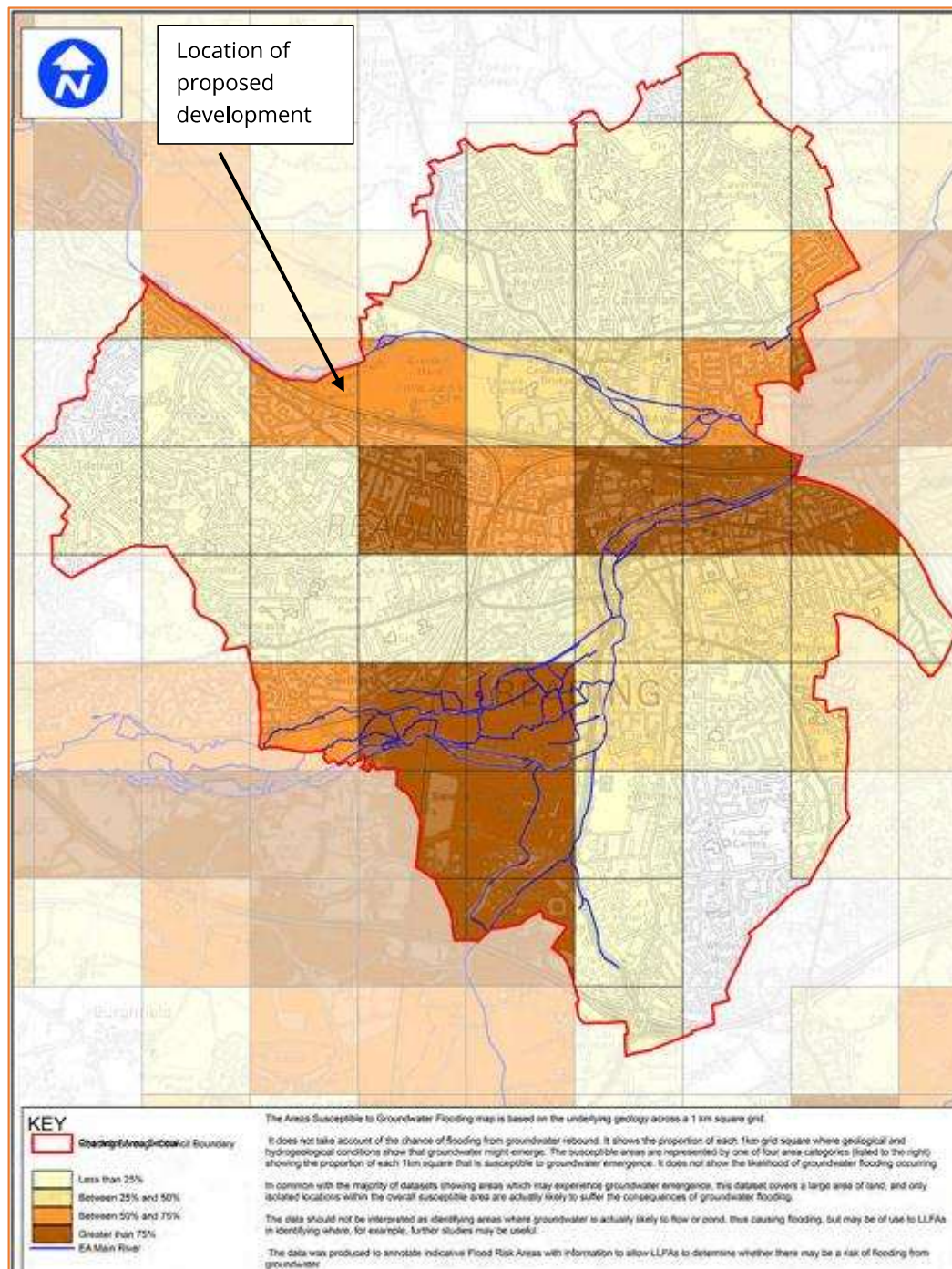


Figure 14: Areas Susceptible to Groundwater Flooding (Source: Reading Borough Council SFRA)

5.5 Sewer Surcharge:

Sewer flooding occurs when the sewer network cannot cope with the volume of water that is entering it. It is often experienced during times of heavy rainfall when large amounts of surface water overwhelm the sewer network causing flooding. Temporary problems such as blockages, siltation, collapses and equipment or operational failures can also result in sewer flooding.

All Water Companies have a statutory obligation to maintain a register of properties/areas which have reported records of flooding from the public sewerage system, and this is shown on the DG5

Flood Register. This includes records of flooding from foul sewers, combined sewers and surface water sewers which are deemed to be public and therefore maintained by the Water Company. The DG5 register records of flood incidents resulting in both internal property flooding and external flooding incidents. Once a property is identified on the DG5 register, water companies can typically put funding in place to address the issues and hence enable the property to be removed from the register. It should be noted that flooding from land drainage, highway drainage, rivers/watercourses and private sewers is not recorded within the register.

According to the Reading Borough Council Strategic Flood Risk Assessment 2017, the postcode in which the site is located (RG30 6) has experienced over 101 flood incidents recorded in Thames Water DG5 Register. No further information has been provided to suggest the site is susceptible to sewer flooding.

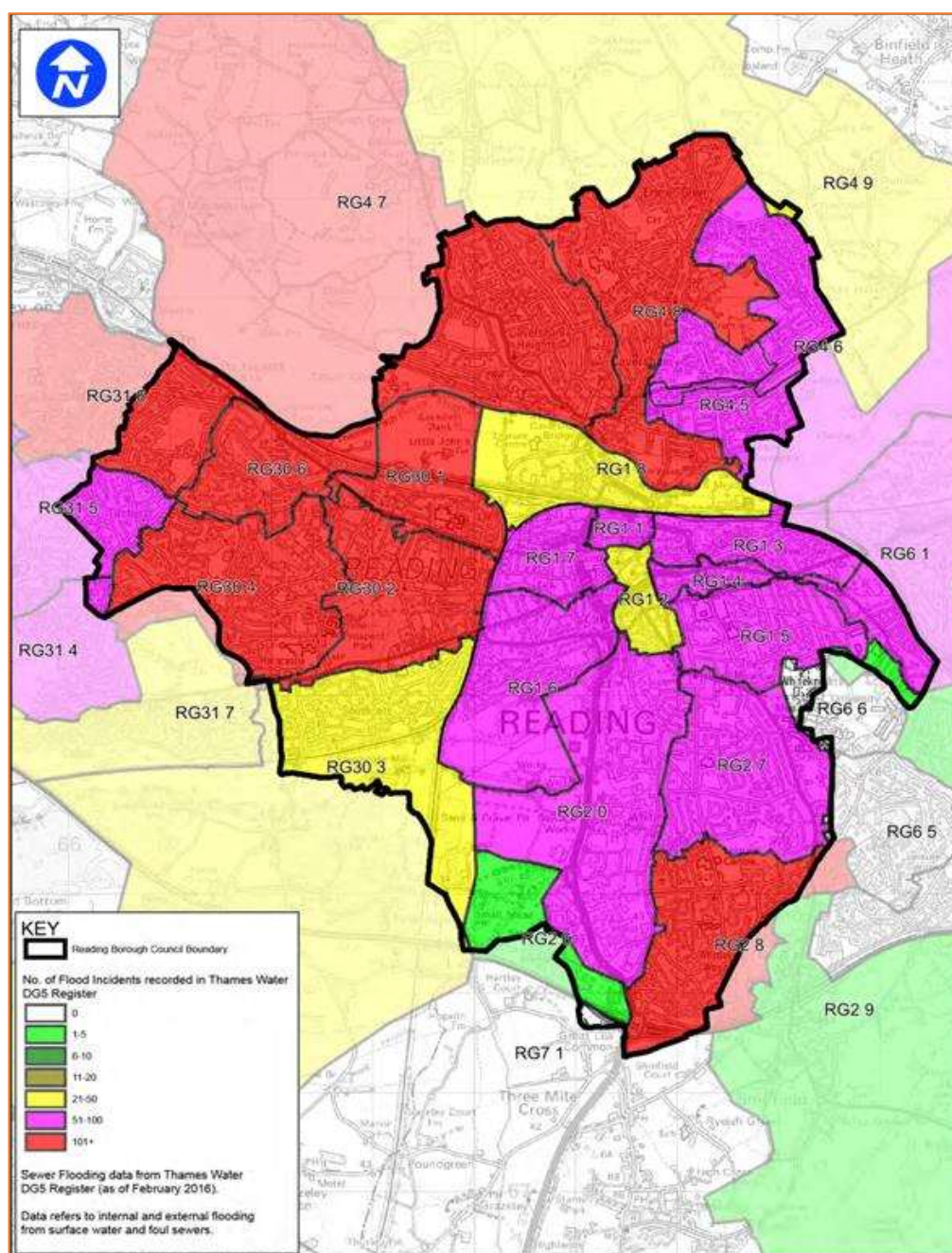


Figure 15: Thames Water Sewer Flooding Incidents (Source: Reading Borough Council SFRA)

5.6 Other Sources:

Reservoirs with an impounded volume in excess of 25,000 cubic metres (measured above natural ground level) are governed by the Reservoirs Act and are listed on a register held by the Environment Agency. The site is inside the maximum inundation extent when there is also flooding from rivers on the EA Reservoir Inundation Map. The EA also advise on their website that there is a risk of flooding from reservoirs in this area. There has been no loss of life in the UK from reservoir flooding since 1925. All major reservoirs have to be inspected by specialist dam and reservoir Engineers. In accordance with the Reservoirs Act 1975 in England, these inspections are monitored and enforced by the EA themselves. The risk to the site from reservoir flooding is therefore minimal and is far lower than that relating to the potential for fluvial / tidal flooding to occur. The Environment Agency Reservoir Flood Map illustrated below, illustrates the largest area that might be flooded if the storage area were to fail and release the water it is designed to hold during a flood event.

Records of flooding from reservoirs and canals are erratic as there is no requirement for the Environment Agency to provide information on historic flooding from canals and raised reservoirs on plans. In particular, the NPPF does not require flood risk from canals and raised reservoirs to be shown on the Environment Agency flood zones.

Overflows from canals can be common as they are often fed by land drainage, and often do not have controlled overflow spillways. Occasionally, major bank breaches also occur, leading to rapid and deep flooding of adjacent land.

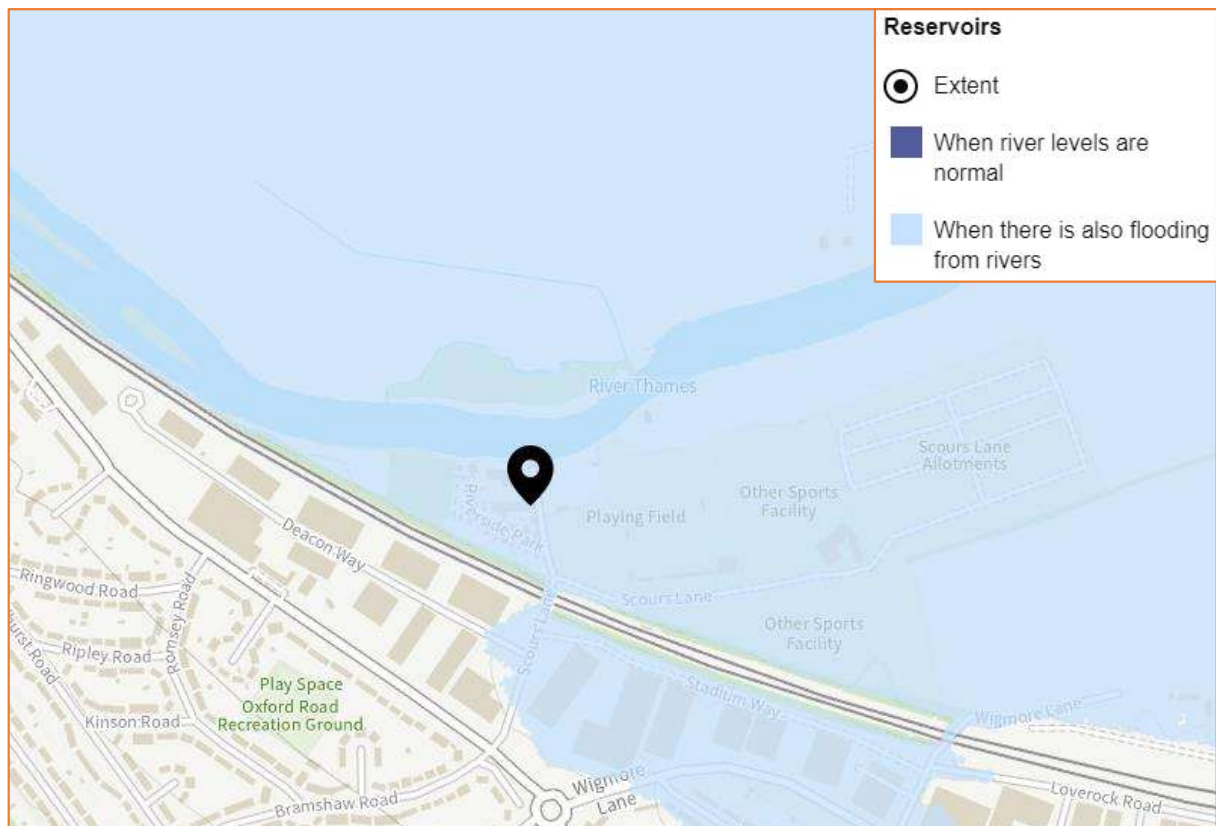


Figure 16: Extract from Environment Agency Reservoirs Flood Map (Source: EA)

6. Flood Risk Management

6.1 Vulnerability to Flooding:

The NPPF classifies property usage by vulnerability to flooding.

The existing site is classified as “more vulnerable” and “highly vulnerable”, as it is a residential dwelling and mobile home for permanent residential use. Post development, the site will be “more vulnerable” and “highly vulnerable” as the proposed application is for the erection of a detached chalet style 4 bedroom bungalow and the retrospective approval for the retention of a mobile home for permanent residential use.

Accordingly, it is considered that the vulnerability of the site will remain the same post development.

6.2 EA Standing Advice:

The EA Standing Advice guidance is for domestic extensions and non-domestic extensions where the additional footprint created by the development does not exceed 250m². It should not be applied if an additional dwelling is being created, e.g. a self-contained annexe or additional commercial unit.

6.3 Physical Design Measures:

The NPPF requires new residential floor levels be set at least 600mm above suitable modelled 1:100 year plus allowance for climate change flood levels. The finished floor levels will be raised at least 600mm above the 1 in 100 year plus 35% climate change allowance flood level (39.26mAOD) to give a finished floor level of 39.86mAOD.

To help protect against flooding during extreme events, the applicant will implement flood resistant design measures into the proposal, in consultation with the local Authority building control department. These measures can include the following:

- Waterproof screed used on floors;
- Solid (concrete) ground floor;
- Closed-cell foam used in wall cavities;
- Waterproof ground floor internal render;
- External walls rendered resistant to flooding to first floor level;
- Exterior ventilation outlets, utility points and air bricks fitted with removable waterproof covers;
- Ground floor electrical main ring run from a high level; and on separately switched circuit from first floor;
- Electrical incomer and meter situated at first floor level or above;
- Boilers, control and water storage / immersion installed at first floor level or above;
- Gas meter installed at first floor level or above;
- Plumbing insulation of closed-cell design;

- Non-return valves fitted to all drain and sewer outlets;
- Manhole covers secured;
- Anti-syphon fitted to all toilets;
- New Kitchen units of solid, water resistant material;
- Use of MDF carpentry (i.e. skirting, architrave, built-in storage) avoided at ground floor level;
- Stairs of solid hardwood construction with wood faces treated to resist water penetration.

The applicant should consider the use of demountable flood defence barriers to defend ground level doorways and low windows.

6.4 Safe Escape and Flood Action Plan:

The NPPF requires a route of safe escape for all residents and users to be provided from new residential properties in Flood Zone 3. Safe escape is usually defined as being through slow moving flood water no deeper than 25cm during the 1:100 year fluvial plus allowance for climate change flood event.

However, it should be noted that the proposed application is for the replacement of the existing residential property. No new units or additional dwelling will be created as part of the development.

Safe refuge is provided for all site occupants and users above the 1:100 year plus 35% climate change flood level within the replacement dwelling.

Internal access will be provided from the ground floor to the first floor of the development for all residential site users.

Residents and users should follow the warning and evacuation procedure detailed in the following section.

6.5 Flood Warning:

The EA is responsible for issuing flood warnings. Flood warnings are issued to the emergency services and local authorities. Both private individuals and organisations can sign-up to receive warnings via phone, text or email. This system of receiving warnings is currently voluntary.

Advice regarding severe flood warnings will generally be given during weather forecasts on local radio and TV. In the case of extreme events, warnings can also be disseminated via door to door visits by the police or locally appointed flood wardens.

The site lies within an Environment Agency Flood Warning Area. The EA issue flood warnings/alerts to specific areas when flooding is expected. It is recommended that the applicant registers online with the free Environment Agency Floodline Warnings/Alert Direct service at www.gov.uk/sign-up-for-flood-warnings to receive flood warnings by phone, text or email.

The flood warning service has three types of warnings that will help you prepare for flooding and take action:

Flood Warning	Flood Alert	Flood Warning	Severe Flood Warning
			
What it means?	Flooding is possible. Be prepared.	Flooding is expected. Immediate action required.	Severe flooding. Danger to life.
When it's used?	Two hours to two days in advance of flooding.	Half an hour to one day in advance of flooding.	When flooding poses a significant threat to life.
What to do?	Be prepared to act on your flood plan. Prepare a flood kit of essential items. Monitor local water levels and the flood forecast on our website.	Move family, pets and valuables to a safe place. Turn off gas, electricity and water supplies if safe to do so. Put flood protection equipment in place.	Stay in a safe place with a means of escape. Be ready should you need to evacuate from your home. Co-operate with the emergency services. Call 999 if you are in immediate danger.

Table 3: EA Flood Warning Service

6.6 Flood Plan:

It is recommended that the applicant and future owners, occupiers and Landlords of the property prepare a flood plan to protect life and property during a flood event:

Before a flood:

- Prepare and keep a list of all your important contacts to hand or save them on your mobile phone.
- Think about what items you can move now and what you would want to move to safety during a flood.
- Know how to turn off electricity and water supplies to the site.
- Prepare a flood kit of essential items and keep it handy. It can include copies of important documents, a torch, a battery-powered or wind-up radio, blankets and warm clothing, waterproofs, rubber gloves and a first aid kit including all essential medication.

During a flood:

- Activate the evacuation plan and evacuate the site.
- Remove cars from the site if there is sufficient warning and the water levels are not rising rapidly.
- Switch off water and electricity for the site.
- Tune into your local radio station on a battery or wind-up radio.
- Listen to the advice of the emergency service and evacuate if told to do so.

- Avoid walking or driving through flood water. Six inches of fast-flowing water can knock over an adult and two feet of water can move a car.

After a flood:

- If you have flooded, contact your insurance company as soon as possible.
- Take photographs and videos of your damaged property as a record for your insurance company.
- If you don't have insurance, contact your local authority for information on grants and charities that may help you.
- Flood water can contain sewage, chemicals and animal waste. Always wear waterproof outerwear, including gloves, wellington boots and a face mask.
- Have your electrics and water checked by qualified engineers before switching them back on.

6.7 Off-Site Impacts:**6.7.1 Fluvial Floodplain Storage:**

The NPPF requires that where development is proposed in undefended areas of floodplain, which lie outside of the functional floodplain, the implications of ground raising operations for flood risk elsewhere needs to be considered. Raising existing ground levels may reduce the capacity of the floodplain to accommodate floodwater and increase the risk of flooding by either increasing the depth of flooding to existing properties at risk or by extending the floodplain to cover properties normally outside of the floodplain. Flood storage capacity can be maintained by lowering ground levels either within the curtilage of the development or elsewhere in the floodplain, in order to maintain at least the same volume of flood storage capacity within the floodplain.

In undefended tidal areas, raising ground levels is unlikely to impact on maximum tidal levels so the provision of compensatory storage should not be necessary.

For development in a defended flood risk area, the impact on residual flood risk to other properties needs to be considered. New development behind flood defences can increase the residual risk of flooding if the flood defences are breached or overtopped by changing the conveyance of the flow paths or by displacing flood water elsewhere. If the potential impact on residual risk is unacceptable then mitigation should be provided.

The site is located partially within Flood Zone 2 and partially within Flood Zone 3 when using the Environment Agency Flood Map for planning (Rivers and Sea).

Comparison of topographic site levels (38.47mAOD to 39.32mAOD) with the modelled 1:100yr + 35% climate change flood level (39.26mAOD), shows the site is partially below the flood level.

Analysis of the site levels in comparison with the design flood level (39.26mAOD) shows that there is insufficient land of high enough elevation on site, to be able to provide full level-for-level floodplain compensation.

The top of the void (or the bottom of the floor slab) will be at least 39.26mAOD.

As such, so as not to displace any fluvial floodwater on site the applicant has agreed to construct the entire building using floodable voids thereby ensuring that there is no loss of flood storage on site:

- The voids will be at least 1m wide at every opening;
- The minimum height of the void beneath the building will be from ground level to the modelled 1:100 year level with allowance for climate change (a top of void height of 39.26mAOD);
- There will be a void opening at least every 5m, on all sides of the building;
- Vertical bars can be installed at 100mm centres to prevent the voids from being used for storage if required.

The voids will be constructed in accordance with the aforementioned criteria.

It is noted that the EA have previously suggested that voids are not considered appropriate for floodplain storage as these 'become blocked over time' and they claim that maintenance agreements can be difficult to ensure. However, we see no reason that the voids should become blocked or ineffective provided it is (i) constructed to the aforementioned guidelines as part of a planning condition, and (ii) appropriately managed and maintained.

It is recommended that the design and maintenance of the void is secured through the inclusion in the deeds of the property such that it remains accessible and clear for the lifetime of the development. Post development, there will be no unacceptable loss in flood storage post development.

6.7.2 Surface Water Drainage:

The development will utilise Sustainable drainage systems (SuDS) design in accordance with the NPPF for Planning Applications and the drainage hierarchy as follows:

1. Store rainwater for later use;
2. Infiltration techniques;
3. Attenuate rainwater by storing in tanks for gradual release;
4. Discharge rainwater direct into watercourse;
5. Discharge rainwater into surface water sewer;
6. Discharge rainwater into a combined sewer;

Due to the scale of the development, a full Surface Water Drainage Strategy is not required at this stage of planning. However, the applicant has confirmed that a sustainable drainage system will be installed which consists of:

"A new 'Kingspan Klargestor Gamma' Rainwater Harvester Tank which will provide the dwelling with grey water to flush toilets etc. reducing water consumption. Water butts will be installed to the downpipes of the Mobile Home. All hardstanding's are to be of a permeable construction restricting any surface water run-off".

7. Sequential and Exception Test

The Sequential Test aims to ensure that development does not take place in areas at high risk of flooding when appropriate areas of lower risk are reasonably available.

The Sequential Test is applied to developments in areas identified as being at risk of any source of flooding now or in the future. The Sequential Test ensures that a sequential, risk-based approach is followed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account.

The sequential approach 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. Other forms of flooding need to be treated consistently with river and tidal flooding in mapping probability and assessing vulnerability, so that the sequential approach can be applied across all areas of flood risk.

The site is located within Flood Zones 2 and 3 when using the Environment Agency Flood Map for Planning (Rivers and Sea), and an area at “very low” risk of flooding from surface water.

Post development, the site will remain “more vulnerable” and “highly vulnerable” throughout, as the proposed application is for the erection of a detached chalet style 4 bedroom bungalow and the retrospective approval for the retention of a mobile home for permanent residential use.

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

Table 4: Flood risk vulnerability and flood zone ‘compatibility’

Using the table above, the application is considered to be suitable within Flood Zone 3, subject to implementation of the Sequential and Exception test.

However, the proposed application is for a replacement dwelling, therefore there is no area sequentially better than to located the proposed development other than the site itself. As such finding an alternative site is not likely to be a realistic option. In addition, the site currently has a dilapidated 2 bedroom bungalow which is of a non-standard construction and the proposed development will therefore provide wider benefits to the community.

8. Discussion and Conclusions

Unda Consulting Limited have been appointed by Michael Coffey to undertake a Flood Risk Assessment for the proposed development at Riverview Manor (formerly Cosy Kennels), Scours Lane, Tilehurst, Reading, RG30 6AX. The FRA has been undertaken in accordance with the National Planning Policy Framework (NPPF) and the associated technical guidance.

The proposed application is for the change of use of the Land from Commercial (sui generis) premises previously trading as 'Cosy Kennels' with emphasis for dog breeding and grooming having onsite accommodation consisting of a detached 2 Bedroom Bungalow, to Residential Use. Residential Use to consist of the erection of a Detached Chalet Style 4 Bedroom Dwelling following the demolition of the existing bungalow, the installation of a Cycle and Refuse/Recycle Bin Store, a packaged Sewage Treatment Plant, hardstanding's including parking for 3 vehicles and 2 cycles, and external lighting, together with the Retrospective approval for the Retention of a 2 Bedroom 'Regent Kensington' Luxury Mobile Home and new entrance.

Post development, the site will be "more vulnerable" and "highly vulnerable" as the proposed application is for the erection of a detached chalet style 4 bedroom bungalow and the retrospective approval for the retention of a mobile home for permanent residential use.

The site is located partially within Flood Zone 2 (Medium Probability), which means it is defined as land having between a 1 in 100 and 1 in 1000 annual probability of river and sea flooding and is located partially within Flood Zone 3 (High Probability), which means it is defined as land having at least a 1:100 annual probability of fluvial flooding.

The risk would appear to be predominantly fluvial and originate from the River Thames located approximately 50m to the north of the site.

Product 4 modelled flood levels and extents have been requested from the Environment Agency for use within this report.

The EA has provided modelled flood levels from the Thames (Pangbourne to Sonning) 2019 flood model. The information provided is from the Reading and Caversham Flood Alleviation Scheme Baseline Modelling Report undertaken by Jacobs in May 2021. The study was carried out using 1D-2D modelling software (Flood Modeller Pro-TUFLOW).

The EA have provided modelled flood levels for the present day 1:100 and 1:1000 year events. Modelling has also been provided for the 1:100 year plus 35% climate change allowance event. The site lies partially within the 1:100 year extent and entirely within the 1:100 year plus 35% and 1:1000 year extents.

Based on the comparison of topographic site levels (38.47mAOD to 39.32mAOD) with the modelled 1:100 year flood level (38.79mAOD), shows the site is partially below the flood level. The site is between 0.32m below and 0.53m above the flood level. Comparison of modelled flood levels for the 1:100 year plus 35% climate change event (39.26mAOD) with site topographic levels (38.47mAOD to 39.32mAOD) show the site is partially below the flood level. The site is between 0.79m below and 0.06m above the flood level.

According to the EA, there are no flood storage areas in the vicinity of the site or surrounding area.

According to the EA, the site is currently defended by Natural High Ground which is maintained by a private individual, company or charity.

According to EA records, the site has previously flooded in Spring 1947 due to channel capacity exceeded (no raised defences). Flooding has also occurred in close proximity to the site due to channel capacity exceeded (no raised defences) in Winter 2000 and Winter 2013/2014. The Reading Borough Council Strategic Flood Risk Assessment 2017 confirms that flooding occurred at the site in March 1947, August 1977 and the winter of 2013/2014.

The EA Risk of Flooding from Surface Water Map suggests that the site lies in an area of "Very Low" risk from surface water.

According to the Reading Borough Council Strategic Flood Risk Assessment 2017, the site is located in an area that has between 50% and 75% susceptibility to groundwater flooding.

According to the Reading Borough Council Strategic Flood Risk Assessment 2017, the postcode in which the site is located (RG30 6) has experienced over 101 flood incidents recorded in Thames Water DG5 Register.

The site is inside the maximum inundation extent when there is also flooding from rivers on the EA Reservoir Inundation Map. The EA also advise on their website that there is a risk of flooding from reservoirs in this area.

The NPPF requires new residential floor levels be set at least 600mm above suitable modelled 1:100 year plus allowance for climate change flood levels. The finished floor levels will be raised at least 600mm above the 1 in 100 year plus 35% climate change allowance flood level (39.26m AOD) to give a finished floor level of 39.86m AOD.

To ensure that there will be no loss in fluvial flood storage, the applicant has agreed that the finished floor level will be elevated on voids covering the whole footprint.

Due to the scale of the development, a full Surface Water Drainage Strategy is not required at this stage of planning. However, the applicant has confirmed that a sustainable drainage system will be installed.

The applicant has confirmed that:

- The proposed development is for the change of use of the Land from Commercial (sui generis) premises previously trading as 'Cosy Kennels' with emphasis for dog breeding and grooming having onsite accommodation consisting of a detached 2 Bedroom Bungalow, to Residential Use. Residential Use to consist of the erection of a Detached Chalet Style 4 Bedroom Dwelling following the demolition of the existing bungalow, the installation of a Cycle and Refuse/Recycle Bin Store, a packaged Sewage Treatment Plant, hardstanding's including parking for 3 vehicles and 2 cycles, and external lighting, together with the Retrospective approval for the Retention of a 2 Bedroom 'Regent Kensington' Luxury Mobile Home and new entrance.
- Finished ground floor levels will be set at least 600mm above the 1:100 year + climate change allowance flood level.
- Flood proofing of the development will be incorporated as appropriate.

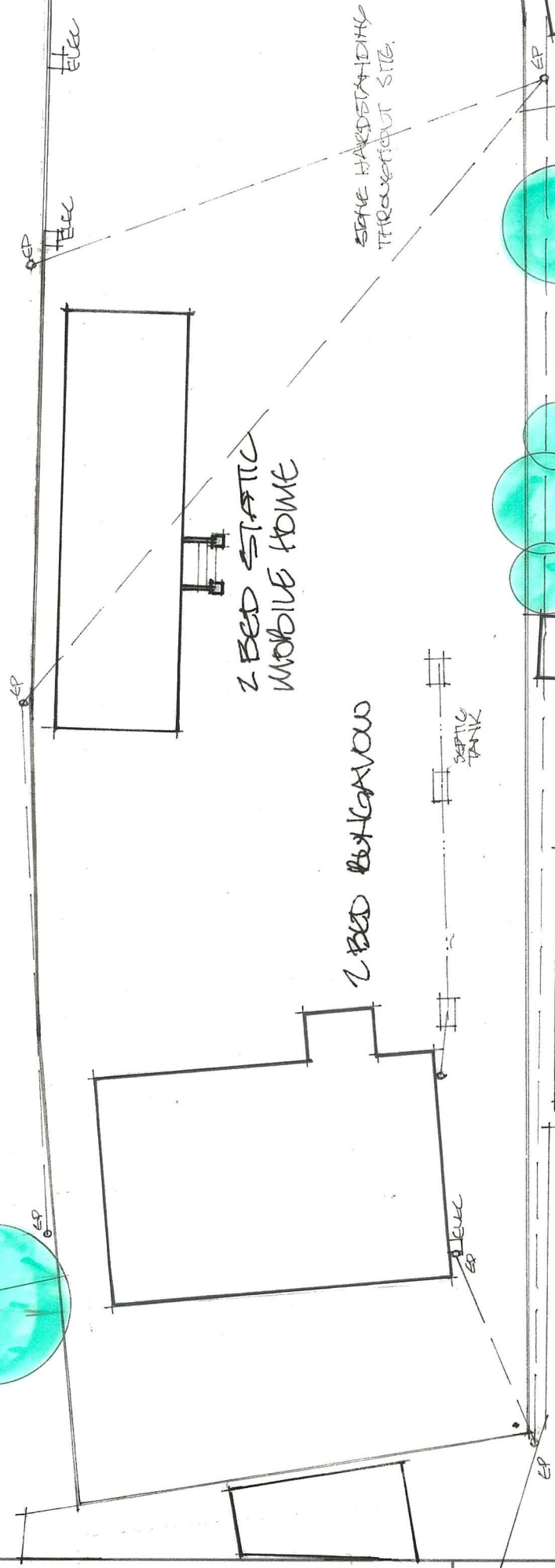
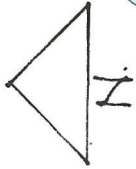
- To ensure that there will be no loss of fluvial flood storage, the applicant has agreed that the finished floor level will be elevated on voids covering the whole footprint.
- A flood warning and evacuation plan will be implemented post development.
- The applicant will register with the Environment Agency Floodline Alert/Warnings Direct service.
- Due to the scale of the development, a full Surface Water Drainage Strategy is not required at this stage of planning.

Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

Appendix

- Existing and Proposed plans;
- Proposed Flood Void Details;
- EA Flood Map for Planning.

REARLAND WAREHOUSE
GARAGE



2 BED STATIC
MOBILE HOME

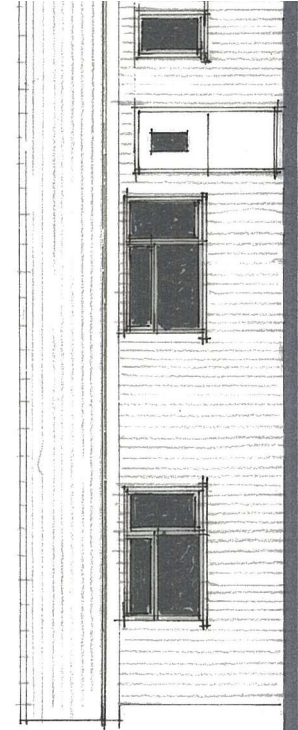
2 BED BUNGALOW

SEPTIC
TANK

6.

11

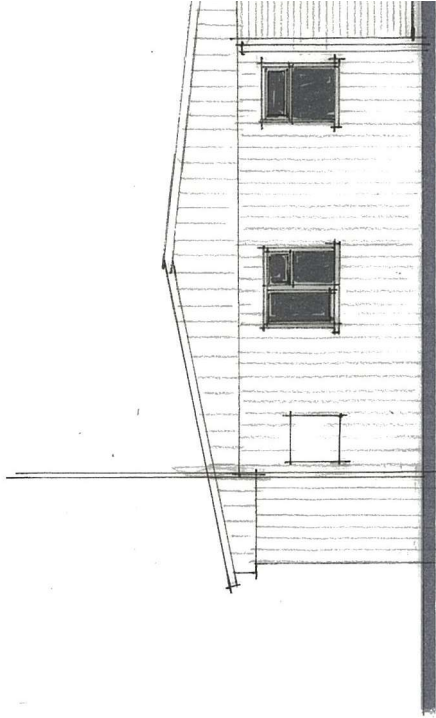
CHANGING
CABINETS



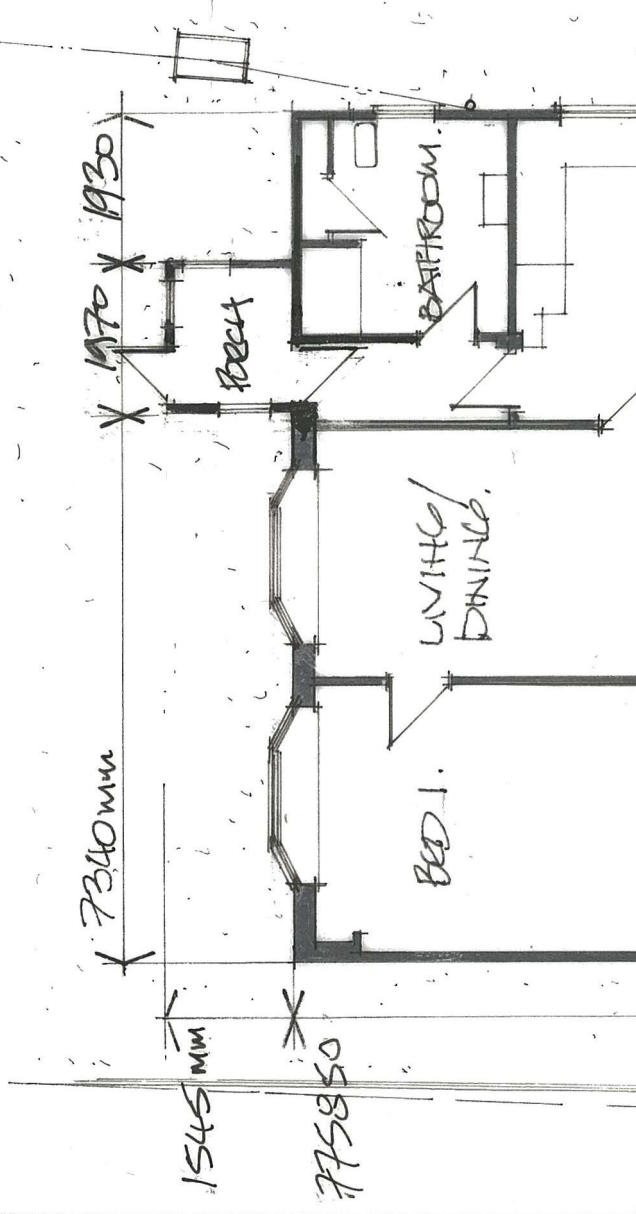
3500mm

FRONT

REAR



SIDE



1545mm

7758mm

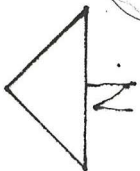
1970 x 1930

REAR

LIVING/DINING

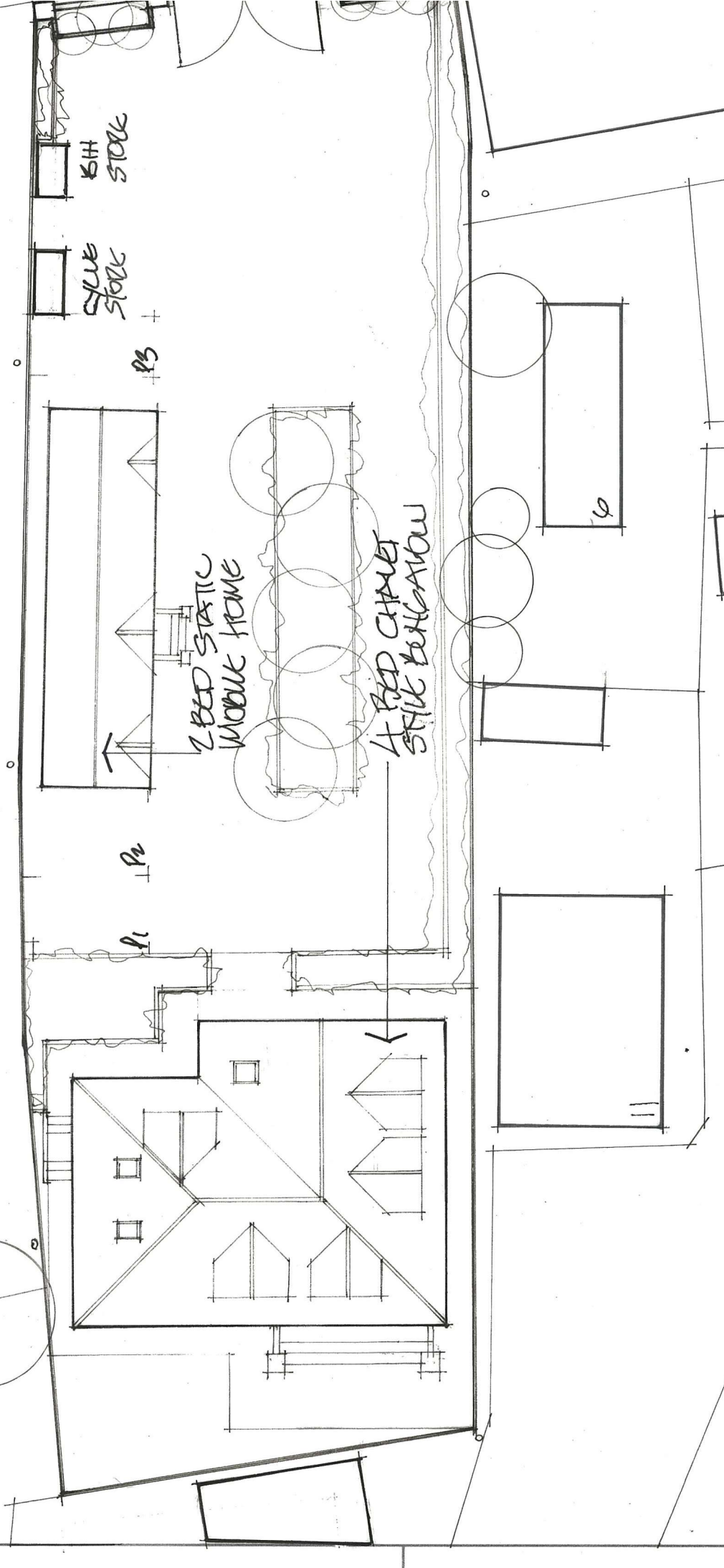
BED 1.

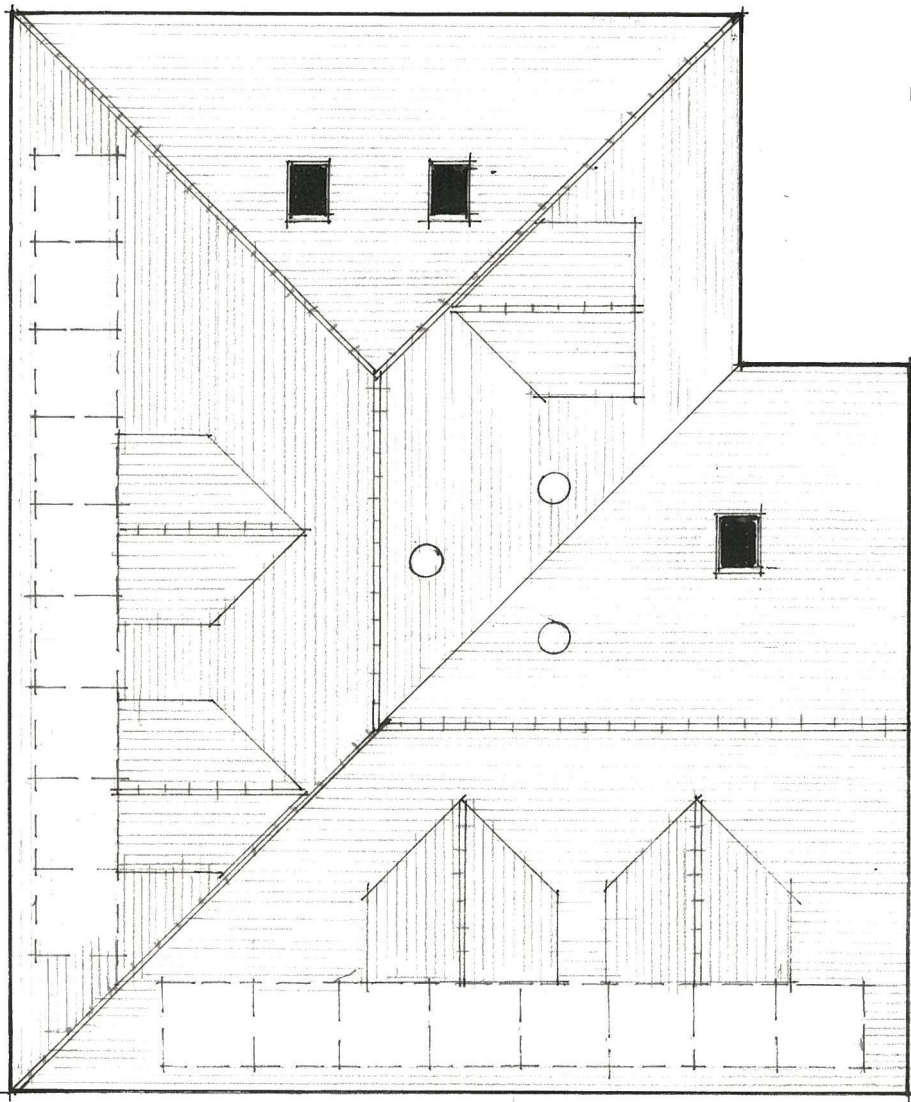
BATHROOM



READY MADE
CHANDURY.

2

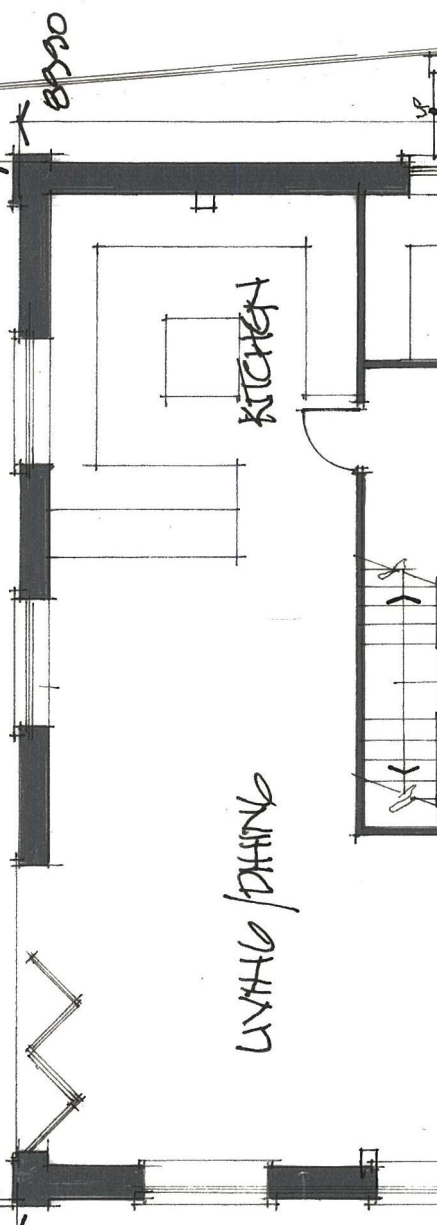




ROOF PLAN.

13715 mm

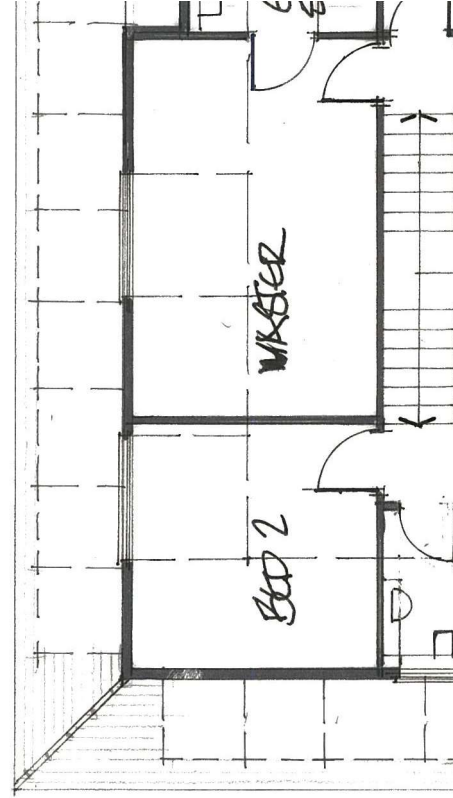
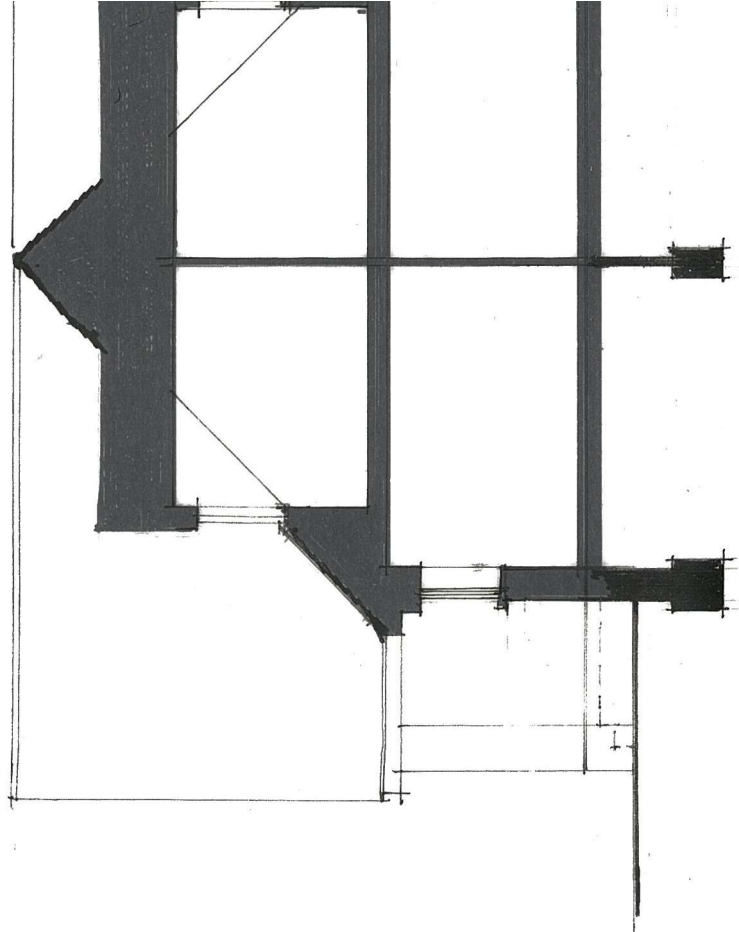
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LIVING / DINING

KITCHEN

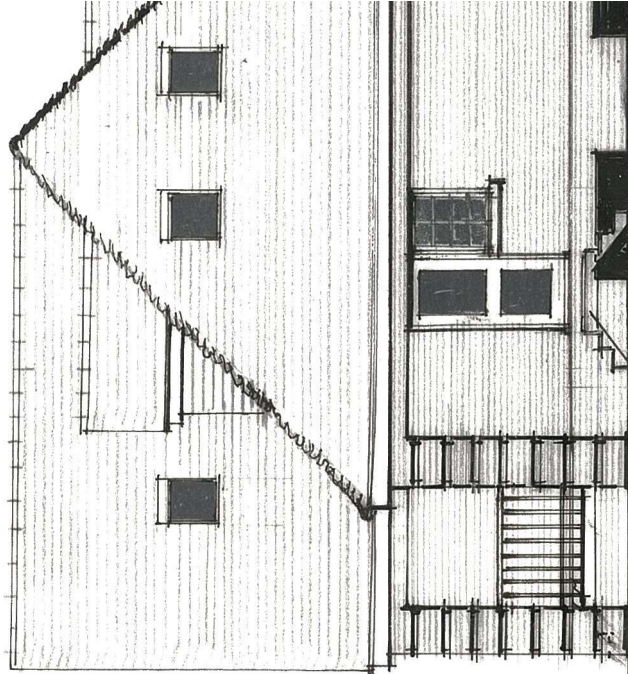
COMPOSITE SECTION



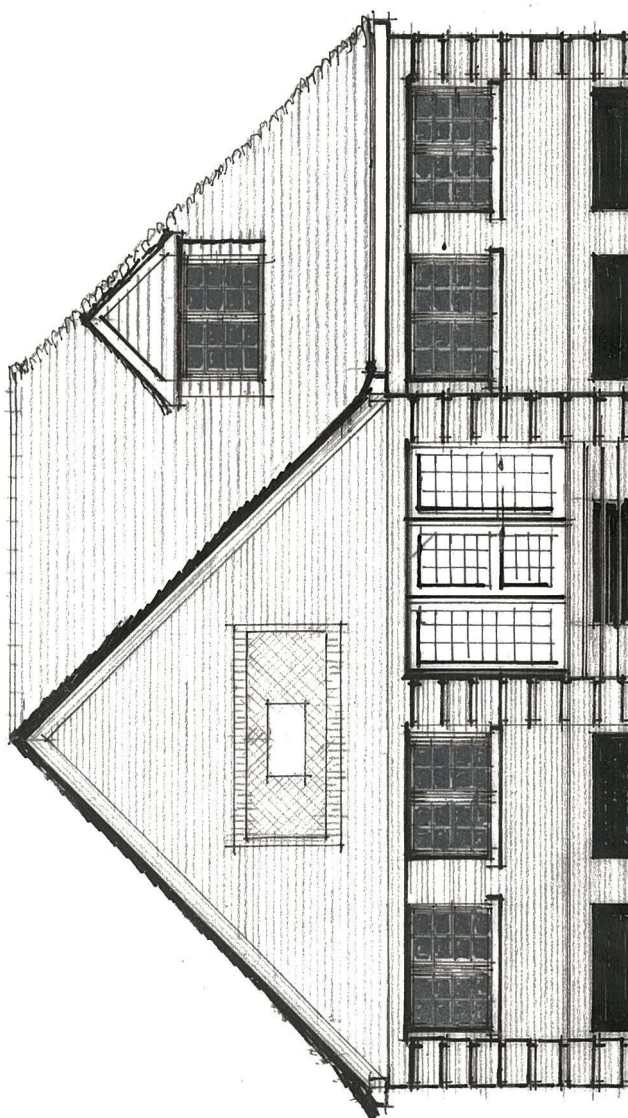
BED 1

BED 2

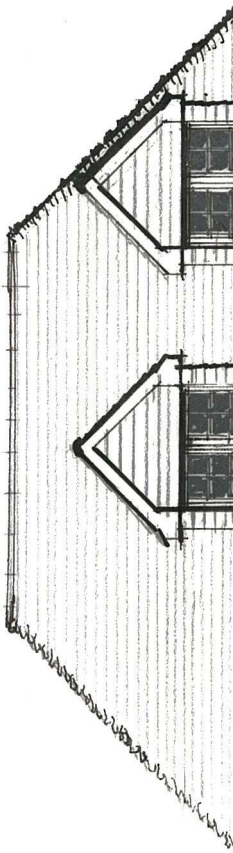
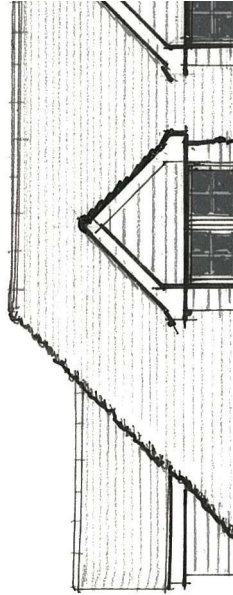
BATH

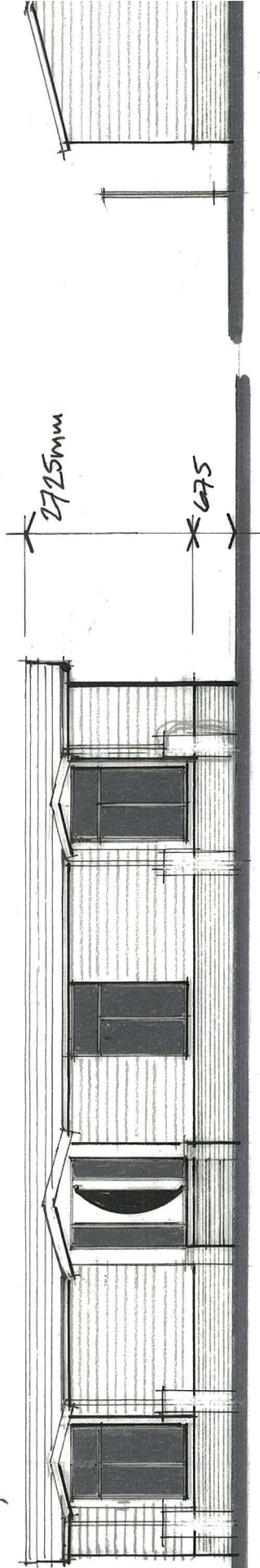


SIDE



FRONT

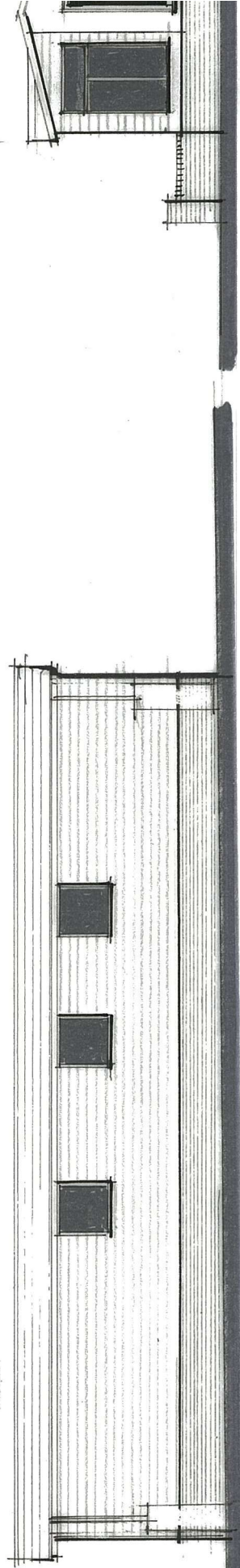




FRONT

S

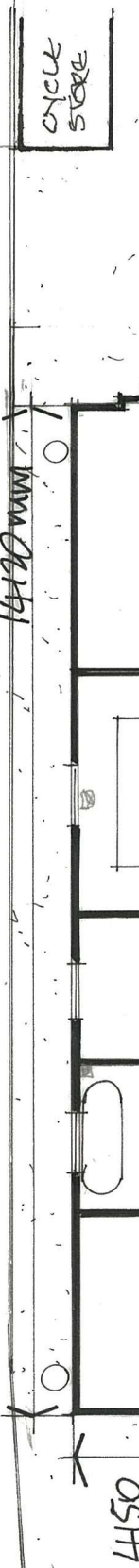
SIDE



REAR

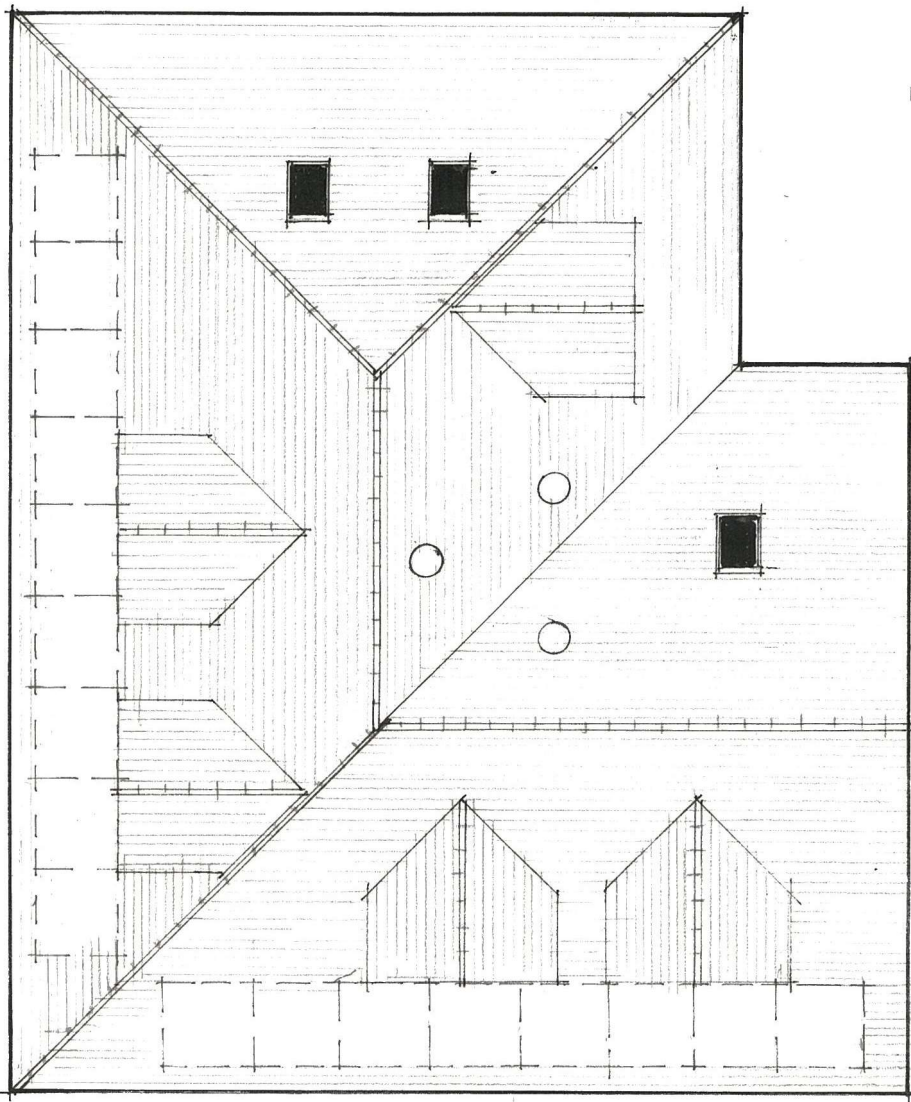
N

SIDE



1000mm

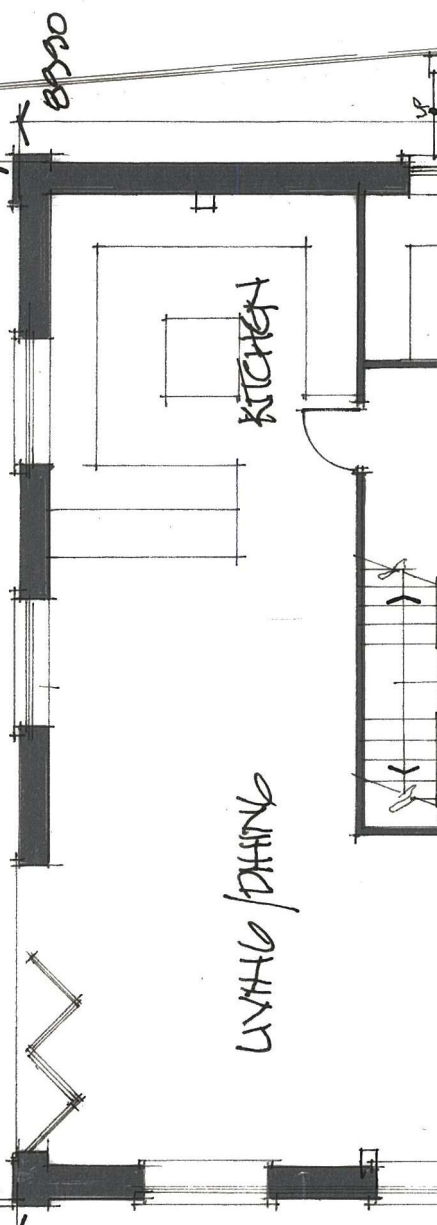
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ROOF PLAN.

13715 mm

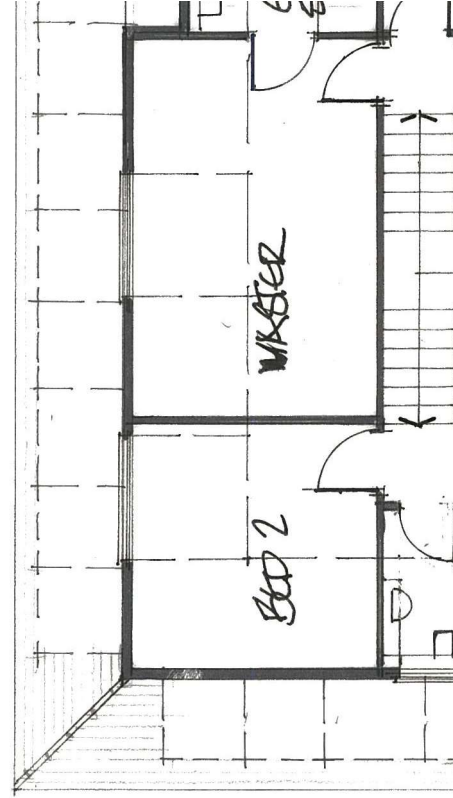
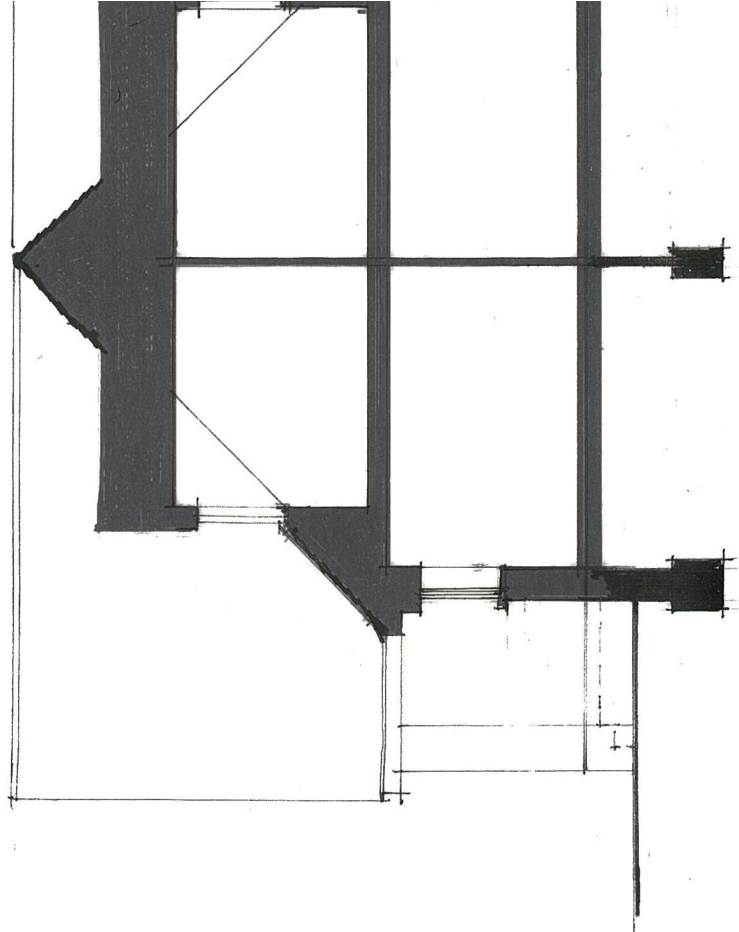
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LIVING / DINING

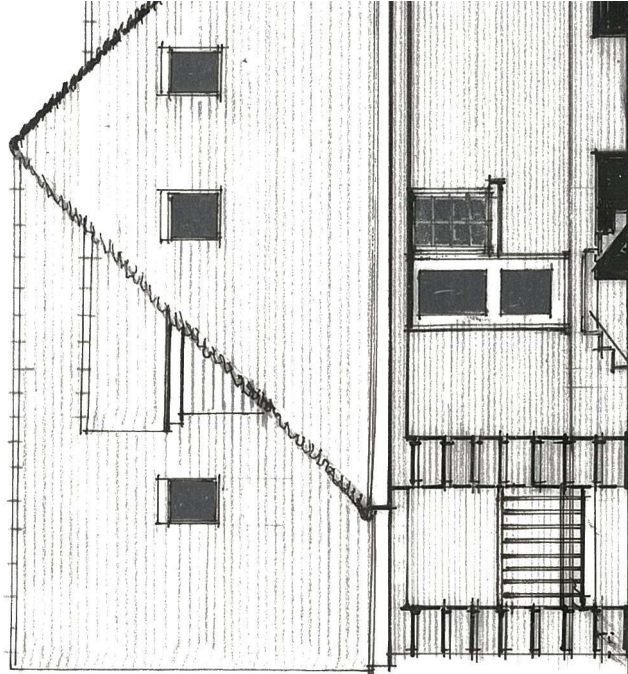
KITCHEN

COMPOSITE SECTION

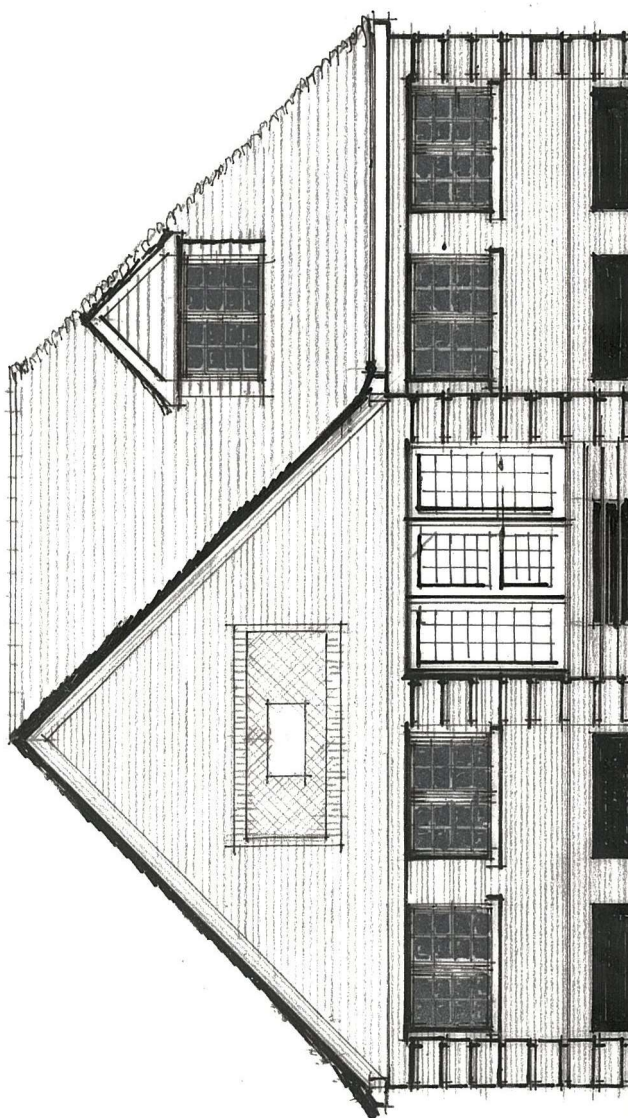


BED 2

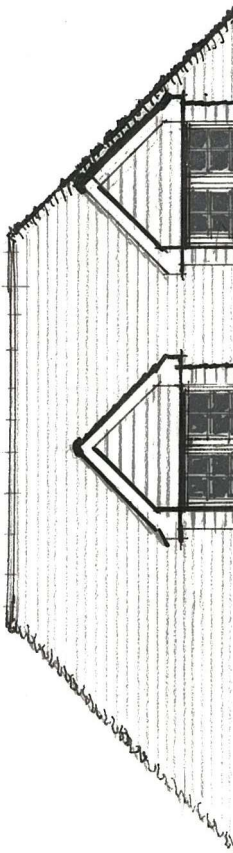
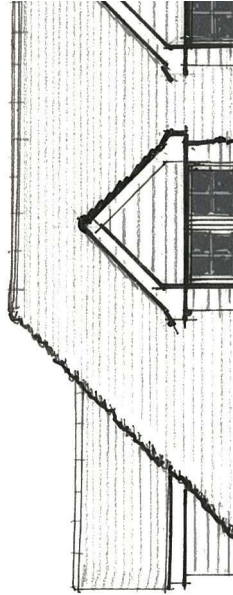
BED 1



SIDE



FRONT



FINISH

WORK

1/6 AREA
(11+100)
25%
CUMULATIVE

1/6 AREA
(11+100)

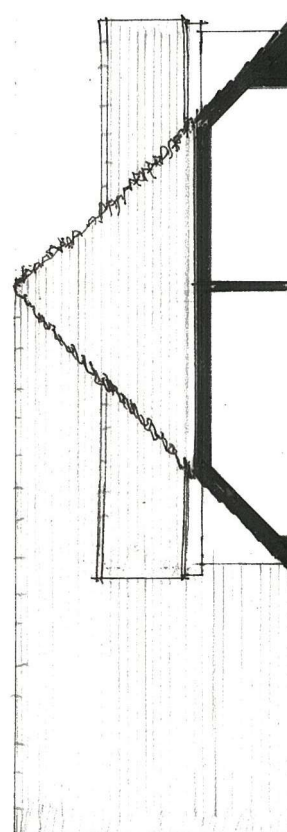
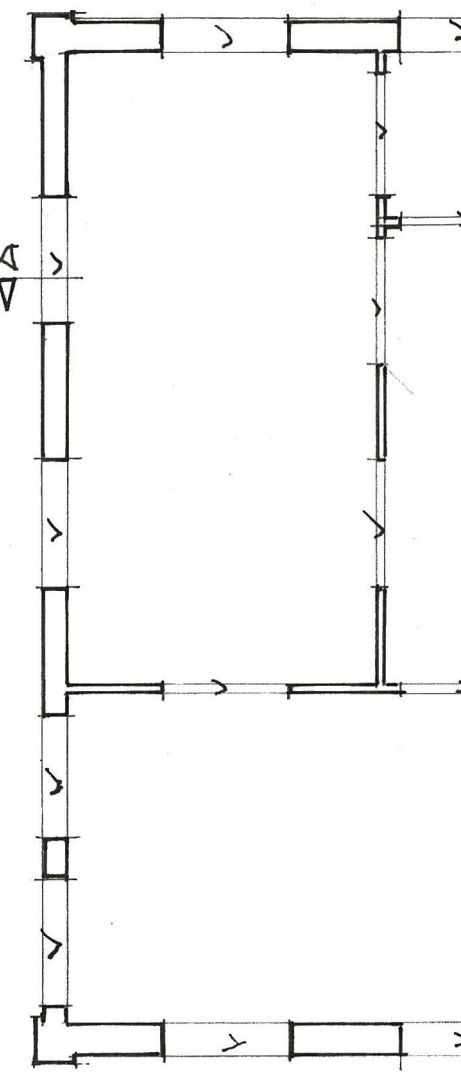
1:10

1007.5mm VOID DEPTH
(HEIGHT VARIES)

18mm DIA. METAL BARS.

40x12mm ANGLE

ELEVATION OF FLOOD VOID OPENING



Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
468556/174554

Created
30 Sep 2024 16:42

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)

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)
468556/174554

Scale
1:2500

Created
30 Sep 2024 16:42

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

