



Flood Risk Assessment and Surface Water Drainage Strategy for Planning

Prepared for:

SFPD Limited

Location:

Eastleigh Leisure Centre
Passfield Avenue
Eastleigh
Hampshire
SO50 9NL

April 2024

Our reference:

94001-SFPD-PassfieldAv_FRA&SuDS



Document Issue Record

Location:	Eastleigh Leisure Centre, Passfield Avenue, Eastleigh, Hampshire, SO50 9NL				
Application:	Construction of 4no. outdoor padel courts with an open sided canopy at Eastleigh Leisure Centre, Passfield Avenue, Eastleigh, Hampshire, SO50 9NL				
Prepared for:	SFPD Limited				
Title:	Flood Risk Assessment and Surface Water Drainage Strategy for Planning				
Project No.:	94001	Date:	22 nd April 2024	Issue No.:	1.0
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1. Introduction

- 1.1. This Flood Risk Assessment and Surface Water Drainage Strategy has been prepared by Unda Consulting Limited on behalf of SFPD Limited, in support of a planning application for the construction of 4no. outdoor padel courts with an open sided canopy at Eastleigh Leisure Centre, Passfield Avenue, Eastleigh, Hampshire, SO50 9NL. This report assesses the flood risk and surface water drainage strategy for the proposed development.
- 1.2. The proposed planning application is for the construction of 4no. outdoor padel courts with an open sided canopy at Eastleigh Leisure Centre, Passfield Avenue, Eastleigh, Hampshire, SO50 9NL. Post development the built footprint of the padel courts will cover approximately 1425m².
- 1.3. In order to mitigate flood risk posed by post development runoff, adequate control measures will be required within the site. This will ensure that surface water runoff is dealt with at source and the flood risk off site is not increased.

2. Existing Site:

- 2.1. The site is currently a field within the Eastleigh Leisure Centre complex.
- 2.2. The surrounding area is characterised by residential dwellings.



Figure 1: Aerial View of the Site (Source: Google Earth)

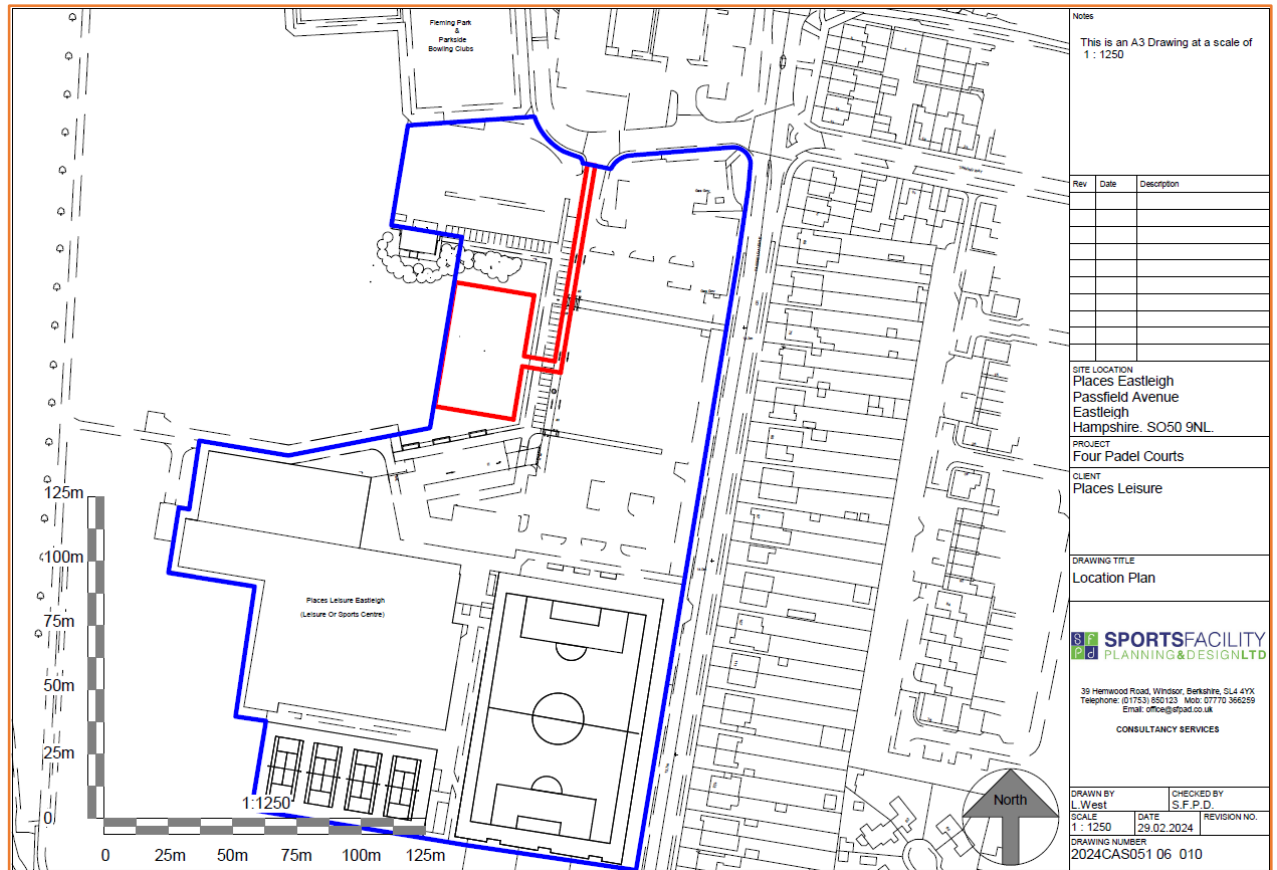


Figure 2: Existing Site Plan (Source: Sports Facility Planning & Design Ltd.)

Site Topography:

- 2.3. A measured topographic survey provided by the Applicant shows that the topographic levels on site range from 14.77m AOD to 14.81m AOD.
- 2.4. The Applicant has confirmed that the finished floor level of the padel courts and entrance pathway is to be 14.80m AOD.

Existing Ground Conditions:

- 2.5. The 1:50,000 BGS map showed the site to be located directly upon the bedrock of Wittering Formation – Sand, Silt and Clay.
- 2.6. According to the BGS, the site is underlain by River Terrace – Sand and Gravel superficial geological deposits.
- 2.7. The soil type of the site, according to the 1:50,000 BGS map, is relatively deep soils with a texture of sand to sandy loam.
- 2.8. The BGS hold borehole records located on or near the site. Borehole SU41NW522 located in the south of the site and borehole SU41NW520 located in the east of the site show deposits of clayey sand and gravel underlain by sand and gravel. Groundwater was encountered at depths of 2.3m and 2.4m for each borehole respectively.
- 2.9. The published Environment Agency Groundwater Source Protection map shows the site is not located within a Groundwater Source Protection Zone.

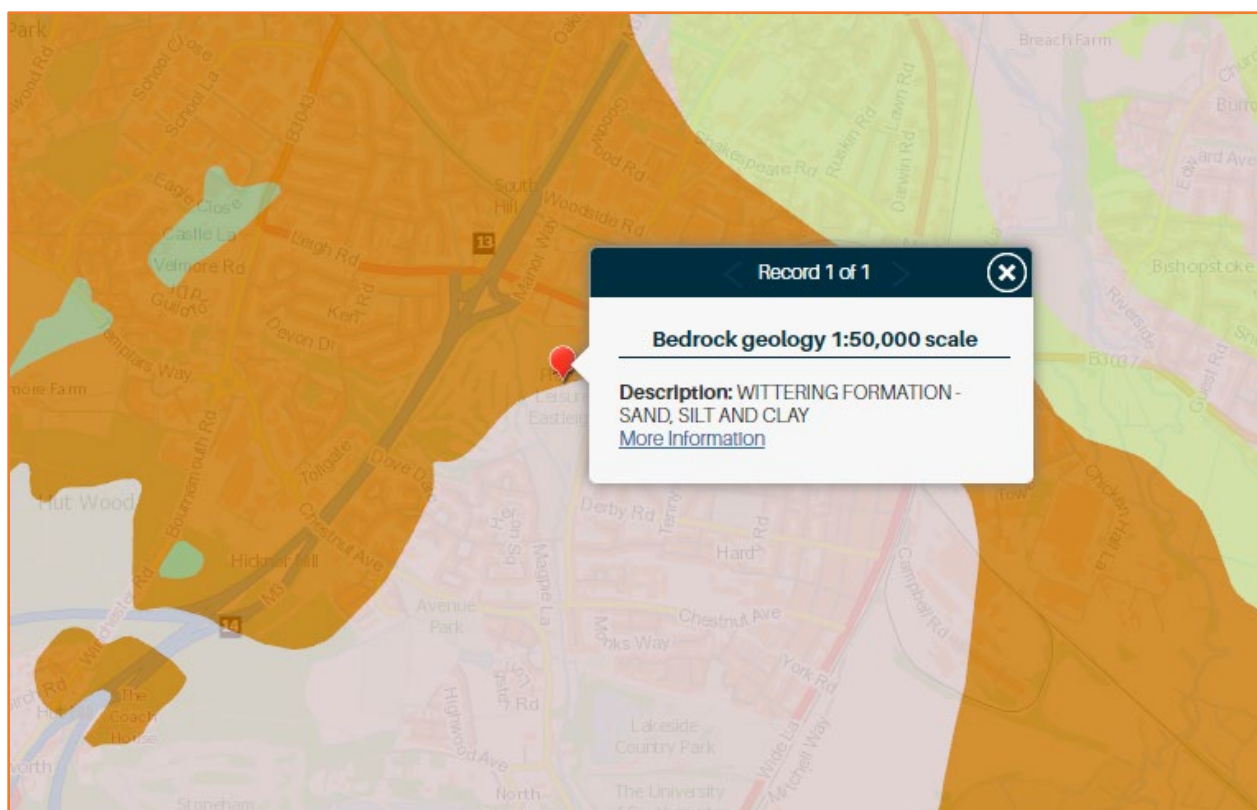


Figure 3: BGS Bedrock Geology (Source: BGS)

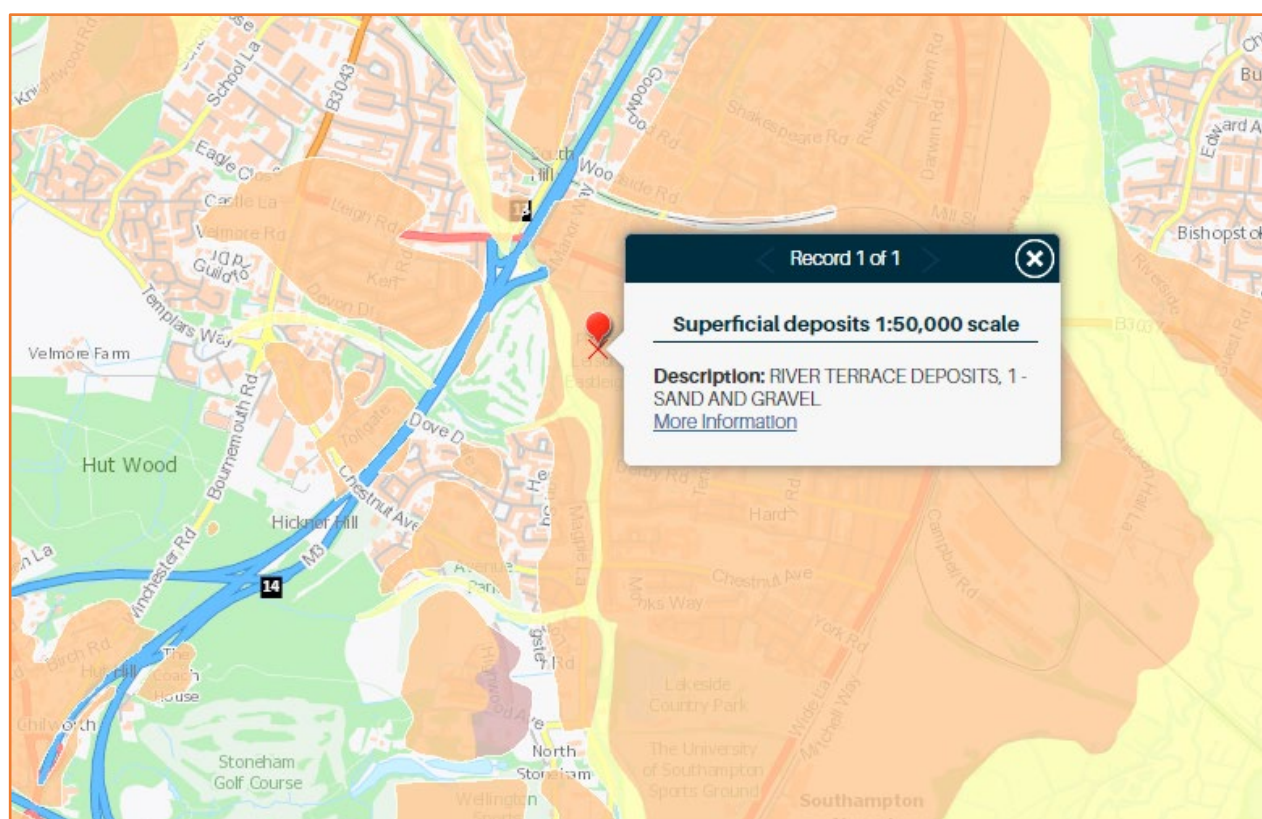


Figure 4: BGS Superficial Geology (Source: BGS)

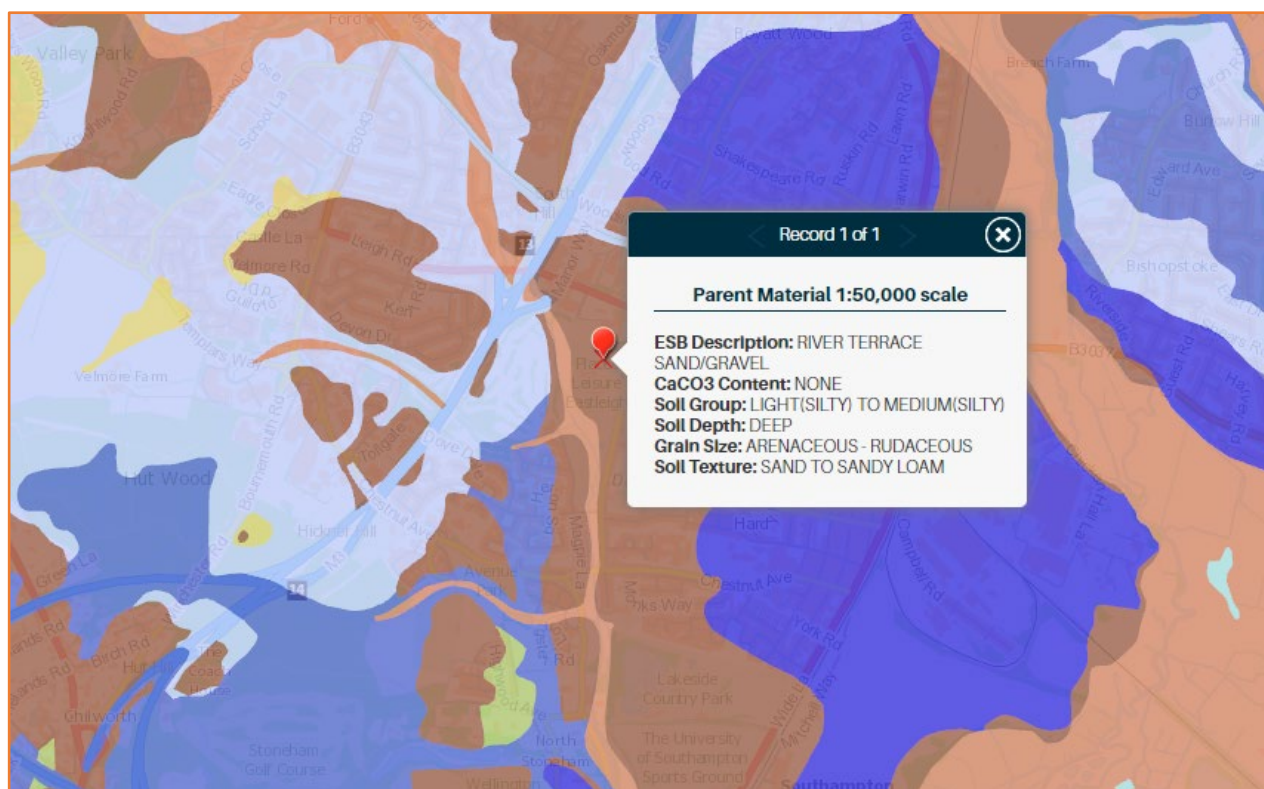


Figure 5: Soil Parent Material Map (Source: BGS)

Nearby Watercourses / Drainage Features:

- 2.10. The nearest watercourse to the site is the Monks Brook located approximately 200m to the west of the site.

3. Development Proposals:

Proposed Development:

- 3.1. The proposed planning application is for the *construction of 4no. outdoor padel courts with an open sided canopy at Eastleigh Leisure Centre, Passfield Avenue, Eastleigh, Hampshire, SO50 9NL.*
- 3.2. Post development the built footprint of the padel courts will cover approximately 1425m². The applicant has confirmed that the entrance pathway is to be of permeable construction.

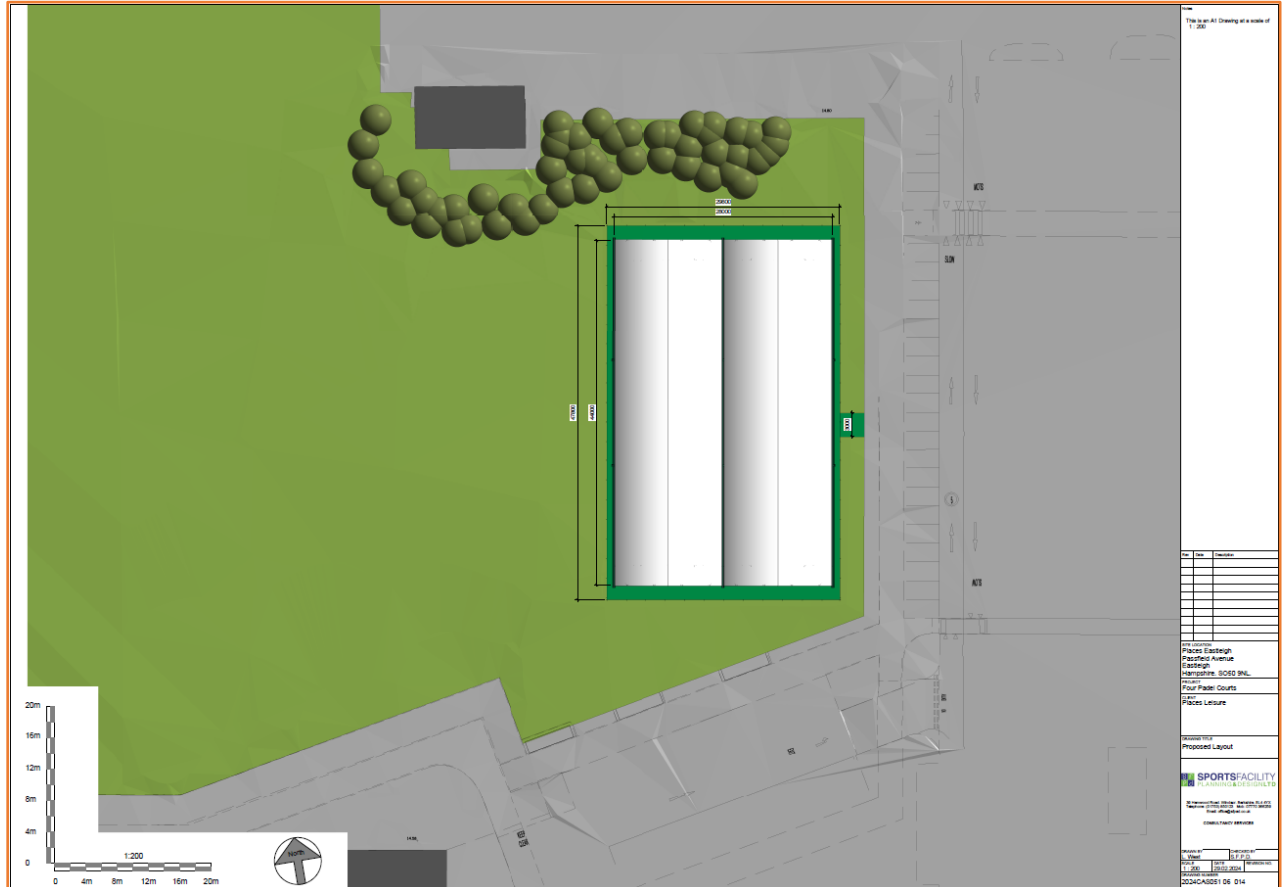


Figure 6: Proposed Roof Plan (Source: Sports Facility Planning & Design Ltd.)

Vulnerability to Flooding:

- 3.3. The NPPF classifies property usage by vulnerability to flooding. Post development, the site will become "Water Compatible", as the application is for the *construction of 4no. outdoor padel courts with an open sided canopy.*
- 3.4. Accordingly, it is considered that the vulnerability of the site as a whole will not increase post development.

4. Flood Risk Assessment:

Flood Zones:

- 4.1. 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

- 4.2. 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.

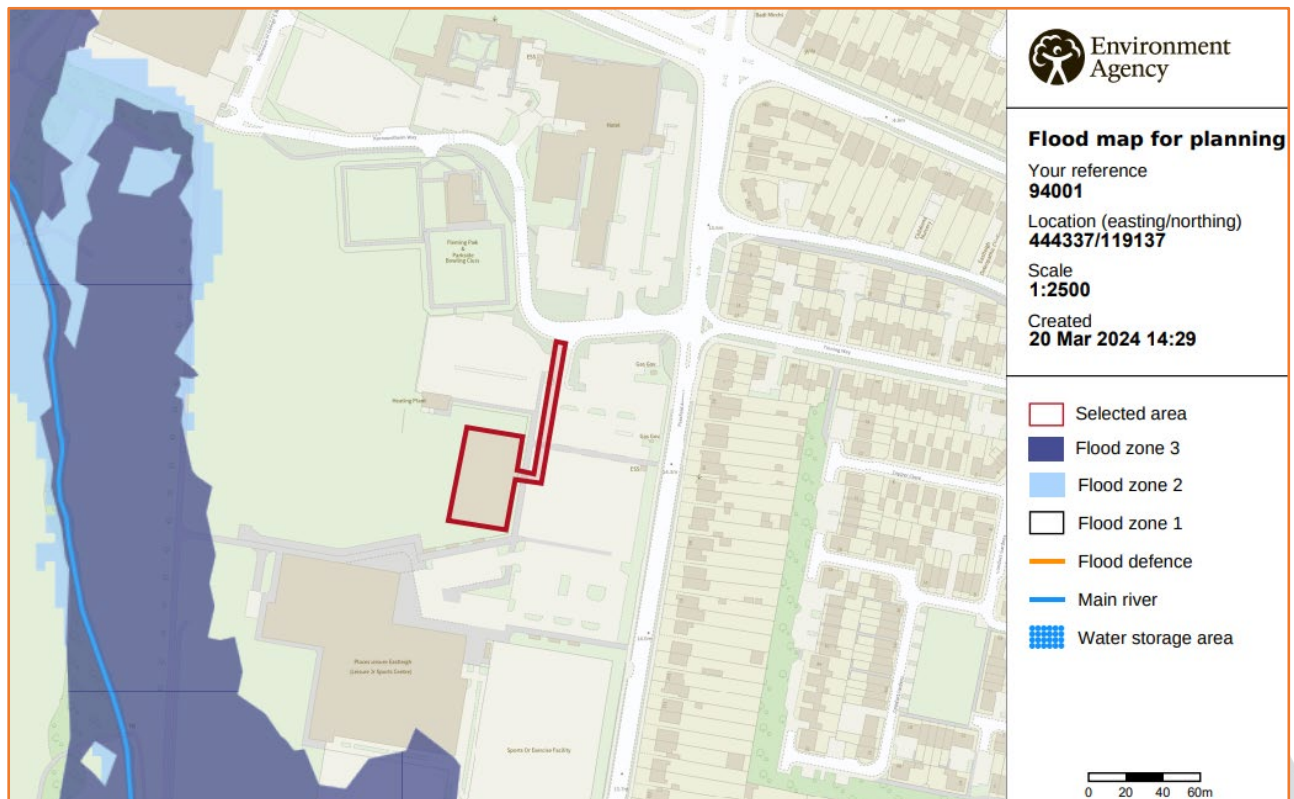


Figure 7: Environment Agency Flood Map for Planning (Rivers and Sea) (Source: EA)

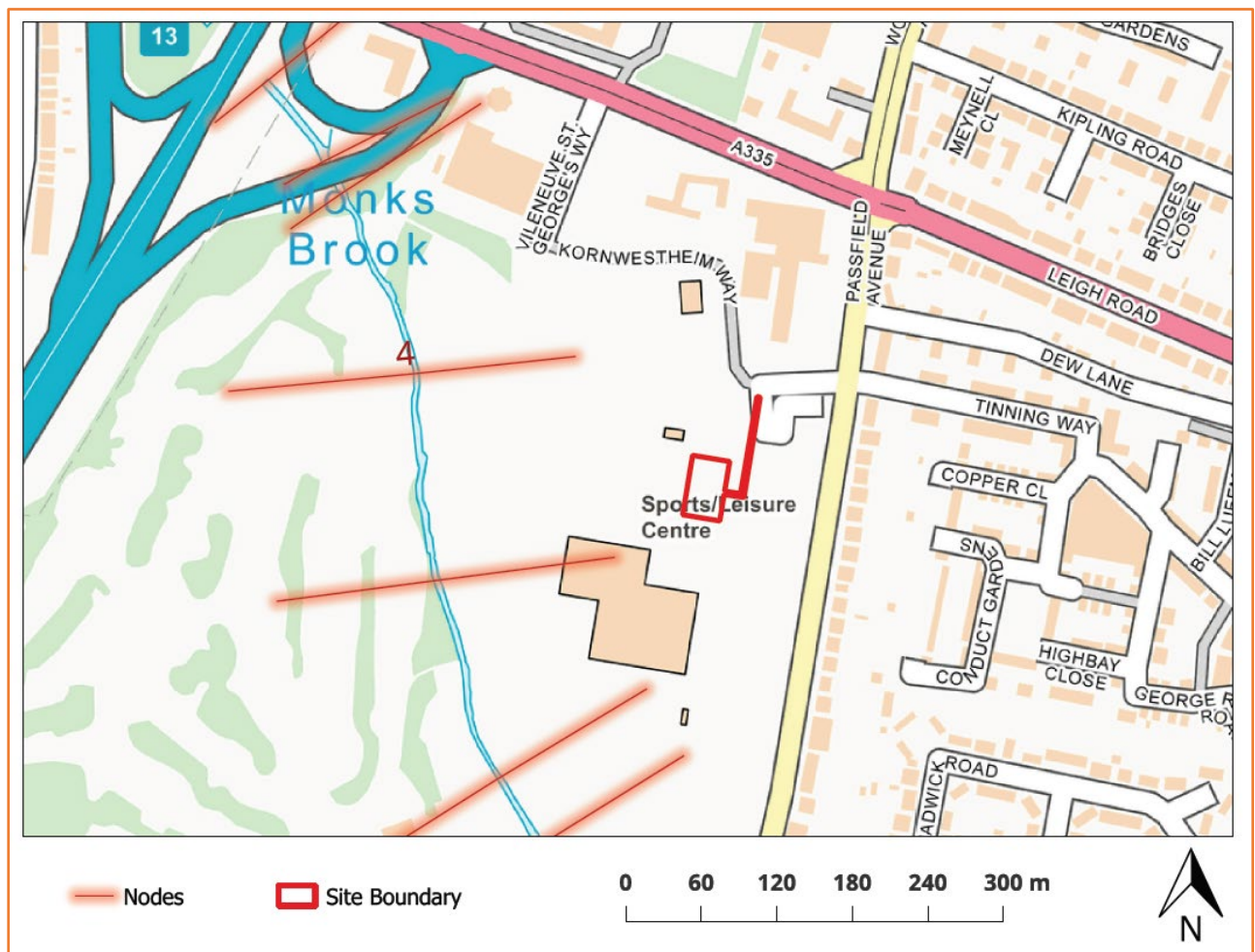
- 4.3. The site is located within Flood Zone 1 (Low Probability) which means it is defined as land having a less than 1 in 1,000 annual probability of river or sea flooding.
- 4.4. The nearest watercourse to the site is the Monks Brook located approximately 200m west.

Detailed Flood Modelling (Monks Brook):

- 4.5. The Monks Brook is a river in Hampshire, South East England. A tributary of the River Itchen, it rises in Bucket Corner and flows for a total distance of 11km through Chandler's Ford and Eastleigh before joining the River Itchen at a medieval salmon pool in Swaythling. The Monks Brook drains a mostly urban catchment area of 49km².

Modelled Flood Levels and Extents:

- 4.6. Modelled flood levels and flood extents have been requested from the EA. Modelled fluvial flood levels have been provided, taken from the Monks Brook Flood Mapping Project, completed in 2008 by Halcrow Group Limited. Data has been provided for in-channel nodes for the following defended and undefended scenarios: 1:25yr, 1:100yr and 1:100yr + 20% climate change allowance.
- 4.7. The following in-channel node flood levels have been extracted for the nearest upstream Node locations to the site, Node 4, shown in Figure 8.

**Figure 8: Node Locations (Source: EA)**

Node 4 Flood Levels			
	1:25 yr	1:100 yr	1:100 yr + 20% CC
Defended	13.82	14.22	14.42
Undefended	13.81	14.31	14.50

Table 2: Modelled Flood Levels in m AOD (Source: EA)

- 4.8. The site is shown to be outside of the modelled flood extent for all modelled defended and undefended flood events. Topographic levels on site range from 14.77m AOD to 14.81m AOD. Thus, the site is above modelled flood levels for the 1:25yr, 1:100yr and 1:100yr + 20% Climate Change events.

- 4.9. The data provided by the EA does include an allowance for climate change of a 20% increase in river flows. In line with the climate change guidance last updated in May 2022, a 35% increase in river flows is required to allow for climate change (Water Compatible development uses the Central 35% allowance for the Test and Itchen Management Catchment).
- 4.10. No modelled flood levels with a 35% increase in flows is available from the EA, however the site is shown to be entirely outside of the modelled 1:100 year +20% climate change flood extents for both the defended and undefended scenarios.

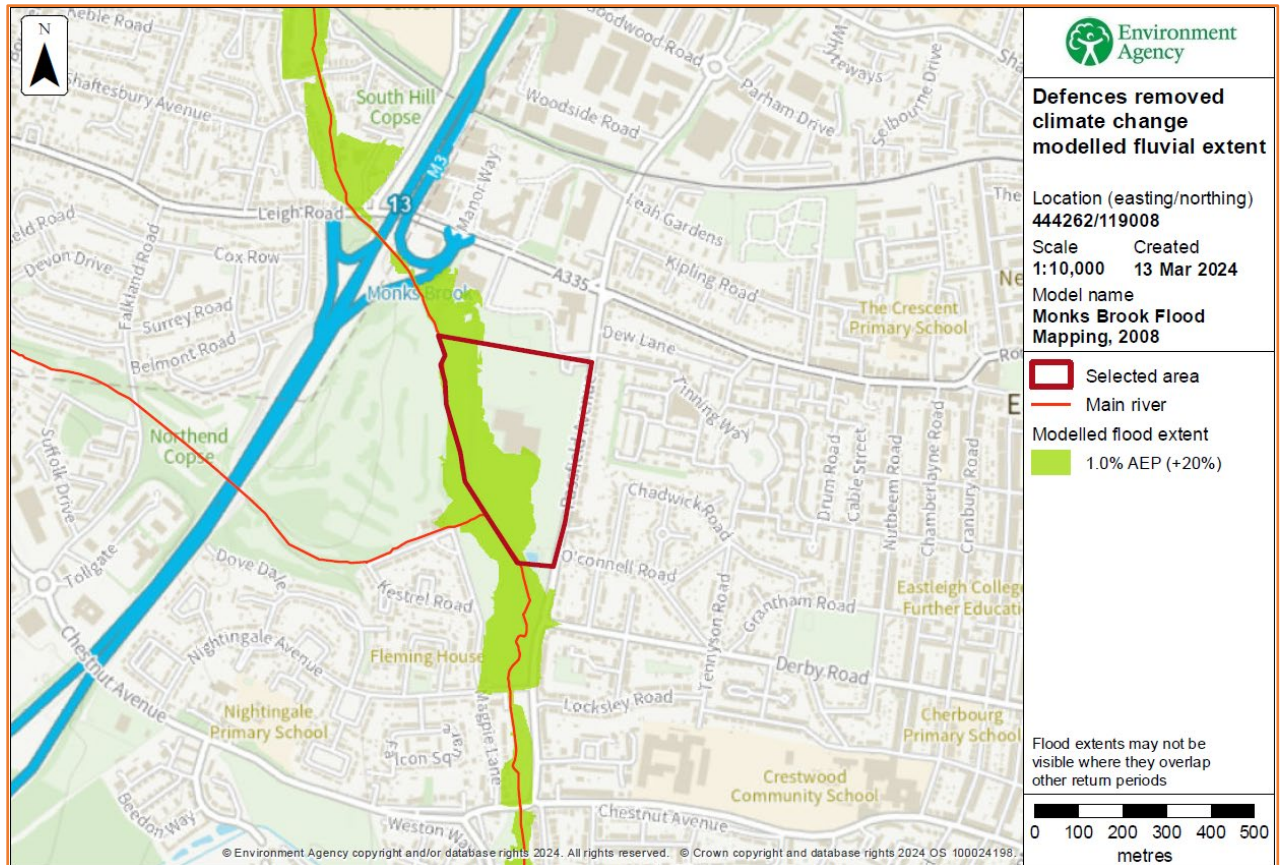


Figure 9: Modelled Undefended 1:100 year +20% Climate Change Flood Extent (Source: EA)

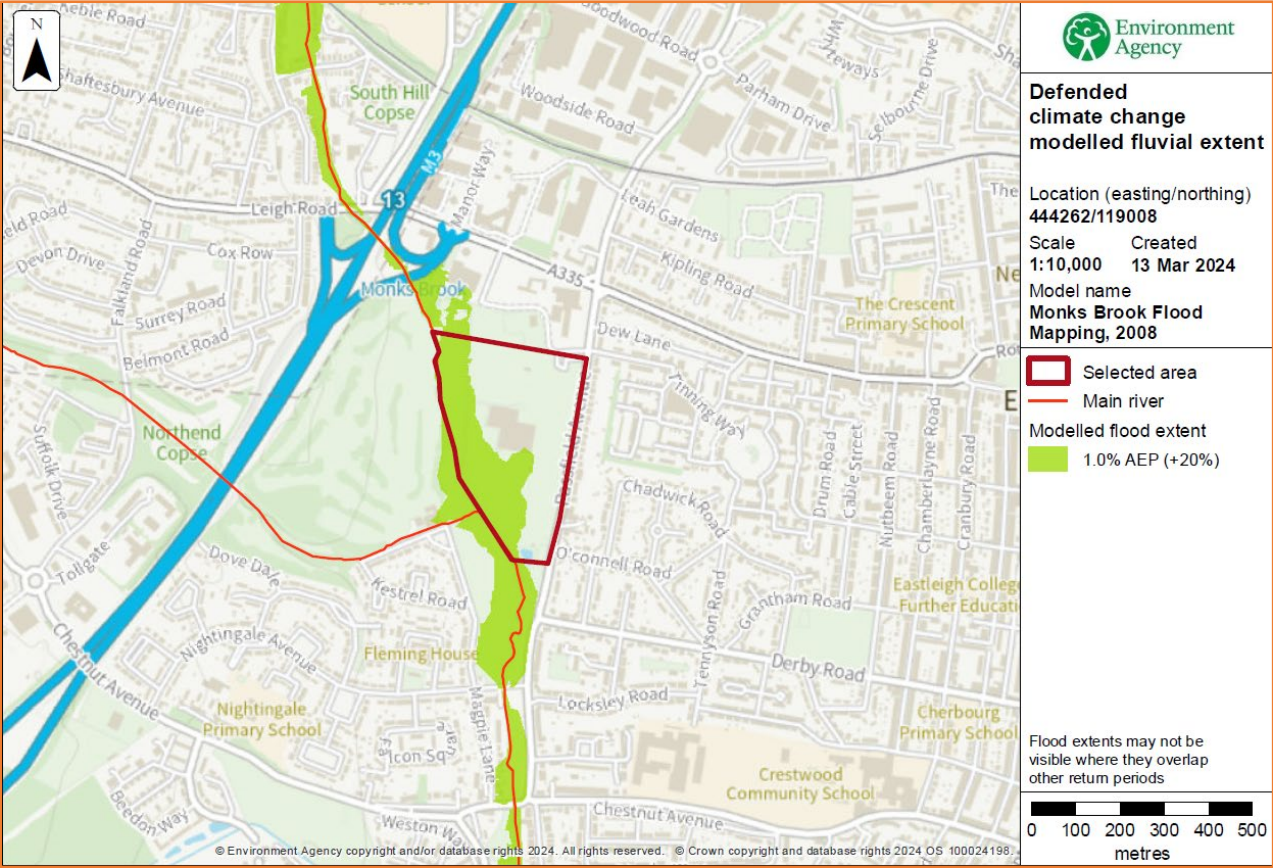


Figure 10: Modelled Defended 1:100 year +20% Climate Change Flood Extent (Source: EA)

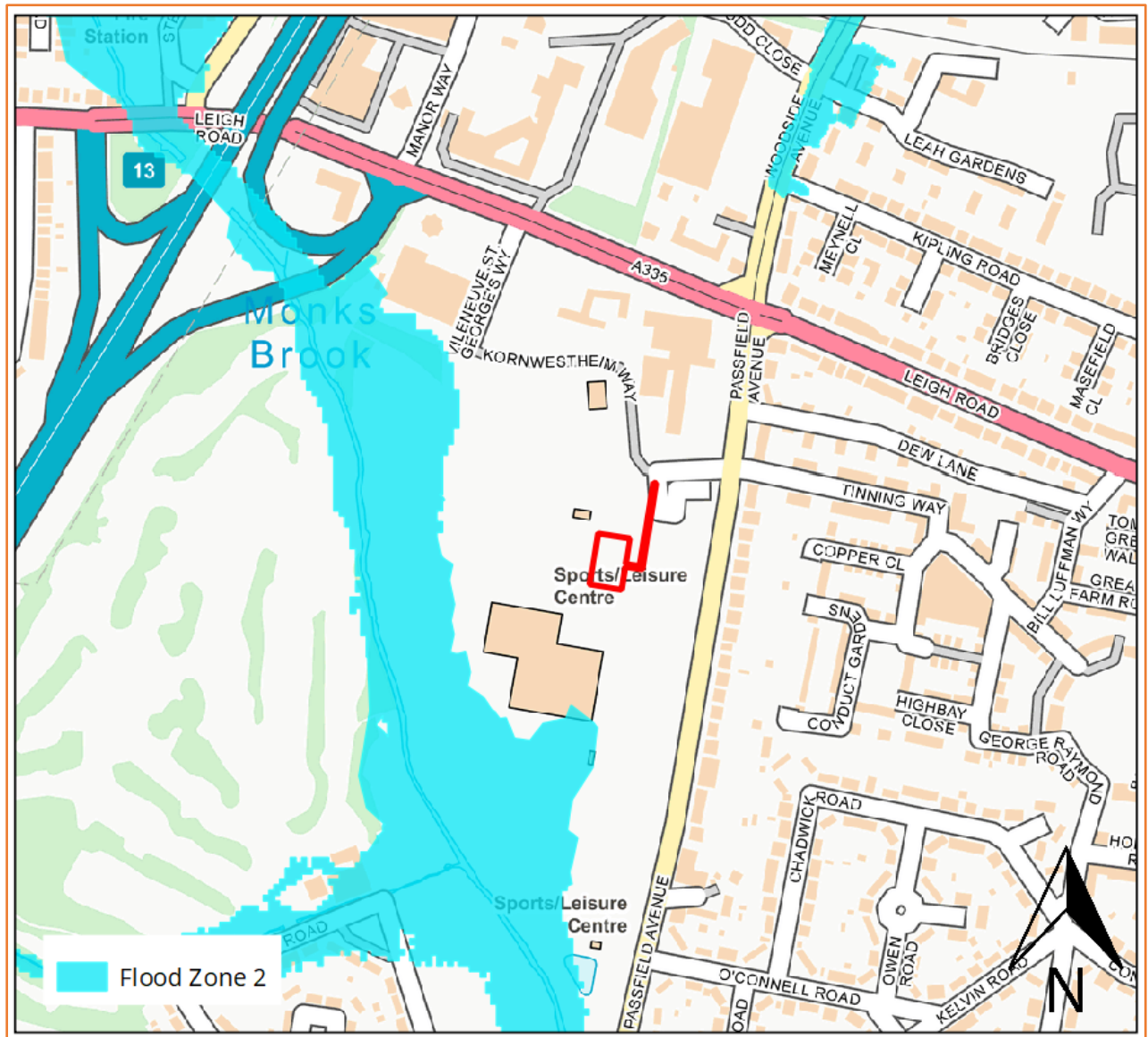


Figure 11: Flood Zone 2 (1:1000 year) Fluvial Flood Extent (Source: EA)

- 4.11. The site is also shown to be entirely outside of Flood Zone 2.
- 4.12. The Monks Brook flood model does not include a modelled 1:1000 year event. As such, the EA has provided modelled flood depths and levels from JFLOW national scale flood mapping. The site is shown to be entirely outside of the 1:1000 year JFLOW extent.
- 4.13. The site is also shown to be entirely outside of the fluvial Flood Zone 3 in 2115 extent in the PfSH Webmaps (Partnership for South Hampshire – Strategic Flood Risk Assessment).

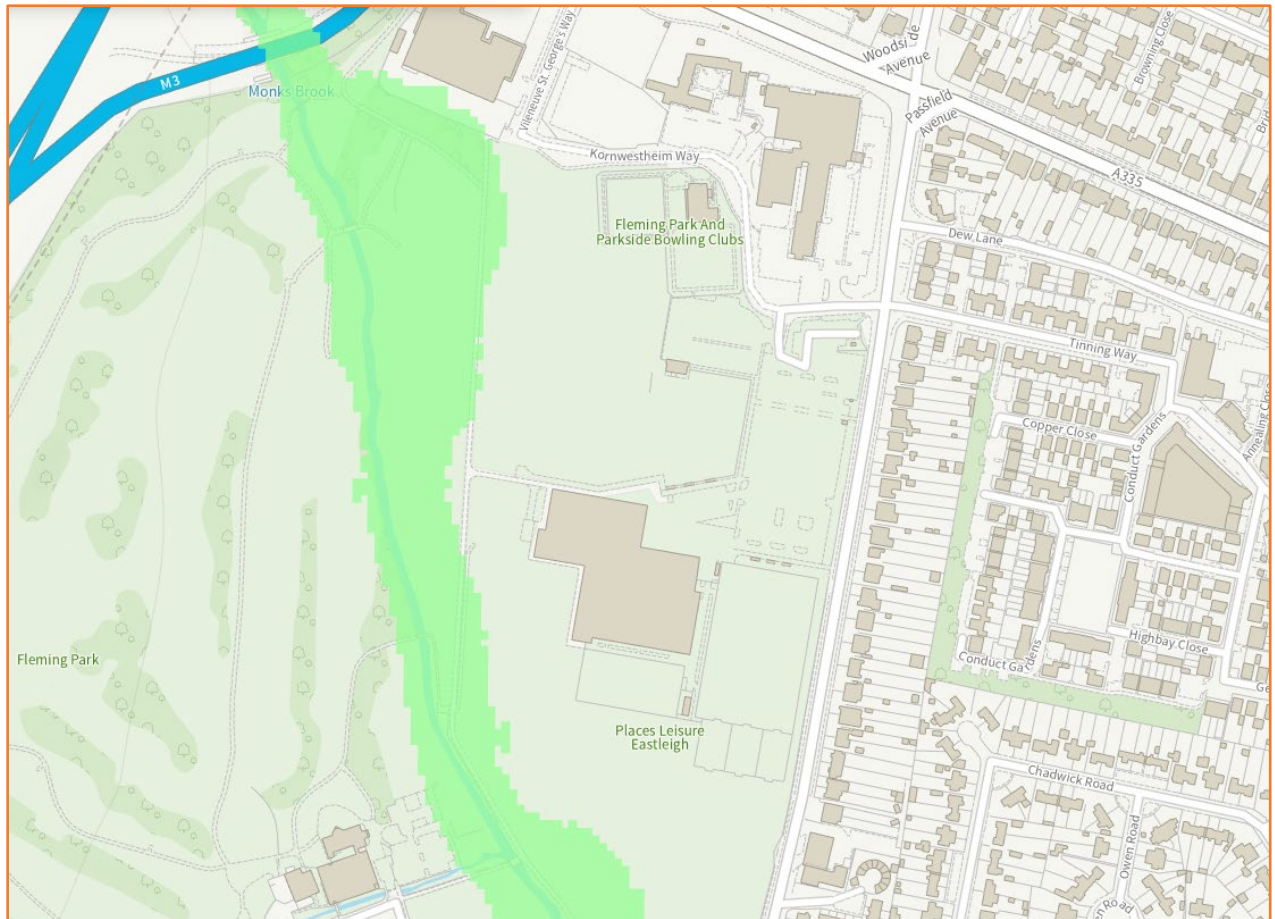


Figure 12: PfSh SFRA Fluvial Flood Zone 3 2115 Flood Extent (Source: PfSH SFRA Webmap)

Functional Floodplain:

- 4.14. Areas subject to flooding up to (and including) once in every 30 years (3.33% annual exceedance probability (AEP)) on average have been delineated as 'Zone 3b Functional Floodplain'. These are areas that are subject to relatively frequent flooding, and may be subject to fast flowing and/or deep water. Flood Zone 3b is where only water-compatible development and essential infrastructure is recommended.
- 4.15. The site is not located with a Functional Floodplain.

Flood Defences:

- 4.16. 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 type 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.
- 4.17. There are no EA owned or maintained defences which defend the site directly.

Historical Flood Events:

- 4.18. According to the EA, the site and surrounding area are not within any historic flood extent. There are no other records of historical flood events affecting the site.

Pluvial:

- 4.19. 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.
- 4.20. 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.
- 4.21. 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):
- 1:30 (3.3%)
 - 1:100 (1%)
 - 1:1000 (0.1%)
- 4.22. The mapping below shows the Risk of Flooding from Surface Water on site. Please note that the EA to 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.
- 4.23. The EA Risk of Flooding from Surface Water Map, with the marker centred on Eastleigh Leisure Centre, suggests that the site lies within an area of "Very Low" risk of flooding from surface water.

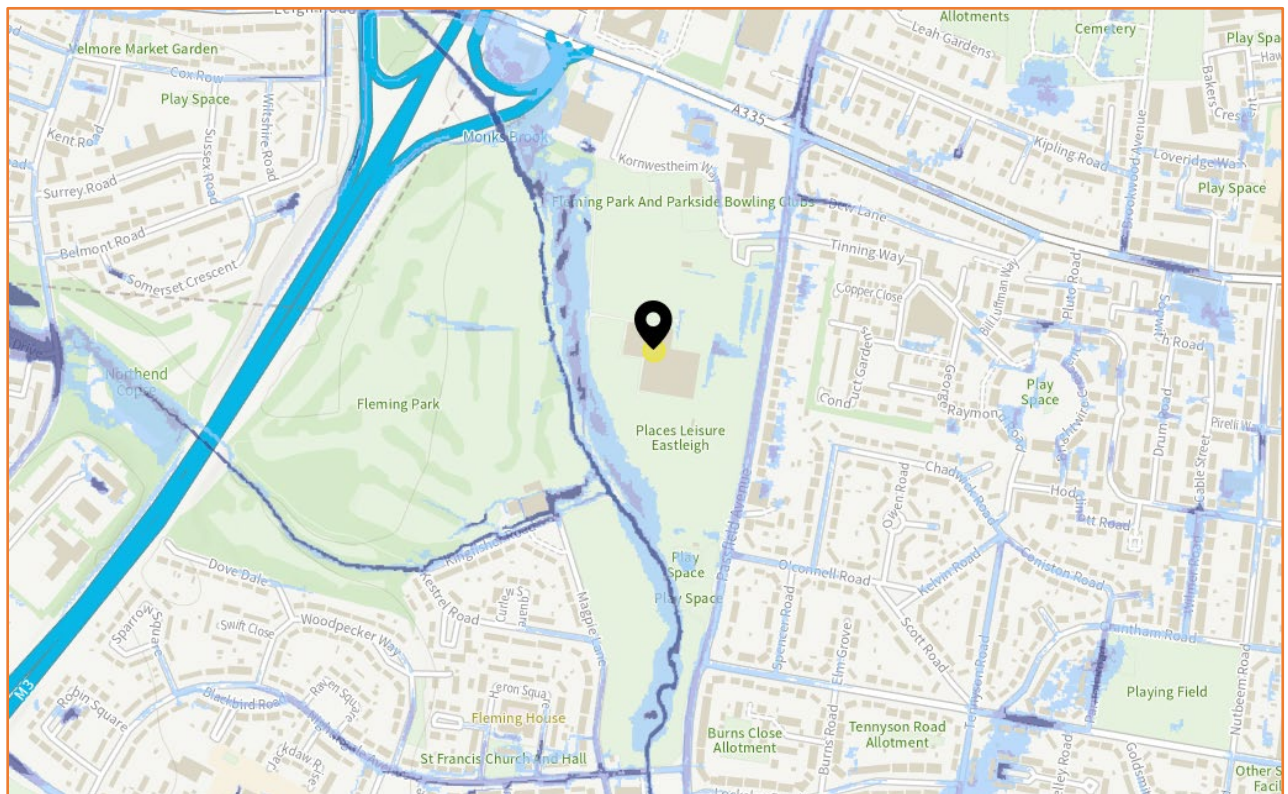


Figure 13: Extract from Environment Agency RoFSW map (Source: EA)

Groundwater:

- 4.24. 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.

- 4.25. 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.
- 4.26. No further information has been presented to suggest that the site has previously flooded from groundwater.

Sewer:

- 4.27. 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.
- 4.28. 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.
- 4.29. No information have been provided to suggest that the site itself has flooded previously as a result of sewer flooding.

Other Sources:

- 4.30. The EA Risk of Flooding from Reservoirs Map suggests that the site lies outside the “Maximum extent of flooding” from reservoir failure. The EA also advise on their website that there is a risk of flooding from reservoirs in this area. All major reservoirs have to be inspected by specialist dam and reservoir Engineers. 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 flooding to occur.
- 4.31. No further information has been provided to suggest the site is susceptible to from the failure of reservoirs, canals or other artificial infrastructure from the risk of flooding.

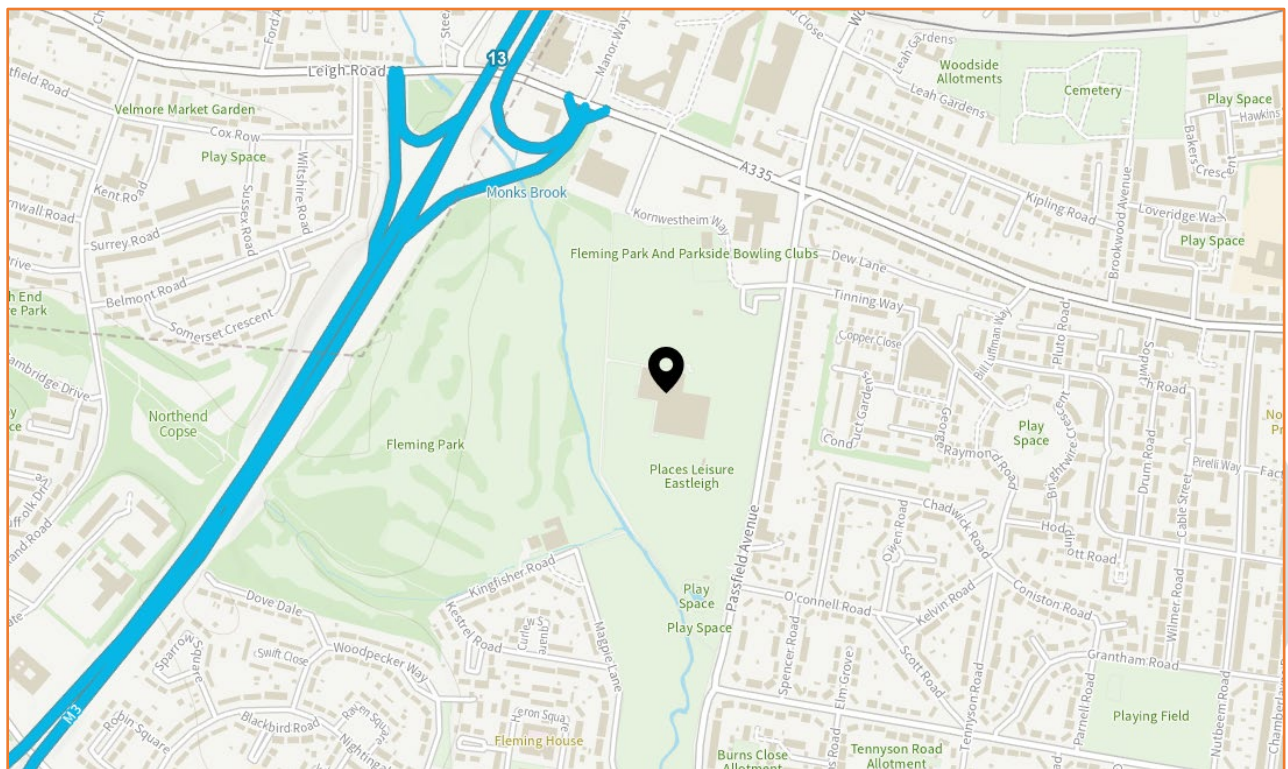


Figure 14: Environment Agency Maximum Extent of Flooding from Reservoirs Map (Source: EA)

5. Surface Water Drainage Strategy:

- 5.1. In order to mitigate flood risk posed by post development runoff, adequate control measures will need to be considered within the site. This will ensure that surface water runoff is dealt with at source and flood risk is not increased elsewhere.

Drainage Hierarchy:

- 5.2. The drainage strategy for the site has been prepared according to the drainage discharge hierarchy from CIRIA C753 The SuDS Manual, as follows:
- Infiltration to the maximum extent that is practical;
 - Discharge to surface waters;
 - Discharge to surface water sewer.

Infiltration Potential:

- 5.3. The 1:50,000 BGS map showed the site to be located directly upon the bedrock of Wittering Formation – Sand, Silt and Clay. The BGS hold borehole records located on or near the site. Borehole SU41NW522 located in the south of the site and borehole SU41NW520 located in the east of the site show deposits of clayey sand and gravel underlain by sand and gravel. Groundwater was encountered at depths of 2.3m and 2.4m for each borehole respectively. Therefore, infiltration SuDS are considered feasible at the site.
- 5.4. In the absence of in-situ testing, an assumed infiltration rate has been utilised based on the below coefficients. Table 25.1 of CIRIA C753 The SuDS Manual 2015 (Figure 15) provides typical infiltration coefficients based on soil texture.

Soil type/texture	ISO 14688-1 description (after Blake, 2010)	Typical infiltration coefficients (m/s)
Good infiltration media • gravel • sand • loamy sand • sandy loam	Sandy GRAVEL Slightly silty slightly clayey SAND Silty slightly clayey SAND Silty clayey SAND	$3 \times 10^{-4} - 3 \times 10^{-2}$ $1 \times 10^{-5} - 5 \times 10^{-5}$ $1 \times 10^{-4} - 3 \times 10^{-5}$ $1 \times 10^{-7} - 1 \times 10^{-5}$
Poor infiltration media • loam • silt loam • chalk (structureless) • sandy clay loam	Very silty clayey SAND Very sandy clayey SILT N/A Very clayey silty SAND	$1 \times 10^{-7} - 5 \times 10^{-6}$ $1 \times 10^{-7} - 1 \times 10^{-5}$ $3 \times 10^{-8} - 3 \times 10^{-6}$ $3 \times 10^{-10} - 3 \times 10^{-7}$
Very poor infiltration media • silty clay loam • clay • till	– – Can be any texture of soil described above	$1 \times 10^{-8} - 1 \times 10^{-6}$ $< 3 \times 10^{-8}$ $3 \times 10^{-9} - 3 \times 10^{-6}$
Other • rock* (note mass infiltration capacity will depend on the type of rock and the extent and nature of discontinuities and any infill)	N/A	$3 \times 10^{-9} - 3 \times 10^{-5}$

Figure 15: Typical Infiltration Coefficients Based on Soil Texture (Source: Table 25.1 of the CIRIA C753)

- 5.5. Given the underlying strata, an assumed infiltration rate of 1×10^{-5} m/s has been utilised for this assessment. However, given the underlying bedrock geology the true infiltration rate is likely to be greater than that used within this assessment.

Proposed Discharge Rate:

- 5.6. The greenfield runoff rates for the area of the sites being attenuated has been calculated as 0.7 l/s for the 1:1 annual runoff event, 1.9 l/s for the 1:30 year event and 2.5 l/s for the 1:100 year event. Refer to calculations in appendix.
- 5.7. Runoff from 1425m² of built footprint area of the padel courts will be directed into the gravel sub-base located beneath the padel courts. The applicant has confirmed that the entrance pathway is to be of permeable construction, utilising permeable paving or similar.

Gravel Sub-base:

- 5.8. The proposed area that will be directed into the gravel sub-base amounts to approximately 1425m².
- 5.9. Preliminary calculations indicate that an attenuation gravel sub-base with dimensions of 1420m² x 0.30 x 0.15 (voids) will be sufficient to accommodate all runoff from 1425m² of built footprint arising from the critical 1:100 year + 45% climate change event. The void ratio of 0.15 used for calculations reflects the minimum void content of the various sub-base materials to be used (28mm aggregate chippings and DOT Type).
- 5.10. Preliminary calculations indicate that some 63.9m³ of storage is required to attenuate runoff for all storms up to and including the 1:100 year + 45% climate change event.
- 5.11. *Please note that the levels and locations of the gravel sub-base within the Causeway calculations are arbitrary for modelling purposes.*
- 5.12. All preliminary surface water drainage calculations have been undertaken using Causeway software. Refer to the appendix.

Water Quality:

- 5.13. Water quality has been assessed in line with the Simple Index approach from Chapter 26 of CIRIA C753 The SuDS Manual:
- Step 1 – Allocate suitable pollution hazard indices for the proposed land use.
Step 2 – Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index.
- 5.14. Roof water and runoff from the path around the courts will contain negligible contaminant concentrations and does not warrant treatment. Nevertheless, it is suggested to include debris / sediment traps on any new drainage.

Design Exceedance:

- 5.15. Should the onsite drainage system fail under extreme rainfall events or blockage, flooding may occur within the site. In the event of the drainage system failure, the runoff flow can be managed through detailing the new external levels to direct water away from structures.

Adoption and Maintenance:

- 5.16. It is proposed that the cellular storage and permeable paving will be maintained by the end users.
- 5.17. A draft Maintenance Schedule is outlined in the Table below.

Permeable Paving

- 5.18. Permeable surfaces need to be regularly cleaned of silt and other sediments to preserve their infiltration capability. A brush and suction cleaner, which can be a lorry-mounted device or a smaller precinct sweeper, should be used and the sweeping regime should be as follows:
1. End of winter (April) – to collect winter debris.
 2. Mid-summer (July/August) – to collect dust, flower and grass-type deposits.
 3. After autumn leaf fall (November).
- 5.19. If reconstruction is necessary, the following procedure should be followed:
1. Lift surface layer and laying course.
 2. Remove any geotextile filter layer.
 3. Inspect sub-base and remove, wash and replace if required.
 4. Renew any geotextile layer.
 5. Renew laying course, jointing material and concrete block paving.
- 5.20. Materials removed from the voids or the layers below the surface of the paving may contain hazardous substances such as heavy metals and hydrocarbons which may need to be disposed of as controlled waste.

Attenuation Gravel Sub-Base

- 5.21. The gravel sub-base should be inspected and maintained in accordance with the manufacturer's guidelines.

Proposed Surface Water Drainage Pipework and Catchpits

- 5.22. It is not envisaged that silt build up within the pipework systems will require a rigorous maintenance regime so long as silt is removed from upstream catch pits on a regular basis. A suitable maintenance regime for the systems will comprise of routine inspection (every six months) and silt removal (as necessary).

Drainage Element	Maintenance Requirement	Frequency
Gutters & downpipes	Inspect and remove silt/ debris.	To be inspected every three months and silt/ debris removed as necessary.
Inspection Chambers and Catch Pits	Inspect and remove silt.	To be inspected every three months and silt/ debris removed as necessary. Flow control to be checked for blockages.
Permeable Paving	Sweeping/vacuuming to remove build-up of silt or other sediments.	Three times a year or as necessary.
	Removal of weeds. Replacement of cracked paving blocks and remedial work of cracks and depressions.	As required.
Attenuation Gravel Sub-Base	Inspected and maintained in accordance with manufacturer's guidelines.	As required.

Table 3: Suggested Maintenance Regime for Elements of the Drainage Infrastructure

Note: In addition to the above maintenance requirements, it is recommended that all drainage elements are inspected:

- Following the first storm event;
- Monthly for the first 3 months following commissioning.

6. Flood Risk Mitigation:

Physical Design Measures:

- 6.1. The proposed site usage is classified as "Water Compatible" under the NPPF and is located entirely within Flood Zone 1 and with an area of "very low" risk of flooding from surface water.

Safe Escape:

- 6.2. 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.
- 6.3. The site is located entirely within Flood Zone 1 and within an area of "very low" risk of flooding from surface water.

Fluvial Floodplain Storage:

- 6.4. 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.
- 6.5. 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.
- 6.6. 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.
- 6.7. The site is situated within Flood Zone 1 when using the Environment Agency Flood Map for Planning (Rivers and Sea). Post development, there will be no unacceptable loss of floodplain storage.

7. Sequential and Exception Test

- 7.1. 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. It 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 direct new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account.
- 7.2. 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, as 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.
- 7.3. The site is situated within Flood Zone 1 when using the Environment Agency Flood Map for Planning (Rivers and Sea), and is located within an area at “very low” risk of flooding from surface water. Post development, the site will become “Water Compatible” throughout, as the application is for the construction of 4no. outdoor padel courts with an open sided canopy.

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’

- 7.4. Using the table above, the proposed application is considered to be suitable within Flood Zone 1.

8. Discussion and Conclusions

- 8.1. This Flood Risk Assessment and Surface Water Drainage Strategy has been prepared by Unda Consulting Limited on behalf of SFPD Limited, in support of a planning application for the construction of 4no. outdoor padel courts with an open sided canopy at Eastleigh Leisure Centre, Passfield Avenue, Eastleigh, Hampshire, SO50 9NL. This report assesses the flood risk and surface water drainage strategy for the proposed development.
 - 8.2. The proposed planning application is for the construction of 4no. outdoor padel courts with an open sided canopy at Eastleigh Leisure Centre, Passfield Avenue, Eastleigh, Hampshire, SO50 9NL.
 - 8.3. A measured topographic survey provided by the Applicant shows that the topographic levels on site range from 14.77m AOD to 14.81m AOD. The Applicant has confirmed that the finished floor level of the padel courts and entrance pathway is to be 14.80m AOD.
 - 8.4. The 1:50,000 BGS map showed the site to be located directly upon the bedrock of Wittering Formation – Sand, Silt and Clay.
 - 8.5. The soil type of the site, according to the 1:50,000 BGS map, is relatively deep soils with a texture of sand to sandy loam.
 - 8.6. The published Environment Agency Groundwater Source Protection map shows the site is not located within a Groundwater Source Protection Zone.
 - 8.7. The site is located within Flood Zone 1 (Low Probability) which means it is defined as land having a less than 1 in 1,000 annual probability of river or sea flooding. The nearest watercourse to the site is the Monks Brook located approximately 200m west.
 - 8.8. Modelled flood levels and flood extents have been requested from the EA. Modelled fluvial flood levels have been provided, taken from the Monks Brook Flood Mapping Project, completed in 2008 by Halcrow Group Limited.
 - 8.9. The site is shown to be outside of the modelled flood extent for all modelled events. Topographic levels on site range from 14.77m AOD to 14.81m AOD. Thus, the site is above modelled flood levels for the 1:25yr, 1:100yr and 1:100yr + 20% Climate Change events.
 - 8.10. The data provided by the EA does include an allowance for climate change of a 20% increase in river flows. In line with the climate change guidance last updated in May 2022, a 35% increase in river flows is required to allow for climate change (Water Compatible development uses the Central 35% allowance for the Test and Itchen Management Catchment).
 - 8.11. No modelled flood levels with a 35% increase in flows is available from the EA, however the site is shown to be entirely outside of the modelled 1:100 year +20% climate change flood extents for both the defended and undefended scenarios.
 - 8.12. The site is also shown to be entirely outside of Flood Zone 2.
 - 8.13. The Monks Brook flood model does not include a modelled 1:1000 year event. As such, the EA has provided modelled flood depths and levels from JFLOW national scale flood mapping. The site is shown to be entirely outside of the 1:1000 year JFLOW extent.
 - 8.14. The site is also shown to be entirely outside of the fluvial Flood Zone 3 in 2115 extent in the PfSH Webmaps (Partnership for South Hampshire – Strategic Flood Risk Assessment).
 - 8.15. The site is not located with a Functional Floodplain.
 - 8.16. There are no EA owned or maintained defences which defend the site directly.
 - 8.17. According to the EA, the site and surrounding area are not within any historic flood extent. There are no other records of historical flood events affecting the site.
 - 8.18. The EA Risk of Flooding from Surface Water Map, with the marker centred on Eastleigh Leisure Centre, suggests that the site lies within an area of “Very Low” risk of flooding from surface water.
 - 8.19. Additionally, the risk of flooding from groundwater, sewer surcharge and reservoirs at the site appears to be very low.
- Gravel Sub-base:*
- 8.20. The 1:50,000 BGS map showed the site to be located directly upon the bedrock of Wittering Formation – Sand, Silt and Clay. The BGS hold borehole records located on or near the site. Borehole SU41NW522 located in the south of the site and borehole SU41NW520 located in the east of the site show deposits of clayey sand and gravel underlain by sand and gravel. Groundwater

was encountered at depths of 2.3m and 2.4m for each borehole respectively. Therefore, infiltration SuDS are considered feasible at the site.

- 8.21. Given the underlying strata, an assumed infiltration rate of 1×10^{-5} m/s has been utilised for this assessment. However, given the underlying bedrock geology the true infiltration rate is likely to be greater than that used within this assessment.
- 8.22. The greenfield runoff rates for the area of the sites being attenuated has been calculated as 0.7 l/s for the 1:1 annual runoff event, 1.9 l/s for the 1:30 year event and 2.5 l/s for the 1:100 year event. Refer to calculations in appendix.
- 8.23. Runoff from 1425m² of built footprint area will be directed into the gravel sub-base located beneath the padel courts. The applicant has confirmed that the entrance pathway is to be of permeable construction, utilising permeable paving or similar.
- 8.24. The proposed area that will be directed into the gravel sub-base amounts to approximately 1425m².
- 8.25. Preliminary calculations indicate that an attenuation gravel sub-base with dimensions of 1420m² x 0.30 x 0.15 (voids) will be sufficient to accommodate all runoff from 1425m² of built footprint arising from the critical 1:100 year + 45% climate change event. The void ratio of 0.15 used for calculations reflects the minimum void content of the various sub-base materials to be used (28mm aggregate chippings and DOT Type).
- 8.26. Preliminary calculations indicate that some 63.9m³ of storage is required to attenuate runoff for all storms up to and including the 1:100 year + 45% climate change event.
- 8.27. *Please note that the levels and locations of the gravel sub-base within the Causeway calculations are arbitrary for modelling purposes.*
- 8.28. All preliminary surface water drainage calculations have been undertaken using Causeway software. Refer to the appendix.
- 8.29. Roof water and runoff from the path around the courts will contain negligible contaminant concentrations and does not warrant treatment. Nevertheless, it is suggested to include debris / sediment traps on any new drainage.
- 8.30. Should the onsite drainage system fail under extreme rainfall events or blockage, flooding may occur within the site. In the event of the drainage system failure, the runoff flow can be managed through detailing the new external levels to direct water away from structures.
- 8.31. This drainage strategy has been undertaken in accordance with the principles set out in NPPF. We can conclude that providing the development adheres to the conditions advised above, the said development proposals can be accommodated without increasing flood risk within the locality in accordance with objectives set by Central Government and the EA.

Unda Consulting Limited

April 2024

9. Appendix

A - Plans by Others:

- Site Location Plan (Sports Facility Planning & Design Ltd.);
- Existing and Proposed Plans (Sports Facility Planning & Design Ltd.).

B – Causeway Calculations:

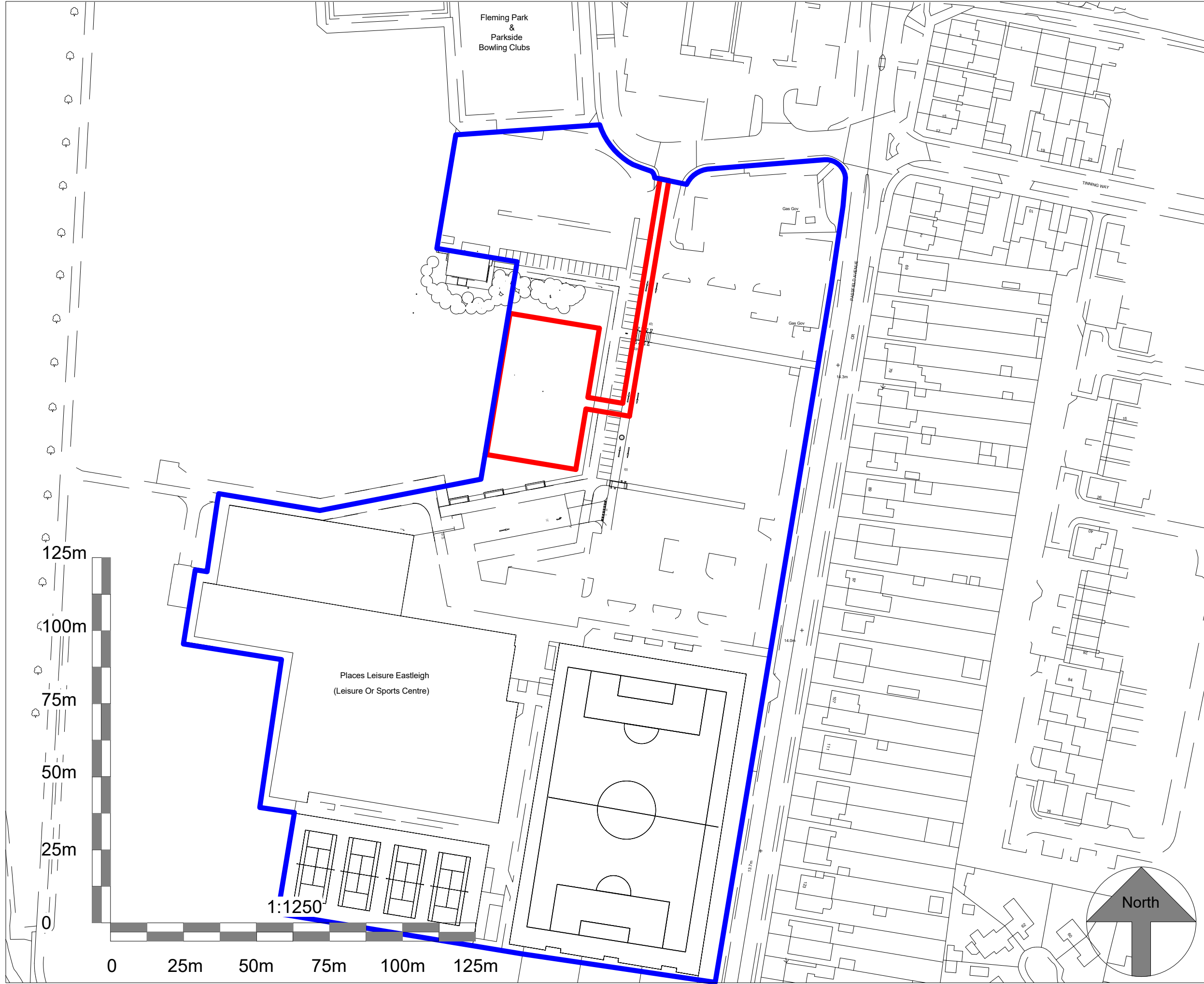
- IH124 Pre-Development Greenfield Runoff Calculations for the area of the site being attenuated;
- Gravel sub-base (Depth/Area/Inf Area Storage Structure) Calculations.

C - Plans:

- Proposed Drainage Layout [94001-01].

D - Other:

- EA Flood Map for Planning.



Notes

This is an A3 Drawing at a scale of 1 : 1250

Rev	Date	Description

SITE LOCATION

Places Eastleigh
Passfield Avenue
Eastleigh
Hampshire. SO50 9NL.

PROJECT

Four Padel Courts

CLIENT

Places Leisure

DRAWING TITLE

Location Plan



39 Hemwood Road, Windsor, Berkshire, SL4 4YX
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CONSULTANCY SERVICES

DRAWN BY L.West		CHECKED BY S.F.P.D.	
SCALE 1 : 1250	DATE 29.02.2024	REVISION NO.	
DRAWING NUMBER 2024CAS051 06 010			



Notes
This is an A1 Drawing at a scale of
1 : 200

Rev	Date	Description

SITE LOCATION
Places Eastleigh
Passfield Avenue
Eastleigh
Hampshire, SO50 9NL.

PROJECT
Four Padel Courts

CLIENT
Places Leisure

DRAWING TITLE
Existing Layout

S

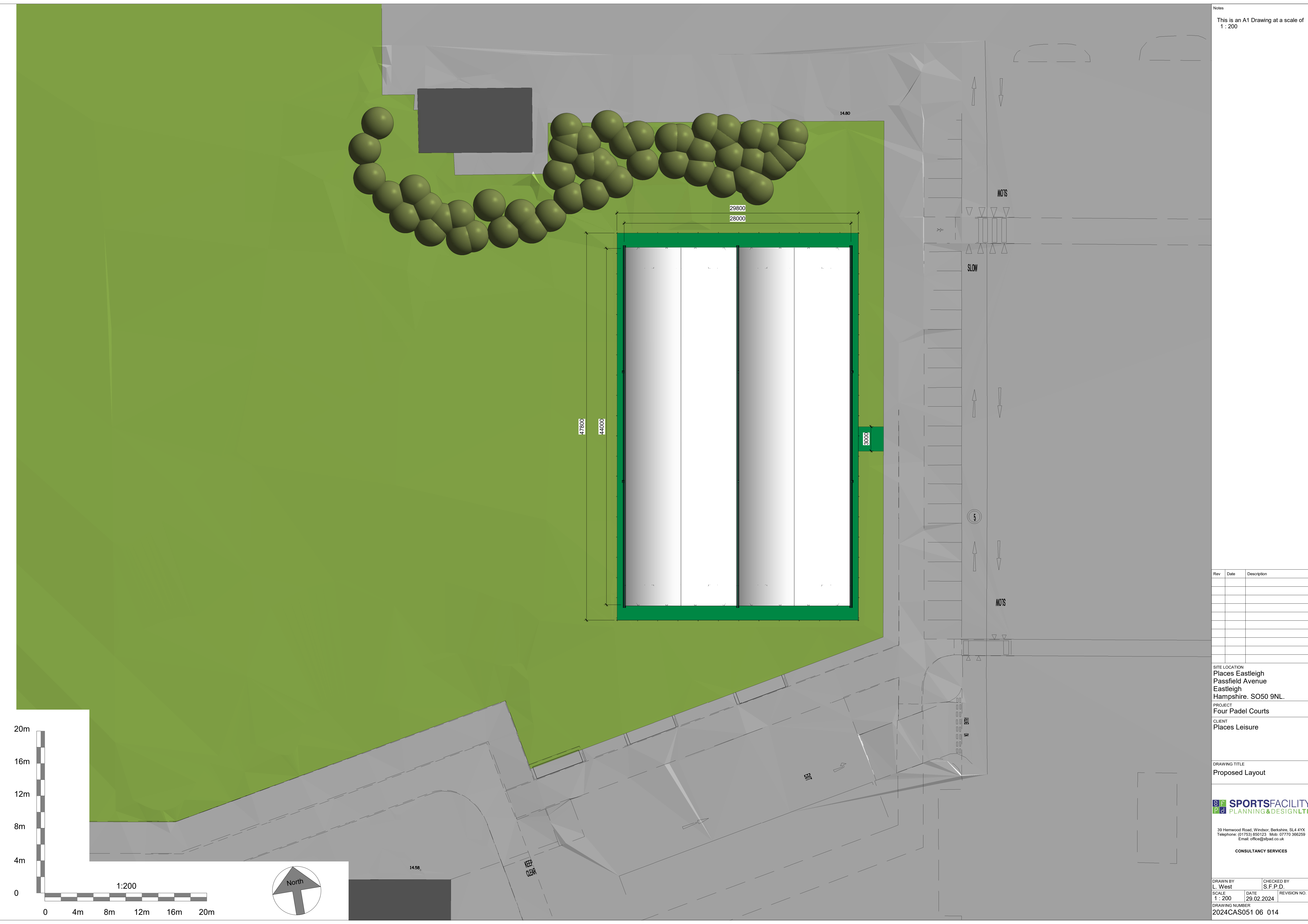
f

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DRAWN BY L. West	CHECKED BY S.F.P.D.
SCALE 1 : 200	DATE 29.02.2024
DRAWING NUMBER 2024CAS051 06 012	REVISION NO.



Notes
This is an A1 Drawing at a scale of
1 : 200

Rev	Date	Description

SITE LOCATION
Places Eastleigh
Passfield Avenue
Eastleigh
Hampshire, SO50 9NL.

PROJECT
Four Padel Courts

CLIENT
Places Leisure

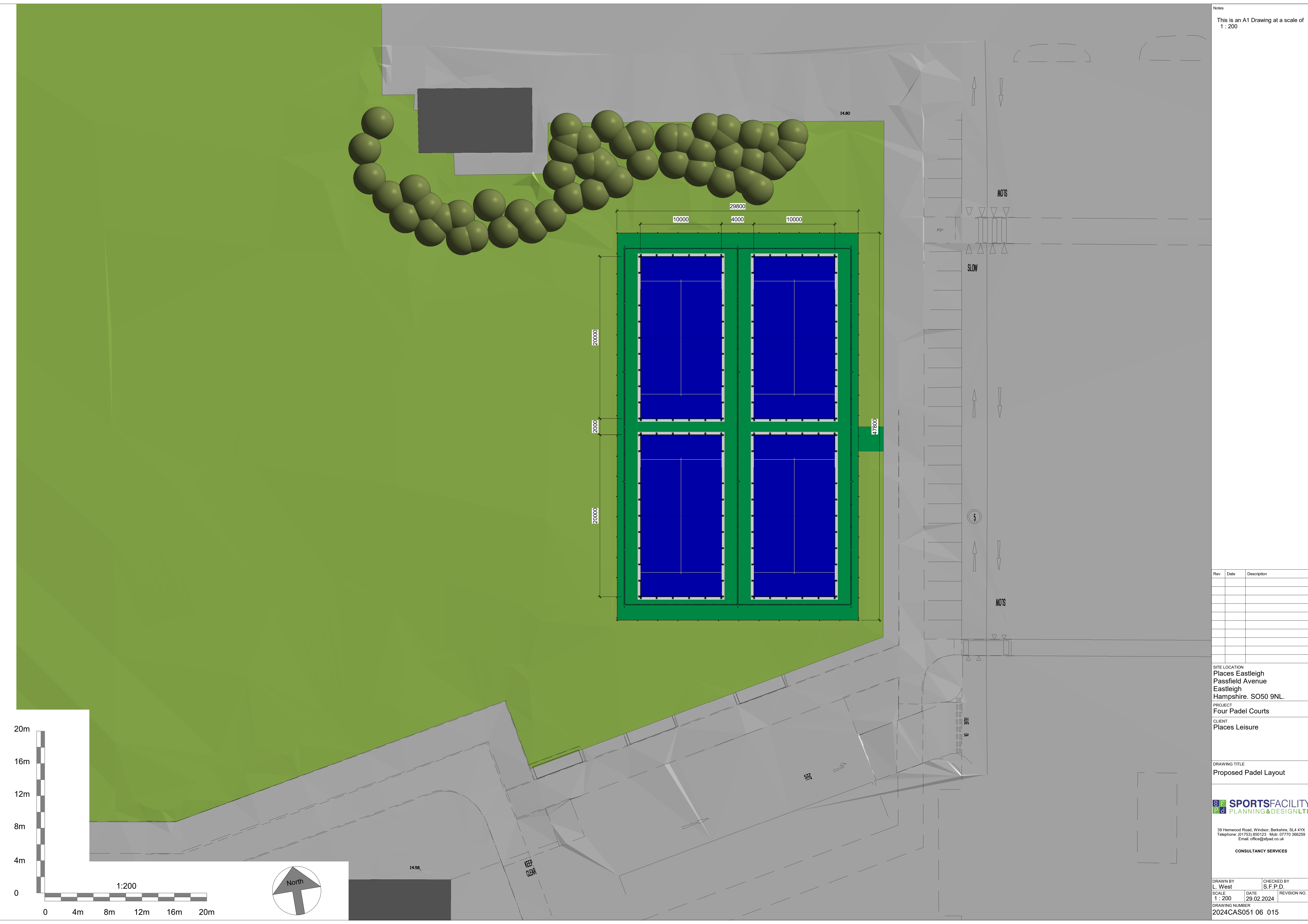
DRAWING TITLE
Proposed Layout

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SCALE 1 : 200	DATE 29.02.2024
DRAWING NUMBER 2024CAS051 06 014	REVISION NO.



Notes
This is an A1 Drawing at a scale of
1 : 200

Rev	Date	Description

SITE LOCATION
Places Eastleigh
Passfield Avenue
Eastleigh
Hampshire, SO50 9NL.

PROJECT
Four Padel Courts

CLIENT
Places Leisure

DRAWING TITLE
Proposed Padel Layout

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SCALE 1 : 200	DATE 29.02.2024
DRAWING NUMBER 2024CAS051 06 015	REVISION NO.

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
MH1	0.143	4.00	10.000	100.000	100.000	0.301

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	0.0
M5-60 (mm)	20.000	Check Discharge Rate(s)	✓
Ratio-R	0.400	1 year (l/s)	0.7
Summer CV	0.750	30 year (l/s)	1.9
Winter CV	0.840	100 year (l/s)	2.5
Analysis Speed	Normal	Check Discharge Volume	x
Skip Steady State	x		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.40
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.143	Betterment (%)	0
SAAR (mm)	788	QBar	0.8
Soil Index	4	Q 1 year (l/s)	0.7
SPR	0.47	Q 30 year (l/s)	1.9
Region	7	Q 100 year (l/s)	2.5
Growth Factor 1 year	0.85		

Node MH1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03600	Safety Factor	2.0	Invert Level (m)	9.699
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.15	Time to half empty (mins)	75

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1420.0	1420.0	0.300	1420.0	1420.0	0.301	0.0	1420.0



Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	MH1	58	9.939	0.240	48.6	51.0617	0.0000	OK
Link Event (Upstream Depth)		US Node	Link	Outflow (l/s)				
60 minute winter		MH1	Infiltration	7.1				

Results for 100 year +45% CC 15 minute summer. 255 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MH1	17	9.855	0.156	98.4	33.1661	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
15 minute summer	MH1	Infiltration	7.1					



Results for 100 year +45% CC 15 minute winter. 255 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	MH1	17	9.876	0.177	98.4	37.6582	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
15 minute winter	MH1	Infiltration	7.1



Results for 100 year +45% CC 30 minute summer. 270 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	MH1	31	9.890	0.191	86.1	40.5885	0.0000	OK
Link Event		US Node		Link	Outflow (l/s)			
30 minute summer		MH1		Infiltration	7.1			



Results for 100 year +45% CC 30 minute winter. 270 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	MH1	31	9.917	0.218	74.6	46.4579	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
30 minute winter	MH1	Infiltration	7.1					

Results for 100 year +45% CC 60 minute summer. 300 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	MH1	53	9.906	0.207	61.8	44.0636	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
60 minute summer	MH1	Infiltration	7.1					



Results for 100 year +45% CC 60 minute winter. 300 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	MH1	58	9.939	0.240	48.6	51.0617	0.0000	OK
Link Event		US Node	Link	Outflow (l/s)				
60 minute winter		MH1	Infiltration	7.1				

Results for 100 year +45% CC 120 minute summer. 360 minute analysis at 2 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	MH1	86	9.902	0.203	40.0	43.2171	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
120 minute summer	MH1	Infiltration	7.1

Results for 100 year +45% CC 120 minute winter. 360 minute analysis at 2 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	MH1	92	9.930	0.231	29.8	49.2991	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
120 minute winter	MH1	Infiltration	7.1					

Results for 100 year +45% CC 180 minute summer. 420 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute summer	MH1	120	9.887	0.188	30.2	40.1072	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
180 minute summer	MH1	Infiltration	7.1

Results for 100 year +45% CC 180 minute winter. 420 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	MH1	132	9.909	0.210	22.0	44.6773	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
180 minute winter	MH1	Infiltration	7.1					

Results for 100 year +45% CC 240 minute summer. 480 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute summer	MH1	152	9.870	0.171	23.4	36.4447	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
240 minute summer	MH1	Infiltration	7.1

Results for 100 year +45% CC 240 minute winter. 480 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	MH1	168	9.883	0.184	17.4	39.1798	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
240 minute winter	MH1	Infiltration	7.1					

Results for 100 year +45% CC 360 minute summer. 600 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	MH1	224	9.838	0.139	17.5	29.6229	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
360 minute summer	MH1	Infiltration	7.1

Results for 100 year +45% CC 360 minute winter. 600 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	MH1	232	9.834	0.135	12.7	28.7461	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
360 minute winter	MH1	Infiltration	7.1					

Results for 100 year +45% CC 480 minute summer. 720 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute summer	MH1	280	9.812	0.113	13.6	24.0253	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
480 minute summer	MH1	Infiltration	7.1

Results for 100 year +45% CC 480 minute winter. 720 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	MH1	296	9.794	0.095	10.1	20.3364	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
480 minute winter	MH1	Infiltration	7.1					

Results for 100 year +45% CC 600 minute summer. 840 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute summer	MH1	345	9.789	0.090	11.0	19.1399	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
600 minute summer	MH1	Infiltration	7.1

Results for 100 year +45% CC 600 minute winter. 840 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	MH1	345	9.764	0.065	8.4	13.8811	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
600 minute winter	MH1	Infiltration	7.1					

Results for 100 year +45% CC 720 minute summer. 960 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute summer	MH1	405	9.771	0.072	9.7	15.3908	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
720 minute summer	MH1	Infiltration	7.1

Results for 100 year +45% CC 720 minute winter. 960 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	MH1	390	9.748	0.049	7.3	10.5383	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
720 minute winter	MH1	Infiltration	7.0					

Results for 100 year +45% CC 960 minute summer. 1200 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute summer	MH1	510	9.750	0.051	7.8	10.7767	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
960 minute summer	MH1	Infiltration	7.1

Results for 100 year +45% CC 960 minute winter. 1200 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	MH1	510	9.739	0.040	5.8	8.5195	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
960 minute winter	MH1	Infiltration	5.7					

Results for 100 year +45% CC 1440 minute summer. 1680 minute analysis at 30 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute summer	MH1	750	9.737	0.038	5.6	8.0540	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
1440 minute summer	MH1	Infiltration	5.4					

Results for 100 year +45% CC 1440 minute winter. 1680 minute analysis at 30 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	MH1	750	9.728	0.029	4.2	6.2212	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
1440 minute winter	MH1	Infiltration	4.1

Results for 100 year +45% CC 2160 minute summer. 2400 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2160 minute summer	MH1	1140	9.726	0.027	3.9	5.8007	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
2160 minute summer	MH1	Infiltration	3.9

Results for 100 year +45% CC 2160 minute winter. 2400 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2160 minute winter	MH1	1140	9.720	0.021	3.0	4.4886	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
2160 minute winter	MH1	Infiltration	3.0

Results for 100 year +45% CC 2880 minute summer. 3120 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute summer	MH1	1500	9.721	0.022	3.2	4.7671	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
2880 minute summer	MH1	Infiltration	3.2					

Results for 100 year +45% CC 2880 minute winter. 3120 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	MH1	1500	9.716	0.017	2.4	3.5943	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
2880 minute winter	MH1	Infiltration	2.4

Results for 100 year +45% CC 4320 minute summer. 4560 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
4320 minute summer	MH1	2220	9.715	0.016	2.3	3.4382	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
4320 minute summer	MH1	Infiltration	2.3					

Results for 100 year +45% CC 4320 minute winter. 4560 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
4320 minute winter	MH1	2280	9.711	0.012	1.7	2.5500	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
4320 minute winter	MH1	Infiltration	1.7

Results for 100 year +45% CC 5760 minute summer. 6000 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
5760 minute summer	MH1	2940	9.712	0.013	1.9	2.8392	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
5760 minute summer	MH1	Infiltration	1.9

Results for 100 year +45% CC 5760 minute winter. 6000 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
5760 minute winter	MH1	3000	9.709	0.010	1.4	2.1000	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
5760 minute winter	MH1	Infiltration	1.4

Results for 100 year +45% CC 7200 minute summer. 7440 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
7200 minute summer	MH1	3660	9.710	0.011	1.6	2.3943	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
7200 minute summer	MH1	Infiltration	1.6					

Results for 100 year +45% CC 7200 minute winter. 7440 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
7200 minute winter	MH1	3720	9.707	0.008	1.1	1.6500	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
7200 minute winter	MH1	Infiltration	1.1

Results for 100 year +45% CC 8640 minute summer. 8880 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
8640 minute summer	MH1	4380	9.709	0.010	1.4	2.0944	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
8640 minute summer	MH1	Infiltration	1.4

Results for 100 year +45% CC 8640 minute winter. 8880 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
8640 minute winter	MH1	4500	9.706	0.007	1.0	1.5000	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
8640 minute winter	MH1	Infiltration	1.0

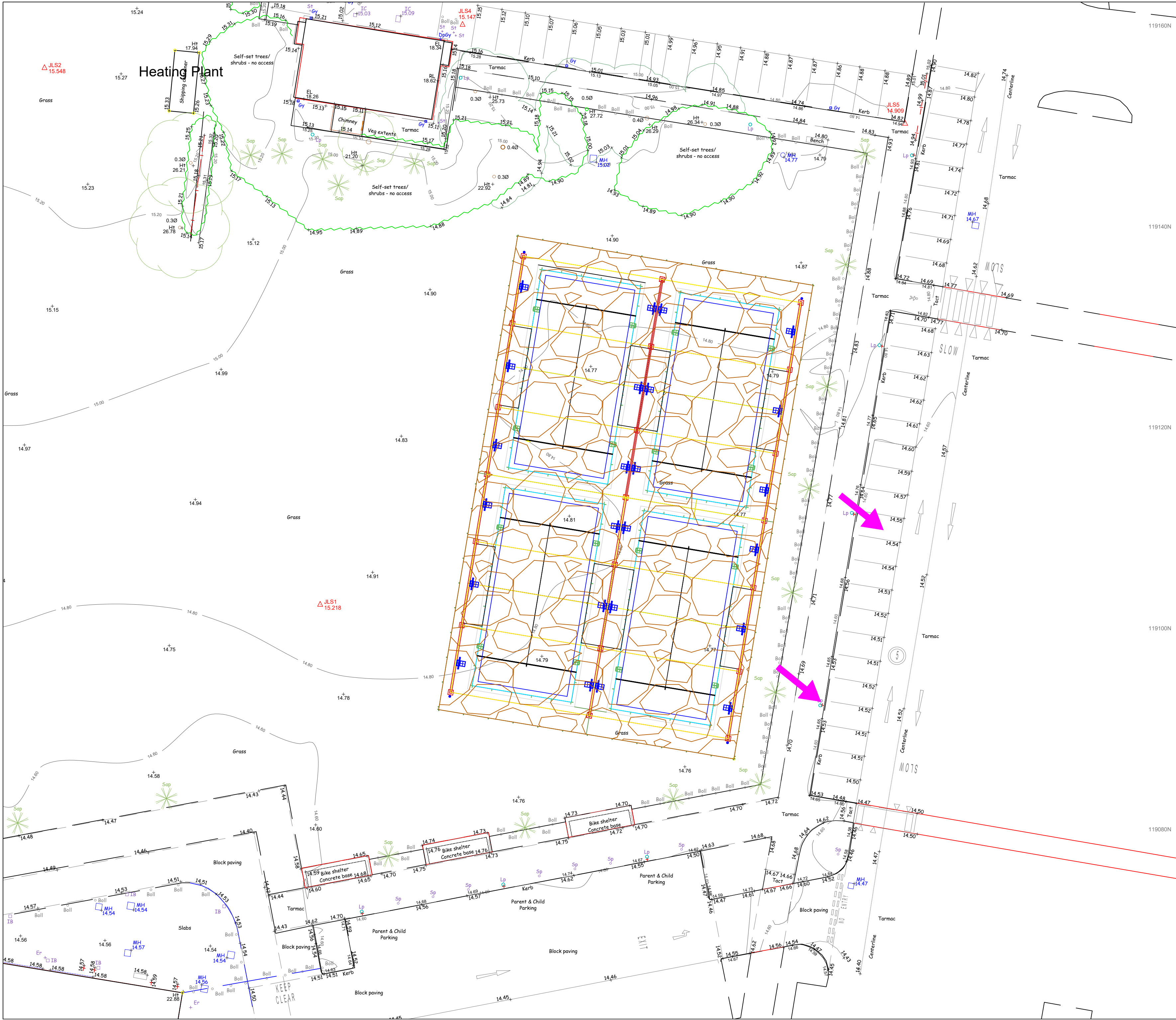
Results for 100 year +45% CC 10080 minute summer. 10320 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute summer	MH1	5160	9.707	0.008	1.2	1.8000	0.0000	OK
Link Event	US Node	Link	Outflow (l/s)					
10080 minute summer	MH1	Infiltration	1.2					

Results for 100 year +45% CC 10080 minute winter. 10320 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute winter	MH1	5220	9.705	0.006	0.9	1.3500	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)
10080 minute winter	MH1	Infiltration	0.9



Flood map for planning

Your reference
94001

Location (easting/northing)
444337/119137

Created
20 Mar 2024 14:29

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)

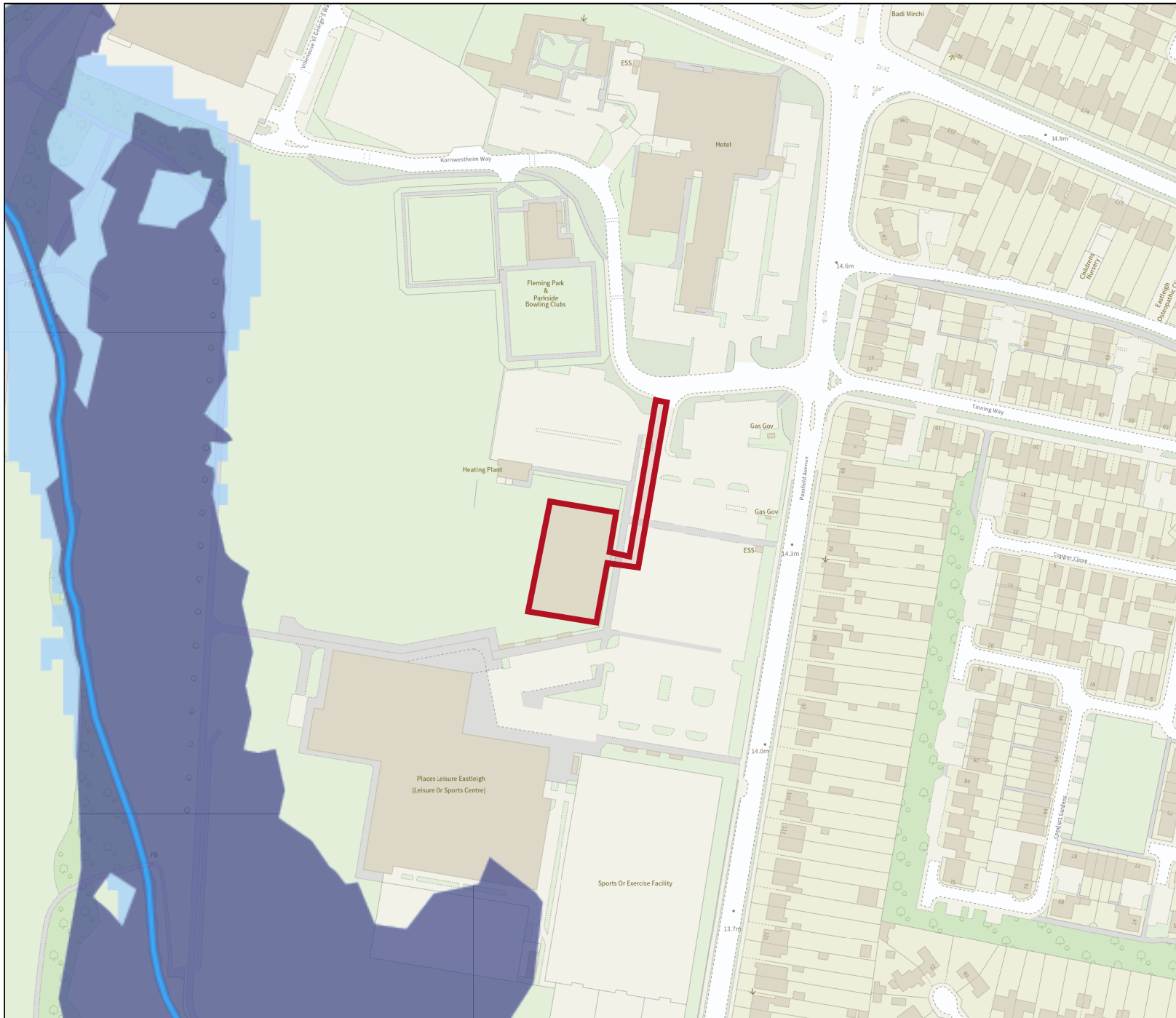
Notes

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 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference

94001

Location (easting/northing)

444337/119137

Scale

1:2500

Created

20 Mar 2024 14:29

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

