GeoSmart Information

FloodSmart Plus

Flood Risk Assessment

Site Address

Castle View
Forstal Rd
Maidstone
ME14 3AQ

Grid Reference

575159, 158210

Report Prepared for

Poise
124 City Road
London
EC1V 2NX

Date

2023-10-31

Report Status

FINAL

Site Area

0.08 ha

Report Reference

80525R1

RISK – Very Low to Low

The majority of the Site is located in a fluvial/tidal Flood Zone 1, this equates to a Low probability of flooding from rivers and the sea. The eastern extent of the Site is located on the boundary of Flood Zone 2/3 (Medium to High probability), including Site access/egress. Flood defences are absent from the nearby watercourse attributed to fluvial flooding on the Site. Surface water (pluvial) flood risks are Very Low. Groundwater flood risks are negligible and flooding risks from artificial sources (i.e. canals, reservoirs and sewers) are Low. Mitigation measures are recommended in this report to reduce the risks to an

Report Author
Lorna Baker
Consultant

Report Checker
Jessica Bayliff
Senior Consultant

Report Reviewer
Bob Sargent
Associate

GeoSmart Information Ltd
Suite 9-11, 1st Floor, Old Bank Buildings,
Bellstone, Shrewsbury, SY1 1HU
+44(0)1743 298 100
info@geosmartinfo.co.uk
www.geosmartinfo.co.uk

1. Executive summary

A review has been undertaken of national environmental data sets to assess the flood risk to the Site from all sources of flooding in accordance with the National Planning Policy Framework (NPPF) (2023) and National Planning Practice Guidance (NPPG) (Published in 2014 and updated in August 2022). A site-specific flood risk assessment, to assess the flood risk to and from the development Site, is provided within this concise interpretative report written by an experienced GeoSmart consultant. Baseline flood risk and residual risks that remain after the flood risk management and mitigation measures are implemented are summarised in the table below.

Site analysis

Source of Flood Risk	Baseline*	Final **
River (fluvial) flooding	Very Low to Medium	Very Low to Low
Sea (coastal/tidal) flooding	Very Low	N/A
Surface water (pluvial) flooding	Very Low	N/A
Groundwater flooding	Negligible	N/A
Other flood risk factors present	Yes	N/A
Is any other further work recommended?	No	No

*BASELINE risks have been calculated for the whole Site, using national risk maps, including the benefit of EA flood defences.**FINAL RISK RATING Includes a detailed analyses of flooding risks over the lifetime of the proposed development, including allowances for climate change AND assumes recommended mitigation measures are implemented. N/A indicates where mitigation is not required.

Summary of existing and proposed development

The Site currently consists of a hard standing carpark also containing a container, heavy steel trash bin and skip. The proposed development is for electric vehicle charging stations to be installed in the existing car park, the location of which shall be informed by the outputs of this assessment.

Summary of flood risks

The flood risks from all sources have been assessed as part of this report and are as follows:

River (fluvial) and Sea (Estuarine) flooding

- According to the Environment Agency's (EA) Flood Map for Planning Purposes, the Site is located within fluvial and tidal Flood Zones 1 (Low Probability), 2 (Medium Probability) and 3 (High Probability); The majority of the Site is classified as a Flood Zone 1.
- The Site, whilst located 173 m away from flood defences on the River Medway, does not benefit from its protection due to the developments positioning at a much higher elevation. Conversely, there are no flood defences present on the unnamed watercourse running along the northern and western boundaries of the Site; modelling shows a medium probability of flooding from this watercourse in which the Site is not protected by flood defences.
- According to the EA's Risk of Flooding from Rivers and Sea (RoFRS) map, which considers the type, condition and crest height of flood defences, the Site has a Medium risk of flooding from the both the sea, the River Medway and the nearby watercourse which drains into the River Medway.
- The Site could potentially be at risk from flooding due to blockage or failure of the Allington Lock, 290m from the Site.
- Modelled flood data obtained from the EA has been analysed in line with the most up to date guidance on climate change (EA, 2022), to confirm a maximum "design" flood level at the Site.

  During a 1 in 100 year plus 27% climate change allowance event the flood level at the Site would be 12.17 mAOD.

Surface water (pluvial) flooding

- According to the EA's Risk of Flooding from Surface Water (pluvial) flood mapping, the Site has a Very Low risk of pluvial flooding.

Groundwater flooding

- Groundwater Flood Risk screening data indicates there is a Negligible potential risk of groundwater flooding at the surface in the vicinity of the Site during a 1 in 100 year event.

Artificial sources of flooding

- The risk of flooding from artificial (man-made) sources such as reservoirs, sewers and canals has been assessed:
  - The EA's Risk of Flooding from Reservoir map confirms the Site is not at risk of reservoir flooding. The potential for a breach of a reservoir to occur and flooding affecting the Site is low.
  - Ordnance Survey (OS) data confirms there are no canals near to the Site.

- The Strategic Flood Risk Assessment (SFRA)(JBA, 2016) has identified 1 incident or modelled incident of flooding as a result of surcharging sewers within the ME14 3 postcode.

The risk of flooding from artificial sources is considered to be Negligible.

In accordance with paragraphs 161, 168 and footnote 56 of the NPPF (2023), as the development proposals are comprised of the addition of electrical car charging infrastructure within Flood Zone 3 the Sequential Test is not required.

Recommendations

Recommendations for flood mitigation are provided below, based upon the proposed development and the flood risk identified at the Site.

- The primary recommendation is to locate the proposed development in areas of the Site which are classified as a Flood Zone 1. The majority of the Site and specifically the western and central extents have the lowest probability of fluvial flooding, classified as Flood Zone 1.
- The ongoing management and maintenance of existing and any proposed drainage networks, under the riparian ownership of the developer, should be undertaken in perpetuity with the development.
- It is recommended where possible to raise electricity and electrical sockets above the predicted flood level on stilts or to provide waterproofed electrical covers.
- An on-Site flood defence and/or drainage scheme could also be implemented to help protect the Site and drain flooding from the area for proposed development.

GeoSmart recommend the mitigation measures discussed within this report are considered as part of the proposed development where possible and evidence of this is provided to the Local Planning Authority as part of the planning application.

2. Introduction

Background and purpose

A site-specific flood risk assessment has been undertaken, to assess the flood risk to and from the development Site. This assessment has been undertaken by firstly compiling information concerning the Site and the surrounding area. The information gathered was then used to construct a 'conceptual site model', including an understanding of the appropriateness of the development as defined in the NPPF (2023) and the source(s) of any flood risk present, guided by the NPPG (Published in 2014 and updated in August 2022). Finally, a preliminary assessment of the steps that can be taken to manage flood risk to the development was undertaken.

This report has been prepared with reference to the NPPF (2023) and NPPG (2022).

"*The National Planning Policy Framework set out the Government's planning policies for England and how these are expected to be applied*" (NPPF, 2023).

The NPPF (2023) and NPPG (2022) promote a sequential, risk based approach to the location of development. This also applies to locating a development within a Site which has a variable risk of flooding.

"*The 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*" (Paragraph: 023. NPPG, 2022).

The purpose of this report is to provide clear and pragmatic advice regarding the nature and potential significance of flood hazards which may be present at the Site.

Report scope

In accordance with the requirements set out within NPPG 2022 (Paragraph: 021 Reference ID: 7-021-20220825), a thorough review of publicly and commercially available flood risk data and EA supplied data indicating potential sources of flood risk to the Site from rivers and coastal sources, surface run-off (pluvial), groundwater and reservoirs, including historical flood information and modelled flood extent. Appropriate measures are recommended to manage and mitigate the flood risk to the property.

Information obtained from the EA and a review of the Maidstone Borough Council Strategic Flood Risk Assessment (SFRA) (JBA, 2016) is used to ascertain local flooding issues and, where appropriate, identify information to support a Sequential and/or Exception test required as part of the NPPF (2023).

The existing and future flood risk to and from the Site from all flood sources is assessed in line with current best practice using the best available data. The risk to the development has been assessed over its expected lifetime, including appropriate allowances for the impacts of climate change. Residual risks that remain after the flood risk management and mitigation

measures are implemented, are considered with an explanation of how these risks can be managed to keep the users of the development safe over its lifetime.

An indication of whether the Site will potentially increase flood risk elsewhere is provided, including where the proposed development increases the building footprint at the Site. A drainage strategy to control runoff can be commissioned separately if identified as a requirement within this report.

Report limitations

It is noted that the findings presented in this report are based on a desk study of information supplied by third parties. Whilst we assume that all information is representative of past and present conditions, we can offer no guarantee as to its validity and a proportionate programme of site investigations would be required to fully verify these findings.

The basemap used is the OS Street View 1:10,000 scale, however the Site boundary has been drawn using BlueSky aerial imagery to ensure the correct extent and proportion of the Site is analysed.

This report excludes consideration of potential hazards arising from any activities at the Site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities.

Datasets

The following table shows the sources of information that have been consulted as part of this report:

Table 1. Datasets consulted to obtain confirmation of sources of flooding and risk

Source of flooding	Datasets consulted			
	Commercial Flood Maps	Local Policy & Guidance Documents*	Environment Agency	OS Data
Historical	X	X	X	
River (fluvial) / Sea (tidal/coastal)	X	X	X	

Source of flooding	Datasets consulted			
	Commercial Flood Maps	Local Policy & Guidance Documents*	Environment Agency	OS Data
Surface water (pluvial)	X	X	X	
Groundwater	X	X		
Sewer		X		
Culvert/bridges		X		X
Reservoir		X	X	

*Local guidance and policy, referenced in Section 6, has been consulted to determine local flood conditions and requirements for flood mitigation measures.

Local policy and guidance

For this report, several documents have been consulted for local policy and guidance and relevant information is outlined below:

Medway and Swale Shoreline Management Plan (Halcrow Group, 2010):

The frontage comprises the urban areas of historic Aylesford and Millhall to the south and areas of agricultural land and freshwater habitats interspersed with small settlements towards the north. Outline planning consent has been granted to a housing and community development (Peters Village) and a new Medway River crossing west of Peters Pit.

The estuary channel is narrow and fluvial in form along the whole frontage. In the short to medium term the plan is to continue protecting the environmental habitats, agricultural land, built assets and flood risk areas. This will allow further studies to consider the viability of multiple areas of managed realignment along the frontage and to define the exact standard and alignment of defences for this frontage.

The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish habitat in some locations, whilst continuing to provide flood defence to remaining urban and environmental assets and flood risk areas. It is recognised that this section of shoreline provides an opportunity for localised environmental enhancement and habitat creation through localised managed realignment.

Maidstone Borough Council Strategic Flood Risk Assessment (JBA, 2016):

Given the widespread flooding recorded historically within the borough (particularly along the River Medway floodplain and the area surrounding the confluence of the Medway with its main tributaries as evidenced in Figure 3-1) particular areas (e.g. roads and settlements) of the borough susceptible to fluvial flooding have not been listed here. Although there are no formal defences within Maidstone Borough, a number of structures (walls and embankments) and formal defences upstream (e.g. Leigh Flood Storage Area) and downstream (e.g. tidal flood walls) of Maidstone act to reduce flooding.

The River Medway catchment (at Allington Lock: NGR 574850 158150) receives approximately 740mm of rain on average per year. The average runoff from the Medway catchment through Allington is in excess of 400 million cubic meters. Flows are reported to vary widely, with winter and spring producing three times the average of the summer and autumn months.

Flood Zone Definitions

Zone 3a: Comprised of land assessed as having a greater than 1 in 100 annual probability of river flooding or a greater than 1 in 200 annual probability of flooding from the sea in any year. Zone 3b: Comprised of land where water has to flow or be stored in times of flood (the functional floodplain). The SFRA identified this Flood Zone as land which would flood with an annual probability of 1 in 20 years, where detailed hydraulic modelling exists. In the absence of detailed hydraulic model information, a precautionary approach was adopted with the assumption that the extent of Flood Zone 3b would be equal to Flood Zone 3a. If development is shown to be in Flood Zone 3a, further work should be undertaken as part of a detailed site specific flood risk assessment to define the extent of Flood Zone 3b.

Flood Risk and Historic Flooding

Water levels in the River Medway are influenced by fluvial inflows for the majority of the borough. However, in the vicinity of Allington, water levels in the River Medway are also influenced by tidal/estuarine effects and it has been known for the backwater effect from tidal water to reach as far upstream as East Farleigh. The Medway has been subject to many flood events, and, as a result, Maidstone has experienced severe flooding on several occasions.

The tidal influence of the River Medway extends from the far north of the borough to beyond Allington Lock which is located within near the boundary of the borough. The tidal limit of the River Medway is at Allington Sluice. However, despite the presence of Sluice gates at Allington, tidal backwater effects can influence water level depths upstream during extreme events and it has been known for the backwater effect to reach as far upstream as East Farleigh. Interrogation of the Environment Agency's recorded flood outline dataset indicates the last known tidal flood event to flood areas of Maidstone Borough occurred in 1927 when the channel capacity was exceeded and there was no presence of raised flood defences.

December 1927: heavy rain on the 25th December, which changed to snow and caused what is regarded as one of the worst snowstorms in the 20th century, resulted in flooding of the area surrounding Allington downstream of Allington Lock.

Guidance

Strategic Flood Risk Assessments are carried out by local authorities, in consultation with the Environment Agency, to assess the flood risk to the area from all sources both now and in the future due to climate change. They are used to inform planning decisions to ensure inappropriate development is avoided (NPPF, 2023).

3. Site analysis

Site information

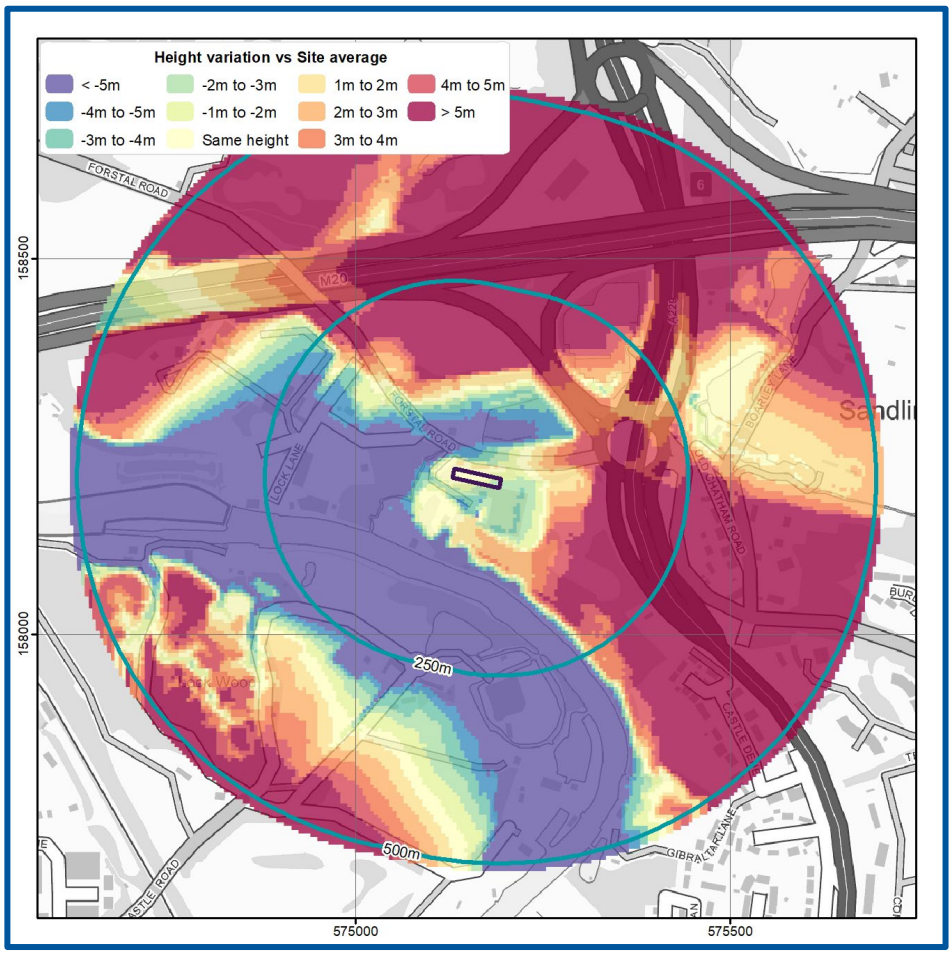
The Site is located in Maidstone, Kent in a setting of commercial and residential land use at National Grid Reference TQ 75159 58210.

Figure 1. Aerial imagery of the Site (Bluesky, 2023)

Figure 2 overleaf indicates ground levels within 500m of the Site fall in a north westerly direction.

The general ground levels on the Site are between 12.15 and 14.81 mAOD with the Site falling gradually in a south easterly direction. This is based on EA elevation data obtained for the Site to a 1 m resolution with a vertical accuracy of ±0.15 m (Appendix C).

Figure 2. Site Location and Relative Elevations (GeoSmart, 2023)



Development

The Site is currently used within a commercial capacity as a hardstand car parking area, containing a heavy steel trash bin, skip and container.

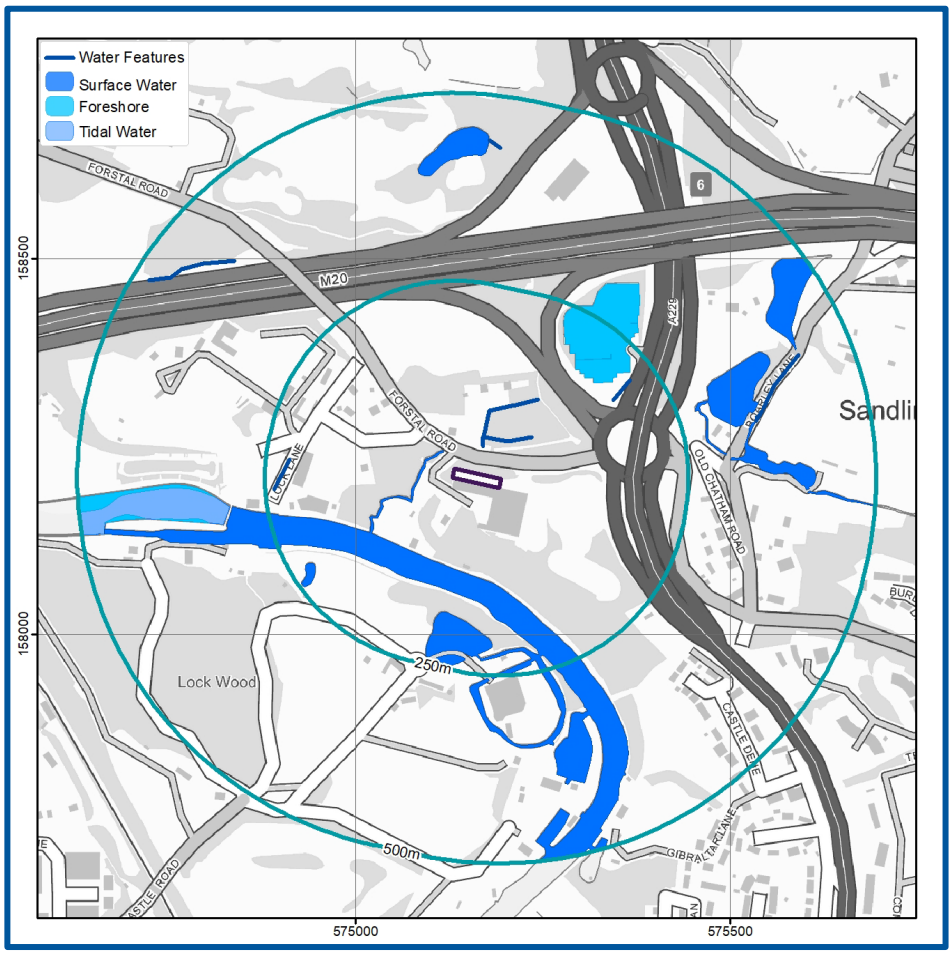
Development proposals comprise the installation of electric vehicle charging infrastructure within the existing car park, the location of which shall be informed by the outputs of this assessment. Site plans are included within Appendix A.

The effect of the overall development will not result in an increase in number of occupants and/or users of the Site and will not result in the change of use, nature or times of occupation. According to Annex 3 of the NPPG (2022), the vulnerability classification of the existing development is Less Vulnerable and proposed development is Less Vulnerable. The estimated lifespan of the development is 75 years.

Hydrological features

According to Ordnance Survey (OS) mapping included in the following figure, there are numerous surface water features within 500 m of the Site.

Figure 3. Surface water features (EA, 2023)



The River Medway is located approximately 118 m south of the Site.

An unnamed watercourse / drain runs from the pond to the River Medway at a distance of 70 m at its closest point, west of the Site.

Multiple lakes/reservoirs are located near the Site with the closest located approximately 336 m north east of the Site.

An unnamed water feature is located approximately 460 m north of the Site at a lower elevation.

A moat and unnamed lake are located approximately 260 m south of the Site.

Proximity to relevant infrastructure

The Allington Lock is located downstream of the Site approximately 290 m to the west.

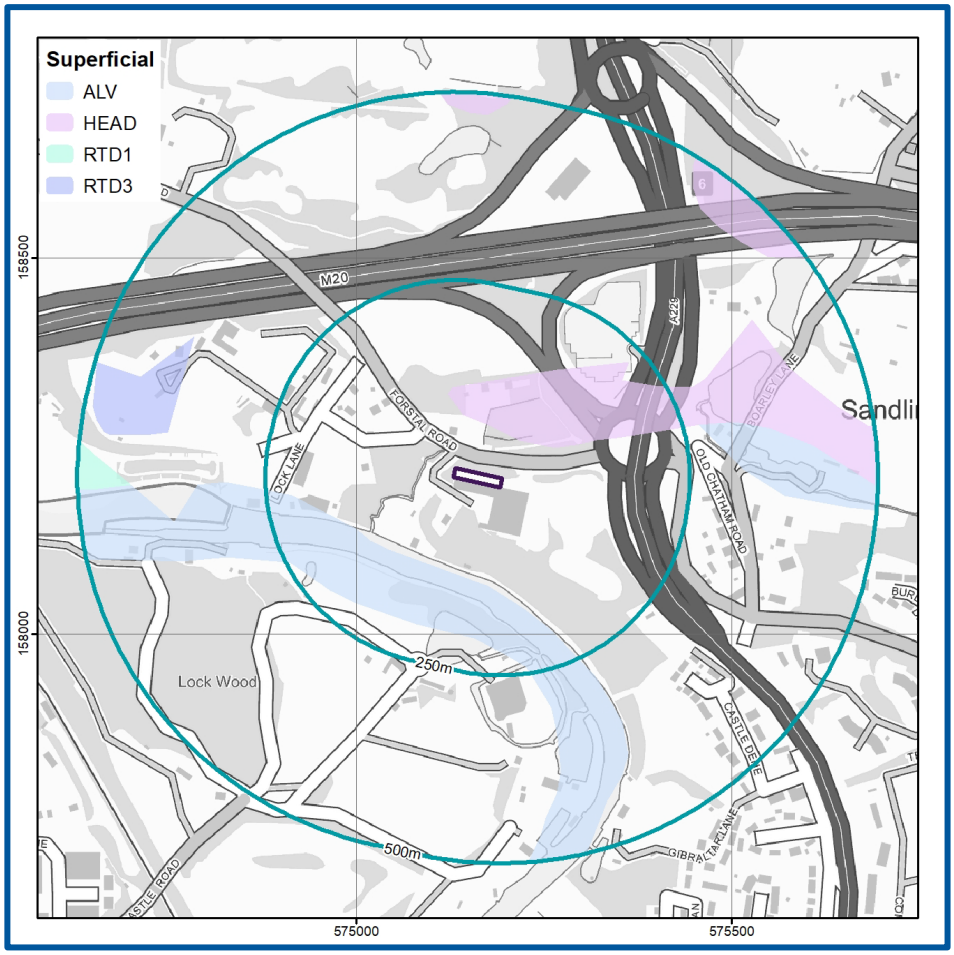
The M20 Graffiti Bridge is located upstream of the Site approximately 815 m to the west.

An unnamed bridge is located upstream of the Site approximately 1.3 km to the south.

Hydrogeological features

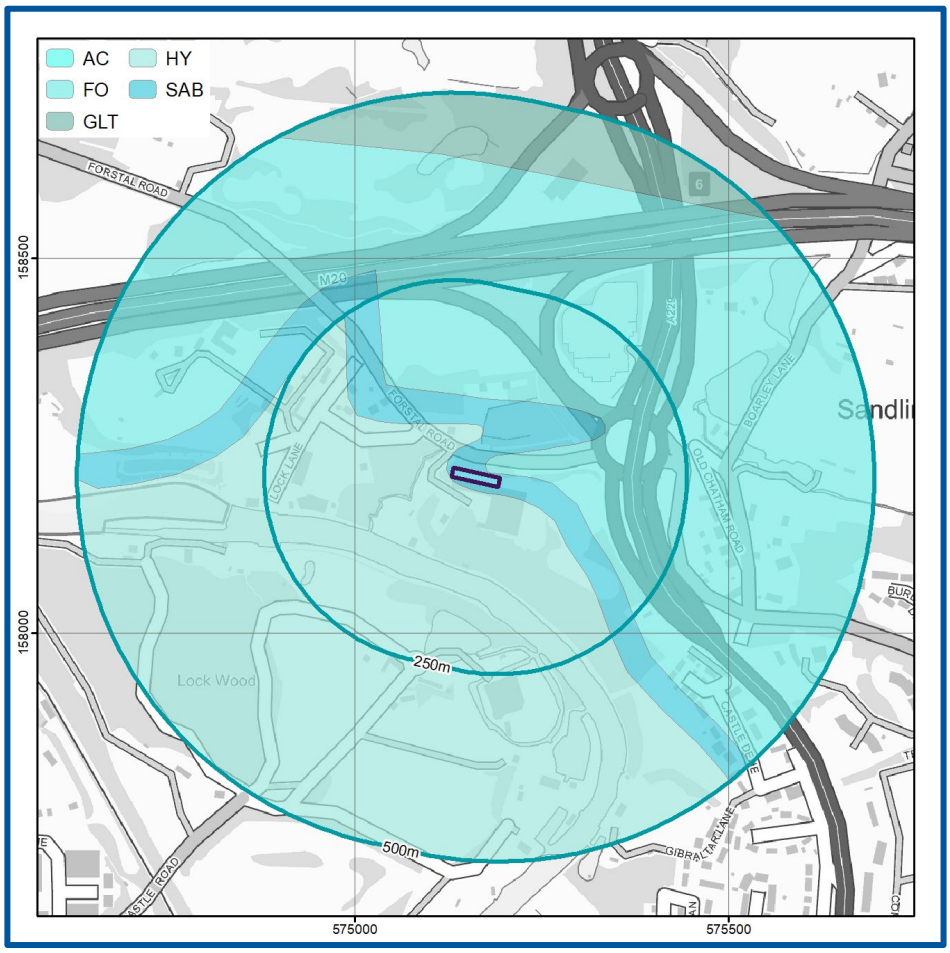
British Geological Survey (BGS) mapping indicates the Site is not underlain by a superficial geology (Figure 4) (BGS, 2023).

Figure 4. Superficial Geology (BGS, 2023)



BGS mapping indicates the underlying bedrock geology (Figure 5, overleaf) consists of the Sandgate Formation (sandstone, siltstone and mudstone) (SAB) (BGS, 2023) and is classified as a Secondary (A) Aquifer (EA, 2023). The bedrock geology is bound to the north by the Folkestone (sandstone) Formation (FO) and the Hythe Formation (sandstone and limestone) (HY) to the south, both classified as Principal Aquifers (EA, 2023).

Figure 5. Bedrock Geology (BGS, 2023)



Geological conditions

A review of the BGS borehole database (BGS, 2023) indicates there are numerous boreholes to the east of the Site, within the adjacent Folkestone Formation and indicates the underlying geology to consist of sand/sandy clay (and minor flint gravel) to a depth of 10m below ground level.

- Borehole (ref: TQ75NE152) is located 173 m to the east of the Site boundary at an elevation of 20.21 mAOD.
- Borehole (ref: TQ75NE153) is located 183 m to the east of the Site boundary at an elevation of 17.91 mAOD.
- Borehole (ref: TQ75NE154) is located 194 m to the east of the Site boundary at an elevation of 16.04 mAOD.

Groundwater

Whilst the closest borehole did not record groundwater, borehole (ref: TQ75NE153) detected slight seepage at 8 m bgl and borehole (ref: TQ75NE154) recorded at 5.8 m below ground level on 7/11/88, subject to seasonal variations (see Appendix D).

Groundwater levels could be approximately 4.8m below/ the Site ground level, but subject to variation with distance from the Site.

4. Flood risk to the development

Historical flood events

According to the EA's Historical Flood Map (Figure 6) and Page 23-24 of the SFRA (JBA, 2016), there has been several flood events within 500m of the Site (not affecting the Site itself), including:

Flooding within 100 m of the Site.

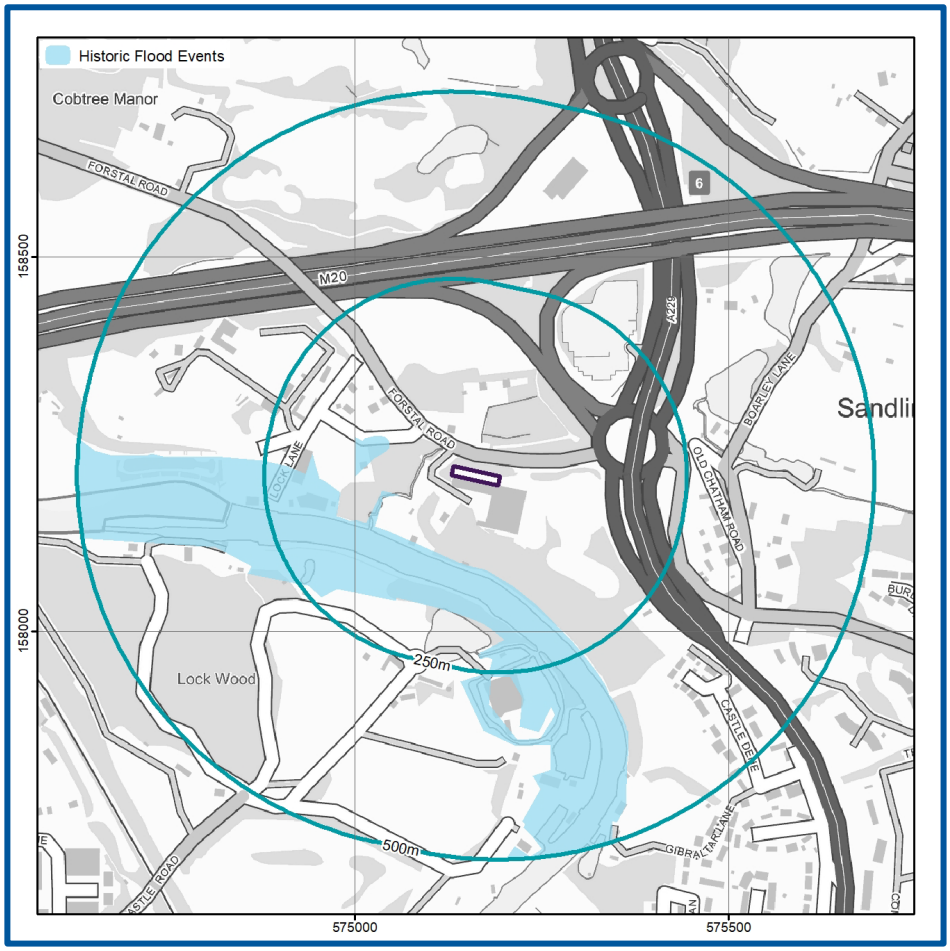
- December 1927: heavy rain and snowstorms on the 25th of December resulted in flooding downstream of Allington Lock, the source identified as the sea.
- November 1960: frequent and heavy rainfall caused water levels within the River Medway to exceed its channel capacity, with no flood defences present.
- September 1968: prolonged heavy rainfall and thunderstorms caused the River Medway to exceed its channel capacity, with no flood defences present.
- December 2013: heavy rainfall and stormy conditions caused the River Medway to exceed its channel capacity, with no raised defences present.

Flooding within 500 m of the Site.

- December 1927: heavy rain and snowstorms on the 25th of December resulted in flooding downstream of Allington Lock, the source identified as the sea.
- October 2000: following the wettest autumn since 1766, numerous fluvial flood events were caused by channel capacity exceedance of the River Medway with no flood defences present.

The purpose of historical flood data is to provide information on where and why flooding may have occurred in the past. The absence of any recorded events does not mean flooding has never occurred on-Site or that flooding will never occur at the Site.

Figure 6. EA Historic Flood Map (EA, 2023)



Rivers (fluvial) / Sea (coastal) / Estuarine (tidal) flooding

Estuarine flooding can occur from a combination of the sea, termed coastal flooding and from rivers, termed as fluvial flooding. There may be a predominant effect from either the sea or from the river. There may be a predominant effect from either the sea or from the river, through the following processes:

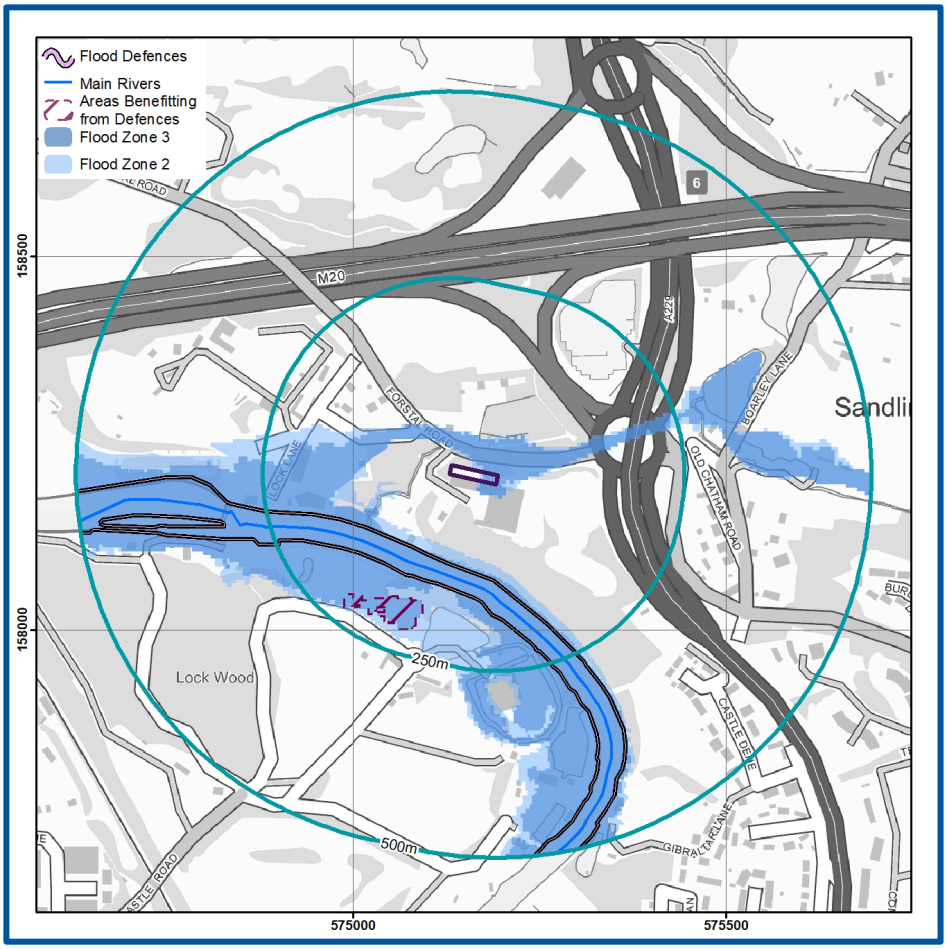
- High tide levels – variations in tidal levels due to gravitational effects of the sun and moon can result in higher sea levels – there is an approximate twice daily variation between high and low tide, onto which is superimposed a spring-neap tide cycle when extra high and low tides occur.
- Surge – an increase in sea level above tidal level caused by low atmospheric pressure which may be exacerbated by the wind acting on the sea. Tidal flooding is of greatest risk when tidal surges combine with high tides;

According to the EA's Flood Map for Planning Purposes (Figure 7), the Site is mainly located in a fluvial/tidal Flood Zone 1 (Low probability) (west and central Site extent); this is classified as

having a low probability of fluvial and tidal (coastal flooding). The eastern extent of the Site is located on the boundary of a fluvial and tidal Flood Zone 2/3 and is therefore classified as having a Medium to High probability of fluvial and tidal (coastal) flooding. The highest probability of flooding within Flood Zone 3 occurs to the east of the Site, including the associated access and adjacent highway to the north on Forstal Road.

Model data received from the EA for the North Kent Coast and River Medway suggest these are not linked to fluvial flooding at the Site. Fluvial flooding is therefore attributed to overtopping of reservoirs to the northeast of the Site which are drained into the River Medway at Allington Lock.

Figure 7. EA Flood Map for Planning Purposes (EA, 2023)



Guidance

As defined in the NPPF (2023):

Ignoring the presence of any defences:

1. land located in a Flood Zone 1 is considered to have a Low probability of flooding,

with less than a 1 in 1000 annual probability of fluvial or coastal flooding in any one year.

Development of all uses of land is appropriate in this zone

2. land located in a Flood Zone 1 is considered to have a Low probability of flooding, with less than a 1 in 1000 annual probability of fluvial or coastal flooding in any one year.

   Development of "Water-Compatible", "Essential Infrastructure", "Less Vulnerable" and "More Vulnerable" land uses are suitable for this zone with "Highly Vulnerable" land uses requiring an Exception Test to be passed prior to development taking place

3. land located in a Flood Zone 3 is considered to have High probability of flooding with a 1 in 100 year or greater annual probability of fluvial flooding or a 1 in 200 or greater annual probability of coastal flooding in any one year.

   Development of "Water-Compatible" and "Less Vulnerable" land uses are suitable for this zone with "More Vulnerable" and "Essential Infrastructure" requiring an Exception test to be passed prior to development taking place.

(see glossary for terminology).

Flood defences

Guidance

Sites that are located close to flood defences are likely to be zones where rapid inundation will occur in the event of the flood defences being overtopped or breached. A Site located close to flood defences (within 250 m) may require a more detailed FRA subject to local topography.

Existing flood defences

- The Site is in an area which benefits from flood defences, but is not within the EA's ABD. [1]
- There are formal flood defences within 115 m of the Site.

Information from the EA relating to the flood defences is outlined below.

[1] The EA maps Areas which Benefit from the presence of Defences (ABD) in a 1 in 100 (1%) chance of flooding each year from rivers; or 1 in 200 (0.5 %) chance of flooding each year from the sea. If the defences were not there, these areas would flood in a 1 in 100 (1%)/ 1 in 200 (0.5 %) or larger flooding incident. The EA do not show all areas that benefit from all flood defences, some defences are designed to protect against a smaller flood with a higher chance of occurring in any year, for example a flood defence which protects against a 1 in 30 chance of flooding in any year. Such a defence may be overtopped in a flood with a 1 in 100 (1%)/ 1 in 200 (0.5%) chance of occurring in any year, but the defence may still reduce the affected area or delay (rather than prevent) a flood, giving people more time to act and therefore reduce the consequences of flooding.

- According to the EA (2023) the flood defences in place for this area are designed to defend up to a 1 in 100 year flood event from the River Medway.
- The nearest and most applicable formal flood defences are raised, natural high ground with a minimum crest level of 6 mAOD.
    - This would not provide a defence from flooding on the Site, which is located at a higher elevation (approx. 12 mAOD).
- The EA inspects the defences once a year and classifies their current condition is unknown.

The Medway and Swale Shoreline Management Plan (SMP) confirms the policy for defences over the next 100 years is to hold the line. Managed realignment of the River Medway is also confirmed both up and downstream of the Allington Lock.

Model data (Fluvial)

As the Site is located within the EA's fluvial floodplain, modelled flood elevation data was obtained from the EA and has been used to assess flood risk and to provide recommendations for mitigation for the proposed development.

The EA's modelled flood data was requested on the 19th September 2023. The EA responded on 26th October 2023 but stated the following:

"Your request for a Product 4 falls under the exemption in provision 6(1)(a) and (b) of the Environmental Information Regulations 2004 (EIR), and on this occasion we are not providing the information in the requested format, but in an alternative format. Further detail of the provisions under the EIR can be found in Appendix 2."

Appendix 2 states:

"On this occasion we are not providing the information in the requested format, for the following reasons:

- *Complying with the preference would incur a significant cost, which the public authority [The Environment Agency] cannot pass on to the requester;*
- *Using a Product 5/6/7 allows us to make the information available at a lower cost; and*
- *The impact on the available resources of the public authority [The Environment Agency], of supplying a Product 5/6/7, is therefore much less."*

Furthermore, the Product 6 model data received from the EA for the North Kent Coast and River Medway do not cover the Site; the Site is therefore not considered at risk from these fluvial and tidal sources. Instead, the fluvial source of flooding is interpreted as overtopping of reservoirs located northeast of the Site, via drains feeding to the River Medway at Allington Lock. As the Environment Agency (EA) were unable to provide detailed model data to support the Flood Zones and RoFRaS flood extents at and in the vicinity of the Site, GeoSmart's FloodSmart Analytics (FSA) dataset has been used. The GeoSmart Flooding data layers are designed to identify the likelihood and severity of flooding occurring at any given location within Great Britain for all four main sources of flooding.

It is comprised of flood map layers which are formed upon a high resolution 5 x 5m grid. Individual flood sources of pluvial, fluvial, tidal and groundwater are each provided as separate layers and at three flood return periods. The layers can be used independently to assess risk from a single source or in combination to understand the overall effect of flooding.

The methodology used to produce the FSA dataset for flooding from fluvial and tidal sources uses the EA's own latest Flood Zone and RoFRaS flood extents alongside the EA's 1m accuracy LiDAR data to calculate the level and depth of flooding. Flooding depths are derived on the assumption that the flood depth is zero at the edge of the flood extent and from this, a triangular interpolation network (TIN) surface is generated which represents the flood surface.

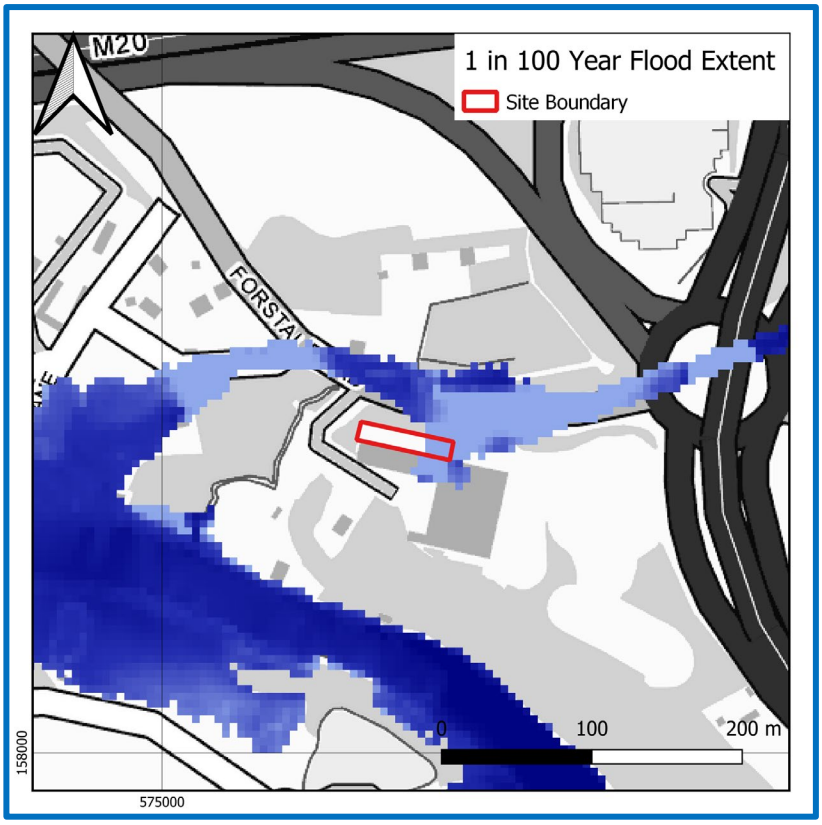
It should be noted the use of the FSA data is only used to calculate flood levels and overall risk at Sites, where detailed modelling is not available from the EA. The following flood levels have been calculated for the 1% AP (1 in 100 year) and 0.1% AP (1 in 1000 year) events:

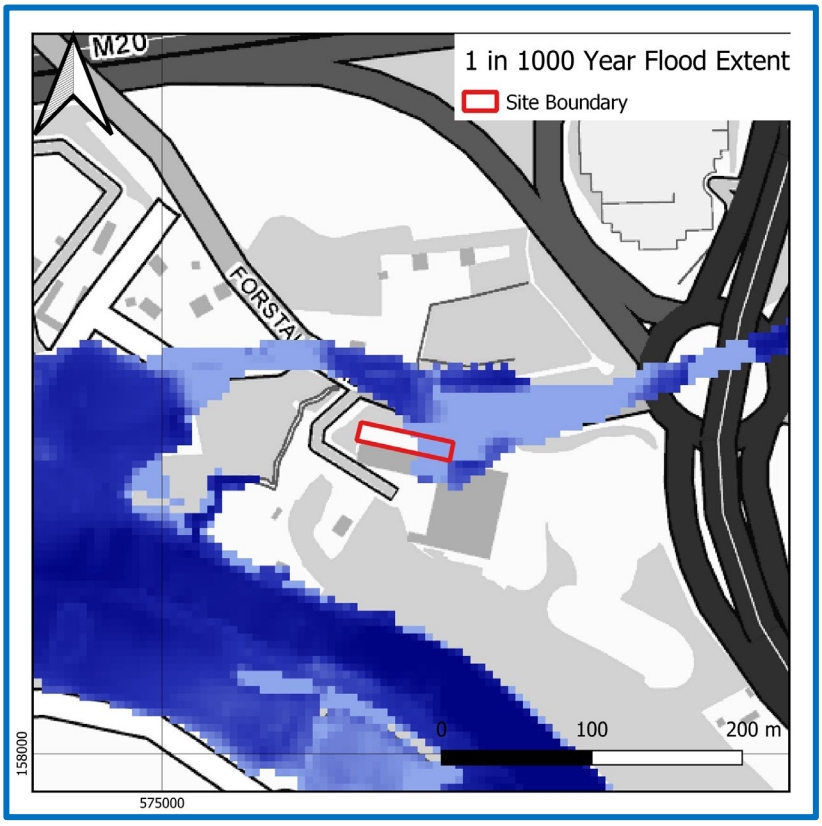
Table 2. GeoSmart present day modelled flood data

Ground levels on-Site (mAOD)	Modelled Flood Levels (mAOD)		
	1 in 20 year	1 in 100 year	1 in 1000 year
12.15 – 14.81	NA	12.17	12.18
Flood depths (m)	No Flooding	0.02	0.03

The following figure confirms the flood extent associated with overtopping of the flood defences in the present-day flooding scenarios.

Figure 8. Modelled present day flooding scenarios (GeoSmart, 2023)





Climate change factors

The EA's *Flood risk assessments: climate change allowances* guidance (Published 19 February 2016 and updated May, 2022) has been used to inform a suitable increase in peak river flows for the proposed development. The updated guidance confirms 'Less Vulnerable' developments are required to undertake a Basic assessment approach.

As the Site is located within the Medway Management Catchment, within the Southeast and the proposed development is classed as Less Vulnerable, where the proposed lifespan is approximately 75 years, the Central (27%) allowance has been used to determine a suitable climate change factor to apply to river data.

A stage / discharge (level/flow) relationship graph (Appendix B) has been produced using the EA's modelled in-channel flood flow and level data.

The in-channel flood data has been related to the Site through a calculation of the relationship between GeoSmart's modelled in-channel water levels and modelled 2D floodplain node points.

Table 3. Flood levels plus climate change allowances

Ground levels on-Site (mAOD)	Modelled Flood Levels (mAOD)	
	1 in 100 year plus 27% 2080 central allowance for climate change flood level (mAOD)	1 in 100 year plus 50% 2080 central allowance for climate change flood level (mAOD)
12.15 – 14.81	12.17	12.18
Flood depths (m)	0.03	0.03

Flood risk including the benefit of defences

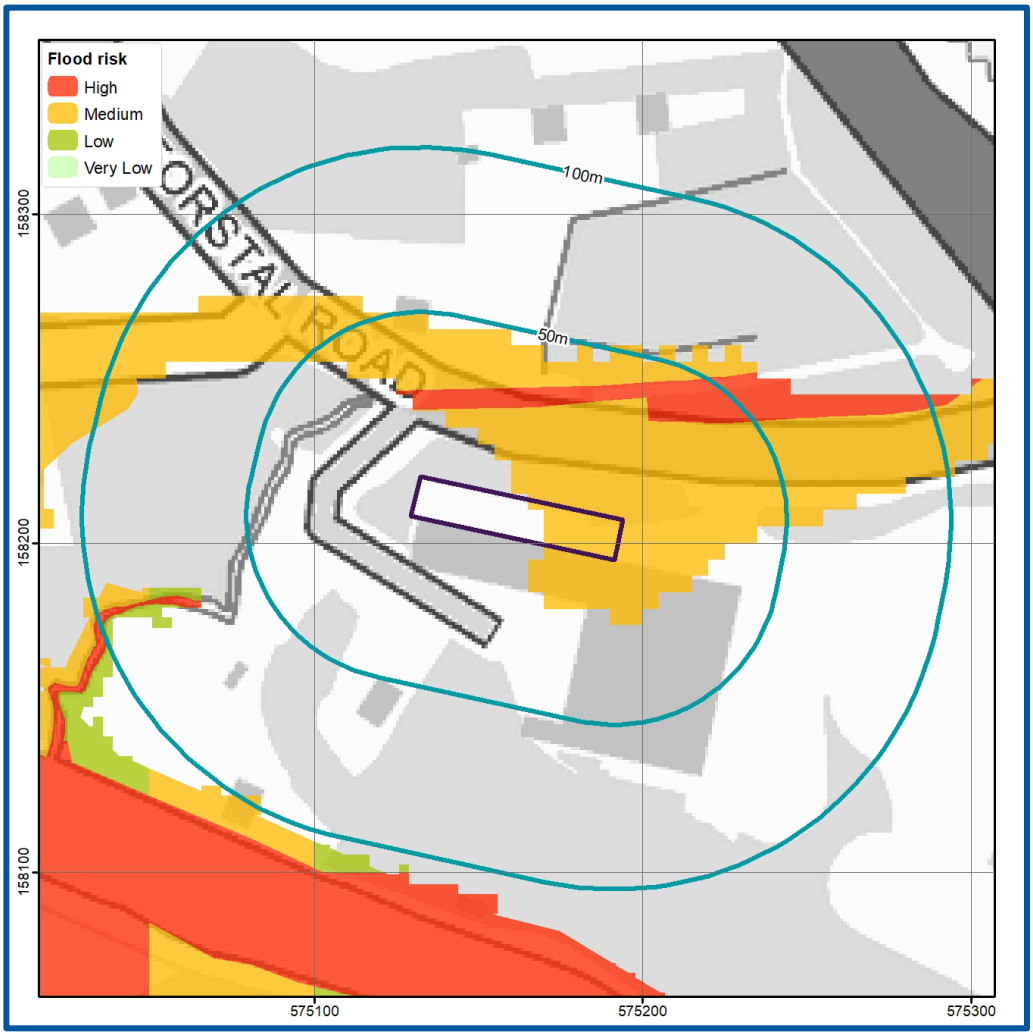
The type and condition of existing flood defences influence the 'actual' risk of fluvial flooding to the Site, albeit the long-term residual risk of flooding (ignoring the defences) should be considered when proposing new development.

According to the EA's Risk of Flooding from Rivers and Sea (RoFRS) map (Figure 9 overleaf), which considers the type, condition and crest height of flood defences, the Site has a risk of flooding ranging from Very Low to Medium. from the both the sea and the nearby watercourse, the River Medway. The associated high risk of fluvial flooding concerns the eastern edge of the Site and adjacent access routes.

Further analysis of Site ground levels and modelled flood data indicate the Site would not be impacted in the 1 in 100 year overtopping scenario of the River Medway as the Site is at a much higher elevation. No flood defences are present to protect from the unnamed

watercourse which drains from the northeast to southwest into the River Medway. The Site is therefore at risk of impact in the 1 in 100 year scenario of this undefended watercourse and the risk is classified as Medium.

Figure 9. Risk of Flooding from Rivers and Sea map (EA, 2023)

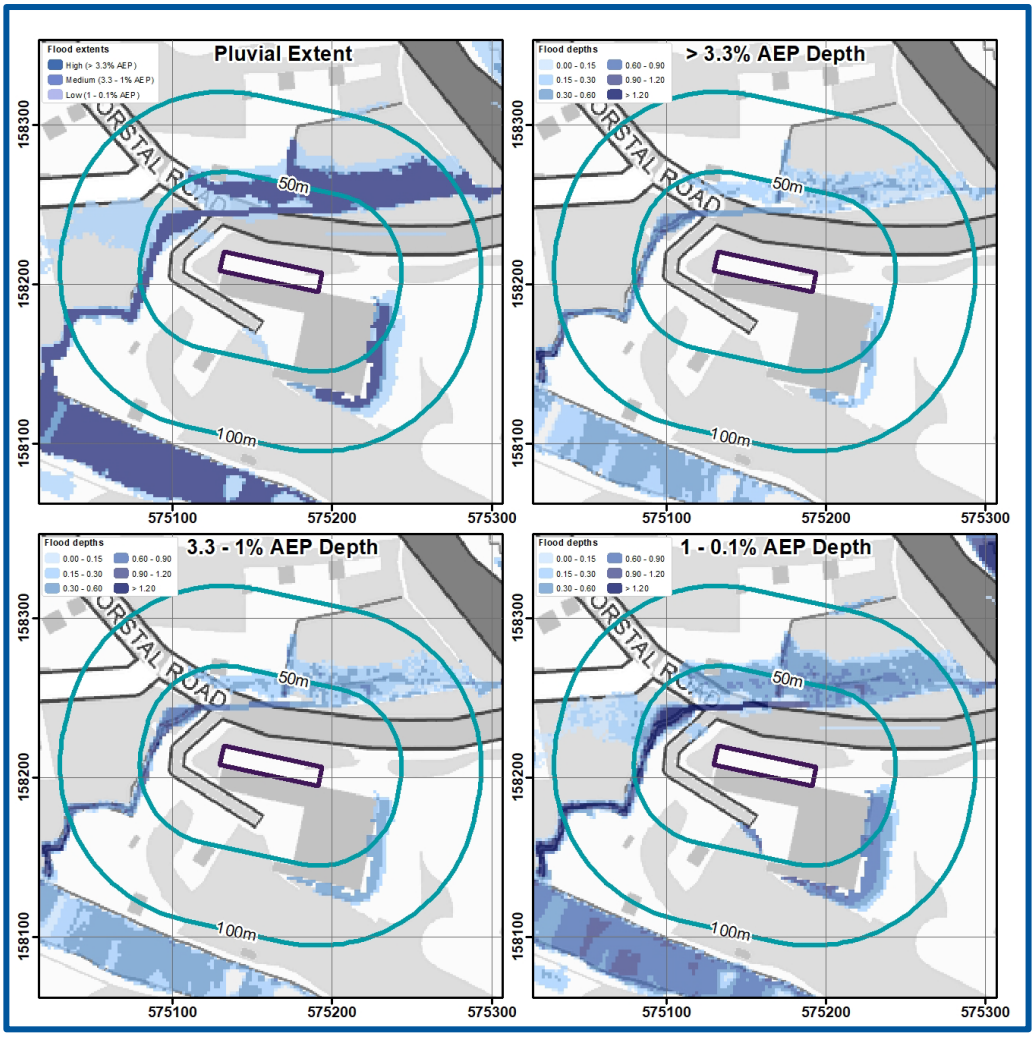


Surface water (pluvial) flooding

Surface water flooding occurs when intense rainfall exceeds the infiltration capacity of the ground and overwhelms the drainage systems. It can occur in most locations even at higher elevations and at significant distances from river and coastal floodplains.

According to the EA's Risk of Flooding from Surface Water (pluvial) flood mapping (Figure 10), the Site has a Very Low risk of pluvial flooding.

Figure 10. EA surface water flood extent and depth map (EA, 2023)



Guidance

According to EA's surface water flood risk map the Site is at:

- Very Low risk - chance of flooding of less than 1 in 1000 (0.1%).

Figure 4.1 of the 2008 SFRA (Mott MacDonald, 2008) documents an area of historic surface water flooding within the vicinity of the Site. The Surface Water Management Plan (SWMP) (JBA, 2013) also confirms the Site is located within a Critical Drainage Area (CDA)[2]

Climate change factors

Paragraph 002 of the National Planning Practice Guidance (August, 2022) requires consideration of the 1% AP (1 in 100 year) event, including an appropriate allowance for climate change.

As the Site is located within the Medway Management Catchment and the proposed development is classed as Less Vulnerable, where the proposed lifespan is approximately 75 years. the Upper End (45%) allowance is required to determine a suitable climate change factor to apply to rainfall data.

The 0.1% AP (1 in 1000 year) surface water flooding event has been used as a proxy in this instance for the 1% AP (1 in 100 year) plus climate change event.

Surface water flooding flow routes

Analysis of OS mapping, ground elevation data and the EA's pluvial flow route mapping in the 1 in 1000 year (Low probability) event confirms the Site is not located on a potential overland flow route.

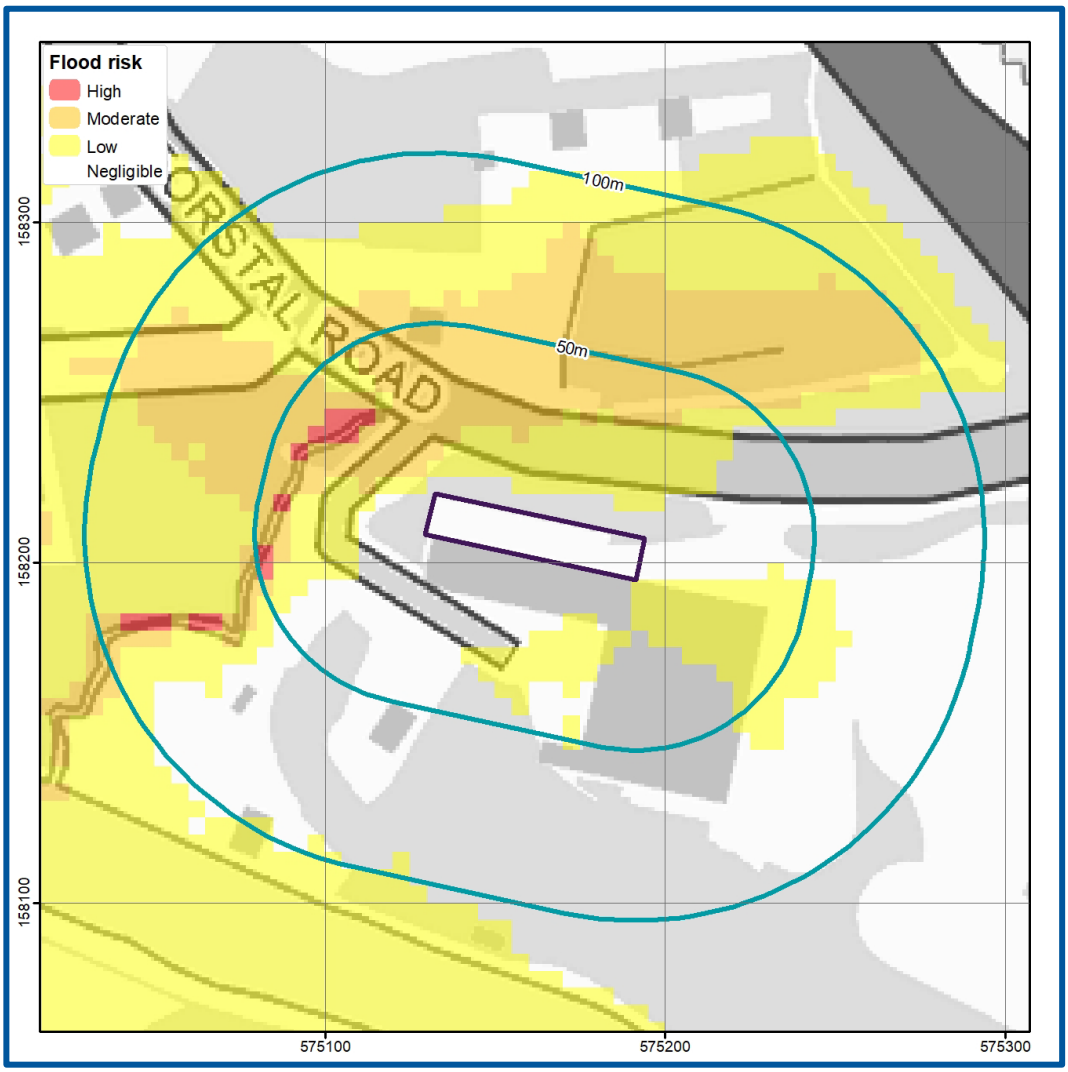
Groundwater flooding

Groundwater flooding occurs when sub-surface water emerges from the ground at the surface or into Made Ground and structures. This may be as a result of persistent rainfall that recharges aquifers until they are full; or may be as a result of high river levels, or tides, driving water through near-surface deposits. Flooding may last a long time compared to surface water flooding, from weeks to months. Hence the amount of damage that is caused to property may be substantially higher.

Groundwater Flood Risk screening data (Figure 11) indicates there is a Negligible risk of groundwater flooding at surface in the vicinity from permeable bedrock deposits during a 1 in 100 year event.

[2] A Critical Drainage Area (CDA) is an area that has critical drainage problems and which has been notified to the local planning authority as such by the Environment Agency in line with the National Planning Policy Framework (NPPF, 2023). CDA's are specific to Flood Zone 1, defined as areas where runoff can and may have historically contributed to flooding downstream, although they are not necessarily areas where flooding problems may occur. Where a Site is located in Flood Zone 1 and within a CDA, a Flood Risk Assessment (FRA) is required and the Council may also request Sustainable Drainage Scheme (SuDS) features to be included within the proposed development.

Figure 11. GeoSmart GW5 Groundwater Flood Risk Map (GeoSmart, 2023)



Mapped classes within the screening map combine likelihood, possible severity and the uncertainty associated with predicting the subsurface system. The map is a national scale screening tool to prompt site-specific assessment where the impact of groundwater flooding would have significant adverse consequences. Mapping limitations and a number of local factors may reduce groundwater flood risk to land and property even where it lies within mapped groundwater flood risk zones, which do not mean that groundwater floods will occur across the whole of the risk area.

A site-specific assessment has been undertaken to refine the groundwater risk screening information on the basis of site-specific datasets (see Section 3) including BGS borehole data, and the EA's fluvial and tidal floodplain data (where available) to develop a conceptual groundwater model. The risk rating is refined further using the vulnerability of receptors including occupants and the existing and proposed Site layout, including the presence of basements and buried infrastructure. The presence of any nearby or on-Site surface water features such as drainage ditches, which could intercept groundwater have also been considered.

It is understood there are no existing basements and a basement is not proposed as part of the development.

According to a review of the hydrogeology (Section 3), the Site is underlain by permeable bedrock. Groundwater levels may rise in the bedrock and superficial aquifers in a seasonal response to prolonged rainfall recharge which may cause an unusually high peak in groundwater levels during some years.

Groundwater levels may also rise in the bedrock aquifer in response to high river and tidalevents due to the potential hydraulic continuity with the nearby River and Tidal Medway.

It is noted groundwater flooding may occur in response to prolonged high water levels, by-passing flood defences even if overtopping does not occur.

SFRA

Appendix A of the SFRA does not indicate reported incidents of historical ground water flooding within 50 m of the Site (JBA, 2016).

Spring Lines

Spring lines have not been identified in close proximity to the Site.

Topography

The local topography and drainage are such that the Site is likely to be higher than the area where groundwater emerges in adjacent low points.

The baseline and site-specific assessment groundwater flood risk rating is Negligible,

Guidance
Negligible Risk - There will be a remote possibility that incidence of groundwater flooding could lead to damage to property or harm to other sensitive receptors at, or near, this location.

Climate change predictions suggest an increase in the frequency and intensity of extremes in groundwater levels. Rainfall recharge patterns will vary regionally resulting in changes to average groundwater levels. A rise in peak river levels will lead to a response of increased groundwater levels in adjacent aquifers subject to the predicted climate change increases in peak river level for the local catchment. Sea level rises of between 0.4m and 1m are predicted by 2100, leading to a rise in average groundwater levels in the adjacent coastal aquifer systems, and potential increases in water levels in the associated drainage systems. The 'backing up' of groundwater levels from both coast and tidal estuary locations may extend a significant distance inland and affect infrastructure previously constructed above average groundwater levels.

The impact of climate change on groundwater levels beneath the Site is linked to the predicted risk in both peak river levels and sea levels and also the variation in rainfall recharge which is uncertain.

Flooding from artificial sources

Artificial sources of flood risk include waterbodies or watercourses that have been amended by means of human intervention rather than natural processes. Examples include reservoirs (and associated water supply infrastructure), docks, sewers and canals. The flooding mechanism associated with flood risk from artificial sources is primarily related to breach or failure of structures (reservoir, lake, sewer, canal, flood storage areas, etc.)

Sewer flooding

Table 3-2 of the SFRA has identified 1 incident or modelled incident of flooding as a result of surcharging sewers within the ME14 3 postcode. However, it is recognised that this four digit postcode covers a large area and instances of flooding are not specific to the Site (JBA, 2016).

Guidance

Properties classified as "at risk" are those that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system either once or twice in the ten year reference period. Records held by the sewage utility company provide information relating to reported incidents, the absence of any records does not mean that the Site is not at risk of flooding.

Canal failure

According to Ordnance Survey (OS) mapping, there are no canals within 500 m of the Site.

Water supply infrastructure

Water supply infrastructure is comprised of a piped network to distribute water to private houses or industrial, commercial or institution establishments and other usage points. In urban areas, this represents a particular risk of flooding due to the large amount of water supply infrastructure, its condition and the density of buildings. The risks of flooding to properties from burst water mains cannot be readily assessed.

If more information regarding the condition and history of the water supply infrastructure within the vicinity of the Site is required, then it is advisable to contact the local water supplier (South East Water).

Culverts and bridges

The blockage of watercourses or structures by debris (that is, any material moved by a flowing stream including vegetation, sediment and man-made materials or refuse) reduces flow capacity and raises water levels, potentially increasing the risk of flooding. High water levels can cause saturation, seepage and percolation leading to failure of earth embankments or other structures. Debris accumulations can change flow patterns, leading to scour, sedimentation or structural failure.

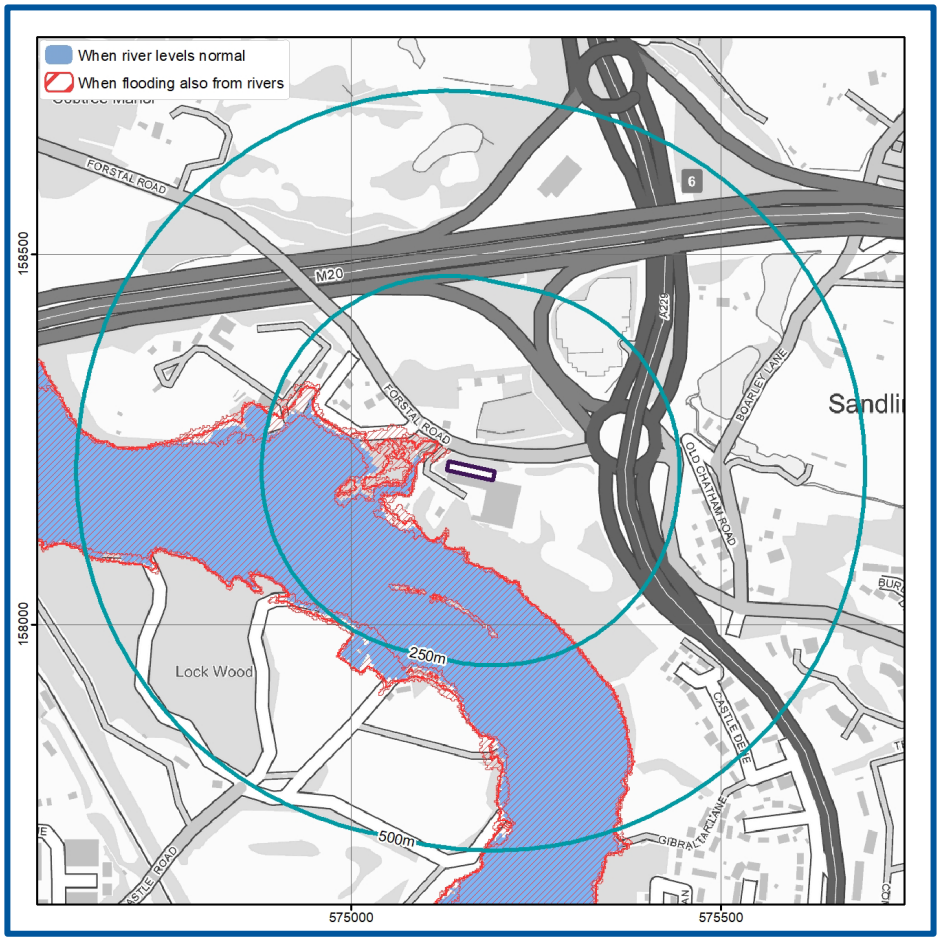
Culverts and bridges have been identified within close proximity to the Site. These structures and specifically the Allington Lock may pose a flood risk to the Site should they become blocked or damaged.

Figure 6.3 SFRA has identified 1 incident of a culvert blockage approximately 600m northeast of the Site on the M20 (Mott Macdonald, 2008).

Reservoir flooding

According to the EA's Risk of Flooding from Reservoir mapping the Site is not at risk of flooding from reservoirs (Figure 12) (EA, 2023).

Figure 12. EA Risk of Reservoir Flooding (EA, 2023)



Guidance

The risk of reservoir flooding is related to the failure of a large reservoir (holding over 25,000 m^3 of water) and is based on the worst-case scenario. Reservoir flooding is extremely unlikely to occur (EA, 2023).

5. Flood risk from the development

Floodplain storage

Where flood storage from any source of flooding is to be lost as a result of development, on-Site level-for-level compensatory storage, accounting for the predicted impacts of climate change over the lifetime of the development, should be provided. Where it is not possible to provide compensatory storage on site, it may be acceptable to provide it off-Site if it is hydraulically and hydrologically linked.

The loss of floodplain storage is less likely to be a concern in areas benefitting from appropriate flood risk management infrastructure or where the source of flood risk is solely tidal.

The development is located within a fluvial Flood Zone 2/3 but does not involve an increase in building footprint. Therefore, there would be no displacement of flood water and compensatory flood storage is not required.

Drainage and run-off

Based on the topography and low surface water flood risk in the vicinity, interference or interaction with overland flow paths and inflows from off-Site is considered unlikely.

The development proposals are for the addition of electric vehicle chargers and will not involve the alteration of any external features (or any changes to existing impermeable and permeable areas), an estimation of surface water runoff is not considered to be required.

Table 4. Climate change rainfall allowances

Medway Management Catchment	3.3% Annual exceedance rainfall event		1% Annual exceedance rainfall event	
	2050s	2070s	2050s	2070s
Upper end	35%	35%	40%	45%
Central	20%	20%	20%	20%

6. Suitability of the proposed development

The information below outlines the suitability of proposed development in relation to national and local planning policy.

National policy and guidance

The aims of the national planning policies are achieved through application of the Sequential Test and in some cases the Exception Test.

Guidance

Sequential test: The aim of this test is to steer new development towards areas with the lowest risk of flooding (NPPF, 2023). Reasonably available sites located in Flood Zone 1 should be considered before those in Flood Zone 2 and only when there are no reasonably available sites in Flood Zones 1 and 2 should development in Flood Zone 3 be considered.

Exception test: In some cases, this may need to be applied once the Sequential Test has been considered. For the exception test to be passed it must be demonstrated that the development would provide wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Suitability of the proposed development, and whether the Sequential and Exception Tests are required, is based on the Flood Zone the Site is located within and the flood risk vulnerability classification of the existing and proposed development. Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

This report has been produced to assess all development types, prior to any development. The vulnerability classification and Flood Zones are compared within the table overleaf (Table 2 of the NPPG (2022)).

As the Site is located within Flood Zone 3a and the proposed development is defined as Less Vulnerable; the proposals would be acceptable, but may be subject to the Sequential Test.

The proposed development is an addition of electric car charging infrastructure to the existing Site and is therefore defined as minor development.

Paragraph 168 of the NPPF states: *"Applications for some minor development should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments."* (NPPF, 2023).

The NPPG (2022) defines a 'minor development' as *"householder development and small non-residential extensions (with a footprint of less than 250 m^2)."*

As a result, as the proposals are defined as "minor development – householder development" they are not subject to the Sequential Test or an Exception Test.

Table 5. Flood risk vulnerability and flood zone 'incompatibility (taken from NPPG, 2022)

Flood risk vulnerability classification		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone	Zone 1 – low probability	✓	✓	✓	✓	✓
	Zone 2 – medium probability	✓	✓	Exception test required	✓	✓
	Zone 3a - high probability	Exception test required	✓	X	Exception test required	✓*
	Zone 3b – functional flood plain	Exception test required	✓	X	X	X

*As the development proposals are for a minor development the Sequential and Exception Tests are not required.

EA Flood Risk Standing Advice for vulnerable developments located in Flood Zones 2 or 3 (February, 2022)

For all relevant vulnerable developments (i.e. more vulnerable, less vulnerable and water compatible), advice on the points should be followed:

- Surface water management;
- Access and evacuation; and
- Floor levels.

Surface water management

Plans for the management of surface water need to meet the requirements set out in either the local authority's:

- Surface water management plan where available; OR
- Strategic flood risk assessment.

They also need to meet the requirements of the approved building regulations Part H: drainage and water disposal. Read section H3 rainwater drainage.

Planning permission is required to use a material that can't absorb water (e.g. impermeable concrete) in a front garden larger than 5m^2.

7. Resilience and mitigation

Based on the flood risk identified at the Site, the national and local policies and guidance and proposed development, the mitigation measures outlined within this section of the report are likely to help protect the development from flooding.

Estuarine flood mitigation measures

As the Site is not located within an area affected by flooding from the sea, mitigation measures are not required.

Rivers (fluvial) flood mitigation measures

The Site is located within an area which is affected by flooding from rivers, the following table confirms the flood depths associated with the area proposed for development.

Table 6. Flood levels compared to ground levels on-Site

Ground levels on-Site (mAOD)	Modelled Flood Levels (mAOD)		
	1 in 100 year plus 27% CC (mAOD)	1 in 100 year plus 50% CC (mAOD)	1 in 1000 year (mAOD)
12.15 – 14.81	12.17	12.18	12.18
Flood depths (m)	0.02	0.03	0.03

Raising minimum floor levels

The primary fluvial mitigation measure should be to locate the proposed development in areas of the Site situated in Flood Zone 1. The majority of the Site (west and central extents) are located in Flood Zone 1 with a low probability of fluvial and coastal flooding.

The vulnerability classification of the Site and the Flood Zone means proposals for the Site fall under the EA's Flood Risk Standing Advice (FRSA) for less vulnerable developments.

As the development regards the addition of electrical charging infrastructure, there are no requirements for the raising of FFL's within the development and therefore, it may be appropriate to adopt a water exclusion strategy for flood depths up to 0.3 m in line with the EA's Standing Advice. A water exclusion strategy, using avoidance and resistance measures,

is appropriate where floods are expected to last for short durations. Potential water exclusion strategies include:

- Construction of local bunds;
- Landscaping to divert water away from the Site;
- Sustainable Drainage Systems (SuDS) to store/intercept flood water;
- Boundary walls/fencing;

Furthermore, it is recommended where possible to raise electricity and electrical sockets the predicted flood level on stilts.

An on-Site flood defence and/or drainage scheme could also be implemented to help protect the Site and drain flooding from the area for proposed development.

Surface water (pluvial) flood mitigation measures

As the Site is not identified as being at risk of pluvial flooding, mitigation measures are not required.

In addition, the regular maintenance of any drains surrounding/on the Site should be undertaken to reduce the flood risk.

Groundwater flood mitigation measures

As the Site is not identified as being at risk of groundwater flooding, mitigation measures are not required.

Reservoir flood mitigation measures

The Site is not a risk of flooding from reservoirs; therefore, mitigation measures are not required.

Other flood risk mitigation measures

As the Site is not identified as at risk from other sources, mitigation measures are not required.

Residual flood risk mitigation measures

The risk to the Site has been assessed from all sources of flooding and appropriate mitigation and management measures proposed to keep the users of the development safe over its lifetime. There is however a residual risk of flooding associated with the potential for failure of mitigation measures if regular maintenance and upkeep isn't undertaken. If mitigation measures are not implemented or maintained, the risk to the development will remain as the baseline risk.

Further flood mitigation information

More information on flood resistance, resilience and water entry can be found here: http://www.planningportal.gov.uk/uploads/br/flood_performance.pdf

www.knowyourfloodrisk.co.uk

Emergency evacuation - safe access / egress and safe refuge

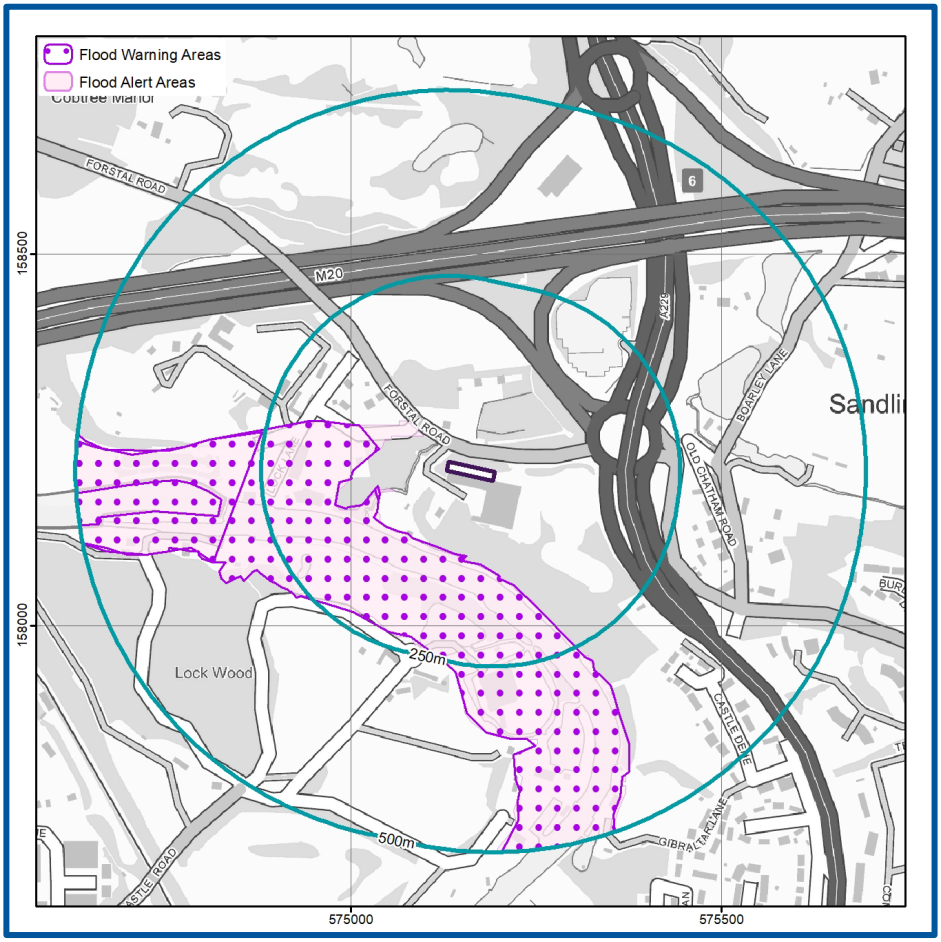
Emergency evacuation to land outside of the floodplain should be provided if feasible. area of safe refuge should be sufficient in size for all potential users and be reasonably accessible to the emergency services.

Emergency evacuation from the development and the Site should only be undertaken in strict accordance with any evacuation plans produced for the Site, with an understanding of the flood risks at the Site including available mitigation, the vulnerability of occupants and preferred evacuation routes.

Flood warnings

The EA operates a flood warning service in all areas at risk of flooding; this is available on their website: https://www.gov.uk/check-flood-risk. The Site is not identified within an EA Flood Alerts/Warning coverage area so is not able to receive alerts (Figure 13).

Figure 13. EA Flood Warning Coverage for the local area (EA, 2023).



Emergency evacuation

Where possible, a safe access and egress route with a 'very low' hazard rating from areas within the floodplain to an area wholly outside the 1 in 100 year flood event including an allowance for climate change should be demonstrated.

Based on the EA's Flood Zone Map the closest dry evacuation area within Flood Zone 1 is along the A229 (Chatham Road) (c.132 m east – direct measurement). It is recommended that residents prepare to evacuate as soon as an EA Flood Warning is issued in order to completely avoid flood waters.

8. Conclusions and recommendations

Table 7. Risk ratings following Site analysis

Source of Flood Risk	Baseline[1]	After analysis[2]	After Mitigation[3]
River (fluvial) flooding	Very Low to Medium		Very Low to Low
Sea (coastal/tidal) flooding	Very Low		N/A
Surface water (pluvial) flooding	Very Low		N/A
Groundwater flooding	Negligible		N/A
Other flood risk factors present	No		N/A
Is any other further work recommended?	No		No

1 BASELINE risks assigned for the whole Site, using national risk maps, including the benefit of EA flood defences.

2 AFTER ANALYSIS modification of risk assessment based on detailed site specific analysis including some or all of the following: flood model data, high resolution mapping, building location, access routes, topographic and CCTV surveys. Reasons for the change in classification are provided in the text.

3 AFTER MITIGATION risks include risks to proposed development / asset and occupants if mitigation measures recommended in this report are implemented, including the impacts of climate change.

*N/A indicates where mitigation is not required.

The table below provides a summary of where the responses to key questions are discussed in this report. Providing the recommended mitigation measures are put in place it is likely that flood risk to this Site will be reduced to an acceptable level.

Less vulnerable developments in a Flood Zone 3 are acceptable according to the NPPF and providing the recommended mitigation measures are put in place (see previous sections) it is likely that flood risk to this Site will be reduced to an acceptable level.

Table 8. Summary of responses to key questions in the report

Key sources of flood risks identified	Yes (fluvial - see Section 4).
Are standard mitigation measures likely to provide protection from flooding to/from the Site?	Yes (see Section 7).
Is any further work recommended?	Yes (See exec summary and section 7)

9. Further information

The following table includes a list of additional products by GeoSmart:

Additional GeoSmart Products			
✓	Additional assessment: SuDSmart Report		The SuDSmart Report range assesses which drainage options are available for a Site. They build on technical detail starting from simple infiltration screening and work up to more complex SuDS Assessments detailing alternative options and designs. Please contact info@geosmartinfo.co.uk for further information.
✓	Additional assessment: EnviroSmart Report		Provides a robust desk-based assessment of potential contaminated land issues, taking into account the regulatory perspective. Our EnviroSmart reports are designed to be the most cost effective solution for planning conditions. Each report is individually prepared by a highly experienced consultant conversant with Local Authority requirements. Ideal for pre-planning or for addressing planning conditions for small developments. Can also be used for land transactions. Please contact info@geosmartinfo.co.uk for further information.

10. References and glossary

References

British Geological Survey (BGS) (2023). Geology of Britain Viewer. Accessed from: http://mapapps.bgs.ac.uk/geologyofbritain/home.html on 25/10/23.

Defra/Environment Agency (2005). Flood Risk Assessment Guidance for New Development. *Phase 2 Framework and Guidance for Assessing and Managing Flood Risk for New Development – Fill Documentation and Tools*. R & D Technical Report FD232-/TR2.

Environment Agency [EA] (2022). Flood risk assessments: climate change allowances. Accessed from: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances on 25/10/23.

Environment Agency [EA] (2023). MagicMap. Accessed from: http://magic.defra.gov.uk/MagicMap.aspx on 25/10/23.

Environment Agency [EA] (2023). Flood map for planning. Accessed from https://flood-map-for-planning.service.gov.uk/ on 25/10/23.

Environment Agency [EA] (2023). Long term flood risk assessment for locations in England. Accessed from https://flood-warning-information.service.gov.uk/long-term-flood-risk on 25/10/23.

GeoSmart (2023). GeoSmart groundwater flood risk (GW5) map (version 2.4).

Ministry of Housing, Communities & Local Government (2023). National Planning Policy Framework (NPPF). Accessed from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2023.pdf on 25/10/23.

Ministry of Housing, Communities & Local Government (2022). Planning Practice Guidance (NPPG). Flood Risk and Coastal Change. Accessed from https://www.gov.uk/guidance/flood-risk-and-coastal-change on 25/10/23.

Ordnance Survey Mapping (2023). © Crown copyright. All rights reserved. Licence number AL 100054687. For full terms and conditions visit: www.ordnancesurveyleisure.co.uk

Maidstone Borough Council (JBA, 2016). Strategic Flood Risk Assessment. Accessed from: https://maidstone.gov.uk/__data/assets/pdf_file/0015/132810/CC-005-Level-One-Strategic-Flood-Risk-Assessment-Addendum-October-2016.pdf on 25/10/23.

LiDAR Survey Open Data (2023). Accessed from: https://environment.data.gov.uk/DefraDataDownload/?Mode=survey on 25/10/23.

GeoSmart Information

Glossary

General terms

BGS	British Geological Survey
EA	Environment Agency
GeoSmart groundwater flood risk model	GeoSmart's national groundwater flood risk model takes advantage of all the available data and provides a preliminary indication of groundwater flood risk on a 50m grid covering England and Wales. The model indicates the risk of the water table coming within 1 m of the ground surface for an indicative 1 in 100 year return period scenario.
Dry-Island	An area considered at low risk of flooding (e.g. In a Flood Zone 1) that is entirely surrounded by areas at higher risk of flooding (e.g. Flood Zone 2 and 3)
Flood resilience	Flood resilience or wet-proofing accepts that water will enter the building, but through careful design will minimise damage and allow the re-occupancy of the building quickly. Mitigation measures that reduce the damage to a property caused by flooding can include water entry strategies, raising electrical sockets off the floor, hard flooring.
Flood resistance	Flood resistance, or dry-proofing, stops water entering a building. Mitigation measures that prevent or reduce the likelihood of water entering a property can include raising flood levels or installation of sandbags.
Flood Zone 1	This zone has less than a 0.1% annual probability of river flooding
Flood Zone 2	This zone has between 0.1 and 1% annual probability of river flooding and between 0.1% and 0.5 % annual probability sea flooding
Flood Zone 3	This zone has more than a 1% annual probability of river flooding and 0.5% annual probability of sea flooding
Functional Flood Plain	An area of land where water has to flow or be stored in times of flood.
Hydrologic model	A computer model that simulates surface run-off or fluvial flow. The typical accuracy of hydrologic models such as this is ±0.25m for estimating flood levels at particular locations.
OS	Ordnance Survey
Residual Flood Risk	The flood risk remaining after taking mitigating actions.
SFRA	Strategic Flood Risk Assessment. This is a brief flood risk assessment provided by the local council

SuDS	A Sustainable drainage system (SuDS) is designed to replicate, as closely as possible, the natural drainage from the Site (before development) to ensure that the flood risk downstream of the Site does not increase as a result of the land being developed. SuDS also significantly improve the quality of water leaving the Site and can also improve the amenity and biodiversity that a Site has to offer. There are a range of SuDS options available to provide effective surface water management that intercept and store excess run-off. Sites over 1 Ha will usually require a sustainable drainage assessment if planning permission is required. The current proposal is that from April 2014 for more than a single dwelling the drainage system will require approval from the SuDS Approval Board (SABs).

Aquifer Types

Principal aquifer	These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.
Secondary A aquifer	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.
Secondary B aquifer	Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.
Secondary undifferentiated	Has been assigned in cases where it has not been possible to attribute either category A or B to a rock type due to the variable characteristics of the rock type.
Unproductive Strata	These are rock layers or drift deposits with low permeability that has negligible significance for water supply or river base flow.

NPPF (2023) terms

Exception test	Applied once the sequential test has been passed. For the exception test to be passed it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
Sequential test	Aims to steer new development to areas with the lowest probability of flooding.
Essential infrastructure	Essential infrastructure includes essential transport infrastructure, essential utility infrastructure and wind turbines.

Water compatible	Water compatible land uses include flood control infrastructure, water-based recreation and lifeguard/coastal stations.
Less vulnerable	Less vulnerable land uses include police/ambulance/fire stations which are not required to be operational during flooding and buildings used for shops/financial/professional/other services.
More vulnerable	More vulnerable land uses include hospitals, residential institutions, buildings used for dwelling houses/student halls/drinking establishments/hotels and sites used for holiday or short-let caravans and camping.
Highly vulnerable	Highly vulnerable land uses include police/ambulance/fire stations which are required to be operational during flooding, basement dwellings and caravans/mobile homes/park homes intended for permanent residential use.

Data Sources

Aerial Photography	Contains Ordnance Survey data © Crown copyright and database right 2023 BlueSky copyright and database rights 2023
Bedrock & Superficial Geology	Contains British Geological Survey materials © NERC 2023 Ordnance Survey data © Crown copyright and database right 2023
Flood Risk (Flood Zone/RoFRS/Historic Flooding/Pluvial/Surface Water Features/Reservoir/ Flood Alert & Warning)	Environment Agency copyright and database rights 2023 Ordnance Survey data © Crown copyright and database right 2023
Flood Risk (Groundwater)	GeoSmart, BGS & OS GW5 (v2.4) Map (GeoSmart, 2023) Contains British Geological Survey materials © NERC 2023 Ordnance Survey data © Crown copyright and database right 2023
Location Plan	Contains Ordnance Survey data © Crown copyright and database right 2023
Topographic Data	OS LiDAR/EA Contains Ordnance Survey data © Crown copyright and database right 2023 Environment Agency copyright and database rights 2023

11. Appendices

GeoSmart Information

Appendix A

Site plans

LEGEND

Topographic Linework Features

Air-Con Unit (ACU)	Hand Rail	Service
Barrier	Hedge	Sky Light
Beam Line	Hoarding	Slope Bottom
Bench	Kerb Bottom	Slope Top
Bin	Kerb Drop	Slot Drain
Bollard Illuminated	Kerb Top	Speed Bump
Bollard	Lake	Steel Cladding
Bridge	Land Drain	Steel Structure
Building Facade	Lift	Step Line
Building	Obstruction	Surface Change
Bus Stop Shelter	Opening - Slab	Tank
Cable Trough	Overhang	Telephone Box (TB)
Canopy	Overhead Cables	Ticket Machine(TVM)
Ceiling Line	Parapet	Toilet
Centre Line	Partition	Top of Fence Line
Column	Parking Meter (PM)	Top of Wall Line
Column Bottom Line	Pipe Line	Track
Column Top Line	Platform Train/Tram	Traffic Ctrl Box(TCB)
Concrete Base/Slab	Plinth	Tree Drip Line
Contour Major	Pond	Tree Line
Contour Minor	Post-box	Trial Pit
Cycle Lane	Rail	Vegetation Line
Ditch	Ramp	Vent
Door	Red Line Dashed	Verge Line
Duct	Red Line Solid	Wall Line
Electric Box (EBOX)	Red Line Double	Window
Fence	River Edge	Window Glazing
Fixture	Road Edge	White Line Dashed
Flowerbed	Road Scar Line	White Line Double
Footpath	Road Text	White Line Solid
Grating	Roof	Yellow Line Dashed
Grid Line	Sanitary	Yellow Line Double
		Yellow Line Solid

Topographic Point Features

Air Valve	Inspection Cover	Road Sign
Apex Building	IC - CATV	Rodding Eye
Bed Level	IC - Comms	Sector Antenna
Belisha Beacon	IC - Electric	Sign (General)
Bollard	IC - Round	Soffit Level
Bolt	IC - Telecom	Spot Height
Borehole	IC - Traffic	Stop Cock
Bush	Invert Level	Telegraph Pole
CCTV Camera Pole	Lamp Post	Top of Fence Level
Ceiling Elevation	Manhole	Top of Tree Level
Dipole	MH - Foul	Top of Wall Level
Earth Rod	MH - Round	Traffic Light
Eave	MH - Surface Water	Tree (TX.XX SX.XX) T=Trunk Radius(m) S=Spread Radius(m)
Electrical Pole	Marker Post	Tree Coniferous
Fire Hydrant	Microwave Dish	Tree Deciduous
Floor Level	Pipe - Down	Tree Trunk
Gas Meter	Pole	Valve General
Gas Valve	Post	Water Level
Gate		Water Meter
Gully		Water Valve
Gully Round		

Special Features

E=XXXX.XXX
ID N=YYYY.YYY Survey Station
H=ZZZ.ZZZ

E=XXXX.XXX
ID N=YYYY.YYY Scan Target
H=ZZZ.ZZZ

Fence Types

B/W	Barbed Wire	C/L	Chain Link	O/B	Open Boarded
C/B	Close Boarded	H	Heras	P/W	Post and Wire
C/I	Corrugated Iron	I/R	Iron Railings	P/R	Post and Rail

Murphy Geospatial Disclaimer

All reasonable endeavours have been used to capture the required data in the survey to the agreed standards of accuracy. Where features have been obstructed due to a lack of access, the areas will be annotated as **UTS** (Unable To Survey). The Company shall not be liable for any damages or consequential losses arising from the reliance on survey information beyond its specified scale and accuracy, or survey information used for purposes other than that stated in the Contract of Works.

Any concerns with the survey should be raised with Murphy Geospatial, who will endeavour to promptly provide a remedy. The Client shall not seek recourse through any third party until such time as Murphy Geospatial have had the opportunity to redress any concerns raised.

For full terms and conditions visit **Terms and Conditions** www.murphygs.com

Revisions

Rev	Description	Surveyed by	Drawn by	Checked by
A	First Issue	ZB - 07/08/23	BK - 08/08/23	ER - 08/08/23

Murphy GEOSPATIAL

Geospatial certainty you can trust murphygs.com

UK Head Office
39-41 North Road
London
N7 9DP
Phone: (+44) 0203 598 3775
Email: info@murphygs.com

London Manchester Birmingham Glasgow Belfast Cork Kildare

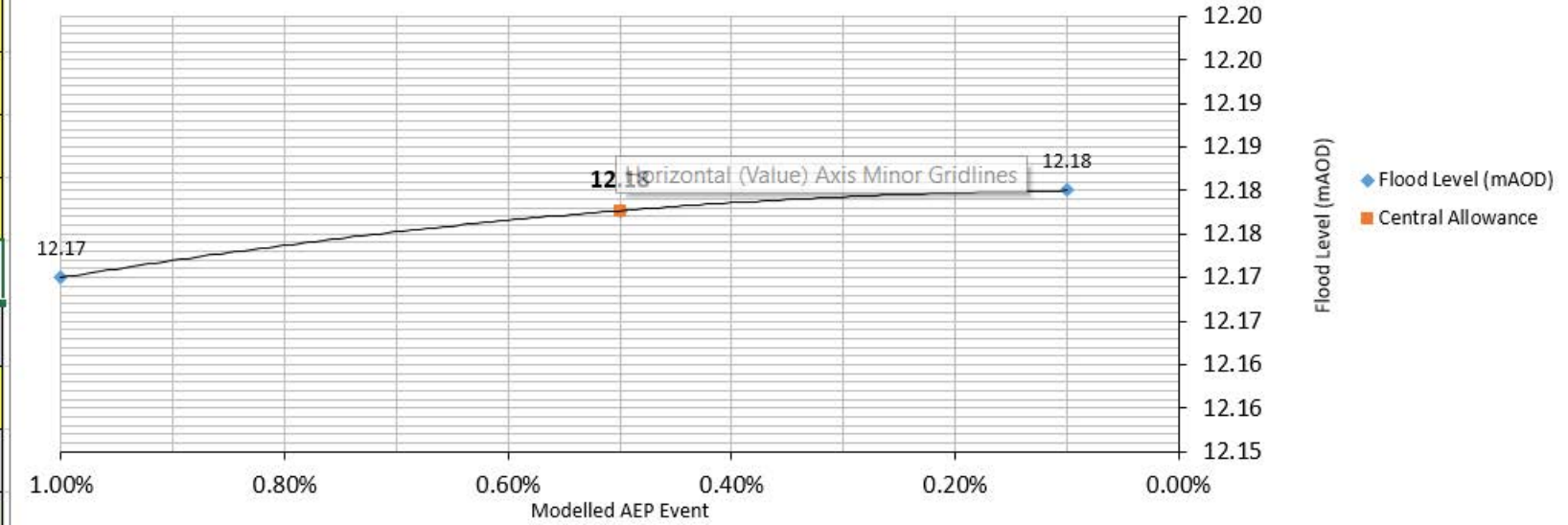
Client	Poise
Project	WP1 - Village Hotels Multiple Topo/GPR Surveys Castle View, Forstal Road,
Site Address	Maidstone, ME14 3AQ
Description	Topographical Survey
Survey Grid	Localised OSGB36(15) - Scale Factor 1.0
Survey Datum	GNSS - Ordnance Datum Newlyn (ODN)
RICS Band	Band E
Drawing Scale	1:100 @A0
Drawing Number	MGS53607-UT-Maidstone-01

GeoSmart Information

Appendix B

GeoSmart Climate Change Interpolation Graph

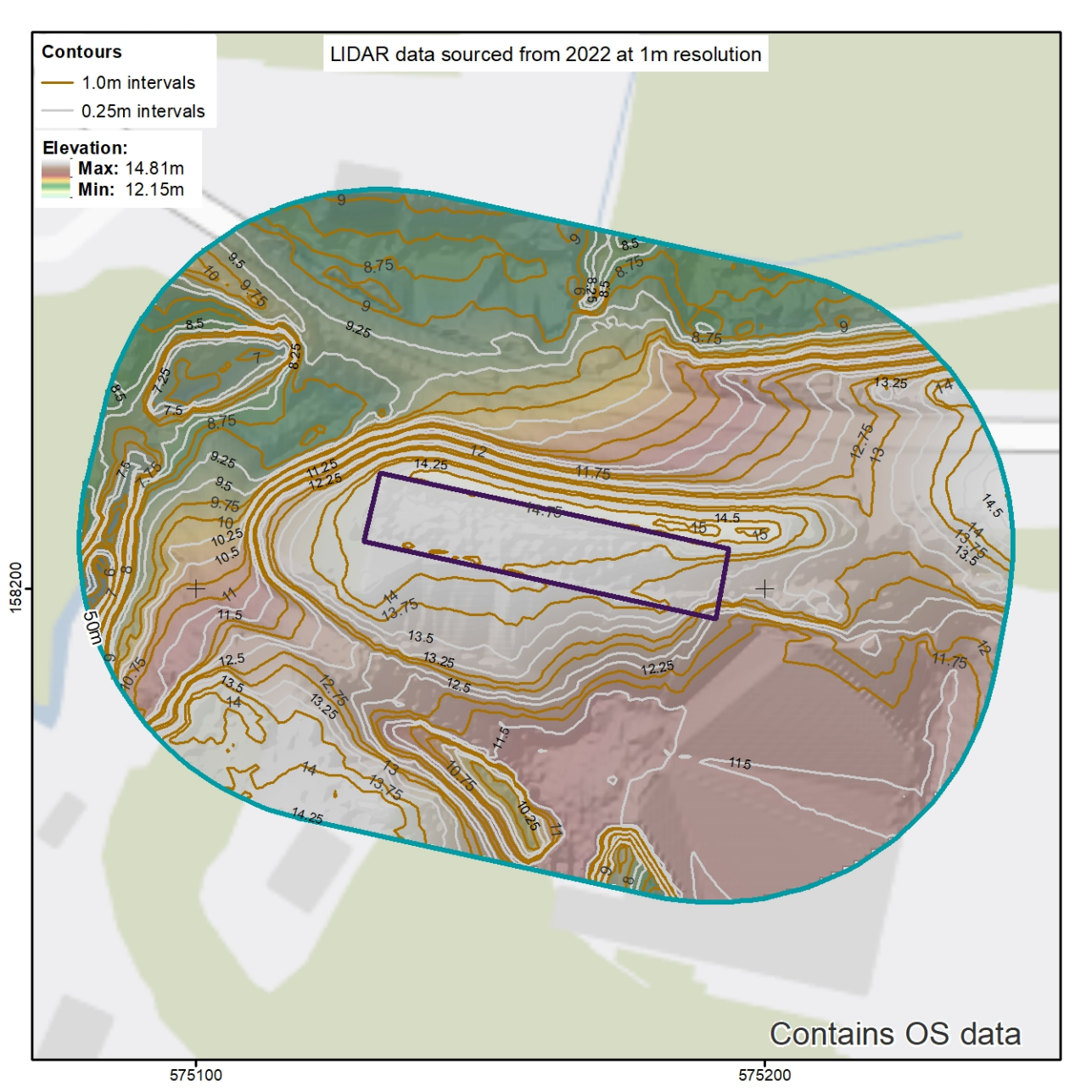
Central Climate Change Allowance Adjusted 1 in 100 Year Flood Level (mAOD)



GeoSmart Information

Appendix C

Environment Agency LiDAR ground elevation data


Contours
1.0m intervals
0.25m intervals
Elevation:
Max: 14.81m
Min: 12.15m
LIDAR data sourced from 2022 at 1m resolution
158200
50m
575100
575200
Contains OS data

GeoSmart Information

Appendix D

Borehole Data

Norwest Holst Soil Engineering Ltd.

Borehole No. **S18**

BOREHOLE LOG

Contract No. FU104
Location M20 : Junct 5 → 8
Client Travers Morgan and Partners
Method of Boring Cable Percussion
Diameter of Borehole 150mm

TQ75NE152
75382 58196

Sheet 1 of 2
Co-ords 15380.5E 8196.5
Ground Level 20.21 mAOD
Date 13 - 14/12/88

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth of Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
Topsoil		0.30	19.91				13/12
MADE GROUND Brown medium sand and sub rounded sub grade gravel with a little concrete brick and tarmac fragments		0.80	19.41		0.70 0.80 1.00 (1.00-2.00) S	"44"	
Very dense, becoming dense from 7.00m orange brown slightly fine to coarse SAND locally with some iron oxide cementing					2.10 (2.10-3.00) S 3.00 (3.00-4.00) S 4.00 (4.00-5.00) S 5.00 (5.00-6.00) S 6.00 (6.00-7.00) S 7.00 (7.00-7.50) S	"88" "83" "56" "47" "51" "37"	
					(7.50-8.00) 8.00 (8.00-9.00) S	"37"	14/12
Medium dense green brown locally orange brown silty fine to coarse SAND		9.40	10.81		9.50 (9.50-10.00) S	"15"	
		10.00	10.21				

Type of Sample

S.P.T. ■ Undisturbed
C.P.T. ✕ Vane
O Jar △ Water
● Bulk ▦ Piezometer

Remarks (Observations of Ground Water etc.)

Borehole started with 0.90m hand dug inspection pit.
Borehole dry during drilling
Chiselling from 10.80 - 11.05m for 1 hour
Borehole cased to 7.50m
Piezometer installed on 14/12/88 with tip at 10.50m

Water levels are subject to seasonal or tidal variations and should not be taken as constant

Norwest Holst Soil Engineering Ltd.

Borehole No. **S18**

BOREHOLE LOG

Contract No. FO104
Location M20 : Junct. 5 - 8
Client Travers Morgan and Partners
Method of Boring Cable Percussion TQ75NE 152
Diameter of Borehole 150mm

Sheet 2 of 2
Co-ords 15380.5E 8196.5N
Ground Level 20.21 m A O D
Date 13 - 14/12/88

Description of Strata	Legend	Depth Below G.L.(m)	O.D Level (m)	Casing Depth at Sampling	Sampling and Casing	"N" H.O.D's	Daily Progress
Firm banded orange, orange brown and dark grey silty very sandy CLAY		10.00	10.21				14 12
		10.80	9.41				
Dark grey fine moderately weathered SANDSTONE		11.05	9.16				

Type of Sample

- S.P.T. ■ Undisturbed
- C.P.T. × Vane
- O Jar △ Water
- ● Bulk ▩ Piezometer

Remarks (Observations of Ground Water etc.)

As sheet 1

Water levels are subject to seasonal or tidal variations and should not be taken as constant

Norwest Holst Soil Engineering Ltd.

Borehole No. **S20**

BOREHOLE LOG

Contract No. P8104
Location M25: Jct. 5 - 11
Client Travers Morgan & Partners
Method of Boring Cable Percussion
Diameter of Borehole 150mm

TQ 75 NE 154
75386 58272

Sheet 1 of 1
Co-ords 15389.0E 8273.8N
Ground Level 16.04 m A.O.D
Date 7/11/88

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
Topsoil		0.30	15.74				7/11
Medium dense dark brown slightly clayey silty fine to coarse SAND with a little sandstone gravel with some bands of firm orange brown very sandy clay		2.70	13.34		1.00 (1.00-1.50) S (1.50-2.00) 2.00 (2.00-2.50) S (2.50-3.00)	"15" "15"	
Dense to medium dense orange brown slightly silty fine to coarse SAND ...with some flint gravel and locally traces of clay (4.50m)		4.80	11.24		3.00 (3.00-3.50) S 4.00 (4.00-4.50) S (4.50-5.00)	"33" "28"	
Stiff dark brown silty slightly sandy CLAY with some pockets of fine mottled organic matter and dark brown peat layers		6.35	9.69		5.00 DW	(11)	
Very loose fine to coarse flint GRAVEL with some dark grey to black silty fine to coarse sand		7.10	8.94		6.50 (6.50-7.00) S	"4"	
Medium dense dark brown silty slightly clayey fine to medium SAND with a little fine organic matter		8.70	7.34		(7.25-7.75) 8.00 (8.00-8.50) S	"14"	
Medium dense orange brown locally slightly clayey silty fine to medium SAND		10.00	6.04		(8.75-9.25) 9.50 (9.50-10.00) S	"22"	

Type of Sample

S.P.T. ■ Undisturbed
C.P.T. × Vane
O Jar △ Water
● Bulk ⊠ Piezometer

Remarks (Observations of Ground Water etc.) () U100 blows DW - Double weights

Water strike at 5.80m with casing at 5.80m
rising to 5.70m after 20 minutes
Standing water level at end of boring 5.50m
Borehole cased to 10.00m

Piezometer installed with tip at 9.65m below ground level.

Water levels are subject to seasonal or tidal variations and should not be taken as constant

Disclaimer

This report has been prepared by GeoSmart in its professional capacity as soil, groundwater, flood risk and drainage specialists, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client and is provided by GeoSmart solely for the internal use of its client.

The advice and opinions in this report should be read and relied on only in the context of the report as a whole, taking account of the terms of reference agreed with the client. The findings are based on the information made available to GeoSmart at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology and practices as at that time. They do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

This report is confidential to the client. The client may submit the report to regulatory bodies, where appropriate. Should the client wish to release this report to any other third party for that party's reliance, GeoSmart may, by prior written agreement, agree to such release, provided that it is acknowledged that GeoSmart accepts no responsibility of any nature to any third party to whom this report or any part thereof is made known. GeoSmart accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual or otherwise, against GeoSmart except as expressly agreed with GeoSmart in writing.

For full T&Cs see http://geosmartinfo.co.uk/terms-conditions

Important consumer protection information

This search has been produced by GeoSmart Information Limited, Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU.

Tel: 01743 298 100

Email: info@geosmartinfo.co.uk

GeoSmart Information Limited is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom.
- sets out minimum standards which firms compiling and selling search reports have to meet.
- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals.
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.
- By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports.
- act with integrity and carry out work with due skill, care and diligence.
- at all times maintain adequate and appropriate insurance to protect consumers.
- conduct business in an honest, fair and professional manner.
- handle complaints speedily and fairly.
- ensure that products and services comply with industry registration rules and standards and relevant laws.
- monitor their compliance with the Code.

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award up to £5,000 to you if the Ombudsman finds that you have suffered actual financial loss and/or aggravation, distress or inconvenience as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs contact details:

The Property Ombudsman scheme

Milford House

43-55 Milford Street

Salisbury

Wiltshire SP1 2BP

Tel: 01722 333306

Fax: 01722 332296

Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk. Please ask your search provider if you would like a copy of the search code

Complaints procedure

GeoSmart Information Limited is registered with the Property Codes Compliance Board as a subscriber to the Search Code. A key commitment under the Code is that firms will handle any complaints both speedily and fairly. If you want to make a complaint, we will:

- Acknowledge it within 5 working days of receipt.
- Normally deal with it fully and provide a final response, in writing, within 20 working days of receipt.
- Keep you informed by letter, telephone or e-mail, as you prefer, if we need more time.
- Provide a final response, in writing, at the latest within 40 working days of receipt.
- Liaise, at your request, with anyone acting formally on your behalf.

If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs): Tel: 01722 333306, E-mail: admin@tpos.co.uk.

We will co-operate fully with the Ombudsman during an investigation and comply with his final decision. Complaints should be sent to:

Martin Lucass

Commercial Director

GeoSmart Information Limited

Suite 9-11, 1st Floor,

Old Bank Buildings,

Bellstone, Shrewsbury, SY1 1HU

Tel: 01743 298 100

martinlucass@geosmartinfo.co.uk

12. Terms and conditions, CDM regulations and data limitations

Terms and conditions can be found on our website:

http://geosmartinfo.co.uk/terms-conditions/

CDM regulations can be found on our website:

http://geosmartinfo.co.uk/knowledge-hub/cdm-2015/

Data use and limitations can be found on our website:

http://geosmartinfo.co.uk/data-limitations/