
BUTLINS SKYLINE LTD

**CROUCH
WATERFALL**

LEVEL 2 FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY REPORT for

BUTLINS BOGNOR REGIS TEMPORARY BUILDING

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1.0 INTRODUCTION

1.1 Commission

Crouch Waterfall has been commissioned by Butlin's Skyline Ltd to undertake Flood Risk Assessment and Drainage Strategy (FRA) for the proposed development of a temporary building to house a stage venue for guests at the resort.

1.2 Background

This FRA has been prepared to support the planning application for the Butlin's Bognor Regis site, which will henceforward be referred to as the 'wider site'. The wider site contains a holiday centre which Butlin's Skyline Ltd has operated in Bognor Regis since 1960. The Butlin's Bognor Regis Resort is currently fully developed for residential and leisure use.

The area of land situated to the south west of the main cluster of recreational buildings, south of the large tent building and currently occupied by the former swimming pool building has been selected as the development site and will hereafter be referred to as the "Site". It is situated within Arun District Council, within land owned and controlled by Butlin's Skyline Ltd. A topographical survey of the Site is contained within Appendix A.

According to Environment Agency flood zone map, which is contained within Appendix B, most of the wider site is located within Flood Zone 3a for flooding from sea. The latest prediction by the Environment Agency for the 1 in 200 year (0.5% probability) surge tide for this area (ignoring wave action) is 4.5m AOD. However, this does not take into account the tidal flood defences along the site boundary with the English Channel. Therefore, despite the fact that the site total size is smaller than 1 hectare, a site-specific FRA is required to be submitted as part of the planning application.

2.0 FLOOD RISK ASSESSMENT METHODOLOGY

2.1 Source-Pathway-Receptor Model

Crouch Waterfall's approach to an FRA is based on the Source-Pathway-Receptor model. The Source-Pathway-Receptor model firstly identifies the causes or 'sources' of flooding to and from a development. The identification is based on a review of available information such as mapping, local conditions and consideration of the effects of climate change. The nature and likely extent of flooding arising from any one source is considered, e.g. whether such flooding is likely to be localised or widespread. As well as flooding from more obvious sources such as rivers and the sea, FRAs include an assessment of other sources of flooding as required in the NPPF including groundwater flooding, flooding from overland flow flooding and flooding from artificial sources.

The presence of a flood source does not always imply a risk. For example, the presence of a sewer does not necessarily increase the risk of flooding unless the sewer is local to the site and ground levels encourage surcharged water to accumulate. The exposure pathway or 'flooding mechanism' determines whether there is a risk of exposure to a flood source.

The identification of flooding pathways is typically undertaken by considering the local and site topography, the proximity of the flood source to the receptor and the potential flood conveyance routes local to the site. For more detailed assessments hydrological or hydraulic modelling may be required to quantify the flood risk and identify specific pathways, for the particular flood source.

If a flooding mechanism is considered not to be present, then the risk from the flood source is considered to be negligible.

2.2 Assessment of Flood Risk to Receptors

If a flood source and flooding pathway are identified, the assessment of the flood risk to the receptor is determined by combining the probability of the flood event occurring with the severity of impact (or consequences) if the flood event were to occur. Receptors include any people or buildings within the range of the flood source, which are connected to the source by a pathway.

The probability of a flood event occurring is usually determined from historical records of events, available modelling information and the design standard and condition of any infrastructure associated with the flood source. For more detailed assessments, hydrological or hydraulic modelling may be used to determine the frequency of flood events occurring, for a particular flood source.

The potential severity of the impact is determined by considering a combination of the type of flood source, the flood mechanisms identified, the layout and design of the proposed receptor and the vulnerability of the receptor.

The Crouch Waterfall FRA approach involves a desk-based review of available information to establish:

- Likely flooding sources;
- Potential flooding pathways (mechanisms of flooding);
- Probability of a flood event occurring; and,
- Severity of impact of a flood event for the site.

In summary, for there to be a flood risk all the elements of the Source-Pathway-Receptor model must be present. Furthermore, effective mitigation can be provided to reduce the magnitude of flood risk by removing one element of the model. For example, by removing the pathway, defending against the flood source, incorporating flood management or flood resilient measures into building receptors, or providing safe access and egress and flood evacuation plans for human receptors.

2.3 Aims and Objectives

The aim of this report is to provide Butlin's Skyline Ltd with a Level 2 FRA and DS, to identify the flood risk associated with each potential flood source and where required, identify appropriate measures that could be used to mitigate any significant risk as well as provide a strategy to implement a suitable drainage solution to complement the FRA.

In order to achieve the above, the following objectives will be met:

- Identify all potential sources of flooding and determine whether potential pathways exist which may cause a flood risk to the proposed development;
- Determine whether the proposed development will increase flood risk elsewhere;
- Establish existing surface water runoff rates;
- Determine the surface water management requirements for the Site in keeping with the principles of current planning policy;
- Propose mitigation measures to reduce the flood risk posed to, or arising from the Site post-development;
- Provide a suitable surface water drainage strategy to meet the requirements of the NPPF and Local Policy.

3.0 SITE DESCRIPTION

3.1 Site Location

The Site is located within the southern section of the wider site and is currently occupied by the old swimming pool building that was recently replaced by the large building called 'Splash', located on the eastern end of the wider site. The Site is located on footprint of the old swimming pool building which was earmarked for demolition as part of a previous application to develop the Splash building.

The postcode to the wider site is PO21 1JJ. An aerial photograph of the wider site is shown in Figure 3-1.

Figure 0-1 Aerial Photograph (© Google 2020)

The red line hatch area represents the approximate development area for the Site.



3.2 Topography

The topographic survey of the Site, included within Appendix A, indicates that the existing ground is predominantly occupied by the old swimming pool building which has a floor level of approximately 2.95mAOD.

The ground level outside the old swimming pool building, to the north of the Site generally falls to a low point of 1.9mAOD within the circulation space between the Site and the adjacent building to the North. To the west of the Site, an existing car park occupies most of the space and generally falls from 2.6mAOD on the southern end to approximately 2mAOD near the location of an existing substation. To the east of the Site, existing ground levels are generally 1.95mAOD, rising to approximately 2.5mAOD at the adjoining edge of another existing car park area. To the south of the Site, a gravel area sits at approximately 2.35mAOD, with levels rising south past a private road followed by a 600mm retaining wall, a 1.7m tall grass bank and onto a raised car park area at approximately 5mAOD which forms the main sea defence structure.

3.3 Site Geology and Hydrogeology

A site-specific ground investigation has yet to be undertaken for the Site. However, details of the existing ground conditions have been obtained from various sources described below:

With reference to the British Geological Survey (BSG) geological mapping for the area [<http://mapapps.bgs.ac.uk/geologyofbritain/home.html> – accessed Nov 2020], the Site is underlain by superficial Raised Marine Deposits (clay, silt, sand and gravel) underlain by the Lambeth Group (clay, silt and sand). The Lambeth Group is underlain by an undifferentiated chalk formation comprising the Lewes Nodular, Seaford, Newhaven, Culver and Portsdown Formations of the Cretaceous Age.

The information collated from a GI report [CJ Associated – April 2016] prepared for a nearby plot within the wider site indicates that the Site is likely to have the following geological properties:

- Topsoil typically between 0.2m and 0.3m thick;
- Made ground comprising sandy gravelly clay with brick typically between 0.7m and 1.8m thick to a depth of between 0.9m and 2.0m;
- Raised marine deposits comprising soft clay, silty sand and silty clayey gravel with cobbles of flint typically between 15.4 and 22.6m thick to a depth of between 17.0m and 24.6m;
- Sandy gravelly clay forming the Lambeth Group between 1.5m and 6m thick to a depth of between 18.5m and 20m;
- Upper Chalk.

As the Site is occupied by an existing building, the top part of the surface will be typically made up of a concrete foundation and ground floor slab together with the foundations of the existing pool structures followed by sub-base material which would replace all or part of the first two strata mentioned above for the nearby site.

The geotechnical investigation for the nearby site indicated that groundwater flows were observed at depths varying between 3.4m and 18.3m. Flows were observed to occur as medium seepages within the Raised Marine Deposits at shallow depth or within the chalk at depth. Subsequent monitoring of groundwater in standpipes indicated groundwater levels at depths ranging between 2.04m and 2.77m.

Soakaway tests were undertaken during the ground investigation at the nearby site, which indicated that the underlying strata are unsuitable for infiltration due to the presence of impermeable strata and groundwater.

Based on the data obtained from the nearby site and the BGS website, it is expected that the ground conditions below the existing building foundations at the proposed Site will be similar to those observed at the nearby site.

3.4 Identification of Watercourses and Water Bodies

The local watercourse crossing through the wider site to the east of the Site is known as Aldingbourne Rife and is classified as a Main River by the Environment Agency. This watercourse is an asset maintained by the Environment Agency and includes a pumped outfall at its interface with the sea, approximately 350m to the east of the Site. The Aldingbourne Rife can only discharge by gravity at the lower tidal levels and is pump assisted at other times.

Appendix B contains extracts of the maps available on the Environment Agency website showing details of the watercourses and water bodies associated with the wider site.

The Site lies at a distance of approximately 50m from the English Channel and is separated from it by a sea defence wall that reaches between 5.6m and 6.3m above Ordnance Datum in the area adjacent to the wider site.

3.5 Existing Surface and Foul Water Drainage

The existing Site consists of an existing building and surface water down pipes that connect to the local private drainage system. The gullies are expected to drain to a private surface water drainage pipe. Due to the age of the existing building, it

is not expected that any attenuation of flow control systems are included within the existing drainage system associated the building.

A concrete surface water sewer owned and maintained by Southern Water exists to the south of the Site, within the existing private road. The sewer flows from west to east along the sewer. This sewer is shown as a 600mm diameter, concrete pipe with approximately 1 m cover to the crown of the sewer.

Another surface water sewer exists within the private circulation space to the north of the Site. This sewer is shown as a 525mm diameter, concrete pipe with approximately 1.2m cover to the crown of the sewer. This sewer also flows west to east and joins the above mentioned sewer before discharging to the River Rife approximately 350m east of the Site. The sewers are shown on the Southern Water records within Appendix C

A 600mm diameter foul water ductile iron rising main exists to the south of the Site and is located within the sea defence structure. This rising main is owned and maintained by Southern Water and is believed to flow in an easterly direction.

3.6 Strategic Flood Risk Assessment

The Arun District Council Level 1 Strategic Flood Risk Assessment [Arun District Council Level Strategic Flood Risk Assessment by JBA Consulting - August 2016] states:

“The Arun District has a long history of flood events, with multiple sources of flooding. In particular, three notable flood events have affected the district in the last 60 years and these have been associated primarily with heavy rainfall, high groundwater levels, high river flows and high tides (but not necessarily in combination). The most recent events of 1974, 2000 and 2012 caused widespread flooding in the district after significantly high rainfall over an extensive period. The West Sussex County Council June 2012 Flood Event report has identified that on the 10th, 11th and 12th June 2012, an extreme rainfall event led to widespread flooding across parts of West Sussex. Approximately 780 properties were affected by flooding from a variety of sources. The worst affected areas in the Arun District were Bognor Regis and Littlehampton. In the area of Bognor Regis, which includes Middleton on Sea, Elmer and Felpham, up to 370 properties were reported to have flooded. West Sussex County Council (WSCC) recorded that rainfall in June 2012 was 430% higher than the average rainfall for June in the Bognor Regis to Chichester area. The probability of the rainfall event for this incident was estimated to be 1 in 200 (0.5% AEP).”

The Aldingbourne Rife is also predominately rural, with the exception of the main urban area of Bognor Regis, in which it flows through to the sea. It is known to flood frequently, and when it does, the river is very slow to drain due to the low topography of the area³¹. The main flood events to have directly impacted the Aldingbourne catchment are November 1960, December 1993 and June 2012. Across these events surface water issues are reported to be main drivers behind the flooding experiences, although these often corresponded with elevated river levels which influence drainage of surface water. In the case of the 1993 event inadequate culvert capacity at Barnham also contributed to flooding experienced. The Aldingbourne catchment was particularly affected during the 2012 flood event, with over 400 properties being affected in areas of Bognor Regis, Barnham, Elmer, Middleton and Felpham. The flood mechanism was thought to be primarily surface water but this was exacerbated by fluvial flooding from the Rife network. There were also some isolated areas impacted by flooding such as Shripney, Westergate and Yapton”

Historic flood extent mapping [Historic Flood Maps contained within Arun District Council Level Strategic Flood Risk Assessment by JBA Consulting - August 2016] detailed in Appendix E indicates that the Site was not flooded during any of the historic events that are outlined above.

3.7 Current Flood Risk Management

The Site is within Flood Zone 3a and benefits from the presence of sea defences immediately to the south which protect the Site from the English Channel and tidal flooding. The flood defences are maintained by the Environment Agency.

The local watercourse (Aldingbourne Rife) is a watercourse which terminates with an outfall to the sea during low tide together with a non-return system and pumped outfall during high tide events.

4.0 Proposed Development

The existing Site will be redeveloped as a temporary building which will be used to house large social events. The structure will be installed following demolition of the existing swimming pool and will include a lifespan no more than 3 years.

The proposed temporary building will measure approximately 40m wide and 65m long. It will include a toilet and bar area within an adjacent structure measuring 20m x 20m. A 3m wide circulation path will be included around the proposed building.

An outline schematic of the proposed development is shown on a sketch contained within Appendix F.

4.1 Proposed Site Topography

The existing topography will generally be retained. However, some existing levels will be altered to accommodate the access and egress routes to the proposed structure.

4.2 Proposed Foul Drainage Strategy

The guests using the proposed temporary building will be those already at the resort which has been operating at reduced capacity compared to pre-covid conditions. Therefore, there will not be any increase in the overall foul water discharge rate and volume from the wider site. The proposed 20m x 20m structure adjacent to the large proposed building will house a number of toilets and a bar that will require foul water drainage connections. These will be configured to re-use the existing systems that served the existing swimming pool building.

4.3 Proposed Surface Water Drainage Strategy

The proposed surface water drainage strategy is dealt with within chapter 7 of this report – Flood Risk from the Development.

5.0 Planning Policy

5.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how they are expected to be applied. This document replaces the previous national planning policy document relevant to flood risk 'Planning Policy Statement: Development and Flood Risk'.

The policy aims to avoid inappropriate development by directing it away from the areas that are at highest risk. Where development is necessary within the floodplain, it must be demonstrated to be safe without increasing flood risk elsewhere.

Planning policy states that a site-specific FRA is required for development proposals that are located within Flood Zone 2 and 3. A site-specific FRA is also required for development proposals greater than a hectare located in Flood Zone 1.

A site-specific FRA should identify and assess the risks of all sources of flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe for its lifetime, taking climate change into account.

5.2 Flood zone definition

The Technical Guidance to the National Planning Policy Framework (NPPF) defines the flood risk zones that are published by the Environment Agency, which are as follows:

- Flood Zone 1 - the low probability zone which is defined as having a less than 0.1% (or 1 in 1000 year) probability of flooding each year;
- Flood Zone 2 – the medium probability zone which is defined as having between 0.1% and 1% (or between 1 in 1000 and 1 in 100 year) probability of fluvial flooding or between 0.1% and 0.5% (or between 1 in 1000 and 1 in 200 year) probability for flooding from the sea each year;
- Flood Zone 3a – the high probability zone which is defined as having a 1% or greater (or 1 in 100 or greater) probability of fluvial flooding, or a 0.5% or greater (1 in 200 or greater) probability of flooding from the sea each year;
- Flood Zone 3b – Functional Floodplain which is defined as land where water has to flow or be stored in times of flood.

5.3 Sequential Test and Vulnerability Classification

The NPPF aims are to ensure that flood risk is taken into account at all stages of the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas of highest risk. On a district wide scale this is achieved through the application of the Sequential Test by the Local Planning Authority (LPA). The Sequential Test encourages LPAs to steer development to areas of lowest flood risk on a borough / district wide level and only develop in flood risk areas where absolutely necessary. The LPA should apply the Sequential Test based on information presented in their Strategic Flood Risk Assessment (SFRA).

Given the temporary nature of the building and its proposed use as a leisure venue for patrons of the Butlin's Bognor Regis site, the Sequential Test is assessed as being passed on the basis that the building can only serve its purpose in its proposed location and will not increase the risk to the users as they will already be on site.

The NPPF Sequential Test evaluates the risk of flooding, based on Environment Agency Flood Zones, against the vulnerability of the proposed development.

According to the Technical Guidance of the NPPF, the proposed development is classified as Less Vulnerable since the proposed temporary building meets the description below:

Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'More Vulnerable' class; and assembly and leisure.

Flood Risk Vulnerability classification (see Table D2)		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone (see Table D.1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	X	Exception Test required	✓
	Zone 3b 'Functional Flood plain'	Exception Test required	✓	X	X	X

Table 5-1 – Flood Risk Vulnerability and Flood Zone Compatibility

Less Vulnerable developments are appropriate in Flood Zone 1, 2 and 3a. Less Vulnerable developments are not appropriate for Flood Zone 3b areas. Therefore, the development classification (Less Vulnerable) is considered to be suitable for this Flood Zone (3a).

6.0 FLOOD RISK – TO THE DEVELOPMENT

This section incorporates an assessment of flood risk from the all potential flood sources as required by the NPPF.

6.1 Flood Risk from Tidal Sources

Tidal sources of flooding include seas and estuaries. Flooding from these sources can occur through overtopping of defences, breaching of defences and wave action.

6.2 Flooding from Tidal Sources Risk Assessment

The Environment Agency Flood Map for Planning (Appendix B), indicates that the Site is in a high probability flood zone (Flood Zone 3) for flooding from sea. The latest prediction by the Environment Agency for the 1 in 200 year (0.5% probability) surge tide for this area (ignoring wave action) is 4.5m AOD. However, this does not take into account the tidal flood defences along the site boundary with the English Channel.

The Finished Floor Level (FFL) of the proposed temporary building will be set to suit level access compared to the existing ground levels post demolition of the existing swimming pool building. The Butlin's Holiday Centre is protected by sea flood defence against a flood of 0.5% Annual Exceedance Probability (AEP), as stated within the SFRA. Due to the presence of flood defences, the site is not expected to be flooded from the sea within the 2056 or 2106 climate change affected time-horizons (assuming the existing defence standard remains), as stated within the SFRA.

In the case of wave overtopping or a breach in the sea defence wall, occupants of the proposed temporary building will be evacuated to areas of the wider site that are elevated above 4.5m AOD. A Flood Emergency Plan exists for the wider site to define the evacuation procedure. As the proposed building will be used by the current population on the wider site, the existing emergency procedures will remain valid.

With the existing sea defence standard taken into consideration, the risk of tidal flooding has been assessed to be low during the life time of the development.

6.3 Flood Risk from Fluvial Sources

Flooding from fluvial sources can occur through inundation of floodplains from watercourses; inundation of areas outside the floodplain due to the influence of bridges, embankments and other features that artificially raise water levels; overtopping of defences; breaching of defences; blockages of culverts; and blockages of flood channels, or flood corridors.

A local watercourse is situated within the wider site, approximately 350m to the east of the Site. The watercourse is an Environment Agency watercourse that includes a mechanically managed outfall.

According to the SFRA the fluvial flood extent is not expected to change significantly within the 2056 and 2106 time horizons.

6.4 Flooding from Fluvial Sources Risk Assessment

There is a potential source of fluvial flooding present around the Site in the form of the local watercourse. The potential flood water level from the Aldingbourne Rife has been assessed to be at approximately 2.0m AOD for the 1 in 100 year event plus 20% increase in peak rainfall intensity for climate change. However, the Site is located approximately 350m from the watercourse and is separated from the watercourse by several other buildings.

Therefore, the probability of fluvial flooding extending into the Site is considered to be low.

6.5 Flood Risk from Pluvial Flooding

Pluvial flooding occurs when rainfall cannot infiltrate the surface, or when intensity exceeds the infiltration capacity of the ground. Pluvial flooding can be evident in many forms and can range from deep ponding of surface water in low lying areas with poor drainage to fast flow via overland routes in heavily urbanised or steep catchments.

The Site is bounded to the north by an area occupied by an existing building. The area to the west of the Site is located at ground levels lower than the Site while the area immediately to the east comprises another existing building. The only potential source of pluvial flooding is the access road to the south east that includes ground levels higher than the Site.

However, the Environment Agency mapping for surface water flooding shows the potential for surface water flooding around the north, east and western parts of the building due to the existing hardstanding areas. A copy of the Environment Agency mapping for surface water flooding is included within Appendix B.

6.6 Pluvial Flooding Risk Assessment

The pluvial flooding area shown immediately north, east and west of the proposed Site is associated with the existing topography and does not account for the presence of the existing drainage system.

There is another potential minor source of pluvial flooding to the Site from the access road to the south of the Site. However, pluvial flows from this area will generally be intercepted by the existing drainage features as well as the gravel area separating the road from the Site.

The risk of flooding from pluvial sources is therefore considered to be low.

6.7 Flood Risk from Sewers

Sewer flooding occurs when the sewer capacity becomes exceeded or where a blockage occurs causing the sewer to surcharge and flood.

Two large diameter Southern Water sewers exist within the vicinity of the Site. In addition, a large diameter foul water rising main exists to the south of the Site.

6.8 Flooding from Sewers Risk Assessment

The large surface water sewers located near the Site are owned and maintained by Southern Water. No evidence of flooding from these sewers has been received from Southern Water. The sewers discharge directly to the Aldingbourne Rife which is an Environment Agency managed watercourse. The proposed development will result in the introduction of drainage features that will attenuate flows and reduce the dependency on capacity within the existing sewers for surface water discharge. Therefore, it is anticipated that flood risk from the sewer will be reduced as a result of the development.

The foul water rising main is a public foul water asset owned and maintained by Southern Water. No evidence of flooding from this sewer has been received from Southern Water.

The risk of flooding from sewers is therefore considered to be low.

6.9 Flood Risk from Groundwater

Groundwater flooding can occur when groundwater levels rise above the surface of the site and infiltrate into the site via the ground surface.

According to the British Geological Survey mapping, the underlying stratum is the Lambeth Group, made up of clay, silt and sand. The Ground Investigation Report by CJ Associates (Apr 2016) prepared for a nearby site indicates that groundwater depths range between 2.04m and 2.77m. This investigation indicates the presence of an artesian type aquifer (a confined aquifer containing groundwater that will flow upward through a well) around 15m below ground level in both the underlying alluvial sand and chalk. If encountered the water is likely to rise to within a meter of ground level. Additionally, new developments that penetrate the groundwater table have the potential to displace groundwater and increase groundwater flood risk to the surrounding areas.

6.10 Flooding from Groundwater Risk Assessment

The Arun District Council SFRA includes mapping of the whole District showing the Areas Susceptible to Groundwater Flooding (AS&GWF), which is duplicated in Appendix E. The AS&GWF is a strategic-scale map showing groundwater flood areas on a 1km square grid. The data was produced to annotate indicative Flood Risk Areas for Preliminary Flood Risk Assessment (PFRA) studies and allow the LLFAs to determine whether they may be at risk of flooding from groundwater. This data shows the proportion of each 1km grid square, where geological and hydrogeological conditions indicate that groundwater might emerge. The mapping indicates that 50% to 75% of the land within the 1km square that is occupied by the Site has geological and hydrogeological conditions indicate that groundwater might emerge. Hence, the SFRA indicates that the Site has potential for groundwater flooding, although no historic groundwater flooding incidences have been recorded on site.

The Ground Investigation Report by CJ Associates (April 2016) for a nearby site indicates that groundwater depths range between 2.04m and 2.77m. This investigation indicates the presence of an artesian type aquifer (a confined aquifer containing groundwater that will flow upward through a well) around 15m below ground level in both the underlying alluvial sand and chalk. If encountered the water is likely to rise to within a meter of ground level.

The proposed development will include the construction of a temporary building in the form of a large tent with shallow foundations. The proposed ground floor level will be set similar to the existing ground levels and therefore will remain safe against groundwater seepage. In addition, the existing building immediately to the north of the building lies at a significantly lower ground floor level of 2mAOD and has not been highlighted as suffering from ground water flooding.

Therefore, the overall flood risk from groundwater on the Site is considered to be low.

6.11 Flood Risk from Artificial Sources

Artificial flood sources include raised channels such as canals or storage features such as ponds and reservoirs.

There are no ponds or other artificial sources near the site.

6.12 Flooding from Artificial Sources Risk Assessment

There is no risk of flooding from artificial sources to the Site. Appendix B includes an extract of a map from the Environment Agency which confirms that the Site does not suffer from risk of flooding from reservoirs.

6.13 Summary of Flood Risk Sources to the Development

Following an assessment of flooding from all sources to the development it has been assessed that:

- With the existing sea defence standard taken into consideration, the risk of tidal flooding has been assessed to be low during the life time of the development;
- The probability of fluvial flooding extending into the Site is considered to be low;

- Due to the topography of the Site and surrounding areas, the probability of pluvial flooding extending into the Site is considered to be low;
- The risk of flooding from sewers is therefore considered to be low;
- The overall flood risk from groundwater on the Site is considered to be low;
- There is no risk of flooding from artificial sources to the Site.

7.0 FLOOD RISK – FROM THE DEVELOPMENT

7.1 Planning Policy

The National Planning Policy Framework (NPPF) sets out the Government's policies for planning and flood risk with the primary objective of reducing flood risk to and arising from development, now and into the future.

Technical Guidance to the NPPF describes the sources of flood risk that should be considered for development and outlines how flood risk from a development should be considered in terms of reducing surface water runoff generated by new development.

In general, site development reduces the permeability of the site, increasing the volume and rate of water to be piped off the site via an existing sewer, potentially increasing flood risk to downstream areas. Therefore, appropriate drainage arrangements are required for new developments to ensure that flood risk to others is not increased.

According to the NPPF the surface water arrangements for any development site should be such that the volumes and peak flow rates of surface water leaving a developed site are no greater than the rates prior to the proposed development, unless specific off-site arrangements are made and result in the same net effect. In addition, surface water arising from a development site should, as far as is practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

7.2 Proposed Outline Drainage Strategy

The existing Site is composed primarily of impermeable surfacing in the form of an existing building and is drained via a dedicated private surface water drainage system. The proposed development comprises the construction of a temporary building within the footprint of the existing building. Therefore, the proposed development will not increase the impermeable area of the Site. However, the inclusion of attenuation features and a surface water drainage network capable of managing the surface water runoff will be needed in order to ensure that flood risk to the downstream catchments is not increased for storms up to the design event.

7.3 SuDS Features

SuDS features will be implemented with due regard to CIRIA publication C697 – The SuDS Manual and the Environment Agency SuDS hierarchy, which is duplicated in Table 7-2. The selection of appropriate SuDS features has been undertaken by considering the local ground conditions and land use as required by the local planning authority.

TABLE 7-2 ENVIRONMENT AGENCY SUDS HIEARCHY

Suds Feature	Rank
Living/Green Roofs	1
Constructed Wetlands/Retention Pond	2
Detention Basins	3
Filter Strips and Swales	4
Soakaways	5
Infiltration Trenches	6
Gravelled Areas	7

Porous Paving	8
Oversized pipes	9

7.3.1 Infiltration devices

The ground conditions on the wider site are such that infiltration devices will not be appropriate due to the impermeable nature of the underlying strata.

7.3.2 Permeable surfacing and filter trenches, ponds and swales

The proposed development is located in an area that comprises a large existing pool building surrounded by other existing buildings, car parks or a sea defence structure. No space is available in the vicinity for such surface water attenuation features without the need for relocation of buildings or amendments to the sea defence structure. The existing circulation spaces and roads around the Site are already heavily congested with existing private drainage and services as well as large diameter Southern Water sewers.

7.3.3 Oversized pipes and cellular storage crates

Whilst they are very effective at providing large volumes storage for minimal land use, oversized pipes and cellular storage crates do not provide any water treatment benefit to the runoff. However, these are likely to be the only features that could be implemented for the construction of the temporary building by constructing the attenuation near the footprint of the proposed building below existing hard standing areas such as the nearby car parks and courtyards.

7.4 Proposed Surface Water Discharge Rates

7.4.1 Greenfield Runoff Rate

The Greenfield rates have been calculated below to determine the discharge rates that would need to be met, should the authorities require the implementation of these parameters.

Using the ICP SuDS calculator within the Source Control module of Microdrainage software, the greenfield rate has been calculated using the following parameters:

- SAAR: 719 mm (average annual rainfall)
- Soil Type: 0.4
- Area: 0.424ha
- Region 7

This yields the following results:

- 1 year event: 1.3 l/s
- Qbar: 1.5 l/s
- 30 year event: 3.4 l/s
- 100 year event: 4.7 l/s

The area referred to above (0.424ha) is the area of the Site that comprises the proposed temporary large tent building, the ancillary building with toilets and a bar together with the 3m circulation space to be provided around the structure.

7.4.2 Brownfield Runoff Rate

The existing Site is classified as a Brownfield site on account that it contains impermeable surfacing. It is therefore already generating large drainage flows. However, the existing downstream system is unlikely to have been designed to accept the runoff from the existing impermeable area at rates that would ensue from modern design standards. Therefore, the

proposed drainage system will need to address this change in order to ensure that the development of the Site does not increase flood risk to downstream buildings.

Using the ICP SuDS calculator within the Source Control module of Microdrainage software, the greenfield rate has been calculated using the following parameters:

- M5-60: 19 mm
- Ratio R: 0.35
- Area: 0.424ha
- Storm: Peak winter profile, 60 mins

This yields the following results:

- 1 year event: 35.8 l/s
- Qbar: 45.5 l/s
- 30 year event: 86.7 l/s
- 100 year event: 113.9 l/s

The brownfield rates calculated are theoretical rates that would be generated from the site area but that may not be able to escape into the existing drainage network unless the network was designed to accommodate for these events. It is expected that the existing network would be capable of accepting flows from storms no larger than the 1 year peak event, based on the existing catchment features that exist.

7.4.3 Proposed discharge rate

To provide betterment to the existing downstream drainage system, the proposed surface water drainage network for the Site will therefore be limited to 3x the 100 year greenfield runoff rate, providing 60% betterment to the 1 year event and significantly larger betterment to all other events. The discharge rate will be 14.1 l/s.

This limit will ensure that the proposed development discharge rate does not exceed the existing downstream network capacity and therefore will not increase the risk of flooding to downstream catchments. The limit will be achieved through the use of flow control devices within the proposed surface water network.

7.5 Attenuation Storage

For standard developments, the design storm is defined by the lifespan of the proposed development. In the case of this development, the proposed building will be constructed to last no more than 3 years.

Therefore, the table below has been used to define the volume of attenuation that will be required for various design storms:

TABLE 7-3 ATTENUATION VOLUMES FOR DESIGN STORMS	
Design Storm (years)	Required volume of storage (m ³)
1	12 - 28
10	38 - 71
30	58 - 100
100	87 - 145
100 + 40% climate change	142 - 226

It is anticipated that, given the temporary nature of the proposed building, the design storm is unlikely to be larger than the 10 year event. However, consultation with the relevant authorities will be required to ensure this is acceptable.

To adequately mobilise the attenuation storage mentioned above, the surface water drainage network will include a flow control device at the downstream end of the attenuation device. This will limit the forward flow of surface water within the network, hence maximising the use of the attenuation at source and reducing the flowrate off site.

7.6 Surface Water Outfall

The proposed surface water network will be designed to outfall to the local private surface water drainage network. A survey of the network will be required in order to identify the discharge point of the existing gullies and re-use the same connection point in order to ensure that the drainage regime within the downstream private drainage is not amended.

7.7 Exceedance Flow Paths Design

The proposed development will not change the location and level of the existing ground level significantly other than through the removal of the existing building and therefore will not alter the existing regime of exceedance flow path. Given the existing ground levels shown on the topographical survey, any exceedance flows generated near the proposed development will flow in the westerly direction, away from the proposed building, leaving a route to the east for patrons to escape the flow.

7.8 Surface Water Treatment – Quality of Runoff

The existing site comprises an existing building. The proposed development will result in the construction of a temporary building which only generate runoff from its roof. Therefore, the surface water generated from the Site will increase remain equal in quality without the need for additional forms of surface water treatment.

7.9 Diversions, build-over agreements

The existing Site is near to two large diameter surface water sewers that run north and south of the footprint of the proposed building. Prior to any works progressing, Southern Water will be consulted to determine if the construction of the temporary building will be acceptable to Southern Water. It is not anticipated that the construction of the proposed building will affect the sewers as the proposed structure will be significantly less onerous than the existing building to be demolished in the same location. Upon receipt of planning approval, applications will be made to Southern Water.

7.10 Surface Water Drainage Adoption and Maintenance

Attenuation will be provided in the form of cellular storage tanks near the proposed building and will be situated on private land, serving a single curtilage; therefore, it is likely to be maintained by the Client or by an appointed management company. It is not anticipated that any of the surface water drainage infrastructure on the Site will be offered for adoption.

The maintenance of the private infrastructure will be provided in line with the guidance offered within the SuDS Manual and, in particular, will include the following:

Table 7-4: Maintenance Requirements for cellular storage tanks (Extract from CIRIA C753)

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

8.0 CONCLUSION

A FRA has been completed in accordance with the NPPF through achieving the objectives set out in Section 2.3. A summary of the main outcomes of the FRA and DS in relation to the objectives are summarised below.

8.1 Planning Policy

The proposed development has a vulnerability classification of 'less vulnerable' and is situated within the Environment Agency's Flood Zone 3a. According to the NPPF, less vulnerable developments are permitted in Flood Zone 3a without the application of the Exception Test.

8.2 Flood Risk – To the Development

Following an assessment of flooding from all sources to the development it has been assessed that:

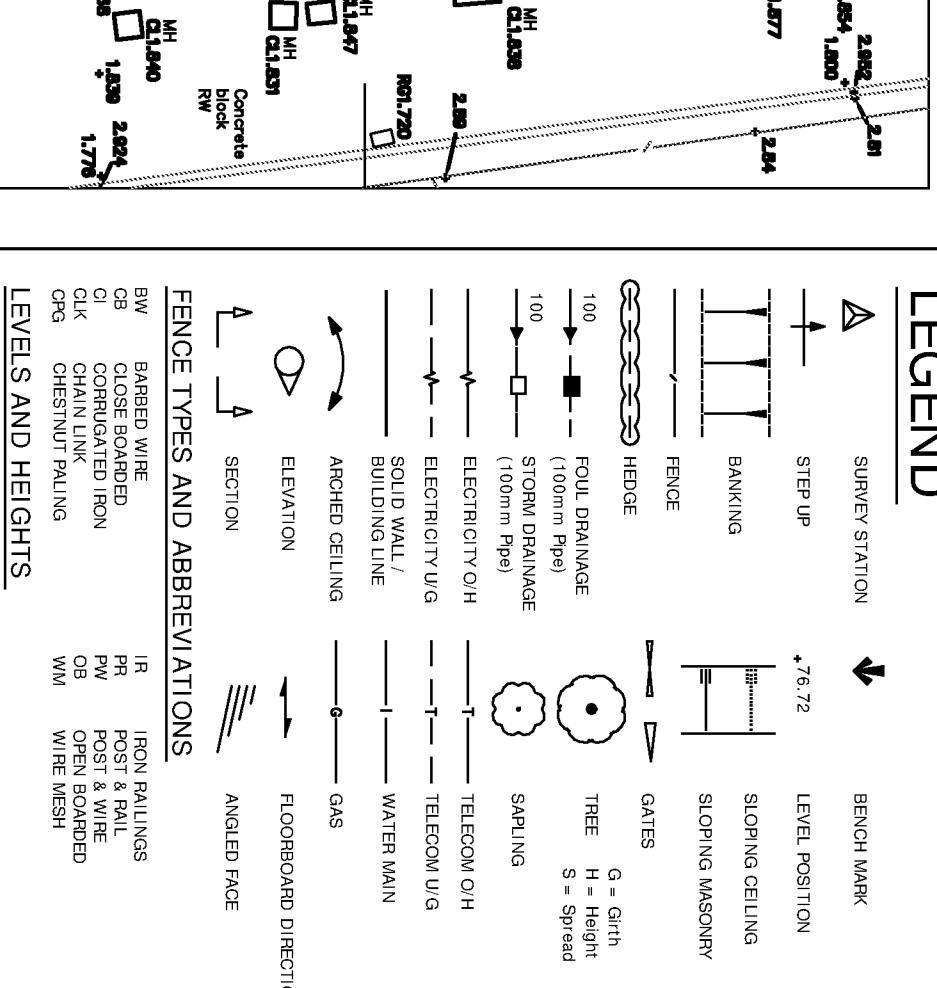
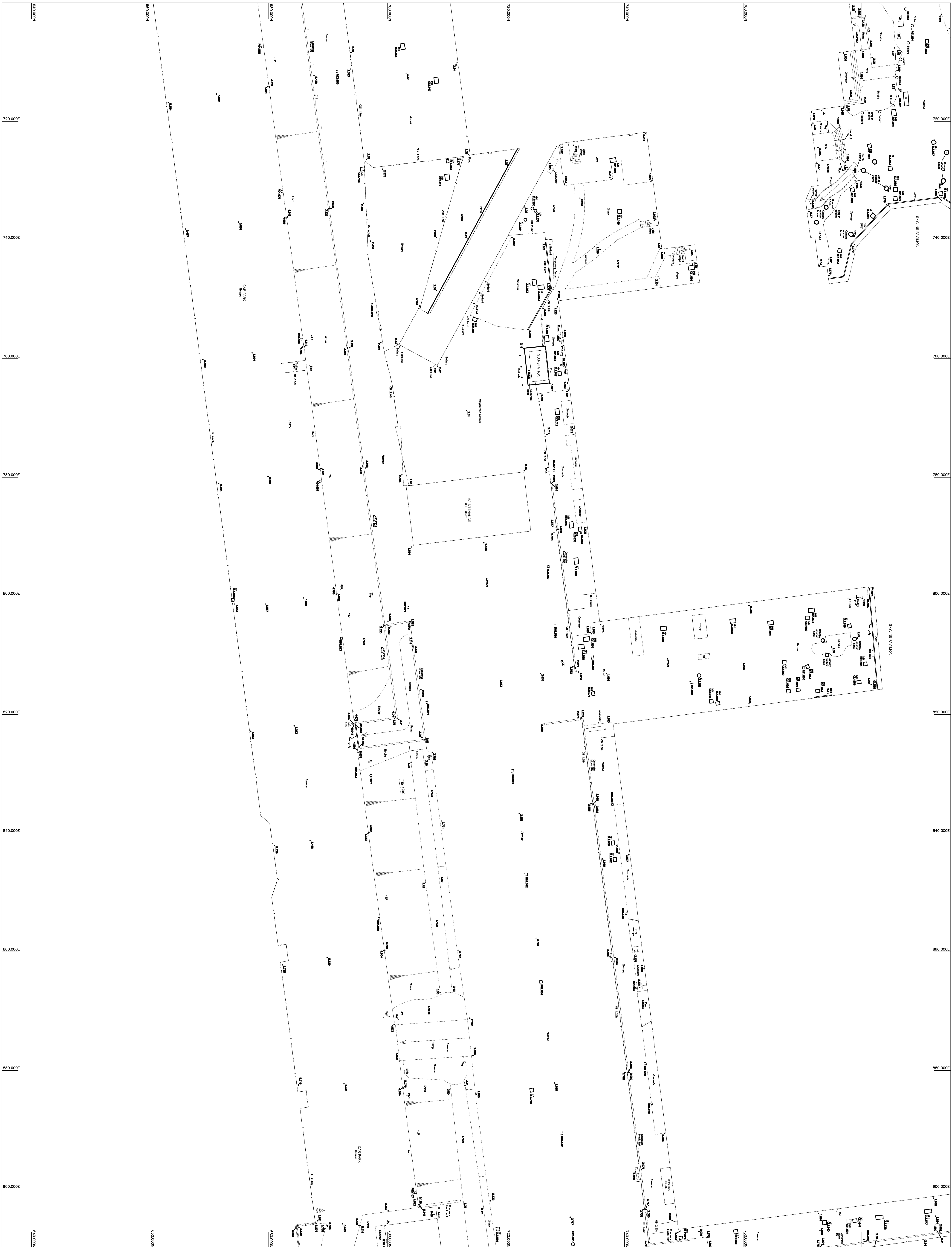
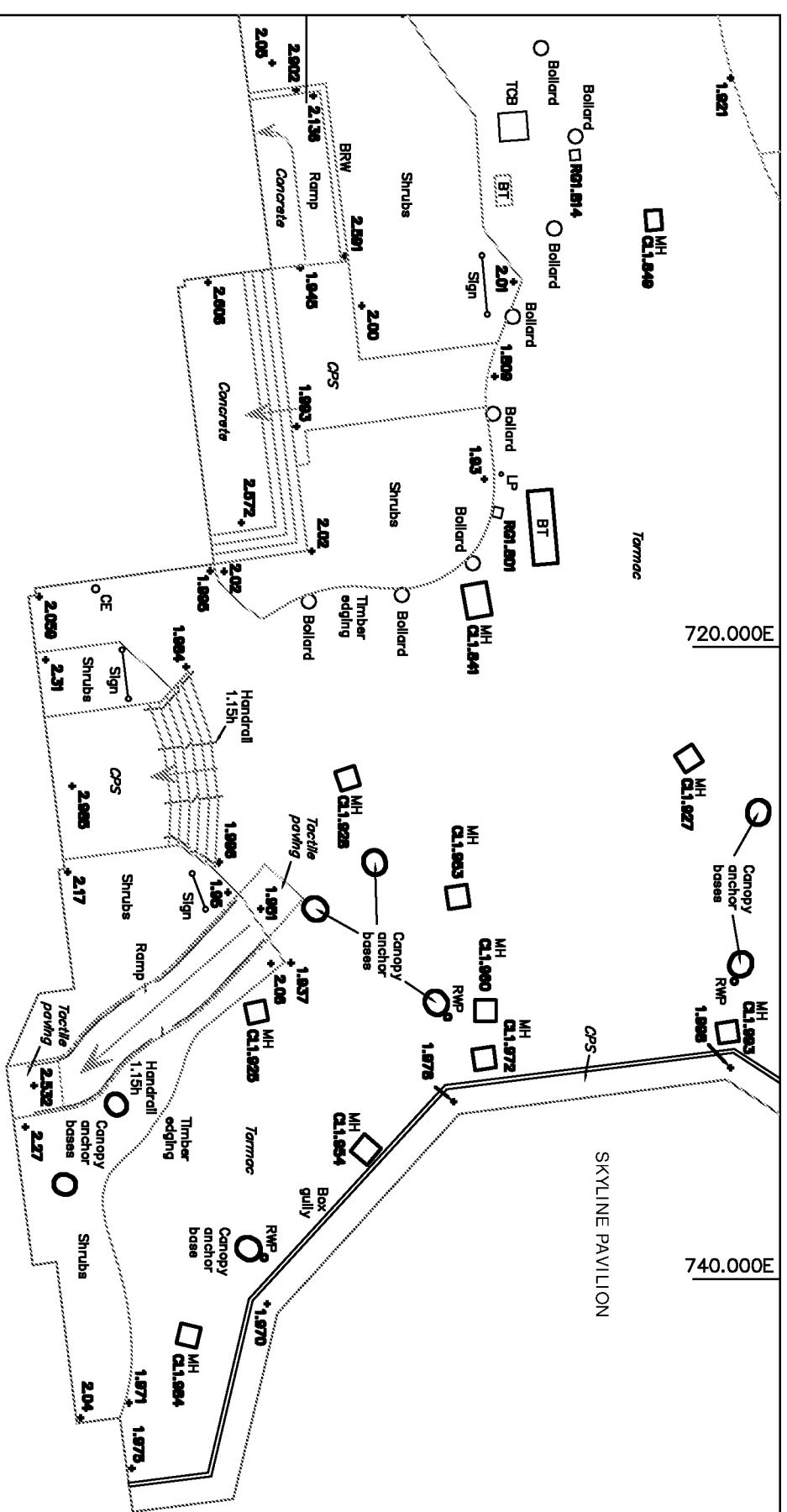
- With the existing sea defence standard taken into consideration, the risk of tidal flooding has been assessed to be low during the life time of the development;
- The probability of fluvial flooding extending into the Site is considered to be low;
- Due to the topography of the Site and surrounding areas, the probability of pluvial flooding extending into the Site is considered to be low;
- The risk of flooding from sewers is considered to be low;
- The overall flood risk from groundwater on the Site is considered to be low;
- There is no risk of flooding from artificial sources to the Site.

8.3 Flood Risk – From the Development

Following an assessment of flooding from the development the following conclusions can be drawn:

- The proposed development will not result in an increase in impermeable area;
- Surface water runoff from the proposed development will be discharged to the private onsite surface water drains in line with the existing regime, as it will not be practical to discharge runoff to ground or the nearby watercourse;
- A new surface water drainage network will be required, which will incorporate Sustainable Drainage Systems to restrict the peak discharge rate from rainfall events to the equivalent 3X the greenfield runoff rate. The design rainfall event will be agreed with Southern Water and the Local Planning Authority but is anticipated to be no more than the 10 year event;
- Proposed attenuation will likely include cellular storage tanks located below areas of existing hardstanding surfacing near the proposed building.

1.0 Appendix A – Topographical Survey



Abbreviations (Where Applicable)	PLEASE NOTE: ALL HEIGHTS TAKEN FROM FLOOR (LAMBING UNLESS OTHERWISE STATED)
W18	WINDOW SILL LEVEL
W19	WINDOW HEAD LEVEL
W20	THRESHOLD LEVEL
W21	CEILING LEVEL
W22	FLOOR LEVEL
W23	CEILING LEVEL
W24	CEILING LEVEL
W25	CEILING LEVEL
W26	CEILING LEVEL
W27	CEILING LEVEL
W28	CEILING LEVEL
W29	CEILING LEVEL
W30	CEILING LEVEL
W31	CEILING LEVEL
W32	CEILING LEVEL
W33	CEILING LEVEL
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W97	CEILING LEVEL
W98	CEILING LEVEL
W99	CEILING LEVEL
W100	CEILING LEVEL

[illegible]

LEVELS:

G	GALLY	DTL
Q	QUICK-LOOK	UNABLE TO CLIMB
Q	Q&S VALVE	VP
IC	INSPECTION COVER	VP
LP	LAMP POST	W
M	MANHOLE	WAI
M	METER	WIP
		WASTE PIPE

DATE: NEWDM

BENCH MARKS USED: 0.8 RM,
CUT MARK ON SOUTH FACE OF 74 UPPER BUCKING ROAD

VALUE: 4.30m

SERVICE INFORMATION

DRINKAGE:
ELECTRICITY
CASH
TELECOM

WATERS:
Drinking water is found in locally purchased water shops. In the case of contamination and closing of the tap water source by Government, there are means to supply the water in the hotel's international water tank.

NORTH POINT:



SHEET LAYOUT:



12				
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[illegible]

PWP ARCHITECTS
BUTLINS
BOGNOR REGIS
CITF DRIVEWAY

SCALE:		SHEET SIZE:		DRAWING:	
1:200		A0		10 OF 13	
JOB NO.		SURVEYOR:		DRAWN:	
M1005		BPM/KFW		BPM/KFW/ARJ	
		CHECKED:		DATE:	
		WGP		FEB 2010	

		5m	10m	20m
A	REV			
DATE	INIT			
AREA ADDED TO NORTH-WEST OF SITE (M100)				
REVISION DETAILS				

MEON *The*  **SURVEY**
Partnership
Specialists in Architectural and Land Surveys
Campbell Park, Fernhurst Road,
Mildred, Liphook, Hampshire, GU30 7JU
TEL 01428 741599, FAX 01428 741466



	12				
	1	2	3	4	
13	5	6	7	8	
	9	10	11		

PWP ARCHITECTS
BUTLINS
BOGNOR REGIS

SITE SURVEY

SCALE:	1:200	SHEET SIZE:	A0	DRAWING:	9 OF 13
JOB No	M1005	SURVEYOR:	BRN/KW	DRAWN:	BRN/KW/ARJ
		CHECKED:	WGP	DATE:	FEB 2010

SCALE BAR

5m 10m 20m

MEON  **SURVEY**

Partnership

Specialists in Architectural and Land Surveys

Campbell Park, Farnham Road,
Milnord, Liphook, Hampshire, GU30 7JU
TEL: 01428 734 699 FAX 01428 734 466
Email: m@meonsurvey.co.uk
Web: <http://www.meonsurvey.co.uk>

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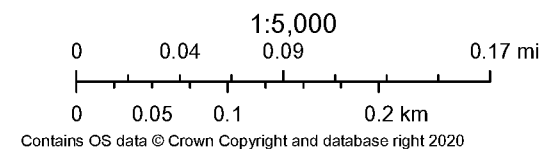
Maximum extent of flooding Location you selected

Main River Map: Rationalising Main River Network



11/15/2020, 12:04:43 PM

----- Statutory Main River Map



Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
494280/99143

Created
29 Nov 2020 18:44

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

This means:

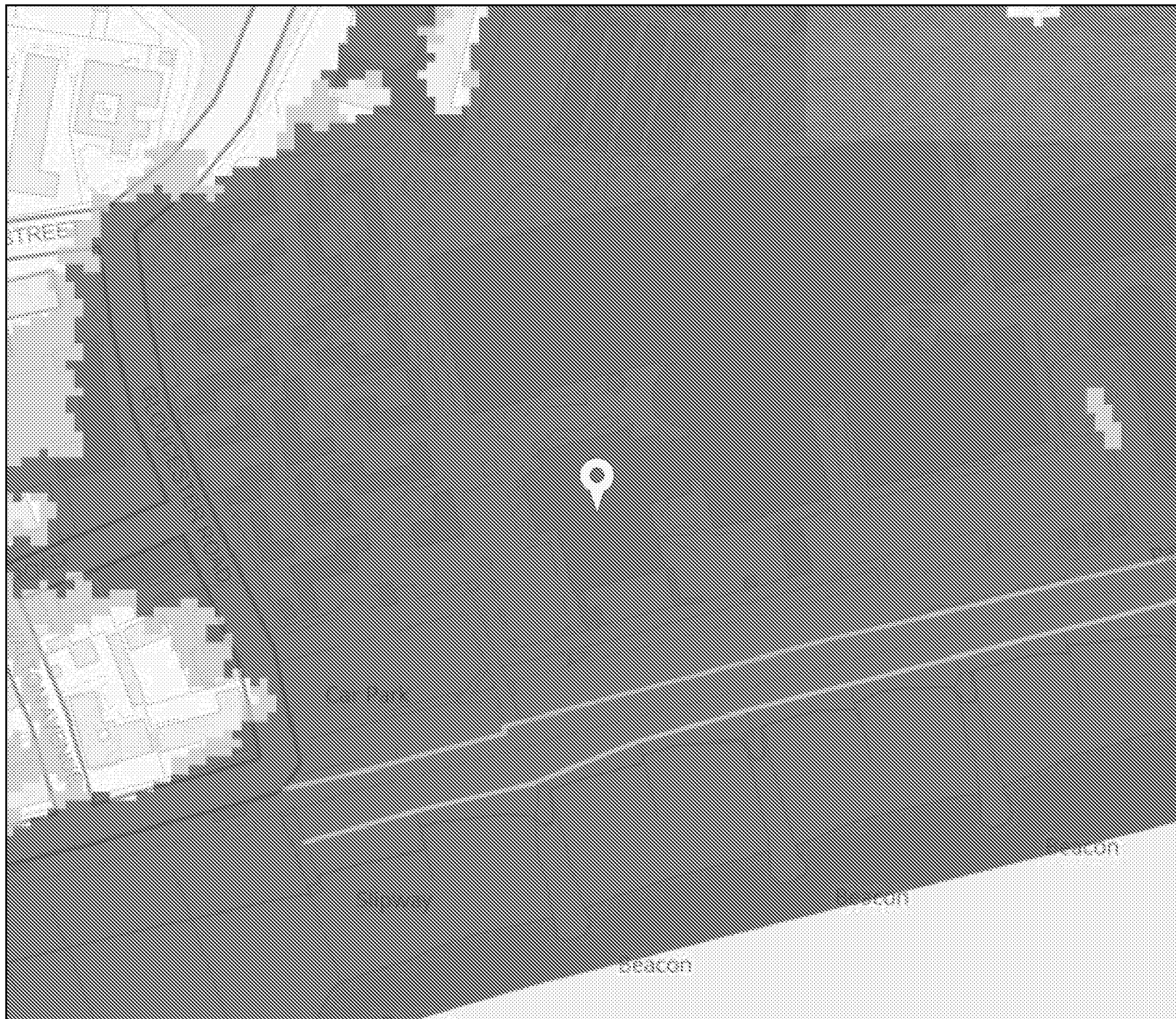
- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

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



Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
494280/99143

Scale
1:2500

Created
29 Nov 2020 18:44

-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefiting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area

0 20 40 60m

3.0 Appendix C – Sewer Records

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
0001X	4.34	1.8	225	VC	CIRC	4154X	3.285	0.008	750	CP	CIRC	8408X	2.94	0.08	300	CP	CIRC						
0002X	4.29	2.85	225	VC	CIRC	4252X	1.84	-0.13	875	CP	CIRC	8408X			175	VC	CIRC						
0003X	4.23	2.43	225	VC	CIRC	4253X	1.8	-0.17	875	CP	CIRC	8410X	1.52	1.52	150	VC	CIRC						
0051X	4.29	3.48	225	VC	CIRC	4254X	1.91	-0.25	875	CP	CIRC	8451X	2.54	1.8	225	CP	CIRC						
0052X	4.23	3.07	225	VC	CIRC	4255X	2.21	-0.215	900	CP	CIRC	8452X	2.56	1.88	150	VC	CIRC						
0101X	3.91	1.11	OTHER	BAC	CIRC	4256X	1.807	-0.322	900	CP	CIRC	8453X	2.84	2.19	150	VC	CIRC						
0102X	2.95	0.63	525	CI	CIRC	4402X	1.99	-1.98	750	CI	CIRC	8454X	2.61	2.01	150	VC	CIRC						
0103Y	3.1		UNK	UNK	CIRC	510AX			800	DI	CIRC	8501X	2.37	-1.14	300	VC	CIRC						
0103X	3.1		525	CI	CIRC	5150X	2.939	0.112	800	CP	CIRC	8502X	2.08	-1.16	300	VC	CIRC						
0104X	3.04	0.74	OTHER	BAC	CIRC	5150Y	2.939	0.112	750	CP	CIRC	8520X			UNK	UNK	CIRC						
0151X	3.92	2.4	225	VC	CIRC	5251X	1.47	-0.66	900	CP	CIRC	8552X	2.15	1.57	150	VC	CIRC						
0152X	3.04	1.02	525	CP	CIRC	5252X	2.31	-0.54	900	CP	CIRC	8553X	2.62	1.23	300	CP	CIRC						
0153X	3.09	1.13	525	CP	CIRC	5253X	1.476	-0.412	900	CP	CIRC	8554X	2.03	0.87	300	CP	CIRC						
0201X	3.21	0.51	525	CI	CIRC	5401X	2.27	0.82	150	VC	CIRC	8555X	1.99	0.62	150	VC	CIRC						
1001X	3.41	1.22	225	VC	CIRC	5451X	2.04	0.71	300	VC	CIRC	8556X	1.92	0.19	150	VC	CIRC						
1002X	4.34	1.52	225	VC	CIRC	5501Y	1.81	-0.45	525	CI	CIRC	8557X	1.95	0.83	300	VC	CIRC						
1005X	2.62	1.59	150	VC	CIRC	5501X	1.81	-2.24	525	CI	CIRC	9101X	4.14	1.19	OTHER	BAC	CIRC						
1051X	3.6	2.32	300	VC	CIRC	5502X	1.47	-0.48	525	CI	CIRC	9151X	4.15	2.64	225	VC	CIRC						
1052X	4.23	2.99	300	CP	CIRC	5504X	1.65	-2.49	OTHER	CI	CIRC	9401X	4.46	3.03	150	VC	CIRC						
1053X	4.34	2.89	450	CP	CIRC	5508X			UNK	UNK	CIRC	9451X	4.39	3.1	150	VC	CIRC						
1054X	3.99	3.06	300	VC	CIRC	620WX			600	DI	CIRC	9501X	4.05	-0.9	300	VC	CIRC						
1055X	3.92	1.33	600	CP	CIRC	6251X	2.61	0.01	875	CP	CIRC	9552X	3.98	2.78	225	VC	CIRC						
1101X	3.08	0.89	OTHER	BAC	CIRC	6252X	2.47		675	CP	CIRC												
1151X	2.89	0.51	525	CP	CIRC	6301X	2.56	0.29	150	VC	CIRC												
1152X	3.05	0.4	525	CP	CIRC	8401X	2.01	-1.97	525	CI	CIRC												
1301X	4.89	0.14	525	CI	CIRC	8501X	1.81	0.24	175	VC	CIRC												
1302X	4.32	0.3	525	CI	CIRC	8502X	1.82	0.26	175	VC	CIRC												
1401X	5.14	-0.16	525	CI	CIRC	8503X	1.8	0.38	175	VC	CIRC												
1402X	5.1	-0.01	525	CI	CIRC	8504X	1.85	0.71	175	VC	CIRC												
2051X	4.55	0.84	600	CP	CIRC	8551X	2.09	0.72	225	CP	CIRC												
2052X	2.5	1.22	600	CP	CIRC	8552X	1.84	0.66	225	CP	CIRC												
2053X	2.45	0.85	600	CP	CIRC	8553X	1.8	0.14	225	CI	CIRC												
2101X	2.63	1.59	150	VC	CIRC	7201X	3	0.38	300	CP	CIRC												
2151X	2.63	1.73	300	VC	CIRC	7202X	3.11	1.35	150	VC	CIRC												
2152X	1.86	0.22	525	CP	CIRC	7203X	3.32	0.45	300	CP	CIRC												
2153X	2.16	0.34	525	CP	CIRC	7204X	3.12	0.8	150	VC	CIRC												
2501X	4.07	-0.37	525	CI	CIRC	7205X	2.38	0.68	300	CP	CIRC												
2502X	4.69	-0.27	525	CI	CIRC	7251X	3.07	1.1	300	VC	CIRC												
255EX			300	VC	CIRC	7252X	3.1	0.9	875	CP	CIRC												
3102X		-0.51	375	VC	CIRC	7253X	2.39	0.06	875	CP	CIRC												
3152X	1.72	0.14	525	CP	CIRC	7401X	1.98	-1.8	525	CI	CIRC												
3153X	2.34	0.6	600	CP	CIRC	7402X	2.1	-0.16	175	VC	CIRC												
3154X	2.45	0.8	600	CP	CIRC	7451X	2.07	0.87	225	CP	CIRC												
3155X	1.9	0.18	675	CP	CIRC	7452X	2.3	0.98	225	CP	CIRC												
3201X	1.85	-0.88	375	CP	CIRC	7502X	2.12	0.07	175	VC	CIRC												
3205X			375	CP	CIRC	7551X	1.78	0.34	300	VC	CIRC												
3206X			375	CP	CIRC	8201X	3.91	2.16	150	VC	CIRC												
3207X			375	CP	CIRC	8202X			150	VC	CIRC												
3208X			375	CP	CIRC	8202X			150	VC	CIRC												
3251X	1.78	-0.12	875	CP	CIRC	8203X			150	VC	CIRC												
3252X	1.91	0.1	875	CP	CIRC	8210X			150	VC	CIRC												
3253X	1.91	0.06	875	CP	CIRC	8301X	2.82	0.13	300	CP	CIRC												
3301X	1.94	-0.53	300	CP	CIRC	8302X	2.96	1.09	150	VC	CIRC												
3302X	1.97	-1.1	375	CP	CIRC	8303X	3.01	0.27	300	CP	CIRC												
3401X	2.59	-0.55	450	CI	CIRC	8304X	2.92	1.29	150	VC	CIRC												
3402X	2.53	-1.75	750	CI	CIRC	8309X	2.83	1.26	150	VC	CIRC												
3403X	2.96	-1.6	750	CI	CIRC	8351X	2.81	1.36	300	VC	CIRC												
3404X	2.84	-0.49	600	CI	CIRC	8352X	2.91	1.21	300	VC	CIRC												
3405X	2.45	-1.38	375	CP	CIRC	8401X	2.27	-1.28	300	VC	CIRC												
3452X	2.68	1.37	OTHER	VC	CIRC	8402X	2.49	-1.27	300	VC	CIRC												
3502X	2.942	-0.286	600	CI	CIRC	8403X	2.8	-1.37	300	VC	CIRC												
3552X	3.51	2.43	300	VC	CIRC	8404X	3.25	-1.4	300	VC	CIRC												
3553X	2.99	1.86	300	VC	CIRC	8405X	2.93	-1.75	525	CI	CIRC												
4152X	2.62	0.12	800	CP	CIRC	8406X	3.99	3.05	150	VC	CIRC												
4153X	2.56	0.55	800	CP	CIRC	8407X	4.13	3.11	225	VC	CIRC												

LINE STYLES / COLOURS		MATERIALS		LEGEND - SEWERS	
Brown	.....	AK	Asbestos	.....	Wastewater treatment works
	.....	6AG	Decorated Asbestos Cement	.....	Manhole treatment works
	.....	6BG	Black (Common)	.....	Gravel headworks
	.....	6BE	Black (Engineering)	.....	Yard
Red	.....	6C	Concrete Box (Cast)	.....	Yard
	.....	CI	Ciased iron	.....	Yard
	.....	CC	Concrete (Pre-Cast)	.....	Yard
	.....	CP	Cast Iron	.....	Yard
Orange	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
Dark Blue	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
Purple	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
Light Blue	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
Yellow	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
Green	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard
	.....	CP	Cast Iron	.....	Yard

Drawn by: goswama

Title: 97799 Butlins Resort

Date: 25/02/2010



ARJUN DISTRICT COUNCIL: BR/292/20/PL

99559



98981

483577

SZ9499SW

Title: 97799 Butlins Resort

Scale: 1:2500

Date: 25/02/2010

WARNING: SAC pipes are constructed of Bonded Asbestos Cement
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement

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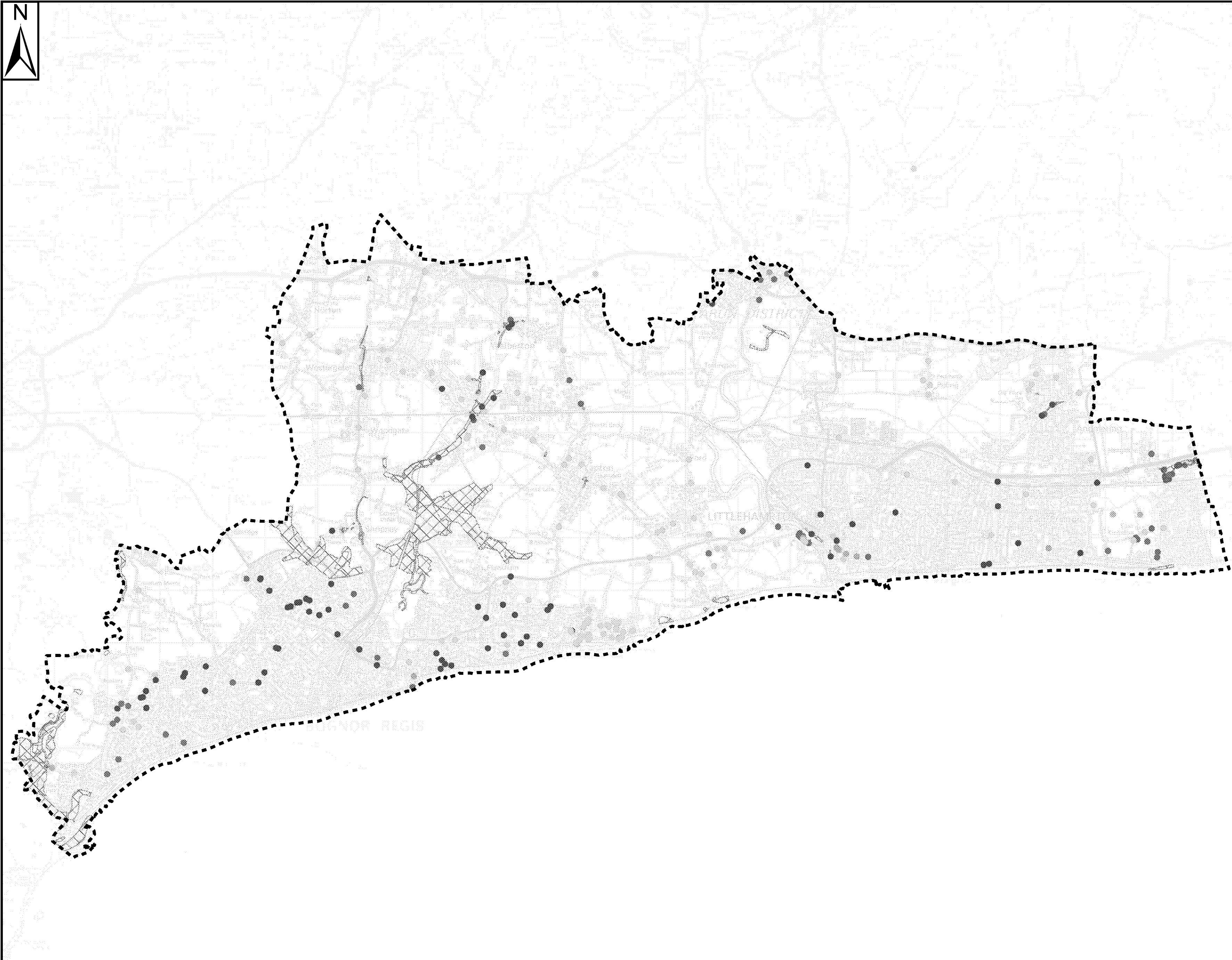


Southern
Water

2025/03/26

4.0 Appendix D – Not used

5.0 Appendix E – SFRA extracts



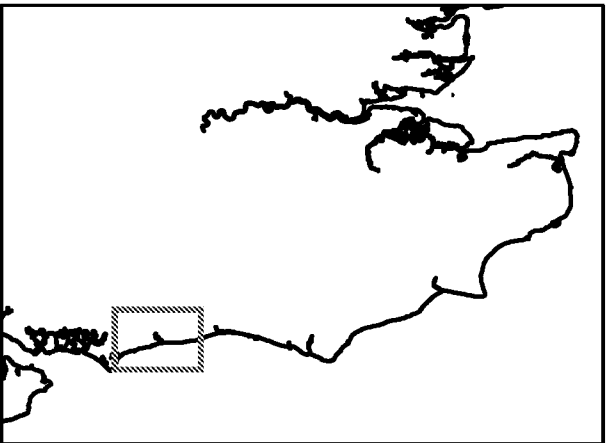
Notes

The Historic Flooding Map shows the recorded incidents and flood outlines provided by Arun District Council, West Sussex County Council, Southern Water and Environment Agency. Historical flood extent was obtained from the Environment Agency.

Flooding incidents provided have been categorised based upon the details provided in the records. Unknown flood points could not be determined from the information provided, and therefore could be from a number of sources.

Please note that not all historical records may be shown on this map, and that it is therefore advised you contact Arun District Council for updated information post 2015.

Key Plan



Legend

- Arun District SFRA boundary
- Historic flood outline

Source of flooding

- Fluvial
- Coastal
- Tidal
- Surface Water
- Failure
- Unknown

REF	Date	Comments
A	June 2016	-

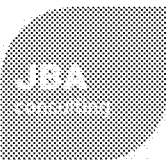


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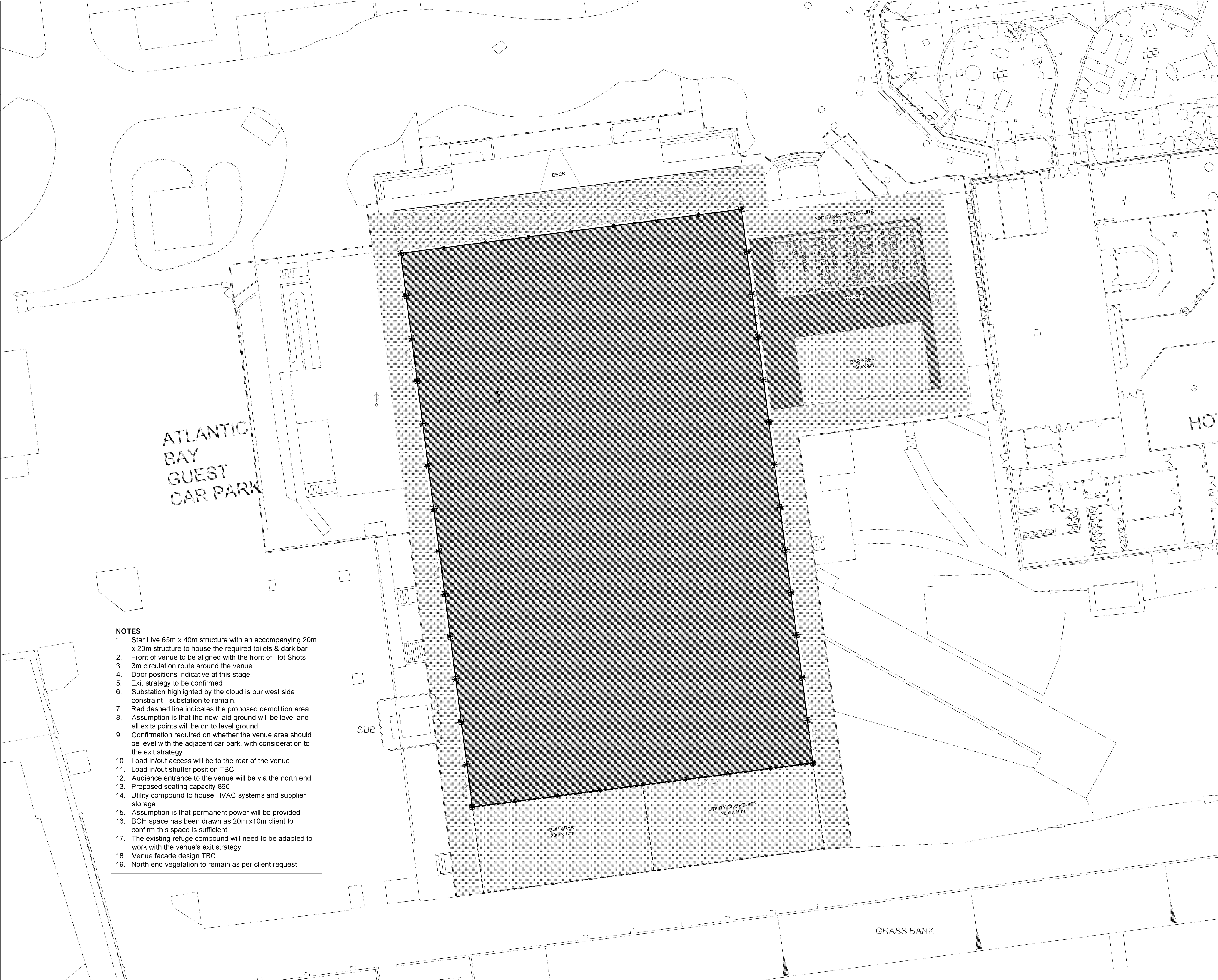
ARUN DISTRICT COUNCIL

SFRA: APPENDIX H
HISTORIC FLOOD RECORDS

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6.0 Appendix F – Drawings



NOTES

1. Star Live 65m x 40m structure with an accompanying 20m x 20m structure to house the required toilets & dark bar
2. Front of venue to be aligned with the front of Hot Shots
3. 3m circulation route around the venue
4. Door positions indicative at this stage
5. Exit strategy to be confirmed
6. Substation highlighted by the cloud is our west side constraint - substation to remain.
7. Red dashed line indicates the proposed demolition area.
8. Assumption is that the new-laid ground will be level and all exits points will be on to level ground
9. Confirmation required on whether the venue area should be level with the adjacent car park, with consideration to the exit strategy
10. Load in/out access will be to the rear of the venue.
11. Load in/out shutter position TBC
12. Audience entrance to the venue will be via the north end
13. Proposed seating capacity 860
14. Utility compound to house HVAC systems and supplier storage
15. Assumption is that permanent power will be provided
16. BOH space has been drawn as 20m x 10m client to confirm this space is sufficient
17. The existing refuge compound will need to be adapted to work with the venue's exit strategy
18. Venue facade design TBC
19. North end vegetation to remain as per client request

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SAFETY, HEALTH, AND ENVIRONMENT INFORMATION

Based on the use of experienced and competent contractors working to an approved method statement unusual residual hazards / risks are identified as per the following symbols:

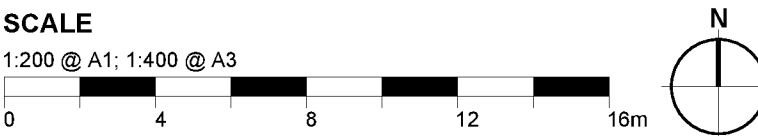
-  We use this symbol to give warning of significant hazards or information which is unusual
-  We use this symbol to encourage a particular action
-  We use this symbol when we want you to avoid something or refrain from a particular action
-  We use this symbol when we want to convey some relevant CDM information

The design team have highlighted unusual and significant risks only that may not be obvious to a competent contractor. They are to assist with risk reduction only and are not necessarily comprehensive.

PROJECT NOTES:

Please see adjacent notes 1-19

REV	DATE	DESCRIPTION	BY	CHKD
E	25/11/20	UPDATED	MS	CL
D	20/11/20	POOL LOCATION DRAFT	CL	EO
C	19/11/20	UPDATED	MS	CL
B	03/11/20	UPDATED	MS	CL
A	28/10/20	FIRST ISSUE	MS	CL



DRAWING STATUS

DRAFT ONLY

CLIENT

BOURNE LEISURE

PROJECT

2015 BUTLINS SEASON 2021

DRAWING TITLE

BLOCK PLAN

TEMPORARY VENUE - BOGNOR

SCALE @ A1	DRAWN	DATE	CHECKED	DATE
1:200	CL	25/11/20	CL	25/11/20

WOO Architects

Unit 5, The Piano Works, 113 - 117 Farringdon Road, London, EC1R 3BX
studio: +44 (0)207 965 7566 www.wilsonowensowens.com

DRAWING NO.

2015-WOO-BOG-00-DR-A-100

REVISION

E



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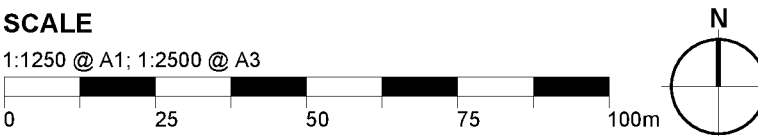
- We use this symbol to give warning of significant hazards or information which is unusual
- We use this symbol to encourage a particular action
- We use this symbol when we want you to avoid something or refrain from a particular action
- We use this symbol when we want to convey some relevant CDM information

The design team have highlighted unusual and significant risks only that may not be obvious to a competent contractor. They are to assist with risk reduction only and are not necessarily comprehensive.

PROJECT NOTES:

Trackway/ Foundation design to be confirmed.

REV	DATE	DESCRIPTION	BY	CHKD
C	27/11/20	UPDATED	MS	CL
B	03/11/20	UPDATED	MS	CL
A	28/10/20	FIRST ISSUE	MS	CL



DRAWING STATUS

DRAFT ONLY

CLIENT

BOURNE LEISURE

PROJECT

2015 BUTLINS SEASON 2021

DRAWING TITLE

SITE PLAN

TEMPORARY VENUE - BOGNOR

SCALE @ A1	DRAWN	DATE	CHECKED	DATE
1:1250	MS	27/11/20	CL	27/11/20

WOO Architects

Unit 5, The Piano Works, 113 - 117 Farringdon Road, London, EC1R 3BX
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DRAWING NO.

2015-WOO-BOG-00-DR-A-001

REVISION

D

7.0 Appendix G – Calculations

Rural Runoff Calculator

ICP SUDS

ICP SUDS Input (FSR Method)

Return Period (Years):

Area (ha):

SAAR (mm):

Soil:

Growth Curve:

Partly Urbanised Catchment (QBAR)

Urban:

Region:

Results

QBAR rural (l/s):

QBAR urban (l/s):

Return Period Flood

	Region	QBAR (l/s)	Q (100 yrs) (l/s)	Q (1 yrs) (l/s)	Q (30 yrs) (l/s)	Q (100 yrs) (l/s)
IH 124						
ICP SUDS	Region 1	1.5	3.7	1.3	2.8	3.7
ADAS 345	Region 2	1.5	3.9	1.3	2.8	3.9
FEH	Region 3	1.5	3.1	1.3	2.6	3.1
ReFH2	Region 4	1.5	3.8	1.2	2.9	3.8
Greenfield Volume	Region 5	1.5	5.3	1.3	3.6	5.3
Greenfield Volume (ReFH2)	Region 6/Region 7	1.5	4.7	1.3	3.4	4.7
	Region 8	1.5	3.6	1.2	2.8	3.6
	Region 9	1.5	3.2	1.3	2.6	3.2
	Region 10	1.5	3.1	1.3	2.5	3.1

OK Cancel Help

Enter Return Period between 1 and 1000