CampbellReith
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Land West of Park Farm, Selsey

Flood Risk Assessment

LANDLINK ESTATES

For:
Landlink Estates Limited

Project Number: 13776

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Contents

Appendices

Tables

Figures

EXECUTIVE SUMMARY

This Flood Risk Assessment has been prepared in accordance with the National Planning Policy Framework (NPPF, 2021) to inform the feasibility of residential development at Land West of Park Farm, Selsey, herein referred to as the 'site'. The total site area is 16.8 hectares (Ha).

The Client's aim is to prepare representations ready for responding to the revised Local Plan and to inform the illustrative masterplan. As part of the Local Plan the site should form part of a Sequential Test (if required) undertaken by the Local Planning Authority (LPA) and supported by an updated Strategic Flood Risk Assessment (SFRA).

The site area is an approximately rectangular-shaped parcel of undeveloped, agricultural land which comprises hedgerow boundaries. The north and eastern sections of the Site are bound by Chichester Road. The southern boundary comprises of a section of residential development. To the west of the site boundary lies further agricultural fields.

No buildings are located within the site, however, there is site access from an existing spur off the roundabout on the B2145.

There is an ordinary watercourse that flows from north to south along the sites western boundary. Adjacent to the south-western corner of the site the watercourse turns western wards and flows away from the site towards Broad Rife. This watercourse is to be retained and enhanced where possible.

The site is located fully within the extents of Flood Zone 1 and is therefore considered at low risk of fluvial flooding. Climate change considerations does not change the status of the flood risk for this site.

Small areas of low risk of surface water flooding have been identified onsite. These areas are likely localised low spots in the sites topography and as such the overall risk of surface water flooding to the site is considered low.

Groundwater monitoring is being undertaken, which could be used to inform future detail design. Where there is a risk for shallow groundwater flood risk, development should be steered away.

The site is considered to be at low risk of all other sources of flooding as assessed in this report.

Future development will increase the impermeable area and therefore will increase the surface water runoff volume from the site. To minimise the risk of flooding to and from the development a robust surface water drainage strategy incorporating sustainable drainage systems (SuDS) should be considered to manage and mitigate any surface water runoff and volume generated from the proposed development.

Discharging to the existing watercourse is considered most suitable method of surface water disposal for this site, in accordance with the SuDS hierarchy.

Based upon the information available at the time of preparing this report, CampbellReith consider the site suitable for residential development, in accordance with National Planning Policy Framework.

1.0 INTRODUCTION

1.1. Brief

1.1.1. CampbellReith has been commissioned by Landlink Estates to prepare a Flood Risk Assessment (FRA) in accordance with the National Planning Policy Framework, to inform the allocation of land west of Park Farm, herein referred to as 'the site'.

1.1.2. The Client's aim is to prepare representations ready for responding to the Local Plan and to inform the illustrative masterplan. The aim of this report is to assess the flood risks associated with the site and advise on the feasibility of future residential development.

1.1.3. This assessment is a qualitative report and has been based on readily available information.

1.2. Proposed Development

1.2.1. The site is located in the northern end of Selsey and is being promoted as part of the council's commitment to deliver new housing. The intention is to seek an allocation for approximately 275 dwellings with associated infrastructure such as roads and landscaping for this site. Furthermore, allowance would be made for allotments and a biodiversity improvement area which offer further utility and environmental enhancement.

1.3. Aims and Objectives

1.3.1. This FRA aims to identify the sources of flooding related to the site whilst demonstrating the feasibility of future residential development and how residual risks could be managed.

1.3.2. The objectives of this FRA are to establish:

- Whether the site is likely to be affected by current or future flooding from any source;
- Whether proposed future development will increase flood risk elsewhere;
- Whether the measures proposed to deal with these effects and risks are appropriate;
- The evidence to satisfy the Local Planning Authority's (LPA) (if necessary) Sequential Test, and;
- Present the findings of the assessment through an indicative land use strategy highlighting constraints and possible flood mitigation (if required).

2.0 PLANNING POLICY AND GUIDANCE

2.1. National Planning Policy Framework (NPPF)

2.1.1. The NPPF as updated in July 2021 sets out the government's national planning policies to protect people and property from flooding from either now or in the future which all Local Planning Authorities (LPAs) are expected to follow. There are three main steps which should be followed to ensure that the risk of flooding from development is minimised; assess the flood risk, avoid flood risk and manage and mitigate the flood risk.

2.1.2. The NPPF recommends that new development adopts a sequential, flood risk-based approach to the location of development, taking into account climate change and its impact to or by current or future flood risk. Subject to the type of development proposed and the relative flood zone (Zone 1 being the least risk and Zone 3b the greatest risk) in which the development site is located, there can be a requirement for a sequential test and an exception test.

2.1.3. The aim of the sequential test is to steer development to areas considered to be at the lowest risk from sources of flooding. If this is not possible then the exception test would be required demonstrating that the development would provide wider sustainability benefits to the community that would outweigh the flood risk and that the development would be safe for its lifetime taking into account the vulnerability of the users without increasing flood risk elsewhere and where possible reducing the current risk of flooding.

2.1.4. The NPPF also states that major developments should incorporate sustainable drainage systems (SuDS) unless there is clear evidence that this would be inappropriate.

2.2. Flood Risk and Coastal Change Planning Practice Guidance (PPG)

2.2.1. A FRA is required when developments are:

- Located within a Flood Zone 2 or 3 including minor development and change of use;
- More than 1 hectare (ha) in a Flood Zone 1;
- Less than 1 ha in a Flood Zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and sea (for example surface water, reservoirs); or
- In an area within a Flood Zone 1 which has critical drainage problems as notified by the Environment Agency (EA).

2.2.2. Paragraph 66 (Table 2) of the PPG defines the various flood risk vulnerability classification and identifies the different types of development within each category. Table 2.1 on the following page summarises the flood risk vulnerability and compatibility as extracted from Paragraph 67 of the PPG in relation to the above flood zones.

Table 2.1: Flood Vulnerability and Flood Zone Compatibility Table

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	**Highly Vulnerable**	**More Vulnerable**	**Less Vulnerable**	**Water Compatible**
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test Required	✓	✓	✓
Zone 3a†	Exception Test required†	×	Exception Test Required	✓	✓
Zone 3b*	Exception Test required*	×	×	×	✓*

Key ✓Development is appropriate.

× Development should not be permitted.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

2.3. Climate Change

2.3.1. The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. The EA provide guidance on the climate change allowances which should be considered when assessing the future risk of flooding.

2.3.2. EA has produced a range of climate change allowances to be applied to the peak river flow based upon the river basin district catchment. The site is located within the Arun and Western Management Catchment. Table 2.2 shows the anticipated changes to peak flow which should be considered for the area.

2.3.3. The range of allowances is based upon a statistical analysis above the 50th percentile which is regarded as being the central category. The higher central is based upon the 70th percentile and the upper end is based on the 90th percentile.

Table 2.2: Peak River flow allowances for Arun and Western Management Catchment

Allowance Category	Total Potential Change Anticipated For The '2020s' (2015 to 2039)	Total Potential Change Anticipated For The '2050s' (2040 to 2069)	Total Potential Change Anticipated For The "2080s" (2070 to 2115)
Upper end	27%	36%	64%
Higher central	16%	19%	36%
Central	11%	13%	25%

2.3.4. Climate change allowances should be applied to the peak rainfall intensities. Table 2.3 shows the anticipated change in extreme rainfall intensity in small and urban catchments. The central and upper allowances should be to assess the range of impact.

Table 2.3: EA Peak Rainfall Intensities

Applies Across All Of England	Total Potential Change Anticipated For The '2020s' (2015 to 2039)	Total Potential Change Anticipated For The '2050s' (2040 to 2069)	Total Potential Change Anticipated For The "2080s" (2070 to 2115)
Upper End	10%	20%	40%
Central	5%	10%	20%

3.0 LOCAL POLICIES AND GUIDANCE

3.1.1. The following documents have been reviewed to inform this assessment:

- Chichester District Council, July 2015, Adopted Chichester Local Plan: Key Policies;
- Chichester District Council, December 2018, Strategic Flood Risk Assessment (SFRA);
- Environment Agency et al., 2006, Beachy Head to Selsey Bill Shoreline Management Plan (SMP);
- Environment Agency, 2009, Arun and Western Streams Catchment Flood Management Plan;
- West Sussex County Council, May 2011, Preliminary Flood Risk Assessment (PFRA);
- West Sussex County Council, July 2015, Manhood Peninsula Surface Water Management Plan (SWMP);
- West Sussex County Council, November 2018, West Sussex Lead Local Flood Authority (LLFA) Policy for the management of surface water;
- West Sussex County Council, 2017, Culvert Policy;
- West Sussex County Council, 2014, Local Flood Risk Management Strategy;
- West Sussex County Council, June 2012, Flood Investigation Report.
- Local Plan Revision which is expected early 2022.

3.2. Local Flood Risk Policy

3.2.1. The Chichester Local Plan: Key Policies provides the policy framework and long-term strategy to manage developments, delivering infrastructure, protecting the environment and promoting more sustainable communities. It attempts to balance the economic, social and environmental dimensions of sustainable development.

3.2.2. The following local policies should be considered when assessing flood risk and surface water management of the Site:

Flood Risk and Water Management Policy 42

Flood and erosion risk will be taken into account at all stages in the planning process to avoid inappropriate development in areas at current or future risk, and to direct development away from areas of highest risk.

Development in areas at risk of flooding as identified by the Environment Agency flood risk maps will be granted where all the following criteria are met:

1. *The proposal meets the sequential and exception test (where required) in relation to the National Planning Policy Framework;*
2. *A site-specific flood risk assessment demonstrates that the development will be safe, including the access and egress, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall;*
3. *The proposal incorporates specific requirements of the site, and protection, resilience and resistance measures appropriate to the character and biodiversity of the area;*

4. *Development would not result/exacerbate coastal squeeze of any European sites or prevent managed realignment that may be required to ensure no adverse effect on European sites as a result of coastal squeeze;*
5. *The scheme identifies adaptation and mitigation measures;*
6. *Appropriate flood warning and evacuation plans are in place; and*
7. *New site drainage systems are designed taking account of events which exceed the normal design standard i.e. consideration of flood flow routing and utilising temporary storage areas.*

All development will be required to ensure that, as a minimum, there is no net increase in surface water run-off. Priority should be given to incorporating Sustainable Drainage Systems (SuDS) to manage surface water drainage, unless it is proven that SuDS are not appropriate. Where SuDS are provided arrangements must be put in place for their whole life management and maintenance.

In locations where strategic flood defence or adaptation measures are necessary within the site itself, proposals will be required to demonstrate how measures have been incorporated as an intrinsic part of the scheme in a manner which meets the requirements to manage flood risk.

All development proposals must take account of relevant Surface Water Management Plans, South East River Basin Management Plan and Catchment Flood Management Plans and related flood defence plans and strategies. Financial contributions may be required from development on sites where measures to address flood risk or to improve the environmental quality of watercourses have been identified by these plans and strategies and in accordance with the overall objective of the Water Framework Directive.

The reports prepared as part of the criteria above must demonstrate that the development is safe and will not increase flood risk elsewhere; will reduce overall flood risk and take into account contingency allowances, addressing climate change as set out in the NPPF Technical Guidance and the relevant Shoreline Management Plans and Coastal Defence Strategy.

3.3. Strategic Flood Risk Assessment

3.3.1. A Level 1 SFRA was prepared by JBA Consulting for Chichester District Council commencing in June 2018 and completion December 2018. The following sources of flood risk were identified within the study area:

- Fluvial
- Tidal
- Surface Water
- Groundwater
- Sewer

3.3.2. The prominent source of flooding is stated in the SFRA as "*fluvial with a significant influence from groundwater and tidal conditions. More recently, surface water flooding across Local Plan areas have caused damage and disruption. Other recent events have highlighted that flooding has been associated with exceedance of the capacity of sewer networks and drainage systems*".

4.0 SITE CONTEXT

4.1. Site Location

4.1.1. The site is approximately 16.78 hectares and is centred at approximate National Grid Reference (NGR) 486007 094420, and the nearest postcode is PO20 0NL. The site is within an area of residential and agricultural land. The site is on a low lying area of land in close proximity to the English Channel.

4.1.2. Chichester District Council (CDC) is the Local Planning Authority (LPA) for the site and West Sussex County Council (WSCC) act as the LLFA for the area.

4.1.3. The site area is an approximately rectangular-shaped parcel of undeveloped, agricultural land which comprises hedgerow boundaries. The north and eastern sections of the Site are bound by Chichester Road. The southern boundary comprises of a section of residential development. To the west of the site boundary lies further agricultural fields.

4.1.4. No existing buildings are located within the site, however, there is site access in the south-east corner from an existing spur off the roundabout on the B2145.

Figure 4.1: Land West of Park Farm Site Boundary

4.2. Topography

4.2.1. Lidar data has been obtained as part of this assessment showing levels falling on the site from north-east to south-west, see Figure 4.2.

4.2.2. The site is has a north-east to south-west orientation and covers an area of 16.8ha. The topography falls from around 8.5m AOD on the eastern side to approximately 5.3m AOD in the north-western corner. An ordinary watercourse runs along the western edge of the red line boundary. To the north-west of the watercourse ground levels are relatively flat.

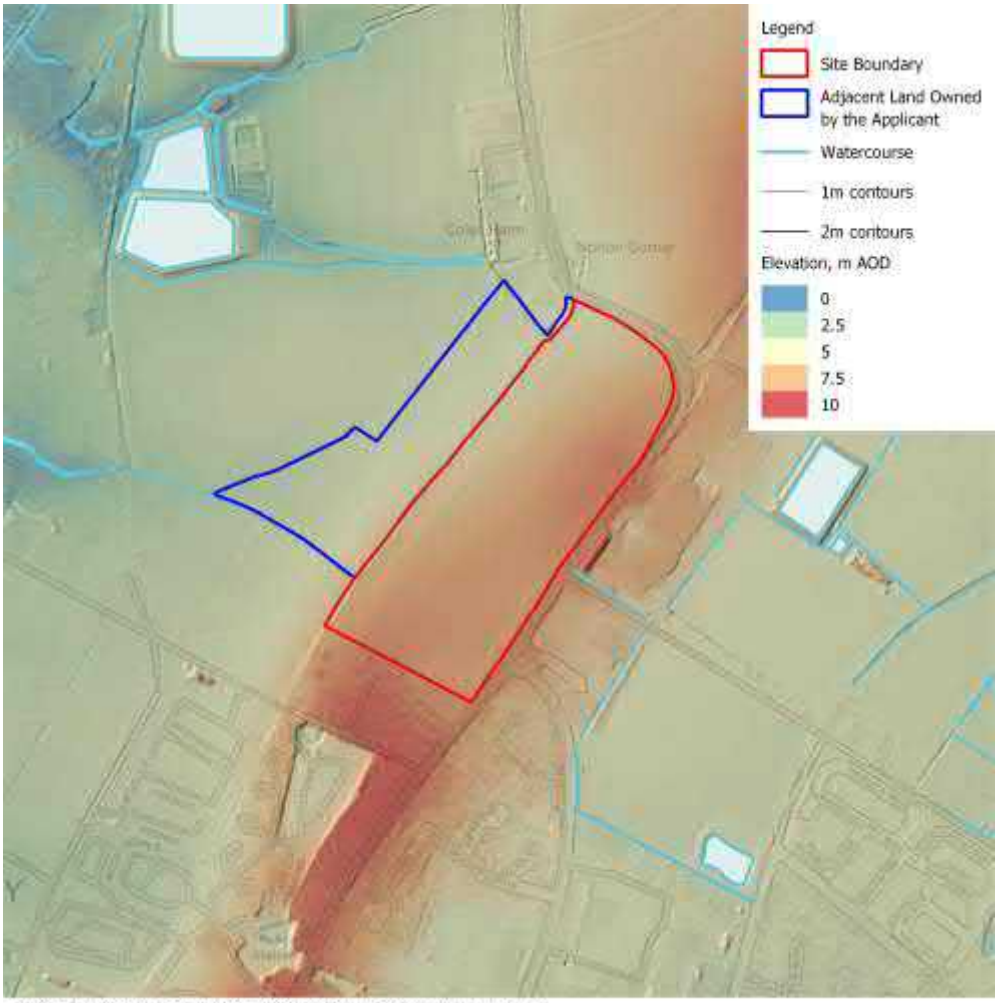

Figure 4.2: Lidar information for the site and surrounding area

4.3. Geology

4.3.1. The Groundsure report[1] indicates the majority of the site is underlain by River Terrace Deposits of silt with two areas of Raised Beach deposits at the south-west corner and the eastern side towards the north of the site. Review of the British Geological Survey's (BGS) Geoindex[2] indicates the area also comprises Brickearth and Alluvium.

[1] Groundsure report, reference: CAR1-8281482, date: 21/10/2021
[2] British Geological Survey (BGS) Online Geology http://mapapps.bgs.ac.uk/geologyofbritain/home.html
[3] Ground Investigation Factual Report by Harrison Geotechnical Engineering, reference: GL24781, date: December 2021

4.3.2. The British Geological Survey (BGS) Online Geology Viewer[2] notes the underlying bedrock for the site as the Bracklesham Group and the Barton Group which comprises the Earnley Formation of sand, clay and glauconitic (comprised of the sea floor forming mineral glauconite) sand and the Marsh Farm Formation of sand, mud and lignite. The Farnley Formation is located in the northern part of the site and the overlying Marsh Farm towards the southern part and notes the superficial deposits as River Terrace Deposits/ Brickearth, clay silt and sand and raised storm beach deposits of sand and gravel. The onsite geology was confirmed by a Ground Investigation carried out by Harrison Geotechnical Engineering[3].

4.4. Hydrology

4.4.1. There is an ordinary watercourse that broadly flows from south to north along the western extent of the red line boundary. From the south-western and north-western corners of the site the watercourse flows west towards the Broad Rife.

4.4.2. The English Channel is located approximately 1.05km east of the site boundary.

4.5. Hydrogeology

4.5.1. The site is situated above Secondary A Aquifer. The superficial deposits are classified as a Secondary A Aquifer. The groundwater vulnerability for the site is Moderate.

4.5.2. Ground investigation carried out by Harrison Geotechnical Engineering included groundwater monitoring at six locations across the site. Four groundwater level monitoring records have been completed between the months of November 2021 and January 2022, with groundwater monitoring continuing throughout the winter up to and including April 2022. The depths of the monitoring holes ranged from 1.24 to 2.92 metres below ground level (m bgl). The results showed inconsistent groundwater levels during the monitoring period, with most of the locations giving dry (no groundwater) results. The peak level recorded was during the final set of recordings in the northern area of the site at 0.64m bgl.

4.5.3. Infiltration testing was undertaken to BRE365 at three test locations. No difference in water levels was recorded over a three hour period for each of the locations and the tests abandoned.

4.6. Environmental Designation

4.6.1. The site is not located within a statutory environmental designation.

4.7. Existing Drainage

4.7.1. As previously mentioned, the site is greenfield in nature, as such surface water runoff flows across the site's natural topography from east to west towards the existing ordinary watercourse.

4.7.2. Table 4.1 below summarises the greenfield runoff rates for the site. Details of the greenfield runoff calculations are attached in Appendix C, these calculations give the greenfield rate per hectare.

Table 4.1: Greenfield Runoff Rates

Storm Event	Greenfield Runoff Rate (litres/sec/ha)	Site Area (ha)	Greenfield Runoff Rate (litres/sec)
1 in 1 Year	2.34	* 16.8	39.31
1 in 30 Year	6.34	* 16.8	106.51
1 in 100 Year	8.80	* 16.8	147.84
QBar	2.76	* 16.8	46.36

5.0 ASSESSMENT OF EXISTING FLOOD RISK TO THE SITE

5.1. Flood Zones

5.1.1. The EA define[4] Flood Zones from rivers or the sea as follows:

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

5.2. Fluvial Flooding

5.2.1. The EA's Flood Map for Planning shows that the proposed developed area of the site is located entirely within the extent of Flood Zone 1 and is therefore, at low risk of fluvial. All development types are considered acceptable within the extents of Flood Zone 1.

[4] Environment Agency & DEFRA (2014) Flood Zone Definition: https://www.gov.uk/guidance/flood-risk-and-coastal-change#flood-zone-and-flood-risk-tables

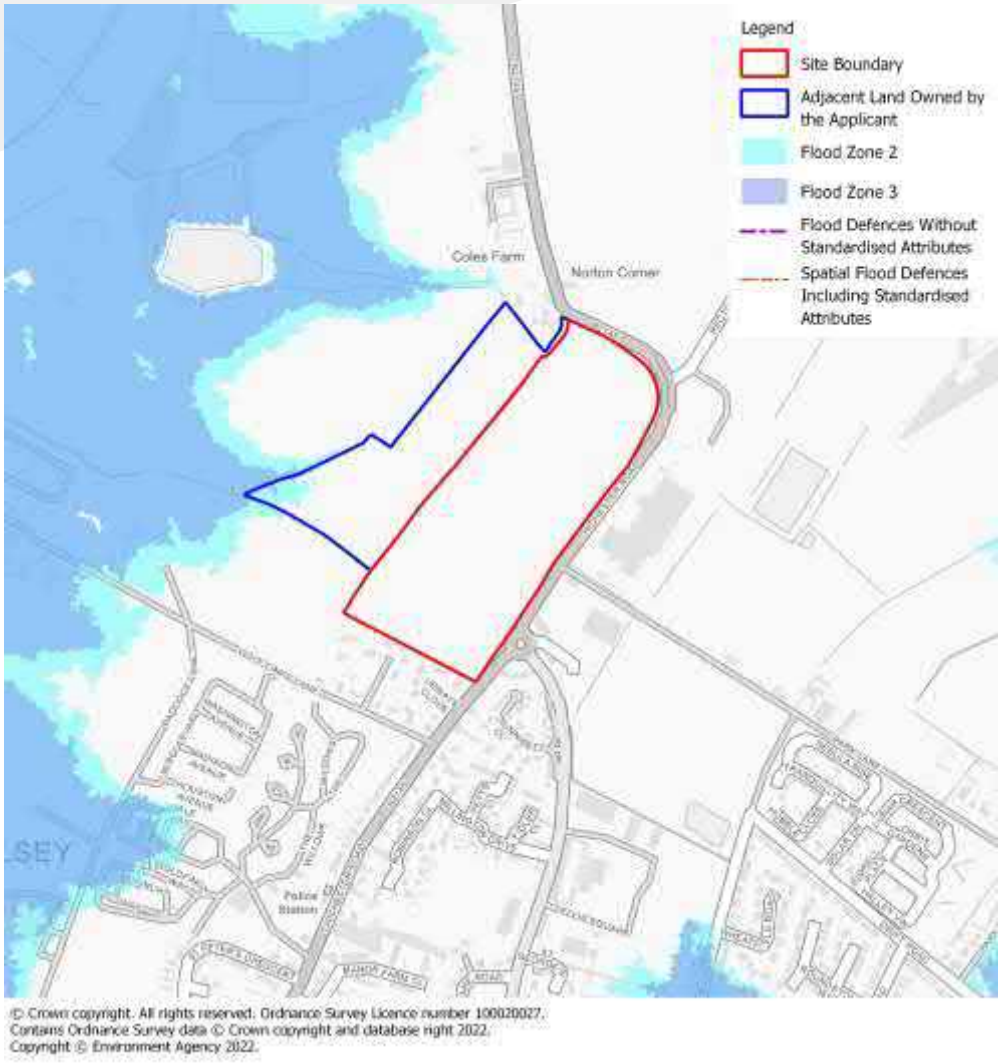

Figure 5.2: EA Flood Map for Planning

5.3. Tidal Flooding

5.3.1. The site is located approximately 1.05km inland from the English Channel and is entirely within Flood Zone 1 of the EA's Flood Map for Planning. Therefore, the site is considered at low risk of Tidal related flooding.

5.3.2. The area is shown to benefit from local flood defences along the coastline and along the Broad Rife.

5.4. Surface Water Flooding

5.4.1. The EA classify surface water flood risk as follows:

- VERY LOW – the area has a chance of surface water flooding of less than 0.1%
- LOW – the area has a chance of surface water flooding of between 0.1% and 1%
- MEDIUM – the area has a chance of surface water flooding of between 1% and 3.3%
- HIGH - the area has a chance of surface water flooding of greater than 3.3%

5.4.2. The EA's Risk of Flooding from Surface Water (RoFSW) map shows that the majority of the site is at very low risk of surface water related flooding. There are isolated areas in the south-east of

the site which are at low risk of surface water flooding. These areas are likely localised depressions/low spots in the site's topography.

5.4.3. Surface water flood risk is therefore considered low for the site.

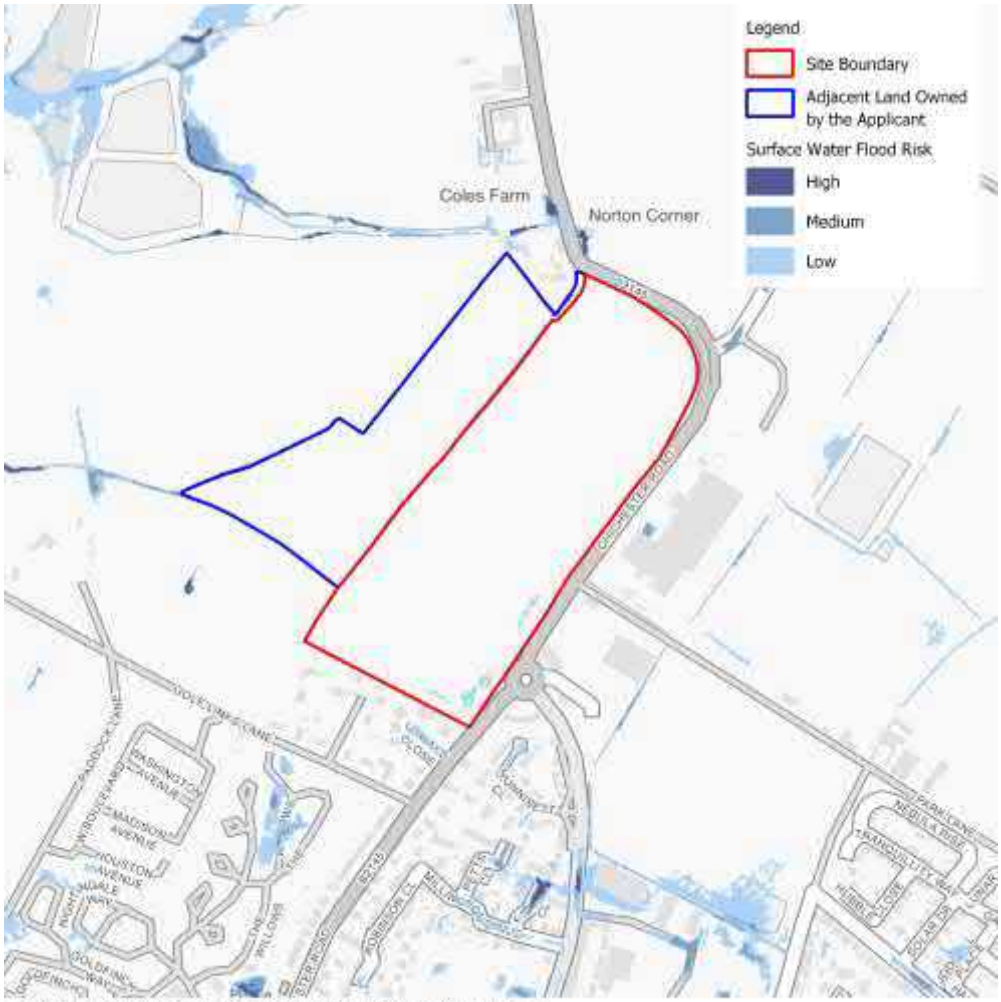

Figure 5.1: EA Updated Flood Map for Surface Water

5.5. Groundwater Flooding

5.5.1. The groundwater flooding vulnerability map from the Groundsure report indicates that the site is primarily at moderate risk of flood from groundwater.

5.5.2. The BGS data and Ground Investigation works show that the site is underlain by a mix of clay, sands and gravels. At time of writing, winter groundwater monitoring is still underway for the site. From available data to date, the northern area of the site was found to have the highest groundwater level recorded at 0.64m bgl. However, groundwater monitoring results across the site were inconsistent and commonly the boreholes were found to be dry.

5.5.3. The site specific testing has shown that the groundwater present across the site is inconsistent in terms of depth. Although, due to the potential for pockets of shallow groundwater across the site the overall risk is considered medium.

5.5.4. Development onsite should be steered away from areas where shallow groundwater has been encountered.

5.6. Sewer Flooding

5.6.1. The 2018 Level 1 SFRA for Chichester District Council outlines that, according to the DG5 register from Southern Water (the local sewer authority) between August 2013 and February 2017 there were a total of five sewer related flooding incidents in the same post code area as the site.

5.6.2. Due to the low number of sewer related flood incidents in the area (as per the SFRA) and the Greenfield nature of the site, the risk of sewer flooding is considered low.

5.6.3. The risk of sewer flooding for the proposed development site is subject to review of the local asset records.

5.7. Flooding from Reservoirs

5.7.1. Information available from the EA for risk of inundation from reservoirs indicates that the site is not at risk.

5.8. Climate Change Impact

5.8.1. The site lies within the south western river basin catchment and the climate change allowances have previously been detailed in Table 2.2 and Table 2.3.

5.8.2. Climate change must be considered as an integral part of any site specific FRA in order to minimise the impact of future flooding and allow adequate consideration for resilience to alleviate the burden on potential future users of the proposed development.

5.8.3. Review of available climate change flood information shows the site remains in Flood Zone 1 for both the defended and undefended scenarios.

5.8.4. The area of land shown in blue, potentially could be affected in an undefended scenario when considering impact of climate change. However that part of the site is indicated to be used for water compatible features only.

5.9. Watercourse Constraints

5.9.1. CDC guidance suggests that no trees or permanent structures are to be located close to watercourses and that a 3m maintenance margin is to be provided to watercourses. Rear gardens and permeable structures such as open fences are considered acceptable within this area.

5.9.2. The existing ordinary watercourse should be retained to minimise the risk of flooding to the proposed development and where possible enhanced via the use of SuDS and landscaping. This could assist with improvement to the biodiversity value of the area.

5.10. Surface Water Management

5.10.1. The increase in surface water runoff and volume resulting from an increase in impermeable areas must be managed and mitigated in order to prevent the increase of surface water flooding both on and off site.

5.10.2. In line with the SuDS hierarchy, surface water should be managed by:

1.) Infiltration to the maximum extent that is practical – where it is safe and acceptable to do so

2.) Discharge to watercourses

3.) Discharge to surface water sewer, highway drain or another drainage system

4.) Discharge to combined sewers (last resort)

5.10.3. The greenfield runoff rate for the site is described in Table 4.1. Qbar has been estimated for the total site area as 46.36 litres/second (2.76 l/s/ha).

Infiltration

5.10.4. Groundwater monitoring carried out onsite showed a variable presence and level of groundwater across the site. The shallowest level recorded was in the northern area at 0.64m bgl, other groundwater levels across the site during the monitoring period ranged from 0.80 to 2.69m bgl.

5.10.5. During the intrusive works carried out by Harrison Group Environmental soakage testing was carried out in three locations across the site at depths ranging from 1.8 to 2.3m bgl. All three tests were carried out for a period of three hours during which the water level did not change in all three pits. Therefore, an infiltration rate could not be calculated in all three locations, as such discharging surface water via shallow infiltration is not likely to be viable.

5.10.6. Taking account of the surface water discharge hierarchy, accordingly discharging to the adjoining watercourse is considered appropriate and compliant with the hierarchy.

Watercourses

5.10.7. As previously noted an ordinary watercourse flows broadly south to north along the sites western boundary. According to the wider LiDAR data for the area the existing land generally falls towards this watercourse and thus it is likely that surface water runoff from the existing site drains into this watercourse. It is recommended that this watercourse is retained when considering future development. If disposal via infiltration is not considered feasible following further ground investigation and infiltration testing then the development should consider discharging to this ordinary watercourse. Outfalls into the watercourses will be subject to approval from the Local Land Drainage Authority.

5.10.8. As a greenfield site, discharge to the watercourse would have to be restricted to Qbar rates as outlined in the LFFA guidance.

5.10.9. A conservative assessment has been undertaken to understand the approximate surface water storage volume required. For the purpose of initial appraisal, assuming that 70% of the developable space is covered with hard standing/built upon, then for the 1in100 year +40% climate change event, a storage volume of approximately 6,620m^3 would be required. Calculations are shown in Appendix F.

5.10.10. To assist with the evolution of the land use strategy and high level masterplan, assuming a storage depth of 1m within a basin, this would equate to an area of approximately 6,620m^2.

5.10.11. Any drainage component considered within the proposed development must account for climate change. EA currently recommends using a climate change allowance of 40% for the peak rainfall intensities and this will have to be verified when undertaking a site specific FRA for the site.

5.11. Water Quality

5.11.1. The treatment of surface water runoff is particularly important for the ordinary watercourse as the watercourse discharges into Broad Rife, which eventually discharges into the English Channel.

5.11.2. The C753 SuDS Manual defines the 'SuDS Management Train' as the sequence of drainage components that collectively provide the necessary processes to control the frequency of runoff, the flow rates and the volumes of runoff, and to reduce concentrations of contaminants to acceptable levels. Table 5.1 lists different SuDS systems and their functions which could be appropriate for the site.

Table 5.1: SuDS Systems and their functions

System	Function
Rainwater Harvesting Systems	Components that capture rainwater and facilitate its use within the building or local environment
Pervious Surfacing Systems	Structural surfaces that allow water to penetrate, thus reducing the proportion of runoff that is conveyed to the drainage system, e.g. green roofs, pervious paving. Many of these systems also include some subsurface storage and treatment.
Infiltration Systems	Components that facilitate the infiltration of water into the ground. These often include temporary storage zones to accommodate runoff volumes before slow release to the soil.
Conveyance Systems	Components that convey flows to downstream storage systems. Where possible, these systems also provide flow and volume control and treatment, e.g. swales.
Storage Systems	Components that control the flows and, where possible, volumes of runoff being discharged from the site, by storing water and releasing it slowly (attenuation). These systems may also provide further treatment of the runoff, e.g. ponds, wetlands and detention basins.
Treatment Systems	Components that remove or facilitate the degradation of contaminants present in the runoff.

5.11.3. SuDS provide natural variability in their ability to remove contamination which drains across a site. The management of water quality is founded on a risk-based approach. The risk-based approach is usually facilitated by the inclusion of different SuDS treatment stages with a number of components in a series providing a range of treatment processes delivering gradual improvement in water quality and an environmental buffer for accidental spills or unexpected high pollutant loadings from the site.

5.11.4. The range of treatment process that can be exploited within a design of a sustainable drainage system include; sedimentation, filtration and bio-filtration, separation, absorption, bio-degradation, volatilisation, precipitation, hydrolysis, oxidation, reduction and substitution plant uptake and photolysis. The level of treatment is strongly related to the velocity control and the retention time.

5.11.5. At this stage a simple index approach to water quality risk management can be adopted. Each pollution hazard level has individual pollution hazard indices as shown in Table 5.2 below. Future development is considering a predominantly residential development which identifies with a low pollution hazard level.

Table 5.2: CIRIA (2015) Pollution Hazard Indices for Different Land Use Classifications

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro-carbons
Residential Roofs	Very Low	0.2	0.2	0.05
Commercial/Industrial Roofs	Low	0.3	0.2	0.05
Individual property driveways, residential car parks, low traffic roads, car parks with infrequent change	Low	0.5	0.4	0.4

5.11.6. Table 5.3 below summarises the treatment efficiency of different SuDS components as detailed in Chapter 26 of the SuDS Manual (CIRIA Report C753).

Table 5.3: CIRIA Indicative SuDS Mitigation Indices for Discharges to Surface Waters

Type of SuDS Component	Total Suspended Solids (TSS)	Mitigation Indices	
		Metals	Hydro-carbons
Filter Strip	0.4	0.4	0.5
Filter Drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Bio-retention System	0.8	0.8	0.8
Permeable Pavement	0.7	0.6	0.7
Detention Basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8

5.11.7. Water quality is an important consideration for future drainage strategies as the surface water runoff, whether it be infiltration or to a surface water body. Treatment stages can be developed during detailed design.

5.12. Foul Water

5.12.1. Southern Water is the incumbent sewerage authority for the area.

5.12.2. A review of the Southern Water asset information notes that the nearest public foul sewer is in Manor Road. There is a 225mm diameter foul sewer shown close to the junction of Hunnisett Close with Manor Road approximately 175m to the south-east. The site falls within the catchment of the Sidelesham Sewage Treatment Works located approximately 1.50km to the north-west of the site[2].

5.12.3. A preliminary review of site levels suggest that an onsite foul water pumping station may be required to enable a connection to the Southern Water network at the nearest connection point.

5.12.4. Initial calculations based on potential for up to 275 dwellings on the site suggest that a peak flow rate of up to 12.7 l/s may be generated. Under normal gravity conditions a pipe of 150 mm diameter would be sufficient to convey this flow when laid at typical gradients.

5.12.5. Under Section 106 of the Water Industry Act (1991), developers have a statutory right to connect new sewers to existing public sewers and sewerage undertakers do not have the ability to refuse a connection on the grounds of capacity in the local sewerage network and/or sewage treatment works[3]. Under The Act, Southern Water have an obligation to provide necessary network upgrades to facilitate development of the site at no additional cost to the developer. However, there is an expectation that the developer will work with the sewerage undertaker to ensure that timelines for delivery of the infrastructure improvement correspond with delivery and phasing of the proposed development[4].

5.12.6. Separate discussions will be required with Southern Water to discuss site specific connection into the public sewer system.

5.12.7. The preliminary foul water pumping station location and potential connection point is shown on the Drainage Plan in Appendix E. A copy of the public foul sewer record is attached in Appendix G.

[2] Southern Water - *Drainage Strategy – Sidlesham (Manhood Peninsula) 2015-2020*
[3] Southern Water - *Briefing Note: For LPAs on Infrastructure Provision. Southern Water's interaction with the planning system in the context of the Water Industry Act 1991* (retrieved on 21/03/22 from https://www.southernwater.co.uk/developing-building/planning-your-development)
[4] Southern Water - *Position Statement Provision of Network Reinforcement* (retrieved on 21/03/22 from https://www.southernwater.co.uk/developing-building/planning-your-development)

6.0 CONCLUSIONS

6.1.1. The site is located fully within the extents of Flood Zone 1 and is therefore considered at low risk of fluvial flooding.

6.1.2. The risk of tidal related flooding to the site is considered low.

6.1.3. When the impact of climate change is considered, current data shows the site remains within Flood Zone 1.

6.1.4. Small areas of low risk of surface water flooding have been identified onsite. These areas are likely localised low spots in the sites topography and as such the overall risk of surface water flooding to the site is considered low.

6.1.5. The site specific testing has shown that the groundwater level varies across the site. Winter groundwater monitoring is ongoing and would be used to inform any future site specific FRA.

6.1.6. The site is considered to be at low risk of all other sources of flooding assessed in this report.

6.1.7. Consideration should be given to watercourse crossings and suitability of crossing points, subject to layout design and other site specific considerations.

6.1.8. From the available information, it is unlikely that the use of infiltration drainage systems would be suitable for this site. Based upon the surface water discharge hierarchy the next suitable discharge method is discharge to the existing watercourse. Any discharge to the existing watercourse would need to be restricted to greenfield runoff rates.

6.1.9. Southern Water are the incumbent sewerage undertaker. The nearest foul water sewer to the site is near the junction of Hunnsett Close with Manor Road. Preliminary levels review suggests that a pumped solution may be required to enable a connection to the Southern Water sewer network.

6.1.10. The Flood Risk Constraint Plan identifies potential areas suitable for residential uses whilst identifying the flood risk constraints.

6.1.11. The illustrative masterplan/land use strategy identifies potential area to be used for surface water drainage attenuation. Consideration should be given to the treatment of surface water runoff and the impact of pollution prior to discharge into any water body.

6.1.12. Based upon the information available at the time of preparing this report, CampbellReith consider the site suitable for residential development, in accordance with National Planning Policy Framework.

Appendix A: Flood Risk Maps

Legend

- Site Boundary
- Adjacent Land Owned by the Applicant
- Flood Zone 2
- Flood Zone 3
- Flood Defences Without Standardised Attributes
- Spatial Flood Defences Including Standardised Attributes

0 250 500 750 1000 m

LANDLINK ESTATES

Land West of Park Farm

Client: Landlink Estates Ltd

Flood Zones

Scale:	1:10000@A3
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Job Number:	13776
Drawn by - Checked by:	RLF - JC
Drg No - Status/Revision:	13776-CRH-XX-XX-FG-G-7010 - P1
File location:	\\red-data1\gis-data\13750 - 13999\13776 R - Land West of Park Farm Selsey\Project_Workspaces (pdf in Outputs)
Date (Revision History):	11/03/2022 (P1, First Issue, 11/03/22, RLF)

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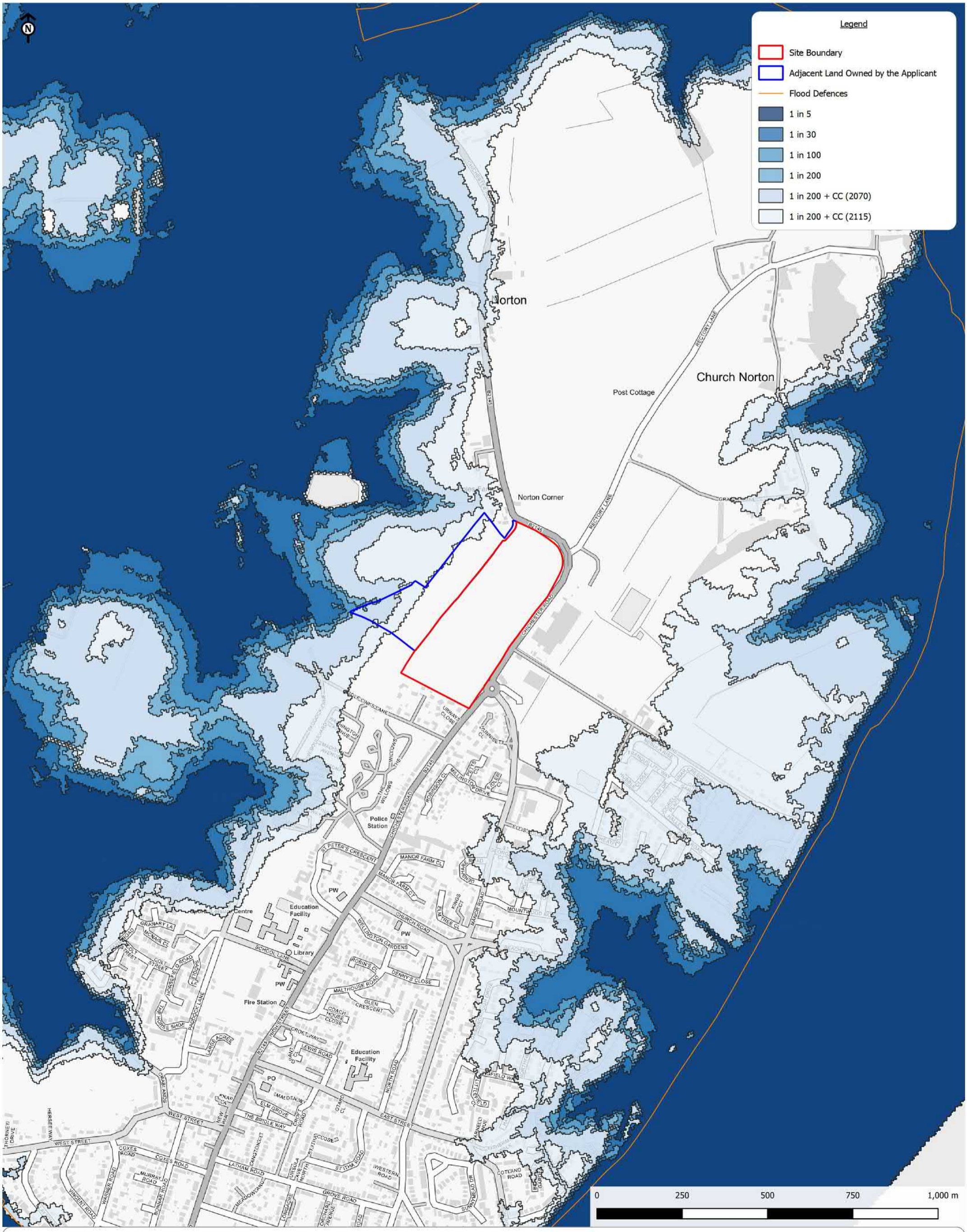

Land West of Park Farm

Client: Landlink Estates Ltd

Undefended Tidal Flood Extents

Scale: 1:10000@A3

Job Number: 13776

Drawn by - Checked by: RP - SR

Drg No - Status/Revision: 13776-CRH-XX-XX-FG-G-7008 - P1

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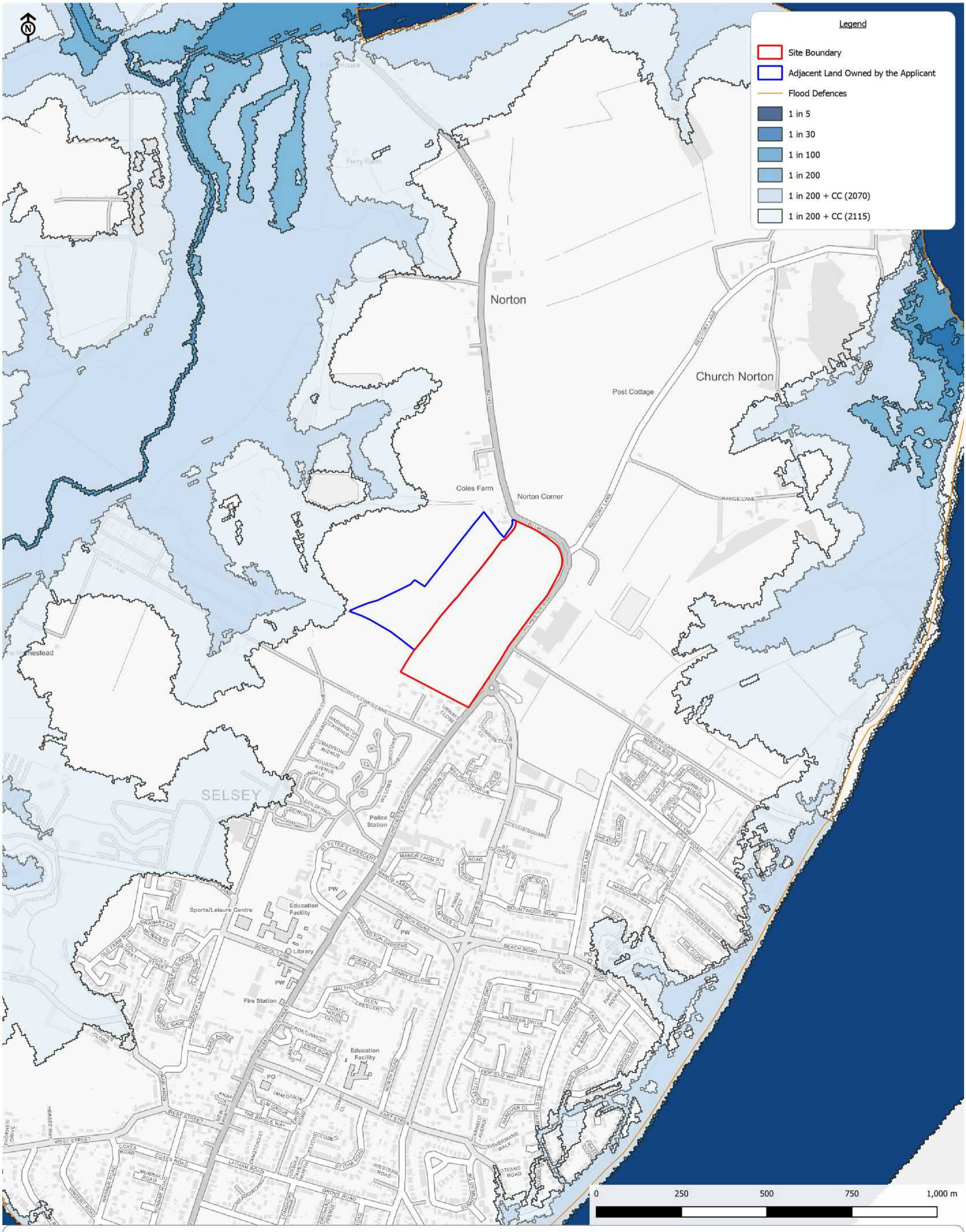

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Client: Landlink Estates Ltd

Defended Tidal Flood Extents

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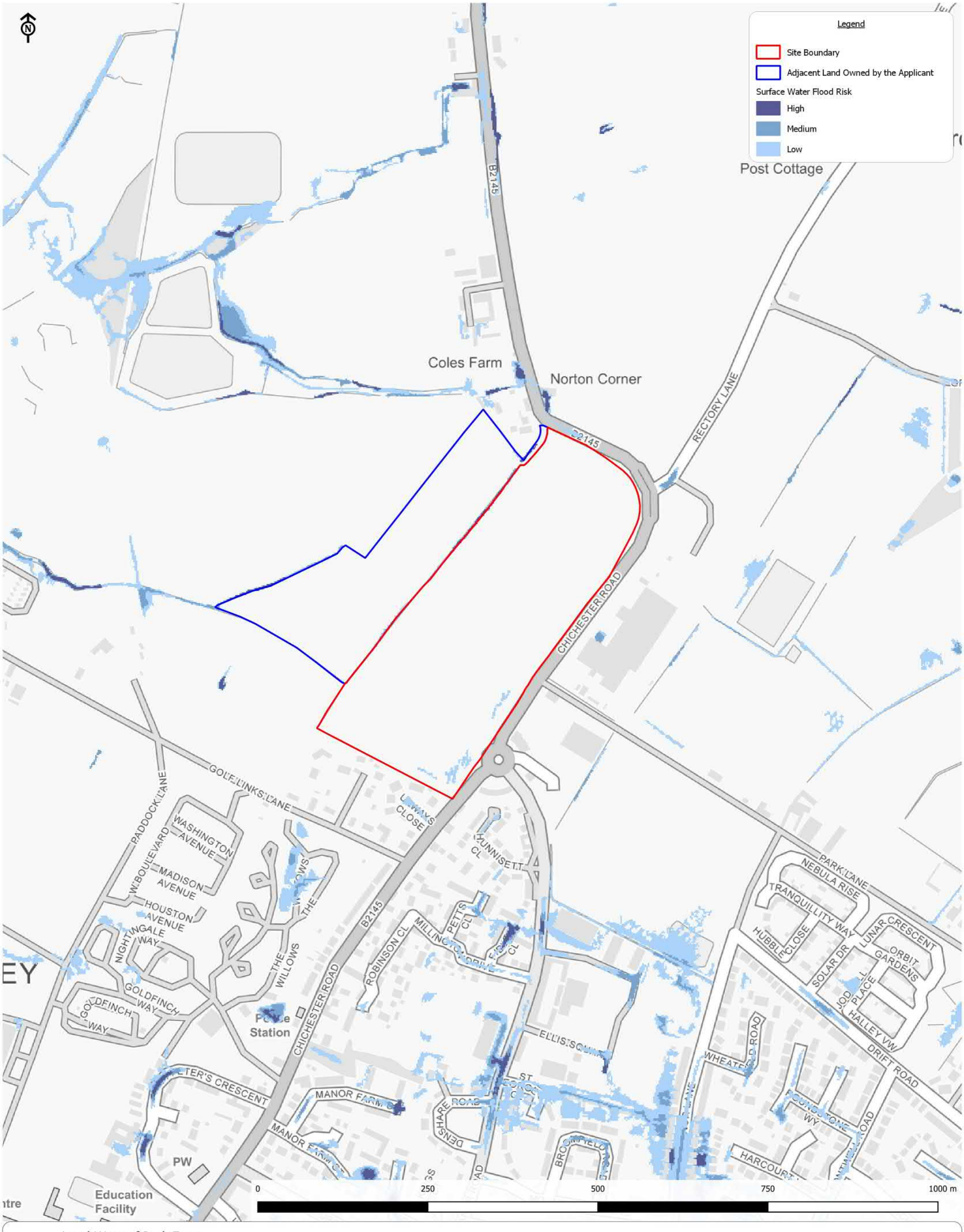

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Client: Landlink Estates Ltd

Surface Water Flood Risk

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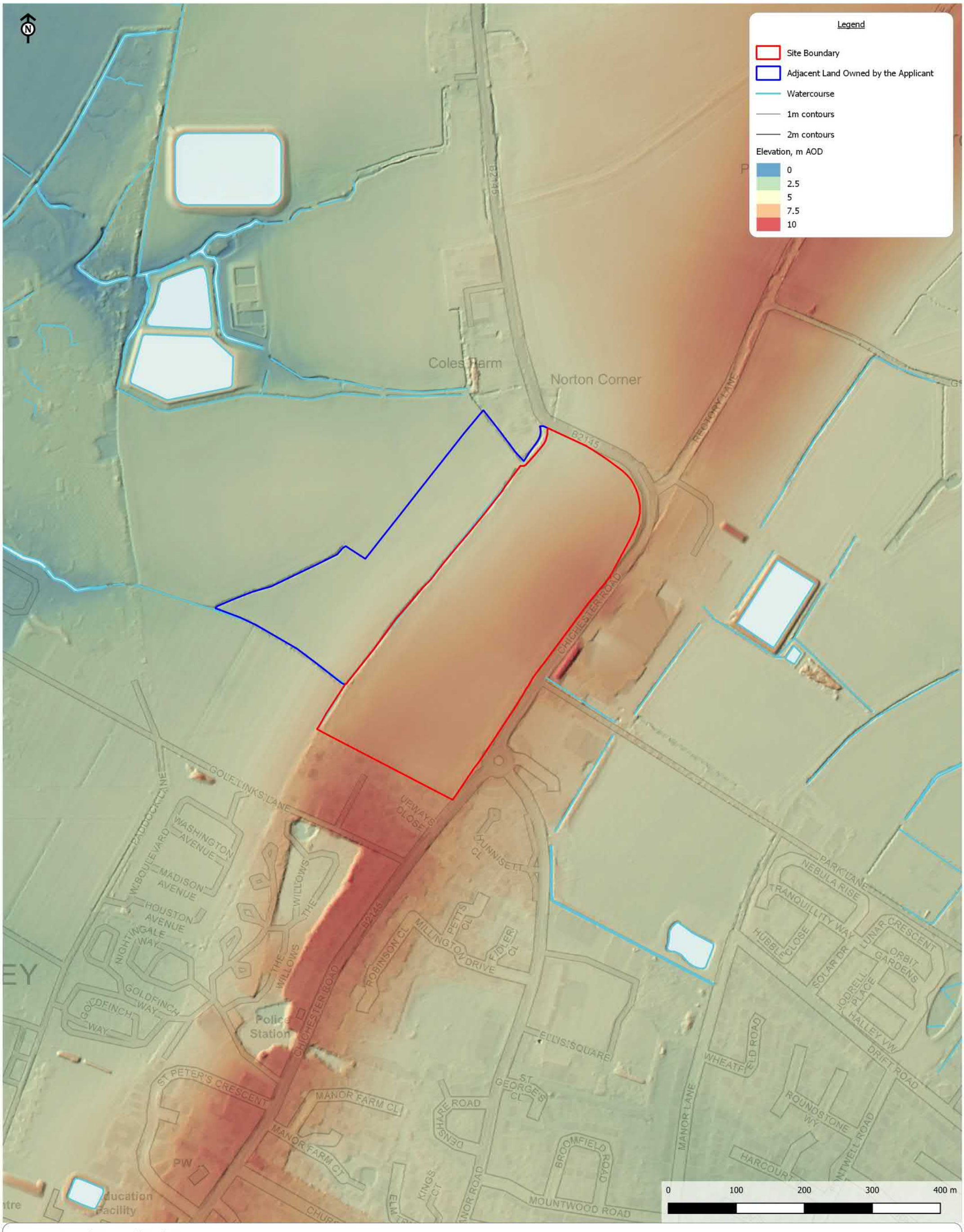

LANDLINK ESTATES

Land West of Park Farm

Client: Landlink Estates Ltd

Elevation Plan

Scale: 1:5000@A3

Job Number: 13776

Drawn by - Checked by: RP - GP/BS

Drg No - Status/Revision: 13776-CRH-XX-XX-FG-G-7001 - P2

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Date (Revision History): 11/01/2022 (P1, First Issue, 15/10/21, RP; P2, Watercourses added, 11/01/22, RP)

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Appendix B: Concept Master Plan

NORTH

10 0 20 40 60 80 100

Rev	Date	Description	By

BOYLE + SUMMERS
ARCHITECTURE AND MASTERPLANNING

Canute Chambers
Canute Road
Southampton
Hampshire
SO14 3AB

Client	Landlink Estates
Project	Selsey North
Title	Sketch Framework Master Plan

Status	Project	Originator	Volume	Level	Type	Role	Series	Number	Suitability	Revision
	SEN	BSL	ZZ	XX	DR	A	14	01	PL	

B+S Ref	Date	Scale @A2	Drawn	Checked
21099	Mar 2022	1:2000	IC/SR	RS

Tel: 023 8063 1432 www.boyleandsummers.co.uk

- The Site - 11.4ha
- Adjacent Land Owned by the Applicant - 5.4ha
- Proposed Tree Lined Primary Road
- Potential Secondary Access Points
- Proposed Access to Pumping Station, Sports Pitches & Rife Maintenance
- Green Areas (inc. Existing Features, Play Space, Amenity Space, Natural/Semi-Natural Green Space & Pavilion)
- Proposed Sports Pitches
- Indicative New Sports Pavilion
- Existing Woodland/Trees
- Proposed Buffer/ Tree Planting
- Proposed Hedgerow Planting
- Residential
- Allotments (exc. Parking Area)
- Play Space - NEAP (30m Buffer)
- Play Space - LAP
- SuDS Attenuation Basin
- Pumping Station
- Multi-functional Green Space (inc. Biodiversity Improvements, Access & Pumping Station)

NORTH

10 0 20 40 60 80 100

Rev	Date	Description	By

BOYLE + SUMMERS
ARCHITECTURE AND MASTERPLANNING

Canute Chambers
Canute Road
Southampton
Hampshire
SO14 3AB

Client	Landlink Estates
Project	Selsey North
Title	Land Use Strategy

BS1192: SEN -- BSL (Project, Originator) ZZ --XX (Volume, Level) DR --A (Type, Role) 15 01 - PL (Series, Number, Suitability, Revision)

B+S Ref	Date	Scale @A2	Drawn	Checked
21099	Mar 2022	1:2000	IC/SR	RS

Tel: 023 8063 1432 www.boyleandsummers.co.uk

Appendix C: Greenfield Runoff Calculations

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Jonathan Adams
Site name:	Land West of Park Farm
Site location:	Selsey

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	50.74458° N
Longitude:	0.78225° W
Reference:	392682070
Date:	Feb 14 2022 11:08

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 1

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	3	3
HOST class:	N/A	N/A
SPR/SPRHOST:	0.37	0.37

Hydrological characteristics	Default	Edited
SAAR (mm):	676	676
Hydrological region:	7	7
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

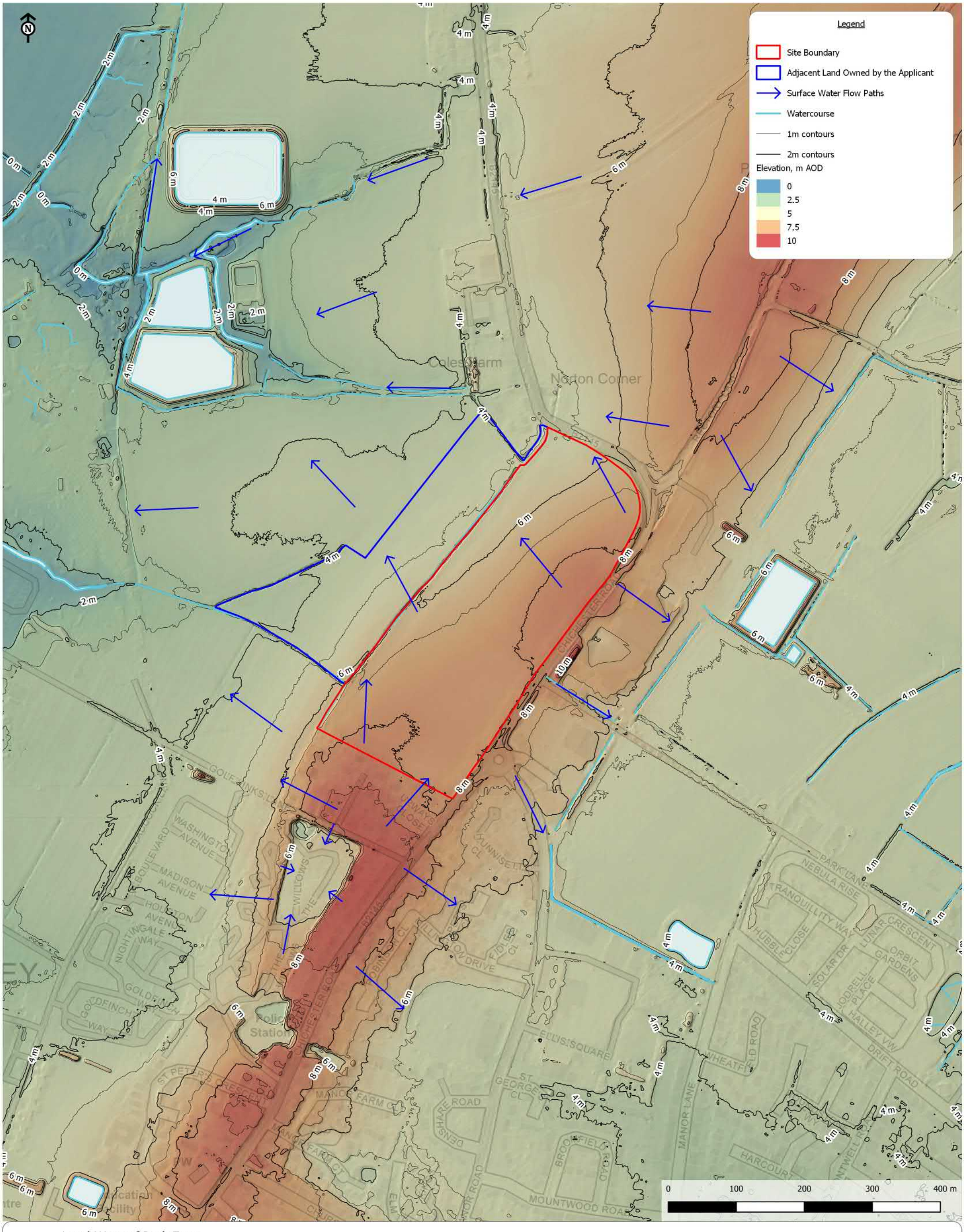
Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	2.76	2.76
1 in 1 year (l/s):	2.34	2.34
1 in 30 years (l/s):	6.34	6.34
1 in 100 year (l/s):	8.8	8.8
1 in 200 years (l/s):	10.31	10.31

Appendix D: Surface Water Flow Path Maps



Land West of Park Farm

Client: Landlink Estates Ltd

Surface Water Flow Paths

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Appendix E: Illustrative Drainage Plan

Legend

Site Boundary

Adjacent Land Owned by the Applicant

Notes:
- Areas hatched are indicative only
- The existing surface water flow path should be maintained
- A review of the existing levels is required
- Photos shown of SuDS features are illustrative only
- On parcel SuDS features and attenuation such as permeable paving have not been indicated but will be implemented where appropriate

Potential Locations for Attenuation Basins

Potential location of foul water pumping station

Indicative FW rising main route

Preferred connection point to Southern Water sewer at junction of Hunnisett Close with Manor Road.

Potential Locations for Swales

COLES FARMHOUSE GRADE II

NORTON CORNER

CHICHESTER ROAD

SuDS ATTENUATION BASIN

SPORTS PITCHES

PAVILION

NEAP

ALLOTMENTS

NATURES WAY FOOD

COSTA COFFEE

ASDA SUPERMARKET

ASDA PETROL STATION

MANOR ROAD

MANOR GARDENS UNDER CONSTRUCTION (119 DWELLINGS + 74 DWELLINGS FUTURE PHASE)

0 50 100 150 200 m

Land West of Park Farm

Client: Landlink Estates Ltd

Drainage Strategy

Scale: 1:2500@A3

Job Number: 13776

Drawn by - Checked by: RLF - JC

Drg No - Status/Revision: 13776-CRH-XX-XX-FG-G-7012 - P2

File location: \\red-data1\gis-data\13750 - 13999\13776 R - Land West of Park Farm Selsey\Project_Workspaces (pdf in Outputs)

Date (Revision History): 14/03/2022 (P1, First Issue, 14/03/22, RLF)

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Appendix F: Surface Water Indicative Calculations

HR Wallingford
Working with water

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	Jacob Cronin
Site name:	Land West of Park Farm
Site location:	Selsey

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:	50.74372° N
Longitude:	0.78235° W
Reference:	240445678
Date:	Mar 14 2022 16:14

Site characteristics

Total site area (ha):	16.8
Significant public open space (ha):	5.4
Area positively drained (ha):	11.4
Impermeable area (ha):	8
Percentage of drained area that is impermeable (%):	70
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	10
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	10
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	11.4
Net impermable area for storage volume design (ha):	8
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Design criteria

Climate change allowance factor:	1.4
Urban creep allowance factor:	1.1
Volume control approach	Use long term storage
Interception rainfall depth (mm):	5
Minimum flow rate (l/s):	2

Methodology

esti	IH124
Q_{BAR} estimation method:	Specify Qbar manually
SPR estimation method:	Calculate from dominant HOST

Soil characteristics

	Default	Edited
HOST class:	--	N/A
SPR:	0.37	0

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	55
Rainfall 100 yrs 12 hrs:	--	78.75
FEH / FSR conversion factor:	1.25	1.25
SAAR (mm):	676	676
M5-60 Rainfall Depth (mm):	17	17
'r' Ratio M5-60/M5-2 day:	0.4	0.4
Hydological region:	7	7
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 10 year:	1.62	1.62
Growth curve factor 30 year:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Q_{BAR} for total site area (l/s):	46.33	46.36
Q_{BAR} for net site area (l/s):	31.44	31.46

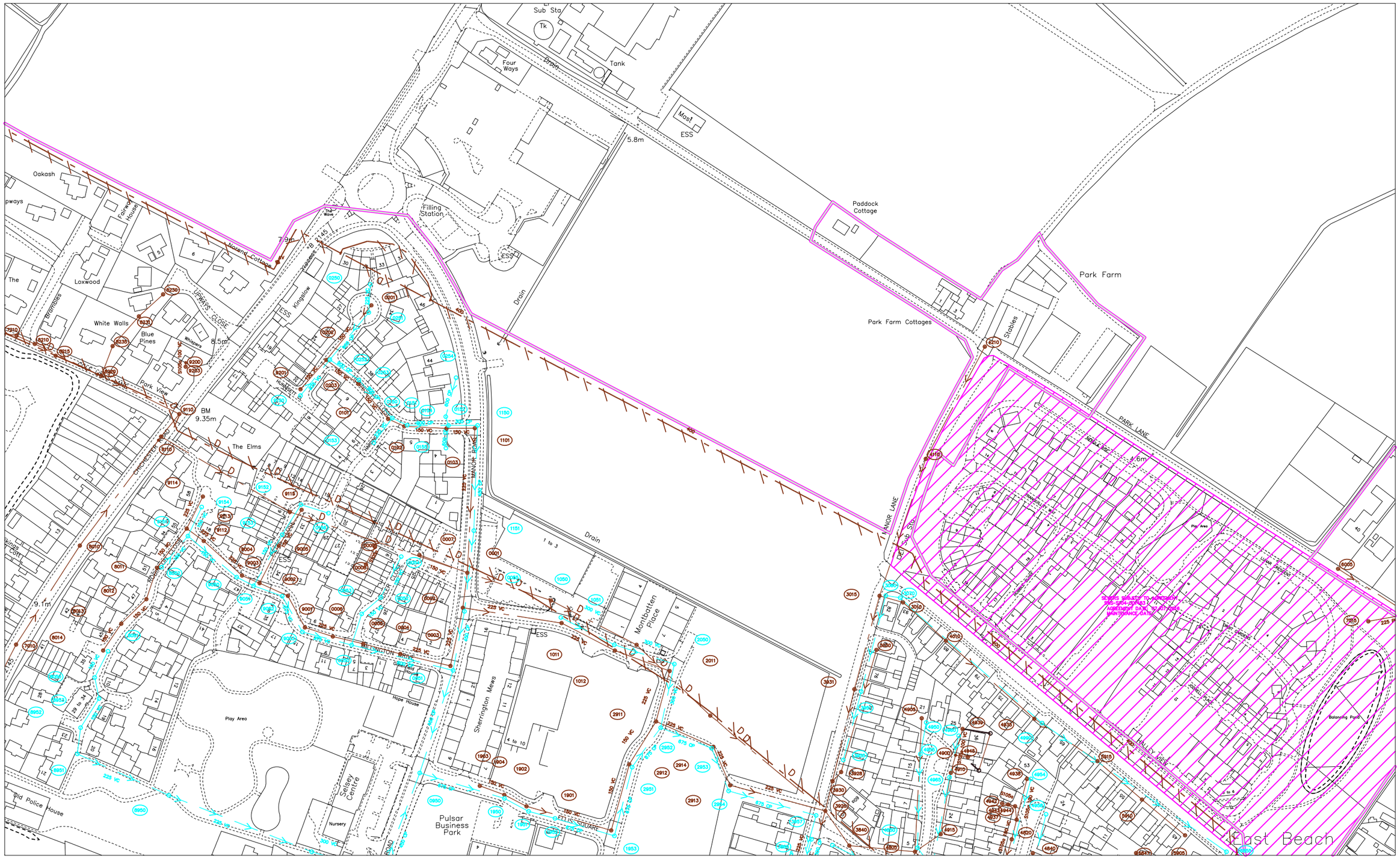
Site discharge rates	Default	Edited	Estimated storage volumes	Default	Edited
1 in 1 year (l/s):	26.7	26.7	Attenuation storage 1/100 years (m^3):	5865	3099
1 in 30 years (l/s):	72.3	72.4	Long term storage 1/100 years (m^3):	1200	3520
1 in 100 year (l/s):	100.3	100.4	Total storage 1/100 years (m^3):	7065	6619

This report was produced using the storage estimation tool developed by HRWallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at http://uksuds.com/terms-and-conditions.htm. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Appendix G: Sewer Asset Location Plan

SEWER RECORDS PAGE 1 OF 2

94465



93887

485787

486727

O.S. REF. SZ8694SW	Drawn by: kumaria	The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determnined on site. WARNING: BAC pipes are constructed of Bonded Asbestos Cement WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement
Title: 353668_Rush Field, Manor Road,	Scale: 1:2500	Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.
	Date: 24/09/2019	N

Southern Water

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	
0001Y	4.67	3.37	225	VC	CIRC	
0002X	4.91	3.22	225	VC	CIRC	
0003X	4.98	3.38	225	VC	CIRC	
0004X	5.08	3.52	225	VC	CIRC	
0005X	5.25	3.63	225	VC	CIRC	
0006X	5.39	3.74	225	VC	CIRC	
0007X	5.06	3.62	150	VC	CIRC	
0008X			UNK	UNK	CIRC	
0050X	5.3	2.89	600	CP	CIRC	
0051X	4.97	2.98	450	CP	CIRC	
0052X	3.71	3.71	150	VC	CIRC	
0053X	3.52	3.52	150	VC	CIRC	
0054X	4.92	3.96	150	VC	CIRC	
0055X	4.91	3.55	450	CP	CIRC	
0101X	6.15	4.24	150	VC	CIRC	
0102X	6.06	4.12	150	VC	CIRC	
0103X	5.87	3.79	150	VC	CIRC	
0150X	6.14	4.19	900	CP	CIRC	
0151X	6.08	4.17	900	CP	CIRC	
0152X	5.74	4.12	300	CP	CIRC	
0153X	5.96	4.67	225	VC	CIRC	
0154X	6	4.17	600	CP	CIRC	
0155X	5.88	4.19	600	CP	CIRC	
0156X	5.55	4.43	150	VC	CIRC	
0201X	6.48	5.2	150	VC	CIRC	
0202X	6.6	4.63	150	VC	CIRC	
0203X	6.4	4.43	150	VC	CIRC	
020ZX			400	DI	CIRC	
021ZX			400	UNK	CIRC	
0250X	6.72	4.78	225	VC	CIRC	
0251X	6.4	4.39	900	CP	CIRC	
0252X	6.53	4.27	900	CP	CIRC	
0253X	6.42	4.23	900	CP	CIRC	
0254X	5.88	4.24	600	CP	CIRC	
0950X	4.52	2.85	675	CP	CIRC	
1010X	4.81	3.6	OTHER	VC	CIRC	
1011X	4.82	2.93	225	VC	CIRC	
1012X	4.52	2.79	225	VC	CIRC	
1050X	4.78	3.36	300	VC	CIRC	
1051X	3.11	3.11	300	VC	CIRC	
1101X	5.15	3.69	225	VC	CIRC	
1150X	5.15	3.93	450	CP	CIRC	
1151X	4.78	3.68	450	CP	CIRC	
1901X	4.15	3.24	150	VC	CIRC	
1902X	4.39	3.64	150	VC	CIRC	
1903X	4.57	3.86	150	VC	CIRC	
1904X	4.5	3.76	150	VC	CIRC	
1950X	4.52	2.64	675	CP	CIRC	
1951X	4.38	2.61	675	CP	CIRC	
1952X	4.28		675	CP	CIRC	
1953X	4.15	2.51	675	CP	CIRC	
2010X	4.6	3.1	OTHER	VC	CIRC	
2011X	4.33	2.68	225	VC	CIRC	
2050X	3	3	300	VC	CIRC	
2910X	4.15	2.6	OTHER	VC	CIRC	
2911X	4.48	2.56	225	VC	CIRC	
2912X	4.03	2.44	225	VC	CIRC	
2913X	3.88	2.37	225	VC	CIRC	
2914X	4.47	2.92	150	VC	CIRC	
2951X	4.5	2.42	675	CP	CIRC	
2952X	4.46	2.42	675	CP	CIRC	
2953X	4.01	2.38	675	CP	CIRC	
2954X	3.98	2.29	675	CP	CIRC	
3010Y	4.75		OTHER	VC	CIRC	*
3010X	4.75	2.77	OTHER	VC	CIRC	*
3015X	4.65	2.52	OTHER	VC	CIRC	
3030X	4.43	3.44	150	PF	CIRC	
3060Y	4.81		225	CP	CIRC	*
3060X	4.81		150	CP	CIRC	*
3070X	4.75		225	CP	CIRC	
3840X	4.1	2.2	150	VC	CIRC	
3855X	4.2	3.32	150	CP	CIRC	
3865X	3.91	2.65	300	CP	CIRC	
3920X	4.27	2.05	225	VC	CIRC	
3928X	4.3	2.37	150	PF	CIRC	
3930X	4.34	2.14	OTHER	VC	CIRC	
3931X	4.43	2.36	OTHER	VC	CIRC	
3951X	4.47		225	PVC	CIRC	
3957X	4.16	2.18	675	CP	CIRC	
4010X	4.56		150	PF	CIRC	
4110X	4.74	2.87	OTHER	VC	CIRC	
4210X	4.85	3.14	OTHER	VC	CIRC	
4805X	4.27	2.49	150	VC	CIRC	
4820X	4.2	2.98	150	PF	CIRC	
4840X	4.04	3.17	150	PF	CIRC	
4850X	4.25	3.2	150	CP	CIRC	
4905X	4.19	2.95	150	PF	CIRC	
490DX			100	VC	CIRC	
4910X	4.35	2.88	150	VC	CIRC	
4915X	4.22	2.58	150	VC	CIRC	
4935X	4.19		150	PF	CIRC	
4937X			150	VC	CIRC	
4938X			100	VC	CIRC	
4939X			100	VC	CIRC	
4942X			UNK	UNK	CIRC	
4943X			UNK	UNK	CIRC	
4944X			100	PF	CIRC	
4945X			UNK	UNK	CIRC	
4946X			UNK	UNK	CIRC	
4947X			UNK	UNK	CIRC	
4950X	4.4	3.58	150	CP	CIRC	
4954X	5.07	4.22	150	CP	CIRC	
4955X	4.53	3.43	150	CP	CIRC	
4958X	4.09	4.09	100	PF	CIRC	
4960X	4.37	3.47	150	CP	CIRC	
4965X	4.37	3.37	150	CP	CIRC	
4990X	4.05	2.63	300	CP	CIRC	
5847X			100	PF	CIRC	
5905X	4.71	4.34	150	PF	CIRC	
5910X	4.33	3.98	150	PF	CIRC	
6005Y	4.24	2.25	150	PF	CIRC	
6855X	4.5	2.49	300	CP	CIRC	
7010X	8.91	6.31	OTHER	VC	CIRC	
7015X	4.55	1.5	225	PP	CIRC	
7210X	8.56	6.55	150	VC	CIRC	
8010X	9.06	5.82	OTHER	VC	CIRC	
8011X	7.61	5.66	150	VC	CIRC	
8012X	7.79	5.78	150	VC	CIRC	
8013X	7.68	5.98	150	VC	CIRC	
8014X	7.55	6.18	150	VC	CIRC	
8050X	7.42	5.96	150	VC	CIRC	
8051X	7.52	6.13	150	VC	CIRC	
8052X	7.55	6.2	150	VC	CIRC	
8110X	9.1		225	VC	CIRC	
8210X	8.83	6.43	150	VC	CIRC	
8215X	9.1	7.72	100	VC	CIRC	
8220X	9.35	6.09	150	VC	CIRC	
8230X	8.39	6.63	150	VC	CIRC	
8231X	6.48	6.48	150	VC	CIRC	
8235X	9.17	6.26	150	VC	CIRC	
8950X	4.98	3.8	225	VC	CIRC	
8951X	6.99	5.29	225	VC	CIRC	
8952X	7.08	5.54	225	VC	CIRC	
8953X	7.24	5.83	150	VC	CIRC	
9001X	5.52	3.83	225	VC	CIRC	
9002X	5.7	3.98	225	VC	CIRC	
9003X	5.9	4.09	225	VC	CIRC	
9004X	6.09	4.14	225	VC	CIRC	
9005X	5.94	4.4	150	VC	CIRC	
9050X	6.12	4.04	150	VC	CIRC	
9051X	5.89	3.54	300	VC	CIRC	
9052X	5.74	3.46	375	VC	CIRC	
9053X	5.53	3.33	375	VC	CIRC	
9110X	9.01	6.53	OTHER	VC	CIRC	
9111X	6.52	4.1	OTHER	VC	CIRC	
9112X	6.89	4.28	225	VC	CIRC	
9113X	7.3	4.31	225	VC	CIRC	
9114X	7.75	4.37	225	VC	CIRC	
9115X	5.77	4.55	150	VC	CIRC	
9150X	6.82	5.29	225	VC	CIRC	
9151X	7.26	5.6	150	VC	CIRC	
9152X	5.8	4.24	150	VC	CIRC	
9153X	5.89	3.97	150	VC	CIRC	
9154X	7.54	6.12	150	VC	CIRC	
9201X	6.84	4.99	150	VC	CIRC	
920DX			100	VC	CIRC	
9866X	4.52	3.42	300	VC	CIRC	

LINE STYLES / COLOURS

Brown — Foul
Foul Syphon Sewer
Foul Vacuum Main
Foul Rising Main
Red — Combined
Combined Syphon Sewer
Combined Rising Main
Lateral Drain
Orange — Building Over Agreement Area
Dark Blue — Treated Effluent
Purple — Sludge
Sewer Catchment
Section 104 Area
Light Blue — Surface Water
Surface Water Rising Main
Yellow — Private
Green — Access Shaft
Decommissioned

MATERIALS

AK	Alkathene
BAC	Bonded Asbestos Cement
BRC	Brick (Common)
BRE	Brick (Engineering)
CC	Concrete Box Culvert
CI	Cast Iron
CO	Concrete (In-Situ)
CP	Concrete (Pre-Cast)
CSB	Concrete Segments (bolted)
CSU	Concrete Segments (unbolted)
DI	Ductile Iron
GRC	Glass Reinforced Concrete
GRP	Glass Reinforced Plastic
MAC	Masonry in regular Courses
MAR	Masonry in random Courses
PE	Polyethylene
PF	Pitch Fibre
PP	Polypropylene
PVC	Polyvinyl Chloride
RPM	Reinforced Plastic Matrix
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
XXX	Other
ZZZ	Unknown

LEGEND - SEWERS

Manhole (SW)
Manhole (F&C)
Lamp hole (SW)
Lamp hole (F&C)
Pumping Station (SW)
Pumping Station (F&C)
Side entry manhole (SW)
Side entry Manhole (F&C)
Blind shaft (SW)
Blind shaft (F&C)
Ejector station (SW)
Ejector station (F&C)
Watertight door (SW)
Watertight door (F&C)
Flushing ch. Mn-e (SW)
Flushing ch. Mn-e (F&C)
Flushing ch. No-e (SW)
Flushing ch. No-e (F&C)
Demarcation Chamber

Washout (SW)
Washout (F&C)
Rodding Eye (SW)
Rodding Eye (F&C)
Gauging point (SW)
Gauging point (F&C)
Intercept chamber (SW)
Intercept chamber (F&C)
Storm Tank (SW)
Storm Tank (F&C)
Vortex chamber (SW)
Vortex chamber (F&C)
Label ellipse
Dummy/S24 manhole
Outfall
Penstock chamber
Damboards
Storm Overflow
Backdrop manhole

Other (s)
Other
Change in sewer (s)
Change in sewer
Reflux valve
Flap valve
Cascade
Anode
Valve
Closed Valve
Air Valve
Hatch box (SW)
Hatch box (F&C)
Direction arrow
Emptying valve
Catchpit
Soakaway
Inlet
Balancing Pond

Wastewater treatment works
Marine treatment works
Outfall headworks
Vent
Vent column
Tidal storage tank
Blank end
Head of Public Sewer
Micro Pumping Station

SHAPES (S)

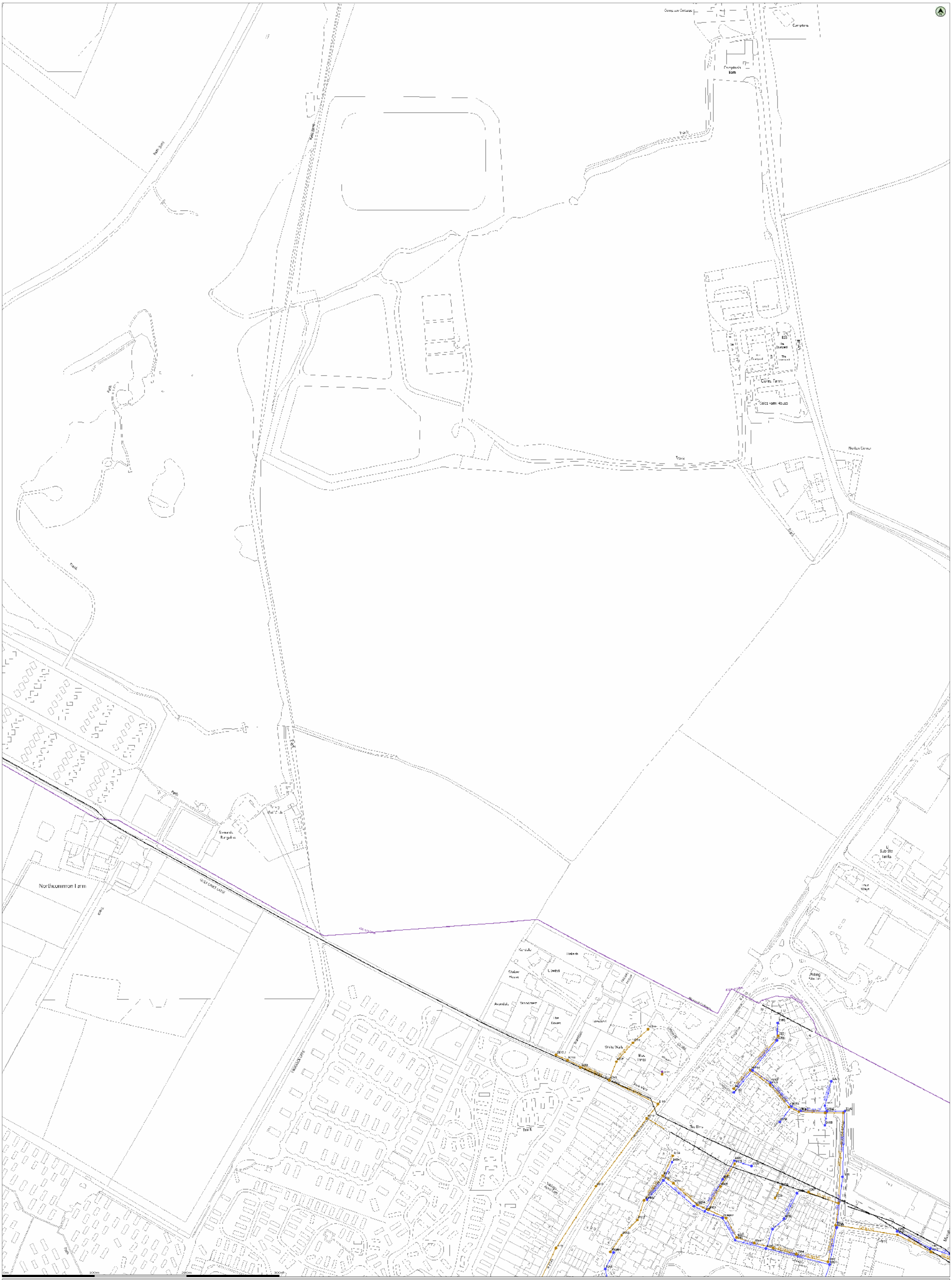
A	Arched	R	Rectangular
B	Barrel	S	Square
C	Circular	T	Trapezoidal
E	Egg	U	U Shape
H	Horseshoe	X	Other

NODE REFERENCING SYSTEM

1st digit: hundred metre easting identifier
2nd digit: hundred metre northing identifier
sewer type identifier
3rd digit: 0-4 = Foul/Combined
5-9 = Surface Water
4th digit: next sequential node

Drawn by:	kumaria
Title:	353668_Rush Field, Manor Road,
Date:	24/09/2019

Southern Water



Data updated: 20/09/21

Scale: 1:1250 | Date: 11/10/21 | Wastewater Plan A0
Map Centre: 485707,94689 | Our Ref: 670680 - 4 | Powered by digdat

utility.reports@technicsgroup.com

SP21787-2

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WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0001	F	4.67		0.00
0002	F	4.91		3.22
0003	F	4.98		3.38
0004	F	5.08		3.52
0005	F	5.25		3.63
0006	F	5.39		3.74
0007	F	5.06		3.62
0008	F	0.00		0.00
0009	F	0.00		0.00
0101	F	6.15		4.24
0102	F	6.06		4.12
0103	F	5.87		3.79
0201	F	6.48		5.20
0202	F	6.60		4.63
0203	F	6.40		4.43
1011	F	4.82		2.93
1012	F	4.52		2.79
1101	F	5.15		3.69
7010	F	8.91		6.31
7210	F	8.56		6.55
8010	F	9.06		5.82
8011	F	7.61		5.66
8012	F	7.79		5.78
8013	F	7.68		5.98
8014	F	7.55		6.18
8110	F	9.10		0.00
8210	F	8.83		6.43
8215	F	9.10		7.72
8220	F	9.35		6.09
8230	F	8.39		6.63
8231	F	6.48		6.48
8235	F	9.17		6.26
9001	F	5.52		3.83
9002	F	5.70		3.98
9003	F	5.90		4.09
9004	F	6.09		4.14
9005	F	5.94		4.40
9110	F	9.01		6.53
9112	F	6.89		4.28
9113	F	7.30		4.31
9114	F	7.75		4.37
9115	F	5.77		4.55
9201	F	6.84		4.99
9203	F	0.00		0.00
0050	S	5.30		2.89
0051	S	4.97		2.98
0052	S	3.71		3.71
0053	S	3.52		3.52
0054	S	4.92		3.96
0055	S	4.91		3.55
0150	S	6.14		4.19
0151	S	6.08		4.17
0152	S	5.74		4.12
0153	S	5.96		4.67
0154	S	6.00		4.17
0155	S	5.88		4.19
0156	S	5.55		4.43
0250	S	6.72		4.78
0251	S	6.40		4.39
0252	S	6.53		4.27
0253	S	6.42		4.23
0254	S	5.88		4.24
1050	S	4.78		3.36
1051	S	3.11		3.11
1150	S	5.15		3.93
1151	S	4.78		3.68
8050	S	7.42		5.96
8051	S	7.52		6.13
8052	S	7.55		6.20
9050	S	6.12		4.04
9051	S	5.89		3.54
9052	S	5.74		3.46
9053	S	5.53		3.33
9150	S	6.82		5.29
9151	S	7.26		5.60
9152	S	5.80		4.24
9153	S	5.89		3.97
9154	S	7.54		6.12

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