Walsall Council

Allen’s Centre, Willenhall

Flood Risk Assessment and Surface Water Drainage Assessment

680535-R1(02)-FRA
January 2023

RSK GENERAL NOTES

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1 INTRODUCTION

1.1 Context

RSK Land and Development Engineering Ltd (RSK) was commissioned to carry out a Flood Risk Assessment (FRA) for Walsall Council (the 'client'). The assessment is in support of the planning submission for the residential development at the Allen's Centre (the 'site').

The assessment has been prepared in accordance with the National Planning Policy Framework (NPPF)[1] and its accompanying Planning Practice Guidance[2], the Interim Code of Practice for Sustainable Drainage[3], BS 8533-2017 Assessing and Managing Flood Risk in Development Code of Practice[4], BS 8582:2013 Code of practice for surface water management for development sites[5] and the Non-statutory technical standards for sustainable drainage systems[6], with site-specific advice from the Environment Agency (EA), the Lead Local Flood Authority (LLFA), the Local Planning Authority (LPA), the architect and the client.

The NPPF sets out the criteria for development and flood risk by stating that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere.

The key definitions within the PPG are:

- "Flood risk" is a combination of the probability and the potential consequences of flooding from all sources – including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources; and
- "Areas at risk of flooding" means areas at risk from all sources of flooding. For fluvial (river) and sea flooding, this is principally land within Flood Zones 2 and 3. It can also include an area within Flood Zone 1 which the EA has notified the local planning authority as having critical drainage problems.

For this site, the key aspects that require the assessment are:

[1] Communities and Local Government, 'National Planning Policy Framework', published March 2012 and last updated July 2021.

[2] Communities and Local Government, 'Planning Practice Guidance - Flood Risk and Coastal Change, ID 7', published March 2014 and last updated August 2022. http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/

[3] DEFRA, 'Interim Code of Practice for Sustainable Drainage Systems' National SUDS Working Group, July 2004.

[4] BSI, 'BS 8533-2017 Assessing and managing flood risk in development Code of practice', 2017.

[5] BSI, 'BS 8582:2013 Code of practice for surface water management for development sites', November 2013.

[6] DEFRA, 'Sustainable Drainage Systems - Non-statutory technical standards for sustainable drainage systems', March 2015.

- The EA's indicative flood zone map shows that the site is located within Flood Zone 1.
- The site is larger than 1Ha in size.

1.2 Scope of work

A key element of project development is to prepare a FRA to establish the flood risk associated with the proposed development and to propose suitable mitigation, if required, to reduce the risk to a more acceptable level.

The scope of work relating to a FRA is based on the guidance provided in Section 14 of the NPPF and its accompanying Planning Practice Guidance.

A site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall. The scope of this assessment therefore comprises the following elements:

- To review architect plans, planning information and other studies to determine existing site conditions;
- To obtain information on the hydrology and hydrological regime in and around the site;
- To obtain the views of the EA/LLFA including scope, location and impacts;
- To determine the extent of flooding and the impact on the site;
- To assess the impact on the site from climate change effects and anticipated increases in rainfall over a 100 year period for residential uses; and
- To provide relevant mitigation advice to address any identified flood risk on site.

Reliance has been placed on factual and anecdotal data obtained from the sources identified. RSK cannot be held responsible for the scope of work, or any omissions, misrepresentation, errors or inaccuracies with the supplied information. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

The comments given in this report and opinions expressed are subject to RSK Group Service Constraints provided in **Appendix A**.

2 SITE DESCRIPTION

2.1 Existing site

2.1.1 Location

Site Address: The Allen's Centre,
Hilton Road,
Willenhall,
West Midlands,
WV12 5XB

Site National Grid Reference: 397379 E, 302192 N

The site currently comprises the site of the former Allen's Centre and adjacent open space. The site is located approximately 5.0km north-west of Walsall and can be accessed off Hilton Road to the south.

The total area outlined for the proposals is approximately 1.32Ha in size.

Table 2.1, below, provides a description of the immediate surroundings of the site. **Figure 2.1** shows a Site Location Map.

Table 2.1: Site setting

Direction	Characteristic
North	Residential properties off Sherringham Drive and Radstock Road are to the north.
East	Residential properties off Hilton Road and Astoria Close are to the east.
South	To the south of the site is a treed mound known as 'Allen's Rough' and Hilton Road with residential properties beyond.
West	Residential properties off Moxhull Close and Kewstoke Road are to the west.

Figure 2.1: Site location map

2.1.2 Topography

The site levels have been assessed using the topographic survey in **Appendix B**. The survey shows the site to be generally flat. There is a slight south/south-western fall across the site, with the highest level on-site being along the northern site boundary at approximately 160.0mAOD. The section of the site which previously had the building on has the lowest site levels, being approximately 158.5mAOD.

Allen's Rough has a high point of approximately 166.3mAOD, with land falling away from the high point. Land falls north and north-west from Allen's Rough towards the site.

2.1.3 Hydrology

The course of the Wyrley and Essington Canal is located 1.25km south of the site and 1.20km east of the site, on the opposite side of the M6.

There are two waterbodies located approximately 0.6km east of the site, within Sneyd Local Nature Reserve.

Numerous field boundary ditches and 'ordinary watercourses' are located approximately 1.0km north-east of the site, which eventually discharge south to the Wyrley and Essington Canal.

There are two waterbodies located approximately 1.3km north-west of the site which have numerous 'ordinary watercourses' discharging into them.

2.1.4 Geology

2.1.4.1 Desk Study

Based on published geological records for the area (British Geological Survey online mapping), the site exhibits the following geology:

- Superficial Geology: Till, Devensian - Diamicton. Sedimentary superficial deposit formed between 116 and 11.8 thousand years ago during the Quaternary period.
- Bedrock Geology: Pennine Middle Coal Measures Formation - Mudstone, siltstone and sandstone. Sedimentary bedrock formed between 318 and 309.5 million years ago during the Carboniferous period.

BGS Borehole data records were searched for nearby borehole logs that may give relevant information regarding the on-site geology. There are two records located on Dorchester Road (SJ90SE1350 and SJ90SE52), approximately 0.1km south of the site, exhibiting geology of coal to the borehole ends (14.4mbgl). Groundwater was not encountered within either of the boreholes.

2.1.4.2 Site Investigation

In December 2015, on-site geo-environmental investigation was undertaken for the site by Opus International Consultants (UK) Ltd[7] (report ref: BM/J-B0984.00 (R02)). During the investigation, seven window sample boreholes and eight trial pits were excavated on-site. The window samples and boreholes exhibited geology of Made Ground over superficial deposits of clays and sands, underlain by Coal Measures.

Groundwater was struck within eight of the window samples/boreholes from depths ranging between 1.5mbgl and 3.0mbgl.

2.1.5 Hydrogeology

Hydrogeological information was obtained from the online 'Magic Map' service. The site is underlain with bedrock geology designated as a ‘Secondary A’ aquifer. The site is underlain with superficial geology designated as a ‘Secondary (undifferentiated)’ aquifer.

Mapping indicates that the site is not within a Groundwater Source Protection Zone.

2.1.6 Site walkover

A site visit was undertaken on the 10th August 2022 by RSK, the Photograph Log can be found within **Appendix C**.

At the site entrance, an off-site roadside gulley was present (**Photograph 1 and 2**), however it was blocked with leaf litter at the time of the site visit. From the site entrance is a hardstanding path which is roughly adjacent to the eastern site boundary. On this path are 5no. manholes (**Photograph 4**) and a drainage gulley (**Photograph 5**). A second footpath extends east from the hardstanding path, connecting the site to Sherringham Drive. 2no. manholes were located on this footpath (**Photograph 7**). There is a hardstanding carpark to the south of the site which had numerous manholes located across it (**Photograph 9 and 10**). A manhole without a cover was located within the

[7] Geo-Environmental Investigation Report, Opus International Consultants (UK) Ltd, February 2016

previously used disabled car parking spaces and was heavily littered with no obvious outlet (**Photograph 11 and 12**). A second manhole without a cover was also located within the car parking spaces to the south (**Photograph 13**). This manhole contained no standing water, however it looked to drain towards Hilton Road (**Photograph 14**).

2.1.7 Existing Drainage Infrastructure

Existing Severn Trent Water utilities records have been provided for the site with the plans included in **Appendix D**. The plans detail the below sewers:

- A 375mm surface water sewer extends south from Sherringham Drive, following the route of the footpath with connects Sherringham Drive to the site.
- The surface water sewer is then upsized to a 525mm pipe and is conveyed south-west, across the existing hardstanding car park area and then off-site through Allen's Rough.
- A 225mm foul sewer extends south from Sherringham Drive, following the route of the aforementioned footpath.
- The foul sewer is then ultimately conveyed south-west, across the existing hardstanding car park area and off-site through Allen's Rough.
- A 150mm foul sewer extends from Hilton Road across the east of the site, conveying flow north-west, to the join the 225mm foul sewer located on the footpath.

It was noted at the time of the site walkover that there is private drainage system across the site, with manholes present that are not detailed on the public sewer records. During the topographic survey, these manholes were lifted, and their invert and cover levels recorded (**Appendix B**). It was noted that four of the manholes on the carpark area are heavily silted or blocked.

2.2 Development proposals

The proposed development is for residential end use. The development plan can be found in **Appendix E**.

3 LEGISLATION, POLICY AND GUIDANCE

3.1 National policy

Table 3.1: National legislation and policy context

Legislation	Key provisions
National Planning Policy Framework (2021)	The aims of planning policy on development and flood risk are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall.
Planning Practice Guidance (2022)	The NPPF is supported by an online Planning Practice Guidance, which provide additional guidance on flood risk.
Flood and Water Management Act 2010[8]	The Flood and Water Management Act (FWMA) aims to implement the findings of the 2007 Pitt Review and co-ordinate control of drainage and flood issues. There are a number of increased responsibilities within the Act that affect adoption of SuDS features and the role of the EA to expand on the mapping data they provide. The implementation of SuDS features has many beneficial impacts on the treatment of surface water during remediation works.
Water Resources Act 1991[9]	Section 24 – The EA is empowered under this Act to maintain and improve the quality of 'controlled' waters Section 85 – It is an offence to cause or knowingly permit pollution of controlled waters Section 88 – Discharge consents are required for discharges to controlled waters
Water Framework Directive (2000)[10]	The Water Framework Directive (WFD) requires all inland and coastal waters to reach 'good' chemical and biological status by 2015. Flood risk management is unlikely to have a significant impact on chemical water quality except where maintenance works disturb sediment (such as de-silting) or where pollutants are mobilised from contaminated land by floodwaters. The main impact of the WFD on flood risk management, both now and in the future, relates to the ecological quality of water bodies. Channel works, such as straightening and deepening, or flood risk management schemes that modify geomorphological processes can change river morphology. The WFD aims to protect conservation sites

[8] Flood and Water Management Act, 2010

[9] Water Resources Act, 1991

[10] EU Water Framework Directive, 2000

Legislation	Key provisions
	identified by the EC Habitats Directive and Birds Directive that have water-related features, by designating them as 'protected sites'.

3.2 Area guidance

Table 3.2: Area Guidance

Study	Overview of key provisions and policies
Walsall Site Allocation[11] 2019	The Site Allocation Document (SAD) is part of Walsall's Local Plan, with the Allen's Centre identified as an allocated site.
SFRA: The Black Country Strategic Flood Risk Assessment[12] 2009	The principle aim of the SFRA was to map all forms of flood risk in order to provide an evidence base to locate new development. It also aims to provide appropriate policies for the management of flood risk, and identify the level of detail required for site-specific FRAs. The SFRA contains information and maps detailing flood sources and risks. The Tame tunnel provides a significant level of flood protection to the Willenhall area. Provided that the tunnel is free from debris or other blockages, it is expected that the Zone 3a High Probability is contained by the tunnel.
PFRA: Walsall Council Preliminary Flood Risk Assessment[13] 2011	Preliminary Flood Risk Assessments are produced by Lead Local Flood Authorities (LLFAs) in England and Wales. A Preliminary Flood Risk Assessment (PFRA) is the first part of the planning cycle for flood risk management as set out in the Flood Risk Regulations (2009), which implement the requirements of the European (EU) Floods Directive (2007). The EU Floods Directive aims to provide a consistent approach to managing flooding across Europe. The PFRA is organised by the River Basin District (in this case the Humber River Basin District) and produced by the LLFA (in this case Walsall Council). The PFRA considers local sources of flooding that the LLFA is responsible for: surface runoff, groundwater and ordinary watercourses. Information is gathered from existing sources on past floods and flood models to identify Flood Risk Areas. The site was not mentioned within the report.
CFMP: River Trent Catchment Flood	Catchment Flood Management Plans (CFMP) give an overview of the flood risk from inland sources across each river catchment and recommend ways of managing those risks now and over the next 50-100 years. The EA is responsible for producing CFMPs.

[11] Walsall Site Allocation Document, Walsall Council, January 2019

[12] The Black Country Level 1 Strategic Flood Risk Assessment, Jacobs, February 2009

[13] Walsall Council Preliminary Flood Risk Assessment Report, Walsall Council, April 2011

Study	Overview of key provisions and policies
Management Plan[14] 2010	The site falls within the 'Birmingham and Black Country' sub-catchment and the policy applicable to this site is Policy Option 5 which states '– Areas of moderate to high flood risk where we can generally take further action to reduce flood risk". There is a focus on opening up the river corridors and returning the watercourses to a more natural state. The CFMP provides the following key proposed actions: • 'Provide a more accurate and community focused flood warning service. • Conclude River Tame flood risk management strategy. • Reduce the incidence of foul water flooding by involving Severn Trent Water Ltd more in flood risk management. • Investigate and promote opportunities to create green corridors along watercourses through Birmingham and the Black Country. • Produce and implement an integrated urban drainage strategy. • Identify locations where flood storage ponds or wetland areas could be developed within the urban areas, with associated habitat creation. • Produce an integrated flood defence asset management strategy.'

3.3 Site-specific consultation

As part of this assessment, the following authorities have been contacted to obtain relevant data/guidance and establish key site constraints:

Table 3.3: Key site-specific consultations

Consultee	Date issued	Enquiry	Appendix
Environment Agency (EA)	August 2022	A pre-application enquiry submitted to obtain further flood information and policy guidance.	**Appendix F**

Key findings are referred to in the relevant part of Section 4 and full details are contained in the relevant appendices.

[14] River Trent Catchment Flood Management Plan: Summary Report, Environmental Agency, December 2010

4 SOURCES OF FLOOD RISK

4.1 Criteria

In accordance with the NPPF[1] and advice from the EA, a prediction of the flood sources and levels is required along with the effects of climate change from the present for the design life of the development (in this case assumed to be 100 years).

Changes to climate change guidance in May 2022 indicate that increased allowances in peak river flow and rainfall intensity should now be incorporated within any assessment. The appropriate allowance for peak river flow is based on the site's location in the country, the lifetime of development, the relevant flood zone and the vulnerability of the proposed end use.

The flood risk elements that need to be considered for any site are defined in BS 8533 as the "Forms of Flooding" and are listed as:

- Flooding from rivers (fluvial flood risk);
- Flooding from the sea (tidal flood risk);
- Flooding from the land;
- Flooding from groundwater;
- Flooding from sewers (sewer and drain exceedance, pumping station failure etc); and
- Flooding from reservoirs, canals and other artificial structures.

The following section reviews each of these in respect of the subject site.

4.2 Definitions of risk

Table 4.1: Flood map for planning risk zoning

Flood Zone	Description
Flood Zone 1	Land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).
Flood Zone 2	Land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year.
Flood Zone 3	Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
Flood Zone 3b	Land having the potential to flood for storm events up to the 1 in 20 year return period (>5% annual probability of flooding occurring). It is classified as 'functional floodplain'.

Table 4.2: Flood risk from rivers or the sea and flood risk from surface water

Flood Risk	Description
High	High risk means that each year this area has a chance of flooding of greater than 3.3%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped or fail.
Medium	Medium risk means that each year this area has a chance of flooding of between 1% and 3.3%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped or fail.
Low	Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped or fail.
Very Low	Very low risk means that each year this area has a chance of flooding of less than 0.1%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped or fail.

Table 4.3: Flood risk category matrix from reservoirs, groundwater, sewers and other artificial sources

Threat Probability	Low Impact	Medium Impact	High Impact
High	Medium	Medium	High
Medium	Low	Medium	Medium
Low	Low	Low	Low
Negligible	Very Low		

4.3 Flooding from rivers (fluvial flood risk)

4.3.1 Main river

The EA Flood Zone mapping study for England and Wales is available on their website at: https://flood-map-for-planning.service.gov.uk.

The latest EA published flood zone map (**Figure 4.1**) shows the site to be located within Flood Zone 1.

In December 2013, the EA released an additional form of mapping 'Risk of Flooding from Rivers and Sea', which is available at:

https://flood-warning-information.service.gov.uk/long-term-flood-risk

The latest 'Risk of Flooding from Rivers and Sea' flood map (**Figure 4.2**), shows the EA's assessment of the likelihood of flooding from rivers and the sea at any location and is based on the presence and effect of all flood defences, predicted flood levels, and ground levels. The map indicates that the site is considered to be at a '**very low**' risk of flooding.

Figure 4.1: Environment Agency 'Flood map for planning' (accessed January 2023)

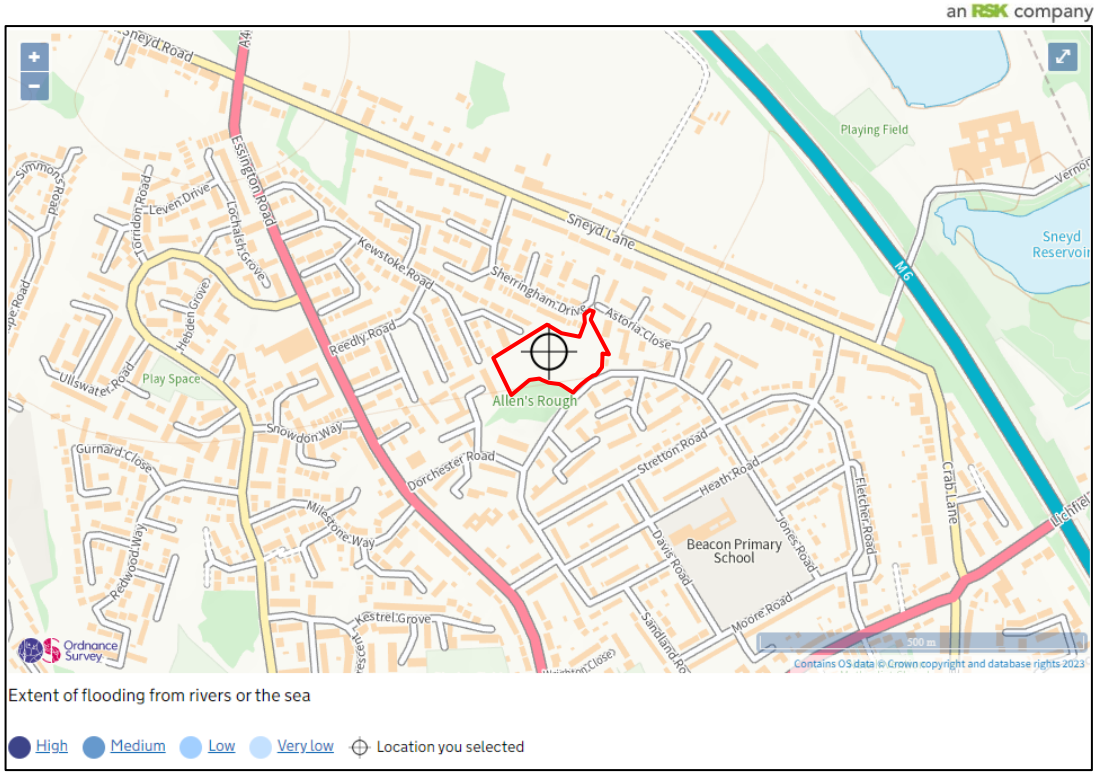


Figure 4.2: Environment Agency 'Flood risk from rivers or the sea' map (accessed January 2023)

4.3.2 Climate change

Fluvial flooding is likely to increase as a result of climate change. A greater intensity and frequency of precipitation is likely to raise river levels and increase the likelihood of a river overtopping its banks. However, as all the proposed works will be below ground, fluvial flooding will not affect the proposed developments. Climate change guidance for river modelling was updated by the EA in May 2022. No model re-runs have been undertaken as part of this site-specific FRA, and the supplied EA mapping therefore represents the best available and up-to-date data when considering the flood risk to the site. The impact upon the site should be negligible given its location within Flood Zone 1.

4.4 Flooding from the sea (tidal flood risk)

The site is not considered to be at risk from tidal flooding due to its inland location and elevated position indicating a '**very low**' risk of flooding.

4.4.1 Climate change

Climate change is not considered to result in an increased risk of tidal flooding to the site.

4.5 Flooding from the land (overland pluvial flood risk)

If intense rain is unable to soak into the ground or be carried through manmade drainage systems, for a variety of reasons, it can run off over the surface causing localised floods before reaching a river or other watercourse.

Generally, where there is impermeable surfacing or where the ground infiltration capacity is exceeded, surface water runoff will occur. Excess surface water flows from the site are believed to drain naturally to the local water features, either by overland flow or through infiltration.

The EA's surface water flood map (**Figure 4.4**) shows that there is a low-medium surface water flow path on-site. It connects Hilton Road and Sherringham Drive, with flow conveyed south from Sherringham Drive, down the footpath, and flow conveyed north-west from Hilton Road along the hardstanding on-site. The flow path extends onto the hardstanding carpark area on-site. Along Hilton Road, adjacent to the site is an area of high pluvial flood risk.

The risk posed to the site from pluvial flooding is **very low-medium** and as discussed is predominantly restricted to the existing hardstanding areas on-site.

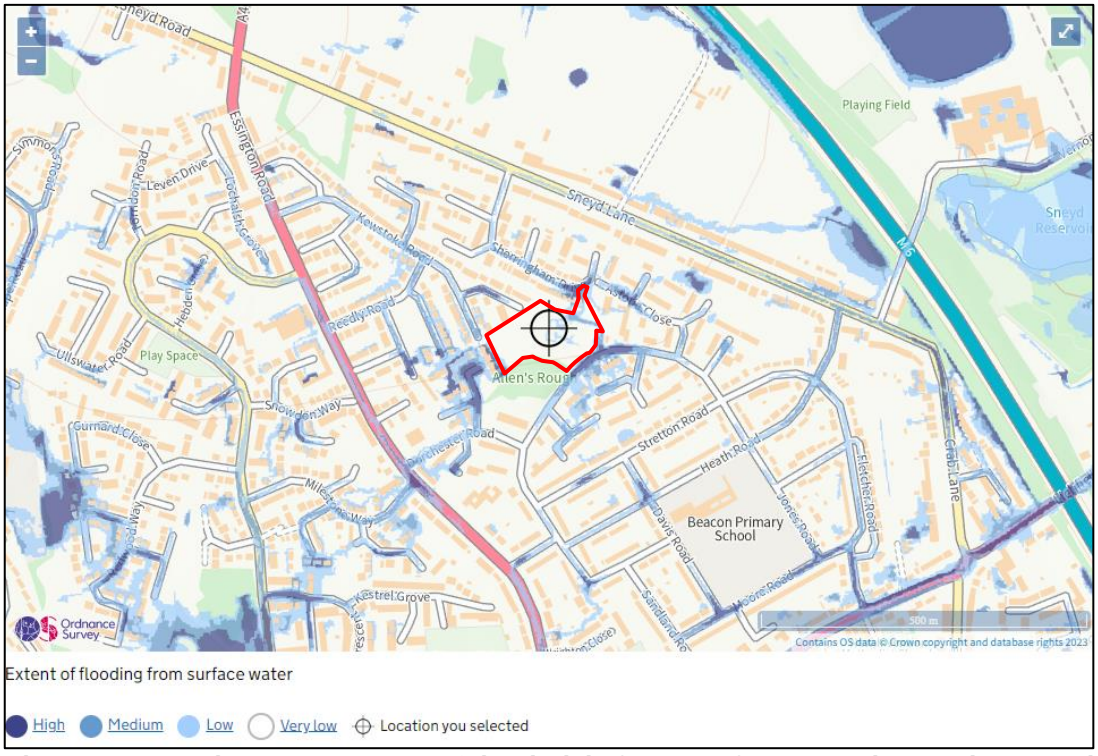


Figure 4.4: Environment Agency 'Flood risk from surface water' map (accessed January 2023)

The topography on site shows the site is relatively flat and therefore any surface water runoff will likely pool on-site. Runoff generated by the proposed development will need to be controlled to prevent surface water flooding elsewhere. This is discussed further in Section 7.

The resultant surface water flood risk is considered to be **very low-medium** based upon available information.

4.5.1 Climate change

Surface water flooding is likely to increase as a result of climate change in a similar ratio to fluvial flooding. Increased intensity and frequency of precipitation is likely to lead to reduced infiltration and increased overland flow. Climate change guidance was updated by the EA in May 2022.

4.6 Flooding from groundwater

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

The on-site ground investigation undertaken in December 2015 recorded groundwater strikes within eight window samples/boreholes from depths ranging between 1.5mbgl and 3.0mbgl.

From the above and due to the sporadic nature of groundwater flooding, the design of the development and the possibility of groundwater emergence at the site, it is unlikely that groundwater flooding would be a significant source of risk to the proposed development.

The resultant groundwater flood risk to the final development is considered to be **medium** based upon available information.

4.6.1 Climate change

Climate change could increase the risk of groundwater flooding as a result of increased precipitation filtering into the groundwater body. If winter rainfall becomes more frequent and heavier, groundwater levels may increase. Higher winter recharge may however be balanced by lower recharge during the predicted hotter and drier summers. This is less likely to cause a significant change to flood risk than from other sources, since groundwater flow is not as confined. It is probable that any locally perched aquifers may be more affected, but these are likely to be isolated. The change in flood risk is likely to be low.

4.7 Flooding from sewers

Flooding from artificial drainage systems occurs when flow entering a system, such as an urban storm water drainage system, exceeds its conveyance capacity, the system becomes blocked or it cannot discharge due to a high-water level in the receiving watercourse. A sewer flood is often caused by surface water drains discharging into the

combined sewer systems; sewer capacity is exceeded in large rainfall events causing the backing up of floodwaters within properties or discharging through manholes.

Most adopted surface water drainage networks are designed to the criteria set out in Sewers for Adoption. One of the design parameters is that sewer systems be designed such that no flooding of any part of the site occurs in a 1 in 30-year rainfall event. By definition a 1 in 100-year event would exceed the capacity of the sewer network as well as any proposed drainage.

Based on the site's previous use as a council building, there is a network of sewers surrounding the site, as noted in **Section 2.1.6**.

As there are existing public and private sewers within the site boundary, then the risk from sewer flooding is considered **medium**.

Development has the potential to cause an increase in impermeable area, an associated increase in surface water runoff rates and volumes, and a consequent potential increase in downstream flood risk due to overloading of sewers, watercourses, culverts and other drainage infrastructure.

To ensure that sewer and surface water flooding is not exacerbated; surface water must be considered within the design of the site. This ensures that any additional surface water and overland flows are managed correctly, to minimise flood risk to the site and the surrounding area. The proposed surface water network on the site should be designed to ensure exceedance of the network has been considered.

4.7.1 Climate change

The impact of climate change is likely to be negative regarding flooding from sewers. Increased rainfall and more frequent flooding put existing sewer and drainage systems under additional pressure resulting in the potential for more frequent surcharging and potential flooding. This would increase the frequency of local sewer flooding but would not be significant in terms of the proposed development.

4.8 Other sources of flooding

4.8.1 Reservoirs

Flood events can occur from a sudden release of large volumes of water from reservoirs, canals and artificial structures.

The EA reservoir flood map (reproduced as **Figure 4.5**) shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. Since this is a prediction of a worst-case scenario, it is unlikely that any actual flood would be this large.

The map shows the site is not risk of flooding from reservoirs.

Reservoirs can be managed over time, controlling inflow/outflow of water and therefore there is the capacity to control the effects of climate change. Increased rainfall has the potential to increase base flow, but this should be minimal. It is unlikely that there will be a substantial change to the risk of flooding for this site.

Reservoir flooding is also extremely unlikely. There has been no loss of life in the UK from reservoir flooding since 1925. Since then reservoir safety legislation has been introduced to ensure reservoirs are maintained.

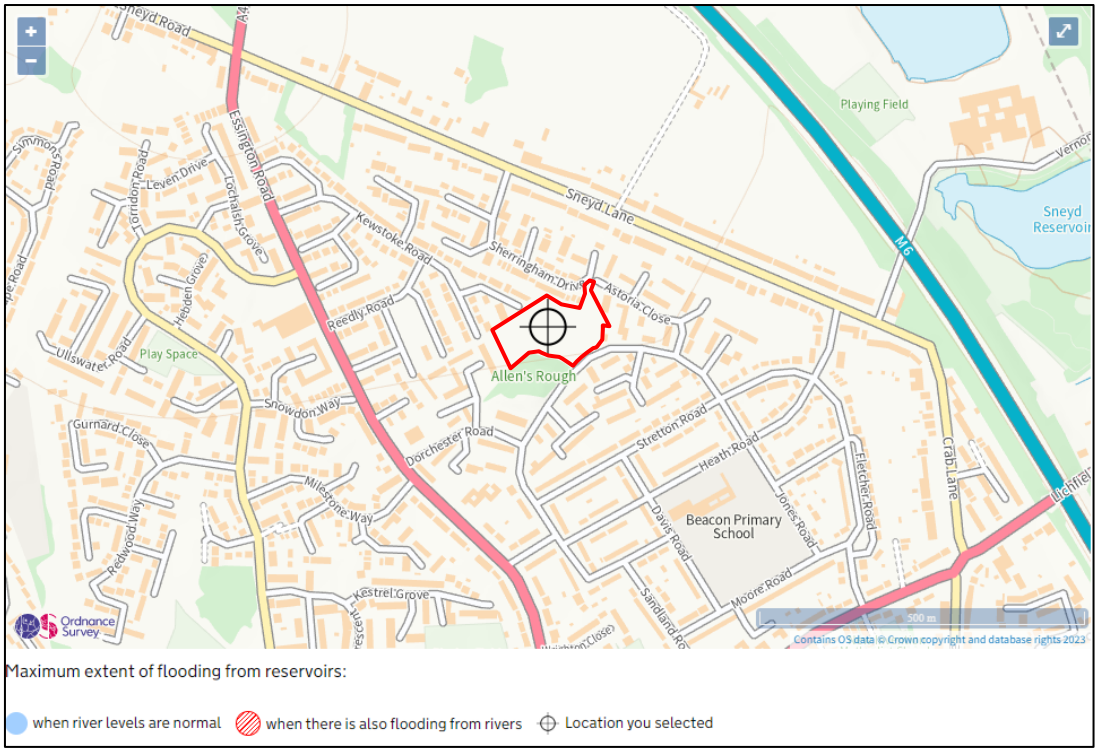


Figure 4.5: Environment Agency 'Flood risk from reservoirs' map (accessed January 2023)

The resultant flood risk from reservoirs is considered to be **very low**.

4.8.2 Canals

There are no canals within the immediate vicinity of the site. As a result, the risk to the site from this source is considered **very low**.

4.8.3 Blockages of artificial drainage systems

There is a possibility that flooding may result due to culverts and/or sewers being blocked by debris or structural failure. This can cause water to backup and result in localised flooding, as well as placing areas with lower ground levels at risk.

During the site walkover, an on-site disused drainage system was observed, thought to serve the removed building on-site. Some of the manholes had been removed and consequently blocked with debris, with the remainder lifted and surveyed during the topographical survey. It is thought this private system will be removed during the construction of the new development and a new drainage system constructed following the development. As such, the risk of flooding from artificial drainage systems is considered to be **very low**.

Climate change is unlikely to affect the flooding risk to the site from such blockages.

5 FLOOD MITIGATION MEASURES

5.1 Overview

The site lies within Flood Zone 1, as shown by the EA's Flood Map for Planning.

5.2 Finished floor levels

As the developable area will not be affected by fluvial flooding there is no need to incorporate any freeboard levels into the finished floor levels of the design. Low lying areas that could lead to ponding of surface flows will be avoided by careful design of finished levels.

5.3 Safe access/egress

As the site lies outside of the 1 in 1000 year fluvial / tidal flood extent, safe access and egress will be available even during the most extreme flooding scenarios.

5.4 Easements

There are no Main Rivers within close enough proximity to the site that require an easement.

Any consent works usually take place post planning, prior to construction, however, the principals of any development within the appropriate easements should be agreed at the planning stage.

The Severn Trent Water owned assets which cross the site require easements; being 10m in width for the surface water sewer and 6m in width for the foul sewer.

5.5 Flood compensation

The site is shown to be outside the 1 in 100 year climate change floodplain, so floodplain compensatory measures are not deemed necessary.

5.6 Groundwater flooding mitigation

Given the potential for elevated groundwater, the following mitigation measures should be considered and incorporated where feasible:

- Best practice should be followed for all new pipes/sewers to prevent the ingress of groundwater into the drainage systems;
- Non-return valves could also be fitted to prevent flooding within properties;

- Additional jointing/sealing should be incorporated in manholes;
- Consider use of groundwater interception systems to divert groundwater flows around below ground level obstructions.

6 PLANNING CONTEXT

6.1 Application of planning policy

Section 14 of the NPPF includes measures specifically dealing with development planning and flood risk using a sequential characterisation of risk based on planning zones and the EA Flood Map. The main study requirement is to identify the flood zones and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions.

6.2 Land use vulnerability

Planning Practice Guidance (PPG) includes a list of appropriate land uses in each flood zone dependent on vulnerability to flooding. In applying the Sequential Test, reference is made to **Table 6.1** below, reproduced from Table 2 of PPG.

Table 6.1: Flood risk vulnerability and flood zone 'compatibility'

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	Appropriate	Appropriate	Appropriate	**Appropriate**	Appropriate
	Zone 2	Appropriate	Appropriate	Exception Test Required	Appropriate	Appropriate
	Zone 3a	Exception Test Required	Appropriate	Should not be permitted	Exception Test Required	Appropriate
	Zone 3b functional floodplain	Exception Test Required	Appropriate	Should not be permitted	Should not be permitted	Should not be permitted

With reference to Table 2 of the PPG, the proposed development, based on its proposed residential end-use, is classed as 'More Vulnerable'. This classification of development requires the 'Exception Test' for development within Flood Zone 3, and therefore the development is considered appropriate.

6.3 Sequential Test

The Sequential Test is required to assess flood risk and the PPG recommends that the test be applied at all stages of the planning process to direct new development to areas with the lowest probability of flooding where possible. In line with Table 2 of the PPG, the

site therefore satisfies the flood risk elements of the sequential test and thus the exception test will not be required.

7 SURFACE AND FOUL WATER DRAINAGE ASSESSMENT

7.1 Scope

This section discusses the potential quantitative effects of the development on both the risk of surface water flooding on-site and elsewhere within the catchment, as well as the type of potential SuDS features that could be incorporated as part of the masterplan.

The NPPF states that SuDS should be considered wherever practical. The use of SuDS is also encouraged by regional and local policy.

In accordance with the Defra Non-Statutory Technical Standards[15], the surface water drainage strategy should seek to implement a SuDS hierarchy that aspires to achieve reductions in surface water runoff rates to greenfield rates. Where a reduction to the greenfield rate is not practicable, the proposed surface water drainage strategy should not exceed the existing runoff rate.

In addition, Building Regulations Part H[16] requires that the first choice of surface water disposal should be to discharge to an adequate soakaway or infiltration system, where practicable. If this is not reasonably practicable then discharge should be to a watercourse, the least favourable option being to a sewer (surface water before combined). Infiltration techniques should therefore be applied wherever they are appropriate.

7.2 Pre-development situation

The existing site area is 1.32Ha and approximately 37% impermeable.

The pro-rata IoH 124[17] method has been used to estimate the Greenfield surface water runoff for the site. Calculations are contained in **Appendix G**.

Table 7.1: IOH 124 surface water runoff for 1.32Ha (total site area)

Return period	Peak flow (l/s)
QBar	5.8
1 in 1 year	4.8
1 in 30 year	11.4
1 in 100 year	14.9

[15] DEFRA, 'Sustainable Drainage Systems - Non-statutory technical standards for sustainable drainage systems', March 2015.

[16] HM Government (2010 with 2013 amendments), 'The Building Regulations 2010: Approved Document H - Drainage and Waste Disposal (2002 Edition incorporating 2010 amendments)'.

[17] Institute of Hydrology (IoH), 'Flood Estimation for small catchments - Report 124', 1994.

Table 7.2: IOH 124 surface water runoff for 0.83Ha (existing greenfield)

Return period	Peak flow (l/s)
QBar	3.6
1 in 1 year	3.0
1 in 30 year	7.1
1 in 100 year	9.4

As a developed site, the pre-development surface water runoff from the site has been calculated for a range of return periods using the Modified Rational method. The Modified Rational method uses the following equation to calculate peak runoff rate from an area:

Q = 2.78 Cv Cr i A

Where:

2.78 = Coefficient which accounts for the differences in units used for the inputs and the outputs of the equation.

Cv = Volumetric Runoff Coefficient - a co-efficient that describes the proportion of rainfall appearing in the surface water drainage system, assumed to be 0.95 for impermeable areas

Cr = Routing Coefficient - a routing co-efficient added to the Rational Method to represent runoff characteristics of a particular site or area in a more accurate manner, assumed to be 1.3 for urban areas

i = Rainfall Intensity (mm/hr) based on a 1 hour rainfall event

A = Area (0.49ha)

Table 7.3: Modified Rational Method pre-development surface water runoff (0.49Ha)

Return period	Rainfall Intensity (mm)	Peak flow (l/s)
QBar	13.92	23.42
1 in 1 year	9.53	16.03
1 in 30 year	32.41	54.52
1 in 100 year	44.90	75.54

Rainfall data has been taken from the Depth Duration Frequency rainfall calculator contained within the FEH 2013 web service.

The total runoff from the site from the greenfield and brownfield areas is summarised in **Table 7.4**.

Table 7.4: Total runoff from the site

Return period	Brownfield (l/s)	Greenfield (l/s)	Total Site (l/s)
QBar	23.42	3.60	27.02
1 in 1 year	16.03	3.00	19.03
1 in 30 year	54.52	7.10	61.62
1 in 100 year	75.54	9.40	84.94

7.3 Post-development situation

The proposed development is for a residential end use. This will result in a potential increase in impermeable area and surface water runoff across the site. It will therefore be necessary to manage surface water on-site through conveyance towards the proposed point of discharge, whilst providing sufficient attenuation for all events up to the 1 in 100 year event inclusive of 40% climate change (based on latest climate change guidance).

7.3.1 Point of discharge

Discharge options from the site have been considered in line with the SuDS hierarchy, as follows.

7.3.1.1 Infiltration

Infiltration should be considered as the primary option to discharge surface water from the developed study area. The effectiveness of infiltration is completely dependent on the physical conditions at the study area. Potential obstacles include:

- Local variations in permeability preventing infiltration - It is understood from the local geology that the site is situated on an area of Pennine Middle Coal Measures, which is not considered suitable for the use of soakaways due to its low permeability. The site investigation confirms the geology of Made Ground over superficial deposits of clays and sands, underlain by Coal Measures.
- Shallow groundwater table - For infiltration drainage devices, Building Regulation approved document H2 states that these *"should not be built in ground where the water table reaches the bottom of the device at any time of the year"*. Groundwater was struck within eight of the window samples/boreholes in the site investigation ranging from depths between 1.5mbgl and 3.0mbgl.
- Source Protection Zones - The study area is not located within a Groundwater Source Protection Zone.

From the information available, infiltration is not considered a viable option as part of the drainage strategy.

7.3.1.2 Discharge to watercourse

The are no watercourses in the vicinity of the site which can be used as a point of connection.

7.3.1.3 Discharge to surface water sewer

Discharging surface water to the on-site public surface water sewer is considered the most feasible option for the site. A pre-development enquiry has been submitted to Severn Trent Water; their response can be found in **Appendix H**. Severn Trent Water have confirmed connection to the on-site surface water sewer at MH SJ97023155.

7.3.2 Discharge rate

The discharge rate from the site is to be limited to 5.8l/s, in line with West Midlands SuDS policy[18].

The policy states that *"for developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 100% Annual Exceedance Probability rainfall event and the 1% Annual Exceedance Probability rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.*"

Confirmation of the discharge rate from Severn Trent Water can be found in **Appendix G**, where a rate of at 5 l/s/ha has been confirmed.

7.3.3 Storage estimates

To determine the volume of attenuation storage that would be required on the site, the WinDes ' 4-Stage Design Guide' tool has been used. This allows for an attenuation figure to be calculated based upon basin dimensions, rainfall values and permitted discharge rates. These volumes can be later revised at detail design stage by the introduction of specific flow control methods. Calculations are based upon providing one attenuation tank.

The attenuation tank is designed to be located within the western extent of the site beneath the main road and car parking spaces. The tank has used the following design parameters:

- A developable area catchment of 1.32ha;
- An impermeable area based on 55% of developable area equating to 0.73ha;
- A discharge rate of 5.8l/s based on the QBAR rate as detailed in **Table 7.1**.

To best suit the development, an attenuation tank will be located within the western extent of the site, with an indicative design that includes 1.2m of cover, and a maximum depth of 1.3m. The total surface area of the tank will be approximately 300m^2.

[18] Sustainable Drainage Systems (SuDS) Handbook, Arcadis Consulting (UK) Limited, 2019

It has been calculated with the above parameters that the attenuation will need to provide a minimum volume of **390m³** to attenuate surface water run-off without flooding during a 1 in 100 year event inclusive of 40% climate change.

Further details on the storage structure and sizing, with attenuation calculations can be found in **Appendix I**.

7.3.4 Proposed drainage strategy

The proposed indicative drainage design outlines the following detail regarding surface water drainage:

- Following the SuDS Hierarchy, infiltration based methods of surface water disposal are not deemed suitable and there are no suitable watercourses within the vicinity of the site to connect to. Therefore connection to the on-site surface water sewer is being utilised. Discharge of surface water runoff from the attenuation tank on-site will ultimately be to the on-site surface water sewer;
- A total developable area of 1.32ha will drain towards a tank based on topography and gravitational connections via conventional surface water pipes;
- The surface water runoff will be discharged at a restricted rate, in line with the QBAR greenfield rate. The total discharge will be restricted to 5.8l/s using flow control devices equivalent to the greenfield QBAR rate as shown in **Table 7.1**;
- The tank will provide surface water storage and attenuation for the 1 in 100 year storm plus 40% climate change event.

The dimensions, volumes and location of the SuDS features will need to be revised as the masterplan develops and during the detailed planning stage. Detailed design of individual features is not part of the scope of this report. Preliminary design criteria have been based upon guidance given in the CIRIA publication 'The SUDS Manual'[19].

Temporary drainage should be established for the construction phase of development to prevent silt mobilisation, potentially impacting on flow regimes and silt pollution downstream. The construction of SuDS should be considered in the early stages of site design.

7.4 Foul drainage provision

Foul drainage will be connected into the public foul network as per the existing scenario. Detailed foul drainage work is outside the scope of the assessment. Severn Trent Water have confirmed connection to the on-site foul sewer, at MH SJ97023104, confirmation can be found in **Appendix H**.

[19] CIRIA, 'The SUDS Manual – C753', 2015.

8 CONCLUSIONS AND RECOMMENDATIONS

This FRA complies with the NPPF and Planning Practice Guidance and demonstrates that flood risk from all sources has been considered in the proposed development. It is also consistent with the Local Planning Authority requirements with regard to flood risk.

The site lies in an area designated by the EA as Flood Zone 1.

NPPF sets out a Sequential Test, which states that preference should be given to development located within Flood Zone 1. This flood risk assessment demonstrates that the requirements of the Sequential Test have been met, with the site located within Flood Zone 1 and 'More Vulnerable' classification of the development.

This flood risk assessment has considered multiple sources of flooding and concluded the following:

Table 8.1: Flood risk summary

Source	Level of risk	Summary
Fluvial	Very Low Flood Zone 1	None required due to location within Flood Zone 1.
Tidal	Very Low	The site is inland and elevated.
Surface water	Very Low-Medium	The development will incorporate a surface water drainage strategy to accommodate surface water generated on site. Surface water will be attenuated on-site and discharged directly to the on-site surface water sewer.
Groundwater	Medium	Due to the elevated groundwater levels encountered during site investigation, the mitigation measures detailed in section 5.6 should be considered to help reduce the risk to the development from this source.
Sewers	Low	Ongoing maintenance of the on-site systems should be undertaken to prevent the risk from blockages.
Reservoirs	Very Low	The site is not shown to lie within the mapped reservoir flood risk area.
Canals	Very Low	There are no canals within the immediate vicinity of the site

Source	Level of risk	Summary
Artificial sources	Very Low	The existing private drainage on-site is likely to be removed following development, and as such will not pose a risk to the site.

Overall, taking into account the above points, the development of the site should not be precluded on flood risk grounds.

APPENDIX A
RSK GROUP SERVICE CONSTRAINTS

1. This report and the drainage design carried out in connection with the report (together the "Services") were compiled and carried out by RSK LDE Ltd (RSK) for Walsall Council (the "client") in accordance with the terms of a contract between RSK and the "client". The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable civil engineer at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.

2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.

3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.

4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.

5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.

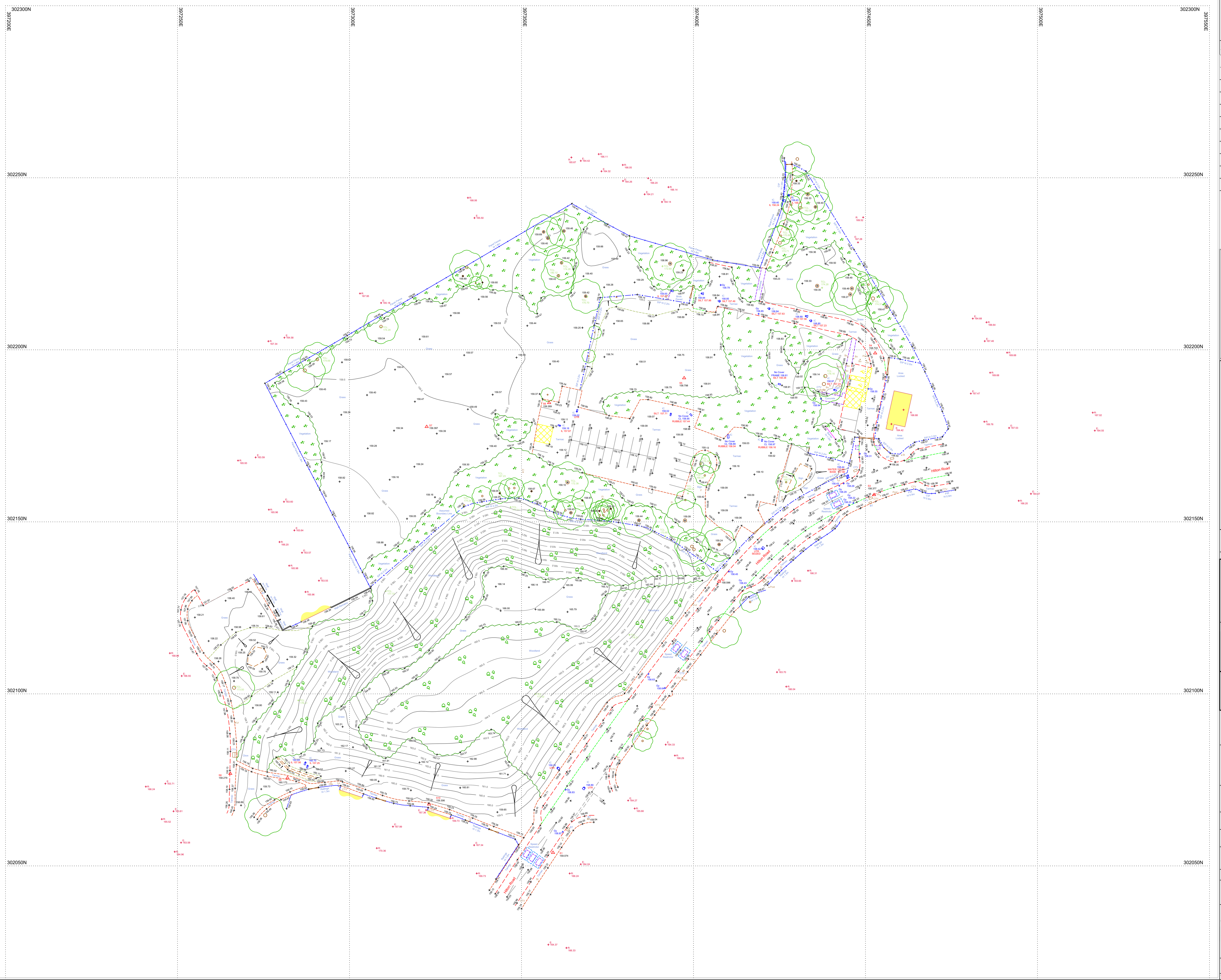
6. The observations and conclusions described in this report are based solely upon the Services, which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.

7. The Services are based upon RSK's observations of existing physical conditions at the site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.

8. The phase II or intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (boreholes, trial pits etc) annotated on site plans are not drawn to scale but are centred over the appropriate location. Such features should not be used for setting out and should be considered indicative only.

APPENDIX B
TOPOGRAPHICAL SURVEY



N

Station Information:

Station	Easting (m)	Northing (m)	Level (m)
S1	397359.182	302053.854	159.074
S2	397407.441	302132.708	158.596
S3	397452.512	302157.850	158.377
S4	397452.831	302199.026	158.722
S5	397397.303	302191.798	158.798
S6	397358.054	302184.602	159.269
S7	397322.452	302177.642	159.397
S8	397265.367	302076.819	158.279
S9	397281.982	302075.561	160.173
S10	397323.132	302067.913	159.306

OS Note:

Surveyed Buildings

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36(15) via Global Navigational Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

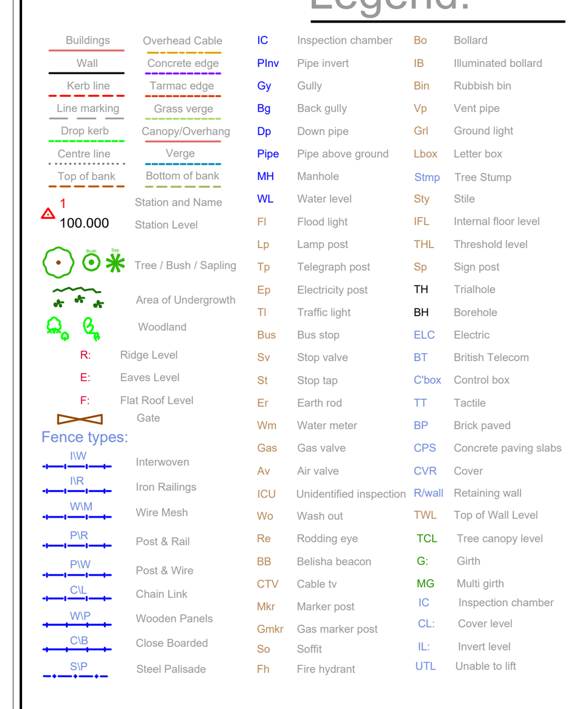
A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.

The survey has been correlated to this point and a further one or more OSGB36 (15) points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Legend:



Rev	Date	Description	Drawn	Q. Ref
1	19.08.22	Manhole inverts added	LMc	GH14594

greenhatch group

Topographical Surveys · Site Engineering · Utility / CCTV Surveys · Measured Building Surveys · 3D Laser Scanning · Revit & BIM Models

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CLIENT
Pick Everard

PROJECT
The Allens Centre
Willenhall
WV12 5XB

TITLE
Topographical Survey

SCALE	DATE
A1@ 1: 500	15/08/22
DRAWN	QUALITY REF
TS	GH14545

Level datum	See note
Grid orientation	See note
Job number	44778

Drawing No.	Rev.
44778_T	1

Comments
This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions should be checked on site prior to design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:

APPENDIX C
PHOTOGRAPH LOG

RSK	Report No: 680535-R1(00)-FRA	PHOTOGRAPHIC LOG

Client name: Walsall Council	**Site Location:** Allen's Centre, Willenhall

Photo No.	**Date:**
1	10.08.22

Description:

Palisade fence site access from Hilton Road.

Note: One roadside gulley in the site entrance.

Photo No.	**Date:**
2	10.08.22

Description:

Gulley in the site entrance. The gulley was blocked with leaf litter at the time of the walkover.

RSK	Report No: 680535-R1(00)-FRA	PHOTOGRAPHIC LOG

Client name: Walsall Council	**Site Location:** Allen's Centre, Willenhall

Photo No.	**Date:**
3	10.08.22

Description:

Hardstanding car parking spaces and walkway directly on-site from the site entrance. No draining features were observed.

Photo No.	**Date:**
4	10.08.22

Description:

Hardstanding path along eastern side of the site, taken looking north.

5 no. manholes were located along this walkway and were unable to be lifted with manhole keys at the time of the site visit.

RSK	Report No: 680535-R1(00)-FRA	PHOTOGRAPHIC LOG

Client name: Walsall Council	**Site Location:** Allen's Centre, Willenhall

Photo No.	**Date:**
5	10.08.22

Description:

A gulley located on the eastern path.

Note: this was the only gulley observed on-site at the time of the walkover.

Photo No.	**Date:**
6	10.08.22

Description:

The eastern path extends north through a palisade gate entrance to the northern extent of the site.

RSK	Report No: 680535-R1(00)-FRA	PHOTOGRAPHIC LOG

Client name:
Walsall Council

Site Location:
Allen's Centre, Willenhall

Photo No.	**Date:**
7	10.08.22

Description:

From the eastern path, a second footpath extends east, emerging at Sherringham Drive. Two manholes are located on this footpath. The photo is taken looking west.

Photo No.	**Date:**
8	10.08.22

Description:

A view across the western extent of the site. No drainage features were observed.

RSK	Report No: 680535-R1(00)-FRA	PHOTOGRAPHIC LOG

Client name: Walsall Council	**Site Location:** Allen's Centre, Willenhall

Photo No.	**Date:**
9	10.08.22

Description:

A view across the southern car park.

Photo No.	**Date:**
10	10.08.22

Description:

Multiple manholes were located within the car park.

RSK	Report No: 680535-R1(00)-FRA	PHOTOGRAPHIC LOG

Client name: Walsall Council	**Site Location:** Allen's Centre, Willenhall

Photo No.	**Date:**
11	10.08.22

Description:

A manhole without a cover was located within the previously used disabled car parking spaces.

Photo No.	**Date:**
12	10.08.22

Description:

The manhole was littered and had no standing water within it, with no obvious outlet.

RSK	Report No: 680535-R1(00)-FRA	PHOTOGRAPHIC LOG

Client name: Walsall Council	**Site Location:** Allen's Centre, Willenhall

Photo No.	**Date:**
13	10.08.22

Description:

A second manhole without a cover was located within the car parking spaces to the south.

Photo No.	**Date:**
14	10.08.22

Description:

The manhole contained no standing water and looked as if water would drain south towards Hilton Road.

RSK	Report No: 680535-R1(00)-FRA	PHOTOGRAPHIC LOG

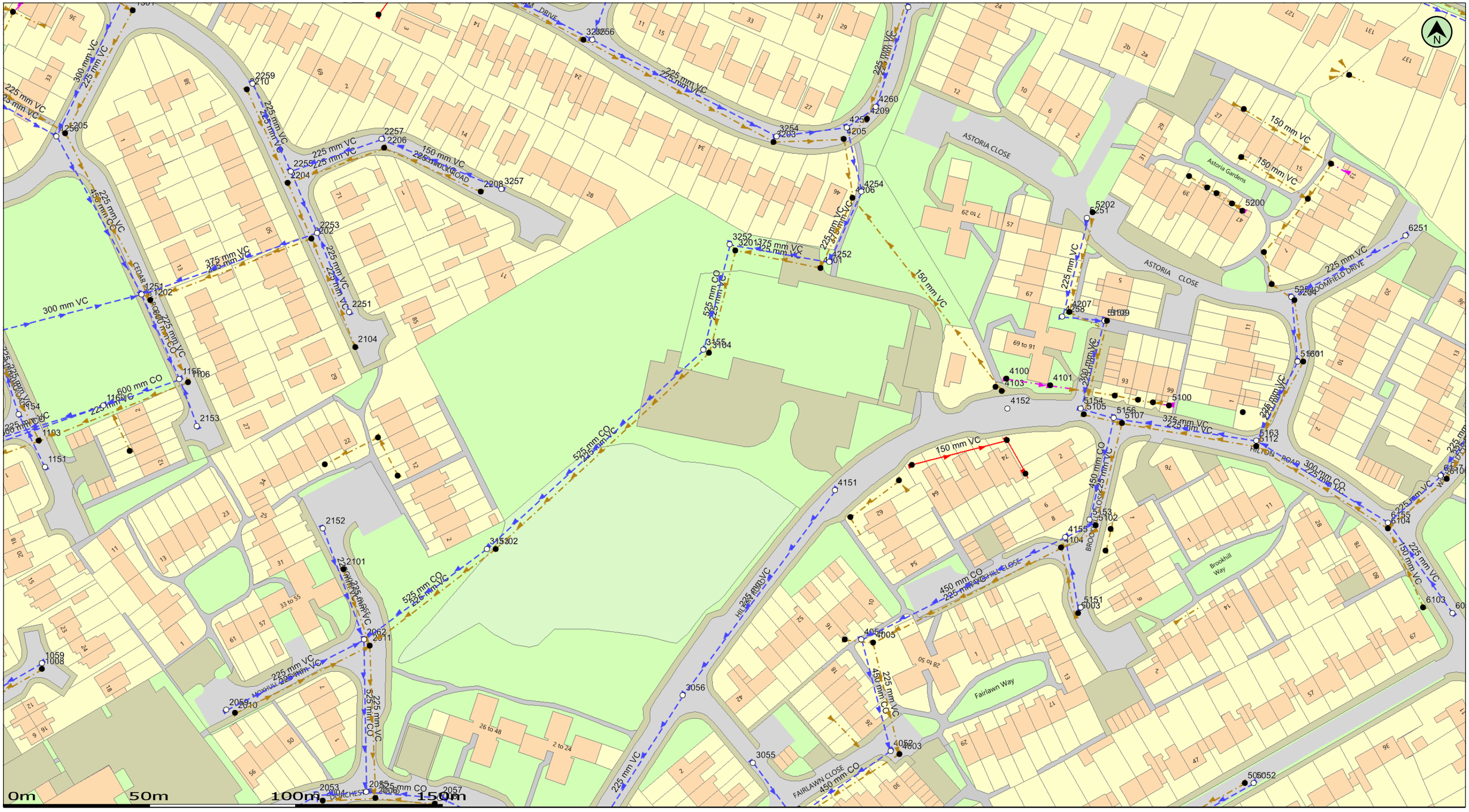
Client name: Walsall Council	**Site Location:** Allen's Centre, Willenhall

Photo No.	**Date:**
15	10.08.22

Description:

Numerous roadside gullies and manholes on the pavement, outside the site boundary, were located on Hilton Road.

APPENDIX D
SEWER RECORDS



Date: 15/08/22 | Scale: 1:1250 | Map Centre: 397385,302170 | Data updated: 14/07/22 | Our Ref: 925797 - 1 | Wastewater Plan A3

- Public Foul Gravity/Lateral Drain
- Public Combined Gravity/Lateral Drain
- Public Surface Water Gravity/Lateral Drain
- Pressure Foul
- Pressure Combined
- Pressure Surface Water
- Highway Drain
- Overflow Pipe
- Disposal Pipe
- Culverted Water Course
- Pumping Station
- Fitting
- Manhole Foul
- Manhole Surface
- Abandoned Pipe
- Chamber

Section 104 sewers are shown in green

Private sewers are shown in magenta

ewalker@rsk.co.uk

Allens Centre

SEVERN TRENT

GENERAL CONDITIONS AND PRECAUTIONS TO BE TAKEN WHEN CARRYING OUT WORK ADJACENT TO SEVERN TRENT WATER'S APPARATUS

Please ensure that a copy of these conditions is passed to your representative and/or your contractor on site. If any damage is caused to Severn Trent Water Limited (STW) apparatus (defined below), the person, contractor or subcontractor responsible must inform STW immediately on:
0800 783 4444 (24 hours)

a) These general conditions and precautions apply to the public sewerage, water distribution and cables in ducts including (but not limited to) sewers which are the subject of an Agreement under Section 104 of the Water Industry Act 1991(a legal agreement between a developer and STW, where a developer agrees to build sewers to an agreed standard, which STW will then adopt); mains installed in accordance with an agreement for the self-construction of water mains entered into with STW and the assets described at condition b) of these general conditions and precautions. Such apparatus is referred to as “STW Apparatus” in these general conditions and precautions.

b) Please be aware that due to The Private Sewers Transfer Regulations June 2011, the number of public sewers has increased, but many of these are not shown on the public sewer record. However, some idea of their positions may be obtained from the position of inspection covers and their existence must be anticipated.

c) On request, STW will issue a copy of the plan showing the approximate locations of STW Apparatus although in certain instances a charge will be made. The position of private drains, private sewers and water service pipes to properties are not normally shown but their presence must be anticipated. This plan and the information supplied with it is furnished as a general guide only and STW does not guarantee its accuracy.

d) STW does not update these plans on a regular basis. Therefore the position and depth of STW Apparatus may change and this plan is issued subject to any such change. Before any works are carried out, you should confirm whether any changes to the plan have been made since it was issued.

e) The plan must not be relied upon in the event of excavations or other works in the vicinity of STW Apparatus. It is your responsibility to ascertain the precise location of any STW Apparatus prior to undertaking any development or other works (including but not limited to excavations).

f) No person or company shall be relieved from liability for loss and/or damage caused to STW Apparatus by reason of the actual position and/or depths of STW Apparatus being different from those shown on the plan.

In order to achieve safe working conditions adjacent to any STW Apparatus the following should be observed:

1. All STW Apparatus should be located by hand digging prior to the use of mechanical excavators.

2. All information set out in any plans received from us, or given by our staff at the site of the works, about the position and depth of the mains, is approximate. Every possible precaution should be taken to avoid damage to STW Apparatus. You or your contractor must ensure the safety of STW Apparatus and will be responsible for the cost of repairing any loss and/or damage caused (including without limitation replacement parts).

3. Water mains are normally laid at a depth of 900mm. No records are kept of customer service pipes which are normally laid at a depth of 750mm; but some idea of their positions may be obtained from the position of stop tap covers and their existence must be anticipated.

4. During construction work, where heavy plant will cross the line of STW Apparatus, specific crossing points must be agreed with STW and suitably reinforced where required. These crossing points should be clearly marked and crossing of the line of STW Apparatus at other locations must be prevented.

5. Where it is proposed to carry out piling or boring within 20 metres of any STW Apparatus, STW should be consulted to enable any affected STW Apparatus to be surveyed prior to the works commencing.

6. Where excavation of trenches adjacent to any STW Apparatus affects its support, the STW Apparatus must be supported to the satisfaction of STW. Water mains and some sewers are pressurised and can fail if excavation removes support to thrust blocks to bends and other fittings.

7. Where a trench is excavated crossing or parallel to the line of any STW Apparatus, the backfill should be adequately compacted to prevent any settlement which could subsequently cause damage to the STW Apparatus. In special cases, it may be necessary to provide permanent support to STW Apparatus which has been exposed over a length of the excavation before backfilling and reinstatement is carried out. There should be no concrete backfill in contact with the STW Apparatus.

8. No other apparatus should be laid along the line of STW Apparatus irrespective of clearance. Above ground apparatus must not be located within a minimum of 3 metres either side of the centre line of STW Apparatus for smaller sized pipes and 6 metres either side for larger sized pipes without prior approval. No manhole or chamber shall be built over or around any STW Apparatus.

9. A minimum radial clearance of 300 millimetres should be allowed between any plant or equipment being installed and existing STW Apparatus. We reserve the right to increase this distance where strategic assets are affected.

10. Where any STW Apparatus coated with a special wrapping is damaged, even to a minor extent, STW must be notified and the trench left open until the damage has been inspected and the necessary repairs have been carried out. In the case of any material damage to any STW Apparatus causing leakage, weakening of the mechanical strength of the pipe or corrosion-protection damage, the necessary remedial work will be recharged to you.

11. It may be necessary to adjust the finished level of any surface boxes which may fall within your proposed construction. Please ensure that these are not damaged, buried or otherwise rendered inaccessible as a result of the works and that all stop taps, valves, hydrants, etc. remain accessible and operable. Minor reduction in existing levels may result in conflict with STW Apparatus such as valve spindles or tops of hydrants housed under the surface boxes. Checks should be made during site investigations to ascertain the level of such STW Apparatus in order to determine any necessary alterations in advance of the works.

12. With regard to any proposed resurfacing works, you are required to contact STW on the number given above to arrange a site inspection to establish the condition of any STW Apparatus in the nature of surface boxes or manhole covers and frames affected by the works. STW will then advise on any measures to be taken, in the event of this a proportionate charge will be made.

13. You are advised that STW will not agree to either the erection of posts, directly over or within 1.0 metre of valves and hydrants,

14. No explosives are to be used in the vicinity of any STW Apparatus without prior consultation with STW.

TREE PLANTING RESTRICTIONS

There are many problems with the location of trees adjacent to sewers, water mains and other STW Apparatus and these can lead to the loss of trees and hence amenity to the area which many people may have become used to. It is best if the problem is not created in the first place. Set out below are the recommendations for tree planting in close proximity to public sewers, water mains and other STW Apparatus.

15. Please ensure that, in relation to STW Apparatus, the mature root systems and canopies of any tree planted do not and will not encroach within the recommended distances specified in the notes below.

16. Both Poplar and Willow trees have extensive root systems and should not be planted within 12 metres of a sewer, water main or other STW Apparatus.

17. The following trees and those of similar size, be they deciduous or evergreen, should not be planted within 6 metres of a sewer, water main or other STW Apparatus. E.g. Ash, Beech, Birch, most Conifers, Elm, Horse Chestnut, Lime, Oak, Sycamore, Apple and Pear. Asset Protection Statements Updated May 2014

18. STW personnel require a clear path to conduct surveys etc. No shrubs or bushes should be planted within 2 metre of the centre line of a sewer, water main or other STW Apparatus.

19. In certain circumstances, both STW and landowners may wish to plant shrubs/bushes in close proximity to a sewer, water main of other STW Apparatus for screening purposes. The following are shallow rooting and are suitable for this purpose: Blackthorn, Broom, Cotoneaster, Elder, Hazel, Laurel, Privet, Quickthorn, Snowberry, and most ornamental flowering shrubs.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
	C			
	C			
	C			
	C			
	C			
	F			
	F			
	F			
	F			
	F			
	F			
	F			
	F			
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	F			
	F			
	F			
	F			
	F			
	F			
	F			
	F			
	F			
	F			
	F			
1008	F	159.49	157.63	1.86
1103	F	159.78	157.26	2.52
1106	F	159.43	157.7	1.73
1202	F	159.68	157.85	1.83
1205	F	161.84	158.24	3.6
1301	F	162.46	159.43	3.03
2004	F	158.27	154.29	3.99
2006	F	158.5	154.32	4.18
2008	F	158.71	0	0
2010	F	158.57	155.47	3.1
2011	F	158.07	154.82	3.25
2101	F	157.83	156.06	1.77
2104	F	159.7	158.36	1.34
2202	F	160.03	158.01	2.02
2204	F	160.28	158.34	1.94
2206	F	159.82	158.65	1.17
2208	F	160.08	158.91	1.17

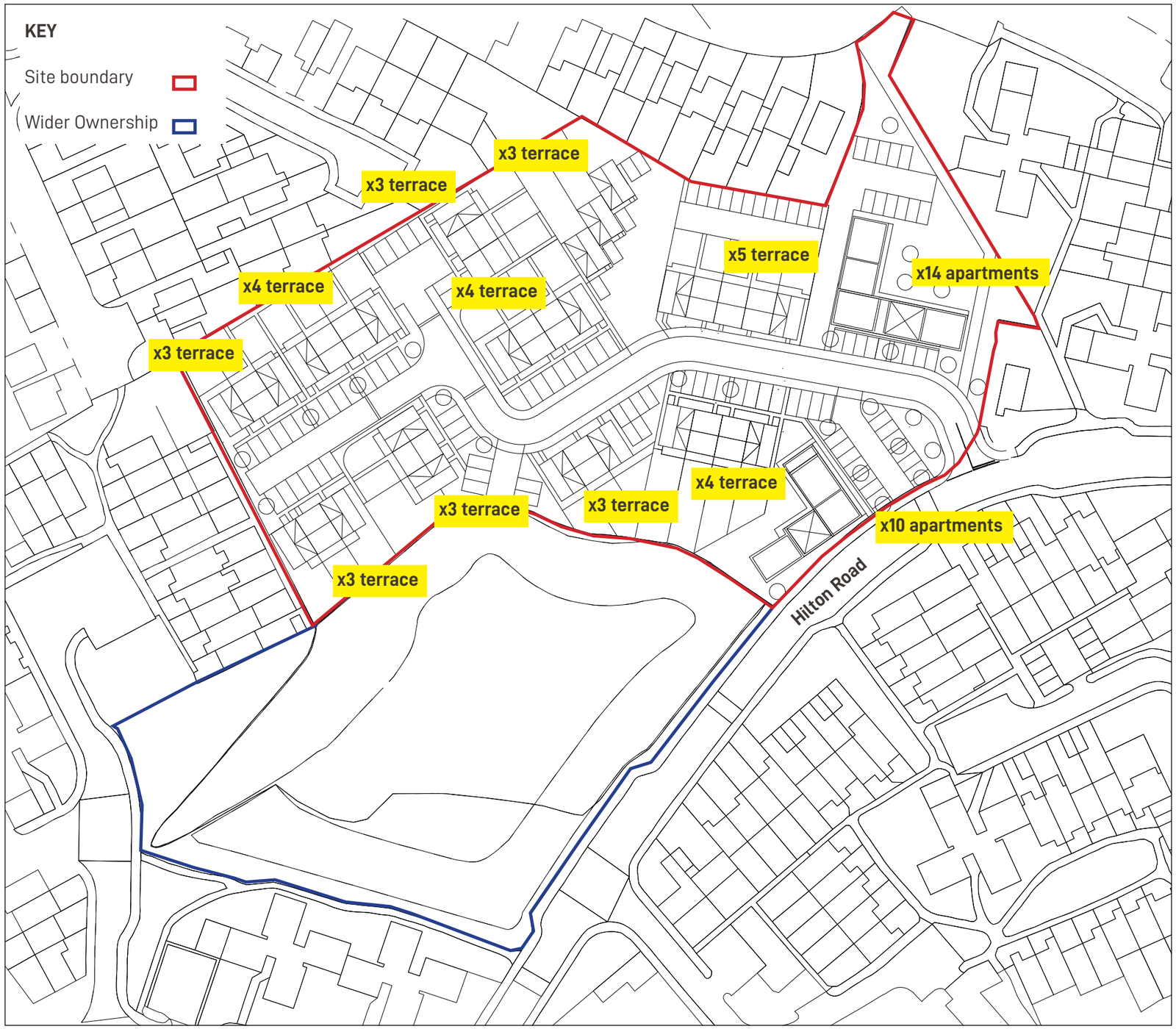
Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
3104	F	158.5	0	0
3201	F	159.17	155.76	3.41
3203	F	159.01	156.66	2.35
3205	F	160.1	157.8	2.3
4003	F	158.88	156.33	2.55
4005	F	158.39	0	0
4100	F	-	0	0
4101	F	-	0	0
4103	F	158.54	157.11	1.43
4104	F	159.35	156.81	2.54
4201	F	159.05	0	0
4205	F	158.96	156.42	2.54
4206	F	159.38	156.21	3.17
4207	F	159.26	0	0
4209	F	159.1	156.55	2.55
5001	F	158.87	157.19	1.68
5003	F	159.05	0	0
5100	F	-	0	0
5102	F	158.75	0	0
5105	F	158.55	156.96	1.59
5107	F	158.64	156.94	1.7
5109	F	159.3	157.11	2.19
5111	F	158.72	157.14	1.58
5112	F	158.99	157.11	1.88
5200	F	-	0	0
5202	F	158.55	0	0
5204	F	159.08	157.45	1.63
6103	F	159.21	158.11	1.1
6104	F	159.01	157.2	1.81
6106	F	158.83	157.23	1.6
1059	S	159.48	157.99	1.49
1151	S	159.7	158.72	0.98
1154	S	159.95	158.62	1.33
1155	S	159.45	157.89	1.56
1160	S	159.71	156.96	2.75
1251	S	159.68	158.07	1.61
1256	S	161.84	158.66	3.18
2053	S	158.29	154.46	3.83
2055	S	158.49	155.6	2.89
2057	S	158.72	154.88	3.84
2059	S	158.61	156.02	2.59
2062	S	158.07	155.25	2.82
2152	S	157.7	155.89	1.81
2153	S	159.29	158.11	1.18
2251	S	159.76	158.66	1.1
2253	S	160	158.48	1.52
2255	S	160.27	158.77	1.5
2257	S	159.81	159.07	0.74

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
3056	S	158.84	155.95	2.89
3153	S	159.11	155.67	3.44
3155	S	158.5	156.08	2.42
3252	S	159.17	156.06	3.11
3254	S	159.04	157.16	1.88
3256	S	160.07	158.17	1.9
3257	S	160.06	159.24	0.82
4052	S	158.88	155.67	3.21
4054	S	158.41	0	0
4151	S	158.37	156.38	1.99
4152	S	-	0	0
4155	S	159.29	156.1	3.19
4252	S	159.05	0	0
4253	S	158.97	156.84	2.13
4254	S	159.38	156.74	2.64
4258	S	159.29	0	0
4260	S	159.14	156.96	2.18
4354	S	159.65	157.69	1.96
5052	S	158.98	157.31	1.67
5151	S	159.05	0	0
5153	S	158.74	0	0
5154	S	158.54	156.32	2.22
5156	S	158.62	156.23	2.39
5158	S	159.3	156.66	2.64
5160	S	158.71	156.86	1.85
5163	S	158.99	156.65	2.34
5251	S	158.55	0	0
5253	S	159.11	157.06	2.05
6055	S	158.84	157.32	1.52
6155	S	159.02	156.85	2.17
6157	S	158.83	157.01	1.82
6251	S	158.87	157.27	1.6

2210	F	161.3	158.59	2.71
3102	F	159.06	155.12	3.94

2259	S	161.47	158.94	2.53
3055	S	158.74	156.07	2.67

APPENDIX E
PROPOSED DEVELOPMENT PLAN



Notes

Numbers and mix

59 dwellings in total

17x 2 bed houses
18x 3 bed houses

15x 1 bed apartments
9x 2 bed apartments

Total:

15x 1 bed (22%)
30x 2 bed (47%)
18x 3 bed (31%)

Parking

1x space per 1 bed
2x space per 2+ bed
7 visitor spaces

113 parking spaces in total

Lambert Smith Hampton

Illustrative masterplan

Project	Allen's Centre		
Client	Walsall Council		
Date	19.01.23		
No.	SK04	**Rev.**	-
Author	RCJ	**Scale**	1:1000 @ A3

APPENDIX F
ENVIRONMENT AGENCY DATA

Emma Walker

Subject: FW: Our Ref 274736 -Flood Information Request - 680535 The Allens Centre, Willenhall
Attachments: Location Plan.pdf; Supporting Information FZ1.pdf

From: Enquiries_Westmids <Enquiries_Westmids@environment-agency.gov.uk>
Sent: 16 August 2022 13:33
To: Emma Walker <EWalker@rsk.co.uk>
Subject: Our Ref 274736 -Flood Information Request - 680535 The Allens Centre, Willenhall

Dear Emma Walker,

In regards to your enquiry the majority of the request is covered by the below product 4 response. However in regards your request regarding the culverted water course our assets team have stated we do not hold/store any information about the culverted watercourse for that area you requested, as it appears that we do not own, maintain or operate any assets in that area.

Request Product 4 for a Site in 397379,302192 (easting and northing coordinates)

Thank you for your request 29 July 2022 for a Product 4 as detailed above.

We respond to requests for information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR). The Act requires that we respond to requests by advising you whether or not information is held, and if so by providing you with that information.

EIR Regulation 3(2) states that information is held if it is in our possession and has been produced or received by us, or is held by another person on our behalf at the time the request is made.

Information held
I attach our standard advice for areas in Flood Zone 1 with open data links including the Flood Map for Planning. Full details of supporting information and licensing are available when you access the data on data.gov.uk.

Please refer to Open Government Licence which explains the permitted use of this information.

Information not held
In this case, the information you have requested is not held by the Environment Agency, and we are therefore refusing your request on the grounds that there is no information we can provide. We are unable to supply you with our usual Product 4 response because the site is in Flood Zone 1.

You might wish to contact the Lead Local Flood Authority Walsall District Council as they may have information on how surface water flooding is managed in the area.

As a public body under FOI/EIR, we must provide reasons for this refusal. We also share how we have considered the Public interest for refusal and disclosure.

Where a request is for environmental information, the Regulations allow us to refuse to disclose it if the exception at EIR Regulation 12(4)(a) applies. The regulation states that a public authority may refuse to disclose environmental information to the extent that it does not hold that

information when an applicant's request is received. It is not possible to conduct a meaningful public interest balancing test because the reason for non-disclosure is that the information is not held.

Rights of Appeal
If you are not satisfied you can contact us within 2 calendar months to ask for our decision to be reviewed. We shall review our response to your request and give you our decision in writing within 40 working days.

If you are not satisfied following this, you can then make an appeal to the Information Commissioner Office (ICO), the statutory regulator for EIR/FOI. The address is: ICO, Wycliffe House, Water Lane, Wilmslow, Cheshire. SK9 5AF. Tel: 0303 123 1113 (local rate) or 01625 545 745 (national rate) | Fax: 01625 524 510
Email: casework@ico.org.uk | Website: http://www.ico.org.uk

Yours sincerely,

Christopher Fisher
Customers and Engagement Officer
West Midlands Customers and Engagement Team
Enquiries Team 02084 747856

Environment Agency

☎ **External**: 02084 747856
Enquiries_Westmids@environment-agency.gov.uk
Environment Agency, 9 Wellington Crescent, Fradley Park, Lichfield, Staffordshire, WS13 8RR

From: Emma Walker <EWalker@rsk.co.uk>
Sent: 29 July 2022 15:47
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Subject: Ref: 220809/GA01-Flood Information Request - 680535 The Allens Centre, Willenhall

Dear Sir/Madam,

Please could I order information on flooding and drainage for the following site in order to inform a Flood Risk Assessment:

The Allens Centre,
Hilton Road,
Willenhall,
West Midlands,
WV12 5XB

Grid reference – 397379 E, 302192 N

I would like all the flooding information you have including the following, if available:

- Confirmation of the site's Flood Zone designation, alternatively could you provide the flood flows and levels for a range of return periods including the 1 in 2, 10, 30, 100, 100+CC, 200, 1000,
- Information on the recently published climate change guidance for this area and how this may impact on the data available for the area,
- Information on surface water flood risk including flow pathways and depths,
- Information on historic flooding,

- Information on flood defences in the area, if any,
- Any data on existing surface water discharges to the surrounding watercourses,
- Any data on groundwater flooding,
- Any information on reservoir flooding; and,
- Any information on culverted watercourses or privates sewers which you know of which do not show up on the public sewer records.

Finally, please could you provide any recommendation on how the surface water is to be managed; for example, restrictions in discharge rates the requirements for SuDS, possible discharge locations and attenuation requirements?

We have a relatively quick turn around on this project and would therefore appreciate a quick response.

If you have any queries please don't hesitate to contact me.

Kind regards,

Emma Walker BSc (Hons)
Graduate Hydrologist
LinkedIn

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Switchboard: +44 (0)1942 493255

Product 4 requests are usually only provided for sites within flood zone 2 and/or 3 to help inform detailed flood risk assessments within these zones.

The location you have requested information for is within flood zone 1, defined as the area within the lowest probability of flooding from rivers and the sea, where the chance of flooding in any one year is less than 0.1% (i.e. a 1000 to 1 chance) and do not have any detailed modelling for this location to provide as a Product 4 request.

Should you wish to download a Flood Map for Planning (rivers and sea) map which displays the area and associated flood zones, please use the following website (https://flood-map-for-planning.service.gov.uk/) and select the 'Download printable map (PDF)' option.

Flood Map for Planning (Rivers and Sea)

The Flood Map for Planning (Rivers and Sea) indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood event with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring in any year for fluvial (river) flooding (Flood Zone 3). It also shows the extent of the Extreme Flood Outlines (Flood Zone 2) which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater. The Flood Zones refer to the land at risk of flooding and **do not** refer to individual properties. It is possible for properties to be built at a level above the floodplain but still fall within the risk area.

This Flood Map only indicates the extent and likelihood of flooding from rivers or the sea. It should also be remembered that flooding may occur from other sources such as surface water, sewers, road drainage, etc.

To find out which flood zone a location is in please use: https://flood-map-for-planning.service.gov.uk/

Definition of flood zones

- **Zone 1** - The area is within the lowest probability of flooding from rivers and the sea, where the chance of flooding in any one year is less than 0.1% (i.e. a 1000 to 1 chance).
- **Zone 2** - The area which falls between the extent of a flood with an annual probability of 0.1% (i.e. a 1000 to 1 chance) fluvial and tidal, or greatest recorded historic flood, whichever is greater, and the extent of a flood with an annual probability of 1% (i.e. a 100 to 1 chance) fluvial / 0.5% (i.e. a 200 to 1 chance) tidal. (Land shown in light blue on the Flood Map).
- **Zone 3** - The chance of flooding in any one year is greater than or equal to 1% (i.e. a 100 to 1 chance) for river flooding and greater than or equal to 0.5% (i.e. a 200 to 1 chance) for coastal and tidal flooding.

Note: The Flood Zones shown on the Environment Agency's Flood Map for Planning (Rivers and Sea) do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding. Reference should therefore also be made to the Strategic Flood Risk Assessment when considering location and potential future flood risks to developments and land uses.

Areas Benefitting From Defences

Where possible we show the areas that benefit from the flood defences, in the event of flooding:

- from rivers with a 1% (1 in 100) chance in any given year, or;
- from the sea with a 0.5% (1 in 200) chance in any given year.

If the defences were not there, these areas would flood. Please note that we do not show all areas that benefit from flood defences.

The associated Dataset is available here: https://data.gov.uk/dataset/flood-map-for-planning-rivers-and-sea-areas-benefiting-from-defences

Planning development/s

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments. You can also request pre application advice:

https://www.gov.uk/planning-applications-assessing-flood-risk
https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Supporting Information

River modelling: technical standards and assessment guidance

The link below contains standards for the flood risk management industry on how to build and review hydraulic models and provide evidence for flood risk management decisions.

https://www.gov.uk/government/publications/river-modelling-technical-standards-and-assessment

Surface Water

Managing the risk of flooding from surface water is the responsibility of Lead Local Flood Authorities. The 'risk of flooding from surface water' map has been produced by the Environment Agency on behalf of government, using information and input from Lead Local Flood Authorities.

You may wish to contact your Local Authority who may be able to provide further detailed information on surface water.

It is not possible to say for certain what the flood risk is but we use the best information available to provide an indication so that people can make informed choices about living with or managing the risks. The information we supply does not provide an indicator of flood risk at an individual site level. Further information can be found on the Agency's website:

https://flood-warning-information.service.gov.uk/long-term-flood-risk

Flood Risk from Reservoirs

The Flood Risk from Reservoirs map can be found on the Long Term Flood Risk Information website:

https://flood-warning-information.service.gov.uk/long-term-flood-risk/map?map=Reservoirs

Flood Alert & Flood Warning Area

We issue flood alert/warnings to specific areas when flooding is expected. If you receive a flood warning you should take immediate action.

You can check whether you are in a Flood Alert/Warning Area and register online using the links below:

https://www.gov.uk/check-flood-risk

https://www.gov.uk/sign-up-for-flood-warnings

If you would prefer to register by telephone, or if you need help during the registration process, please call Floodline on 0345 988 1188.

The associated dataset for flood warning areas is available here: https://data.gov.uk/dataset/flood-warning-areas3

The associated dataset for flood alert areas is available here: https://data.gov.uk/dataset/flood-alert-areas2

Flood Risk Activity Permits

We now consider applications for works, which may be Flood Risk Activities, under Environmental Permitting Regulations. This replaces the process of applying for a Flood Defence Consent. You may need an environmental Permit for flood risk activities if you want to do work:

- in, under, over or near a main river (including where the river is in a culvert)
- on or near a flood defence on a main river
- in the flood plain of a main river
- on or near a sea defence

Please go to this website to find out more about how to apply:
https://www.gov.uk/guidance/flood-risk-activities-environmental-permits.
Please be aware that Bespoke and Standard Rules permits can take up to 2 months to determine and will incur a charge.

Further details about the Environment Agency information supplied can be found on the GOV.UK website:

https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather

APPENDIX G
GREENFIELD RUNOFF CALCULATIONS

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	1.320	Urban	0.000
SAAR (mm)	700	Region Number	Region 4

Results l/s

QBAR Rural	5.8
QBAR Urban	5.8
Q100 years	14.9
Q1 year	4.8
Q30 years	11.4
Q100 years	14.9

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.830	Urban	0.000
SAAR (mm)	700	Region Number	Region 4

Results l/s

QBAR Rural	3.6
QBAR Urban	3.6
Q100 years	9.4
Q1 year	3.0
Q30 years	7.1
Q100 years	9.4

APPENDIX H
SEVERN TRENT WATER CORRESPONDENCE

Emma Walker

Subject: FW: Developer Enquiry Response - Our Ref: DEV S THE ALLENS CENTRE, HILTON RD 1069598
Attachments: A3L_Sewer_Tabular - Hilton Road.pdf

From: Network Solutions <Network.Solutions@severntrent.co.uk>
Sent: 18 January 2023 15:17
To: Emma Walker <EWalker@rsk.co.uk>; Network Solutions <Network.Solutions@severntrent.co.uk>
Subject: RE: Developer Enquiry Response - Our Ref: DEV S THE ALLENS CENTRE, HILTON RD 1069598

ST Classification: OFFICIAL PERSONAL

Hi Emma – Thanks for your email.

Please see attached sewer records with the MH refs for SW and FW connection points, circled blue.

Thanks for submitting infiltration evidence, I note soakaways are not suitable for this development. Therefore connection to the surface water will be acceptable in line with your attached proposals at 5 l/s/ha subject to s106 submission.

I trust this is acceptable.

Regards

Belal

From: Emma Walker <EWalker@rsk.co.uk>
Sent: 11 January 2023 15:01
To: Network Solutions <Network.Solutions@severntrent.co.uk>
Subject: RE: Developer Enquiry Response - Our Ref: DEV S THE ALLENS CENTRE, HILTON RD 1069598

For the attention of Belal Ali

Good Afternoon Belal,

In addition to the below query, we have a site investigation report (attached) which evidences the on-site geology, indicating why soakaways have not been used as a method of surface water disposal for this site.

In the site investigation undertaken by Opus in February 2016, seven window sample boreholes and eight trial pits were excavated on-site. The window samples and boreholes exhibited geology of Made Ground over superficial deposits of clays and sands, underlain by Coal Measures.

It was summarised in the report that “due to the locally extensive Made Ground and the variable but predominantly cohesive nature of the near surface natural soils, it is considered that soakaways will not be a viable drainage solution for the site”.

There are no watercourses in close proximity to the site which could be used as a point of connection, as a result, we are proposing to connect to the on-site surface water sewer. Could you advise whether the stated discharge rate

(QBar of the attached) and connection to the on-site surface water sewer is acceptable, following the evidence of impermeable on-site geology?

Kind regards,

Emma Walker BSc (Hons)
Hydrologist
LinkedIn

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From: Emma Walker
Sent: 03 January 2023 11:39
To: Network Solutions <Network.Solutions@severntrent.co.uk>
Subject: FW: Developer Enquiry Response - Our Ref: DEV S THE ALLENS CENTRE, HILTON RD 1069598

For the attention of Belal Ali

Good morning,

Would you be able to confirm the location of MH SJ97023104 and MH SJ97023155 on the sewer record map you provided, as the manhole references on the map don't match up to the ones in the table.

Many thanks,

Emma Walker BSc (Hons)
Hydrologist
LinkedIn

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From: Network Solutions <Network.Solutions@severntrent.co.uk>
Sent: 29 December 2022 10:39
To: Emma Walker <EWalker@rsk.co.uk>
Subject: Developer Enquiry Response - Our Ref: DEV S THE ALLENS CENTRE, HILTON RD 1069598

ST Classification: UNMARKED

Dear Sir/Madam

Please find attached below our Developer Enquiry response letter, along with a sewer record extract and supplementary guidance notes with regard to the above site.

If you have any further queries with regard to our response, please do not hesitate to contact us on the number / email address mentioned below. Please refrain from sending responses to a certain individual directly. Our email address below will ensure that your response is logged and tracked for a response. When responding, please quote our reference number above in all return correspondence.

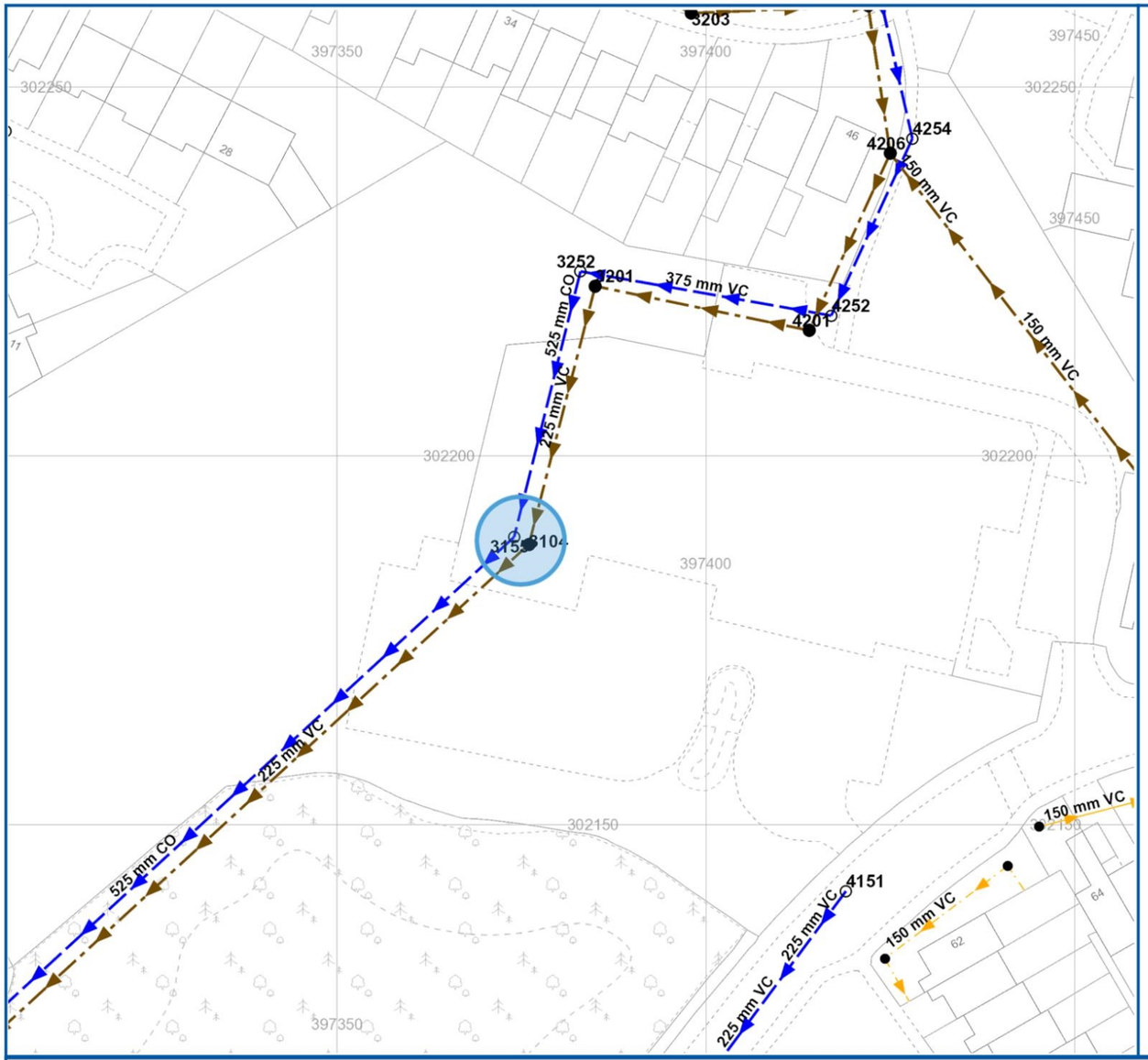
Kind regards,

Network Solutions

(reply to network.solutions@severntrent.co.uk)

WONDERFUL ON TAP

Severn Trent Plc (registered number 2366619) and Severn Trent Water Limited (registered number 2366686) (together the "Companies") are both limited companies registered in England & Wales with their registered office at Severn Trent Centre, 2 St John's Street, Coventry, CV1 2LZ This email (which includes any files attached to it) is not contractually binding on its own, is intended solely for the named recipient and may contain CONFIDENTIAL, legally privileged or trade secret information protected by law. If you have received this message in error please delete it and notify us immediately by telephoning +44 2477715000. If you are not the intended recipient you must not use, disclose, distribute, reproduce, retransmit, retain or rely on any information contained in this email. Please note the Companies reserve the right to monitor email communicationsin accordance with applicable law and regulations. To the extent permitted by law, neither the Companies or any of their subsidiaries, nor any employee, director or officer thereof, accepts any liability whatsoever in relation to this email including liability arising from any external breach of security or confidentiality or for virus infection or for statements made by the sender as these are not necessarily made on behalf of the Companies. Reduce waste! Please consider the environment before printing this email [WARNING: This email originated outside of RSK. DO NOT CLICK links, attachments or respond unless you recognise the sender and are certain that the content is safe]



Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SJ97023155	158.5	156.08	155.682	S	CO	C	525	<UNK>	251.25	31/12/1899 00:00:00
SJ97023104	158.5	<UNK>	155.184	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SJ97024201	159.054	<UNK>	155.769	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SJ97024252	159.054	<UNK>	156.069	S	VC	C	375	<UNK>	0	31/12/1899 00:00:00
SJ97023252	159.169	156.059	156.08	S	CO	C	525	<UNK>	<UNK>	31/12/1899 00:00:00
SJ97024151	158.3679	156.378	155.961	S	VC	C	225	<UNK>	207.62	31/12/1899 00:00:00
SJ97024205	158.9589	156.419	156.212	F	VC	C	225	<UNK>	96.29	31/12/1899 00:00:00
SJ97023201	159.169	155.759	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SJ97023203	159.014	156.664	156.439	F	VC	C	225	<UNK>	104.43	31/12/1899 00:00:00
SJ97024254	159.375	156.735	<UNK>	S	VC	C	375	<UNK>	0	31/12/1899 00:00:00
SJ97024206	159.382	156.212	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	C	VC	<UNK>	<UNK>	<UNK>	<UNK>	31/12/1899 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	31/12/1899 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	31/12/1899 00:00:00

LEGEND

Ancillary
- Balancing Lagoon
- Grease Trap
- Interceptor
- Screen

Chamber
- Flushing Chamber
- Scalaway
- Overflow

Connector
- Sewer Junctions
- SewerLine Connection Node

Fitting
- Blind Shaft
- Facility Connector
- Head Node
- Lamphole
- Sewerage Air Valve
- Sewerage Chemical Injection Point
- Sewerage Hatch Box
- Sewerage Pressure Washout
- Vent Column
- Waste Water Outfall

Control Valve
- Hydrobrake
- Penstock
- Sewerage Isolation Valve
- Sewerage Non Return Valve

Manhole
- Foul Bifurcation Manhole
- Combined Bifurcation Manhole
- Surface Water Bifurcation Manhole
- Dual Manhole
- Foul Single Manhole
- Combined Single Manhole
- Surface Water Single Manhole
- Twin Manhole
- Foul Adopted Manhole
- Combined Adopted Manhole
- Surface Adopted Manhole
- Transferred Manhole
- Unsurveyed Manhole

Operational Site

Waste Water Pump
- Transferred Asset
- S24

- S104
- S102
- Null Private
- Null
- None
- Highway Drain
- Adopted Sewer

Storage
- Disposal Site
- Off-Line Waste Water Storage
- On-Line Waste Water Storage
- Wet Well

Waste Water Process Structure
- Sewage Treatment Point
- Sewage Treatment Structure
- Sludge Treatment Point
- Sludge Treatment Structure

Gravity Sewer Pipe
- Foul Gravity Sewer
- Combined Gravity Sewer
- Surface Water Gravity Sewer
- S104 Surface Water Gravity Sewer
- S104 Combined Gravity Sewer
- S104 Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Surface Water Unsurveyed Pipe
- Combined Unsurveyed Pipe
- Foul Unsurveyed Pipe
- Transferred Surface Water Sewer
- Transferred Combined Sewer
- Transferred Foul Sewer
- Disposal Pipe
- Overflow Pipe
- Culverted Water Course
- Waste Internal Site Pipe
- Sewer Service Connection
- Gravity Sewer Others

Pressure Sewer Pipe
- Surface Water Pressure Sewer
- Combined Pressure Sewer
- Foul Pressure Sewer
- S104 Surface Water Pressure Sewer
- S104 Combined Pressure Sewer
- S104 Foul Pressure Sewer
- Private Surface Water Pressure Sewer
- Private Combined Pressure Sewer
- Private Foul Pressure Sewer
- Surface Water Vacuum Sewer
- Foul Vacuum Sewer
- Combined Vacuum Sewer
- S104 Surface Water Vacuum Sewer
- S104 Combined Vacuum Sewer
- S104 Foul Vacuum Sewer
- Private Surface Water Vaccum Sewer
- Private Combined Vacuum Sewer
- Private Foul Vacuum Sewer
- Surface Water Siphon
- Combined Siphon
- Foul Siphon
- Private Surface Water Siphon
- Private Combined Siphon
- Private Foul Siphon
- S104 Surface Water Siphon
- S104 Combined Siphon
- S104 Foul Siphon
- Surface Water Unsurveyed Pipe
- Combined Unsurveyed Pipe

Service Pipe
- Surface Water Lateral Drain
- Combined Lateral Drain
- Foul Lateral Drain
- S104 Surface Water Lateral Drain
- S104 Combined Lateral Drain
- S104 Foul Lateral Drain
- Private Surface Water Lateral Drain
- Private Combined Lateral Drain
- Private Foul Lateral Drain
- Transfered Surface Water Lateral Dra
- Transfered Combined Lateral Drain
- Transfered Foul Lateral Drain

LandlineSymbol
- Culvert Symbol
- Direction Of Flow Symbol
- Boundary Half Meeting Symbol
- Bench Mark Symbol
- Railway Switch Symbol
- Road Related Flow Symbol

Print50mLine

MATERIALS

-	- NONE
AC	- ASBESTOS CEME
BR	- BRICK
CC	- CONCRETE BOX CULVERT
CI	- CAST IRON
CO	- CONCRETE
CSB	CONCRETE SEGMENTS (BOLTED)
CSU	- CONCRETE SEGMENTS (UNBOLTED)
DI	- DUCTILE IRON
GRP	- GLASS REINFORCED PLASTIC
MAC	- MASONRY IN REGULAR COURSES
MAR	- MASONRY RANDOMLY COURSED
PE	- POLYETHLENE
PF	- PITCH
PP	- POLYPROPYLENE
PSC	- PLASTIC STEEL COMPOSITE
PVC	- POLYVINYL CHLORIDE
RPM	- REINFORCED PLASTIC MATRIX
SI	- SPUN (GREY) IRON
ST	- STEEL
U	- UNKNOWN
VC	- VITRIFIED CLAY
XXX	- OTHER

CATEGORIES

W	- WEIR
C	- CASCADE
DB	- DAMBOARD
SE	- SIDE ENTRY
FV	- FLAP VALVE
BD	- BACK DROP
S	- SIPHON
D	- HIGHWAY DRAIN
S104	- SECTION 104

SHAPE

C	- CIRCULAR
E	- EGG SHAPED
O	- OTHER
R	- RECTANGLE
S	- SQUARE
T	- TRAPEZOIDAL
U	- UNKNOWN

PURPOSE

C	- COMBINED
E	- FINAL EFFLUENT
F	- FOUL
L	- SLUDGE
S	- SURFACE WATER

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0345 601 6616

SEWER RECORD (Tabular)

O/S Map Scale: 1:750 **This map is centred upon:**

Date of Issue: 18-01-23 **X:** 397381.70 **Y:** 302189.76

Disclaimer Statement:

1 Do not scale off this Map.

2 This plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this plan and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of SEVERN TRENT WATER assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.

3 On 1 October 2011 most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012. Private pumping stations, which form part of these sewers or lateral drains, will transfer to ownership of Severn Trent Water on or before 1 October 2016. Severn Trent Water does not possess complete records of these assets. These assets may not be displayed on the map.

5 Ordnance Survey licence number: **100031673**

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SUPPLEMENTARY GUIDANCE NOTES RELATING TO DISPOSAL OF SURFACE WATER

Introduction

The purpose of this guidance note is to provide advice to applicants when completing the surface water drainage design for a new development, both for Greenfield and Brownfield sites. This does not affect foul drainage disposal which should be discussed with Severn Trent as early as possible to ensure additional flows can be accommodated without undue delay to the development.

Lead Local Flood Authority (LLFA) Consultation

Since April 2015, the LLFA have assumed the role of being a statutory consultee in the planning process for developments of 10 dwellings or more; or equivalent non-residential and/or mixed development. The LLFAs role is vital to ensure that surface water disposal on new development is adequately assessed so that the local planning authority can satisfy themselves that drainage proposals are satisfactory and to make sure, through the use of planning conditions or planning obligations, that there are clear arrangements in place for future maintenance of sustainable drainage systems (SuDS) over the lifetime of the development. This will also ensure surface water disposal aligns with local planning policies, flood risk strategies and national policies, such as the National Planning Policy Framework (NPPF).

It is strongly recommend that the LLFA are involved in early pre-application discussions when the development of a site is initially being considered. Pre-application discussions will help to ensure that SuDS are appropriately considered ahead of or as part of preliminary development layouts, and that they are fully integrated into the final development layout. Whilst Severn Trent are willing to advise on sewerage availability this does to negate the planning requirement relating to adequacy of SuDS on new development.

SuDS Hierarchy

Severn Trent is fully supportive of the fundamental SuDS principle that priority should be given to managing surface water as close to source as possible. In accordance with national standards and guidance a sequential series of checks should be undertaken to ensure the relevant SuDS features are being proposed whereby (in order of priority) rainwater re-use, infiltration to ground and controlled discharge to a water body are properly considered ahead of any controlled connection to a culverted watercourse/other drainage system or public surface water sewer.

A controlled connection to a public combined/foul sewer would only be considered under rare exceptional circumstances where all other options have been completely exhausted. Acceptance of surface water into a combined sewer is not only unsustainable because of the need to convey/treat rainwater but is also takes away existing capacity which could constraint the connection of foul flows on future development. It is also possible that connection of additional surface water flows will require capacity upgrades to the existing sewerage system which may delay development.

Connection to a Public Sewer

Whilst Severn Trent will be able to provide advice on potential public surface water sewer connection options, it is essential that a developer contacts the LLFA as early as possible to discuss surface water disposal as they will be able to provide guidance on surface water flood risk policy which may influence SuDS requirements. It is strongly recommended that LLFA discussions take place before contacting Severn Trent. Where the outcome of LLFA discussions concludes that a controlled discharge to the public sewerage system is the only viable option then Severn Trent would be pleased to discuss sewer connection options, satisfied that the LLFA have been consulted in line with their surface water management role and in their capacity as statutory consultee.

Evidence must be provided to demonstrate why the sequential SuDS checks have concluded that a connection to the public sewer is required. This must include a Site Investigation Report including percolation test data/graphs/calculations/results together with relevant correspondence with the LLFA.

Design Standards

Surface water disposal design should consider the interactions between the adoptable sewer design criteria based on a 30 year design storm (outlined in 'Sewers For Adoption') and the "Non-statutory technical standards for SuDS" requirement to restrict discharge from a site up to and including the 1 in 100 year critical storm event plus an allowance for climate change as required by the LLFA.

For Greenfield development, the peak runoff rate should never exceed the peak pre-development run-off rates/volumes for the same rainfall event irrespective of the design storm duration consistent with the national non-statutory technical standards. For developments which were previously developed (Brownfield), the peak runoff rate must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment again for the same rainfall event. This requirement to remove pre-development surface water discharges to the sewerage system will help remove capacity constraints and aid future development.

To establish the pre-development run-off rates a detailed existing drainage survey will be required indicating pipe locations including sizes and levels, impermeable area connectivity to each pipe and topographical information to support existing drainage assumptions. Photographs of the existing buildings and surface features should be provided and where necessary a CCTV sewer survey should be provided to support the drainage survey to demonstrate connectivity.

In line with 'Sewers for Adoption', the drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event. For higher storm return periods the drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station, electricity substation, water booster station) within the development.

Small Developments

Whilst developments of fewer than 10 dwellings (or their equivalent) are excluded from the post April 2015 planning requirements the underlying principles regarding sustainable surface water management are still valid. The collective impacts of surface water discharges from smaller developments can have an adverse impact on flood risk, especially in smaller rural catchments where smaller sewerage systems are more susceptible to increases in surface water inflow. On small developments infiltration to ground and peak flow attenuation must be considered to mitigate flood risk in the community but where a sewer connection is envisaged then the developer is recommended to discuss surface water disposal options with Severn Trent as early as possible.

Contact

For further assistance please contact our Network Solutions team via:
network.solutions@severntrent.co.uk

APPENDIX I
PROPOSED INDICATIVE ATTENUATION CALCULATIONS

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m^3)	Status
15 min Summer	157.525	0.525	3.9	157.5	O K
30 min Summer	157.686	0.686	4.0	205.7	O K
60 min Summer	157.845	0.845	4.5	253.4	O K
120 min Summer	157.989	0.989	4.8	296.8	O K
180 min Summer	158.058	1.058	5.0	317.3	O K
240 min Summer	158.092	1.092	5.0	327.7	O K
360 min Summer	158.115	1.115	5.1	334.5	O K
480 min Summer	158.113	1.113	5.1	333.8	O K
600 min Summer	158.102	1.102	5.1	330.5	O K
720 min Summer	158.090	1.090	5.0	326.9	O K
960 min Summer	158.062	1.062	5.0	318.6	O K
1440 min Summer	158.002	1.002	4.8	300.6	O K
2160 min Summer	157.913	0.913	4.6	274.0	O K
2880 min Summer	157.832	0.832	4.4	249.5	O K
4320 min Summer	157.688	0.688	4.1	206.3	O K
5760 min Summer	157.562	0.562	3.9	168.6	O K
7200 min Summer	157.446	0.446	3.9	133.8	O K
8640 min Summer	157.336	0.336	3.9	100.8	O K
10080 min Summer	157.248	0.248	3.9	74.3	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Summer	130.597	26
30 min Summer	85.825	41
60 min Summer	53.779	70
120 min Summer	32.595	128
180 min Summer	24.012	186
240 min Summer	19.224	244
360 min Summer	13.954	362
480 min Summer	11.125	474
600 min Summer	9.325	522
720 min Summer	8.069	582
960 min Summer	6.417	710
1440 min Summer	4.640	984
2160 min Summer	3.350	1392
2880 min Summer	2.656	1816
4320 min Summer	1.912	2604
5760 min Summer	1.513	3400
7200 min Summer	1.261	4176
8640 min Summer	1.086	4840
10080 min Summer	0.957	5448

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Winter	157.589	0.589	3.9	176.8	O K
30 min Winter	157.770	0.770	4.3	231.0	O K
60 min Winter	157.950	0.950	4.7	284.9	O K
120 min Winter	158.116	1.116	5.1	334.9	O K
180 min Winter	158.197	1.197	5.3	359.1	O K
240 min Winter	158.241	1.241	5.4	372.2	O K
360 min Winter	158.275	1.275	5.5	382.4	O K
480 min Winter	158.281	1.281	5.5	384.2	O K
600 min Winter	158.270	1.270	5.4	381.1	O K
720 min Winter	158.252	1.252	5.4	375.5	O K
960 min Winter	158.218	1.218	5.3	365.5	O K
1440 min Winter	158.139	1.139	5.2	341.6	O K
2160 min Winter	158.012	1.012	4.9	303.5	O K
2880 min Winter	157.894	0.894	4.6	268.1	O K
4320 min Winter	157.687	0.687	4.0	206.0	O K
5760 min Winter	157.501	0.501	3.9	150.3	O K
7200 min Winter	157.308	0.308	3.9	92.5	O K
8640 min Winter	157.186	0.186	3.9	55.9	O K
10080 min Winter	157.142	0.142	3.6	42.6	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Winter	130.597	26
30 min Winter	85.825	40
60 min Winter	53.779	68
120 min Winter	32.595	126
180 min Winter	24.012	184
240 min Winter	19.224	240
360 min Winter	13.954	354
480 min Winter	11.125	464
600 min Winter	9.325	570
720 min Winter	8.069	660
960 min Winter	6.417	750
1440 min Winter	4.640	1058
2160 min Winter	3.350	1512
2880 min Winter	2.656	1944
4320 min Winter	1.912	2808
5760 min Winter	1.513	3632
7200 min Winter	1.261	4264
8640 min Winter	1.086	4752
10080 min Winter	0.957	5256

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time / Area Diagram

Total Area (ha) 0.660

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.220	4-8	0.220	8-12	0.220

Model Details

Storage is Online Cover Level (m) 159.500

Tank or Pond Structure

Invert Level (m) 157.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	300.0	1.300	300.0	1.301	0.0

Hydro-Brake® Outflow Control

Design Head (m) 1.500 Diameter (mm) 92
Design Flow (l/s) 5.8 Invert Level (m) 157.000
Hydro-Brake® Type Md6 SW Only

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.7	1.200	5.3	3.000	8.4	7.000	12.8
0.200	3.9	1.400	5.7	3.500	9.0	7.500	13.2
0.300	3.7	1.600	6.1	4.000	9.7	8.000	13.7
0.400	3.6	1.800	6.5	4.500	10.2	8.500	14.1
0.500	3.6	2.000	6.8	5.000	10.8	9.000	14.5
0.600	3.8	2.200	7.2	5.500	11.3	9.500	14.9
0.800	4.3	2.400	7.5	6.000	11.8		
1.000	4.8	2.600	7.8	6.500	12.3		