



Hinckley CDC and Endoscopy

Flood Risk Assessment and Drainage Strategy

August 2023

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Client Name: NHS Property Services
Document Reference: WIE19849-100-R-1-2-3-FRA
Project Number: WIE19849

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS EN ISO 45001:2018)

Issue	Date	Prepared by	Checked by	Approved by
First	02/06/2023	R.Lal Engineer Apprentice	R Beyene Principal Engineer	S. Songprasit Associate Director
Comments	First Issue for comments			
2 nd	08/08/2023	R.Lal Engineer Apprentice	R Beyene Principal Engineer	S. Songprasit Associate Director
Comments	Site layout and redline boundary updated			

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1. Introduction

1.1 Background

Waterman Infrastructure & Environment Limited ("Waterman") have been commissioned by NHS Property Services (hereafter 'the Client') to prepare a Flood Risk Assessment and Drainage Strategy to support a planning application for a site at Hinckley and District Hospital, Mount Road, Hinckley LE10 1AG (hereafter referred to as 'the Site').

The purpose of this report is to provide an assessment of flood risk from all sources and details of how the foul and surface water drainage from the proposed development would be managed in consideration of the surface water drainage hierarchy and appropriate discharge points.

Leicestershire County Council is the Lead Local Flood Authorities (LLFA). Severn Trent Water is the sewerage undertaker.

1.2 Site Description

The Site is located at Hinckley and District Hospital, Hinckley, approximately 20km from Leicester City Centre. The Site is brownfield with an approximate red line boundary of 0.404ha.

The west of the Site is bound by access roads (Argents Mead) and a leisure centre. There are residential dwellings to the east and Mouth Road to the south of the Site. To the north, there are more access roads, footways, Greenland and behind that a car park.

The Site is located at the grid reference SP 42927 93749 with coordinates X:442927, Y: 293749 and the nearest postcode being LE10 1AG.

A Site location plan is shown in **Figure 1-1**.

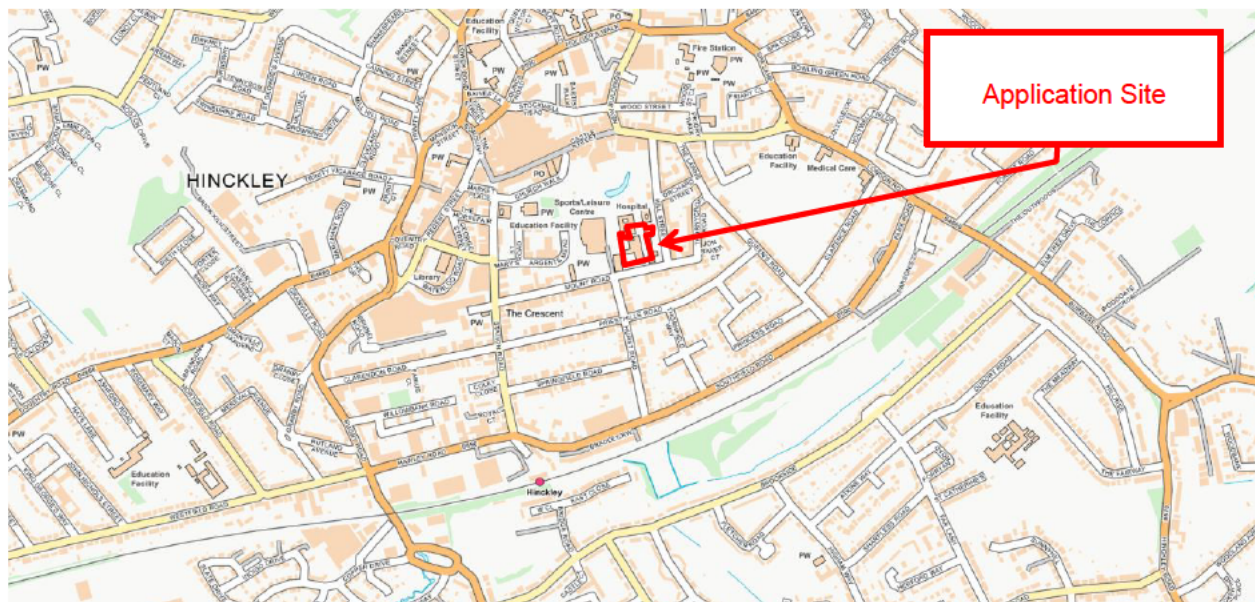


Figure 1-1: Site Location Plan

1.3 Development Proposals

The proposed developments involve the construction of a high-quality two-storey Community Diagnostics

Centre (CDC) and Endoscopy building. The proposed site layout is provided in **Appendix A**.

1.4 Topography

A topographical survey was undertaken by Survey Solutions in June 2019. At the northeast corner of the Site, the topographical levels are approximately 121.95mAOD, at the northwest corner of the Site, the levels are slightly lower at 120.65mAOD. At the southeast of the Site, the topographical levels are approximately 122mAOD, they then decrease in the west of the Site to 120.25mAOD.

It can be concluded that the Site generally falls from the east to the west.

A copy of the topographical survey can be found in **Appendix B**.

2. Planning Policy and Guidance

2.1 National Planning Policy Framework and Planning Practice Guidance

The National Planning Policy Framework¹ (NPPF) last revised in July 2021 and its supporting Planning Practice Guidance² (PPG) states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk. Where development is necessary, it must be made safe without increasing flood risk elsewhere. Refer to **Appendix C**.

In relation to drainage, it states that when determining planning applications, Local Planning Authorities (LPA) should only consider development in areas where priority is given to the use of Sustainable Drainage Systems (SuDS).

The PPG states that developers and LPAs should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of SuDS.

2.2 Non-statutory Technical Standards for Sustainable Drainage Systems

The Non-statutory Technical Standards for SuDS³ was published in March 2015 and is the current guidance for the design, maintenance and operation of SuDS.

The standards set out that the peak runoff rates should be as close as is reasonably practicable to the greenfield rate but should never exceed the pre-development runoff rate.

The standards also set out that the drainage system should be designed so that flooding does not occur on any part of the Site for a 1 in 30-year rainfall event, and that no flood of a building (including basement) would occur during a 1 in 100-year rainfall event.

It is also noted within the standards that pumping should only be used when it is not reasonably practicable to discharge by gravity.

2.3 Local Planning Policy

2.3.1 Site Allocations and Development Management Policies DPD Local Plan (2006 – 2026)

There are relevant two policies listed within the Local Plan (2006-2026), which are DM7 and DM10 from the 'Natural Environment' and the 'Built Environment' respectively.

Point h) of the Policy DM7 Preventing Pollution and Flooding states that:

"Adverse impacts from pollution and flooding will be prevented by ensuring that development proposals demonstrate that:

- h) The development doesn't create or exacerbate flooding by being located away from areas of flood risk unless adequately mitigated against in line with National Policy."*

Point h) of Policy DM10 Development and Design states that:

"Developments will be permitted providing that the following requirements are met:

- h) An appropriate Sustainable Drainage Scheme is submitted to and approved by the relevant*

¹ Ministry of Housing, Communities and Local Government, March 2012. National Planning Policy Framework.

² Ministry of Housing, Communities and Local Government, November 2016. Planning Practice Guidance.

³ Department for Environment, Food, and Rural Affairs, March 2015. Non-statutory technical standards for sustainable drainage systems.

Authority. Schemes should incorporate wildlife areas, ponds, swales and permeable paving where appropriate

In exceptional circumstances where outstanding, innovative design is demonstrated (particularly where high levels of sustainability are an integral feature), applications will be considered favourably, even where this may result in some limited conflict with the above criteria.”

3. Sources of Potential Flooding

3.1 Rivers

Sketchley Brook is located approximately 600m to the south of the Site.

According to the EA Flood Map for planning, shown in **Figure 3-1**, the Site is situated within Flood Zone 1 (less than 1 in 1000 annual probability of river or sea flooding in any year). The closest flood risk in flood zone 2 and 3, is approximately 550m to the south of the Site boundary.

Based on the information currently available, the risk posed by fluvial flooding sources to the development areas of the Site can be considered as low.

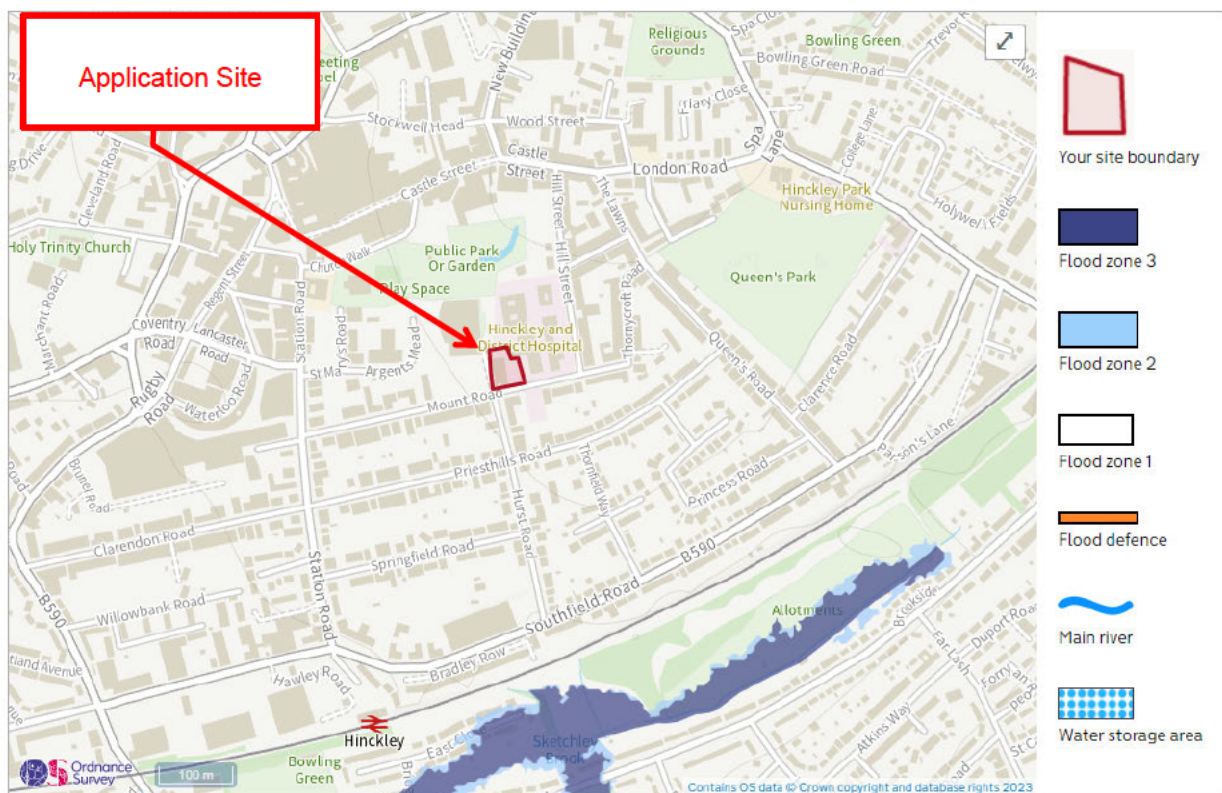


Figure 3-1: EA Flood Map for planning

Source: [Flood risk information for this location - Flood map for planning - GOV.UK \(flood-map-for-planning.service.gov.uk\)](https://flood-risk-information-for-this-location-flood-map-for-planning.gov.uk)

3.2 Residual Risk from Breach

There are no formal flood defences within the vicinity of the Site and the Site is not within the Areas Benefiting from Flood Defences (ABDs). Therefore, it is considered that the risk of breach failure or overtopping is low.

3.3 Surface Water

Surface water flooding in urban areas can sometimes occur during extreme, high-intensity, low-duration summer rainfall events which overwhelm the local surface water drainage system, or in rural areas during

medium-intensity, long-duration events where saturated ground conditions prevent infiltration into the subsoil. The floodwater would be conveyed via overland flow routes as dictated by the local topography.

The Environment Agency (EA) surface water flooding map, as shown in **Figure 3-2** indicates that the Site is at a 'low' risk of surface water flooding with an area of 'medium' risk to the east of the Site.

To mitigate the risk posed by surface water flooding, the proposed development will include an attenuation tank and permeable paving. The surface water runoff as a result of the proposed development will be managed by the Site's surface water drainage.

Based on the information currently available, the risk of surface water flooding affecting the Site can be considered as low.



Figure 3-2: Extent of Flooding from Surface Water

Source: [Learn more about flood risk - GOV.UK \(check-long-term-flood-risk.service.gov.uk\)](https://check-long-term-flood-risk.service.gov.uk/)

3.4 Groundwater

3.4.1 Geology

Geological information and maps have been extracted from the British Geological Survey (BGS) Digital Geological map of Great Britain at 1:50,000 scale, to be used for a geological assessment of the Site.

Bedrock geology is a term used for the main mass of rocks forming the Earth that are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water. The bedrock geology at the Site is found to be Mercia Mudstone Group, made up of Mudstone.

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, which extends back about 1.8 million years from the present. They rest on older deposits or rocks referred to as Bedrock. The BGS dataset describes the superficial deposits as Oadby Member - Diamicton. Sedimentary superficial deposits.

3.4.2 Borehole Data

The BGS historic borehole scan records show that there are two groups of manholes to the north of the Site between 0 and 10m deep as shown in **Figure 3-3**.

The closest boreholes to the Site have a reference SP49SW387 with a depth of 5.18m, SP49SW386 with a depth of 9.44m, SP49SW385 with a depth of 7.01m and SP49SW384 with a depth of 5.18m.



Figure 3-3: BGS Borehole Data

Source: [BGS Geology Viewer \(BETA\)](#)

Refer to the borehole data in **Appendix D**.

3.4.3 Risk of Groundwater Flooding

There are no records of the previous flooding attributed to groundwater flooding in the area. Two boreholes in the area indicate a water level of around 3.4m below ground. The other two boreholes are dry. Therefore, it is considered that the risk of groundwater flooding at the Site is low.

3.5 Risk of Flooding from Drainage Systems

Sewer flooding poses the highest risk of frequent flooding. Flooding from the drainage system occurs when flow entering a system exceeds its discharge capacity, the system becomes blocked or, in the case of surface water sewers, it cannot discharge due to high water level in the receiving watercourse. Sewer

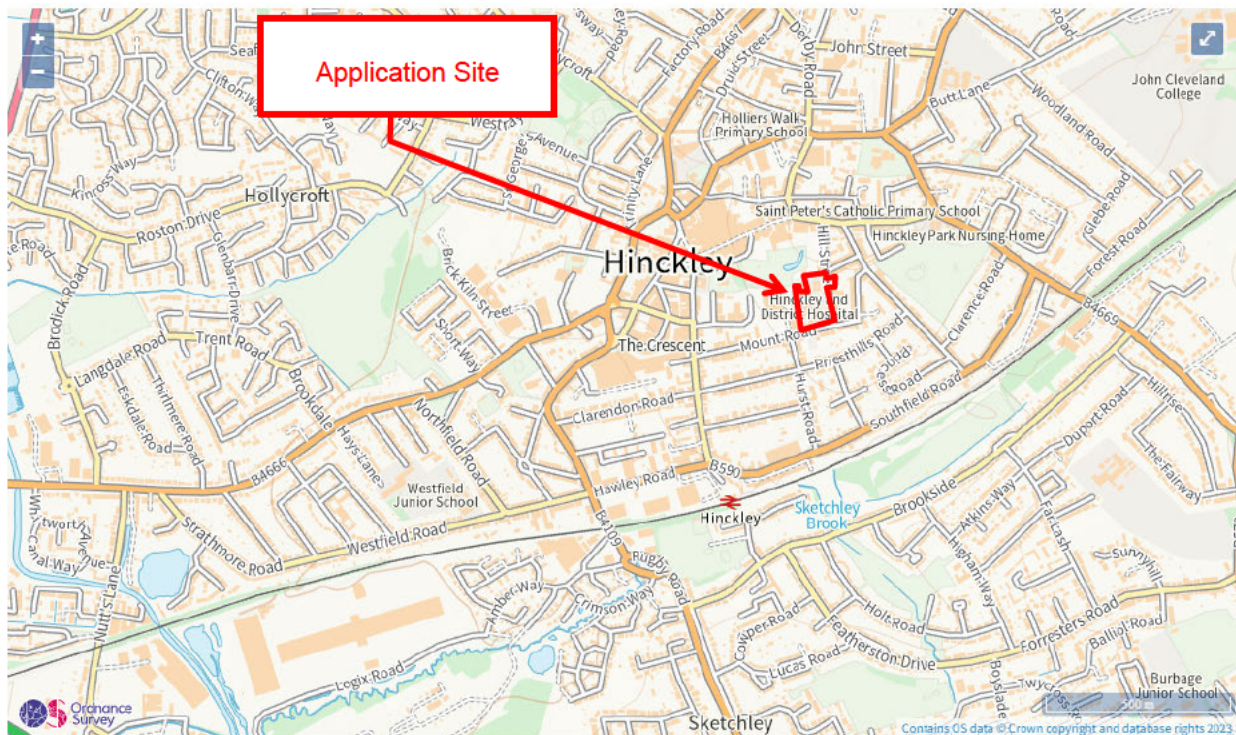
flooding is often caused by sewer capacity being exceeded in large rainfall events causing a backup of floodwaters within properties or through manholes.

Severn Trent Water is responsible for the management of urban drainage (surface water) and sewerage for the Site.

The Leicestershire County Council Level 1 Strategic Flood Risk Assessment (SFRA) suggests that there is no historic flooding within the Site or any flooding which has affected any properties within the area. It is therefore considered that the risk of sewer flooding at the Site is low.

3.6 Reservoir, Canal and Artificial Sources

The Environment Agency's Reservoir Flood Map in **Figure 3-4** indicates that the Site is not within the maximum extent of flooding from reservoirs. Therefore, there is a low likelihood of flooding due to reservoirs or artificial sources. It is considered the residual risk of reservoir breach is low.



Maximum extent of flooding from reservoirs:

● when river levels are normal ● when there is also flooding from rivers

Figure 3-4: Maximum Extent of Flooding from Reservoirs

Source: [Learn more about flood risk - GOV.UK \(check-long-term-flood-risk.service.gov.uk\)](https://www.gov.uk/check-long-term-flood-risk)

There is a small pond approximately 40m to the north of the site in a public park. It is assumed that the water level in the pond is regulated, and the risk of overtopping is low. No canals or other artificial sources that may pose a flood risk in the vicinity of the Site. The risk of flooding from canals and artificial sources is considered low.

4. The Sequential and Exception Test

4.1 National Planning Policy Framework

The NPPF sets out the approach LPAs should take when determining planning applications. LPAs should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a Site-specific flood risk assessment following the Sequential Test, and if required the Exception Test, it can be demonstrated that:

- Within the Site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and
- Development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems.

The Site falls within Flood Risk Vulnerability Zone 1. This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%). It is considered that all uses of land are appropriate in this zone.

In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems.

4.2 The Sequential Test

Paragraph 162 of the NPPF gives guidance on the aim of the Sequential Test, which states:

“The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available Sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding”.

The Environment Agency’s (EA) Flood Zone Map indicates that the Site falls within Flood Zone 1 and therefore, a sequential test has been passed.

4.3 The Exception Test

Paragraph 163 of the NPPF states that:

“If it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the Site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in Annex 3”.

Annex 3: Flood risk Vulnerability Classification classes the proposed daycare development as ‘more vulnerable’. According to Table 2 Flood Risk Vulnerability and Flood Zone Compatibility of the Planning Practice Guidance (PPG), ‘More Vulnerable’ development in Flood Zones 1 is appropriate and, therefore, the Site does not require to undergo the Exception Test.

Table 1 of the PPG: Definition of Flood Zones, Table 2 of the PPG: Flood risk vulnerability and flood zone ‘incompatibility’, and NPPF Annex 3: Flood risk vulnerability classification are provided in **Appendix C**.

5. Surface Water Drainage Strategy

5.1 Pre and Post-development Drainage

The Site area is 0.404ha, which consists of tarmac, compacted soil, concrete, rough ground, vegetation and an access road. As the existing access road has its own drainage in place, the road area of 0.069ha is excluded from the drainage calculations, leaving the site catchment area of 0.335ha.

A summary of the permeable and impermeable areas is summarised below in **Table 5-1**.

Table 5-1: Summary of Permeable and Impermeable Areas

	Impermeable Area (ha)	Permeable Area (ha)	% Impermeable
Pre-Development	0.298	0.037	89%
Post-Development	0.335	0.000	100%

The Catchment area from the Site is calculated based on assumed impermeability factors or run-off coefficients of 0.95 for impermeable areas to account for surface losses. Therefore, the overall effective impermeable area for the Site is 0.319ha.

5.2 Geology

5.2.1 Groundwater Vulnerability

Based on the Groundwater Vulnerability Maps from Magic Maps, the Site is within an area of 'medium' groundwater vulnerability. The 'Medium' zones are medium-priority groundwater resources that have some natural protection resulting in a moderate overall groundwater risk. Activities in these areas should, as a minimum, follow good practice to ensure they do not cause groundwater pollution.

5.2.2 Groundwater Source Protection Zone

The EA's Ground Source Protection Zone map indicates that the Site is not within the Ground Source Protection Zone.

5.3 Existing Drainage

Severn Trent Water is the statutory undertaker and is responsible for the public sewer systems in the area. Based on the Severn Trent Water sewers record map, which is presented in **Appendix E**, there are existing combined water public sewers running to the south of the Site along Mount Road. There are private sewers within the vicinity of the Site. They are summarised below.

5.3.1 Existing Public Sewers

- There is a 225mm diameter combined public sewer flowing in a southern direction in Hill Street to the east of the Site.
- There is a 300mm diameter combined public sewer flowing in a western direction in Mount Road to the south of the Site.

5.3.2 Existing Private Surface Water Sewers

The existing utility survey (**Appendix B**) indicates that there are existing private surface, foul and combined water drainage networks within the Site. They are summarised below:

- 150mm diameter and 100mm diameter sewers from the two buildings in the north flow in the western direction into a 225mm diameter combined sewer in the car park which continues west.
- Combined 150mm diameter sewers are found to the west of the main building flowing west.
- Combined 150mm diameter sewers running along the main building to the west flowing south.
- Combined 150mm diameter sewers running along the main building to the east. It is unclear which way the end of the pipe flows.
- 100mm Surface water sewers flow south into a 150mm combined sewer which discharges into the public combined sewer in Mount Road.
- The utility survey indicates surface water discharging to the ground to the south of the Site.
- Several gullies to the east of the main building are flooded.

5.3.3 Greenfield Runoff Rates

The greenfield runoff rates have been calculated using the ICP SUDS method in MicroDrainage which uses the IH124 method and scales the runoffs down from a 50-ha Site. The calculated rates based on the total Site area of approximately 0.335 ha are shown in **Table 5-2** below and **Appendix F**.

Table 5-2: Greenfield Runoff Rates

Flood Event	Open Field
QBAR _{Rural}	1.8 l/s
QBAR _{Urban}	1.8 l/s
Q1 Year	1.5 l/s
Q30 Years	3.5 l/s
Q100 Years	4.6 l/s

5.3.4 Brownfield Runoff Rates

As the entire Site has been previously developed, a brownfield runoff rate is calculated based on the hardstanding area of 0.298 ha. Runoff from the existing Site has been calculated using the Rational Method based on an estimation of impermeable areas. The existing Site runoff calculation is shown in **Table 5-3** to **Table 5-5**.

Table 5-3: Brownfield Runoff Rates for 1 in 1 year

Average Rainfall Intensity (mm/hr)		Brownfield Runoff Rate (l/s)
Storm Duration (mins)	1 in 1 year	Modified Rational Method $Q = 2.78 C i A$
15	30.7	24.8
30	20.0	16.1
60	12.7	10.2
120	7.9	6.3
240	4.8	3.9
360	3.6	2.9
600	2.5	2.0
1440	1.3	1.1

Table 5-4: Brownfield Runoff Rates for 1 in 30 year

Storm Duration (mins)	Average Rainfall Intensity (mm/hr)	Brownfield Runoff Rate (l/s)
	1 in 30 years	Modified Rational Method $Q = 2.78 C i A$
15	75.2	60.8
30	49.0	39.6
60	30.5	24.6
120	18.4	14.9
240	10.9	8.8
360	8.0	6.4
600	5.4	4.3
1440	2.7	2.2

Table 5-5: Brownfield Runoff Rates for 1 in 100 year

Storm Duration (mins)	Average Rainfall Intensity (mm/hr)	Brownfield Runoff Rate (l/s)
	1 in 100 years	Modified Rational Method $Q = 2.78 C i A$
15	97.6	78.8
30	64.1	51.8
60	40.1	32.4
120	24.2	19.6
240	14.2	11.5
360	10.3	8.3
600	6.9	5.6
1440	3.4	2.8

The brownfield runoff rates for the 1 in 1, 1 in 30 and 1 in 100 year for 60 minutes storm duration are 10.2l/s, 24.6l/s and 32.4l/s respectively.

5.4 Proposed Surface Water Drainage Strategy

The management of surface water is considered an essential element in reducing future flood risk to both the Site and its surroundings. In accordance with the NPPF, design proposals should seek to ensure that surface water run-off is managed as close to its source as possible.

As the greenfield run-off rates are very low and will likely cause blockage in the drainage system, the proposed discharge rate for the surface water drainage for the Site has been designed based on 5 l/s.

5.4.1 Climate Change Allowances (Peak Rainfall Intensity Allowances) to Assess Surface Water Flood Risk

The NPPF in **Appendix C**, Annex 3: Flood Risk Vulnerability Classification, classes the proposed Day Care as 'More Vulnerable'. The government guidance states that if a development has a development lifetime beyond 100 years, then the upper-end allowances should be considered for climate change.

It is assumed that for this development, the lifetime will be beyond 100 years, so 40% climate change is considered for the Site.

The Site is located within the Soar Management Catchment peak rainfall allowances. The central allowances for the Site are shown in **Table 5-6**.

Table 5-6: Soar Management Catchment Peak Rainfall Allowances

3.3% annual exceedance rainfall event	Central allowance	Upper end allowance
2050s	20%	35%
2070s	25%	35%
1% annual exceedance rainfall event	Central allowance	Upper end allowance
2050s	20%	40%
2070s	25%	40%

5.4.2 Surface Water Drainage Hierarchy

Part H of the Building Regulations 2010⁴ recommends that surface water runoff shall discharge to one of the following, listed in order of priority:

- An adequate soakaway or some other adequate infiltration system, or where that is not reasonably practicable.
- A watercourse, or, where that is not reasonably practicable.
- A sewer.

The surface water discharge options are considered based on the surface water drainage hierarchy, which is summarised in **Table 5-7**.

Table 5-7: Summary of Surface Water Discharge Options

Drainage Hierarchy	Consideration	✓/✗
1 Store rainwater for later use	Recycling attenuated rainwater is considered unfeasible for use within the Site because of the limited space and nature of the proposal.	✗
2 Into the ground by infiltration	The geology of the Site indicates that it is made up of mudstone. It is likely that infiltration is not feasible. However, this will have to be confirmed by a ground investigation study. If infiltration rates are appropriate, partial infiltration may be used	✗
3 Into a surface water body such as a river, ditch, pond or stream	Sketchley Brook is approximately 500m to the south of the site. It would require permission to cross public highways and third-party lands to discharge into the watercourse. Therefore, this method of discharge is deemed unfeasible.	✗
4 Into a surface water sewer	No public surface water sewers within the vicinity of the Site. There are private surface water sewers within the Site however, they discharge into the public combined sewer in Mouth Road	✗
5 Into a combined sewer	There are public combined sewers in Mouth Road to the south of the Site.	✓

Based on the hierarchy above, it is proposed to discharge the surface water runoff into the existing foul water manhole to the west of the Site which is to be reinstated to a combined drainage system. The proposed connection is subject to third party's approval.

5.4.3 Sustainable Urban Drainage System (SuDS)

The surface water drainage strategy has been developed to incorporate appropriate SuDS techniques for the Site to enhance the amenity of the proposed development while minimising the impacts of the

⁴ The Building Regulations 2010 – Drainage and Waste Disposal – HM Government – 2015 Edition

quantity and quality of the surface water runoff. **Table 5-8** outlines constraints and comments for different SuDS techniques.

Table 5-8: Sustainable Drainage Techniques

Device	Description	Constraints/Comments	✓/✗
Green/Brown Roofs	Provide soft landscaping at roof level which reduces surface water runoff	The proposed design would be modular construction, therefore, green roof would not be appropriate for the Site.	✗
Infiltration devices & Soakaways (source control)	Store runoff and allow water to percolate into the ground via natural infiltration	The geology of mudstone would not make infiltration suitable. This will have to be confirmed by a ground investigation study.	✗
Pervious surfaces (source control)	Stormwater is allowed to infiltrate through the surface into a storage layer, from which it can either infiltrate and/or slowly release to sewers	Pervious surface would be suitable for parking bays.	✓
Rainwater harvesting (source control)	Reduces the annual average rate of runoff from the Site by reusing water for non-potable uses e.g., toilet flushing or water butts	Due to the nature of the proposals, rainwater harvesting is not deemed suitable at the Site.	✗
Swales (permeable conveyance)	Broad shallow channels that convey / store runoff, and allow infiltration (ground conditions permitting)	Swales are not deemed feasible at the Site due to the nature of the proposed development, which is limited with space. Therefore, it is considered not feasible.	✗
Filter drains & perforated pipes (permeable conveyance)	Trenches filled with granular materials (which are designed to take flows from adjacent impermeable areas) that convey runoff while allowing infiltration (ground conditions permitting)	Filter drains are not suitable due to the nature of the proposed development, and limited space. It is considered not feasible.	✗
Filter Strips (permeable conveyance)	Wide gently sloping areas of grass or dense vegetation that remove pollutants from runoff from adjacent areas	Filter strips are not deemed feasible at the Site due to space constraints.	✗
Infiltration basins (end of pipe treatment)	Depressions in the surface designed to store runoff and allow infiltration through the base	Infiltration basins are not deemed feasible at the Site due to space constraints.	✗
Bio-retention Systems / Rain Garden (end of pipe treatment)	A shallow landscaped depression which allows runoff to pond temporarily on the surface before filtering through vegetation and underlying soils.	Bio-retention systems are not suitable due to the nature of the development.	✗
Detention Basins (end of pipe treatment)	Depressions in the surface designed to store runoff without infiltration through the base	Detention basins are not deemed feasible at the Site due to the limited space.	✗
Attenuation Underground/Podium (end of pipe treatment)	Oversized pipes or geo-cellular tanks designed to store water below ground level or at podium level.	Attenuation tanks are feasible to be incorporated into the Site.	✓

5.4.4 Drainage Strategy

As the greenfield run-off rates are very low and will likely cause a blockage in the drainage system, the Site drainage for the Site has been designed based on 5 l/s. The average attenuation storage was calculated using InfoDrainage Software with a maximum allowable discharge rate of 5 l/s. The results show that a storage volume of 140m³ should be provided.

The InfoDrainage calculations are presented in **Appendix G**.

The proposed overall attenuation storage volume of approximately 140m³ is sized for a maximum allowable surface water discharge rate of 5l/s for the 1 in 100-year critical storm return period with a 40% allowance for climate change. The proposed storage volume is to be attenuated through the below-ground cellular tank and permeable paving.

The proposed surface water drainage is to connect to the existing foul water manhole to the west of the Site which is to be reinstated to a combined drainage system. The proposed connection is subject to third party's approval.

Location and size of the proposed attenuation storage systems are subject to coordination with the landscaping proposal, site levels and other proposed works.

Further investigation should take place to confirm the outfall of the existing drainage network and infiltration rates.

It is noted that the proposed drainage system does not include the access road to the west of the Site (Argents Mead) as it has existing adequate drainage in place. The existing arrangements indicate the road is drained via road gullies.

The proposed Drainage Strategy is presented in **Appendix H**.

5.4.5 Water Quality

In line with the SuDS Manual Simple Index Approach, appropriate treatments would be incorporated into the drainage system to ensure that the quality of water discharged is acceptable. The runoff from the Site will flow through an oil separator which provides water treatment before the runoff discharges into the existing downstream drainage system.

The Pollution Hazard Indices for the SuDS used in this development in different land use classifications are presented in **Table 5-9** below, and the Total SuDS mitigation index is shown in **Table 5-10**.

The indices range from 0 to 1 to show the rate of pollution hazard. The pollution hazards and the total SuDS mitigation for the different types of SuDS proposed for this development are referred to SuDS Manual CIRIA document.

Table 5-9: Pollution Hazard Indices for the Development

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Non-residential Car Park	Low	0.5	0.4	0.4
Other Roofs	Low	0.3	0.2	0.05
Total		0.8	0.6	0.45

Table 5-10: Total SuDS mitigation index

Type of SuDS Component	TTS	Metals	Hydrocarbons
Permeable Paving	0.7	0.6	0.7
Total	0.7	0.5	0.4

To make sure that the treatment is delivered to an accurate extent, for each component type the Total SuDS mitigation index $\geq$ total pollution hazard index.

The total mitigation index levels are less than the total pollution hazard levels. However, a propriety treatment system such as a petrol interceptor can be used to improve the discharge quality.

5.4.1 Exceedance Flow

During an exceedance event, any surface water flooding will be managed safely on-site. This would be achieved by setting out the external levels to direct flows away from the buildings and to be stored temporarily in car parks.

In an event that the capacity of the proposed surface water drainage network is exceeded, flood water escaping from the drainage system will be routed away from the buildings until there is sufficient capacity to allow it back into the system.

5.5 Maintenance

All those responsible for maintenance should take appropriate health and safety precautions and risk assessments. In any eventuality, it is considered the SuDS features will be adopted and maintained in perpetuity.

The detailed drainage design will incorporate sufficient access and working spaces for maintaining the drainage systems. This will be achieved by incorporating appropriate access points at reasonable intervals (for example manhole, rodding eye and inspection chamber). After completion of works, routine checks need to be carried out to ensure the ongoing performance of drainage systems.

The proposed SuDS features will need to be maintained throughout their lifetime to ensure their effectiveness.

The future Site owner will be responsible for the maintenance of the proposed private drainage works. A management company is normally set up to undertake regular inspections and maintenance activities with respect to drainage components and SuDS features.

A schedule of inspections and activities is to be incorporated into the maintenance plan. Refer to **Table 5-11** to **Table 5-15**.

Table 5-11: Operation and Maintenance for Attenuation Tanks

Maintenance schedule	Required action	Typical frequency	Expected Design Life
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually	50 Years
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly	

Maintenance schedule	Required action	Typical frequency	Expected Design Life
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually	
	Remove sediment from pre-treatment structures and/or internal forebays.	Annually, or as required	
Remedial actions	Repair/rehabilitate inlets, outlets, overflows and vents.	As required	
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually	
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required	

Table 5-12: Operation and Maintenance for Gullies

Maintenance schedule	Required action	Typical frequency	Expected Design Life
Regular Maintenance	Inspect and identify blockages, debris and litter	As Required	50-100 Years
	Removal of any debris and litter from the gully	As Required	
Occasional	Inspect gullies to determine whether they are operating correctly	Annually or as required	
Remedial Actions	Repair gullies and any identified areas that are not operating correctly	As Required	

Table 5-13: Operation and Maintenance for Manhole and Inspection Chamber

Maintenance schedule	Required action	Typical frequency	Expected Design Life
Regular maintenance	Inspect and identify blockages, debris and litter. If required, take remedial action	As Required	50-100 Years
	Removal of sediments, debris and litter from the manhole and inspection chamber	As Required	
Occasional maintenance	Inspect all manholes and inspection chambers to determine whether they are operating correctly	Annually or as required	
Remedial actions	Repair gullies and any identified areas that are not operating correctly	As required	
	Repair manhole and inspection chamber by clearing any blockages and any other areas that are not operating correctly	As required	
	Removal of any blockages by rodding or jetting through an access point	As Required	

Table 5-14: Operation and Maintenance for Drainage Pipes

Maintenance schedule	Required action	Typical frequency	Expected Design Life
Regular maintenance	Remove sediment and debris from drainage pipes	Annually or as required	50-100 Years
	Remove any root ingress	Annually or as required	
	Cleaning of gutters and any filters on downpipes	As required	
Occasional maintenance	CCTV survey of drains to check alignment, cracking and joint displacement	10-year intervals	

Table 5-15: Operation and Maintenance for Permeable Paving

Maintenance schedule	Required action	Typical frequency	Expected Design Life
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over the whole surface)	Once a year	Lifetime of the development
	Stabilise and mow contributing and adjacent areas	As required	
	Removal of weeds	As required	
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required	
	Removal of weeds	As required	
Remedial actions	Remedial work to any depressions rutting and cracked or broken blocks	As required	
Monitoring	Inspect for evidence of poor operation and weed growth	Three-monthly	
	Inspect silt accumulation	Annually	

Table 5-16: Flow Control Device

Maintenance schedule	Required action	Typical frequency	Expected Design Life
Regular maintenance	Keep the device free from silt and debris	Monthly	60 Years
Occasional maintenance	Remove obstructions and silt as necessary	As necessary	
Remedial actions	Repair physical damage if necessary	As required	
Monitoring	Inspect for evidence of blockage and silt accumulation	Annually	

6. Foul Drainage Strategy

6.1 Existing Foul Drainage

Based on the existing utility survey, which can be found in **Appendix B**, there is an existing foul water sewer located in the access road. This is summarised as follows:

- 225mm diameter foul water sewer in Argents Mead to the west of the Site flowing in a southerly direction from a manhole which appears to discharge into the 300mm combined sewer in Mount Road.

6.2 Proposed Foul Drainage

Based on Design and Construction Guidance for Foul and Surface Water Sewers (March 2019) offered for adoption under the Code for adoption agreements for water and sewerage companies operating wholly or mainly in England, the peak flow rate of 0.60 l/s per developed area in hectare for commercial use is used for the proposed development. This equates to 0.201 l/s of foul flow rate. The exact flow rate will be calculated at a later stage once the Site layout is further developed.

It is proposed to connect foul water drainage from the development to the existing foul water manhole in Argents Mead.

7. Conclusions and Recommendations

Waterman Infrastructure & Environment Limited (“Waterman”) have been commissioned by NHS Property Services (hereafter ‘the Client’) to prepare a Flood Risk Assessment and Drainage Strategy to support a planning application for a Site at Hinckley CDC and Endoscopy.

Based on the assessment in this report, our conclusions are as follows:

- The proposed Site boundary extends to an area of approximately 0.404ha.
- The Site lies within Flood Zone 1.
- The risk of flooding from surface water, sewers, groundwater and artificial sources is low.
- The sequential test has been passed and the Site does not require to undergo the exception test.
- Severn Trent Water is the statutory undertaker and is responsible for the public sewer systems for the Site area.
- The existing access road (Argents Mead) to the west of the Site has existing adequate drainage in place and does not form part of the proposed drainage design. The road area of 0.069ha is therefore excluded from the drainage calculations, leaving the site catchment area of 0.335ha.
- As the greenfield run-off rates are very low, to reduce the risk of blockage in the drainage system, the proposed surface water drainage for the Site has been designed based on 5 l/s.
- The Site is located within the Soar Management Catchment peak rainfall climate change allowances. For this development, the lifetime will be beyond 100 years, so 40% climate change is considered for the Site.
- The average attenuation storage for the Site is 140m³ which will be accommodated with attenuation tanks and permeable paving. The attenuation storage volumes are calculated based on a maximum allowable surface water discharge rate of 5 l/s for the 1 in 100 year critical storm return period with 40% allowance for climate change.
- The proposed surface water and foul water drainage is to connect to the existing foul water manhole to the west of the Site which is to be reinstated to a combined drainage system. The proposed connection is subject to third party's approval.
- Future maintenance for any private drainage systems would be under the responsibility of the Site owner or an appointment management company.

APPENDICES

A. Site Layout Plan

Site Address

Hinckley and District Hospital
Mount Road
Hinckley
LE10 1AG

N

North

Produced on 27 February 2023 from the Ordnance Survey National Geographic Database and incorporating surveyed revision area data as of the date
This map shows the area bounded by 40357 791020 44080 719420 44050 219810 44080 393673 442807 219420
Copyright and database rights 2023 OS 100064135. Supplied by mapbox ltd trading as Mapbox.com a licensed Ordnance Survey
partner OS 100064135
Data revision request 27 February 2024. Unique plan reference: null19146171234327

Key

Application Site Area:
4042.89 sq m
0.404 ha

Land owned/controlled by the
trust



Notes:

This drawing is to be read in conjunction with all other consultants engineers and specialist sub contractors drawings
All items are to be cross referenced throughout design, tender & construction

Any discrepancies whatsoever discovered must be reported to the Main Contractor or Contract Administrator (CA) as soon as they become apparent

The Main Contractor is responsible for checking all dimensions prior to commencement of work

All specified manufacturers are OSA (or similar approved) OEA (or equal approved) whether stated or not. Any equivalent product or manufacturer must be approved in writing by the CA before use

All structure shown on these drawings is based on structural philosophy & is to be fully designed, detailed & dimensioned by 'Others'. Refer to Structural Engineers plans for current structural design

All drawings are to be read in conjunction with project specific NBS (national building specification)

P06	12/07/2023	Building layout updated in line with latest plans	BCP
P05	16/05/2023	Updated building shape to reflect current proposal	BCP
P04	12/04/2023	Car park layout updated to factor in refuse lorry swept path analysis	BCP
Rev	Date	Revision Details	Author
Status	Purpose For Issue		
S0	Initial Issue		

designbüro

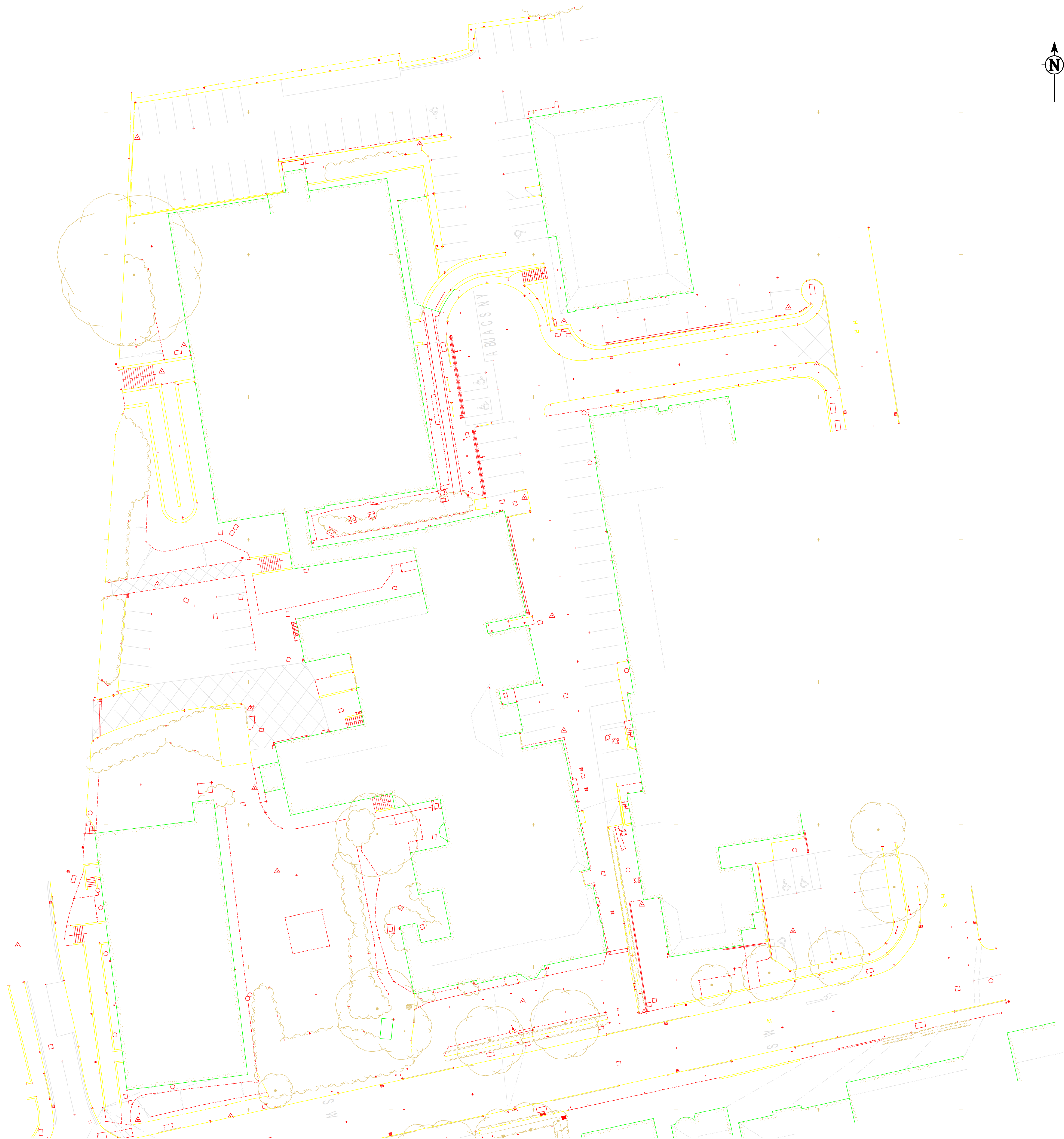
The Design Buro (Coventry) Ltd
5 Euston Place,
Leamington Spa,
Warwickshire,
CV32 4LN
01788 555350
www.thedesignburo.co.uk

Client	NHS Property Services		
Job	Hinckley CDC & Endoscopy		
Title	Proposed Site Plan		
Drawn BCP	Date Feb 2023	Checked MH	Date Feb 2023
Scale:Size	1:500	@	A2
Drawing Number	Revision		
1782 DBC ZZ 00 DR A 0100	P06		

The copyright of this drawing is vested in the Architect/ Designer and must not be copied or reproduced without the written consent. Figured dimensions only to be taken from the drawing. All contractors and / or specialists must visit the site and be responsible for taking and checking all dimensions relative to this work

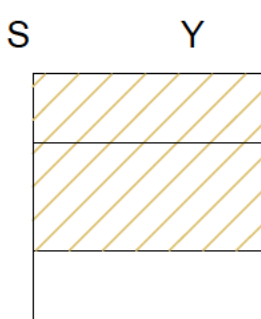
B. Topographical and Utility Surveys

Appendices

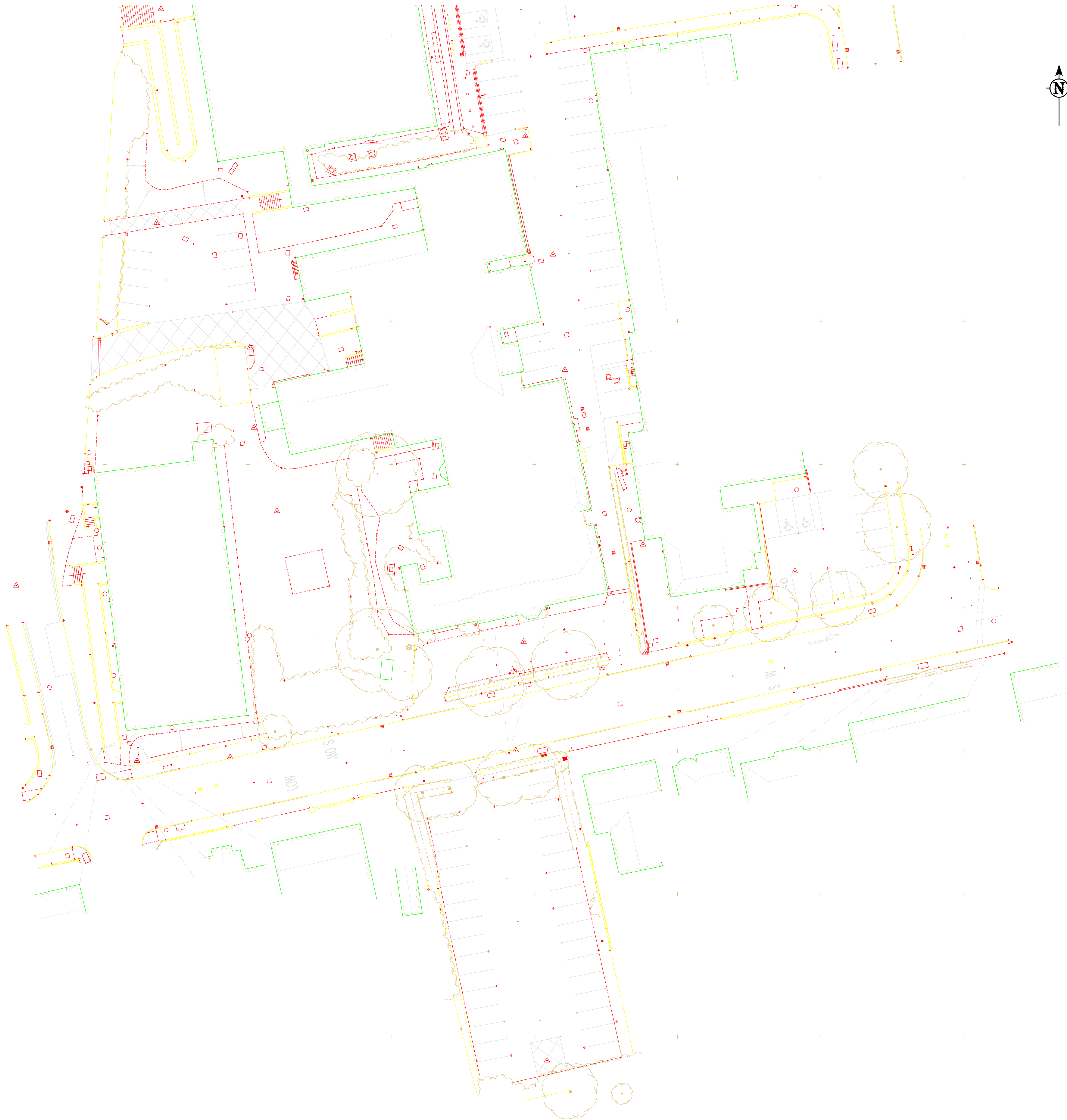


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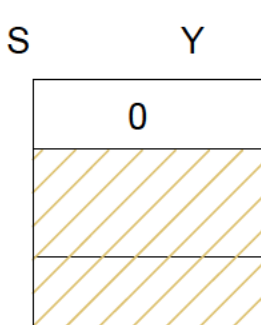
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C. National Planning Policy Framework and Planning Practice Guidance

Appendices

Table 1 of the Planning Practice Guidance Flood Zones

In accordance with the sequential test in the National Planning Policy Framework, sites are to be classed as follows:

Flood Risk Vulnerability	Definition	Appropriate Uses	FRA Requirements	Policy Aims
Zone 1 – Low Probability	This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).	All uses of land are appropriate in this zone.	For development proposals on sites comprising one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a FRA. This need only be brief unless the factors above or other local considerations require particular attention.	In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems.
Flood Zone 2 – Medium Probability	This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.	Essential infrastructure and the water-compatible, less vulnerable and more vulnerable uses as set out in table 2 are appropriate in this zone. The highly vulnerable uses are only appropriate in this zone if the Exception Test is passed.	All development proposals in this zone should be accompanied by a FRA.	In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems.
Zone 3a -High Probability	This zone comprises land assessed as having a 1 in 100 or greater annual probability of river (>1%) or a 1 in 200-year greater annual probability of flooding from the sea (>0.5%) in any year.	The water-compatible and less vulnerable uses of land (table 2) are appropriate in this zone. The highly vulnerable uses in the table below should not be permitted in this zone. The more vulnerable uses and essential infrastructure should only be permitted in this zone if the Exception Test is passed.	All development in this zone should be accompanied by a FRA.	In this zone, developers and local authorities should seek opportunities to: i. reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems; ii. relocate existing development to land in zones with a lower probability of flooding; and

Flood Risk Vulnerability	Definition	Appropriate Uses	FRA Requirements	Policy Aims
		Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood.		iii. create a space for flooding to occur by restoring functional and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.
Zone 3b - The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local Planning Authorities should identify in their SFRAs areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. But land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, should provide a starting point for consideration and discussions to identify the functional floodplain.	Only the water-compatible uses and essential infrastructure listed in table 2 that has to be there should be permitted in this zone. It should be designed and constructed to: • remain operational and safe for users in times of flood; • result in no net loss of floodplain storage; • not impede water flows; and • not increase flood risk elsewhere. Essential infrastructure in this zone should pass the Exception Test.	All development in this zone should be accompanied by a FRA.	In this zone, developers and local authorities should seek opportunities to: i. reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage techniques; and ii. relocate existing development to land with a lower probability of flooding.

National Planning Policy Framework Annex 3 - Flood Risk Vulnerability Classification

Vulnerability	Land Use Types
Essential Infrastructure	- Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk; - Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary stations; water treatment works that need to remain operational in times of flood; - Wind turbines. - Solar farms.
Highly Vulnerable	- Police stations, Ambulance stations and Fire stations and Command Centres and telecommunications installations required to be operational during flooding; - Emergency dispersal points; - Basement dwellings; - Caravans, mobile homes and park homes intended for permanent residential use; - Installations requiring hazardous substances consent.
More Vulnerable	- Hospitals; - Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels; - Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels; - Non-residential uses for health services, nurseries and educational establishments; - Landfill and sites used for waste management facilities for hazardous waste; - Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	- Police stations, Ambulance stations and Fire stations which are not required to be operational during flooding; - Buildings used for: shops; financial, professional and other services; restaurants and cafes; hot food takeaways; offices; general industry; storage and distribution; non-residential institutions not included in 'more vulnerable'; and assembly and leisure; - Land and buildings used for agriculture and forestry; - Waste treatment (except landfill and hazardous waste facilities); - Minerals working and processing (except for sand and gravel working); - Water treatment plants which are not required to be operational during flooding; - Sewage treatment plants (if adequate measures to control pollution and manage sewage during flooding events are in place). - Car parks
Water-compatible Development	- Flood control infrastructure; - Water transmission infrastructure and pumping stations; - Sewage transmission infrastructure and pumping stations; - Sand and gravel workings; - Docks, marinas and wharves; - Navigation facilities; - Ministry of Defence installations; - Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location - Water-based recreation (excluding sleeping accommodation); - Lifeguard and coastguard stations; - Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms; - Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan

Table 2 of the Planning Practice Guidance - Flood Risk Vulnerability and Flood Zone Compatibility

Flood Risk Vulnerability	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	√	√	√	√	√
Zone 2	√	√	Exception Test Required	√	√
Zone 3a	Exception Test Required	√	X	Exception Test Required	√
Zone 3b	Exception Test Required	√	X	X	X

√ - Development is appropriate.

X – Development should not be permitted.

Notes: This table does not show:

1. The application of the Sequential Test which gives development to Flood Zone 1 first, then Zone 2, and then Zone 3;
2. Flood risk assessment requirements; or
3. The policy aims for each flood zone.

D. BGS Borehole Data

Appendices

E. Severn Trent Water Sewer Map

Appendices



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			
0601	C	126.48	123.31	3.17
0602	C	126.54	123.4	3.14
0603	C	123.65	120.44	3.21
0701	C	126.45	124.14	2.31
0802	C	129.95	127.06	2.89
0803	C	130.28	129.16	1.12
0902	C	132.21	131.32	0.89
0903	C	132.78	130.58	2.2
0904	C	131.39	0	0
1501	C	118.51	116.76	1.75
1502	C	118.76	116.92	1.84
1503	C	121.22	119.14	2.08
1504	C	121.7	119.92	1.78
1505	C	121.83	120.35	1.48
1601	C	124.78	122.57	2.21
1602	C	124.7	123.29	1.41
1603	C	123.35	121.7	1.65
1701	C	126.25	123.75	2.5
1801	C	130.62	127.59	3.03
1802	C	130.12	127.42	2.7
1803	C	130.09	127.7	2.39
2501	C	118.07	116.21	1.86
2601	C	-	0	0
2602	C	121.89	0	0
5705	C	111.58	108.78	2.8
5706	C	112.82	110.34	2.48
5803	C	113.03	110.46	2.57
5808	C	113.6	111.83	1.77
6502	C	116.11	113.64	2.47
6503	C	115.91	113.05	2.86
6601	C	114.77	111.84	2.93
6602	C	112.83	109.69	3.14
6606	C	112.83	109.42	3.41
6701	C	112.91	109.2	3.71
6702	C	113.55	110.31	3.24
6703	C	114.54	112.27	2.27
6704	C	113.18	111.12	2.06
6705	C	114.81	112.84	1.97
6801	C	114.88	113.08	1.8
6802	C	115.53	112.9	2.63
6803	C	117.03	116.21	0.82
6804	C	118.61	117.24	1.37
6901	C	112.85	109.1	3.75
6902	C	112.97	111.34	1.63
6903	C	112.54	110.54	2
6904	C	113.07	111.42	1.65
6905	C	112.83	108.57	4.26
7501	C	119.18	114.58	4.6
7601	C	116.44	113.59	2.85
7602	C	117.44	114.69	2.75
7701	C	116.26	114.04	2.22
7801	C	121.27	119.69	1.58
7802	C	121.27	119.14	2.13
7803	C	123.94	122.04	1.9
7901	C	118.71	117.11	1.6
7902	C	120.8	118.6	2.2
7903	C	123.55	122.12	1.43
8501	C	119.28	116.3	2.98
9501	C	120.47	118.1	2.37
9503	C	118.2	116.73	1.47
9601	C	120.69	118.17	2.52
9603	C	121.99	119.3	2.69
9604	C	124.91	121.83	3.08
9802	C	130.77	128.64	2.13
9803	C	129.79	127.39	2.4
9905	C	131.44	130.03	1.41
	F			

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
	F			
	F			
	F			
	F			
	F			
	F			
	F			
	F			
0605	F	-	0	0
0609	F	-	0	0
0715	F	-	0	0
0800	F	-	0	0
0801	F	-	0	0
0804	F	-	0	0
0812	F	-	0	0
0814	F	-	0	0
0820	F	-	0	0
0907	F	-	0	0
1600	F	-	0	0
1703	F	-	0	0
1704	F	-	0	0
1706	F	-	0	0
1707	F	-	0	0
1712	F	-	0	0
1714	F	-	0	0
1804	F	-	0	0
1812	F	-	0	0
1813	F	-	0	0
1819	F	-	0	0
1901	F	132.19	130.79	1.4
1902	F	129.86	128.23	1.63
1903	F	129.66	0	0
1907	F	-	0	0
1909	F	-	0	0
1914	F	-	0	0
2508	F	-	0	0
2513	F	-	0	0
2600	F	-	0	0
2603	F	-	0	0
2604	F	-	0	0
2607	F	-	0	0
2609	F	-	0	0
2700	F	-	0	0
2701	F	-	0	0
2702	F	-	0	0
2704	F	-	0	0
2706	F	-	0	0
2711	F	-	0	0
2902	F	129.88	128.9	0.98
6600	F	114.05	111.2	2.85
6603	F	-	0	0
6604	F	-	0	0
6605	F	113.9	111.38	2.52
6607	F	-	0	0
6608	F	-	0	0
6609	F	113.73	110.98	2.75
6610	F	-	0	0
6611	F	-	0	0
6700	F	-	0	0
7502	F	-	0	0
7504	F	-	0	0
7506	F	-	0	0
7508	F	-	0	0
7510	F	-	0	0
7511	F	-	0	0
7514	F	-	0	0
7604	F	-	0	0
7607	F	-	0	0
8503	F	-	0	0
8504	F	-	0	0

[illegible]

	F			
	F			

8507	F	-	0	0
8601	F	-	0	0

F. MicroDrainage Calculations

Appendices

Waterman Group		Page 1
Pickfords Wharf Clink Street London, SE1 9DG		
Date 30/05/2023 11:14 File	Designed by BMRL1 Checked by	
Innovyze		Source Control 2020.1.3
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 10 Soil 0.450 Area (ha) 0.405 Urban 0.000 SAAR (mm) 700 Region Number Region 4 Results 1/s QBAR Rural 1.8 QBAR Urban 1.8 Q10 years 2.7 Q1 year 1.5 Q30 years 3.5 Q100 years 4.6		
©1982-2020 Innovyze		

G. InfoDrainage Calculation Results

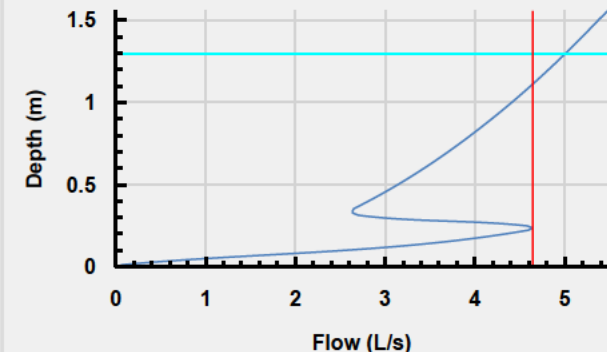
Appendices

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Junctions Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
SW01	Inlet	Catchment Area	(None)	No Restriction
SW02	Inlet	1.000	(None)	No Restriction
SW04	Inlet	1.002	(None)	No Restriction
	Inlet (1)	Catchment Area (4)	(None)	No Restriction
SW06	Inlet	Catchment Area (2)	(None)	No Restriction
SW07	Inlet	2.000	(None)	No Restriction
	Inlet (1)	Catchment Area (3)	(None)	No Restriction
SW08	Inlet	2.001	(None)	No Restriction
	Inlet (1)	Catchment Area (5)	(None)	No Restriction
SW09	Inlet (2)	2.002 1.004	(None)	No Restriction
SW05	Inlet	1.003 Catchment Area (6) Catchment Area (7)	(None)	No Restriction
SW10 WITH HB	Inlet (3)	1.006	(None)	No Restriction
SW11	Inlet	1.007	(None)	No Restriction
EX MH	Inlet	1.009	(None)	No Restriction
SW12	Inlet	1.008	(None)	No Restriction
SW03	Inlet	1.001 Catchment Area (1)	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type	
SW01	Outlet	1.000	Free Discharge	
SW02	Outlet	1.001	Free Discharge	
SW04	Outlet	1.003	Free Discharge	
SW06	Outlet	2.000	Free Discharge	
SW07	Outlet	2.001	Free Discharge	
SW08	Outlet	2.002	Free Discharge	
SW09	Outlet	1.005	Free Discharge	
SW05	Outlet	1.004	Free Discharge	
SW10 WITH HB	Outlet	1.007	Hydro-Brake®	
	Invert Level (m)	118.777		
	Design Depth (m)	1.297		
	Design Flow (L/s)	5.0		
	Objective	Minimise Upstream Storage Requirements		
	Application	Surface Water Only		
	Sump Available	☐		
	Unit Reference	CHE-0096-5000-1297-5000		
				
	SW11	Outlet	1.008	Free Discharge
	SW12	Outlet	1.009	Free Discharge
SW03	Outlet	1.002	Free Discharge	

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Stormwater Controls Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			



TANK

Type : Cellular Storage

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	1.005
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.006
Outlet Type	Free Discharge

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Connections Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
2.000	23.510	Pipe	89.734		0.6	225	122.000	119.550
2.001	13.139	Pipe	89.996		0.6	300	122.000	119.288
2.002	14.348	Pipe	89.119		0.6	300	122.000	119.142
1.007	17.327	Pipe	154.708		0.6	375	120.350	118.777
1.000	19.612	Pipe	154.422		0.6	225	120.450	119.550
1.003	24.208	Pipe	154.192		0.6	375	120.200	119.242
1.004	16.025	Pipe	154.084		0.6	375	120.200	119.085
1.006	9.814	Pipe	155.778		0.6	375	122.000	118.840
1.005	6.310	Pipe	44.755		0.6	375	120.400	118.981
1.008	33.505	Pipe	154.402		0.6	375	120.000	118.665
1.009	5.038	Pipe	86.859		0.6	375	120.000	118.448
1.001	10.757	Pipe	153.669		0.6	225	120.450	119.423
1.002	17.156	Pipe	154.559		0.6	300	120.200	119.353

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Lock	Flow Restriction (L/s)	Velocity (m/s)
2.000	122.000	119.288	All		
2.001	122.000	119.142	All		
2.002	120.400	118.981	All		
1.007	120.000	118.665	All	5.0	
1.000	120.450	119.423	All		
1.003	120.200	119.085	All		
1.004	120.400	118.981	All		
1.006	120.350	118.777	All		
1.005	121.500	118.840	All		
1.008	120.000	118.448	All		
1.009	120.070	118.390	All		
1.001	120.200	119.353	All		
1.002	120.200	119.242	All		

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023		
Report Details: Type: Manhole Schedule Storm Phase: Phase		Designed by: RB	Checked by: SS	
		Approved By: SS		
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX		

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
SW01	120.450 119.550	Diameter / Length: 1.200					Manhole - Access Required
E:442927.129 N:293684.786	0.900						
			{a} 1.000	Pipe	119.550	Diam/Width:225	Not Applicable
SW02	120.450 119.423	Diameter / Length: 1.200	{1} 1.000	Pipe	119.423	Diam/Width:225	Manhole - Access Required
E:442908.029 N:293680.338	1.027						
			{a} 1.001	Pipe	119.423	Diam/Width:225	Not Applicable
SW04	120.200 119.242	Diameter / Length: 1.350	{1} 1.002	Pipe	119.242	Diam/Width:300	Manhole - Access Required
E:442897.791 N:293704.496	0.958						
			{a} 1.003	Pipe	119.242	Diam/Width:375	Not Applicable
SW06	122.000 119.550	Diameter / Length: 1.200					Manhole - Access Required
E:442932.994 N:293699.767	2.450						
			{a} 2.000	Pipe	119.550	Diam/Width:225	Not Applicable
SW07	122.000 119.288	Diameter / Length: 1.200	{1} 2.000	Pipe	119.288	Diam/Width:225	Manhole - Access Required
E:442929.944 N:293723.079	2.712						
			{a} 2.001	Pipe	119.288	Diam/Width:300	Not Applicable

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Manhole Schedule Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
SW08	122.000 119.142	Diameter / Length: 1.200	{1} 2.001	Pipe	119.142	Diam/Width:300	Manhole - Access Required
E:442928.440 N:293736.132	2.858						
			{a} 2.002	Pipe	119.142	Diam/Width:300	Not Applicable
SW09	120.400 118.981	Diameter / Length: 1.350	{1} 2.002	Pipe	118.981	Diam/Width:300	Manhole - Access Required
E:442914.144 N:293734.918	1.419		{2} 1.004	Pipe	118.981	Diam/Width:375	
			{a} 1.005	Pipe	118.981	Diam/Width:375	Not Applicable
SW05	120.200 119.085	Diameter / Length: 1.350	{1} 1.003	Pipe	119.085	Diam/Width:375	Manhole - Access Required
E:442899.395 N:293728.651	1.115						
			{a} 1.004	Pipe	119.085	Diam/Width:375	Not Applicable
SW10 WITH HB	120.350 118.777	Diameter / Length: 1.500	{1} 1.006	Pipe	118.777	Diam/Width:375	Manhole
E:442902.935 N:293736.447	1.573						
			{a} 1.007	Pipe	118.777	Diam/Width:375	Not Applicable
SW11	120.000 118.665	Diameter / Length: 1.350	{1} 1.007	Pipe	118.665	Diam/Width:375	Manhole - Access Required
E:442888.423 N:293726.978	1.335						
			{a} 1.008	Pipe	118.665	Diam/Width:375	Not Applicable

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023		
Report Details: Type: Manhole Schedule Storm Phase: Phase		Designed by: RB	Checked by: SS	
		Approved By: SS		
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX		

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
EX MH	120.070 118.390	Diameter / Length: 1.350	{1} 1.009	Pipe	118.390	Diam/Width:375	Manhole - Access Required - Sealed
E:442892.264 N:293688.834	1.680						
							Not Applicable
SW12	120.000 118.448	Diameter / Length: 1.350	{1} 1.008	Pipe	118.448	Diam/Width:375	Manhole - Access Required
E:442893.102 N:293693.801	1.552						
			{a} 1.009	Pipe	118.448	Diam/Width:375	Not Applicable
SW03	120.200 119.353	Diameter / Length: 1.200	{1} 1.001	Pipe	119.353	Diam/Width:225	Manhole - Access Required
E:442899.986 N:293687.481	0.847						
			{a} 1.002	Pipe	119.353	Diam/Width:300	Not Applicable

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Inflow Summary Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	SW01		Time of Concentration	0.029	95	0	95	0.027
Catchment Area (1)	SW03		Time of Concentration	0.045	95	0	95	0.043
Catchment Area (2)	SW06		Time of Concentration	0.075	95	0	95	0.071
Catchment Area (3)	SW07		Time of Concentration	0.046	95	0	95	0.043
Catchment Area (4)	SW04		Time of Concentration	0.019	95	0	95	0.018
Catchment Area (5)	SW08		Time of Concentration	0.062	95	0	95	0.059
Catchment Area (6)	SW05		Time of Concentration	0.045	95	0	95	0.042
Catchment Area (7)	SW05		Time of Concentration	0.015	95	0	95	0.015
TOTAL		0.0		0.336				0.319

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Network Design Report Storm Phase: Phase Flow Path: Path 1.000		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			

Name	Time Of Travel (mins)	Rainfall Intensity (mm/hr)	Total Area (ha)	Total Impermeable Area (ha)	Proportional Depth (mm)	Proportional Velocity (m/s)	Full Bore Velocity (m/s)	Capacity (L/s)
1.000	5.31	158.537	0.029	0.027	81	0.904	1.050	41.7368
1.001	5.48	156.667	0.029	0.027	81	0.905	1.052	41.8402
1.002	5.71	154.265	0.074	0.070	118	1.133	1.262	89.2213
1.003	5.99	151.451	0.093	0.088	120	1.183	1.457	160.8895
1.004	6.17	149.660	0.153	0.145	156	1.347	1.457	160.9464
Branch: 2.000								
2.000	5.28	158.846	0.075	0.071	120	1.419	1.381	54.9056
2.001	5.42	157.384	0.121	0.115	135	1.586	1.658	117.1999
2.002	5.56	155.833	0.183	0.174	172	1.753	1.666	117.7798
1.005	6.21	149.288	0.336	0.319	172	2.616	2.715	299.8391
1.006	6.32	148.218	0.336	0.319	256	1.605	1.449	160.0611
1.007	6.52	146.381	0.336	0.319	255	1.609	1.454	160.6189
1.008	6.90	142.992	0.336	0.319	255	1.611	1.456	160.7789
1.009	6.95	142.623	0.336	0.319	210	2.029	1.945	214.8287

Name	Flow (L/s)
1.000	11.7156
1.001	11.7156
1.002	29.1810
1.003	36.0886
1.004	58.7751
Branch: 2.000	
2.000	30.7380
2.001	48.9389
2.002	73.3266
1.005	128.8756
1.006	128.8756
1.007	128.8756
1.008	128.8756
1.009	128.8756

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Network Design Criteria Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Rain 1

Type: FSR

Return Period (years)	100.0
Region	England And Wales
M5-60 (mm)	19.8
Ratio R	0.400

Pipe Options

Lock Slope Options	None
Design Level	Level Inverts
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Manhole Options

Apply Offset

☐

An error has occurred while processing TextBox
'txtSynchroniseManholeInvertLevelsHeader':
The expression contains object 'SynchroniseManholeInvertLevelsTitle' that is
not defined in the current context.



Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.200	0.000
375	1.350	0.000
500	1.500	0.000
750	1.800	0.000

Additional Sizing

Connection (mm)	900
Diameter / Length (m)	0.900
Width (m)	0.000

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.000	1.050	0.000
1.500	1.200	0.000

Access

Depth (m)	Ladder Protrusion (mm)
0.000	130
3.000	230

Benching Requirements

Landing Width (mm)	500
Benching Width (mm)	225

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design	Date: 01/06/2023			
Report Details: Type: Outfall Details Storm Phase: Phase	Designed by: RB	Checked by: SS	Approved By: SS	
Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX				

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
EX MH	Free Discharge		

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design	Date: 01/06/2023			
Report Title: Rainfall Analysis Criteria	Designed by: RB	Checked by: SS	Approved By: SS	
Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX				

Runoff Type	Dynamic
Output Interval (mins)	1
Time Step	Shortest
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	150
Perform No Discharge Analysis	☐

Rainfall

Rain 1	Type: FSR
Region	England And Wales
M5-60 (mm)	19.8
Ratio R	0.400
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
2.0	0.000
5.0	0.000
10.0	0.000
30.0	0.000
100.0	40.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			



Rain 1: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW01	Rain 1: 2 years: +0 %: 15 mins: Winter	120.45 0	119.55 0	119.603	0.053	4.9	0.060	0.000	4.8	2.273	OK
SW02	Rain 1: 2 years: +0 %: 15 mins: Winter	120.45 0	119.42 3	119.474	0.051	4.8	0.058	0.000	4.8	2.264	OK
SW04	Rain 1: 2 years: +0 %: 15 mins: Winter	120.20 0	119.24 2	119.320	0.078	15.4	0.111	0.000	15.4	7.307	OK
SW06	Rain 1: 2 years: +0 %: 15 mins: Winter	122.00 0	119.55 0	119.625	0.075	12.9	0.085	0.000	12.7	5.949	OK
SW07	Rain 1: 2 years: +0 %: 15 mins: Winter	122.00 0	119.28 8	119.379	0.091	20.5	0.103	0.000	20.2	9.554	OK
SW08	Rain 1: 2 years: +0 %: 15 mins: Winter	122.00 0	119.14 2	119.256	0.114	30.9	0.128	0.000	30.5	14.462	OK
SW09	Rain 1: 2 years: +0 %: 15 mins: Winter	120.40 0	118.98 1	119.106	0.125	55.6	0.180	0.000	55.8	26.482	OK
SW05	Rain 1: 2 years: +0 %: 15 mins: Winter	120.20 0	119.08 5	119.194	0.109	25.2	0.156	0.000	25.3	12.039	OK
SW10 WITH HB	Rain 1: 2 years: +0 %: 120 mins: Winter	120.35 0	118.77 7	119.074	0.297	4.8	0.525	0.000	4.6	45.411	OK
SW11	Rain 1: 2 years: +0 %: 180 mins: Winter	120.00 0	118.66 5	118.709	0.044	4.6	0.064	0.000	4.6	56.844	OK
EX MH	Rain 1: 2 years: +0 %: 180 mins: Winter	120.07 0	118.39 0	118.428	0.038	4.6	0.000	0.000	4.6	56.808	OK
SW12	Rain 1: 2 years: +0 %: 180 mins: Winter	120.00 0	118.44 8	118.488	0.040	4.6	0.057	0.000	4.6	56.808	OK
SW03	Rain 1: 2 years: +0 %: 15 mins: Winter	120.20 0	119.35 3	119.431	0.078	12.4	0.088	0.000	12.2	5.810	OK

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023		
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: RB	Checked by: SS	
		Approved By: SS		
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX		



Rain 1: 5 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW01	Rain 1: 5 years: +0 %: 15 mins: Winter	120.450	119.550	119.611	0.061	6.3	0.069	0.000	6.2	2.927	OK
SW02	Rain 1: 5 years: +0 %: 15 mins: Winter	120.450	119.423	119.481	0.058	6.2	0.066	0.000	6.2	2.918	OK
SW04	Rain 1: 5 years: +0 %: 15 mins: Winter	120.200	119.242	119.331	0.089	19.9	0.127	0.000	19.9	9.409	OK
SW06	Rain 1: 5 years: +0 %: 15 mins: Winter	122.000	119.550	119.637	0.087	16.6	0.098	0.000	16.4	7.664	OK
SW07	Rain 1: 5 years: +0 %: 15 mins: Winter	122.000	119.288	119.395	0.107	26.5	0.121	0.000	26.1	12.308	OK
SW08	Rain 1: 5 years: +0 %: 15 mins: Winter	122.000	119.142	119.275	0.133	39.8	0.150	0.000	39.3	18.636	OK
SW09	Rain 1: 5 years: +0 %: 120 mins: Winter	120.400	118.981	119.175	0.194	22.8	0.277	0.000	22.9	65.615	OK
SW05	Rain 1: 5 years: +0 %: 15 mins: Winter	120.200	119.085	119.211	0.126	32.6	0.180	0.000	32.7	15.524	OK
SW10 WITH HB	Rain 1: 5 years: +0 %: 120 mins: Winter	120.350	118.777	119.175	0.398	5.0	0.703	0.000	4.6	40.898	Surcharged
SW11	Rain 1: 5 years: +0 %: 480 mins: Winter	120.000	118.665	118.709	0.044	4.6	0.064	0.000	4.6	92.848	OK
EX MH	Rain 1: 5 years: +0 %: 480 mins: Winter	120.070	118.390	118.428	0.038	4.6	0.000	0.000	4.6	92.845	OK
SW12	Rain 1: 5 years: +0 %: 480 mins: Winter	120.000	118.448	118.488	0.040	4.6	0.057	0.000	4.6	92.845	OK
SW03	Rain 1: 5 years: +0 %: 15 mins: Winter	120.200	119.353	119.443	0.090	15.9	0.101	0.000	15.7	7.481	OK

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			



Rain 1: 10 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW01	Rain 1: 10 years: +0 %: 15 mins: Winter	120.45 0	119.55 0	119.616	0.066	7.4	0.074	0.000	7.3	3.400	OK
SW02	Rain 1: 10 years: +0 %: 15 mins: Winter	120.45 0	119.42 3	119.487	0.064	7.3	0.072	0.000	7.2	3.390	OK
SW04	Rain 1: 10 years: +0 %: 15 mins: Winter	120.20 0	119.24 2	119.338	0.096	23.1	0.137	0.000	23.1	10.934	OK
SW06	Rain 1: 10 years: +0 %: 15 mins: Winter	122.00 0	119.55 0	119.645	0.095	19.3	0.107	0.000	19.1	8.901	OK
SW07	Rain 1: 10 years: +0 %: 15 mins: Winter	122.00 0	119.28 8	119.405	0.117	30.8	0.133	0.000	30.3	14.300	OK
SW08	Rain 1: 10 years: +0 %: 15 mins: Winter	122.00 0	119.14 2	119.288	0.146	46.2	0.165	0.000	45.7	21.656	OK
SW09	Rain 1: 10 years: +0 %: 120 mins: Winter	120.40 0	118.98 1	119.242	0.261	26.8	0.373	0.000	26.6	75.976	OK
SW05	Rain 1: 10 years: +0 %: 120 mins: Winter	120.20 0	119.08 5	119.242	0.157	12.2	0.224	0.000	12.3	34.857	OK
SW10 WITH HB	Rain 1: 10 years: +0 %: 120 mins: Winter	120.35 0	118.77 7	119.242	0.465	5.2	0.821	0.000	4.6	36.722	Surcharged
SW11	Rain 1: 10 years: +0 %: 720 mins: Summer	120.00 0	118.66 5	118.709	0.044	4.6	0.064	0.000	4.6	105.846	OK
EX MH	Rain 1: 10 years: +0 %: 720 mins: Summer	120.07 0	118.39 0	118.428	0.038	4.6	0.000	0.000	4.6	105.844	OK
SW12	Rain 1: 10 years: +0 %: 720 mins: Summer	120.00 0	118.44 8	118.488	0.040	4.6	0.057	0.000	4.6	105.844	OK
SW03	Rain 1: 10 years: +0 %: 15 mins: Winter	120.20 0	119.35 3	119.450	0.097	18.5	0.110	0.000	18.2	8.692	OK

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023		
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: RB	Checked by: SS	
		Approved By: SS		
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX		



Rain 1: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW01	Rain 1: 30 years: +0 %: 15 mins: Winter	120.45 0	119.55 0	119.625	0.075	9.3	0.084	0.000	9.2	4.312	OK
SW02	Rain 1: 30 years: +0 %: 15 mins: Winter	120.45 0	119.42 3	119.498	0.075	9.2	0.084	0.000	9.1	4.301	OK
SW04	Rain 1: 30 years: +0 %: 180 mins: Winter	120.20 0	119.24 2	119.370	0.128	7.0	0.183	0.000	7.0	30.170	OK
SW06	Rain 1: 30 years: +0 %: 15 mins: Winter	122.00 0	119.55 0	119.660	0.110	24.4	0.124	0.000	24.2	11.288	OK
SW07	Rain 1: 30 years: +0 %: 15 mins: Winter	122.00 0	119.28 8	119.425	0.137	39.0	0.154	0.000	38.5	18.133	OK
SW08	Rain 1: 30 years: +0 %: 180 mins: Winter	122.00 0	119.14 2	119.370	0.228	13.9	0.258	0.000	13.9	59.416	OK
SW09	Rain 1: 30 years: +0 %: 180 mins: Winter	120.40 0	118.98 1	119.370	0.389	25.4	0.557	0.000	24.6	107.345	Surcharged
SW05	Rain 1: 30 years: +0 %: 180 mins: Winter	120.20 0	119.08 5	119.370	0.285	11.6	0.408	0.000	11.6	49.161	OK
SW10 WITH HB	Rain 1: 30 years: +0 %: 180 mins: Winter	120.35 0	118.77 7	119.370	0.593	5.1	1.048	0.000	4.6	60.629	Surcharged
SW11	Rain 1: 30 years: +0 %: 960 mins: Winter	120.00 0	118.66 5	118.709	0.044	4.6	0.064	0.000	4.6	158.785	OK
EX MH	Rain 1: 30 years: +0 %: 960 mins: Winter	120.07 0	118.39 0	118.428	0.038	4.6	0.000	0.000	4.6	158.783	OK
SW12	Rain 1: 30 years: +0 %: 960 mins: Winter	120.00 0	118.44 8	118.488	0.040	4.6	0.057	0.000	4.6	158.783	OK
SW03	Rain 1: 30 years: +0 %: 15 mins: Winter	120.20 0	119.35 3	119.464	0.111	23.5	0.126	0.000	23.1	11.026	OK

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			



Rain 1: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW01	Rain 1: 100 years: +40 %: 240 mins: Winter	120.45 0	119.55 0	120.175	0.625	3.2	0.707	0.000	3.2	18.415	Surcharged
SW02	Rain 1: 100 years: +40 %: 240 mins: Winter	120.45 0	119.42 3	120.175	0.752	3.2	0.850	0.000	3.2	18.398	Surcharged
SW04	Rain 1: 100 years: +40 %: 240 mins: Winter	120.20 0	119.24 2	120.175	0.933	10.2	1.335	0.000	9.4	56.712	Flood Risk
SW06	Rain 1: 100 years: +40 %: 240 mins: Winter	122.00 0	119.55 0	120.175	0.625	8.4	0.707	0.000	8.4	47.889	Surcharged
SW07	Rain 1: 100 years: +40 %: 240 mins: Winter	122.00 0	119.28 8	120.175	0.887	13.5	1.003	0.000	12.9	75.940	Surcharged
SW08	Rain 1: 100 years: +40 %: 240 mins: Winter	122.00 0	119.14 2	120.175	1.033	19.6	1.168	0.000	18.7	114.003	Surcharged
SW09	Rain 1: 100 years: +40 %: 240 mins: Winter	120.40 0	118.98 1	120.175	1.194	32.3	1.708	0.000	31.8	203.100	Surcharged
SW05	Rain 1: 100 years: +40 %: 240 mins: Winter	120.20 0	119.08 5	120.175	1.090	15.5	1.559	0.000	13.8	91.984	Flood Risk
SW10 WITH HB	Rain 1: 100 years: +40 %: 240 mins: Winter	120.35 0	118.77 7	120.175	1.398	5.3	2.469	0.000	5.1	109.389	Surcharged
SW11	Rain 1: 100 years: +40 %: 240 mins: Winter	120.00 0	118.66 5	118.712	0.047	5.1	0.067	0.000	5.1	109.120	OK
EX MH	Rain 1: 100 years: +40 %: 240 mins: Winter	120.07 0	118.39 0	118.430	0.040	5.1	0.000	0.000	5.1	108.963	OK
SW12	Rain 1: 100 years: +40 %: 240 mins: Winter	120.00 0	118.44 8	118.490	0.042	5.1	0.060	0.000	5.1	108.963	OK
SW03	Rain 1: 100 years: +40 %: 240 mins: Winter	120.20 0	119.35 3	120.175	0.822	8.2	0.930	0.000	8.1	46.409	Flood Risk

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			



Rain 1: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
TANK	Rain 1: 2 years: +0 %: 120 mins: Winter	119.074	119.074	0.234	0.234	18.5	32.031	0.000	0.000	4.8	45.730	77.391	OK

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			



Rain 1: 5 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
TANK	Rain 1: 5 years: +0 %: 120 mins: Winter	119.175	119.175	0.335	0.335	22.9	45.787	0.000	0.000	5.0	41.668	67.682	OK

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
		Designed by: RB	Checked by: SS		Approved By: SS
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			



Rain 1: 10 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
TANK	Rain 1: 10 years: +0 %: 120 mins: Winter	119.242	119.242	0.402	0.402	26.6	54.939	0.000	0.000	5.2	37.842	61.222	OK

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
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		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			



Rain 1: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
TANK	Rain 1: 30 years: +0 %: 180 mins: Winter	119.370	119.370	0.530	0.530	24.6	72.500	0.000	0.000	5.1	61.887	48.827	OK

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			



Rain 1: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
TANK	Rain 1: 100 years: +40 %: 240 mins: Winter	120.175	120.175	1.335	1.335	31.8	139.884	0.000	0.000	5.3	111.572	1.265	OK

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Connections Summary Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			



Rain 1: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
2.000	Rain 1: 2 years: +0 %: 15 mins: Winter	Pipe	SW06	SW07	122.000	119.625	0.083	5.949	1.0	0.23	12.7	OK
2.001	Rain 1: 2 years: +0 %: 15 mins: Winter	Pipe	SW07	SW08	122.000	119.379	0.103	9.554	1.0	0.17	20.2	OK
2.002	Rain 1: 2 years: +0 %: 15 mins: Winter	Pipe	SW08	SW09	122.000	119.256	0.119	14.462	1.2	0.26	30.5	OK
1.007	Rain 1: 2 years: +0 %: 180 mins: Winter	Pipe	SW10 WITH HB	SW11	120.350	119.066	0.044	56.891	0.6	0.03	4.6	OK
1.000	Rain 1: 2 years: +0 %: 15 mins: Winter	Pipe	SW01	SW02	120.450	119.603	0.052	2.273	0.7	0.12	4.8	OK
1.003	Rain 1: 2 years: +0 %: 15 mins: Winter	Pipe	SW04	SW05	120.200	119.320	0.093	7.307	0.7	0.1	15.4	OK
1.004	Rain 1: 2 years: +0 %: 15 mins: Winter	Pipe	SW05	SW09	120.200	119.194	0.117	12.039	0.9	0.16	25.3	OK
1.006	Rain 1: 2 years: +0 %: 15 mins: Winter	Pipe	TANK	SW10 WITH HB	122.000	119.008	0.199	5.615	0.4	0.03	5.5	OK
1.005	Rain 1: 2 years: +0 %: 15 mins: Winter	Pipe	SW09	TANK	120.400	119.106	0.121	26.482	2.7	0.19	55.8	OK
1.008	Rain 1: 2 years: +0 %: 180 mins: Winter	Pipe	SW11	SW12	120.000	118.709	0.042	56.844	0.7	0.03	4.6	OK
1.009	Rain 1: 2 years: +0 %: 180 mins: Winter	Pipe	SW12	EX MH	120.000	118.488	0.039	56.808	0.8	0.02	4.6	OK
1.001	Rain 1: 2 years: +0 %: 15 mins: Winter	Pipe	SW02	SW03	120.450	119.474	0.064	2.264	0.5	0.11	4.8	OK
1.002	Rain 1: 2 years: +0 %: 15 mins: Winter	Pipe	SW03	SW04	120.200	119.431	0.078	5.810	0.8	0.14	12.2	OK

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023		
Report Details: Type: Connections Summary Storm Phase: Phase		Designed by: RB	Checked by: SS	
		Approved By: SS		
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX		



Rain 1: 5 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
2.000	Rain 1: 5 years: +0 %: 15 mins: Winter	Pipe	SW06	SW07	122.000	119.637	0.097	7.664	1.0	0.3	16.4	OK
2.001	Rain 1: 5 years: +0 %: 15 mins: Winter	Pipe	SW07	SW08	122.000	119.395	0.120	12.308	1.0	0.22	26.1	OK
2.002	Rain 1: 5 years: +0 %: 15 mins: Winter	Pipe	SW08	SW09	122.000	119.275	0.139	18.636	1.2	0.33	39.3	OK
1.007	Rain 1: 5 years: +0 %: 480 mins: Winter	Pipe	SW10 WITH HB	SW11	120.350	119.061	0.044	92.852	0.6	0.03	4.6	OK
1.000	Rain 1: 5 years: +0 %: 15 mins: Winter	Pipe	SW01	SW02	120.450	119.611	0.059	2.927	0.7	0.15	6.2	OK
1.003	Rain 1: 5 years: +0 %: 15 mins: Winter	Pipe	SW04	SW05	120.200	119.331	0.107	9.409	0.8	0.12	19.9	OK
1.004	Rain 1: 5 years: +0 %: 15 mins: Winter	Pipe	SW05	SW09	120.200	119.211	0.136	15.524	0.9	0.2	32.7	OK
1.006	Rain 1: 5 years: +0 %: 15 mins: Summer	Pipe	TANK	SW10 WITH HB	122.000	119.033	0.224	6.116	0.4	0.04	6.7	OK
1.005	Rain 1: 5 years: +0 %: 15 mins: Winter	Pipe	SW09	TANK	120.400	119.127	0.152	33.888	2.8	0.24	71.6	OK
1.008	Rain 1: 5 years: +0 %: 480 mins: Winter	Pipe	SW11	SW12	120.000	118.709	0.042	92.848	0.7	0.03	4.6	OK
1.009	Rain 1: 5 years: +0 %: 480 mins: Winter	Pipe	SW12	EX MH	120.000	118.488	0.039	92.845	0.8	0.02	4.6	OK
1.001	Rain 1: 5 years: +0 %: 15 mins: Winter	Pipe	SW02	SW03	120.450	119.481	0.074	2.918	0.5	0.15	6.2	OK
1.002	Rain 1: 5 years: +0 %: 15 mins: Winter	Pipe	SW03	SW04	120.200	119.443	0.089	7.481	0.9	0.18	15.7	OK

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023		
Report Details: Type: Connections Summary Storm Phase: Phase		Designed by: RB	Checked by: SS	
		Approved By: SS		
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX		



Rain 1: 10 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
2.000	Rain 1: 10 years: +0 %: 15 mins: Winter	Pipe	SW06	SW07	122.000	119.645	0.106	8.901	1.0	0.35	19.1	OK
2.001	Rain 1: 10 years: +0 %: 15 mins: Winter	Pipe	SW07	SW08	122.000	119.405	0.132	14.300	1.0	0.26	30.3	OK
2.002	Rain 1: 10 years: +0 %: 15 mins: Winter	Pipe	SW08	SW09	122.000	119.288	0.153	21.656	1.3	0.39	45.7	OK
1.007	Rain 1: 10 years: +0 %: 600 mins: Winter	Pipe	SW10 WITH HB	SW11	120.350	119.094	0.044	113.553	0.6	0.03	4.6	OK
1.000	Rain 1: 10 years: +0 %: 15 mins: Winter	Pipe	SW01	SW02	120.450	119.616	0.064	3.400	0.8	0.17	7.3	OK
1.003	Rain 1: 10 years: +0 %: 15 mins: Winter	Pipe	SW04	SW05	120.200	119.338	0.117	10.934	0.8	0.14	23.1	OK
1.004	Rain 1: 10 years: +0 %: 15 mins: Winter	Pipe	SW05	SW09	120.200	119.223	0.150	18.046	0.9	0.24	37.9	OK
1.006	Rain 1: 10 years: +0 %: 15 mins: Winter	Pipe	TANK	SW10 WITH HB	122.000	119.095	0.286	6.214	0.5	0.04	6.0	OK
1.005	Rain 1: 10 years: +0 %: 15 mins: Winter	Pipe	SW09	TANK	120.400	119.142	0.184	39.163	2.8	0.28	83.0	OK
1.008	Rain 1: 10 years: +0 %: 720 mins: Summer	Pipe	SW11	SW12	120.000	118.709	0.042	105.846	0.7	0.03	4.6	OK
1.009	Rain 1: 10 years: +0 %: 720 mins: Summer	Pipe	SW12	EX MH	120.000	118.488	0.039	105.844	0.8	0.02	4.6	OK
1.001	Rain 1: 10 years: +0 %: 15 mins: Winter	Pipe	SW02	SW03	120.450	119.487	0.080	3.390	0.6	0.17	7.2	OK
1.002	Rain 1: 10 years: +0 %: 15 mins: Winter	Pipe	SW03	SW04	120.200	119.450	0.096	8.692	0.9	0.2	18.2	OK

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Connections Summary Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			



Rain 1: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
2.000	Rain 1: 30 years: +0 %: 15 mins: Winter	Pipe	SW06	SW07	122.000	119.660	0.123	11.288	1.1	0.44	24.2	OK
2.001	Rain 1: 30 years: +0 %: 15 mins: Winter	Pipe	SW07	SW08	122.000	119.425	0.154	18.133	1.1	0.33	38.5	OK
2.002	Rain 1: 30 years: +0 %: 15 mins: Winter	Pipe	SW08	SW09	122.000	119.313	0.181	27.422	1.3	0.49	58.0	OK
1.007	Rain 1: 30 years: +0 %: 960 mins: Summer	Pipe	SW10 WITH HB	SW11	120.350	119.167	0.044	141.712	0.6	0.03	4.6	Surcharged
1.000	Rain 1: 30 years: +0 %: 15 mins: Winter	Pipe	SW01	SW02	120.450	119.625	0.074	4.312	0.8	0.22	9.2	OK
1.003	Rain 1: 30 years: +0 %: 15 mins: Winter	Pipe	SW04	SW05	120.200	119.351	0.135	13.891	0.8	0.18	29.3	OK
1.004	Rain 1: 30 years: +0 %: 15 mins: Winter	Pipe	SW05	SW09	120.200	119.245	0.175	22.493	1.0	0.3	48.1	OK
1.006	Rain 1: 30 years: +0 %: 15 mins: Winter	Pipe	TANK	SW10 WITH HB	122.000	119.167	0.359	5.201	0.5	0.04	7.0	OK
1.005	Rain 1: 30 years: +0 %: 15 mins: Winter	Pipe	SW09	TANK	120.400	119.173	0.257	48.794	2.9	0.35	104.6	OK
1.008	Rain 1: 30 years: +0 %: 960 mins: Winter	Pipe	SW11	SW12	120.000	118.709	0.042	158.785	0.7	0.03	4.6	OK
1.009	Rain 1: 30 years: +0 %: 960 mins: Winter	Pipe	SW12	EX MH	120.000	118.488	0.039	158.783	0.8	0.02	4.6	OK
1.001	Rain 1: 30 years: +0 %: 15 mins: Winter	Pipe	SW02	SW03	120.450	119.498	0.093	4.301	0.6	0.22	9.1	OK
1.002	Rain 1: 30 years: +0 %: 15 mins: Winter	Pipe	SW03	SW04	120.200	119.464	0.110	11.026	1.0	0.26	23.1	OK

Project: WIE19849 Hinckley Daycare Phase 1 Proposed Surface Water Drainage Design		Date: 01/06/2023			
Report Details: Type: Connections Summary Storm Phase: Phase		Designed by: RB	Checked by: SS		Approved By: SS
		Company Address: Waterman Infrastructure & Environment Ltd 5th Floor One Cornwall Street Birmingham, B3 2DX			

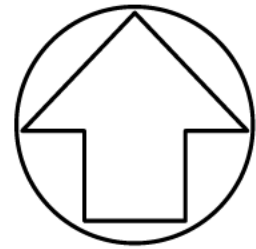


Rain 1: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
2.000	Rain 1: 100 years: +40 %: 15 mins: Winter	Pipe	SW06	SW07	122.000	119.717	0.194	20.514	1.2	0.8	44.0	OK
2.001	Rain 1: 100 years: +40 %: 15 mins: Winter	Pipe	SW07	SW08	122.000	119.519	0.279	32.419	1.1	0.59	69.5	OK
2.002	Rain 1: 100 years: +40 %: 15 mins: Winter	Pipe	SW08	SW09	122.000	119.469	0.300	48.125	1.5	0.88	103.7	Surcharged
1.007	Rain 1: 100 years: +40 %: 240 mins: Winter	Pipe	SW10 WITH HB	SW11	120.350	120.175	0.047	109.330	0.6	0.03	5.1	Surcharged
1.000	Rain 1: 100 years: +40 %: 15 mins: Winter	Pipe	SW01	SW02	120.450	119.656	0.110	7.832	0.9	0.4	16.7	OK
1.003	Rain 1: 100 years: +40 %: 15 mins: Winter	Pipe	SW04	SW05	120.200	119.415	0.251	23.962	0.9	0.33	53.3	OK
1.004	Rain 1: 100 years: +40 %: 15 mins: Winter	Pipe	SW05	SW09	120.200	119.414	0.375	37.875	1.0	0.53	84.8	OK
1.006	Rain 1: 100 years: +40 %: 15 mins: Summer	Pipe	TANK	SW10 WITH HB	122.000	119.358	0.375	6.171	0.5	0.06	9.0	Surcharged
1.005	Rain 1: 100 years: +40 %: 15 mins: Winter	Pipe	SW09	TANK	120.400	119.415	0.375	83.548	3.1	0.61	184.3	Surcharged
1.008	Rain 1: 100 years: +40 %: 240 mins: Winter	Pipe	SW11	SW12	120.000	118.712	0.044	109.120	0.7	0.03	5.1	OK
1.009	Rain 1: 100 years: +40 %: 240 mins: Winter	Pipe	SW12	EX MH	120.000	118.490	0.041	108.963	0.8	0.02	5.1	OK
1.001	Rain 1: 100 years: +40 %: 15 mins: Winter	Pipe	SW02	SW03	120.450	119.538	0.137	7.821	0.7	0.4	16.6	OK
1.002	Rain 1: 100 years: +40 %: 15 mins: Winter	Pipe	SW03	SW04	120.200	119.513	0.158	19.887	1.1	0.47	42.1	OK

H. Surface Water Drainage Strategy

Appendices



PROPOSED ATTENUATION TANK:

- STORAGE VOLUME: 140m³ (APPROX.). SEE NOTE 11
- DEPTH OF TANK: 1.02m
- COVER LEVEL OF GROUND: 122.00 (ASSUMED) WITH MINIMUM 800mm COVER)
- INVERT LEVEL OF BASE OF TANK: 118.840
- PRODUCT: HYDRO INTERNATIONAL'S STORMBLOC EXTRA OR SIMILAR APPROVED

PROPOSED MANHOLE WITH FLOW CONTROL DEVICE (HYDROBRAKE)
DISCHARGE RATE 5.0l/s (SEE NOTE 11)

SW10 (WITH HYDRO-BRAKE)
CL: 120.350 (ASSUMED)
IL: 118.777
SIZE: 1,500mmØ

SW11
CL: 120.000 (ASSUMED)
IL: 118.665
SIZE: 1,350mm

SW05
CL: 120.200 (ASSUMED)
IL: 119.085
SIZE: 1,350mm

SW04
CL: 120.200 (ASSUMED)
IL: 119.242
SIZE: 1,350mm

SW12
CL: 120.000 (ASSUMED)
IL: 118.448
SIZE: 1,350mm

PROPOSED SURFACE WATER AND FOUL WATER DRAINAGE CONNECTION TO EXISTING FOUL WATER MANHOLE. THIS MANHOLE AND THE ASSOCIATED OUTGOING PIPE TO BE REINSTATED TO A COMBINED DRAINAGE SYSTEM. SEE NOTE 13.

EX MH
CL: 120.070
IL: 118.390
SIZE: 1,350mm

SW09
CL: 120.400 (ASSUMED)
IL: 118.981
SIZE: 1,350mm

SW03
CL: 120.200 (ASSUMED)
IL: 119.353
SIZE: 1,200mm

SW02
CL: 120.450 (ASSUMED)
IL: 119.423
SIZE: 1,200mm

PROPOSED OIL SEPARATOR
SW08
CL: 122.000 (ASSUMED)
IL: 119.142
SIZE: 1,200mm
SW07
CL: 122.000 (ASSUMED)
IL: 119.288
SIZE: 1,200mm

SW06
CL: 122.000 (ASSUMED)
IL: 119.550
SIZE: 1,200mm

SW01
CL: 120.450 (ASSUMED)
IL: 119.550
SIZE: 1,200mm

This drawing should not be scaled. Dimensions to be verified on site.
Any discrepancies should be referred to the Engineer prior to work being put in hand.
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Pickfords Wharf, Clark Street, London SE1 5JG 1 202 7528 7888 1 03333 444 501

GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEER, ARCHITECTS OR OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
2. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PREPARING ANY WORKING DRAWINGS OR COMMENCING WORK ON SITE.
3. THE CONTRACTOR MUST ENSURE AND WILL BE HELD RESPONSIBLE FOR THE OVERALL STABILITY OF THE BUILDING STRUCTURE/EXCAVATION AT ALL STAGES OF THE WORK.
4. ALL WORK BY THE CONTRACTOR MUST BE CARRIED OUT IN SUCH A WAY THAT ALL REQUIREMENTS UNDER THE HEALTH AND REGULATIONS.
5. ALL WORK IS TO BE CARRIED OUT IN COMPLIANCE WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES.
6. THE PROPOSED ARCHITECTS LAYOUT IS BASED ON THE DESIGN BUREAU'S DRAWING "1782-DBC-ZZ-00-DR-A-0100" REV 006 DATED 12.07.2023.
7. THE TOPOGRAPHICAL SURVEY INFORMATION IS BASED ON SURVEY SOLUTIONS DRAWING "24420-01" DATED 24/05/19.
8. THE EXISTING UTILITY SURVEY INFORMATION IS BASED ON CL B SURVEY LTD'S DRAWING "JAZ3-4892-1" DATED JANUARY 2023.
9. THE EXISTING PUBLIC SEWER INFORMATION IS BASED ON SEVERN TRENT'S SEWER RECORD PLAN.
10. CATCHMENT AREA IS CALCULATED BASED ON ASSUMED IMPERMEABILITY COEFFICIENTS OF 0.20 AND 0.05 FOR PERMEABLE AND IMPERMEABLE AREAS RESPECTIVELY. THE APPROXIMATE OVERALL EFFECTIVE IMPERMEABLE AREA FOR THE SITE IS 0.319ha.
11. THE PROPOSED OVERALL ATTENUATION STORAGE VOLUME OF 140m³ IS SIZED BASED ON A MAXIMUM ALLOWABLE SURFACE WATER DISCHARGE RATE OF 5 L/S FOR THE 1 IN 100 YEAR CRITICAL STORM RETURN PERIOD WITH 40% ALLOWANCE FOR CLIMATE CHANGE. ALLOWANCE FOR CLIMATE CHANGE.
12. THE LOCATION AND SIZE OF THE PROPOSED ATTENUATION STORAGE SYSTEMS & PROPOSED DRAINAGE CHANNELS ARE SUBJECT TO COORDINATION WITH THE LANDSCAPING PROPOSAL AND OTHER PROPOSED APPROVALS.
13. THE PROPOSED SURFACE WATER DRAINAGE STRATEGY IS SUBJECT TO FURTHER SITE INVESTIGATIVE WORKS AND THIRD PARTIES APPROVAL.
14. THE PROPOSED SURFACE WATER DRAINAGE STRATEGY IS BASED ON ASSUMED FINISHED FLOOR LEVELS AND EXTERNAL LEVELS.
15. THE PROPOSED FINISHED FLOOR LEVELS AND EXTERNAL LEVELS ARE BASED ON INFORMATION RECEIVED FROM NHS PROPERTY SERVICES.

KEY	
	PROPOSED SITE BOUNDARY
	EXISTING FOUL WATER DRAINAGE (SEE NOTE 8)
	EXISTING SURFACE WATER DRAINAGE (SEE NOTE 8)
	EXISTING PRIVATE COMBINED WATER DRAINAGE (SEE NOTE 8)
	EXISTING PUBLIC COMBINED WATER SEWER (SEE NOTE 8)
	PROPOSED COMBINED SEWER
	PROPOSED SURFACE WATER DRAINAGE
	PROPOSED OIL SEPARATOR
	PROPOSED ATTENUATION TANK
	PROPOSED PERMEABLE PAVING

Rev	Date	Description	By	Chk
A02	08.08.23	REDLINE BOUNDARY AND SITE LAYOUT UPDATED	AS	RB
A01	02.06.23	FIRST ISSUE	RL	RB

Project
HINCKLEY CDC AND ENDOSCOPY

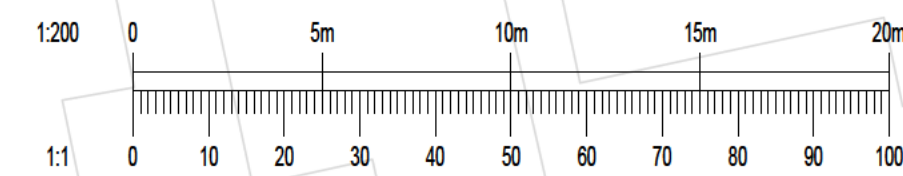
Title
PROPOSED SURFACE WATER DRAINAGE STRATEGY

Client
NHS PROPOERTY SERVICES



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Work Stage		STAGE 2		RIBA	
		Concept design			
Subsidiary		PRELIMINARY			
Designed By	RB	Director	SS	Waterman Ref	WIE19849
Drawn By	RL	Date	JUNE 2023	Scales @ A1	1:200
Project Originator Functional Spatial Form Discipline Number					Revision
19849-WIE-ZZ-XX-DR-D-92-001					A02



Our vision

“Engineering a better environment for people and the planet”

Our mission

“To solve complex problems for the benefit of clients, communities and the climate”

Our values

People orientated

Individually and collectively, people are our business. We strive to create environments for everyone to flourish and thrive.

Flexible

Pragmatic by nature and dedicated to getting the job done to the highest possible standard.

Professional

Operating at pace with integrity to deliver technical and robust solutions.

Environmentally aware

We understand our responsibility to the environment, it shapes our decision making and informs our practice.

Innovative

Our forensic questioning provides the ability to deliver appropriate innovations at every stage on every project.

Relationship focused

We value individuality and the benefits of working collaboratively to achieve positive outcomes for all.

