

DRAINAGE STATEMENT

McDonald's, Molesworth Street, Rochdale (ST2285)



Prepared for: McDonald's Restaurants Ltd

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Document History

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1.0 Introduction

Purpose

- 1.1 This Drainage Statement has been prepared by Glanville Consultants Ltd on behalf of McDonald's Restaurants Limited to support a planning application for the re-development of an existing car park in Rochdale.

Site Location & Description

- 1.2 The site is located at the northern end of the A671 Molesworth Street at its junction with Water Street, as shown in Figure 1. The site is surrounded by car and motorbike garages to the north, a retail area to the east, a car park area and recycling business to the south and further car parking with an established wooded area to the west.

Data Sources

- 1.3 Data used for this report is as follows:
- Topographical survey, sub scan, Google Earth observations & historical mapping;
 - On-line Flood Maps -. Gov;
 - Sewer record plans for the surrounding area;
 - Geotechnical & Geo-environmental data;
 - Rochdale Borough's Strategy for Flood Risk Management 2014-2024;
 - National Planning Policy Framework December 2024 (NPPF)
- 1.4 All the level information quoted in this report refers to the Ordnance Datum, defined as the mean sea level recorded at Newlyn in Cornwall.

Approach to SuDS

- 1.5 McDonald's are an advocate of sustainable development and will employ sustainable development practices wherever possible. The selection of SuDS for McDonald's sites is based on practical experience of building and maintaining thousands of similar restaurants across the United Kingdom, where many different forms of SuDS have been employed, some with greater success than others. The selection of SuDS therefore takes account of both National & Local SuDS policies, advice from LLFA's or LPA drainage engineers where this is offered, feedback from McDonald's maintenance staff, the experience of the development team and the specific conditions at the site.
- 1.6 McDonalds and their consultants are also constantly researching new and innovative forms of SuDS or refinements to existing SuDS designs in order to:
- Create solutions that better provide for all of the 'Four Pillars of SuDS'.
 - Provide better longevity and maintenance performance for SuDS.
 - Reduce carbon emissions.
- 1.7 Information relating to BREEAM credits for flood risk and drainage can be found in Appendix D.

2.0 Flood Risk & SuDS Planning Policy

National Flood Risk Policy

- 2.1 National planning policy (NPPF) states that a site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3.
In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.
The proposed development is within Zone 1 and outside of any critical drainage area, therefore a Flood Risk Assessment is not Required.
- 2.2 The proposed Restaurant use is classified as 'Less Vulnerable' in accordance with Annex 3 of the NPPF, the proposed development is compatible with flood Zones 1, 2 or 3a.
- 2.3 The NPPF also states that:

Applications which could affect drainage on or around the site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff, and which are proportionate to the nature and scale of the proposal. These should provide multifunctional benefits wherever possible, through facilitating improvements in water quality and biodiversity, as well as benefits for amenity. Sustainable drainage systems provided as part of proposals for major development should:
- take account of advice from the Lead Local Flood Authority;
 - have appropriate proposed minimum operational standards; and
 - have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development.
- Major development is defined at Annex 2 of the NPPF (December 2024) as developments where:
- 10 or more homes will be provided, or the site has an area of 0.5 hectares or more; and
 - For non-residential development it means additional floorspace of 1,000m² or more, or a site of 1 hectare or more; or
 - As otherwise provided in the Town and Country Planning (Development Management Procedure) (England) Order 2015 to major commercial development.
- 2.4 This development is not classified as 'Major Development' due to its size. It is located within an area of flood risk from reservoir breach, the 1975 Reservoir Act made changes to ensure reservoirs are regularly inspected to avoid the risk of breach and warning systems are in place should the worst happen, therefore planning policies requiring SuDS do not apply to this development.

Local SuDS Policy

- 2.5 Rochdale Council is the Lead Local Flood Authority for the site. Guidance on SuDS is provided for major development proposals.
- Paragraph 5.37 of the Places for Everyone Joint Development Plan Document sets out that SuDS schemes can provide appropriate solutions to addressing both flood risk and water quality issues and are mandatory for major development unless clear evidence indicates that they would be inappropriate.
- As set out above, the proposed development is not a major development and the above guidance and policy do not therefore apply.

3.0 Existing Conditions and Sources of Flooding

Topography

- 3.1 The site levels fall from northwest to southeast, between a high point of 132.16 in the south to a low point of 123.88m near the northwest corner of the site. Taking average gradients from the south to the northern boundary the gradients across the site vary from 1:12 in the east to 1:5 in the west.
- 3.2 The site is currently a car park with asphalt paving and there is no evidence of any surface water drainage within the existing surfacing. Mature trees form the site's southern and western boundaries.

Historical Use

- 3.3 Historical mapping shows the site has a history of generally industrial uses from a print works and brickfield in 1851 the buildings of which were added to and extended over time, garages shown in the 1950s, a warehouse c.2000 which was demolished c.2017 before becoming a car park which appears to have been resurfaced around 2020.

Geology & Ground Conditions

- 3.4 The British Geological Survey (BGS) mapping indicates superficial Glaciofluvial Deposits over Old Lawrence Rock and Pennine Lower Coal Measures Formation.
- 3.5 Extracts of the Geo-Environmental Desktop Report can be found in Appendix A.

Groundwater Quality

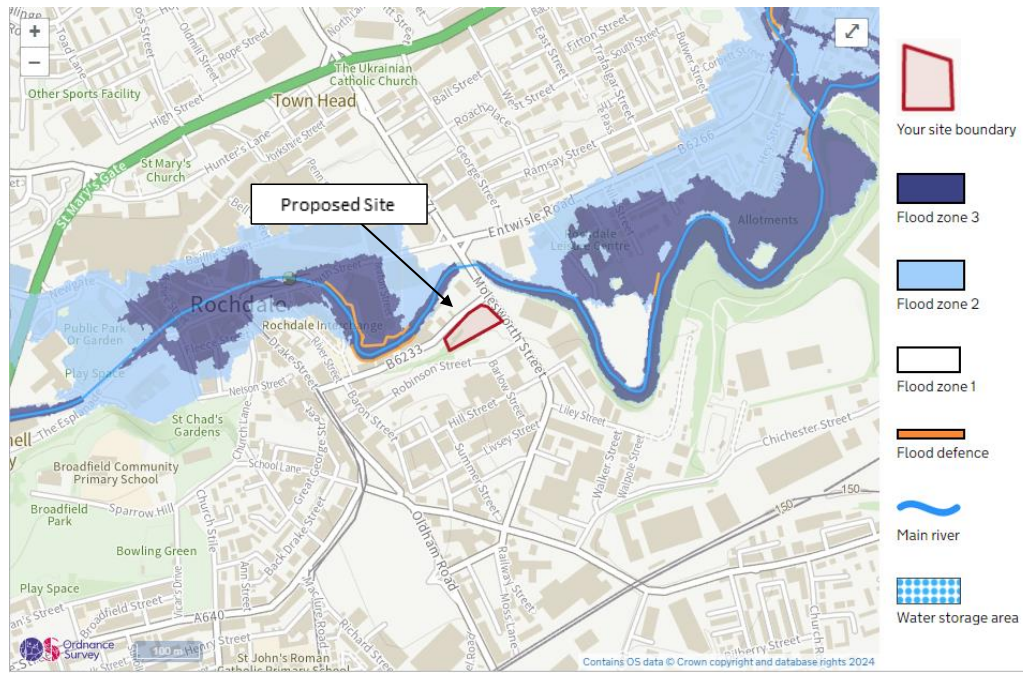
- 3.6 Geological records indicate the superficial and bedrock aquifer designation is 'Secondary A' and supports water supplies at a local scale including river, wetland and lake recharge. Groundwater in this location has a high vulnerability, the site is not within a source protection zone.

Tidal & Fluvial Flooding

- 3.7 Flood Zone definitions are set out in the National Planning Policy Guidance:
- Flood Zone 1 - land assessed as having a less than 1 in 1,000 annual probabilities of river or sea flooding (<0.1%)
 - Flood Zone 2 - land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year
 - Flood Zone 3 - land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year

Note: Flood zones refer to the probability of river and sea flooding, ignoring defences.

Image 1: Gov.UK Fluvial & Tidal Flood Risk Map



- 3.8 The Environment Agency flood maps, see Image 1, indicate the site to be located within Zone 1, low risk.

Groundwater Flooding

- 3.9 The Geo-Environmental Desk Study indicates the site is not shown to be in an area at risk of groundwater flooding.

Overland (Pluvial) Flooding

- 3.10 The Flood Risk Map website, see Image 2, includes updated mapping from 2025 and indicates the site to have a 'very low risk' of surface water flooding. However, some small areas of low, medium and high risk are located within the roads to the north and east of the site. The topographic survey, see Figure 2, shows the levels and existing surface flow directions.

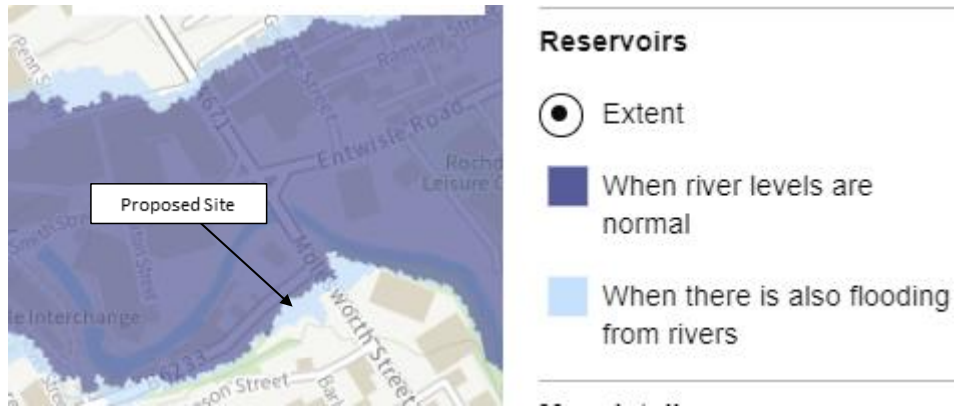
Image 2: Gov.UK Surface Water Flood Risk Map



Flooding from Reservoirs, Canals and other Artificial Sources

- 3.11 The Flood Warning Information Service website indicates the site is within the area at risk of reservoir flooding when river levels are normal and in flood, as shown in Image 3.

Image 3: Gov.UK Reservoir Flood Breach Extent Map



Existing Sewer Flooding

- 3.12 The public sewer records, Image 4 shows combined (foul and surface) water sewers in the roads to the north and east of the site. The sub scan in image 5 indicates there are no surface water drainage features on site although a number of manholes are identified. A CCTV survey will be carried out to confirm any existing connections and condition of drainage runs to be re-used.

Image 4: Public Sewer Records Extract

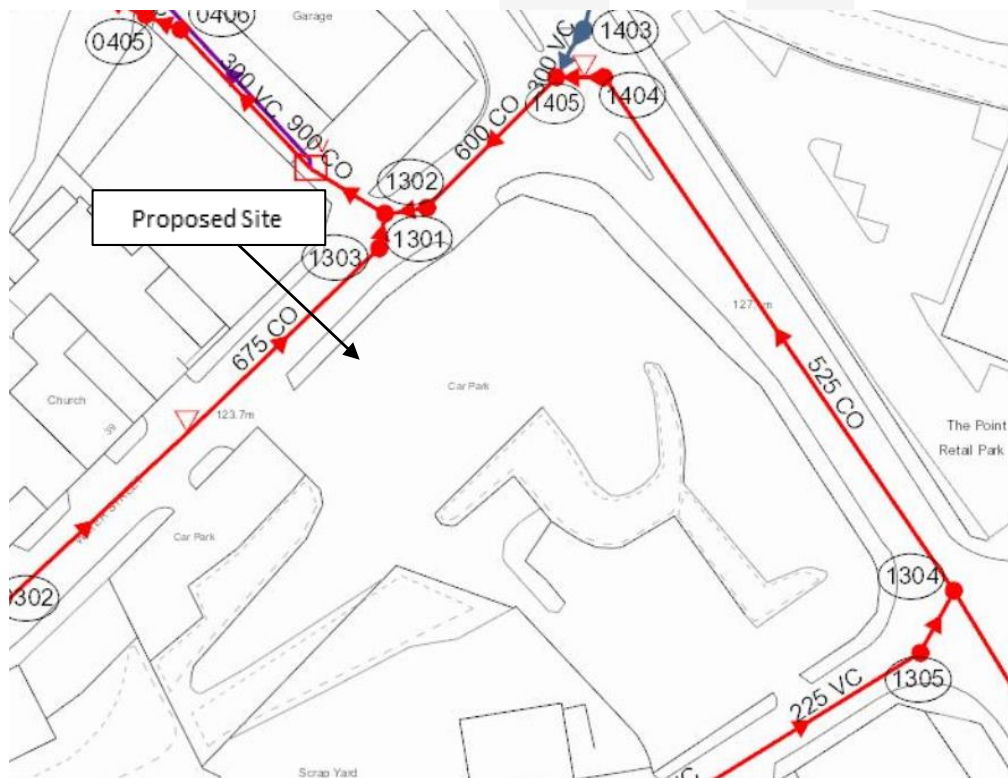


Image 5: Extract of Sub Scan



4.0 Development Flood Risk

Development Proposals

- 4.1 The proposed development consists of a McDonald's Restaurant with associated drive-through lane and car park. The development layout can be seen in Figure 3.

Flood Risk Management

- 4.2 The development design includes flood risk reducing features which are listed in Table 1. The following sub sections of this chapter describe in more detail each of the potential sources of flooding and how the development design features will reduce these risks.

Table 1: Flood Risk Reducing Design Features

Possible Design Features	In this Design	Description of Feature	Flood Risk Reduction
Surface levels & FFL	Yes	Surfaces drained into the SuDS. Exceedance flow routes are checked and do not create a flood risk.	Pluvial flooding
SuDS Drainage	Yes	1:100 + climate change allowance included within drainage system.	Drainage flooding
Flood Resilience Measures	No	Not required, buildings not expected to flood.	N/A
Flood Compensation	No	Not required, not developing in floodplain.	N/A
Flow Control Devices	Yes	Infiltration unsuitable & thus Flow Control Devices are required to restrict discharge rates.	Yes
Safe Pedestrian Escape Route	Yes	The site is dry and proposed levels designed to ensure overland surface water flow routes do not create a flood risk.	Fluvial & Pluvial flooding
Safe Escape Route Vehicular	Yes	The site is dry and proposed levels designed to ensure overland surface water flow routes do not create a flood risk.	Fluvial & Pluvial flooding
Dry parking area	Yes	Proposed levels designed to ensure overland surface water flow routes do not create a flood risk.	Fluvial & Pluvial flooding
Flood Plan & Warning	No	Not required, development outside floodplain.	N/A

Tidal & Fluvial Flooding

- 4.3 The development is outside the floodplain. Therefore, no design features are required to address fluvial flood risks to the development. Hence, the risk of fluvial flooding will remain very low.

Groundwater Flooding

- 4.4 The site level design will ensure that in the unlikely event that any groundwater does flood at surface level, the proposed overland flow routes do not create a risk to the development (see Figure 6).

Overland Surface Water Flooding (Pluvial) On Site

- 4.5 The proposed overland flow paths and levels are shown in Figure 6 with the existing flow paths shown in Figure 2. In addition to the new on-site drainage and raised building FFL, the site level design will ensure that any pluvial flooding is routed to avoid a risk to the development.

Overland Surface Water Flooding from the Site onto Surrounding Land

- 4.6 The proposed on-site drainage system will be designed to accommodate a 1 in 100 plus climate change rainfall event, without creating a flood hazard. If an exceedance event occurs (greater magnitude than 1 in 100 plus climate change storm event) then the existing overland flood routes on and off the site will not be changed by the development, so the development cannot adversely impact surrounding land, see Figures 2, 5 and 6.

Flooding from Reservoirs, Canals and other Artificial Sources

- 4.7 The site has been identified as flooding in the event of a reservoir breach. However, under the Reservoirs Act 1975 and Flood and Water Management Act 2010 the Environment Agency enforce the role of the reservoir undertaker in maintenance and day to day monitoring of reservoirs to reduce the risk of breach and the chance of this form of flooding is therefore low.

Sewer Flooding

- 4.8 The proposed development surface and foul water drainage layouts are shown in Figure 5. The new foul drainage infrastructure on the site will be designed in accordance with Building Regulations and therefore no significant flood risk is expected from the proposed on-site foul water drainage.
- 4.9 The new on-site surface water drainage will be designed to accommodate a 1 in 100 year plus climate change event without creating a flood hazard and therefore the risk of flooding is low.
- 4.10 Any flooding from existing sewers will be routed through design of exceedance flow routes to avoid creating a flood risk to the development. Any exceedance flows leaving the site will follow the existing exceedance routes, so no new flood risks will be created downstream, see Figure 6.

Flood Impacts, Mitigation and Residual Effects

- 4.11 Table 2 below rates the different flood risks to the development, considering the development design proposals as described in this report. Design proposals are not considered to be mitigation, but any action required in addition to the current design proposals is considered mitigation and listed in the table. We have rated the risks as none, low, medium and high based on our assessment of the facts relating to each source of flooding and the potential hazards.

Table 2: Residual Flood Risk

Type of Flood Risk	Flood Risk Rating None Low Med High	Mitigation required	Mitigation Measure
Fluvial Flooding	Low	No	None
Groundwater flooding	Low	No	None
Overland SW flooding from adjacent land	Low	No	None
Overland SW flooding onto adjacent land	Low	No	None
Flooding from reservoirs	Low	No	None
Flooding from sewers	Low	Yes	SuDS maintenance

5.0 Proposed Sustainable Drainage

Site Specific Sustainable Drainage Assessment

5.1 The Ciria SuDS Manual describes the four main categories of benefits that can be achieved by SuDS as water quantity, water quality, amenity and biodiversity; also known as the four Pillars of SuDS. The SuDS Manual Box 1.2 describes the SuDS approach to managing surface water runoff as follows & depending on the characteristics of the site, these may be used in combination and to varying degrees:

- use surface water runoff as a resource
- manage rainwater close to where it falls (at source)
- manage runoff on the surface (above ground)
- allow rainwater to soak into the ground (infiltration)
- promote evapotranspiration
- slow and store runoff to mimic natural runoff rates and volumes
- reduce contamination of runoff through pollution prevention and by controlling the runoff at source
- treat runoff to reduce the risk of urban contaminants causing environmental pollution.

5.2 Table 4 below is a version of the Ciria SuDS Manual table 1.1 'Types of SuDS Components with a comment on the suitability of each component for this site.

Table 3: SuDS Component Suitability Assessment

Component Type	Description	Suitability for this Site
Rainwater Harvesting	Rainwater collected from roof and paved surfaces in a tank. The system may include treatment elements and should include specific storage provision if it is to be used to manage runoff to a design standard.	The restaurant is of modular construction to a standard design which is not set up for rainwater recycling. Water demand is also high so any recycling would need to be accompanied by a backup water supply and a very large recycling tank, negating the environmental benefits.
Green /Blue Roofs	A planted soil layer constructed on the roof of a building to create a living surface. Water is stored in the soil layer and absorbed by vegetation. Blue roofs store water at roof level, without the use.	The restaurant is a lightweight modular construction, produced in a factory and transported to site. This form of construction has many environmental benefits but is not currently capable of supporting green or blue roofs for McDonald's.
Infiltration System	Collects & stores runoff allowing it to infiltrate into the ground. Overlying vegetation & unsaturated soils offer protection to groundwater from pollution.	Infiltration is not suitable for this site, due to the anticipated depth of made ground and possible contaminants.
Proprietary Treatment System	These structures provide treatment of water through the removal of contaminants.	These systems are suitable for this site.
Filter Strips	Runoff from an impermeable area is allowed to flow across a grassed or otherwise densely planted area for sedimentation & filtration.	Filter strips are suitable for this site if there is sufficient space to incorporate them.

Filter Drains	Runoff is temporarily stored below the surface in a trench filled with stone, providing attenuation, conveyance & treatment (via filtration).	These have limited benefit due to the lack of infiltration but may be suitable subject to detailed design.
Swales	A vegetated channel is used to convey & treat runoff (via filtration). These can be "wet", where water will remain permanently at the base of the swale (lined), or "dry" where water is only present temporarily after rainfall events (unlined).	There is insufficient space for significant swales and they have less benefit due to the lack of infiltration available. The site is also quite steeply sloping, reducing the benefit of these systems.
Bioretention Systems (inc. rain gardens)	A shallow landscaped depression allows runoff to pond temporarily on the surface, before filtering through vegetation and underlying soils prior to collection or infiltration. In its simplest form it is often referred to as a rain garden. Engineered soils (gravel and sand layers) and enhanced vegetation may improve treatment performance.	These have limited benefit due to the lack of infiltration but may be suitable subject to detailed design.
Rills	Formal linear drainage features in which surface water can be stored or conveyed. They can be incorporated with water features such as ponds or waterfalls where appropriate.	Unsuitable due to trip/wheel hazard & high pedestrian & vehicle traffic. Unsuitable for disabled access. Channels with heel guard grating are an acceptable alternative.
Trees	Trees within a range of infiltration SuDS components improve their performance, as root growth & decomposition increase soil infiltration capacity. Alternatively, as standalone features within soil filled tree pits, tree planters or structural soils, collecting and storing runoff and providing treatment (via filtration and phytoremediation).	New planting is proposed, but space is limited. Existing wooded areas adjoin the southern and western boundaries.
Pervious Pavements	Runoff soaks through structural paving. This can be paving blocks with gaps between solid blocks, or porous paving where water filters through the block itself. Water can be stored in the sub-base & potentially allowed to infiltrate into the ground.	Porous block paving has been used extensively by McDonald's in the past, but the daily jet washing of pavements consistently led to early failure of the pavement. Porous asphalt paving is now being considered for use and has been proposed in some of the parking bays.
Attenuation storage tanks	Below-ground spaces used to temporarily store runoff before infiltration, controlled release, or use E.g. geocellular or concrete tanks, oversized pipes.	These systems are suitable for this site.
Detention Basins	Runoff drains to a landscaped depression with an outlet that restricts flows, so that the basin fills & provides attenuation. Generally, basins are dry, except during & immediately following the rainfall event. If vegetated, runoff will be treated as it is conveyed & filtered across the base of the basin.	These systems are unsuitable for this site, as there is insufficient space.
Ponds & Wetlands	Features with a permanent pool of water can provide attenuation & treatment of runoff, where outflows are controlled & water levels vary. They can support emergent & submerged vegetation along their shoreline & in shallow, marshy zones, which enhances treatment & biodiversity.	A permanent pond or wetland is not suitable for this site.

Available Surface Water Discharge Options

- 5.3 The Geo-Environmental Desktop Investigation indicates that a significant depth of made ground is likely to underly the site which, together with the probability of contaminants, is unsuitable for infiltration.
- 5.4 The nearest watercourse to the site is the River Roch, located approx. 60m north of the site. However, the river is located behind commercial units on the northern side of Water Street and a direct connection would not be possible.
- 5.5 It is concluded that the most suitable option is therefore to use the existing combined sewer within Water Street to the north of the site.

Selected Sustainable Drainage Measures

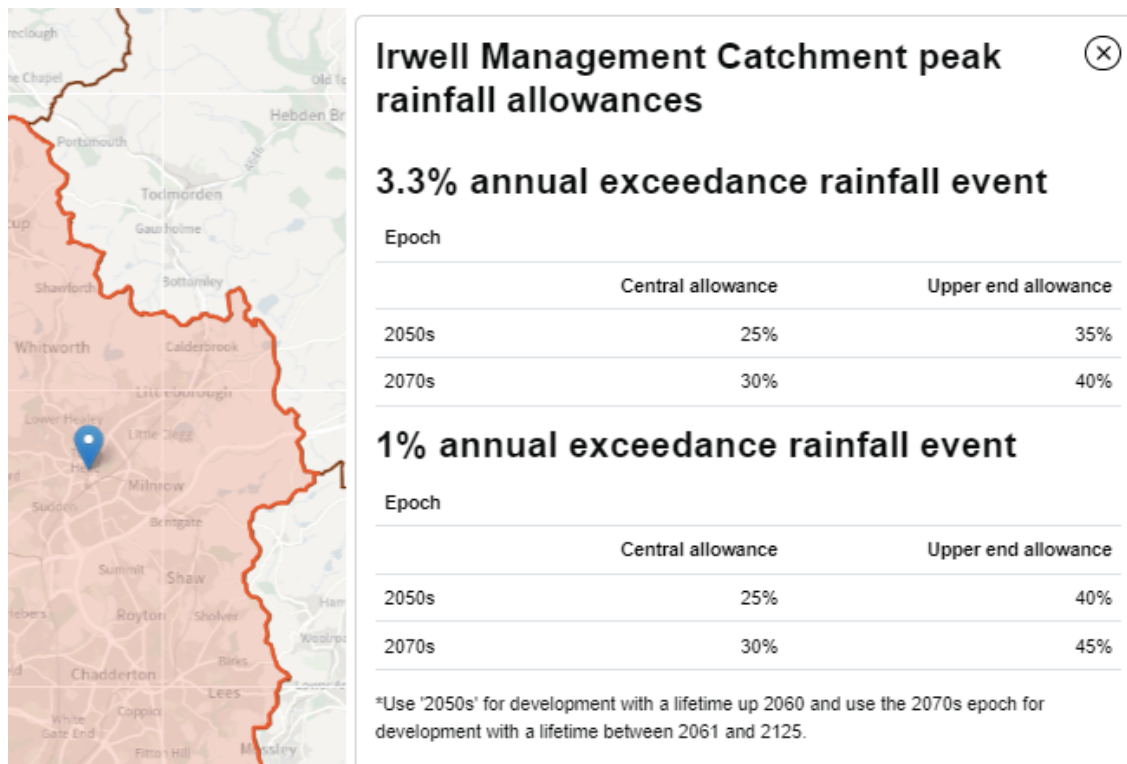
- 5.6 The selection of SuDS techniques for this site has followed the SuDS management train concept explained in the SuDS Manual. The concept is to use drainage techniques in series to incrementally reduce pollution, flow rates and volumes. The hierarchy of techniques to be used are as follows:
- Prevention - prevent runoff & pollution e.g., rainwater re-cycling and road sweeping.
 - Source Control - control runoff at or near its source e.g., local infiltration methods.
 - Site Control - routing water to site controls e.g., pipes to a large detention basin.
 - Regional Control - routing water from several sites to regional controls e.g., pipes to a balancing pond or wetland.
- 5.7 The proposed surface water drainage layout is shown in Figure 5 and includes the following features:
- Rainfall will be collected from roofs will be conveyed into the site's below ground drainage system.
 - Some of the car park spaces will be permeable asphalt paved, infiltrating through the impermeably lined voided sub-base and discharging into the below ground surface water drainage network.
 - Patio areas fall towards the drive thru lane / car parking areas, which will be collected within the site's drainage system.
 - Run-off collected in the site's below ground drainage system will pass through a flow control device and then coalescing petrol interceptor unit and the treated run-off will discharge into the existing combined sewer within water Street to the north.
- 5.8 These sustainable drainage measures have been selected for the site conditions and are suitable for the constant use and daily maintenance required for a McDonald's site. These systems are tried and tested on similar sites where permeability is poor, and the site area cannot accommodate larger open drainage features.

Climate Change

- 5.9 Climate Change allowances were updated on the 10th of May 2022. The new climate change allowances map places the site within the Irwell Management Catchment, see Image 6. The design life for the proposed development is 50 years, but planning practice guidance requires non-residential development to have a minimum 75-year life for the purpose of climate change assessments which places it within 2070's epoch and the central allowance. For Flood Risk Assessments, the developments should be designed to cater for 1% annual exceedance events so:
- there is no increase in flood risk elsewhere and
 - the development will be safe from surface water flooding.

- 5.10 Development drainage should therefore be designed for no flooding in the **1:100 year plus 30%** climate change event.

Image 6: Gov.UK Climate Change Allowances



Development with a lifetime of between 2061 and 2100

For development with a lifetime between 2061 and 2100 take the same approach but use the central allowance for the 2070s epoch (2061 to 2125).

Flow Rates & Attenuation

- 5.11 Existing and proposed impermeable areas have been calculated and are shown in Figure 4. These areas have been used to calculate the existing and proposed discharge from the site for a range of storm events. 'Urban Creep' is not applicable to McDonald's as most of their sites have no space for further expansion of impermeable areas and those that do will have any alterations to paving accompanied by a new planning application with additional SuDS measures if required. Urban creep allowances are normally only required for residential development where small paving alterations and extensions are more likely to be completed outside of the planning process, without complementary sustainable drainage improvements. This approach accords with the advice in the Non-Statutory Technical Standards for SuDS by LASOO (Local Authority SuDS Officer Organisation).
- 5.12 Table 4 shows the existing and proposed discharge rates from the drainage system with attenuation proposed to cater for surface water storm events up to a 1 in 100yr storm event plus climate change. The full calculation results are shown in Appendix A. The proposed surface water discharge from the site to the sewer is limited to 3.2 litres per second for all storm events.

Table 4: Existing & Proposed Flows & Attenuation

Storm Event (Annual Exceedance Probability)	Existing Greenfield Run Off Rates (l/s)	Proposed Restricted Discharge (l/s)	Attenuation Provided (m ³)
Q _{BAR}	3.18		192.00
1 in 2		3.10	
1 in 30 (3.3% AEP)	5.40	3.10	
1 in 100 (1% AEP)	6.61		
1 in 100 (1% AEP) plus 30%		3.20	

- 5.13 The site is small, with an impermeable area of just 0.282Ha (2820m²) and is constrained with the proposed building and existing utilities limiting the locations for attenuation tanks. Using the Rational equation where $Q=2.78A_i$, for the impermeable area of 2820m² and a rainfall intensity of 50mm/hour, this equates to a discharge rate from the existing car park of 39.2 l/s. Reducing this to a rate of 3.20l/s ($\sim Q_{bar}$) offers **92% betterment** over the existing uncontrolled discharge, with all discharged waters receiving suitable treatment.

Pollution Control

- 5.14 Ciria pollution treatment measures have been applied to ensure treatment of the surface water. The pollution control measures are designed to minimise the transmittal of any pollutants, collected by runoff flowing over hard paved areas, to the public sewers and to ground. Pre-treatment is provided with gulleys and catchpit manholes to remove silt and prolong the life of the pollution control treatment media. Pollution control measures for this site include:
- Permeable paving.
 - Coalescing petrol interceptor.
- 5.15 The suitability of the pollution control measures is quantified in accordance with CIRIA 753, pollution hazard indices. Comparing the pollution hazard indices in Table 5, for each catchment type, with the total pollution mitigation indices in Table 6 it can be seen that the suggested drainage system will be sufficient to mitigate the expected pollution from roofs and paved areas. See mitigation formula below and Appendix B for the product details.

*Total SuDS Mitigation Index must be $\geq$ Each Catchment's Pollution Hazards Index
(For each contaminant type)*

Total SuDS Mitigation Index = 1st Stage Mitigation Index + 0.5 (2nd Stage Mitigation Index)

Table 5: Pollution Hazard Indices

Catchment Type	Pollution Hazard Level	Method	Pollution Hazard Indices		
			Suspended solids	Metals	Hydrocarbons
Restaurant Roof	low	Simple index approach	0.3	0.4	0.05
Restaurant parking	Medium	Simple index approach	0.7	0.6	0.7

Table 6: Total Pollution Mitigation Indices for Discharge to Surface Waters

Type of Pollution Mitigation (SuDS)	Pollution Mitigation Indices		
	Suspended solids	Metals	Hydrocarbons
1. SPEL Petrol Interceptor with coalescer ESR 25/C1	0.8	0.6	0.9
Total treatment indices	0.8	0.6	0.9

Note: The permeable asphalt parking areas and filter trenches have been ignored from the above as only part of the impermeable area is treated in these areas.

Maintenance

- 5.16 Refer to the separate Glanville report entitled 'Drainage Maintenance Plan'.

Foul Water (FW) Drainage Strategy

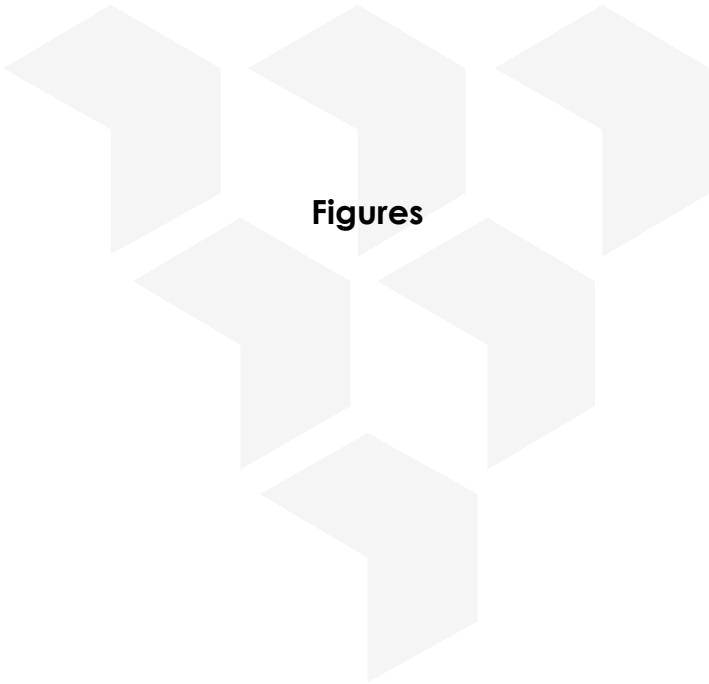
- 5.17 The development will connect FW flows, via gravity, to the existing foul sewer, south of the site, as shown in Figure 5. A pre-development enquiry has been submitted to United Utilities and their response is awaited.
- 5.18 The restaurant drainage includes an alarmed grease trap for all the kitchen waste pipework to ensure drains do not lose capacity due to grease build up and to prevent grease entering the public sewers.

6.0 Further Investigations & Approvals

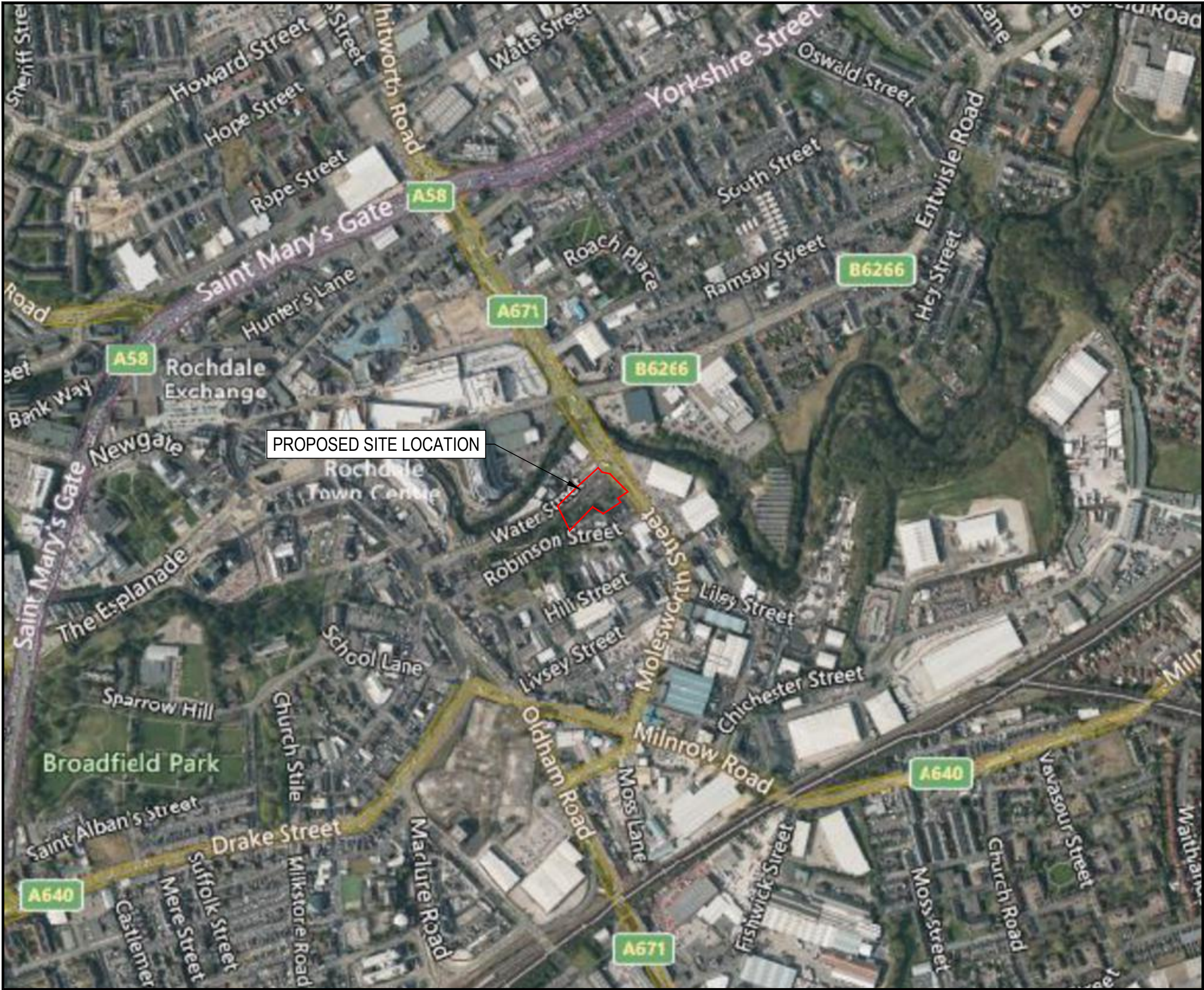
- 6.1 The information in this report is sufficient to demonstrate the suitability of the proposed development in respect of Flood Risk and Sustainable Drainage. It is expected that planning conditions will be imposed requiring drainage proposals to be in accordance with this Drainage Statement, and that details of the on-site foul and surface water drainage designs will need to be provided prior to commencement of works.
- 6.2 The detailed drainage design must comply with the Building Regulations and approval will be required from a qualified Building Inspector.
- 6.3 Prior to construction a formal application will need to be submitted to obtain consent for physical connections (direct or indirect) and the discharge of flows to the adopted sewer. This applies to the foul and surface water flows from this development.
- 6.4 A CCTV survey will verify the condition of existing sewers within the site to be retained and sewers outside the site that are being used for connections from the development.
- 6.5 Surface water must be carefully managed on site during construction to safeguard the works and neighbouring land from flooding and to ensure protection of natural water resources and ecology.

7.0 Conclusion

- 7.1 The development proposals have been designed after consideration of national and local planning policy and best practice guidance, in the context of the proposed use and site conditions.
- 7.2 Flood risks within the site have been assessed and are low. The proposed design ensures that flood risks are not increased by the development.
- 7.3 The development's surface water drainage strategy follows sustainable drainage guidance. Infiltration is unsuitable and there are no watercourses close enough, therefore runoff is discharged to the nearby surface water sewer. The proposed discharge rate is restricted to a maximum of 3.20 litres per second. The sustainable surface water drainage system is designed to accommodate a 1:100-year event plus the appropriate climate change allowance for this site without flooding.
- 7.4 The existing car park does not benefit from any form of drainage system, the proposals collect all rainfall falling on the impermeable areas of the proposed development and discharge to the combined sewer at Q_{bar} rate offering a significant reduction of the current flows from the existing car park. This will reduce flood risk to the adjacent properties to the north and those downstream of the connection point.
- 7.5 A SuDS maintenance schedule has been provided to demonstrate adoption and maintenance proposals in a separate Glanville report entitled 'Drainage Maintenance Plan'.
- 7.6 The development's foul water drainage strategy utilises gravity to take effluent to the existing public sewer to the northwest of the site. The design includes many access points for maintenance and an alarmed grease trap to ensure downstream sewers are protected from cooking waste / grease.
- 7.7 In summary, the development proposals comply with relevant standards for flood risk and sustainable drainage.



Figures



N

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS, DOCUMENTS AND SPECIFICATIONS. ANY DISCREPANCIES BETWEEN INFORMATION SHOWN ON THIS AND ANY OTHER DRAWING SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY.

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KEY

PROPOSED SITE BOUNDARY

FOR INFORMATION ONLY

FIGURE 1

I3	SITE BOUNDARY EXTENDED	05.12.24	KJ	HBG
I2	MAP INFO UPDATED	06.09.24	KJ	
I1	ISSUED FOR PLANNING	30.07.24	KJ	HBG
Rev.	Description	Date	By	Chkd

Glanville

Survey > Plan > Engineer

Civil Engineering

Structural Engineering

Transport Planning

Highways Engineering

Building Surveying

Geomatics

Hertfordshire

Oxfordshire

Cambridgeshire

Bristol

Client:

Project:

MCDONALDS RESTAURANT
WATER STREET, ROCHDALE
OL16 1TL [ST2285]

Title:

SITE LOCATION PLAN

Engineer:

KJ

Date:

JULY 2024

Director:

HBG

Scale:

1:2500 @ A1

Status:

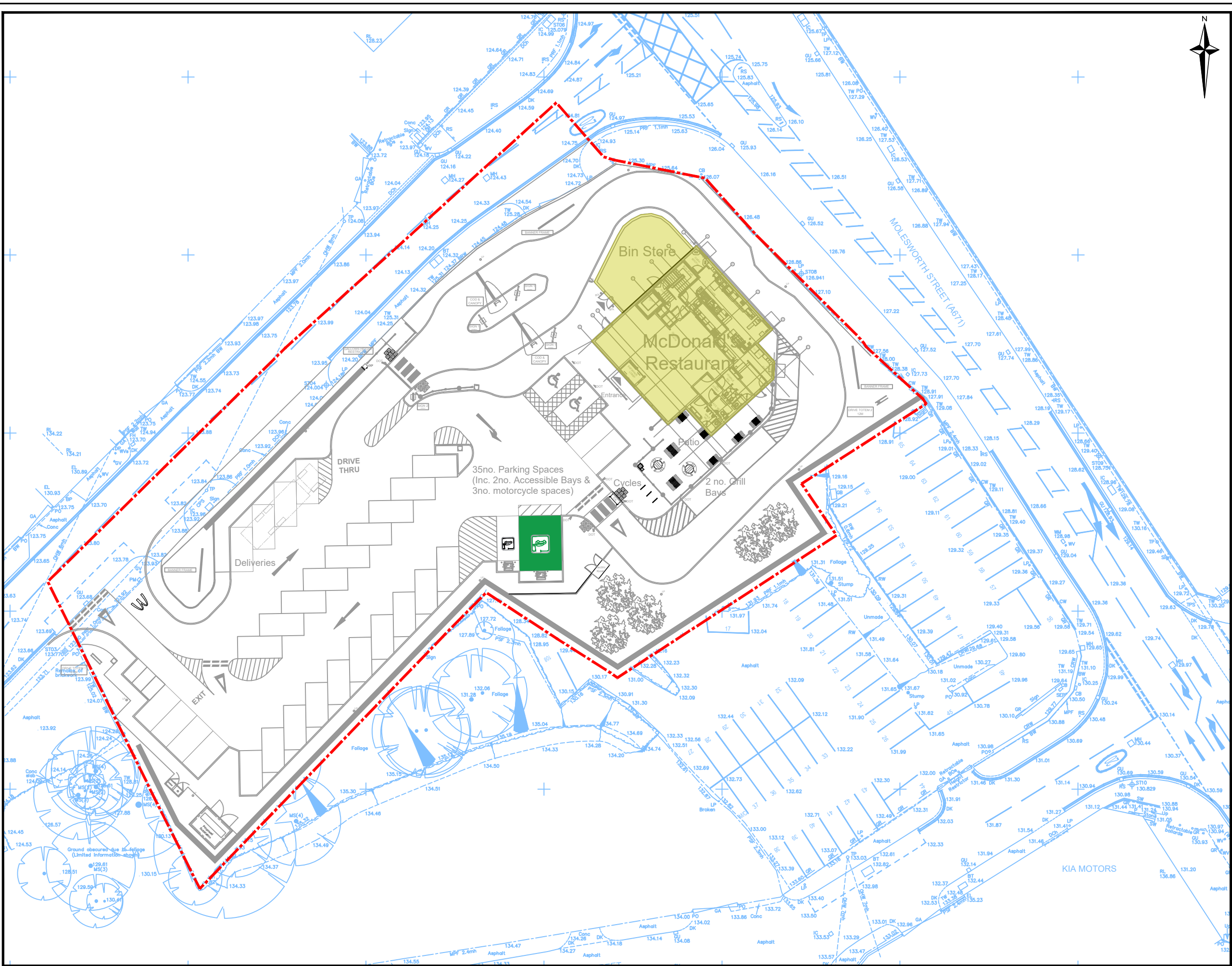
INFORMATION

Drawing No.

4230334-SK02

Rev

I3



PROPOSED SITE LAYOUT
Scale 1:200

NOTES

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KEY

- PROPOSED SITE BOUNDARY
- TOPOGRAPHICAL SURVEY
- PROPOSED SITE LAYOUT

FOR INFORMATION
ONLY

FIGURE 3

I3	FURTHER UPDATE TO SITE LAYOUT	17.02.25	KJ	HBG
I2	SITE LAYOUT AND BRY UPDATED	05.12.24	KJ	HBG
I1	ISSUE FOR PLANNING	30.07.24	KJ	HBG
Rev	Description	Date	By	Chkd

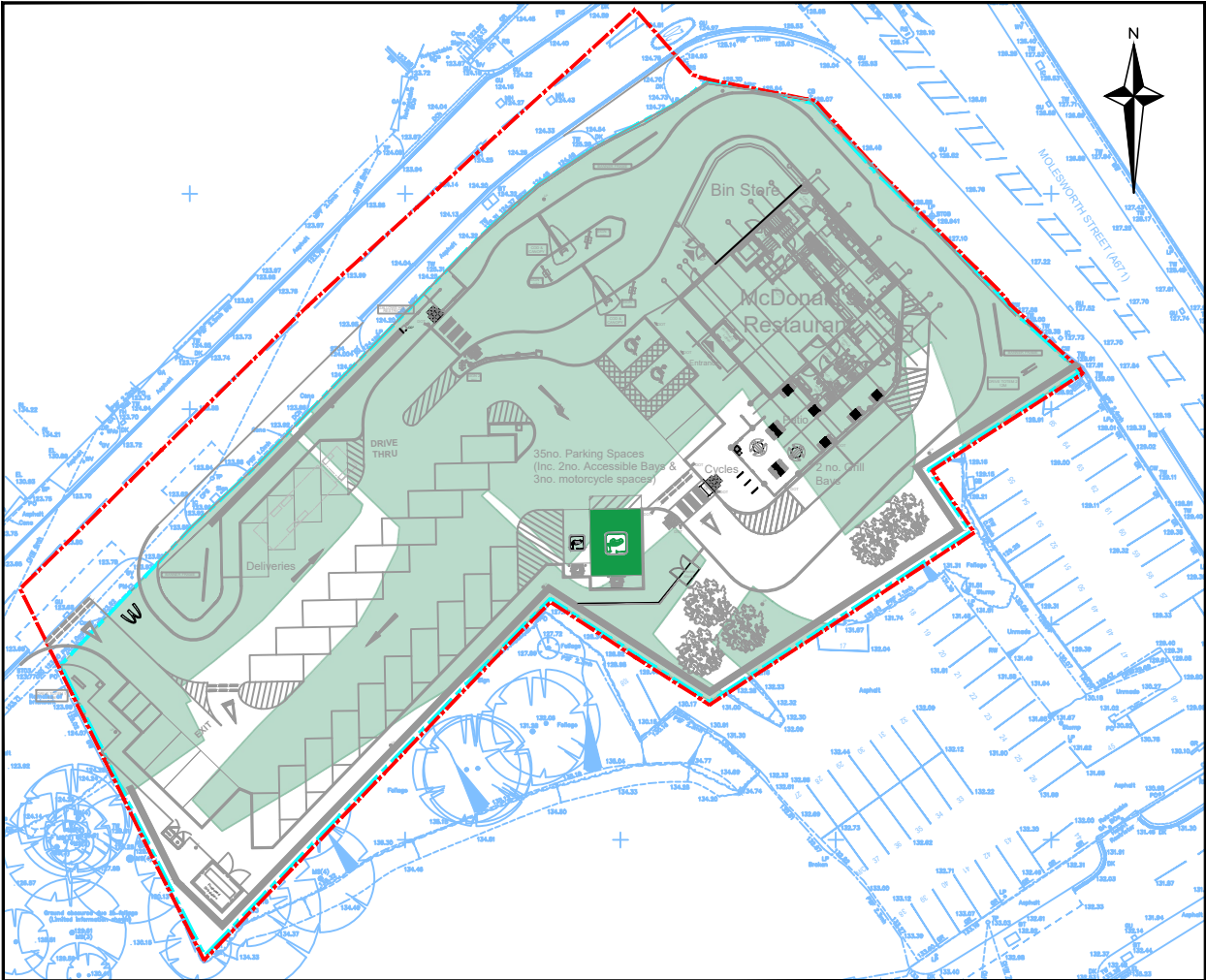
Glanville
Survey > Plan > Engineer

Civil Engineering
Structural Engineering
Transport Planning

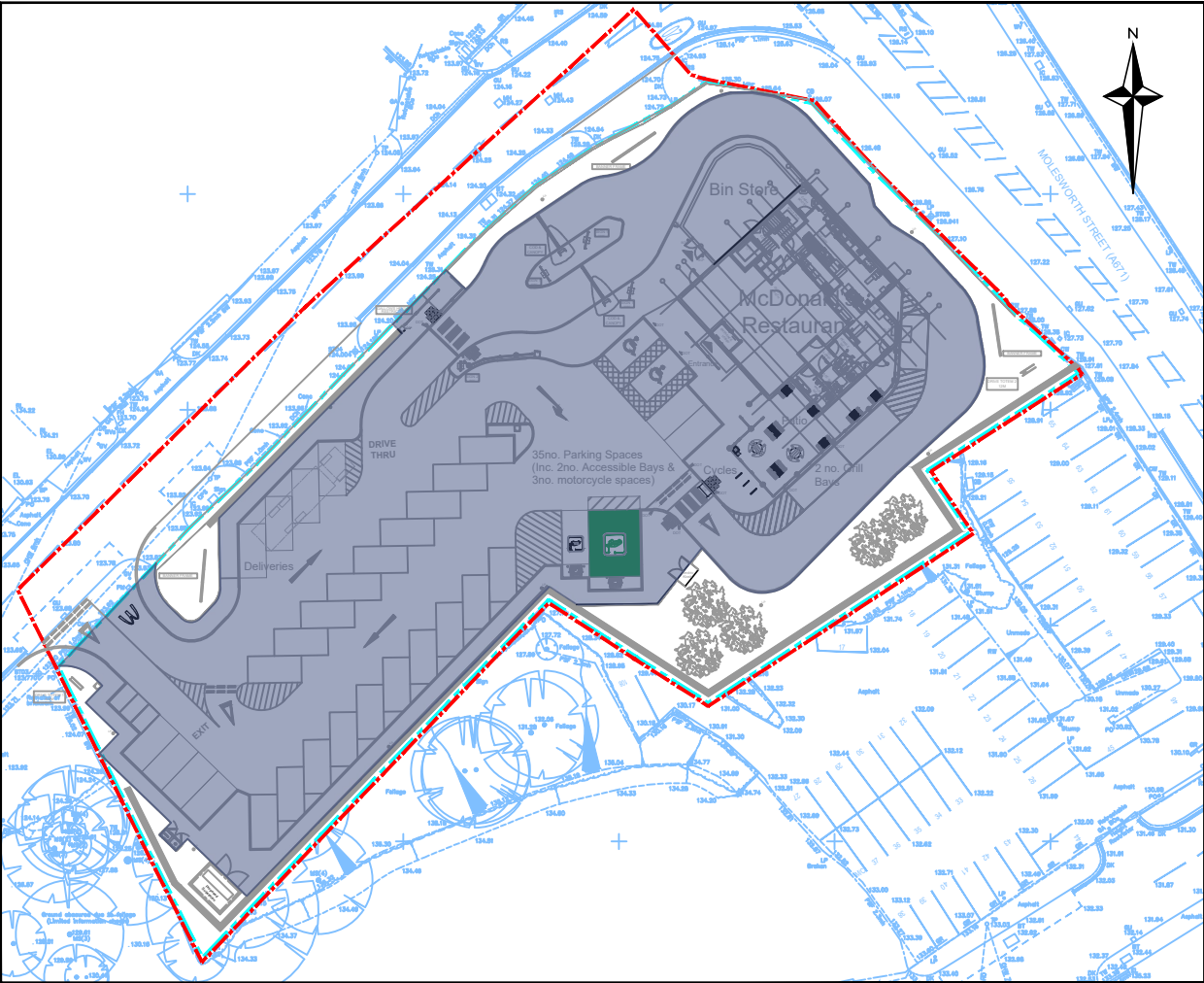
Highways Engineering
Building Surveying
Geomatics

Hertfordshire | Oxfordshire | Cambridgeshire | Bristol

Client:	McDonald's
Project:	McDONALDS RESTAURANT WATER STREET, ROCHDALE OL16 1TL [ST2285]
Title:	PROPOSED SITE PLAN
Engineer:	KJ
Date:	JULY 2024
Director:	HBG
Scale:	1:200 @ A1
Status:	INFORMATION
Drawing No.	4230334-SK04
Rev	I3



EXISTING SITE PLAN
Scale NTS



PROPOSED SITE PLAN
Scale NTS

NOTES

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3. THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS SPECIFICALLY STATED AS 'FOR CONSTRUCTION' IN THE DRAWING STATUS.
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KEY

- PROPOSED APPLICATION BOUNDARY
- PROPOSED SITE DEMISE
- PROPOSED IMPERMEABLE AREA (0.270ha)
- EXISTING IMPERMEABLE AREA (0.260ha)

FOR INFORMATION ONLY

FIGURE 4

I3	FURTHER UPDATE TO SITE LAYOUT	17.02.25	KJ	HBG
I2	SITE LAYOUT AND BRY UPDATED	05.12.24	KJ	HBG
I1	ISSUED FOR PLANNING	30.07.24	KJ	HBG
Rev.	Description	Date	By	Chkd



Survey > Plan > Engineer

 Civil Engineering

 Structural Engineering

 Transport Planning

 Highways Engineering

 Building Surveying

 Geomatics

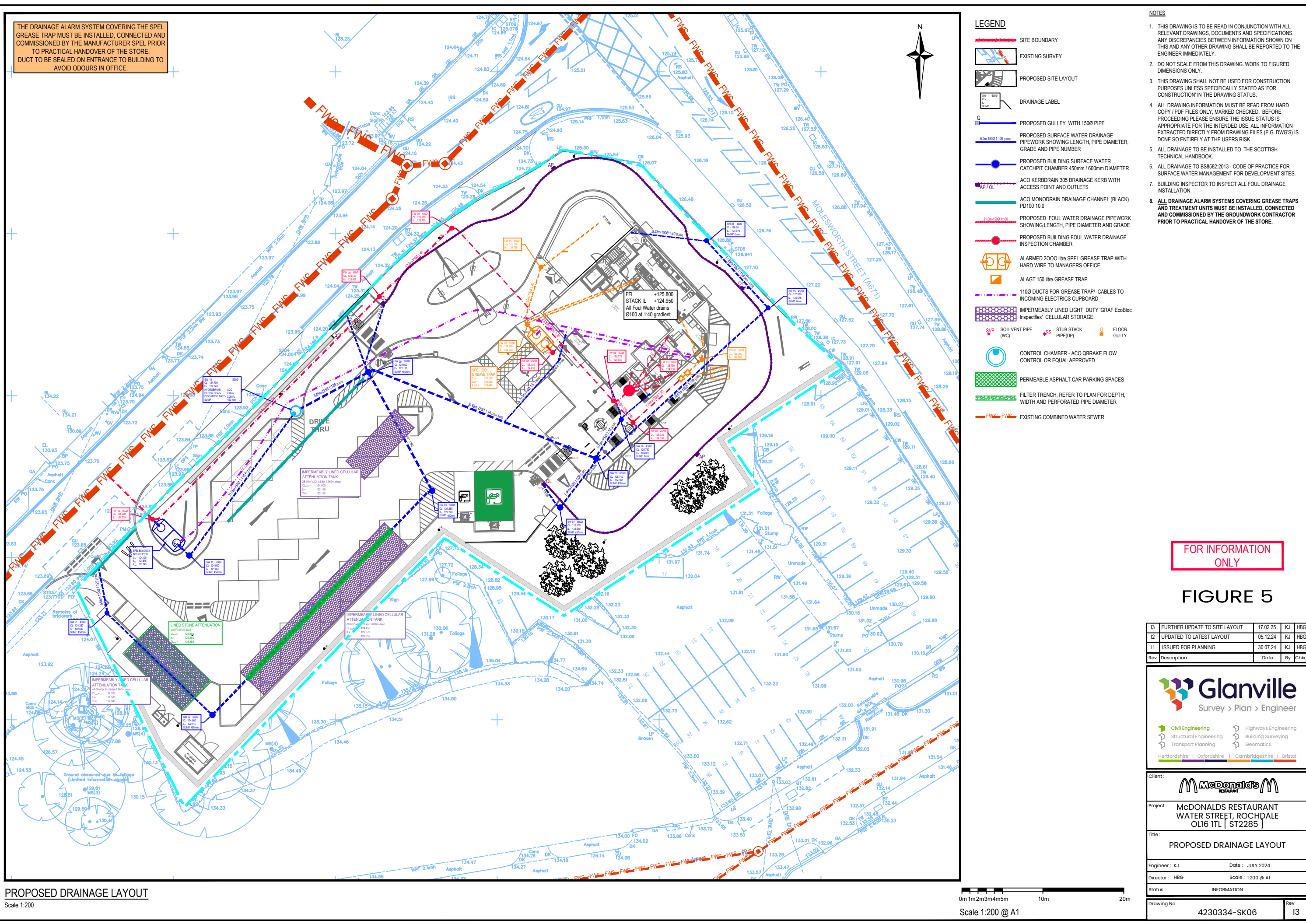
Hertfordshire

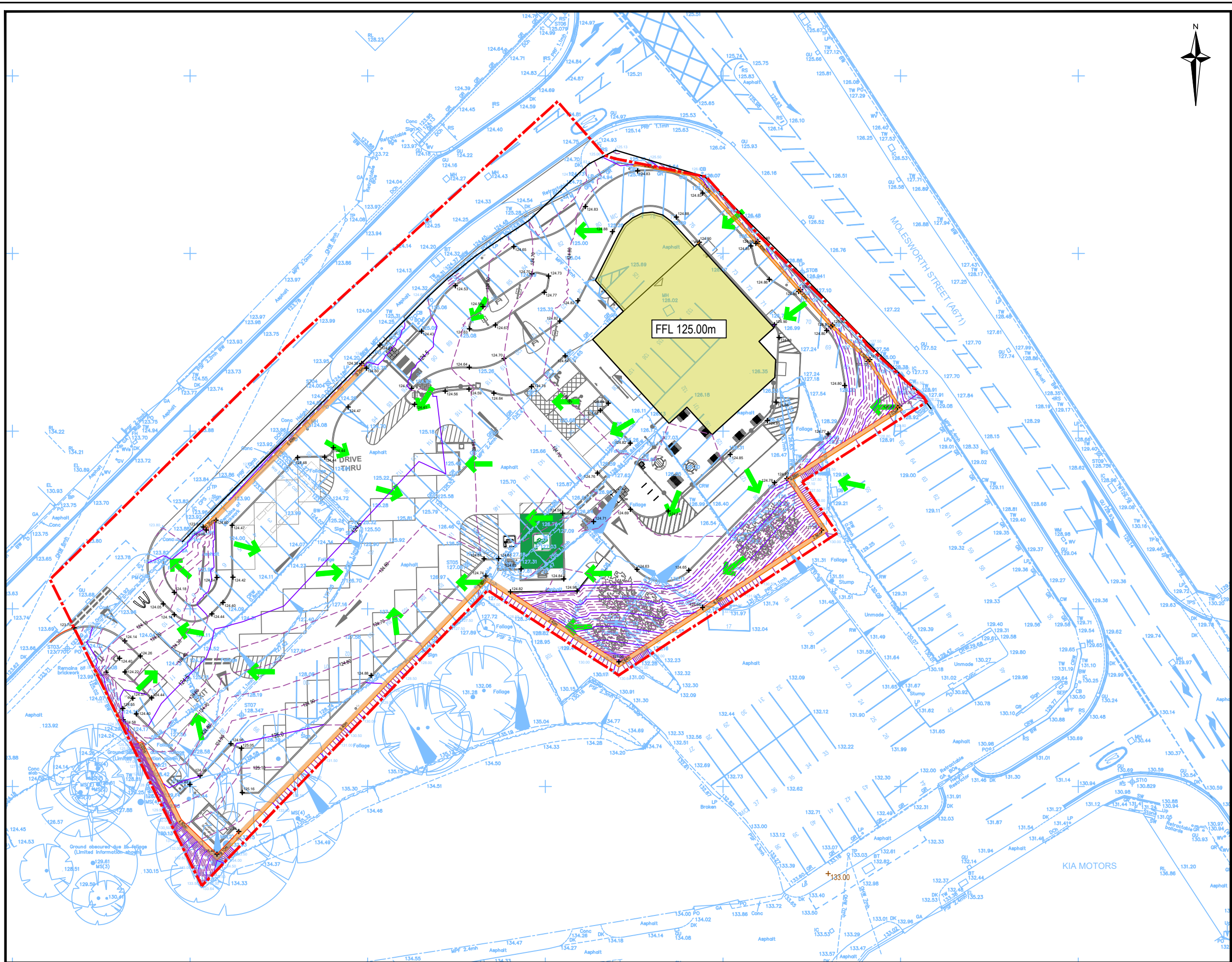
Oxfordshire

Cambridgeshire

Bristol

Client:			
Project:	MCDONALDS RESTAURANT WATER STREET, ROCHDALE OL16 1TL [ST2285]		
Title:	EXISTING AND PROPOSED IMPERMEABLE AREAS		
Engineer: KJ	Date: JULY 2024		
Director: HBG	Scale: NTS @ A1		
Status:	INFORMATION		
Drawing No.	4230334-SK05		Rev I3





NOTES

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KEY

- SITE BOUNDARY
- PROPOSED SITE LAYOUT
- PROPOSED FINISHED LEVELS
- PROPOSED RETAINING WALL (with retained height noted at intervals)
- OVERLAND FLOW ROUTE

FOR INFORMATION ONLY

FIGURE 6

I4	FURTHER SITE LAYOUT UPDATE	17.02.25	KJ	HGB
I3	SITE LAYOUT UPDATED	05.12.24	KJ	HGB
I2	ISSUED FOR PLANNING	30.07.24	KJ	HGB
I1	INFORMATION ISSUE	12.07.23	KJ	-
Rev	Description	Date	By	Chkd



Survey > Plan > Engineer

 Civil Engineering

 Structural Engineering

 Transport Planning

 Highways Engineering

 Building Surveying

 Geomatics

 Hertfordshire

 Oxfordshire

 Cambridgeshire

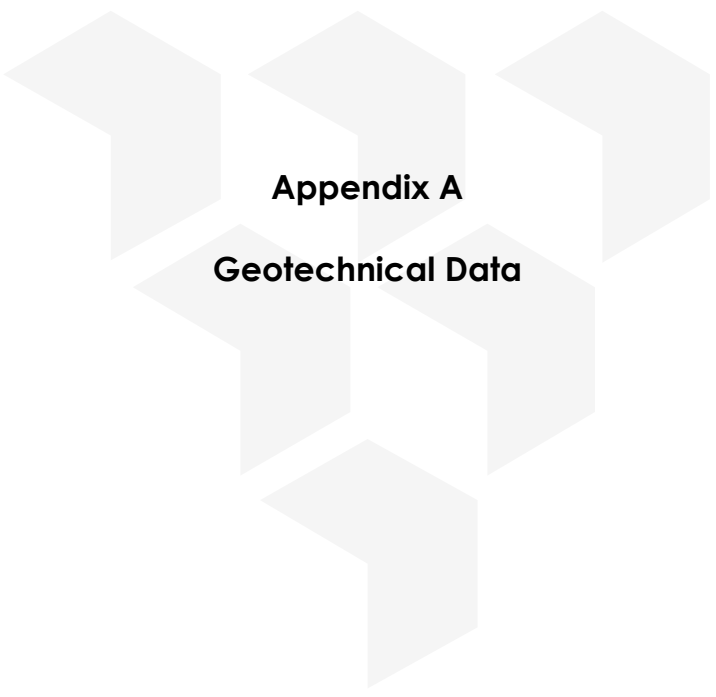
 Bristol

Client :			
Project :	MCDONALDS RESTAURANT WATER STREET, ROCHDALE OL16 1TL [ST2285]		
Title :	PROPOSED LEVELS AND OVERLAND FLOW ROUTES		
Engineer : KJ	Date : JULY 2024		
Director : HBG	Scale : 1:200 @ A1		
Status :	INFORMATION		
Drawing No.	4230334-SK01		Rev 14

PROPOSED LEVELS LAYOUT
Scale 1:200



Appendices



Appendix A

Geotechnical Data

**Phase 1 Desk Study
Report**

Project Name: Molesworth Street, Rochdale, OL16 1TQ

Client: Glanville Consultants Limited (on behalf of McDonalds)

Project ID: J15721

Report Ref: J15721-DS

Report Date: 12 December 2024

Report Issue: 2

SUMMARY

The site is located on the junction of Water Street and Molesworth Street. The northern part of the site is used by a Kia car dealership for parking cars. There is a webuyanycar cabin towards the centre of the northern boundary. The remainder of the site is used as car parking. It is proposed to construct a new McDonalds, together with associated car parking and a drive-thru lane.

Geological records indicate the site to be underlain by superficial Glaciofluvial Deposits over Old Lawrence Rock and Pennine Lower Coal Measures Formation on the south-westernmost edge of the site. Superficial Till deposits and Alluvial deposits are also mapped within close vicinity to the site.

A desk study was carried out and indicates that the site has a history of industrial land use including a clay brick and tile manufacturer, print works, iron works and garages, and the site is currently used as a car park. The site has also been located within an industrial/commercial area. The Petroleum Officer does not hold any records of fuel storage at the site.

An Unexploded Ordnance (UXO) risk assessment was undertaken by a specialist subcontractor as part of these works. This report has concluded that the risk of UXO is not considered to be higher than the 'background risk' of finding UXO in this part of the UK. It was recommended that no further action was required. The assessment was made with specific regard to the proposed investigation works/site works and its conclusions may not be appropriate to other activities.

A Consultants Coal Mining Report from The Coal Authority has been obtained for the site and did not identified any mining activity within the near vicinity of the site or any evidence of investigation or remedial activity or future mining activity near the site. From geological mapping the nearest coal seam is recorded around 450m south-west of the site.

Based on the Desk Study search and walkover survey carried out on the site, the overall risk of on-site contamination associated with both historical and current land use is considered low to moderate, in the context of the proposed commercial use of the site. Furthermore, the risk of off-site contamination migrating on to the subject site from contemporary sources is also considered low to moderate.

Where there is proposed hard covering (i.e. parking, buildings etc.) there would not be any direct contact of contamination with proposed end users as the Source-Pathway-Receptor pollutant linkage is broken by the permanent hard barrier. Where soft landscaping is proposed there is considered to be a potential pathway to the proposed end users. There is also a potential risk to site workers during the groundwork stages of the development and also a risk to proposed services, structures and the underlying aquifers.

A Phase II intrusive investigation is recommended to assess the contamination risk for the site. In order to assess the risk it is recommended that the investigation includes sampling and testing of any Made Ground, the underlying natural soils and groundwater. Chemical analysis, including asbestos screening, of the samples should be carried out in order to determine the nature and extent of any contamination on the site, and whether there is a need for any remedial works or additional assessment. The intrusive investigation can be integrated to include assessment for both geotechnical design purposes if required.

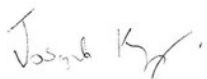
A potential risk from ground gases has also been identified due to potentially infilled land both onsite and in the near vicinity. Therefore, ground gas monitoring should be carried out within the location of the building to better assess the gas risk.

It is possible the site may have been used as a petrol filling station which means there may be have been buried fuel tanks and if so these may remain beneath the site and may represent a risk of hydrocarbon contamination. A petroleum licencing search, from Greater Manchester Fire and Rescue Service, did not identify any evidence that petroleum spirit was stored at this address.

The investigation was conducted and this report has been prepared for the sole internal use and reliance of Glanville Consultants Limited and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The findings and opinions conveyed via this investigation report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd. believes are reliable. Nevertheless, Southern Testing Laboratories Ltd. cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The recommendations contained in this report are made in respect of the particular context of the investigation as described in the report and may not be appropriate to alternative development schemes. This report should be considered in its entirety and Southern Testing Laboratories Ltd accepts no responsibility for and excludes liability in respect of any omission or alteration made by others, and any use of the report for any purpose other than that for which it was produced.

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Check / Review	C Lennard BEng (Hons)	
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For and on behalf of Southern Testing Laboratories Limited

DOCUMENT HISTORY AND STATUS

Issue No.	Date	Purpose or Status	Author	Check / Review
1	16/05/2024	First Issue - DRAFT	VF	CL
2	12/12/2024	Updated with response from Petroleum Officer	VF	JK

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Preliminary UXO Risk Assessment

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APPENDIX E

Petroleum Licensing Search

APPENDIX F

Phase 1 Desk Study – Historical Mapping

APPENDIX G

Phase 1 Desk Study – Environmental Database Search Results and Mapping

A INTRODUCTION

1 Authority

Our authority for carrying out this work is contained in an email from Mr K Jackson on behalf of Glanville Consultants Limited, dated 3rd May 2024, with their purchase order number of GCH1086.

2 Location

The site is currently used as a car park, located immediately to the south of the junction for Molesworth Street and Water Street in Rochdale.

The approximate National Grid Reference of the site is SD 90118 13371. The site location is indicated on Figure 1 within Appendix A.

3 Proposed Construction

It is proposed to redevelop the site with a new McDonalds building in the east, together with associated car parking in the west and a drive-thru lane etc. Based on the supplied proposed layout (included in Appendix A) it appears that only very limited, or no soft-landscaped are proposed.

In the absence of an applicable generic land use for a proposed McDonalds, for the purposes of the contamination risk assessment in relation to the proposed development, a combined Public Open Space (Park) and Commercial/Industrial classification has been used CLEA Model [1] / C4SL Report [2].

The gas sensitivity of the proposed development is rated as Low CIRIA C665 Ref [3]

4 Object

This is a Phase 1 Desk Study including a Walkover Survey, the object of which was to assess the likely nature and extent of soil, groundwater and soil gas contamination on the site.

5 Scope

This report presents our desk study findings only.

An Unexploded Ordnance (UXO) risk assessment was included within our brief for the investigation. The assessment was made with specific regard to the proposed investigation works/site development and its conclusions may not be appropriate to other activities.

This report is not an engineering design and the figures and calculations contained in the report should be used by the Engineer, taking note that variations will apply, according to variations in design loading, in techniques used, and in site conditions. Our figures therefore should not supersede the Engineer's design.

The findings and opinions conveyed via this investigation report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd. believes are reliable. Nevertheless, Southern Testing Laboratories Ltd. cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The investigation was conducted and this report has been prepared for the sole internal use and reliance of McDonalds and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The recommendations contained in this report are made in respect of the particular context of the investigation as described in the report and may not be appropriate to alternative development schemes. This report should be considered in its entirety and Southern Testing Laboratories Ltd accepts no responsibility for and excludes liability in respect of any omission or alteration made by others, and any use of the report for any purpose other than that for which it was produced.

Detailed information on the proposed development, such as detailed final layout, loadings and serviceability limits was not provided. Accordingly, where geotechnical design advice is provided it is on the prescriptive basis allowed for by Eurocode 7: employing conventional and conservative design rules.

B DESK STUDY AND WALKOVER SURVEY

6 Desk Study

A desk study has been carried out. Reference has been made to the following information sources.

- Online Geological Maps Ref [4] & Ref [5]
- Online Hydrogeological Maps Ref [6]
- Aerial Photographs
- Historical Ordnance Survey Maps
- Environmental Databases
- BGS Online Historical Borehole Records Ref [7]
- Search on Local Authority Planning Portal for planning history
- MAGIC website mapping Ref [8]
- Environment Agency / Gov.UK Website Flood Risk Ref [9]
- UK Radon Ref [10] and BRE Radon Ref [11]
- Google Earth (for old aerial photographs)
- Preliminary UXO Risk Assessment (1st Line Defence)
- The Coal Authority Consultants Coal Mining Report
- Greater Manchester Fire & Rescue Service, Petroleum Search

The environmental databases search report compiled for this desk study contains site-specific environmental data drawn from data sets that comprise publicly available information together with data from third parties, some of which is under review. Accordingly, Southern Testing Laboratories Limited does not warrant its accuracy, reliability or completeness.

The full report is included in Appendix F and G, a summary of the salient features is included in the following sections of this report.

6.1 Geology

The British Geological Survey Map, No. 76 (Rochdale) and No. 85 (Manchester), indicate that the site geology consists of superficial Glaciofluvial Deposits over Old Lawrence Rock and Pennine Lower Coal Measures Formation on the south-westernmost edge of the site. Superficial Till deposits and Alluvial deposits are also mapped within close vicinity to the site (also see Section 6.4.1).

6.1.1 Glaciofluvial Deposits

The deposits comprise sediments transported and deposited by glacial meltwater, either sub-glacially, en-glacially, supra-glacially or downstream of glaciers via meltwater channels and/or glacial outwash events. Deposits are formed via number of processes and therefore vary greatly in depth. Sediments commonly comprise of sand and gravel, with moderate sorting and bedding. Fines including clay have generally been washed out leaving the sand and gravel which is commonly non-cohesive and highly permeable, a good bearing capacity and low settlement is common. However, lenses of silt, clay or organic material can be locally present.

6.1.2 Till Deposits

Till is typically an unsorted and unstratified drift, generally overconsolidated, deposited directly by and underneath a glacier without subsequent reworking by water from the glacier. It consists of a heterogeneous mixture of clay, sand, gravel, and boulders varying widely in size and shape (diamicton).

6.1.3 Alluvium

Alluvium is a geologically recent deposit found in association with watercourses. It is typically soft to firm normally consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger, desiccated surface zone may be present.

Running sand or silt may be encountered. Excavations are often unstable. Bottom heave may be encountered in clayey soils below 3m.

It is inherently variable and rapid lateral transitions in soil type should be anticipated.

6.1.4 Pennine Lower Coal Measures Formation / Old Lawrence Rock

These deposits generally consist of interbedded grey mudstone, siltstone and pale grey sandstone. Marine fossils are commonly contained within mudstone in the lower part and there are more numerous and thicker coal seams in the upper part.

The Pennine Lower Coal Measures Formation is the parent unit of Old Lawrence Rock.

6.2 Historical Borehole Records

A search of previous exploratory hole records both from the online British Geological Survey database [7] and Southern Testing in-house records, revealed numerous records within the near vicinity of this site, all from the BGS source only.

Information from the historic borehole records are generally located approximately 100m to the north east of the site, around the River Roch and are mapped within superficial alluvial deposits over the Old Lawrence Rock.

These boreholes records indicate a significant covering of made ground up to 3m depth, underlain by soft clays, peat and loose sands/gravels to around 6-8m(bgl), underlain by a stiff sandy boulder clay and sandy laminated clay.

Water strikes were generally recorded at around 3m depth and around 4.5/5.0m depth. Standing water levels were recorded between 2.2m and 3.2m.

The BGS borehole records within around 100m of the site are summarised in the table below.

BH Reference	Final Depth (bgl)	Distance from site (m) & Direction	Remarks
SD91SW275	3.5m	65m N	Trial pit, April 1988. Soils recorded as loose fill, cinder, ash and rubble to 3.0m, underlain by damp very sandy clay to 3.5m. Recorded as dry.
SD91SW272	10m	80m NE	Borehole, April 1988 Soils recorded as firm crush overlying rubble mixed with clay and ash to 2.9m, underlain by firm clay and water to 3.1m, underlain by soft dark grey silty clay and peat to 4.3m, underlain by loose wet silty sand to 6.0m, underlain by coarse sand with gravel and cobbles to 7.4m, underlain by alternating bands of sandy boulder clay and sandy laminated clay to 10m. Water strike recorded at 2.9m and 5.2m. Standing water recorded at 2.9m.
SD91SW277	2.2m	80m NE	Trial pit, April 1988. Soils recorded as compact ash and rubble to 1.0m, underlain by soft sandy clay to 1.4m, underlain by firm sandy stony clay to 2.2m. Recorded as dry.

BH Reference	Final Depth (bgl)	Distance from site (m) & Direction	Remarks
SD91SW278	3.8m	80m N	Trial pit, April 1988. Soils recorded as loose fill, cinder, ash and rubble to 3.0m, underlain by damp very sandy clay to 3.5m. Recorded as dry.
SD91SW276	3.0m	90m NE	Trial pit, April 1988. Soils recorded as loose brick rubble fill to 3.0m. Recorded as dry.
SD91SW274	2.8m	90m N	Trial pit, April 1988. Soils recorded as loose ash fill to 1.5m, over soft very sandy clay to 2.8m. Recorded as dry.
SD91SW10	246.89m	100m E	Soil recorded as drift to 67.06m, underlain by mudstone to 127.71m, underlain by shale to 132.89m, underlain by mudstone to 149.35m, underlain by sandstone to 168.86m, underlain by interbedded sandstone and mudstone. Water strike recorded >149.4m.
SD91SW270	10m	100m NE	Borehole, April 1988. Soils recorded as ash, stone and brick rubble fill to 1.5m, underlain by soft clay mixed with ash to 3.1m, underlain by soft silty clay with peat to 3.8m, underlain by very soft silty clay to 4.7m, underlain by coarse sand gravel and cobbles to 5.7m, underlain by alternating bands of firm sandy boulder clay and sandy laminated clay to 10m. Water strike recorded at 2.8m and 4.7m. Standing water recorded at 2.2m.
SD91SW273	10m	100m NE	Borehole, April 1988. Soils recorded as loose ash, stone and brick rubble fill to 2.0m, underlain by soft silt and peat mixed with rubble to 3.0m, underlain by loose coarse sand and gravel to 3.8m, underlain by soft silty clay and peat to 4.5m, underlain by very soft/loose silt and sand to 6.1m, underlain by coarse sand with gravel and cobbles to 6.9m, underlain by stiff sandy boulder clay with occasional bands of sandy laminated clay to 10m. Water strike recorded at 3.0m and 4.5m. Standing water recorded at 3.2m.

6.3 Geological Hazards and Mining Activities

Data from various sources relating to potential geological hazards at the site are summarized below. The Hazard Potentials listed for the BGS data are as presented in the Envirocheck report, derived from various generic BGS sources, **which are not considered as site-specific**. It is important that this information is considered in context of the actual site topography, ground conditions encountered during future investigation, and development proposals.

Data Source	Hazard	Hazard Potential to Site	Remarks
BGS	Potential for Collapsible Ground Stability Hazard	Very Low	
	Potential for Compressible Ground Stability Hazard	No Hazard	Moderate risk recorded 2m south-west of the site.
	Potential for Ground Dissolution Stability Hazard	No Hazard	

Data Source	Hazard	Hazard Potential to Site	Remarks
	Potential for Landslide Ground Stability Hazard	Very Low	Low risk recorded 1m south of the site.
	Potential for Running Sand Ground Stability Hazard	Very Low	Low risk recorded 2m north of the site.
	Potential for Swelling or Shrinkage Clay Ground Stability Hazard	No Hazard	Very low risk recorded 1m south and 2m north of the site.
	Shallow Mining Hazard	Low	
	BGS recorded mineral site	Very Low	Nearest BGS recorded mineral site recorded 442m north of the site as Rock House Sand Pit. Recorded as ceased.
ARUP [Ref [12]]	Mining Instability	Moderate	The site is located within an area that may be affected by coal mining. A Coal Authority coal mining report has been obtained (see section 6.4).
CSS [Ref [13]] KURG [Ref [14]]	Underground Openings	Very Low	None recorded within 1km of the site.
PBA	Natural & Mining Cavities	Very Low	None recorded within 1km of the site.

From historic mapping the site was shown to be part of a brick works therefore, it is possible that areas has been infilled and the site may be underlain by a significant depth of Made Ground.

6.4 Coal Mining

6.4.1 Geological Mapping

From the BGS 1:10,000 scale geological mapping (sheet refs. SD91SW & SD81SE) the nearest outcropping coal seam is recorded around 0.5km south-west of the site (the Arley Coal seam), with further seams outcropping around 0.8-0.9km to the east/northeast.

6.4.2 Coal Authority Report

A Coal Authority “Consultants Coal Mining Report” has been obtained for the site (ref. 51003422219001, dated 3 May 2024) and can be found in Appendix D.

This report had not identified any mining activity within the near vicinity of the site or any evidence of investigation or remedial activity or future mining activity near the site.

6.5 Radon Risk

With reference to the Envirocheck report, UK Radon Ref [10] and BRE Radon Ref [11] guidance: the site is within an intermediate probability radon area (with 1% to 3% of homes estimated to be at or above the Action Level). However, according to the site-specific data within the Envirocheck report, no radon protection is required on this site.

6.6 Hydrology and Hydrogeology

Data from the Environment Agency and other information relating to controlled waters is summarised below.

Data		Remarks	Possible Hazard to/from Site (Y/ N)
Aquifer Designation	Superficial Deposits	Glaciofluvial Deposits - Secondary A aquifer	Y
	Bedrock	Old Lawrence Rock/Pennine Lower Coal Measures Formation - Secondary A aquifer	Y
Groundwater Vulnerability		High groundwater vulnerability. Relates to shallowest aquifer and is a function of the ability of superficial soils to transmit contaminants.	Y
Abstractions	Surface Water	The nearest surface water abstraction is listed as 152m west of the site as hydroelectric power generation. A few other surface water abstractions are listed within 1km, however, these predominantly relate to commercial/industrial uses.	N
	Groundwater	The nearest groundwater abstraction is listed as 144m east of the site as boiler feed and private water supplies (domestic). A few other groundwater abstractions are listed within 1km, however, these predominantly relate to commercial/industrial uses.	N
Source Protection Zones		The site is not located within a groundwater Source Protection Zone (SPZ).	N
Surface Watercourses		The nearest surface water feature is the River Roch, located approximately 40m to the north-west of the subject site.	Y
Groundwater Flood Risk*		The north-eastern most two thirds of the site is mapped as limited potential for groundwater flooding to occur. The south-western thirds is mapped within an area with the potential for groundwater flooding of property situated below ground level.	Y
Surface Water Flood Risk*		The site itself is not shown within an area mapped as being at risk. Water Street and Molesworth Street with a low to high risk of surface water flooding.	Y
Marine / Fluvial Flood Risk*		The site is not shown within an area mapped as being at risk.	N
Reservoir Flood Risk*		From the Gov.UK website flood mapping, the northern edge of the site is shown as being at risk, with the majority of the remainder of the site shown within an area mapped as being at risk when there is also flooding from rivers.	Y
Discharge Consents		The nearest discharge consent is listed as 51m north-west of the site as public sewage, storm sewage overflow (United Utilities Water Limited) to the River Roch.	N

** These sections are provided for information only, this report does not constitute a formal flood risk assessment and specialist advice should be sought in relation to potential flooding issues.*

The site is mapped as being underlain by superficial Glaciofluvial Deposits which are classified as a Secondary A Aquifer with high groundwater vulnerability, but is not located within a source protection zone. The underlying Old Lawrence Rock/Pennine Lower Coal Measures Formation bedrock is also classified a Secondary A Aquifer. Therefore, the site would be classed as hydrogeologically sensitive which means there is a potential risk to the site and underlying aquifer from any potentially mobile contaminants arising from either an on-site or off-site sources.

No current groundwater monitoring data is available for the subject site. Nearby BGS borehole data suggests groundwater levels are between 3-5mbgl, which would seem a reasonable estimate given the elevation of the site in relation to the River Roch approximately 40m away.

6.7 Historical Ordnance Survey Maps

Copy extracts of historical Ordnance Survey plans dating from 1851 to 2024 were obtained and are presented in Appendix F. A summary of the salient features is presented below.

The site itself has had a generally industrial land use over time. From earliest OS mapping (1851) the site is shown to comprise a print works in the north-east and the remainder of the site as part a brickfield, extending offsite to the south. By early 1890s mapping the site comprises a large warehouse building in the south-west and further building in the centre of the site labelled as 'Victoria Works (machinery)', understood to have been an iron works including a small tank along the boundary with Water Street, as well as a row of terraced houses along the north-eastern boundary fronting onto Molesworth Street. By the 1930 OS mapping, the site layout remains the same but the central building is no longer labelled as an iron works.

By the late 1950s OS mapping, the layout of the central building had changed and by the 1970s mapping, both of the larger buildings are shown as garages. The site remains generally unchanged until the 2000 aerial photography which shows the site with a warehouse style building remaining in the south-west and the remainder of the site having been cleared and in use as a car park. The building on site was removed around 2017 with the whole site becoming a car park, as the site is today, which appears to be newly resurfaced around 2020.

The area surrounding the site has had a generally commercial/industrial history with numerous works and factories being present in the near vicinity overtime including iron and brass works, timber yards, smithy's, brewery, sanitary depot, clay/sand pits and allotment gardens. From 1851 mapping to a large sand pit was also located around 115m east of the site just south of the River Roch, which appears to have been potentially infilled/partially infilled by 1891 mapping and building constructed in this location. Further quarrying/mining activities are around 220m north east of the site (northern side of the River Roch) shown from 1910 mapping to the late 1950s, understood to be for metal casting/foundries.

6.8 Environmental Databases

Data Source	Distance (m)	Direction	Details	Possible Hazard to Site (Y/N)
Historical Industrial Land Use (within 250m)	0	SW	Clay brick & tiles manufacture (1851)	Y
	45	S	Factory or works – use not specified (1889)	Y
	61	NE	Factory or works – use not specified (1910)	Y
	106	SE	Factory or works – use not specified (1889)	Y
	113	N	Natural and man-made textile manufacture and products (1851)	Y
	115	E	Quarrying of sand and clay, operation of sand and gravel pits (1851)	Y
	122	NE	Refuse disposal (1894-1956)	Y
	190	NW	Road haulage (1993)	N
	217	NE	Metal casting/foundries (1910-1956)	N
	244	SE	Factory or works – use not specified (1889)	N
Contemporary Trade Directory Entries (within 100m)	11	E	Car Dealers (inactive)	N
	18	S	Recycling service / scrap metal merchants (active)	Y

Data Source		Distance (m)	Direction	Details	Possible Hazard to Site (Y/N)
		34	W	Car dealers (inactive)	N
		34	W	Garage services (active)	Y
		46	N	Car dealers (inactive)	N
		46	N	Car dealers (active)	N
		59	E	Car dealers (inactive)	N
		69	S	Cleaning materials & equipment (active)	N
		72	S	Textile manufacturing (inactive)	N
		75	S	Car dealers (inactive)	N
		75	S	Gearboxes (inactive)	N
		79	N	Tyre dealers (inactive)	N
		83	SE	Commercial vehicle servicing, repairs, parks and accessories (inactive)	N
		84	SE	Car dealers (inactive)	N
Current and Historical Landfills (within 500m)		270	E	Waithlands – recorded as depositing waste including inert, industrial, commercial, household waste and liquid sludge (31/12/1922 to 07/07/1985).	N
Potentially Infilled Land (within 250m)	Water	149	W	Unknown filled ground (1956)	N
		223	W	Unknown filled ground (1910)	N
	Non-water	0	SW	Unknown filled ground (1989)	Y
		115	E	Unknown filled ground (1989)	N
Fuel Sites (within 250m)		204	SE	Tcs Molesworth Street – obsolete	N
Pollution Incidents (within 250m)		49	NE	Category 3 minor incident (March 1995) to River Roch, - no pollution found.	N
		52	NE	Category 3 minor incident (October 1995) to River Roch due to blocked sewer,- rubble, litter or solids	N
		112	N	Category 3 minor incident (March 1995) to River Roch - rubble, litter or solids	N
		139	E	Category 3 minor incident (July 1995) to River Roch - miscellaneous natural pollutant.	N
		140	E	Category 2 significant incident (November 1993) to River Roch – diesel (including agricultural).	N
		145	E	Category 3 minor incident (July 1994) to groundwater - unknown pollutant.	N
		146	E	Category 3 minor incident (April 1996), receiving water not given – fire water run-off.	N
		164	NW	Category 3 minor incident (November 1995), receiving water not given - unknown pollutant.	N
IPPC/LAPPC Authorisations (within 250m)		95	SE	LAAPC – PG6/29 Di-isocyanate processes.	N
		158	SE	LAAPC – PG6/23 coating of metal and plastic.	N

Data Source	Distance (m)	Direction	Details	Possible Hazard to Site (Y/N)
	204	SE	LAAPC – PG1/14 petrol filling station.	N
	235	NE	LAAPC – PG2/4 iron, steel and non-ferrous metal foundry processes.	N
	235	NE	LAAPC – PG2/3 electrical and rotary furnaces.	N
	236	SE	LAAPC – PG2/4 iron, steel and non-ferrous metal foundry processes.	N
Hazardous Substances Consents	None recorded within 500m of the site			N
Sensitive Land Uses	None recorded within 500m of the site			N

From the environmental database search a few potential sources of contamination have been identified on site and in the near vicinity. From the Envirocheck report and historic OS mapping the site is recorded to have previously been used for a number of uses, including for clay, brick and tile manufacturer, print works, iron works and garages, and the site is currently used as a car park.

The site is indicated to have been part of a brick field (extending off-site to the south), which would likely have been excavated and has potentially been infilled with unknown fill materials and this is considered a source of a range of contaminants, which could migrate to the site through groundwater but also a source of ground gases.

Numerous current and historic commercial/industrial activities have also been recorded both onsite and in the near vicinity which would be considered significant sources of contamination in terms of heavy metals, PAHs, VOCs and petroleum hydrocarbons.

The proposed end use of the site is commercial (and predominantly comprises building/hardstanding), so not particularly sensitive in terms of the end-user. Despite the contamination risk identified, there is considered a potential risk to site workers during the groundwork stages of the construction/development and also a risk to proposed services, structures and the underlying aquifers.

6.9 Planning Application History

A search of the Rochdale Metropolitan Borough Council planning website identified a number of planning applications for the subject site which are outlined in the table below.

(<https://publicaccess.rochdale.gov.uk/online-applications/>, accessed 8th May 2024).

Application Number	Application Date	Proposal Details / Comments	Decision
79/D08150	Not available	Motor vehicle show room alongside existing garage and petrol filling station to provide manufacturers agency for new vehicles	Not available
80/D10807	Not available	Extension to fascia to showroom and hand carwash unit facility	Not available
81/D13287	Not available	Use of building as parts and spares department and vehicle display in connection with adjoining repair garage and car showroom and use of land for vehicle parking	Not available
90/D24806	Feb 1990	Showroom extension	Grant subject to conditions
98/D35655	July 1998	Erection of food store and video library rental store	Withdrawn

Application Number	Application Date	Proposal Details / Comments	Decision
13/00797/FUL	July 2013	Change of use of land to form car park including the demolition of former carcraft buildings	Grant subject to conditions
13/00798/ADV	July 2013	Erection of 13 non illuminated advertisement hoardings to south and west boundaries of the former carcraft site	Refuse
13/01109/ADV	Oct 2013	Installation of one non-illuminated advertisement hoarding (Resubmission of 13/00798/ADV)	Grant subject to conditions
14/00584/ADV	May 2014	One non-illuminated advertisement hoarding (Retrospective)	Granted

The above applications suggest the site has a long history as a car garage/dealership and planning application 79/D08150 suggest the site may have been used as a petrol filling station. Therefore it is possible that there may be have been buried fuel tanks and if so these may remain beneath the site and may represent a risk of hydrocarbon contamination.

A petroleum licencing search has been requested from Rochdale Borough Council, however, at the time of writing, the results of this have not been received and an updated report will be issued in due course.

Other planning application viewed for neighbouring land are generally for extensions, alterations and refurbishments to existing buildings/plots and do not indicate any further significant potential sources of contaminations.

6.10 Petroleum Licencing Search

A petroleum licencing search (ref. PE1003693), from Greater Manchester Fire and Rescue Service, was undertaken for the site. The full correspondence can be found in Appendix E but a summary is provided below.

The Authority reviewed the site historical files and records for any past or current licensed storage of petroleum within the site, but the review did not identify any evidence that petroleum spirit was stored at this address.

However, if whilst undertaking future works it becomes apparent to contractors that above or underground petroleum tanks are present, the Authority must be informed immediately.

6.11 Ground Gas Risk

The site itself and the area immediately to the south-eastern boundary is listed as being an area of potentially infilled ground (non-water) it is assumed this is associated with the historic brick field located on site and brick field/sand pit located to the south-east. Depending on its composition and depth, the made ground beneath the site or beneath the adjacent land could be a potential source of land gases.

In addition, there are three other areas of potentially infilled land recorded within 250m of the site. The nearest of these is located 115m east and is related to historic sand, gravel and clay pits which have been potentially infilled in the late 1980s. Given the relatively large size of the pits and the potential for a significant depth of unknown fill material this is also considered a potential source of ground gases.

The other two areas of potentially infilled land (water) are appear to be related to a small channel (goit) located adjacent to the River Roch and a small pond. Given their small size and distance from the site these features are not considered to pose a significant risk to the proposed site.

Similarly, an historic landfill approximately 270m east of the site (Waithlands) which was active between 1922 and 1985 and is recorded to have deposited waste including inert, industrial, commercial, household waste and liquid sludge. Given the distance from the site (ie. >250m) this is not considered to be a credible source of ground gases at the site.

Based on the above there is considered to be a potential risk from land gases at the subject site and, therefore, gas monitoring should be carried out during any future ground investigation to determine the risk on site and if any mitigation measures are required.

6.12 UXO Risk Management

A preliminary UXO risk assessment has been prepared by 1st Line Defence (ref PA19968-00) and a copy can be found in Appendix C. The assessment was made with specific regard to the proposed investigation works/site works and its conclusions may not be appropriate to other activities.

The report indicated that during WWII the site was within an area which sustained an overall very low density of bombing according to official Home Office bombing statistic, with just 4 HE bombs recorded within the Country Borough of Rochdale. The report suggest that no evidence could be found at this preliminary stage to suggest that these four bombs were located within close proximity of the site.

This report has concluded that the risk of UXO is not considered to be higher than the 'background risk' of finding UXO in this part of the UK. It is recommended that no further action is required.

The possibility of unexploded ordnance (UXO) being encountered on a site falls within the category of a potentially significant risk and should be addressed as a legal duty under the Construction (Design and Management) Regulations by the Client as early as possible in a project.

The CIRIA publication C681 Ref [15] has been developed to provide a consistent framework for the management of potential risks posed by UXO during site investigation and groundwork phases of construction. The process adopts a tiered approach, divided into four distinct stages; Preliminary risk assessment, Detailed risk assessment, Risk mitigation and Implementation.

7 Site Walkover Survey

At site walkover was carried out on 9th May 2024.

7.1 General Site Description and Boundaries

The site is located on the southern side of the junction of Water Street and Molesworth Street. The northern part of the site is used by a Kia car dealership for parking cars. There is a 'Webuyanycar' office/cabin towards the centre of the northern boundary. The remainder of the site is used for car parking. The whole site is covered with blacktop hardstanding which appears to be in good condition. To the south of the site is a stone retaining wall, perpendicular to which is a brick built structure, which is in poor condition, with a door leading into the bank (possibly associated with one of the historical uses of the site).

7.2 Topography and Drainage

The site generally slopes towards the north and the east in some parts, with level differences of 5m+ from the south, falling towards the north/north-east.

In the southern part of the site, the car parking is on two different levels separated by a steep wooded bank and in parts a brick/stone retaining wall (approximately 3m high). Parts of the retaining wall are noted to be in poor condition.

7.3 Vegetation

The site is heavily vegetated around the site boundary along the south with numerous semi-mature to mature trees and there are also some overgrown banks between the car park to the south and towards the east of the site, including a number of semi-mature trees.

7.4 Buildings and Land Use on Site and Nearby

The site itself, is currently used by a car dealership and as a car park, with no buildings present on site.

The site is located within a generally industrial/commercial/retail area with various warehouses, a retail park, factories and car dealerships. A scrap metal company is also located along the western half of the southernmost boundary of the site.

7.5 Inaccessible Site Areas

Most areas of the site were accessible during the site walkover, however, due to dense vegetation some areas were not easily visible.

7.6 Site Photographs

A series of photographs showing the site is included in Appendix B.

C PRELIMINARY SITE MODELS

8 Conceptual Engineering Geological Ground Model

From the desk study information and walkover undertaken at this site the following conceptual ground model has been formulated.

Data Source	Comments
Geology	The mapped geology at the site indicates superficial Glaciofluvial Deposits over Old Lawrence Rock and Pennine Lower Coal Measures Formation. Superficial Till deposits and Alluvial deposits are also mapped within close vicinity to the site. Some areas of made ground are considered likely, due to both the previous use for brick/tile manufacture (which could have included excavations) and apparent numerous redevelopment of the site with various buildings/structures. An intrusive ground investigation should be carried out to confirm the soil conditions beneath the site and provide parameters for foundation design.
Former Site Use	The site has a history of generally commercial/industrial land uses, including a clay brick and tile manufacturer, print works, iron works, garages and possibly a fuel filling station, and the site is currently used as a car park. Based on the site history, it is known that a brick field was present on and around the site which was likely to have included excavations which may have been infilled with unknown materials. Therefore, it is possible that the site may be underlain by a significant depth of Made Ground, which may provide low bearing capacities and provide issues with differential settlement. It is not recommended for new foundations to be placed within Made Ground materials. In addition, due to past developments and underground services there is the potential to encounter numerous sub-surface structures/obstructions beneath the site and a number of former site uses could have resulted in contamination of both soils and groundwater. If the site was used a fuel filling station, then it is possible that there may have been underground fuel tanks, which may still be in-situ.
Groundwater	The superficial and bedrock geologies mapped across the site are classified as Secondary A Aquifers and the site is recorded to have a high groundwater vulnerability, however the site is not located within a source protection zone. The depth of groundwater on site is unknown. No site specific groundwater monitoring has been carried out at this stage.
Surface Water	The nearest surface water feature is the River Roch located 42m north of the site. Surface water disposal should be carefully considered within the design.
Potential Geo-hazards	A significant depth of made ground may be encountered at the site, which may have low/variable bearing capacities and may be prone to differential settlement, evidence of which was noted across the car parking area. Possible shrinkage/swelling for clay soils within the superficial deposits, where present. Superficial sand and gravel soils or soft clays are prone to significant instability in open excavations. Additionally, very dense soils could prove difficult to penetrate during piling works. It is also possible that running sand might be experienced. There is the potential to encounter sub-surface structures beneath the site, associated with past developments. Numerous utility covers were observed on or adjacent to the site.
Other Comments	A Low UXO Risk has been determined for the site.

On the basis of the available information the geotechnical categorization for the proposed structure(s) is considered to fall within Geotechnical Category 2 – Conventional structure with no exceptional risk or difficult ground or loading conditions; Eurocode 7 Ref [16].

9 Conceptual Site Model

In the context of this report, the conceptual model summarises the potential pollutant linkages identified for the site and forms the basis of the risk assessment for the site. The preliminary model comprises the potential sources of contamination, receptors that could be harmed and exposure pathways identified from the desk study and walkover survey. These potential linkages form the basis upon which the investigation is designed and reported.

9.1 Potential Sources of Contamination

The site has a history of commercial/industrial land use and is located within an industrial/residential area.

A number of potentially contaminative uses have been identified, both on site and in the locality.

9.1.1 On-Site Sources

Potential Source	Potential Contaminants
Made Ground from past development/redevelopment of the site and infilled historic brick field	Heavy metals, asbestos, petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAH compounds), and possible land gases.
Historic Print Works	Heavy metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAH compounds), volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs)
Historic Works/Factory	Heavy metals, petroleum hydrocarbons and polycyclic aromatic hydrocarbons (PAH compounds)
Historic Garage (potentially including a fuel filling station)	Heavy metals, petroleum hydrocarbons and polycyclic aromatic hydrocarbons (PAH compounds)
Parked Cars	Petroleum Hydrocarbons

As with any previously developed site, it is possible that the site is underlain by Made Ground. Such material may contain a wide range of contaminant, arising from the site itself or possibly from off-site sources where materials/soils have been imported onto the site. Given the site was formerly part of a brick works which has potentially been infilled with unknown materials, it is possible that a significant depth of Made Ground is present beneath the site. Depending on its composition, any deep made ground beneath the site could also be a potential source of land gases.

The site land use formerly included garages and potentially a fuel filling station. It is likely that spillages of liquids, fuels and chemicals may have occurred, but there is also risk of contamination from the inappropriate disposal of residues or faulty products and from the storage of materials. It is possible buried underground tanks may have been associated with the petrol filling station but at this stage we do not have any records of their presence on site, their condition or any decommissioning. A petroleum licencing search, from Greater Manchester Fire and Rescue Service, did not identify any evidence that petroleum spirit was stored at this address. This land uses can be considered potential source of contamination including heavy metals, petroleum hydrocarbons and PAH compounds.

The most recent site use has been for car parking, therefore there is the potential for small, localised oil or fuel leaks/spills. The car parking area is hard covered and any contamination due to this source is likely to be minor and localised.

Considering the proposed development appears to be largely hard covered it is not considered likely there would be any direct contact of significant contamination with the proposed end users. However, there is a potential risk to site workers during any groundwork stages of the development and also a risk to proposed underground services, structures and the underlying aquifers. The risk to the subject site from historic and current land uses is considered low to moderate at this stage in the context of the continued commercial use proposed.

In addition, considering the site history (including brick/tile manufacture), there could potentially be infilled ground with a significant depth of Made Ground beneath the site, therefore there is considered to be a potential risk from ground gases depending on the nature of the materials present.

9.1.2 Off-Site Sources

The site may be impacted by contamination migrating from beyond the site boundary. The following potential off-site sources have been identified.

Potential Source	Distance from Site Boundary	Direction	Potential Contaminants	Likely hazard to Site
Various commercial/industrial land uses (including brick works, iron/brass works, timber yard, smithy's, brewery, garages, joinery works)	0m+	All	Heavy metals, petroleum hydrocarbons, PAH compounds, VOCs/SVOCs.	Low to moderate
Scrap metal works (historic & current)	0m	S	Heavy metals, petroleum hydrocarbons, PAH compounds	Low
Allotments	0m	S	Heavy metals, Herbicides/pesticides	Negligible to very low
Potentially infilled land	0-115m	South & South-east	Heavy metals, petroleum hydrocarbons, PAH compounds, land gases	Low to moderate

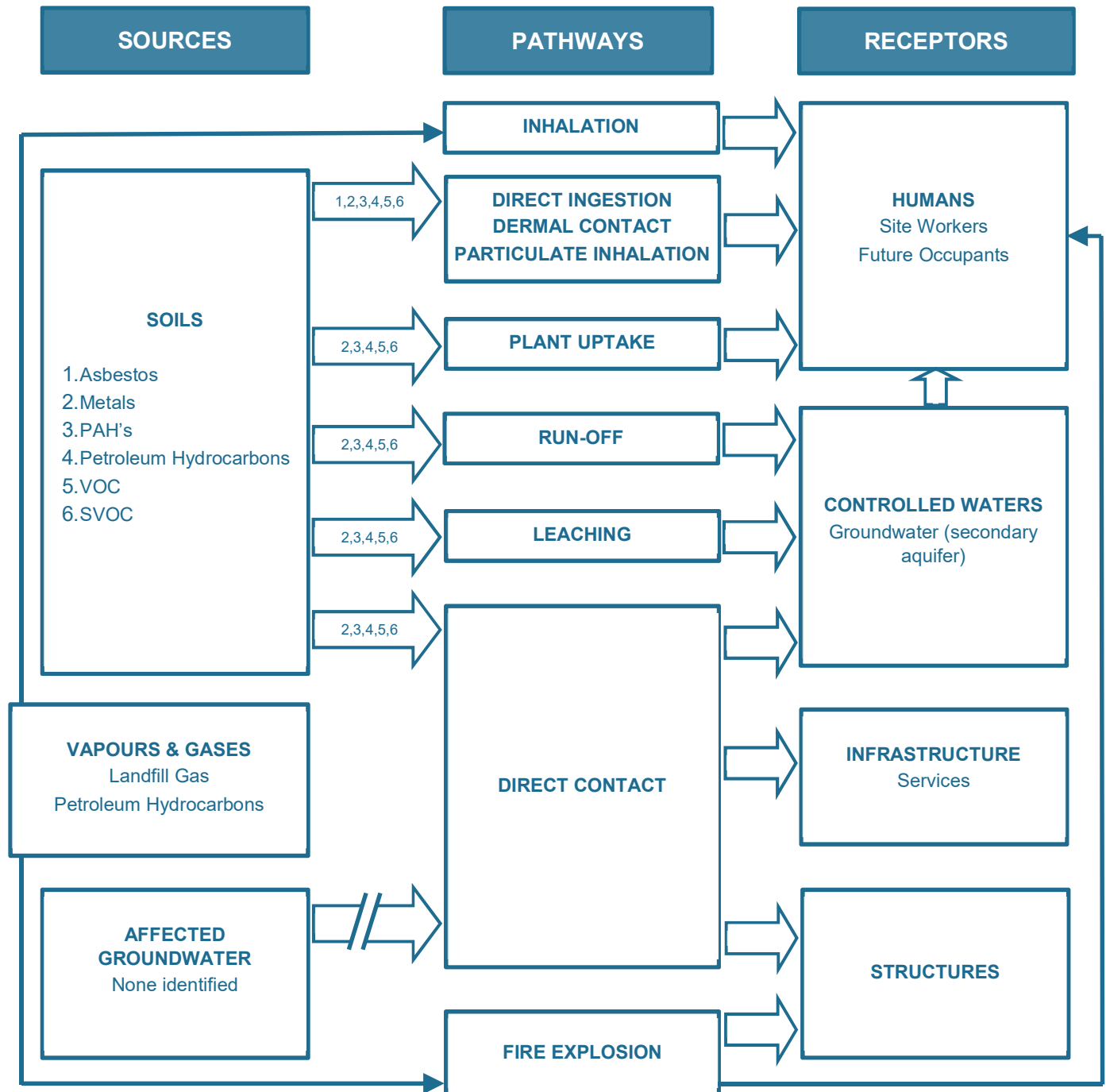
Historically, there have been various commercial/industrial land uses in the surrounding area. These land uses are considered potential sources of potentially mobile contamination. The site is anticipated to be underlain by potentially permeable soil, in places, which means there is a potential pathway for contaminants arising from these sources to migrate on to the subject site.

In the late 1950s there were allotment gardens adjacent to the southern-most site boundary. It is possible that herbicides/pesticides could have been used or stored on the site, although these are likely to be in relatively small quantities and considered a low risk at this stage.

In addition, there is an area of potentially infilled land adjacent to the southern boundary and a further area located 115m east, related to historic sand, gravel and clay pits. Given the relatively large size of the pits and the potential for a significant depth of unknown fill material this is also considered a potential source of ground gases as well as a range of general contaminants which could migrate to the site.

9.2 Pollutant Linkages and Conceptual Site Model Summary

The following diagram shows the potential pollutant linkages identified for the site and summarises the preliminary conceptual model:



// Denotes potential pollutant linkage not complete.

10 Conclusions and Recommendations

The site is currently a car parking area and it is proposed to construct a new McDonalds, together with associated car parking and a drive-thru lane. There are areas of proposed soft landscaping around the perimeter of the site.

Based on the Desk Study search and walkover survey carried out on the site, the overall risk of on-site contamination associated with both historical and current land use is considered low to moderate, in the context of the proposed commercial use of the site. Furthermore, the risk of off-site contamination migrating on to the subject site from contemporary sources is also considered low to moderate.

Where there is proposed hard covering (i.e. parking, buildings etc.) there would not be any direct contact of contamination with proposed end users as the Source-Pathway-Receptor pollutant linkage is broken by the permanent hard barrier. Where soft landscaping is proposed there is considered to be a potential pathway to the proposed end users.

There is also a potential risk to site workers during the groundwork stages of the development and also a risk to proposed services, structures and the underlying aquifers.

A Phase II intrusive investigation is recommended to assess the contamination risk for the site. In order to assess the risk it is recommended that the investigation includes sampling and testing of any Made Ground, the underlying natural soils and groundwater. Chemical analysis, including asbestos screening, of the samples should be carried out in order to determine the nature and extent of any contamination on the site, and whether there is a need for any remedial works or additional assessment. In addition, the laboratory testing should be used to determine waste classifications etc. The intrusive investigation can be integrated to include assessment for both geotechnical design purposes if required.

A potential risk from ground gases has also been identified due to potentially infilled land both onsite and in the near vicinity. Therefore, ground gas monitoring should be carried out within the location of the building to better assess the gas risk.

A planning application search indicated that the site may have been used as a petrol filling station which means it is possible that there may have been buried fuel tanks and if so these may remain beneath the site and may represent a risk of hydrocarbon contamination. A petroleum licencing search, from Greater Manchester Fire and Rescue Service, did not identify any evidence that petroleum spirit was stored at this address.

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- [15] CIRIA, "C681 Unexploded Ordnance (UXO) A guide for the construction industry," 2009.
- [16] BSI Standards, "Eurocode 7 Geotechnical Design," 2013.

Appendix B
Drainage Calculations

Calculated by: Kevin Jackson

Site name: Molesworth Street

Site location: Rochdale

Site Details

Latitude: 53.61672° N

Longitude: 2.15077° W

Reference: 2868015106

Date: Jul 22 2024 13:50

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

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 0.282

Methodology

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

SPR estimation method: Calculate from SOIL type

Notes

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

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

Soil characteristics

	Default	Edited
SOIL type:	4	5
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.53

(2) Are flow rates $< 5.0 \text{ l/s}$?

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

Hydrological characteristics

	Default	Edited
SAAR (mm):	1156	1156
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

(3) Is $\text{SPR/SPRHOST} \leq 0.3$?

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

Greenfield runoff rates	Default	Edited
-------------------------	---------	--------

Q_{BAR} (l/s):	2.45	3.18
1 in 1 year (l/s):	2.13	2.76
1 in 30 years (l/s):	4.16	5.4
1 in 100 year (l/s):	5.09	6.61
1 in 200 years (l/s):	5.8	7.53

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

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location GB 390119 413336 SD 90119 13336	
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	5.675	0.410	13.8	0.007	5.00	0.0	0.600		o	150	Pipe/Conduit	
S1.001	4.985	0.041	121.6	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.002	10.029	0.083	120.8	0.000	0.00	0.0		0.075	o	150	Pipe/Conduit	
S1.003	3.098	0.025	123.9	0.036	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.004	6.246	0.031	201.5	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S1.005	25.599	0.129	198.4	0.000	0.00	0.0		0.075	o	225	Pipe/Conduit	
S1.006	6.934	0.035	198.1	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.03	123.050	0.007	0.0	0.0	0.0	2.72	48.1	0.9
S1.001	50.00	5.13	122.640	0.007	0.0	0.0	0.0	0.91	16.1	0.9
S1.002	50.00	6.36	122.599	0.007	0.0	0.0	0.0	0.14	2.4	0.9
S1.003	50.00	6.41	122.515	0.043	0.0	0.0	0.0	0.90	15.9	5.8
S1.004	50.00	6.53	122.415	0.043	0.0	0.0	0.0	0.92	36.5	5.8
S1.005	50.00	9.60	122.309	0.043	0.0	0.0	0.0	0.14	5.5«	5.8
S1.006	50.00	9.72	122.255	0.043	0.0	0.0	0.0	0.93	36.8	5.8

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Network Design Table for Storm												
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.007	15.873	0.105	151.2	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S2.000	1.972	1.610	1.2	0.124	5.00	0.0	0.600		o	150	Pipe/Conduit	
S1.008	0.762	0.005	152.4	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S3.000	9.225	0.230	40.1	0.008	5.00	0.0	0.600		o	100	Pipe/Conduit	
S3.001	7.885	0.067	117.7	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S3.002	3.362	0.028	120.1	0.018	0.00	0.0	0.600		o	150	Pipe/Conduit	
S3.003	28.214	0.240	117.6	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S4.000	5.722	0.445	12.9	0.016	5.00	0.0	0.600		o	100	Pipe/Conduit	
S5.000	3.427	0.070	49.0	0.036	5.00	0.0	0.600		o	150	Pipe/Conduit	
S5.001	7.513	0.075	100.2	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S3.004	12.203	0.872	14.0	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S6.000	10.030	1.352	7.4	0.008	5.00	0.0	0.600		o	100	Pipe/Conduit	
S3.005	17.877	1.278	14.0	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
Network Results Table												
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)		
S1.007	50.00	9.97	122.220	0.043	0.0	0.0	0.0	1.06	42.2	5.8		
S2.000	50.00	5.00	123.800	0.124	0.0	0.0	0.0	9.18	162.3	16.8		
S1.008	50.00	9.98	122.115	0.167	0.0	0.0	0.0	1.06	42.0	22.6		
S3.000	50.00	5.13	124.950	0.008	0.0	0.0	0.0	1.22	9.6	1.1		
S3.001	50.00	5.27	124.670	0.008	0.0	0.0	0.0	0.93	16.4	1.1		
S3.002	50.00	5.33	124.603	0.026	0.0	0.0	0.0	0.92	16.2	3.5		
S3.003	50.00	5.84	124.575	0.026	0.0	0.0	0.0	0.93	16.4	3.5		
S4.000	50.00	5.04	124.830	0.016	0.0	0.0	0.0	2.17	17.0	2.2		
S5.000	50.00	5.04	124.020	0.036	0.0	0.0	0.0	1.44	25.5	4.9		
S5.001	50.00	5.16	123.950	0.036	0.0	0.0	0.0	1.00	17.7	4.9		
S3.004	50.00	5.89	124.260	0.078	0.0	0.0	0.0	3.52	139.8	10.6		
S6.000	50.00	5.06	124.865	0.008	0.0	0.0	0.0	2.86	22.4	1.1		
S3.005	50.00	5.98	123.388	0.086	0.0	0.0	0.0	3.52	139.8	11.6		
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Micro Drainage

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S7.000	6.554	1.174	5.6	0.005	5.00	0.0	0.600		o	100	Pipe/Conduit	
S8.000	7.749	1.754	4.4	0.018	5.00	0.0	0.600		o	100	Pipe/Conduit	
S7.001	1.066	0.191	5.6	0.000	0.00	0.0	0.600		o	100	Pipe/Conduit	
S1.009	10.192	0.070	145.6	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S1.010	22.142	0.180	123.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.011	1.848	0.015	123.2	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.012	3.428	0.100	34.3	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.013	1.114	0.010	111.4	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S7.000	50.00	5.03	123.550	0.005	0.0	0.0	0.0	3.29	25.9	0.7
S8.000	50.00	5.03	124.130	0.018	0.0	0.0	0.0	3.71	29.1	2.4
S7.001	50.00	5.04	122.376	0.023	0.0	0.0	0.0	3.30	25.9	3.1
S1.009	50.00	10.14	122.110	0.276	0.0	0.0	0.0	1.08	43.0	37.4
S1.010	50.00	10.55	122.040	0.276	0.0	0.0	0.0	0.90	16.0	37.4
S1.011	50.00	10.58	121.860	0.276	0.0	0.0	0.0	0.90	16.0	37.4
S1.012	50.00	10.62	121.845	0.276	0.0	0.0	0.0	1.73	30.5	37.4
S1.013	50.00	10.64	121.745	0.276	0.0	0.0	0.0	0.95	16.8	37.4

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.013	SCombind MH	124.000	121.735	121.735	150	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

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Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 390119 413336 SD 90119 13336
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.950
Cv (Winter)	0.950
Storm Duration (mins)	30

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Online Controls for Storm

Orifice Manhole: S03, DS/PN: S1.007, Volume (m³): 3.2

Diameter (m) 0.125 Discharge Coefficient 0.600 Invert Level (m) 122.220

ACO Q-Brake Manhole: S10 Flow Control, DS/PN: S1.010, Volume (m³): 3.4

Design Head (m) 2.375 Diameter (mm) 73
Design Flow (l/s) 3.2 Invert Level (m) 122.040

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.8	1.200	2.3	3.000	3.6	7.000	5.6
0.200	2.6	1.400	2.5	3.500	3.9	7.500	5.8
0.300	3.1	1.600	2.7	4.000	4.2	8.000	5.9
0.400	3.2	1.800	2.8	4.500	4.5	8.500	6.1
0.500	2.9	2.000	3.0	5.000	4.7	9.000	6.3
0.600	2.2	2.200	3.1	5.500	4.9	9.500	6.5
0.800	1.9	2.400	3.3	6.000	5.1		
1.000	2.1	2.600	3.4	6.500	5.4		

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Date 05/12/2024 15:51 File 4230334 SW Network v3_0...	Designed by K Jackson Checked by													
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Storage Structures for Storm Complex Manhole: SAtt1 In, DS/PN: S1.002 Filter Drain Infiltration Coefficient Base (m/hr) 0.00000 Pipe Diameter (m) 0.150 Infiltration Coefficient Side (m/hr) 0.00000 Pipe Depth above Invert (m) 0.000 Safety Factor 2.0 Number of Pipes 1 Porosity 0.30 Slope (1:X) 200.0 Invert Level (m) 122.599 Cap Volume Depth (m) 0.000 Trench Width (m) 1.0 Cap Infiltration Depth (m) 0.000 Trench Length (m) 10.0 Cellular Storage Invert Level (m) 123.339 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><tr><td>Depth (m)</td><td>Area (m²)</td><td>Inf. Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td><td>Inf. Area (m²)</td></tr><tr><td>0.000</td><td>46.0</td><td>0.0</td><td>0.360</td><td>46.0</td><td>0.0</td></tr></table> Porous Car Park Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 5.0 Membrane Percolation (mm/hr) 1000 Length (m) 50.0 Max Percolation (l/s) 69.4 Slope (1:X) 200.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 124.299 Cap Volume Depth (m) 0.500 Complex Manhole: SAtt2 In, DS/PN: S1.005 Filter Drain Infiltration Coefficient Base (m/hr) 0.00000 Pipe Diameter (m) 0.225 Infiltration Coefficient Side (m/hr) 0.00000 Pipe Depth above Invert (m) 0.000 Safety Factor 2.0 Number of Pipes 1 Porosity 0.30 Slope (1:X) 200.0 Invert Level (m) 122.384 Cap Volume Depth (m) 0.000 Trench Width (m) 1.0 Cap Infiltration Depth (m) 0.000 Trench Length (m) 22.4 Cellular Storage Invert Level (m) 122.570 Infiltration Coefficient Side (m/hr) 0.00000 Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	46.0	0.0	0.360	46.0	0.0
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)									
0.000	46.0	0.0	0.360	46.0	0.0									
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Boundary Way	Rochdale Molesworth St																									
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Cellular Storage Porosity 0.95 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>89.6</td><td>0.0</td><td>1.080</td><td>89.6</td><td>0.0</td></tr></tbody></table> Cellular Storage Manhole: SJnctn 1, DS/PN: S1.008 Invert Level (m) 122.115 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>28.2</td><td>0.0</td><td>1.080</td><td>28.2</td><td>0.0</td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	89.6	0.0	1.080	89.6	0.0	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	28.2	0.0	1.080	28.2	0.0
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)																					
0.000	89.6	0.0	1.080	89.6	0.0																					
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)																					
0.000	28.2	0.0	1.080	28.2	0.0																					
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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 3

Number of Online Controls 2

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH

FEH Rainfall Version 2013

Site Location GB 390119 413336 SD 90119 13336

Data Type Point

Cv (Summer) 0.950

Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 150.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status ON

DVD Status ON

Inertia Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years) 2, 30, 100

Climate Change (%) 0, 0, 30

PN

US/MH Name

Storm

Return Period

Climate Change

First (X) Surge

First (Y) Flood

First (Z) Overflow

Overflow Act.

S1.000

SChannel 1

15 Summer

2

+0%

100/60 Summer

S1.001

S01

480 Summer

2

+0%

30/30 Summer

S1.002

SAtt1 In

480 Summer

2

+0%

30/30 Summer

S1.003

SAtt1 Out

480 Summer

2

+0%

2/120 Summer

S1.004

S02

480 Summer

2

+0%

2/120 Summer

S1.005

SAtt2 In

480 Summer

2

+0%

2/30 Summer

S1.006

SAtt2 Out

240 Summer

2

+0%

2/15 Summer

S1.007

S03

240 Summer

2

+0%

2/15 Summer

S2.000

SChannel 2

15 Summer

2

+0%

100/15 Summer

S1.008

SJnctn 1

240 Summer

2

+0%

2/15 Summer

S3.000

SRWP 1

15 Summer

2

+0%

S3.001

S04

15 Summer

2

+0%

100/15 Summer

S3.002

SJnctn 2

15 Summer

2

+0%

100/15 Summer

S3.003

S05

15 Summer

2

+0%

100/15 Summer

S4.000

S06

15 Summer

2

+0%

S5.000

S15

15 Summer

2

+0%

2/1

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SChannel 1	123.067	-0.133	0.000	0.03		1.1	OK	
S1.001	S01	122.706	-0.084	0.000	0.02		0.3	OK	
S1.002	SAtt1 In	122.706	-0.043	0.000	0.11		0.3	OK	
S1.003	SAtt1 Out	122.706	0.041	0.000	0.16		1.7	SURCHARGED	
S1.004	S02	122.705	0.065	0.000	0.05		1.5	SURCHARGED	
S1.005	SAtt2 In	122.705	0.171	0.000	0.29		1.6	SURCHARGED	
S1.006	SAtt2 Out	122.728	0.248	0.000	0.06		1.6	SURCHARGED	
S1.007	S03	122.736	0.291	0.000	0.04		1.6	SURCHARGED	
S2.000	SChannel 2	123.851	-0.099	0.000	0.25		19.7	OK	
S1.008	SJctn 1	122.770	0.430	0.000	0.10		3.0	SURCHARGED	
S3.000	SRWP 1	124.975	-0.075	0.000	0.14		1.3	OK	
S3.001	S04	124.700	-0.120	0.000	0.09		1.3	OK	
S3.002	SJctn 2	124.664	-0.089	0.000	0.34		3.6	OK	
S3.003	S05	124.624	-0.101	0.000	0.23		3.7	OK	
S4.000	S06	124.858	-0.072	0.000	0.17		2.5	OK	
S5.000	S15	124.333	0.163	0.000	0.34		5.6	SURCHARGED	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S5.001	S16	15 Summer	2	+0%	2/15 Summer		
S3.004	S08	15 Summer	2	+0%			
S6.000	SRE 1	15 Summer	2	+0%			
S3.005	SJnctn 3	15 Summer	2	+0%	100/15 Summer		
S7.000	SChannel 3	15 Summer	2	+0%	100/15 Summer		
S8.000	SKerb 2	15 Summer	2	+0%	100/60 Summer		
S7.001	SJnctn 4	240 Summer	2	+0%	2/15 Summer		
S1.009	S09	240 Summer	2	+0%	2/15 Summer		
S1.010	S10 Flow Control	240 Summer	2	+0%	2/15 Summer		
S1.011	S11	960 Summer	2	+0%			
S1.012	SPI In	240 Winter	2	+0%			
S1.013	SPI Out	1440 Winter	2	+0%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Pipe Flow / Overflow Flow Cap. (l/s)	Pipe Flow (l/s)
S5.001	S16		124.324	0.224	0.000	0.37	5.7
S3.004	S08		124.308	-0.177	0.000	0.10	11.9
S6.000	SRE 1		124.881	-0.084	0.000	0.06	1.3
S3.005	SJnctn 3		123.437	-0.176	0.000	0.10	13.1
S7.000	SChannel 3		123.562	-0.088	0.000	0.03	0.8
S8.000	SKerb 2		124.152	-0.078	0.000	0.11	2.9
S7.001	SJnctn 4		122.772	0.296	0.000	0.09	1.0
S1.009	S09		122.772	0.437	0.000	0.10	3.5
S1.010	S10 Flow Control		122.774	0.584	0.000	0.21	3.1
S1.011	S11		121.915	-0.095	0.000	0.29	3.1
S1.012	SPI In		121.885	-0.110	0.000	0.16	3.1
S1.013	SPI Out		121.800	-0.095	0.000	0.29	3.1

PN	US/MH Name	Status	Level Exceeded
S5.001	S16	SURCHARGED	
S3.004	S08	OK	
S6.000	SRE 1	OK	
S3.005	SJnctn 3	OK	
S7.000	SChannel 3	OK	
S8.000	SKerb 2	OK	
S7.001	SJnctn 4	SURCHARGED	
S1.009	S09	SURCHARGED	
S1.010	S10 Flow Control	SURCHARGED	
S1.011	S11	OK	
S1.012	SPI In	OK	
S1.013	SPI Out	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SChannel 1	123.105	-0.095	0.000	0.01		0.4	OK	
S1.001	S01	123.105	0.315	0.000	0.03		0.4	SURCHARGED	
S1.002	SAtt1 In	123.105	0.356	0.000	0.14		0.3	SURCHARGED	
S1.003	SAtt1 Out	123.104	0.439	0.000	0.19		2.0	SURCHARGED	
S1.004	S02	123.104	0.464	0.000	0.07		2.0	SURCHARGED	
S1.005	SAtt2 In	123.104	0.570	0.000	0.28		1.6	SURCHARGED	
S1.006	SAtt2 Out	123.313	0.833	0.000	0.07		1.9	SURCHARGED	
S1.007	S03	123.340	0.895	0.000	0.05		1.9	SURCHARGED	
S2.000	SChannel 2	123.882	-0.068	0.000	0.58		45.9	OK	
S1.008	SJctn 1	123.471	1.131	0.000	0.07		2.1	SURCHARGED	
S3.000	SRWP 1	124.990	-0.060	0.000	0.33		3.0	OK	
S3.001	S04	124.730	-0.090	0.000	0.22		3.1	OK	
S3.002	SJctn 2	124.720	-0.033	0.000	0.94		10.2	OK	
S3.003	S05	124.664	-0.061	0.000	0.66		10.3	OK	
S4.000	S06	124.874	-0.056	0.000	0.39		5.9	OK	
S5.000	S15	124.439	0.269	0.000	0.79		13.1	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S5.001	S16	15 Summer	30	+0%	2/15 Summer		
S3.004	S08	15 Summer	30	+0%			
S6.000	SRE 1	15 Summer	30	+0%			
S3.005	SJnctn 3	60 Summer	30	+0%	100/15 Summer		
S7.000	SChannel 3	15 Summer	30	+0%	100/15 Summer		
S8.000	SKerb 2	15 Summer	30	+0%	100/60 Summer		
S7.001	SJnctn 4	60 Summer	30	+0%	2/15 Summer		
S1.009	S09	60 Summer	30	+0%	2/15 Summer		
S1.010	S10 Flow Control	60 Summer	30	+0%	2/15 Summer		
S1.011	S11	240 Summer	30	+0%			
S1.012	SPI In	240 Winter	30	+0%			
S1.013	SPI Out	240 Summer	30	+0%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Pipe Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)
S5.001	S16		124.393	0.293	0.000	0.86	13.2
S3.004	S08		124.335	-0.150	0.000	0.24	29.3
S6.000	SRE 1		124.890	-0.075	0.000	0.14	3.0
S3.005	SJnctn 3		123.489	-0.124	0.000	0.19	24.3
S7.000	SChannel 3		123.569	-0.081	0.000	0.08	1.8
S8.000	SKerb 2		124.164	-0.066	0.000	0.25	6.7
S7.001	SJnctn 4		123.480	1.004	0.000	0.37	4.5
S1.009	S09		123.478	1.143	0.000	0.11	4.0
S1.010	S10 Flow Control		123.474	1.284	0.000	0.20	3.1
S1.011	S11		121.915	-0.095	0.000	0.29	3.1
S1.012	SPI In		121.885	-0.110	0.000	0.16	3.1
S1.013	SPI Out		121.800	-0.095	0.000	0.29	3.1

PN	US/MH Name	Status	Level Exceeded
S5.001	S16	SURCHARGED	
S3.004	S08	OK	
S6.000	SRE 1	OK	
S3.005	SJnctn 3	OK	
S7.000	SChannel 3	OK	
S8.000	SKerb 2	OK	
S7.001	SJnctn 4	SURCHARGED	
S1.009	S09	SURCHARGED	
S1.010	S10 Flow Control	SURCHARGED	
S1.011	S11	OK	
S1.012	SPI In	OK	
S1.013	SPI Out	OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 3
Number of Online Controls 2 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 390119 413336 SD 90119 13336
Data Type Point
Cv (Summer) 0.950
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 150.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SChannel 1	480 Winter	100	+30%	100/60 Summer			
S1.001	S01	480 Winter	100	+30%	30/30 Summer			
S1.002	SAtt1 In	480 Winter	100	+30%	30/30 Summer			
S1.003	SAtt1 Out	480 Winter	100	+30%	2/120 Summer			
S1.004	S02	480 Winter	100	+30%	2/120 Summer			
S1.005	SAtt2 In	480 Winter	100	+30%	2/30 Summer			
S1.006	SAtt2 Out	120 Summer	100	+30%	2/15 Summer			
S1.007	S03	120 Summer	100	+30%	2/15 Summer			
S2.000	SChannel 2	60 Summer	100	+30%	100/15 Summer			
S1.008	SJnctn 1	60 Summer	100	+30%	2/15 Summer			
S3.000	SRWP 1	15 Summer	100	+30%				
S3.001	S04	15 Summer	100	+30%	100/15 Summer			
S3.002	SJnctn 2	15 Summer	100	+30%	100/15 Summer			
S3.003	S05	15 Summer	100	+30%	100/15 Summer			
S4.000	S06	15 Summer	100	+30%				
S5.000	S15	15 Summer	100	+30%	2/15 Summer			

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SChannel 1	123.648	0.448	0.000	0.01		0.6	SURCHARGED	
S1.001	S01	123.648	0.858	0.000	0.03		0.4	SURCHARGED	
S1.002	SAtt1 In	123.648	0.899	0.000	0.30		0.7	SURCHARGED	
S1.003	SAtt1 Out	123.656	0.991	0.000	0.24		2.6	SURCHARGED	
S1.004	S02	123.656	1.016	0.000	0.09		2.4	SURCHARGED	
S1.005	SAtt2 In	123.656	1.122	0.000	0.37		2.1	SURCHARGED	
S1.006	SAtt2 Out	124.109	1.629	0.000	0.07		1.9	SURCHARGED	
S1.007	S03	124.149	1.704	0.000	0.05		1.9	SURCHARGED	
S2.000	SChannel 2	124.492	0.542	0.000	0.63		50.3	SURCHARGED	
S1.008	SJctn 1	124.417	2.077	0.000	0.07		2.1	FLOOD RISK	
S3.000	SRWP 1	125.004	-0.046	0.000	0.57		5.0	OK	
S3.001	S04	124.827	0.007	0.000	0.39		5.6	SURCHARGED	
S3.002	SJctn 2	124.814	0.061	0.000	1.55		16.9	SURCHARGED	
S3.003	S05	124.742	0.017	0.000	1.04		16.3	SURCHARGED	
S4.000	S06	124.890	-0.040	0.000	0.67		10.1	OK	
S5.000	S15	124.642	0.472	0.000	1.33		22.0	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow
S5.001	S16	15 Summer	100	+30%	2/15 Summer		
S3.004	S08	60 Summer	100	+30%			
S6.000	SRE 1	15 Summer	100	+30%			
S3.005	SJnctn 3	60 Summer	100	+30%	100/15 Summer		
S7.000	SChannel 3	60 Summer	100	+30%	100/15 Summer		
S8.000	SKerb 2	60 Summer	100	+30%	100/60 Summer		
S7.001	SJnctn 4	60 Summer	100	+30%	2/15 Summer		
S1.009	S09	60 Summer	100	+30%	2/15 Summer		
S1.010	S10 Flow Control	60 Summer	100	+30%	2/15 Summer		
S1.011	S11	60 Summer	100	+30%			
S1.012	SPI In	60 Summer	100	+30%			
S1.013	SPI Out	60 Summer	100	+30%			

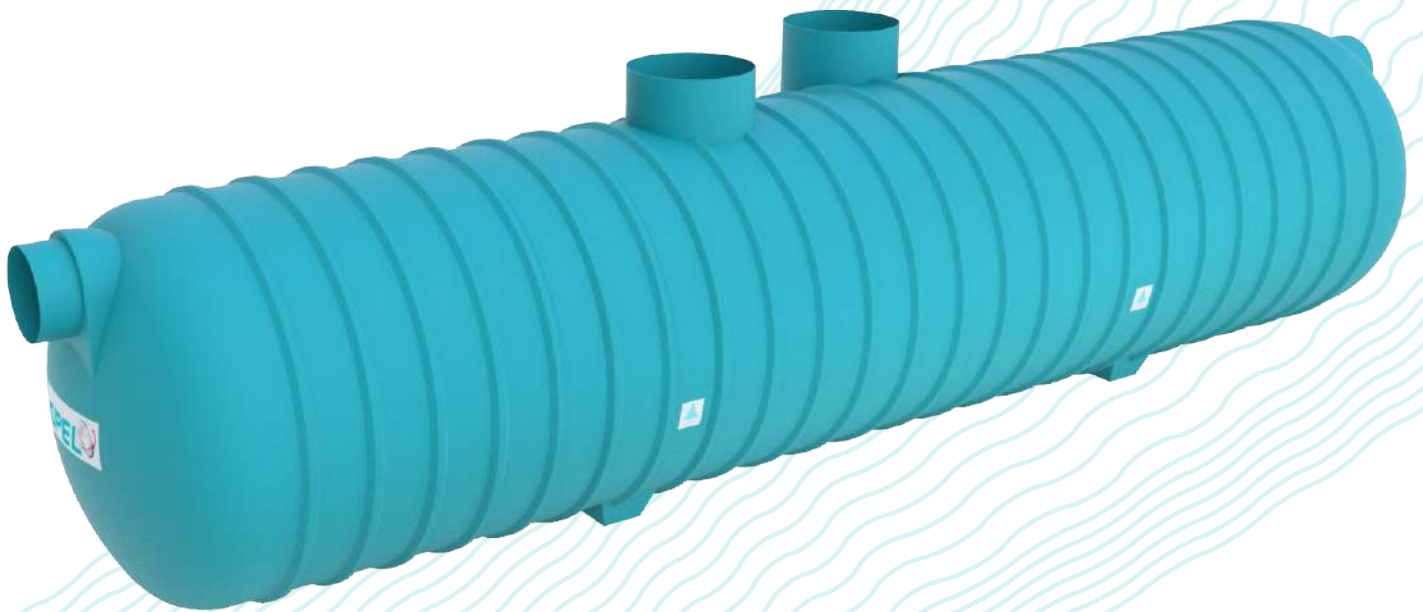
PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S5.001	S16		124.515	0.415	0.000	1.44		22.0
S3.004	S08		124.453	-0.032	0.000	0.32		38.2
S6.000	SRE 1		124.898	-0.067	0.000	0.24		5.0
S3.005	SJnctn 3		124.441	0.828	0.000	0.31		38.3
S7.000	SChannel 3		124.433	0.783	0.000	0.10		2.3
S8.000	SKerb 2		124.441	0.211	0.000	0.33		8.9
S7.001	SJnctn 4		124.429	1.953	0.000	0.64		7.8
S1.009	S09		124.425	2.090	0.000	0.15		5.5
S1.010	S10 Flow Control		124.420	2.230	0.000	0.21		3.2
S1.011	S11		121.916	-0.094	0.000	0.30		3.2
S1.012	SPI In		121.885	-0.110	0.000	0.16		3.2
S1.013	SPI Out		121.801	-0.094	0.000	0.30		3.2

PN	US/MH Name	Status	Level Exceeded
S5.001	S16	SURCHARGED	
S3.004	S08	OK	
S6.000	SRE 1	OK	
S3.005	SJnctn 3	SURCHARGED	
S7.000	SChannel 3	FLOOD RISK	
S8.000	SKerb 2	SURCHARGED	
S7.001	SJnctn 4	SURCHARGED	
S1.009	S09	SURCHARGED	
S1.010	S10 Flow Control	SURCHARGED	
S1.011	S11	OK	
S1.012	SPI In	OK	
S1.013	SPI Out	OK	



Appendix C

Product Details



SPEL Stormceptor

ESR (Enhanced Silt Retention)

SuDS Compliant ESR Range

spelproducts.co.uk

SPEL Stormceptor ESR Range

By-Pass System

The **total** treatment solution for SuDS

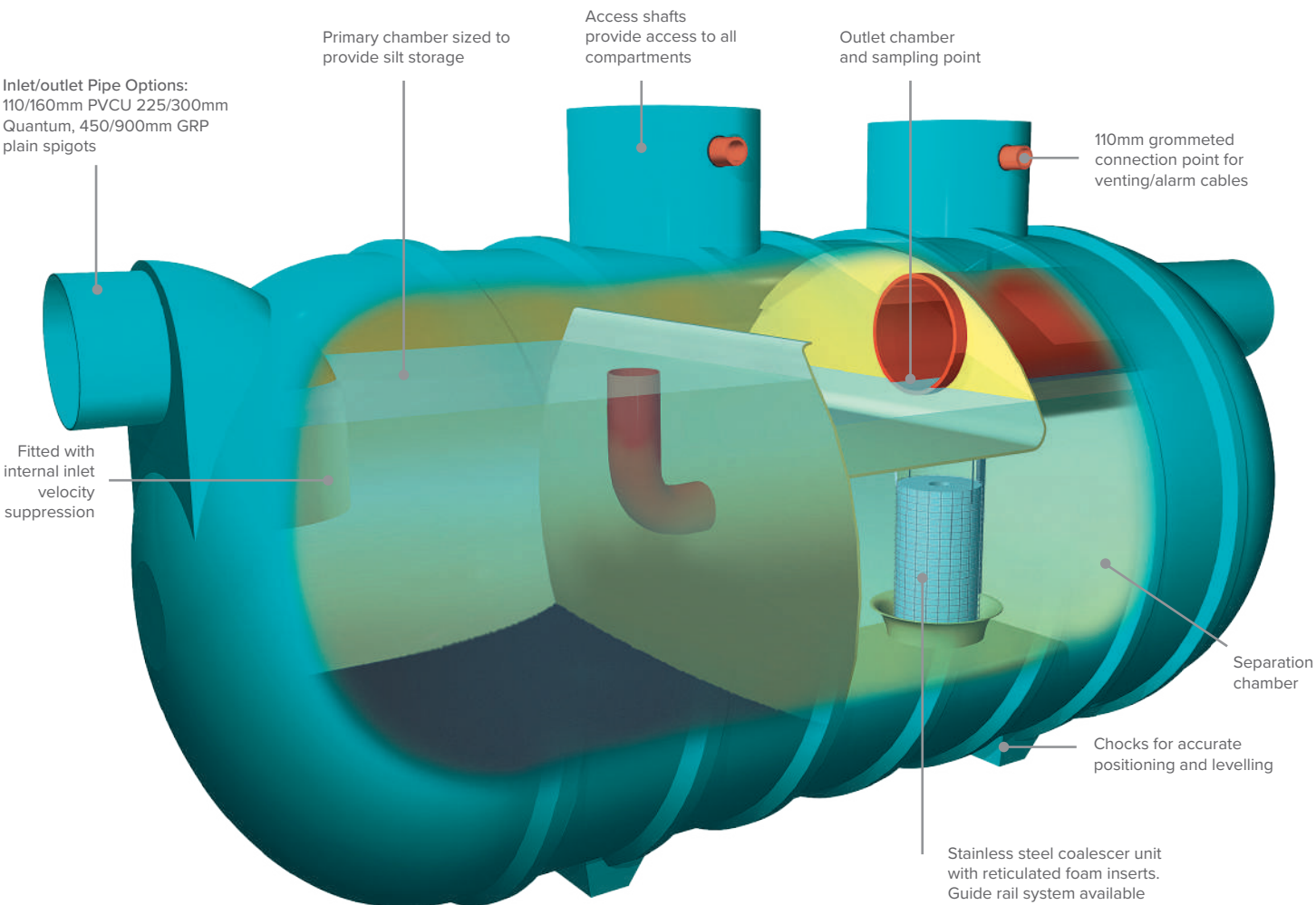
The new SPEL ESR System is fully certified to meet the CIRIA SuDS Mitigation Index. It has been tested by WRc (for TSS and Metals) to the British Water Code of Practice for Manufactured Treatment Devices. This unit is also compliant to the British and European Standard BS EN 858.

SPEL's ESR range is a total treatment system removing Hydrocarbons, Total Suspended Solids (TSS) and Metals (particulate). It's a highly efficient, single unit, water quality SuDS component.

SPEL ESR Stormceptor Certified Mitigation Index

TSS	0.8
Metals	0.6
Hydrocarbons	0.9*

**H R Wallingford test results to BS EN 858*



SPEL Stormceptor ESR Range

By-Pass System



Surface Water Treatment Device Performance Declaration

Testing carried out according to British Water Code of Practice

Product Details	Description
Manufacturer	SPEL Products
Treatment Device Name/Model	Stormceptor Type 210 C1/SC
General description	Class 1 By-pass Separator with Silt Capacity
Envisaged application	Treatment of Surface Water Run-off
Pollutant(s) captured	Suspended Solids

Test	Value	Unit
Treatment device capacity	3200	litres
Sediment Storage capacity	1000	litres
Treatment Flow rate	10	l/s
Connected Area	1,333	m²
Pollution retention flow rate	10	l/s

Parameter	Value	Unit
Maximum capacity flow rate	100	l/s
Device head loss (at treatment flowrate)	0.15	m
Device head loss (at maximum capacity treatment flowrate)	-	m
TSS capture and retention efficiency (Milisil W4 test sediment)	82	%
Zinc capture efficiency (if tested)	Not tested for dissolved metals	%
Zinc retention efficiency (if tested)	Not tested for dissolved metals	%
Copper capture efficiency (if tested)	Not tested for dissolved metals	%
Copper retention efficiency (if tested)	Not tested for dissolved metals	%
Dissolved Metals reduction	0.0	%
Particulate metals reduction*	61.5*	%
Total Metals reduction*	61.5*	%
Total Metals Mitigation Index	0.615*	-

* Extrapolated value in accordance with British Water How to Guide: Applying the CIRIA The SuDS Manual (C753) Simple Index Approach to Proprietary / Manufactured Stormwater Treatment Devices. Version 7, Section 4.3, (2021- under pre-publication review).

Certificates of compliance from WRc and HR Wallingford for the SPEL Stormceptor ESR Range

CERTIFICATE

LIGHT LIQUID SEPARATOR TEST PERFORMANCE CERTIFICATE
Compliance with Clause 8.3.3 of BS EN 858

Separator make and model number: SPEL STORMCEPTOR 330C1/SC NSB30
As detailed in SPEL Drawing SSP 9076

The separator tested complied with the drawing provided by the manufacturer and no additional features were noticed

Test date: 12 October 2006

Designated/nominal flow rate, Qw (litres/second): 30 litres/s
Net capacity of separator (excluding any allowance for silt storage), V_k (litres): 5050 litres

Total duration of test (minutes): 20 min
Running-in period (≥ 15 minutes): 15 min
Sampling period (minutes): 5 minutes common to all tests

Oil flow rate (based on 0.5% of water flowrate, litres/second): 0.15 litres/s

Temperature of oil (°C): 16.2
Temperature of water (°C): 15.6
Temperature of air (°C): 16.8

Analysis of samples by IR spectroscopy carried out by: Intertek Caleb Brett Testing Services*
Date of results: 16 October 2006

Sample	Oil concentration (mg/l)**	Name	Date
1	0.1		
2	0.5		
3	<0.1		
4	0.6		
5	0.2		
Resulting average:	0.3mg/l		

* NEMAS accredited laboratory
** Value of baseline concentration deducted

Handwritten signature: 17/10/06
For and on behalf of HR Wallingford Ltd.



SPEL's Head of Technical Development alongside the WRc testing officer.

Research and Development

Research and development is at the heart of what we do at SPEL, our passion as Zero Pollution Ambassadors is to be at the cutting edge of clean surface water technology.

Months of rigorous testing has resulted in the new SPEL Stormceptor ESR Range.

Quality Assured Company
BS EN ISO 9001
Design & Manufacture



Protecting our environment for over 45 years

The SuDS Manual is leading good practise in drainage design, SPEL are endorsing this with the release of the new SPEL Stormceptor ESR range.

Total Suspended Solids (TSS)	Metals	Hydrocarbons
0.8	0.6	0.9*

*H R Wallingford test results to BS EN 858

Added to these class-leading Mitigation Indices, the ESR range benefits from:

- British/European Standard BS EN 858-1 2002 certification.
- The SPEL 25 year shell Warranty.
- 50 year+ life expectancy.
- ISO9001 quality assurance.
- ISO14001 committed to environmental improvement

26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

26.3 Indicative SuDS mitigation indices for discharges to surface waters

Type of SuDS component	Mitigation Indices		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4 ²	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond ⁴	0.7 ³	0.7	0.5
Wetland	0.8 ³	0.8	0.8
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Tables from The SuDS Manual (C753), p568-569

For reference notes, please see the full manual: https://www.ciria.org/Memberships/The_SuDs_Manual_C753_Chapters.aspx

SPEL Stormceptor ESR Range By-Pass System

ESR Specification Chart

Model	Series	Treated Flow Rate - l/s	Maximum Flow	Catchment area (m ²)*	Oil storage (litres)	Silt capacity (litres)	Overall length* (mm) L	Overall diameter (mm)	Inlet Invert (mm) A	Base to Inlet (mm) B	Base to outlet (mm) C	Max in/ out pipe diameter** (mm)	Number of access shafts (dia. mm)			
													600	750	900	1200
ESR10/C1	200	10	100	1,333	150	1,000	2,920	1,225	560	1,350	1,300	300	-	1	-	-
ESR15/C1	200	15	150	2,000	225	1,500	4,237	1,225	560	1,350	1,300	300	-	1	-	-
ESR20/C1	300	20	200	2,665	300	2,000	3,200	1,875	700	1,450	1,350	450	2	-	-	-
ESR25/C1	300	25	250	3,333	375	2,500	3,540	1,875	700	1,450	1,350	450	2	-	-	-
ESR30/C1	300	30	300	4,000	450	3,000	4,420	1,875	700	1,450	1,350	450	-	1	1	-
ESR40/C1	300	40	400	5,333	600	4,000	5,760	1,875	740	1,410	1,310	450	1	1	-	-
ESR45/C1	300	45	450	6,000	675	4,500	6,570	1,875	740	1,410	1,310	450	1	1	-	-
ESR50/C1	300	50	500	6,665	750	5,000	7,060	1,875	740	1,410	1,310	450	1	1	-	-
ESR60/C1	400	60	600	8,000	900	6,000	4,400	2,700	950	2,100	2,000	600	1	-	1	-
ESR70/C1	400	70	700	9,333	1,050	7,000	5,250	2,700	950	2,100	2,000	600	1	-	1	-
ESR80/C1	400	80	800	10,665	1,200	8,000	6,170	2,700	950	2,100	2,000	600	1	-	1	-
ESR100/C1	400	100	1000	13,333	1,500	10,000	7,400	2,700	1,100	1,950	1,850	750	1	-	1	-
ESR125/C1	400	125	1250	16,665	1,875	12,500	9,050	2,700	1,100	1,950	1,850	750	1	-	1	-
ESR150/C1	400	150	1500	20,000	2,250	15,000	9,950	2,700	1,100	1,950	1,850	750	-	-	2	-
ESR160/C1	400	160	1600	21,333	2,400	16,000	11,830	2,700	1,250	1,800	1,700	750	1	1	1	-
ESR180/C1	500	180	1800	24,000	2,700	18,000	7,470	3,650	1,185	2,690	2,550	900	-	-	-	-
ESR200/C1	500	200	2000	26,665	3,000	20,000	8,530	3,650	1,185	2,690	2,355	1,200	-	-	-	-
ESR250/C1	500	250	2500	33,333	3,750	25,000	10,040	3,650	1,185	2,690	2,355	1,200	-	-	-	-
ESR300/C1	600	300	3000	40,000	4,500	30,000	10,310	4,150	1,325	2,850	2,675	1,200	-	-	-	-
ESR350/C1	600	350	3500	46,665	5,250	35,000	11,470	4,150	1,325	2,850	2,675	1,200	-	-	-	-
ESR400/C1	600	400	4000	53,333	6,000	40,000	12,690	4,150	1,325	2,850	2,675	1,200	-	-	-	-
ESR500/C1	600	500	5000	66,665	7,500	50,000	15,870	4,150	1,325	2,850	2,675	1,200	-	-	-	-
ESR600/C1	600	600	6000	80,000	9,000	60,000	18,260	4,150	1,325	2,850	2,675	1,200	-	-	-	-
ESR700/C1	600	700	7000	93,333	10,500	70,000	22,250	4,150	2,850	2,850	2,675	1,200	-	-	-	-

*These catchment areas are based on the SuDS Manual requirement for By-Pass devices to treat the 1 in 1 year storm event (27mm).

**This dimension is for A-C inlet/outlet options, larger pipe sizes are available for D-I inlet/outlet options.

200 Series ESR – Inside diameter 1200mm, outside diameter 1225mm.

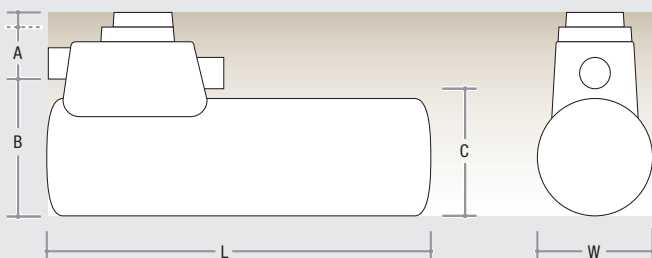
300 series ESR – Inside diameter 1800mm, outside diameter 1875mm.

400 series ESR – Inside diameter 2600mm, outside diameter 2700mm.

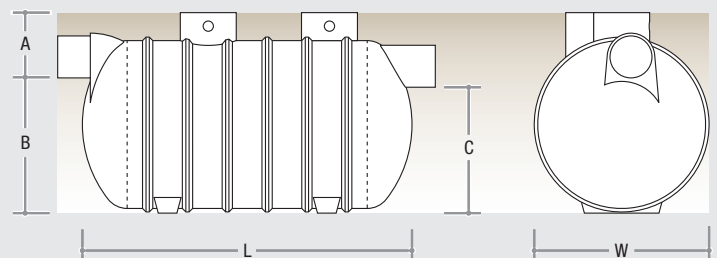
500 series ESR – Inside diameter 3500mm, outside diameter 3650mm.

600 series ESR – Inside diameter 4000mm, outside diameter 4150mm.

200 series



300/400/500 & 600 series



Optional extras

SPEL coalescer unit guide rail systems

To facilitate easy insertion of coalescer units, the SPEL guide rail system manufactured in stainless steel can be incorporated into SPEL Puraceptors and class 1 Stormceptors.

Brackets fixed to the top and bottom of the coalescer unit simply engage the stainless steel guide rail fixed to the top of the stub access shaft. The coalescer unit is then lowered in the normal way, being guided at the correct angle into the conical base.

Lifting chains are available for the larger coalescer units and where extension shafts are fitted.

Extension guide rails can be incorporated into SPEL extension shafts to suit.

SPEL coalescer unit lifting, locating and locking system

The SPEL lifting, locating and locking system is manufactured in stainless steel and replaces the standard coalescer unit handle.

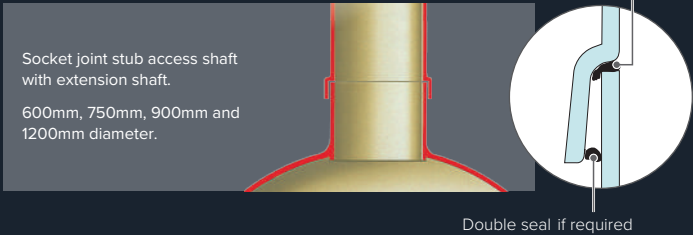
The locating/locking handle ensures the coalescer unit is seated and locked in its correct position after maintenance.



Above left: Lifting, locating and locking system with guide rail system.
Above right: The SPEL coalescer unit with lifting chain.

SPEL extension access shafts

Extension access shafts are available for deep invert applications.



Tank shell specifications

The 'standard' specification is normally adequate for most installations but heavier specifications are available depending upon the burial depth and water table level, in winter. The concern is when the system is emptied completely and remains empty for a period of time.

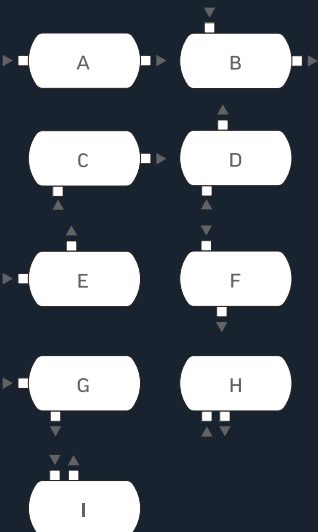
Standard tanks			Heavy tanks		
Series	WT (m)	D (m)	Series	WT (m)	D (m)
100/200	1.0	4.0	100/200	2.0	6.0
300	0.9	4.0	300	2.8	5.6
400	1.3	5.0	400	3.5	6.0
500	1.9	5.7	500	4.5	7.25
600	2.4	6.2	600	4.7	7.3

WT depth of water table	D maximum depth	WT depth of water table	D maximum depth
High water table	Well drained ground	High water table	Well drained ground

Based on installation in concrete with concrete surround
For pea gravel surround, see SPEL Data Manual p13.5

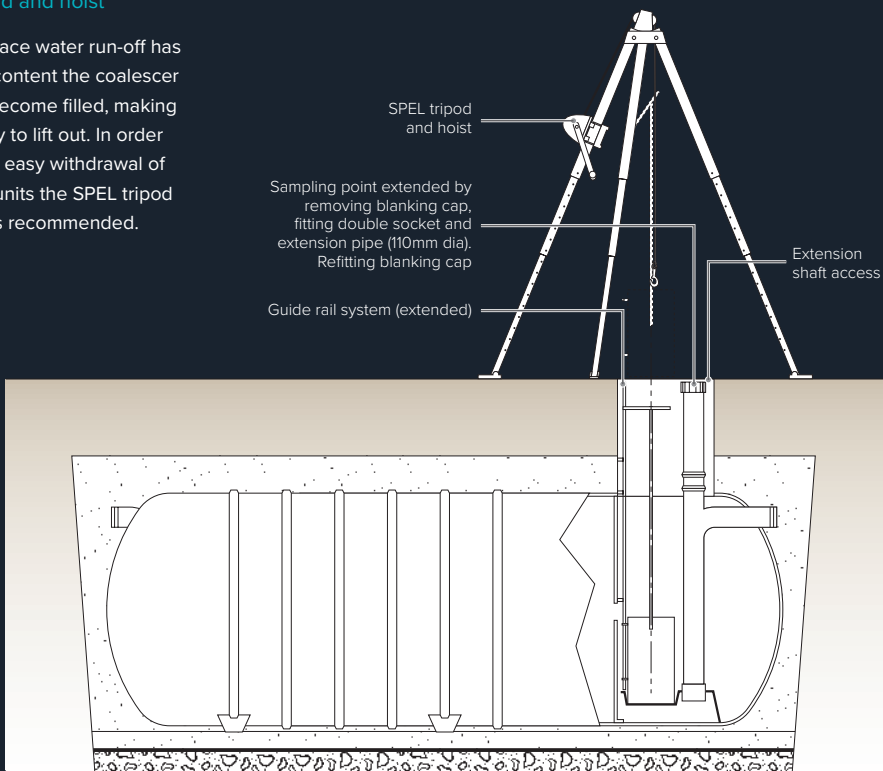
SPEL ESR Range – Inlet/outlet orientation

Dependent upon model and diameter of connections, these nine different orientations are available. However on the larger models it is important to check with our technical department.



SPEL tripod and hoist

Where surface water run-off has a high silt content the coalescer units can become filled, making them heavy to lift out. In order to facilitate easy withdrawal of coalescer units the SPEL tripod and hoist is recommended.



SPEL

Quality that protects the environment the **safest way**



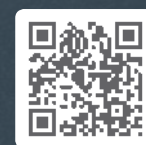
The SPEL underground tanks have been designed with reference to BS EN 13121

SPEL Tank shells carry a 25 year Warranty and have a life expectancy of over 50 years

Rigorous quality control procedures at all stages of manufacture for each serial numbered tank, ISO 9001.

SPEL is an environmentally accredited company to ISO 14001.

Certificate No: FM 35174 UVDB/Achilles accredited – Supplier No. 88611.



Scan code with a QR reader to launch our website: spelproducts.co.uk

#ZeroPollutionAmbassadors

SPEL 10/21

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Appendix D
BREEAM Information

Relating drainage reports to BREEAM

The purpose of this guidance note is to help assist BREEAM Assessors relate the contents of a drainage report to the 'Surface water run-off' and 'Minimising watercourse pollution' criteria in Pol 03 (Flood and surface water management) in BREEAM UK New Construction 2018 and BREEAM UK New Construction Version 6. This form can be used by the BREEAM Assessor as supporting evidence for their assessment and the awarding of BREEAM credits.

Note:

- Completing this form is optional, it is not a requirement for demonstrating compliance with Pol 03 only an aid.
- This form is not applicable to the 'Flood resilience' section of this issue.

Instructions

The **BREEAM Assessor must complete Section A Contact details** and the **appropriate consultant must complete all other sections**, including section E 'Signature of Validation'.

If the form is incomplete and / or unsigned it will not be accepted as evidence supporting a BREEAM assessment.

The below sections to be completed by the project's BREEAM Assessor

Section A: Contact Details

Consultant/Engineer Details

Company name:	Glanville Group
Company address:	3 Grovelands Business Centre, Boundary Way, Hemel Hempstead, Hertfordshire, HP2 7TE
Contact name:	Kevin Jackson
Contact telephone number:	07855 112098

Developer/Client Details

Company name:	McDonald's Restaurants Limited
Company address:	11-59 High Road, East Finchley, London N2 8AW
Contact name:	George Layzell
Contact telephone number:	

Development Details

BRE project reference number (if known):	
Development name:	
Development address:	

All of the following sections of the template to be completed by the appropriate consultant

Section B: Assessment Information

1.	Where the assessed building is part of a larger development of buildings there are a number of options for assessment of the surface water run-off and minimising watercourse pollution credits. Please tick one of the following boxes to confirm the approach taken:	
	☐	A. An individual building is being assessed independently where the run-off is being dealt with on a building by building basis (i.e. each building has its own dedicated sub-catchment that serves only that building).
	☐	B. This assessment is part of a larger site with a number of buildings (which can include domestic and/or non-domestic buildings), and this template covers the drainage from the local sub-catchment serving all those dwellings/buildings within the sub catchment. To do this the site has been split up into smaller pockets of land covering one or several buildings ¹ . Please confirm the number of assessed areas within the site (you will need to complete this template for each assessed area) ² . Number of assessed areas: _____
	OR	
	☒	C. The whole development has been assessed for compliance on a site wide basis.

Site Information

2.	A. Please provide the site area ³ (select unit of measurement in drop-down list)	3465	m2
	B. Please provide the impermeable area of the site pre-development (select unit of measurement in drop-down list)	0.268	hectare
	C. Please provide the impermeable area of the site post development (select unit of measurement in drop-down list)	0.282	hectare

3.	Tick one or both of the following to confirm if some or all of the highways will be omitted from the impermeable areas in the calculations for one of the following reasons ⁴ :	
	☐	A. The highways are being adopted.
	☒	B. The building(s) will be located beside existing highways already adopted.

1 Note: proportioning cannot be used to calculate the percentage of run-off discharging into the local sub-catchment resulting from just the assessed building.

2 It would aid the QA process to provide a site plan highlighting each assessment area and highlighting which area is being assessed in this report.

3 The site area will include all areas within the boundaries of the site, including both permeable and impermeable areas. If box 1A or 1B has been ticked, the 'site area' will be only that for which this template demonstrates compliance.

4 Refer to the Definitions section for 'Adoptable highways'.

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Section C: Consultant's qualifications

Appropriate Consultant

Prerequisite

1.	☒	I can confirm that I am an appropriate consultant, as defined by BREEAM ⁵
2.	☒	I can confirm that all surface water run-off design solutions are bespoke, taking account of the specific site requirements and natural or man-made environment of and surrounding the site.

Section D: Awarding of credits

1.	What type of site is this?		
	☐	Greenfield site (Note: drainage measures need to be specified so that the run-off from the site to water courses is no greater for the developed site than it was for the pre-developed site.)	
	☒	Brownfield site (Note: drainage measures are specified so that the peak rate of run-off from the site to the watercourses shows a 30% improvement for the developed site compared with the pre-developed site.)	
2.		A. Please provide the pre-development peak rate of run-off for the 1 year return period event ⁶	2.76 l/s
		B. Please provide the post-development peak rate of run-off for the 1 year return period event ⁵	3.10 - 2yr l/s
		C. Please provide the pre-development peak rate of run-off for the 100 year return period event ⁵	6.61 l/s
		D. Please provide the post-development peak rate of run-off for the 100 year return period event ⁵	3.2 l/s
3.	☐	Please tick this box to confirm that the building meets the 5l/s compliance criteria.	
4.	If, post-development, it is necessary to reduce the peak rate of run-off to meet the BREEAM criteria, please provide a brief explanation below describing how the peak rate will be reduced. For example, 'soakaways reduce the peak rate of run-off to pre-development levels'. Peak discharge will be reduced to Qbar discharge rate through the use of cellular storage creates and a flow control device. ☐ N/A		
5.	☒	Please tick this box to confirm that the post development peak rate of run-off calculations include an allowance for climate change in accordance with current best practice planning guidelines.	

⁵ Refer to the BREEAM UK New Construction technical manual for the definition of an appropriate consultant.

⁶ Peak rate of run-off calculations should be carried out for the range of storm durations up to and including the 6 hour storm. The peak rate of run-off for the storm event will then be the 'worst case' run-off rate from the range of storm durations. The climate change allowance should be added only to the post development calculations.

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SECOND CREDIT: Volume of Run-off			
	☐	Please tick this box if this credit within the Pol 03 issue is not being sought.	
Designing for Local Drainage System failure (criteria 10)			
6.	☒	Tick here to confirm that flooding of property will not occur in the event of local drainage system failure (caused by extreme rainfall or lack of maintenance). ⁷	
Volume requirements - criteria 11-12 and 15-16			
7.	☒	Please tick this box to confirm that the following post development volume of run-off calculations include an allowance for climate change in accordance with current best practice planning guidelines.	
	☒	Please tick this box to confirm that the following volume of run-off calculations are for the 100 year event of 6 hour duration.	
8.	A. Please provide the pre-development volume of run-off		0.3 m ³
	B. Please provide the post development volume of run-off caused by the new development prior to mitigation		0.4 m ³
	C. Calculate the additional predicted volume of rainwater caused by the new development prior to mitigation (= 8B – 8A)		0.1 m ³
	D. If the answer to 8C is greater than zero, please provide a brief explanation below describing how you have reduced the additional volume discharged from the developed site, for example, 'soakaways will infiltrate all of the additional volume':		
	☒	N/A	
	☐	Please provide the additional volume of run-off discharged from the site when all (if any) mitigation measures described in 8D are in place.	m ²

⁷ Refer to the Evidence section of the technical guide for details on the evidence that would be required to demonstrate that this has been considered fully.

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9.	A. Where there is an increase in the volume of run-off as a result of the development and criteria 11 and 12 cannot be fully satisfied via infiltration or other SuDS techniques (as listed below), please provide an explanation under the following headings (evidence to support the reasoning should be provided in/via the hydrological report):
	Soakaways: No infiltration on site Porous/Pervious paving: Asphalt Porous paving has been specified to non-HGV parking spaces Rainwater re-use/harvesting: The restaurant is of modular construction to a standard design which is not set up for rainwater re-use Green Roof: The restaurant is a lightweight modular construction, produced in a factory and transported to site. This form of construction is not suitable for green roofs Other surface infiltration techniques: No infiltration on site ☐ N/A (all additional volumes of run-off have been dealt with)

Volume requirements – Criteria 13-14⁹ (and 15-16)

10.	Where it has not been possible to reduce all of the additional volume by infiltration or other SuDS techniques, the volume of run-off should be discharged in accordance with one of the following rates of run-off, whichever is the higher. Please tick one of the boxes below to confirm the level of flow control that has been achieved:
☐	A. The peak discharge rate has been reduced to pre-development 1 year peak flow rate Please state the pre-development 1-year peak flow rate _____ l/s
	OR
☒	B. The peak discharge rate has been reduced to the site's estimated mean annual flood flow rate (Qbar). Please state Qbar: <u>3.18</u> l/s
☐	C. The peak discharge rate has been reduced to 2l/s/ha. Please state the peak discharge rate at 2l/s/ha: _____ l/s
	OR
☐	D. The limiting discharge rate requires a flow rate of less than 5l/s at a discharge point, therefore a flow rate of up to 5l/s has been used.

⁹ Note that criteria 11-12 (and 15-16) must be satisfied as far as possible prior to then applying criteria 13-14 (and 15-16).

THIRD CREDIT: Minimising Watercourse pollution		
11.	☐	Please tick this box if this credit within the Pol 03 issue is not being sought.
	☐	Tick this box to confirm that there will be no discharge from the developed site for rainfall up to 5 mm. Please provide a brief explanation as to how this is being met. Where this is N/A please also provide a brief explanation. ☐ N/A
	☒	Tick this box to confirm the specification of Sustainable Drainage Systems (SUDs) or source control systems such as permeable surfaces or infiltration trenches where run-off drains are in areas with a relatively low risk source of watercourse pollution. Please provide a brief explanation as to how this is being met. Where this is N/A please also provide a brief explanation. Flows will be collected by gullies, kerb drainage and slot drains and discharge to an attenuation tank ☐ N/A
	☒	Tick this box to confirm the specification of oil/petrol separators (or equivalent system) in surface water drainage systems, where there is a high risk of contamination or spillage of substances such as petrol and oil. Please provide a brief explanation as to how this is being met. Where this is N/A please also provide a brief explanation. An oil separator will be used within the site prior to discharge. ☐ N/A
	☒	Tick this box to confirm that, where present, chemical/liquid gas storage areas have a means of containment. Please provide a brief explanation as to how this is being met. Oil waste will be stored within the unit and any spills will be contained within the building. The Oils will pass through a grease trap prior to connection to the foul drainage system ☐ N/A
	☒	Tick this box to confirm that all water pollution prevention systems have been designed and detailed in accordance with the recommendations of documents such as the SuDS manual and other relevant industry best practice. Please provide a brief explanation as to how this is being met. Where this is N/A please also provide a brief explanation. Due to a lack of infiltration on site surface water flows will be stored within an attenuation tank prior to a controlled discharge via a flow control device. The flow will pass through a petrol/oil separator prior to discharge to a stream ☐ N/A

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12.	☒	Tick this box to confirm that a comprehensive and up-to-date drainage plan of the site will be made available. (NOTE: Evidence from the developer will be required to confirm that this drainage plan will be made available for the building/site occupiers) <i>Please provide a brief explanation as to how this is being met. Where this is N/A please also provide a brief explanation.</i> Drainage plan will be submitted to the developer and store management once complete	☐ N/A
	☒	Tick this box to confirm that relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS have been / will be put in place. <i>Please provide a brief explanation as to how this is being met. Where this is N/A please also provide a brief explanation.</i> A maintenance plan and schedule will be provided to the developer and store management once complete	☐ N/A
	☒	Tick this box to confirm that, where present, all external storage and delivery areas are designed and detailed in accordance with the current best practice planning guidelines. <i>Please provide a brief explanation as to how this is being met. Where this is N/A please also provide a brief explanation.</i> Deliveries will be made while vehicle is parked within the development so as not to block adjacent access roads. The area drains through a positive system and passes through a petrol interceptor prior to discharge to the adjacent stream. Storage of associated packaging waste is within a bin store area located to allow collection without accessing the site.	☐ N/A

Section E: Signature of Validation**Signature**

The following declaration should be signed by the appropriate consultant responsible for ensuring that the development meets the Pol 03 surface water run-off and minimising watercourse pollution criteria, where applicable.

I confirm that the information provided in this document is truthful and accurate at the time of completion.

Name of appropriate consultant:

Kevin Jackson

Signature of appropriate consultant:

Kevin Jackson

Date:

31.07.24

Hertfordshire

|

Oxfordshire

|

Cambridgeshire

|

Bristol

postbox@glanvillegroup.com | www.glanvillegroup.com



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