



**CALDERSHAW CENTRE
INGS LANE
ROCHDALE
OL12 7LQ**

**Flood Risk Assessment
& Drainage Strategy
(Rev A)**

DOCUMENT No:
23083-DOC-002-A

**Issue Sheet.**

Prepared	Date		Checked	Date
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Revisions	Comment	Date
A	Initial Issue	19-03-24
B	Update to LLFA comments	07-07-25

The report is based on the information that has been acquired and / or made available to Advant Engineers via the various searches and consultations undertaken as part of the Drainage Strategy. In some cases, anecdotal information has been relied upon, where documented evidence has been lacking.

The conclusions drawn in the above report are considered correct although any subsequent additional information may allow refinement of the conclusions.

All work carried out in preparing this report has utilised and is based upon Advant Engineers current professional knowledge and understanding of current UK standards and codes, technology and legislation. Changes in this legislation and guidance may occur at any time in the future and cause any conclusions to become inappropriate or incorrect.

This report has been prepared using information contained in maps and documents prepared by others. Advant Engineers can accept no responsibility for the accuracy of such information.



EXECUTIVE SUMMARY

Site Description

Site Area	2,962m ² (0.296ha)
Existing Use	Greenfield
Proposed Use	Historically industrial use

Flood Risk

Flood Zone	1 (one)
Surface Water	None
Reservoirs	None
Sewers	None known.
Ground Water	Low Risk

Drainage Strategy

Existing Impermeable Area	-
Proposed Impermeable Area	2,962m ² (0.296ha)
Proposed Discharge Rate	5.6 l/s
Proposed Outfall	Watercourse
1 in 100 Year + CC Storage	160m ³



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1. Introduction

- 1.1. Advant Engineers has been commissioned by I.Q.7 LTD, to undertake a Flood Risk Assessment and a Drainage Strategy in connection with the proposed development at the land off Ings Lane in Rochdale. The proposal consists of 9 new build industrial / commercial units with access road and parking.
- 1.2. This report should be read in conjunction with drawing 23083-101 and associated architectural and engineering drawings.
- 1.3. This FRA has been produced to demonstrate how risk from all sources of flooding to the site itself and risk to others will be managed, in order to satisfy the requirements, set out in the NPPF – National Planning Policy Framework.

2. Existing Site

- 2.1. The site currently is a greenfield piece of waste land located between existing industrial units, and is located off Ings Road, the overall site area is 2,962m² (0.296ha). (See Appendix A for location plan).
- 2.2. This site can be located at the following co-ordinates 387844E, 414531N and the nearest postcode is OL12 7LQ and can be seen on the below extract.





2.3. A Phase 1 Site Investigation has been undertaken by TJ Booth Associates, which describes the site as follows:

3.3. Geological Maps.

The local solid geology was reviewed using BGS Rochdale Sheet 76 (1:10650 edition) map (refer to appendix for maps).

The mapping data indicated that the Site lay on Milnrow Sandstone of the Carboniferous Lower Coal Measures. Undifferentiated sandstones/mudstones outcrop nominally 50m W & 100m E. The Upper Mountain Mine Coal Seam outcrops nominally 450m W, and the region has a stratigraphic dip in the order of approximately 5-10° S.

The drift geology under the Site was noted as being glacial till for much of the local area with some alluvium in the Spodden Valley bottom 300mE.

4.1. BGS Borehole Data.

The British Geological Survey has records of boreholes for England & Wales. A number of records were found to the W of Caldershaw Mills. The closest of these indicated up to 7m sand and gravel in the Caldershaw Brook vicinity with 5m of boulder clay found to the estate N of the Mill.

5.1.1. Records and Details of Existing Structures.

The Site was accessed by an entrance gate to the E side of the Caldershaw Centre off Ings Lane access road.

The E side of the Site comprised a concrete yard which is currently used as a car park to the Eurotyre depot. There was a tank to the NW corner of the yard situated on concrete. There was also some storage of tyres, a container and a prefabricated office block.

The S side of the Caldershaw Centre comprised a generally flat made ground (building rubble including brick, stone, conc, macadam, with occasional metal & plastics etc). The ground was vegetated with weeds/shrubs. The site sloped down to the adjacent landscaping & timber yards to the S. There were occasional areas of minor tipping on Site.

The landscaping & timber yards to the S comprised two storage bays which were used for composts.

Himalayan Balsam was noted to the SW corner adjacent the reservoir.

2.4. The site falls from the North to the South with a steep level difference to the adjacent site. (See Appendix B for Site Investigation).

3. Proposed Development

3.1. The proposed development is for 9 new build industrial / commercial units with associated parking and a new private access into the site. (See Appendix C for layout)



4. Existing Flood Risk.

4.1 National Planning Policy Framework (NPPF) Paragraphs 155-165 refers to the risk based Sequential Test aiming to steer new development to areas at the lowest probability of flooding (Zone 1).

4.2 Paragraph's 158 & 159 of the NPPF states that

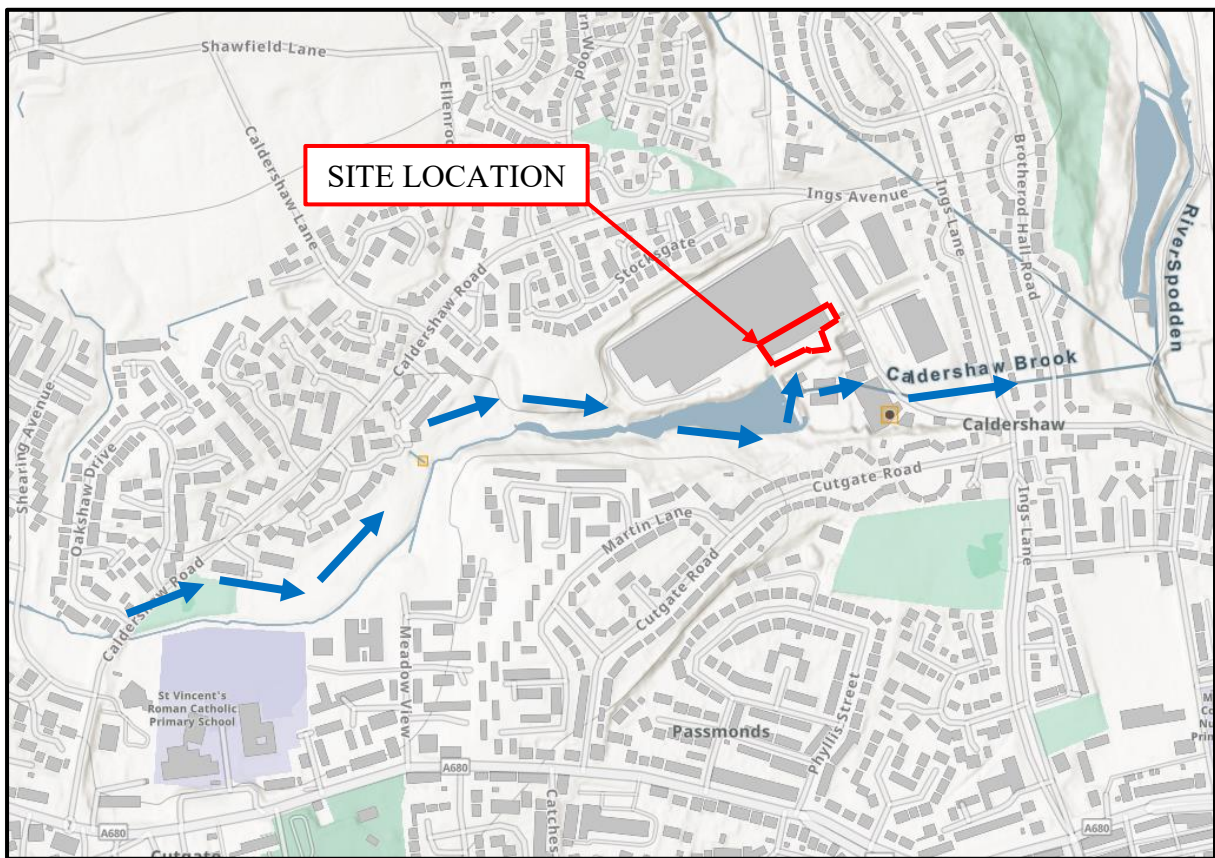
"158. The aim of the sequential test is to steer new development to areas with the lowest risk of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk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

"159. If it is not possible for development to be located in zones with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in national planning guidance."



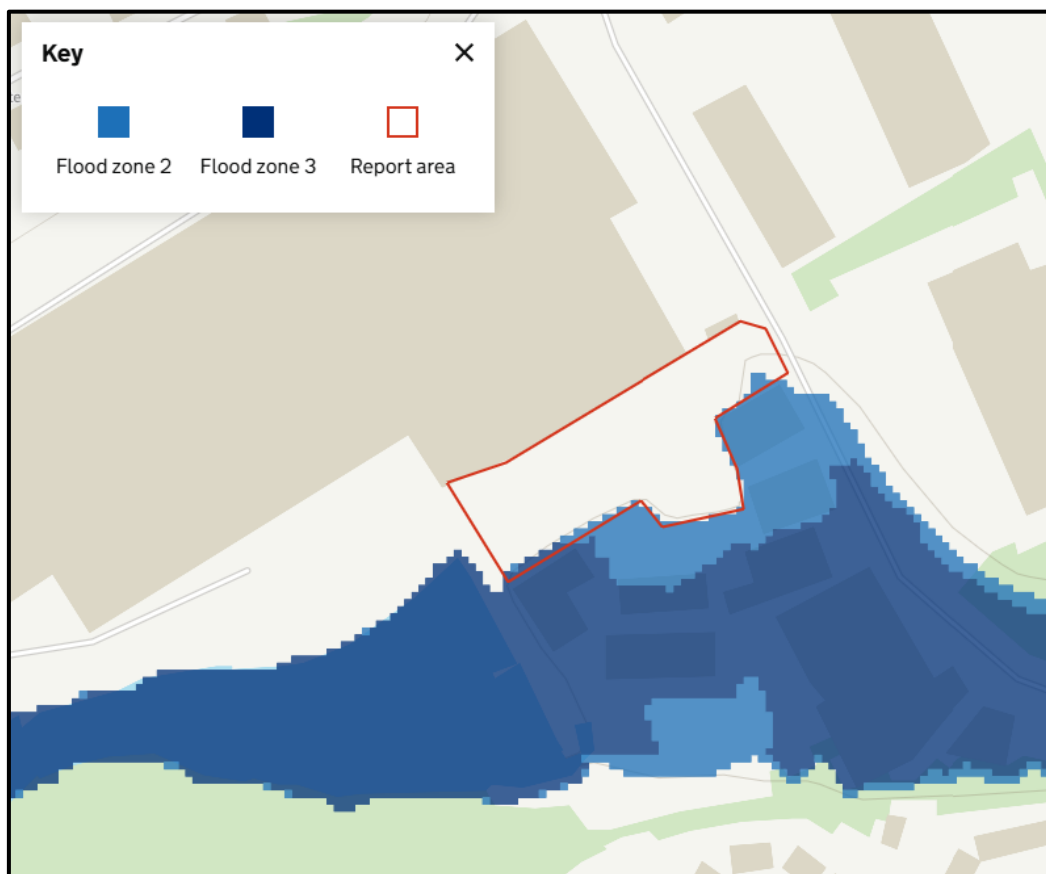
5. Existing Drainage

- 5.1. From the topographical survey, existing drainage records and site inspections, we have been able to build up the drainage system that runs through and adjacent the site.
- 5.2. To the south-west of the site is Caldershaw Brook that flows into a reservoir just west of the timber merchants' yard, at which point the brook becomes culverted under the timber merchants' yard and then flows away in an easterly direction towards the River Spodden. (See Appendix D for existing drainage survey).



6. Flood Risk Assessment

- 6.1 The National Planning Policy Framework (NPPF) aims to avoid inappropriate development in areas at risk of flooding, directing development away from high-risk areas and avoiding increasing or reducing the risk of flooding elsewhere.
- 6.2 The flood risk assessment will use a sequential approach to assess the site to avoid development in flood risk areas and to manage the residual risks and take into account the effect of climate change. The 'Sequential Test' will start with consideration of the Flood Zones in the vicinity of the site. Where development is proposed within a flood zone an 'Exception Test' may also be necessary in accordance with the National Planning Policy Framework guidance.
- 6.3 As per the Environment Agency (EA) flood map below, the proposed developed area of the site is in **Flood Zone 1**.



- 6.4 These flood zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood map for planning (River and Seas) available on the Environment Agency's website.



7. Sequential Test

7.1 This risk-based test has the aim of steering new development to area at the lowest probability of flooding, it is broken down into 3 tables, the first of which identifies the risk based on Flood zone as per below, of which this site is within **FLOOD ZONE 1**.

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

7.2 The second table then identifies the vulnerability class of the site dependant on the sites proposed used, and within this table this site falls into the **LESS VULNERABLE DEVELOPMENT** classification as shown below:

Less vulnerable
• Police, ambulance and fire stations which are not required to be operational during flooding. • Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill* and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place. • Car parks.



7.3 Finally, Table 3 determines the need for the Exception test based upon the results from tables 1 and 2 previously identified, in this instance the development **IS** appropriate and there is **NO** need for an exception test.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*
Key:					
✓ Development is appropriate					
✗ Development should not be permitted.					

8. Exception Test

8.1 The sequential test has been passed and therefore the exception test is **not** required.

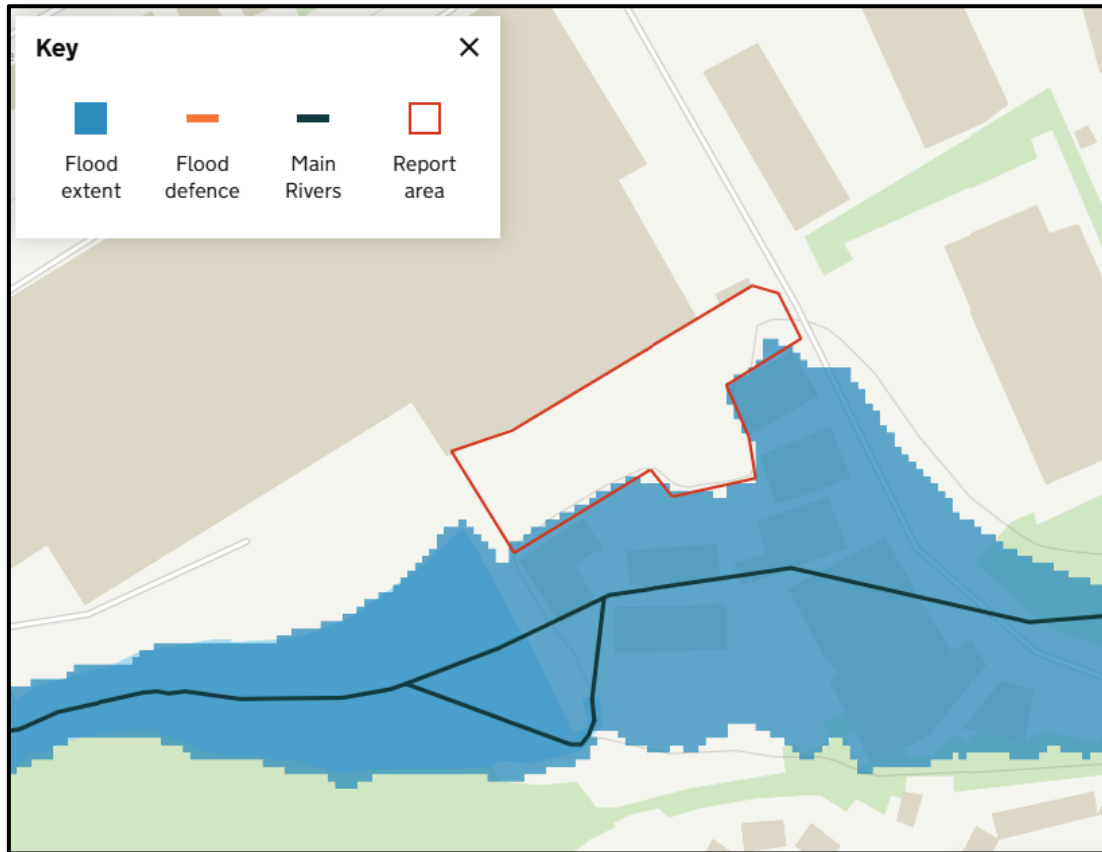


9. Sources of Potential Flooding

SOURCE OF FLOODING	POTENTIAL RISK				DESCRIPTION
	HIGH	MEDIUM	LOW	NONE	
Fluvial			X		See paragraph 14.1
Pluvial			X		See paragraph 14.2
Reservoirs			X		See paragraph 14.3
Sewers			X		We have not been made aware of any issues with the sewers flooding.
Groundwater			X		The SI doesn't indicate any ground water issues.
Proposed Development			X		See paragraph 14.4



- 9.1 The (EA) flood mapping service on their website identifies the areas at risk of flooding from rivers and seas, it can be seen from the below map that the site is at a **not at a risk of flooding** from rivers and seas, this also includes for climate change.





9.2 The (EA) flood mapping service on their website identifies the areas at risk from surface water flooding, it can be seen from the below map that the site is **not at risk**, from surface water flooding.



- 9.3 The (EA) flood mapping service on their website identifies the areas at risk from reservoirs flooding through failure to the reservoir or over topping, as per the map below the site would **NOT** be at risk of flooding should the reservoir breach.



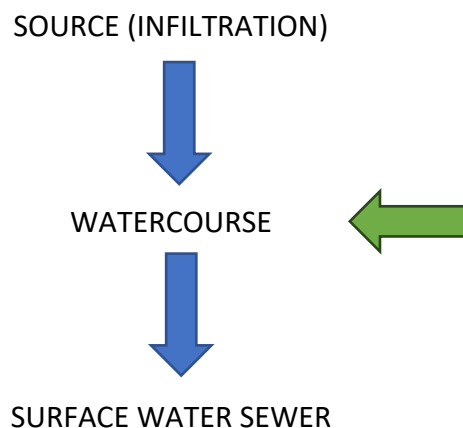
- 9.4 The proposed development needs to be considered when looking at the risks of flooding both on site and the surrounding areas and downstream of the proposed outfall to ensure that the development does not create flooding elsewhere. Therefore, any risk of increase of flooding would be mitigated through a SUDS surface water drainage scheme.
- 9.5 Even though the above EA maps demonstrate that the site is not directly at risk of flooding it has to be acknowledged that it is located directly adjacent areas of flooding a there is a reservoir located along its boundary, therefore we have had the land surveyed and taken a closer look at the existing surrounding ground levels.
- 9.6 The watercourse, reservoir and surrounding land has been modelled, and should the reservoir breach the boundary wall, either in an extreme rainfall event or through blockage of the culvert then it would overtop the wall at level 151.500m, this would then flow across the timber merchants' yard and south down Ings Road away from the site. (See Appendix E for layout plan).



10. Drainage Strategy

10.1. Surface Water

10.2. The surface water drainage should be designed in accordance with the SUD hierarchy providing evidence to each step before moving on to the next one, the SUDS hierarchy is as follows:



10.3. According to the Site Investigation there is a level of made ground on the site as well as a significant level difference on the land that could risk any soakaways being used breaching the surface downstream of the site, we have therefore dismissed the use of soakaways on this site.

10.4. The next level on the hierarchy is discharge to a watercourse, as previous shown Caldershaw Brook runs south of the site which then discharges to the River Spodden, to get to the Brook it would be necessary to cross third party land, however the culverts that run across the access to the site connect up to the culverted watercourse of Caldershaw Brook, it is therefore proposed to connect onto this pipe which in turn connects to Caldershaw Brook.

10.5. The site is historically brownfield, but wherever possible new developments should be returned to greenfield rates, which for this site are as follows: (See Appendix F for calc).

QBAR = 2.67 l/s
1 in 1 Year = 2.32 l/s
1 in 30 Year = 4.53 l/s
1 in 100 Year = 5.55 l/s



10.6. To achieve the QBAR rate for this site we would require an orifice size of 31mm, we consider this too small for a site of this nature as it would be susceptible to blockages, therefore we propose a discharge rate of 5.6 l/s which is the 1 in 100 year greenfield rate and allows for a 44mm orifice, ideally we would prefer an orifice sized no lower than 50mm but then we would be exceeding the equivalent greenfield rate.

10.7. Therefore, it is proposed to discharge to the surface water sewer across the site access that connects into the culverted Caldershaw brook at a controlled rate of **5.6 l/s** with the **1 in 100 Year + 40%** climate change rainfall event is attenuated on site within a cellular attenuation tank. (See Appendix G for Drainage Layout and Appendix H for drainage calcs).

10.8. Foul Drainage

10.9. The foul drainage is proposed to connect into the public foul sewer located in Ings Lane.



11. SUDS Elements

11.1. All new surface water drainage systems should implement SUDS features where reasonably possible, these features are incorporated to offer benefits in Water Quality, Water Quantity, Amenity and Biodiversity. Below we have considered each SUDS element and determined its use within this particular development

COMPONENT	SUITABILITY	REASON
Rainwater Harvesting	X	Site not suitable.
Green Roof	X	Roof not suitable for a Green Roof.
Blue Roof	X	Roof not suitable for a Blue Roof.
Infiltration Systems	X	Ground conditions not suitable
Proprietary Treatment Systems	✓	Flow control to be installed.
Filter Strips	X	Ground conditions not suitable and insufficient land
Filter Drains	X	Ground conditions not suitable and insufficient land
Swales	X	Ground conditions not suitable and insufficient land
Bioretention Systems	✓	Sudspod units utilised, these are installed under the RWP's and collect the water (See Appendix I for more information)
Trees	X	Site constraints do not allow.
Rain Garden	✓	Sudspod units utilised
Permeable Pavements	✓	Permeable paving used in parking bays by units to collect RWP's
Attenuation Storage Tanks	✓	Cellular attenuation tank proposed.
Detention Basins	X	Insufficient land available
Ponds and Wetlands	X	Insufficient land available



12. SUDS Maintenance

12.1. Upon selection of the SUDS elements to be incorporated into the surface water drainage scheme then a maintenance plan needs to be adopted along with responsibility of the maintenance.

12.2. The responsibility can general be with 3 different bodies, it could be 'Private' which means the responsibility remains with the homeowner, it could be 'Public' which means it will be adopted and be the responsibility of the local authority or water authority, or it could be 'Management Company' which means a specialist company could be employed or created for the purpose of maintaining those elements, for the management company there would be an annual charge that the home owners would be expected to pay each year.

	PRIVATE	PUBLIC	MANAGEMENT
Flow Control Device	✓		
Attenuation Tank	✓		
Sudspod Units	✓		
Permeable Paving	✓		

12.3. With each element the relevant responsible person(s) / company will need to undertake different tasks on varying frequencies to ensure the peak performance of the SUDS system and remove the risk of flooding or failure, the maintenance regime and regularity for each element are outlined in the tables below.



12.4. Flow Control Device

An example of operation and maintenance requirements for a proprietary treatment system		
Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

12.5. Attenuation Tank

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

**12.6. Sudspod Units**

Maintenance schedule	Required action	Typical frequency
Regular inspections	Inspect infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary	Quarterly
	Check operation of underdrains by inspection of flows after rain	Annually
	Assess plants for disease infection, poor growth, invasive species etc and replace as necessary	Quarterly
	Inspect inlets and outlets for blockage	Quarterly
Regular maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays	Quarterly to biannually
Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
Remedial actions	Remove and replace filter medium and vegetation above	As required but likely to be > 20 years



12.7. Permeable Paving

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

13. Flood Exceedance Events

13.1. Although the surface water drainage has been designed to accommodate the 1 in 100 year + 40% climate change rainfall event with no flooding, we have to consider events that exceed this and what happens to any flooding that may occur.

13.2. To illustrate this event, we have produced a Flood Exceedance Layout plan (See Appendix J for layout) and from this we can see that flood would occur at the flow control manhole (S13) and then would follow the road as per the original contours of the site.

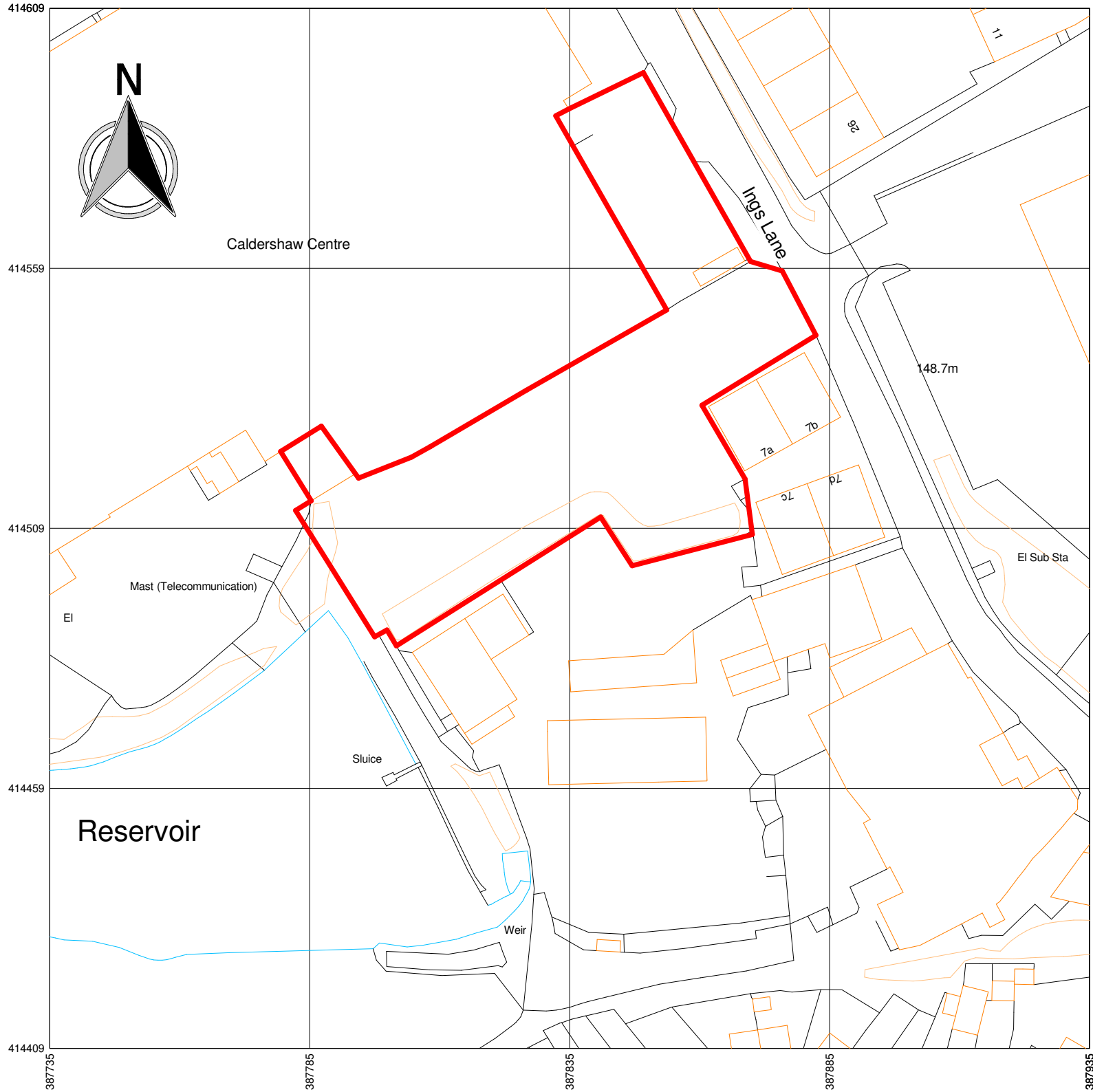


14. Conclusion

- 14.1. Advant Engineers were commissioned by I.Q.7. LTD to undertake a Flood Risk Assessment and Drainage Strategy for the proposed industrial / commercial development at Ings Lane, Rochdale. This report will be provided as supporting documentation as part of a planning application.
- 14.2. The site was historically a brown field site but is now being treated as greenfield, it is 2,962m² (0.296ha) is overall area..
- 14.3. It is proposed to discharge the surface water to Caldershaw Brook via the surface water sewer that crosses the site.
- 14.4. The surface water will be restricted to **5.6 l/s** for the 1 in 100 year + 40% climate change rainfall event with attenuation provided in a cellular storage tank.
- 14.5. Foul drainage is to be discharged to the public foul sewer that crosses the site.
- 14.6. The flood exceedance event allows water flows to follow the road and match the existing undeveloped overland flows.
- 14.7. All public surface water/foul water drainage should be designed in accordance with the Water Authority and Sewers for Adoption.
- 14.8. All private surface water and surface water/foul water drainage should be designed in accordance with the current Building Regulations Part H.



**APPENDIX A
LOCATION PLAN**



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NOTES

CLIENT

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P0 First Issue

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15/09/2023

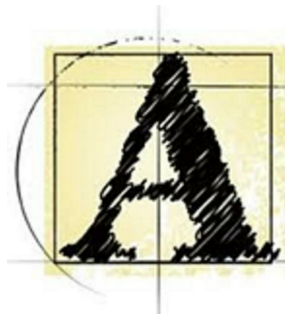
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PROJECT TITLE

Caldershaw Centre, Ings Lane, Rochdale

PLANNING SUBMISSION

DRAWING TITLE

Location Plan

SCALE

@ A3
1 : 1000

DATE

10/09/2023

DRAWING No.

89107-ACC-ZZ-00-DP-A-0001

REVISION

P0



**APPENDIX B
SITE INVESTIGATION**

PHASE I ENVIRONMENTAL AUDIT.
Caldershaw Centre, Ings Lane, Rochdale.

Client:	Iqbal Enterprises.
Date:	August 2013.
Version:	rev0.
Reference:	rep-tjba-iqbal-caldershaw ctr-phs I-160813

PHASE I ENVIRONMENTAL AUDIT.

Caldershaw Centre, Ings Lane, Rochdale.

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PHASE I ENVIRONMENTAL AUDIT.

Caldershaw Centre, Ings Lane, Rochdale.

1. INTRODUCTION.

T. J. Booth Associates have been appointed by Iqbal Enterprises to undertake a Phase I Environmental Audit to the above Site and surrounding area to support Town & Country Planning requirements for development.

The report will provide a desk based study to assess the potential for contamination at the Site, and will assess the effects on potential receptors. Data gathered from various sources will be accessed including information on historic and current maps, landfill activity, industrial activity, geological and mining hazards, and flooding etc.

Recommendations in line with current best practice (CIRIA/CLEA/LQM/NHBC) shall be put forward at the end of the report.

The Site comprises commercial brownfield land on the urban edge of Caldershaw, Rochdale. The developments Site is currently disused land, generally levelled with a slope to the S boundary.

The Phase I report will form part of a planning application to Rochdale MBC.

2. PROPOSED DEVELOPMENT.

The proposed development is for the construction of 11 industrial/commercial units which are proposed nominally to the W and S boundaries, and will share a common yard and site entrance area to the centre (refer to proposed plans in appendix).

The slope to the S perimeter will be re-profiled and the wall to the E rebuilt. The Site will be covered with concrete to the units & yard, with PCC pavements to the perimeter.

3. MAP REVIEW.

3.1. Historic Maps.

An historic map pack was obtained at nominally 1:2500 and 1:10000 scale of the Site and the surrounding area. They were reviewed and tabulated below.

Date	On Site	Off Site / Surrounding Area
c1850	The Site generally field for the most part with structures noted to the East & west sides.	To the WNW is a tenters field, reservoirs to the SW & S. Embankment/slope noted to the S side of the Site. There are building structures to the SE. There is a colliery approx. 400m W. Caldershaw Brook is culverted to the S of the Site. Brookside Mill 150-200m N. Brotherod Cotton Mill approx. 200m E. Clod Cotton Mill 250m E. Spotland Cotton & Woolen Mills 300m E.

c1890	No change.	Caldershaw Mills noted to the NW of the Site (labelled wrong on map, is in fact Caldershaw House). Caldershaw Mills to the SE of the Site with tanks & associated raised bund reservoir. Tanks are adjacent the perimeter of the development Site. Old shaft noted 250-300m W.
c1910	No change.	Caldershaw Mill to the SE noted as dying & finishing. Tanks to the S perimeter of development Site are noted as filter tanks. Asbestos & India Rubber Works 500m E. Caldershaw Brook to the E culverted with made ground now indicated.
c1930	Caldershaw Mill Expanded to N & NW side of the development Site. Tanks & chimneys noted on Site.	Caldershaw Mill expanded to N of Site.
c1960s	Chimneys demolished, mill expanded further on to development Site.	Housing estate erected approx. 150m S & 150m E on now demolished Brothorod Mill Site. Brookside Mill to N demolished. Former Clod & Spotland Mills now just indicated as Works 350E.
c1980s-90s	Further development of Mills on Site.	Caldershaw Mill expanded to the WNW of the Site, replacing Caldershaw House.

3.2. Present Day Maps.

Present day mapping data comprises digital mapping data, topographical survey data, and OS maps.

3.2.1. Site Boundaries, Outlines of Structures and Building Lines.

The present day Caldershaw Centre is split in to different industrial units. The proposed development is to the S side of the Centre, with the old mill reservoir to the SW, Ings Lane access road to the E, and commercial premises to the S and E. The Site is currently a vacant and unused plot of land.

3.2.2. Ground Contours, Natural Drainage Features and Water Courses.

The development Site is relatively flat at a height of nominally 152.5m aOD. There is a slope to the S side of the Site with the adjoining commercial land in the order of nominally 4m. The reservoir to the SW of the Site is fed by Caldershaw Brook which is then culverted under the area S of the Site. The raised bund wall reservoir to the S has now been removed. Drainage from the Site is too the S & W with the natural contours of the land lowest to the S of the Site in the approx. position of the culverted watercourse. The local area is also served by man-made sewerage and piped services.

3.2.3. Indication of Obstructions below Ground.

Historical mapping data indicates that there is an old/disused coal shaft nominally 250-300m W, which indicates a potential for worked coal seams at depth.

3.3. Geological Maps.

The local solid geology was reviewed using BGS Rochdale Sheet 76 (1:10650 edition) map (refer to appendix for maps).

The mapping data indicated that the Site lay on Milnrow Sandstone of the Carboniferous Lower Coal Measures. Undifferentiated sandstones/mudstones outcrop nominally 50m W & 100m E. The Upper Mountain Mine Coal Seam outcrops nominally 450m W, and the region has a stratigraphic dip in the order of approximately 5-10° S.

The drift geology under the Site was noted as being glacial till for much of the local area with some alluvium in the Spodden Valley bottom 300mE.

4. ENVIRONMENTAL DATA SEARCH.

4.1. BGS Borehole Data.

The British Geological Survey has records of boreholes for England & Wales. A number of records were found to the W of Caldershaw Mills. The closest of these indicated up to 7m sand and gravel in the Caldershaw Brook vicinity with 5m of boulder clay found to the estate N of the Mill.

4.2. Environment Agency Data.

The Environment Agency maintains various environmental datasets for England and Wales such as flooding, landfill, and pollution data.

4.2.1. Flooding.

In a search on the development Site, the EA flood mapping data indicated that the Site is not within a flood zone area (refer to EA map in appendix).

4.2.2. Landfill.

In a search on the development Site, the EA landfill mapping data indicated that the Site is not within 250m of a landfill site (refer to EA map in appendix).

4.3. Coal Authority Report.

4.3.1. Mining.

The Coal Authority report indicated that the site is not within the zone of likely physical influence of past or present underground workings. The site is also not within the area for which licences have, or are in the process of being granted; although reserves of coal do exist in the area. Past, present, and future open cast mining is not an issue in the area.

4.3.2. Mine Adits, Shafts, and Entries.

There are no known mine entries exist within the site, or within 20m of the site boundaries.

4.3.3. Mining Geology and Subsidence.

No evidence of any damage has been noted in the area due to lines of weakness or faults occurring as a result of mining activity. No subsidence issues have been noted in the area.

4.3.4. Hazards and Mine Gas.

There have been no records of mine gas or hazards pertaining to the site.

4.4. UK Radon Maps.

UK Radon Maps indicate that the Site is within an area where less than 1% of homes are above the radon action level.

5. FIELDWORK.

5.1. Site Reconnaissance.

A Site reconnaissance/investigation was undertaken on the 23rd August 2013. The weather was overcast but dry.

5.1.1. Records and Details of Existing Structures.

The Site was accessed by an entrance gate to the E side of the Caldershaw Centre off Ings Lane access road.

The E side of the Site comprised a concrete yard which is currently used as a car park to the Eurotyre depot. There was a tank to the NW corner of the yard situated on concrete. There was also some storage of tyres, a container and a prefabricated office block.

The S side of the Caldershaw Centre comprised a generally flat made ground (building rubble including brick, stone, conc, macadam, with occasional metal & plastics etc). The ground was vegetated with weeds/shrubs. The site sloped down to the adjacent landscaping & timber yards to the S. There were occasional areas of minor tipping on Site.

The landscaping & timber yards to the S comprised two storage bays which were used for composts.

Himalayan Balsam was noted to the SW corner adjacent the reservoir.

5.1.2. Water Levels, Directions of Flow and Rates in Rivers.

Caldershaw Brook flows in to the reservoir to the SW. The reservoir has a sluice/culvert outflow which flow under the Adjoining yards to the S.

5.1.3. Records of Adjacent Properties.

Timber yard and landscaping to the S. Other factories/works to the E across Ings Lane access road and to the N.

Reservoir to the SW comprised a concrete wall and bund dam.

5.1.4. Records of Old Mine or Quarry Workings.

None noted.

5.1.5. Records of any Obvious or Immediate Hazards to Health or Safety.

None noted.

5.1.6. Records of Areas of Discoloured Soil, Polluted Water, Vegetation, and Significant Odours.

A putrid odour was noted to the SE corner of the Site adjacent the landscaping yard. However it is thought that the source of the odour was from the compost stores adjacent to the Site in the landscaping yard.

5.1.7. Records of Relevant Ground Levels, Ground Water Levels, Positions of Wells and Springs.

The Site was generally flat with a steep slope in the order of approx. 4m to the S boundary/perimeter. The E boundary had a retaining wall above the adjacent Site nominally 3-4m high.

6. DISCUSSION FROM THE DESK STUDY AND FIELDWORK.

6.1. Preliminary Conceptual Model.

6.1.1. Introduction.

The development Site is on the rural edge of Caldershaw, Rochdale. It is surrounded generally by a commercial premises and some green space, with some residential development in the local area.

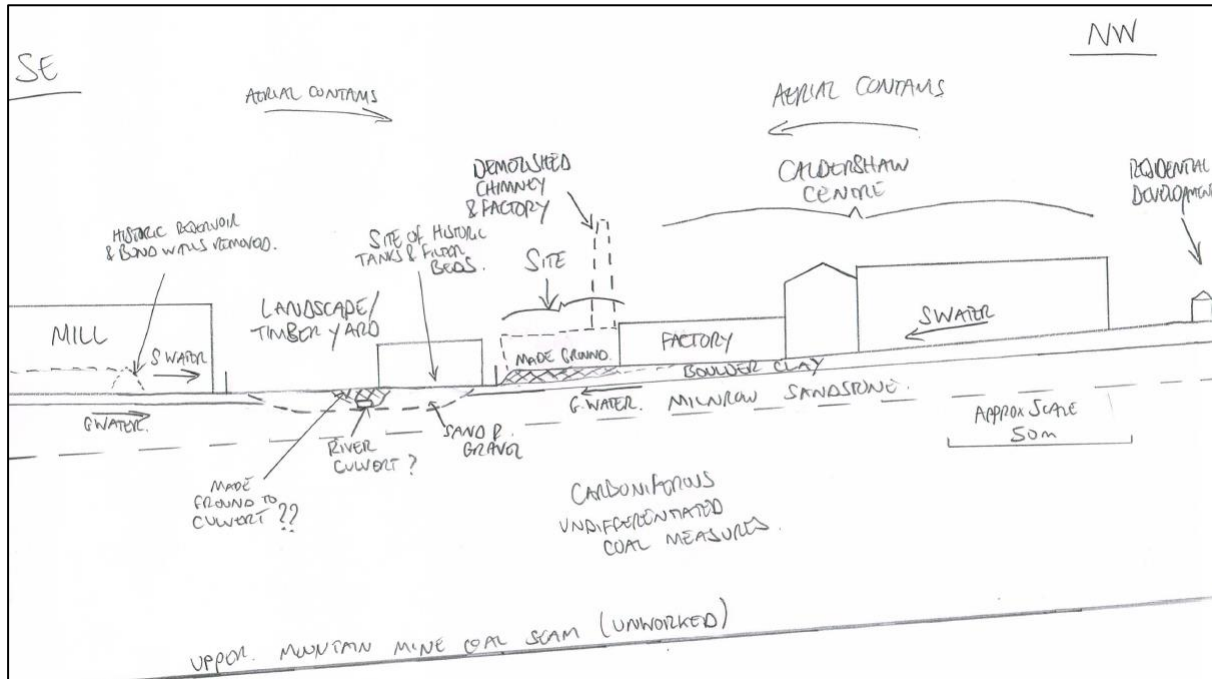
The local area has seen a significant amount of industry in the past due to its location on the Caldershaw Brook, and formed part of the Caldershaw Mills complex which was a dying & finishing mill historically, with cotton & woollen mills in the local area. The majority of the mills in the area have been demolished or modernised/rebuilt.

The Site itself has comprised part of the mill historically as well as housing chimneys and storage tanks. Filter beds have been noted historically to the S of the Site boundary. The Site comprises made ground built up both recently and historically.

Although in a coal mining area, the coal authority report indicated that no seams have been worked beneath the Site. Landfill sites are not an issue in the local area as none are within the standard 250m buffer zone of the Site.

Although there is a reservoir adjacent to the SW corner of the Site, the ground on Site is approx. 4m higher than the adjacent commercial premises to the S. The reservoir to the S of the Site was shown on historical maps to have raised bund banks and so is not thought to be infilled when removed.

6.1.2. Local Conceptual Model.



6.1.3. Potential Contaminants.

Potential minor contaminants include possible furnace ash in made ground (most likely used to build up levels historically but not encountered on Site reconnaissance) which generally contain heavy metals and PAHs as well as contaminants usually associated with building rubble such as sulphates and asbestos fibre or ACMs.

6.1.4. Potential Pathways.

Potential pathways at the Site include:

Ingestion of contaminated plant matter.

Ingestion of soils either via plants, or by children playing.

Ground water pathways.

Surface water pathways.

Ground gas migration and inhalation.

Inhalation of dust.

Dermal contact with contaminated soil/water.

Ingestion of contaminated water.

6.1.5. Potential Receptors.

Receptors include construction workers, potential future residents, plant matter.

6.1.6. Potential Pollutant Linkages.

Below is a tabulated form of the conceptual model.

	Source	Pathway	Receptor
1	On site surface soils.	Direct ingestion, aerial ingestion, dermal contact, drinking water.	Site construction operatives & future workers.
2	Subsoils.	Contact with potential hazards.	Site buildings.
3	Ground gas from coal measures.	Diffusion through soil, aerial inhalation.	Future workers. Site buildings.
4	Ground gas from waste or landfill sites.	Diffusion through soil, aerial inhalation.	Future workers. Site buildings.
5	Contaminated ground and surface water.	Permeation through soils into excavations / basements, dermal contact & ingestion.	Site construction operatives & future workers.
6	Aerial contaminants, settled dust, fumes, from local industrial processes.	Dermal contact & aerial inhalation.	All site users.

7. CONCLUSIONS.

7.1. Preliminary Contaminant Risk Assessment.

The Site will be a commercial development and contaminant hazards will be assessed where appropriate against common/established criteria.

Regarding potential pollutant linkage 1 & 2, there is a potential risk of minor contamination to on Site soil from made ground which is likely to contain furnace ash as well as the noted demolition rubble. These have the potential to contribute minor contamination of heavy metals, PAHs, and inorganic/sulphates & asbestos etc.

Regarding potential pollutant linkage 3, ground gas from coal seams is not thought to pose a risk to the Site. The Coal Authority report indicated that coal had not been worked beneath the Site and no ground gas issues from coal mining had been noted in the local area.

Ground gas sources such as waste & landfill sites in potential pollutant linkage 4 are not considered to pose a risk. No landfill Sites were noted within the 250m buffer of Site Boundaries. However, made ground which the Site generally comprises could potentially pose a minor risk.

Regarding potential pollutant linkage 5, surface/ground water is not considered to present a risk to the Site or development. There were no potentially contaminative uses noted on Site reconnaissance.

Potential pollutant linkage 6 is considered to pose a risk. Although present legislation regarding the release of aerial contaminants is regulated and licensed, past releases would have been unregulated. Any contamination from historic aerial pathways would now be recorded in potential pollutant linkage 1 as shallow ground contamination.

8. RECOMMENDATIONS.

There is the potential for on-site made ground to comprise contaminants; however, the proposed development is for commercial development with warehouse units to the perimeter of the Site with the central area to be a concrete hardstanding yard.

There is no reason why any shallow low level contaminated material can not remain below permanent hardstanding areas such as the concrete yard and building areas where it will not be accessible, thus cutting off any pathway to receptors.

It is recommended however that as part of the development boreholes/trial pits should be undertaken to the Site to better understand the geotechnical conditions of made ground. As part of the Site investigations a soil sampling regime should be undertaken to ascertain whether or not made ground to the Site is contaminated for excavation and tipping purposes.

There are no landfill Sites in the area, so ground gas from these is not considered an issue. Likewise, although coal seams have been noted at depth beneath the Site, the Coal Authority report indicated that the Site is not within the likely zone of physical influence suggesting they are unworked local to the Site, and thus do not pose a gas risk. There is however a potential for minor ground gas from made ground and infilled basements etc.

In lieu of a gas testing regime and dependant on site investigation results at this stage it is recommended that any development unit should comprise class 2 gas protective measures such as:

- a) Reinforced concrete cast in situ floor slab (suspended, non-suspended or raft) with at least 1200g DPM9. All joints and penetrations sealed.
- b) Beam & block or pre-cast concrete slab and minimum 2000g DPM/reinforced gas membrane. All joints and penetrations sealed.
- c) Possibly underfloor venting or pressurisation in combination with a) or b) depending on use.

Signed.....

D.S.Slattery BSc (Hons).

T J Booth Associates.

Authorised.....

T J Booth BSc (Hons), C. Eng. C. Env. MICE.

T J Booth Associates.

9. REFERENCES.

- NHBC. 2007. Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present.
- CIRIA. Report C665.
- CIRIA. Report 130.
- BS:10175.
- BRE 414. 2001. Protective Measures for Housing on Gas Contaminated Land.

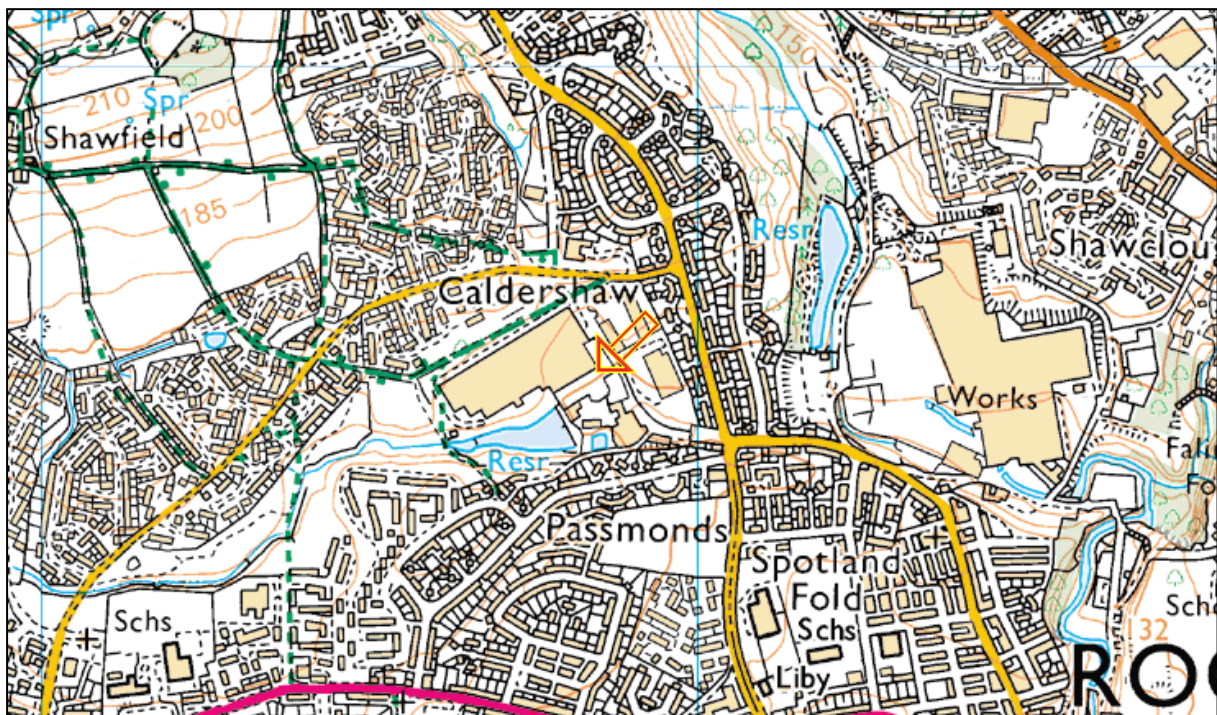
10. APPENDIX A: PHOTOGRAPHS & FIGURES.

10.1. Photographs.

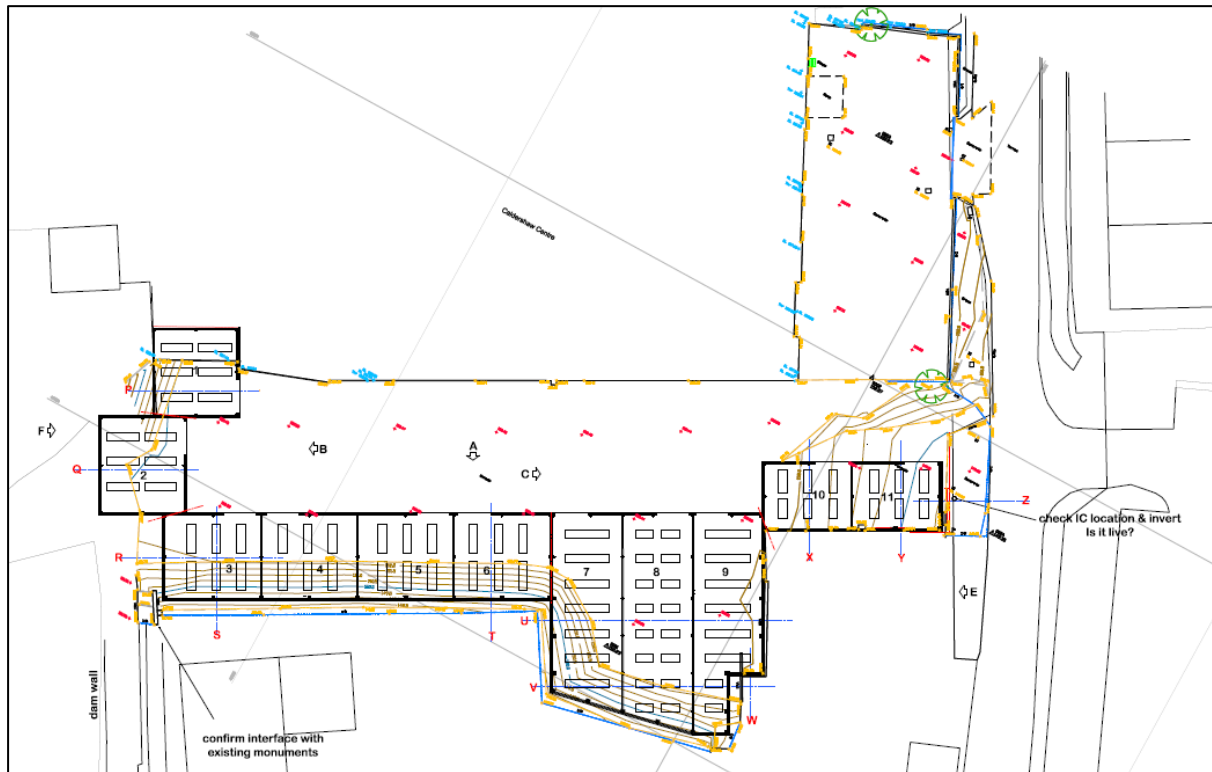




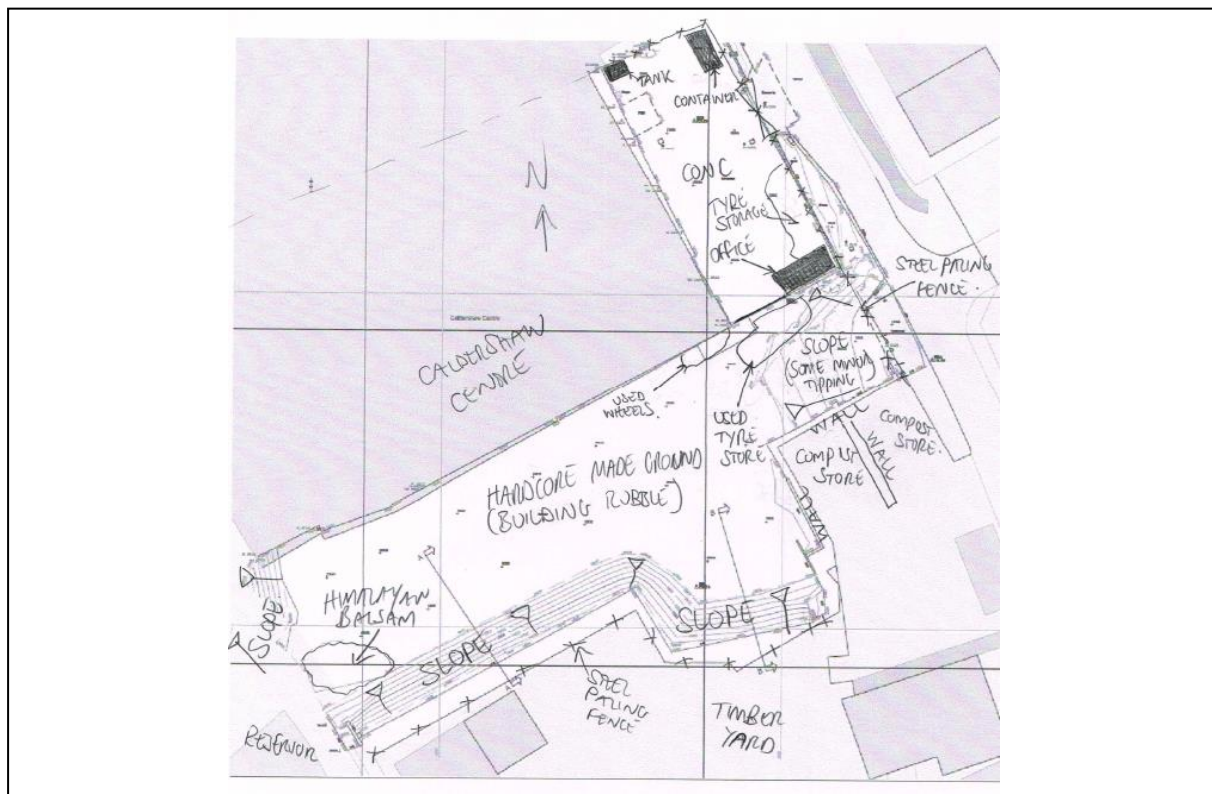
10.2. Location Plan.



10.3. Proposed Site Plan.



10.4. Existing Site Plan/Site Sketch.



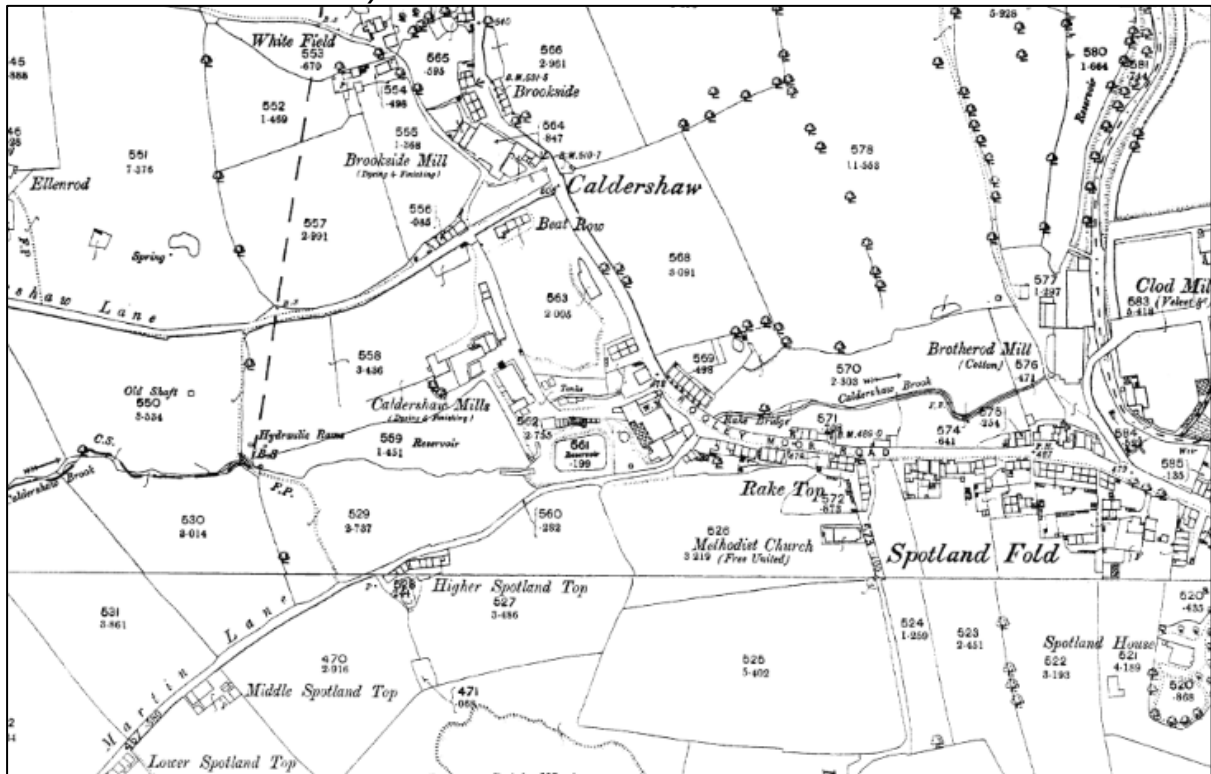
11. APPENDIX B: MAPS.

11.1. Historic Maps.

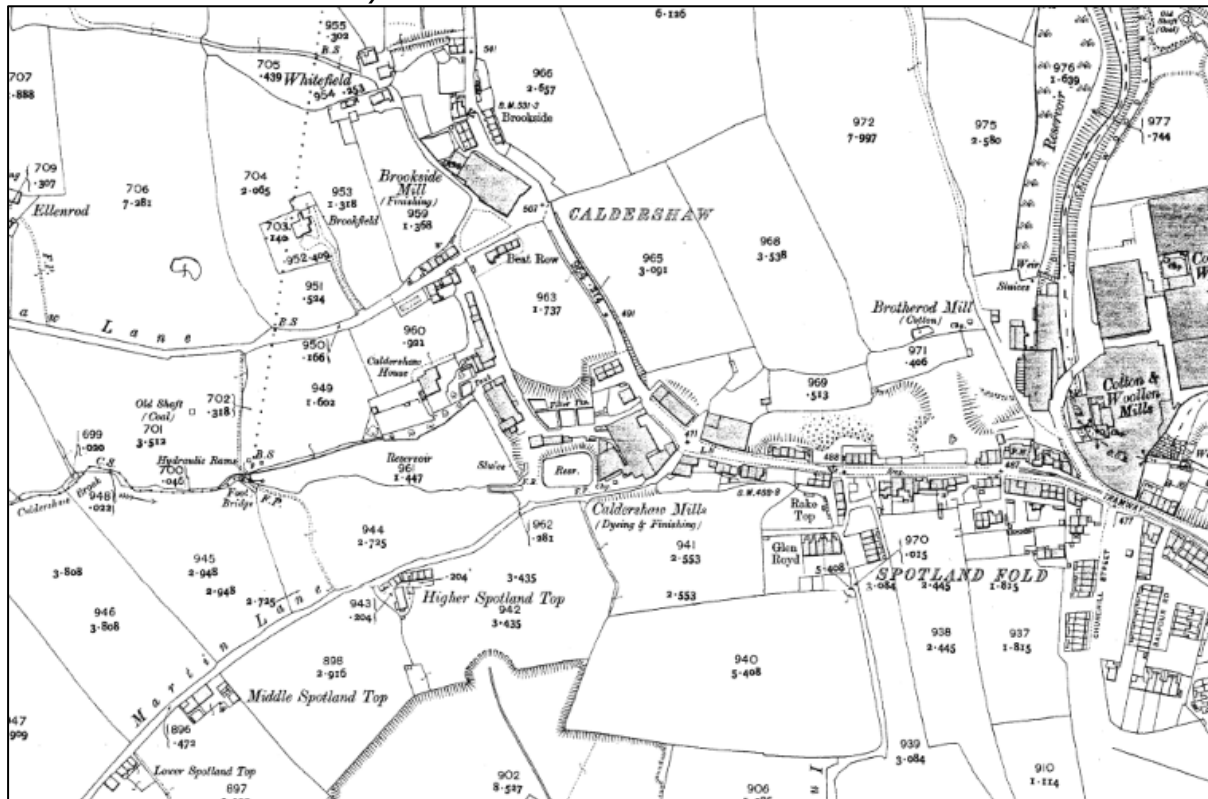
11.1.1.1. Ordnance Survey c1850.



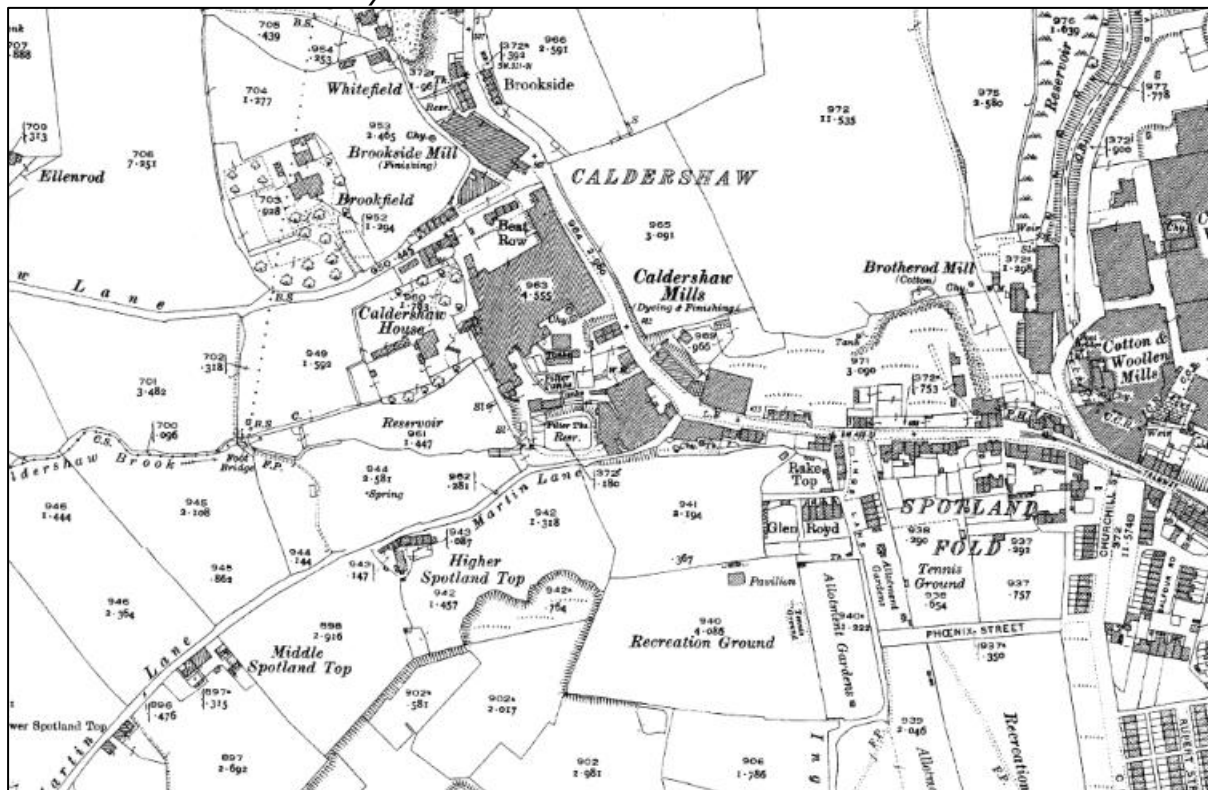
11.1.1.2. Ordnance Survey c1890.



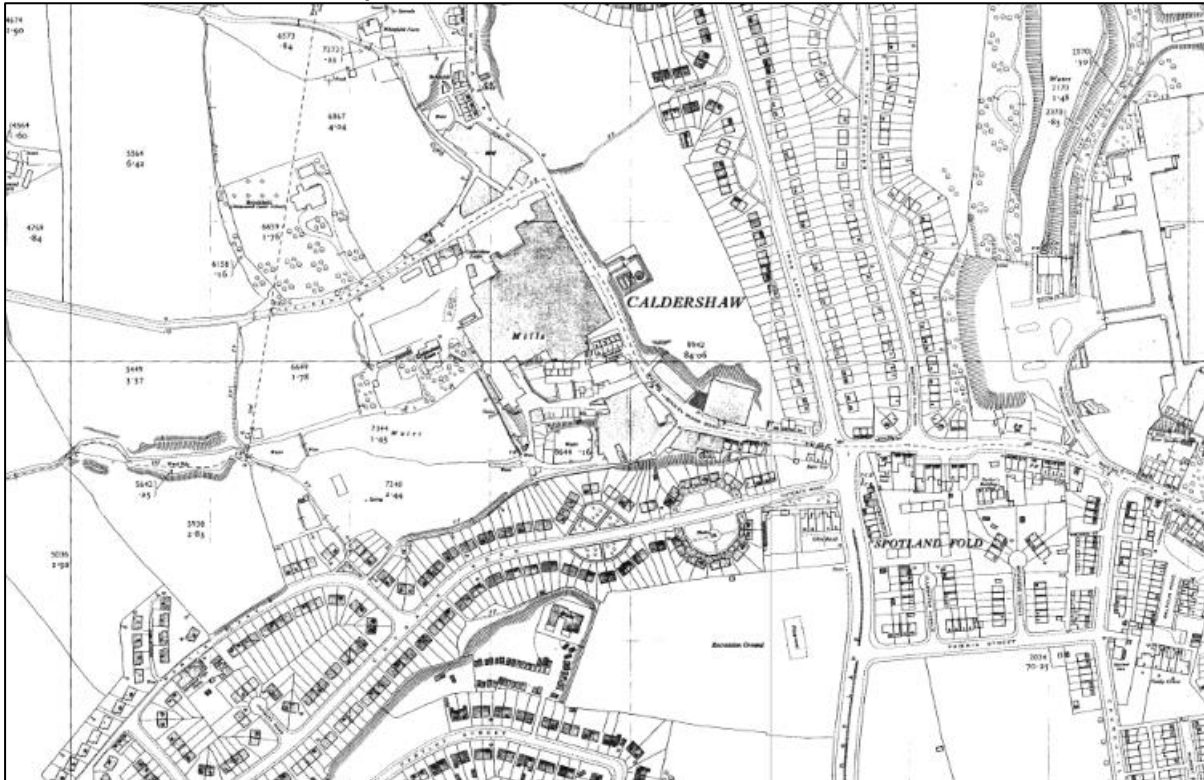
11.1.1.3. Ordnance Survey c1910.



11.1.1.4. Ordnance Survey c1930s.



11.1.1.5. Ordnance Survey c1960s.



11.1.1.6. Ordnance Survey c1980-90s.

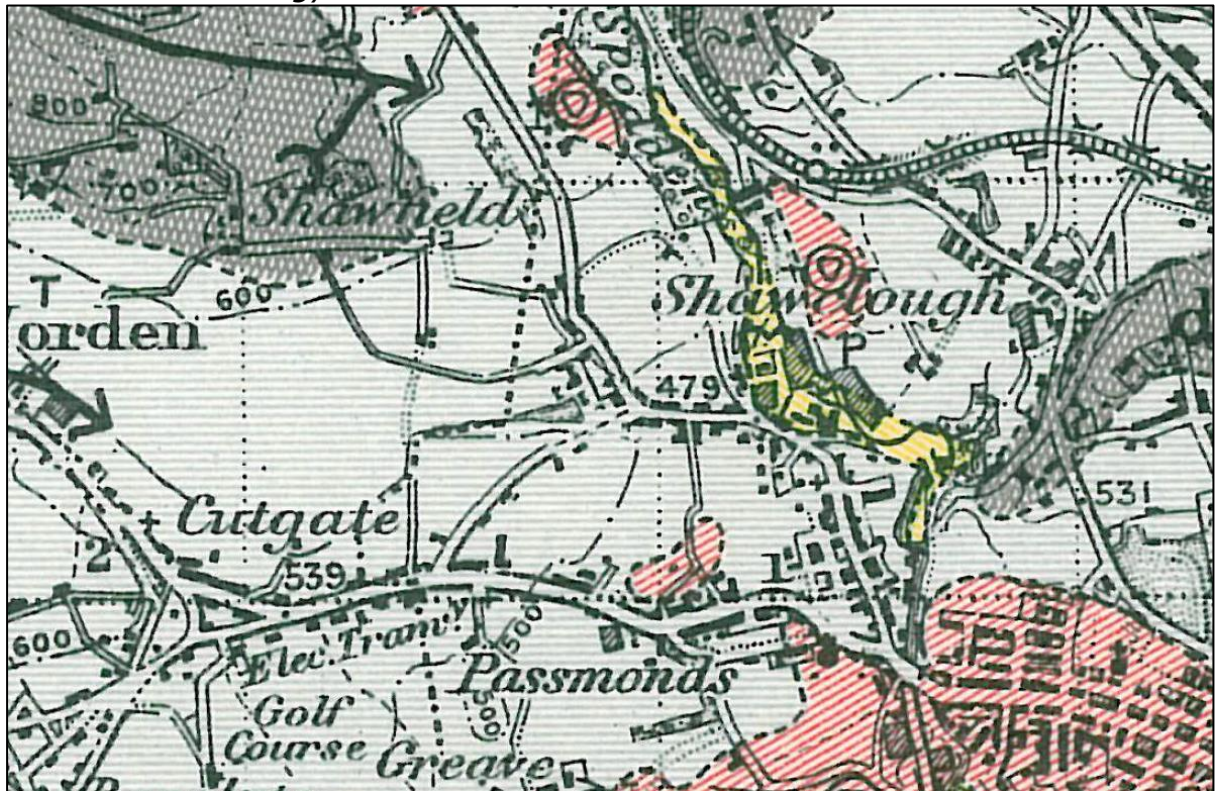


11.2. Geological Maps.

11.2.1.1. Solid Geology.



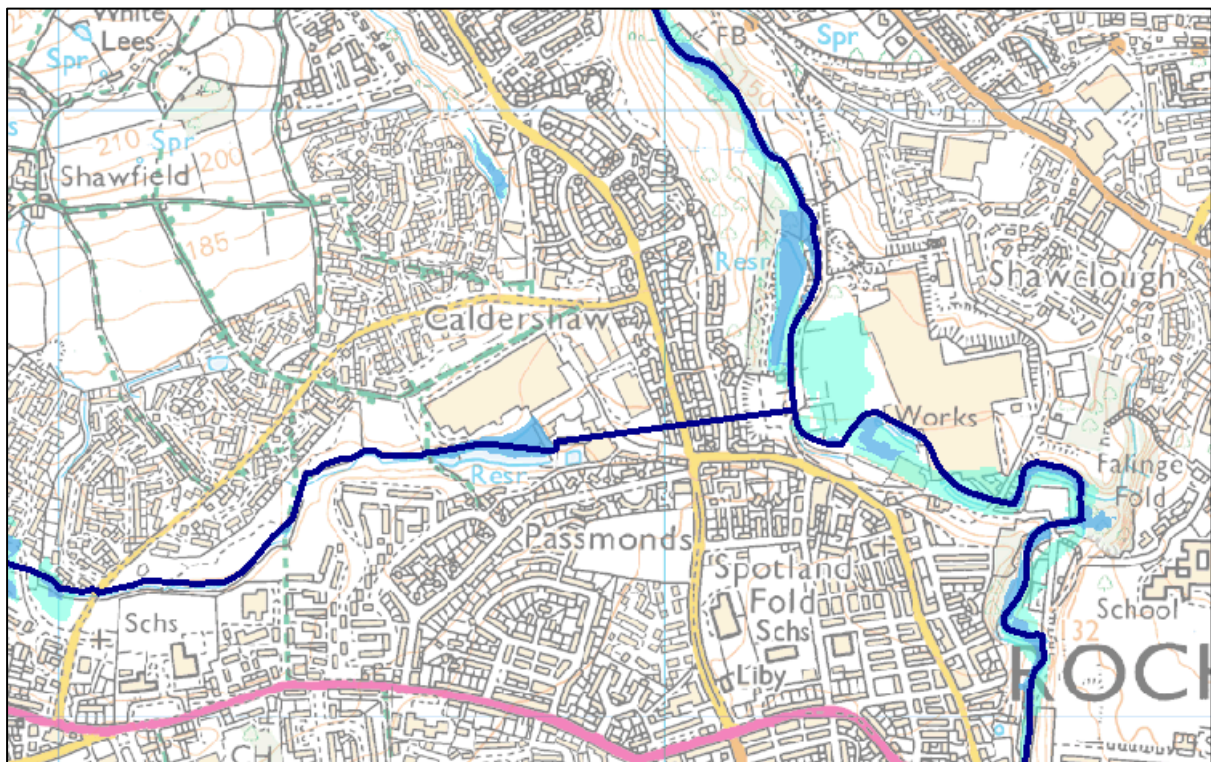
11.2.1.2. Drift Geology.



11.3.Environment Agency Landfill Map.



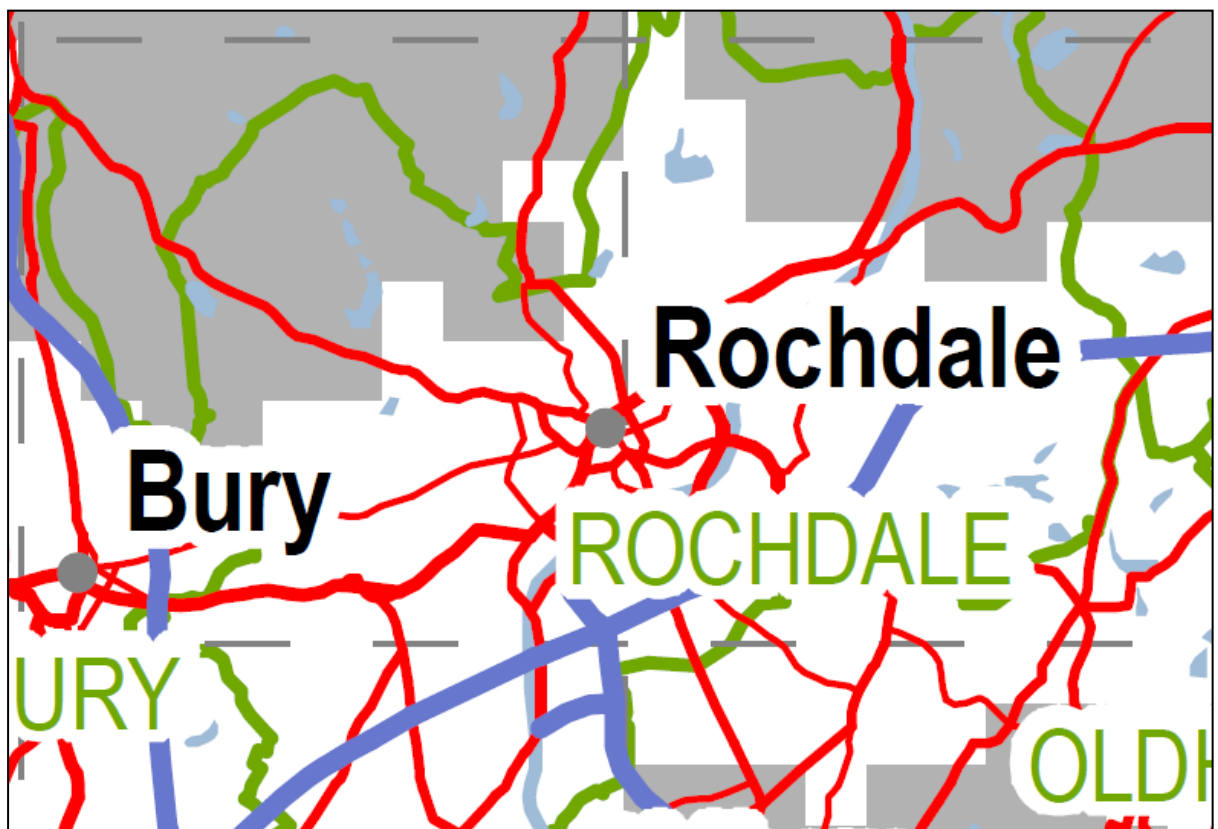
11.4.Environment Agency Flood Map.



11.5. Coal Authority Report Map.



11.6. Radon Map.



12. APPENDIX C: ENVIRONMENTAL DATABASES & REPORTS.

The
COAL
AUTHORITY

Issued by:
The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0845 762 6848 DX 716176 MANSFIELD 5

LANDMARK INFORMATION GROUP LIMITED SOWTON INDUSTRIAL ESTATE ABBEY COURT UNIT 5/7 EAGLE WAY EXETER DEVON EX2 7HY	Our reference: 51000363123001 Your reference: 48630242 Date of your enquiry: 23 August 2013 Date we received your enquiry: 23 August 2013 Date of issue: 23 August 2013
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This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

CALDERSHAW CENTRE, INGS LANE, ROCHDALE , GREATER MANCHESTER,

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	See comments below
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

According to the records in our possession, the property is not within the zone of likely physical influence on the surface from past underground workings.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

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 Non-Residential Coal Authority Mining Report - 51000363123001 Page 1 of 4 —

13. APPENDIX D: TABLES.

13.1. CIRIA SP 78, TABLE 15, Contaminant Hazards Related to End Use.

	Targets and associated hazards ¹						
	1	2	3	4	5	6	7
	Site works	Water resources	Buildings and services	Buildings and services	Garden amenities	Allotments, agriculture	Plant growing
Critical Contamination ²	Harm to workers ³	Leachate pollution ⁴	Fire and explosion	Corrosion or expansion damage ⁴	Harm to children ⁵	Crop uptake of contaminant ⁴	Phyto-toxicity ⁴
Arsenic	○	○			●	○	
Cadmium		○			●	● ¹⁵	
Lead		○		○ ¹¹	●	● ¹⁵	
Cyanide	○	●			● ¹⁴		
PAH ⁶	●		○		●		○
Phenols	●	●		●	●		○
Copper		○		○ ¹¹	○		● ¹⁵
Nickel		○		○ ¹¹			● ¹⁵
Zinc		○		○ ¹¹			● ¹⁵
Sulphate		●		● ¹²	●		○
Sulphide		○		●			
Chloride		○		●			○
Mineral oils	● ⁸	○	○	●	○		
Ammoniumion				●			
Methane	○ ⁹		● ⁹				○
Sulphur			●	○ ¹³			
Combustibles	○		● ⁷				
Oily, tarry substances	●	○	○	●			○
Asbestos	●	○ ¹⁰					
Radioactive materials	●	○			○	○	
Soluble metals		●		○	○		
pH	○	●		●		●	●
Solvents and organics	○	○	○				
Boron		○					○
Expansives				○ ¹⁷			

● Listed contamination hazards (from BS, DD 175 1988, and ICRL Note 59/83 2nd edition 1987).
 ○ Non-listed contamination hazards.

Notes.

1. Combinations of hazards may need investigation.
2. Local factors may involve other contaminants.
3. Workers at risk from contact, inhalation, explosion, fire and ground pH.
4. Soil pH affects incidence of these hazards.
5. Children at risk from inhalation, ingestion and contact.
6. PAH polynuclear aromatic hydrocarbons.
7. Combustibles include coal, oils, tars, refuse, rubber, etc Determine calorific value, loss on ignition, ash and volatile contents, total organic carbon.
8. Mineral oils are industrial hygiene problem, with or without PCB contamination.
9. Continuous on-site monitoring.
10. Hazard if run-off carries friable asbestos into streams.
11. Electrolytic action if free metal present.
12. Total and soluble sulphate (See also Section 1 1.4.4).
13. Corrosion induced by sulphur consuming bacteria.
14. Free cyanide.
15. Total and 'plant-available' metals.
16. Total, 'plant-available' and 'zinc equivalent' values.
17. Expansives include: blast-furnace and steel slags, mining spoils and pyritic materials. Determine: total sulphur and acid soluble sulphate, calcite, and calcium as CaO.

13.2.CLR 8, Table2.1.

Table 2.1 Potential inorganic contaminants for the assessment of industrial land and their receptors

Contaminants ^{a, b}	Receptors			
	Humans	Water	Vegetation and the ecosystem	Construction materials
Metals				
Barium		✓		
Beryllium	✓	✓	✓	
Cadmium	✓	✓	✓	
Chromium	✓	✓		
Copper		✓	✓	
Lead	✓	✓	✓	
Mercury	✓	✓	✓	
Nickel	✓	✓	✓	
Vanadium	✓	✓		
Zinc		✓	✓	
Semi-metals and non-metals				
Arsenic	✓	✓		
Boron		✓	✓	
Selenium	✓	✓	✓	
Sulphur	✓		✓	✓
Inorganic chemicals				
Cyanide (complex)	✓	✓	✓	✓
Cyanide (free) ^c	✓	✓	✓	
Nitrate		✓		
Sulphate		✓	✓	✓
Sulphide		✓	✓	✓
Other				
Asbestos	✓			
pH (acidity/alkalinity)	✓	✓	✓	✓

Notes

^a The list should not be regarded as a comprehensive list that should be taken into account in any particular site investigation. Some contaminants will be of no importance on certain types of site, while some sites may be contaminated by elevated concentrations of particular substances, which may not be selected because of their infrequent occurrence generally.

^b For references to synonyms of substances refer to Appendix C.

^c Free cyanide is broadly equivalent to "easily liberatable cyanide", which covers compounds that can release hydrogen cyanide at pH 4 and 100°C (see paragraph B.15 in Appendix B).

13.3.CLR 8, Table2.2.

Table 2.2 Potential organic contaminants for the assessment of industrial land and their receptors

Contaminants ^{a, b}	Receptors			
	Humans	Water	Vegetation and the ecosystem	Construction materials
Acetone	✓	✓		
Oil/fuel hydrocarbons	✓	✓	✓	✓ ^c
<i>Aromatic Hydrocarbons</i>				
Benzene	✓	✓	✓	✓ ^c
Chlorophenols	✓	✓	✓	✓ ^c
Ethylbenzene	✓	✓	✓	✓ ^c
Phenol	✓	✓	✓	✓ ^c
Toluene	✓	✓	✓	✓ ^c
<i>o</i> -Xylene	✓	✓	✓	✓ ^c
<i>m,p</i> -Xylene	✓	✓	✓	✓ ^c
Polycyclic Aromatic Hydrocarbons	✓	✓		
<i>Chlorinated Aliphatic Hydrocarbons</i> ^d				
Chloroform	✓	✓	✓	
Carbon tetrachloride	✓	✓	✓	✓ ^c
Vinyl chloride	✓	✓		
1,2-Dichloroethane	✓	✓	✓	✓ ^c
1,1,1-Trichloroethane	✓	✓	✓	✓ ^c
Trichloroethene	✓	✓	✓	✓ ^c
Tetrachloroethene	✓	✓	✓	✓ ^c
Hexachlorobuta-1,3-diene	✓	✓	✓	
Hexachlorocyclohexanes	✓	✓	✓	
Dieldrin	✓	✓	✓	
<i>Chlorinated Aromatic Hydrocarbons</i>				
Chlorobenzenes	✓	✓	✓	
Chlorotoluenes	✓	✓	✓	
Pentachlorophenol	✓	✓	✓	
Polychlorinated biphenyls ^e	✓	✓	✓	
Dioxins and furans ^f	✓	✓	✓	
<i>Organometallics</i>				
Organolead compounds	✓		✓	
Organotin compounds	✓	✓		

Notes

^a The list should not be regarded as a comprehensive list that should be taken into account in any particular site investigation. Some contaminants will be of no importance on certain types of site, while some sites may be contaminated by elevated concentrations of particular substances, which may not be selected because of their infrequent occurrence generally.

^b For references to synonyms of substances refer to Appendix C.

^c The impact of chlorinated hydrocarbons and other organic substances is probably limited to concentrations in the free phase.

^d Some chlorinated aliphatic hydrocarbons are considered to be of secondary importance (see paragraphs B.16 and B.17 in Appendix B) and are therefore excluded because they are less toxic, highly volatile or have limited industrial use. However, some highly volatile substances may be significant due to their solubility and are not excluded on grounds of volatility alone.

^e There are 209 polychlorinated biphenyl (PCB) congeners, the significance of which can be expressed using toxic equivalency factors (TEFs) relative to the best-characterised member of the group.

^f There are 210 possible isomers of chlorinated dioxins and furans, of which the most studied and most toxic representative of the group is 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD). Other dioxins and furans could be expressed in terms of TEFs relative to 2,3,7,8-TCDD.

13.4. CIRIA (Report 659) Wilson and Card Classification.

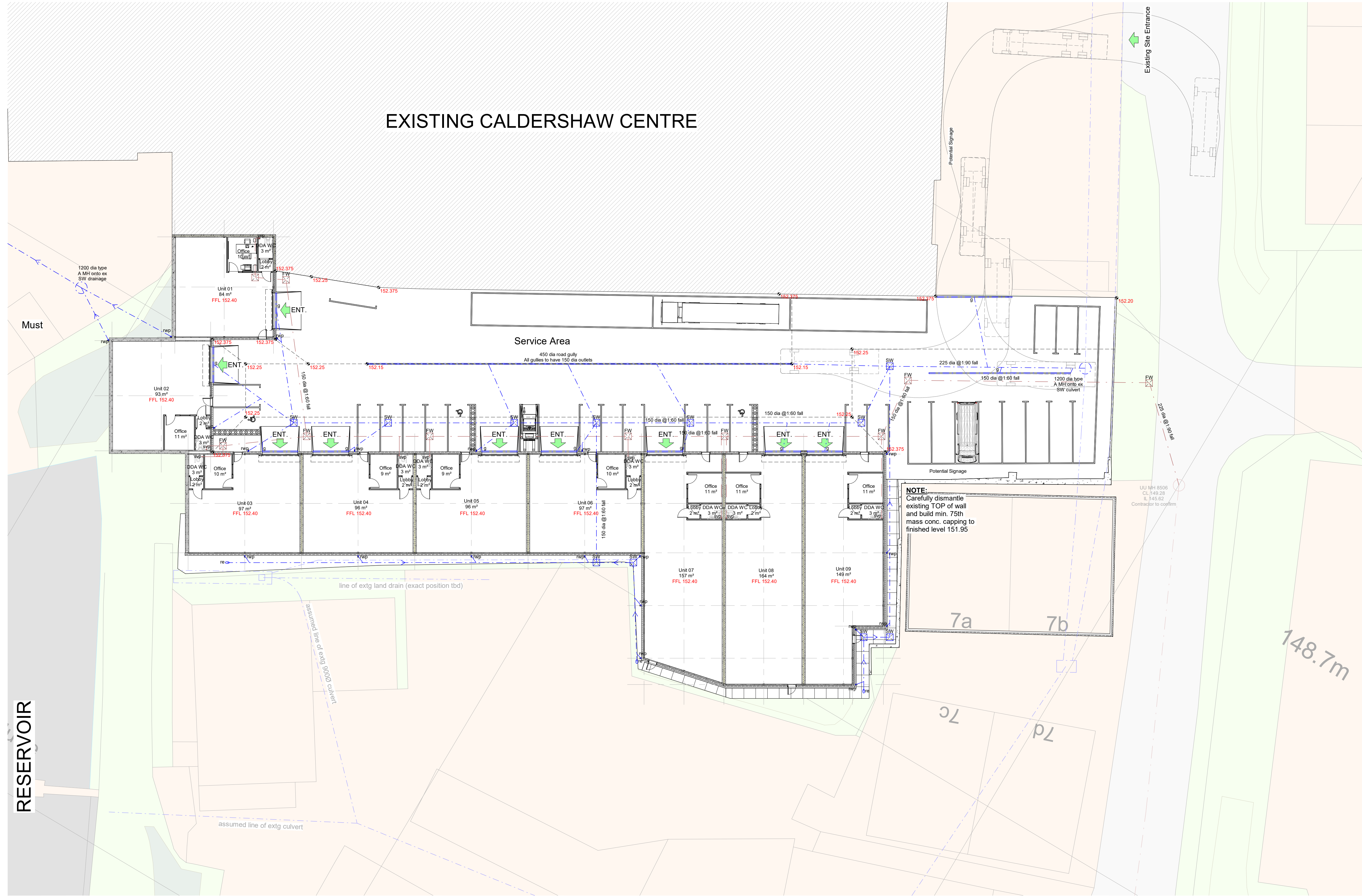
Characteristic Situation (CIRIA Report 149)	Risk Classification	GSV (CH ₄ or CO ₂) (l/hr) ¹	Additional factors	Typical source of generation
1	Very low risk	<0.07	Typically methane ≤1%v/v and/or carbon dioxide ≤5%v/v. Otherwise consider increase to Situation 2	Natural soils with low organic content. "Typical" Made Ground
2	Low risk	<0.7	Borehole flow rate not to exceed 70l/hr. Otherwise consider increase to Situation 3	Natural soil, high peat/organic content. "Typical" Made Ground
3	Moderate risk	<3.5		Old landfill, inert waste, mineworking flooded
4	Moderate to high risk	<15	Quantitative risk assessment required to evaluate scope of protective measures	Mineworking susceptible to flooding, completed landfill (WMP 26B criteria)
5	High risk	<70		Mineworking unflooded inactive with shallow workings near surface
6	Very high risk	>70		Recent landfill site
Notes: 1. Gas screening value: litres of gas/hour is calculated by multiplying the gas concentration (%) by the measured borehole flow rate (l/hr); 2. Site characterisation should be based on gas monitoring of concentrations and borehole flow rates for the minimum periods as defined within CIRIA Report 659; 3. Source of gas and generation potential/performance must be identified; 4. Soil gas investigation to be in accordance with guidance contained within CIRIA Report 659; 5. If there is no detectable flow, use the limit of detection of the instrument; 6. The boundaries between the Partners in Technology classifications do not fit exactly with the boundaries for the above classification.				

13.5. CIRIA (Report 659) Wilson and Card Protective Measures.

Characteristic Situation (From Table 11.1)	Residential building (Not low-rise traditional housing) ¹		Commercial /industrial development	
	Number of levels of protection	Typical scope of protective measures	Number of levels of protection	Typical scope of protective measures
1	None	No special precautions	None	No special precautions
2	2	a) Reinforced concrete cast in situ floor slab (suspended, nonsuspended or raft) with at least 1200g DPM9 and underfloor venting b) Beam and block or pre-cast concrete and 2000 g DPM/reinforced gas membrane and underfloor venting. All joints and penetrations sealed. 1 to 2	1 to 2	a) Reinforced concrete cast in situ floor slab (suspended, non-suspended or raft) with at least 1200g DPM9 b) Beam and block or pre cast concrete slab and minimum 2000g DPM/reinforced gas membrane c) Possibly underfloor venting or pressurisation in combination with a) and b) depending on us All joints and penetrations sealed.
3	2	All types of floor slab as above. All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated or positively pressurised underfloor sub-space.	1 to 2	All types of floor slab as above. All joints and penetrations sealed. Minimum 2000g/reinforced gas proof membrane and passively ventilated underfloor sub-space or positively pressurised underfloor sub-space
4	3	All types of floor slab as above. All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated underfloor subspace or positively pressurised underfloor sub-space, oversite capping or blinding and in ground venting layer.	2 to 3	All types of floor slab as above. All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated or positively pressurised underfloor sub-space with monitoring facility.
5	4	Reinforced concrete cast in situ floor slab (suspended, non-suspended or raft). All joints and penetrations sealed. Proprietary gas resistant membrane and ventilated or positively pressurised underfloor sub-space, oversite capping and in ground venting layer and in ground venting wells or barriers.	3 to 4	Reinforced concrete cast in-situ floor slab (suspended, non-suspended or raft). All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated or positively pressurised underfloor sub-space with monitoring facility. In ground venting wells or barriers.

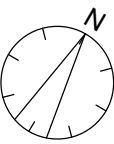


APPENDIX C PROPOSED LAYOUT



NO RESPONSIBILITY SHALL BE TAKEN FOR ANY USE MADE OF THIS DOCUMENT OTHER THAN FOR THAT WHICH IT WAS PREPARED AND ISSUED.
ALL DIMENSIONS SHOULD BE CHECKED ON SITE.
DO NOT SCALE FROM THIS DRAWING
ANY DRAWING ERRORS OR DIVERGENCIES SHOULD BE BROUGHT TO THE ATTENTION OF DESIGN TEAM AT THE ADDRESS SHOWN BELOW.

NOTES

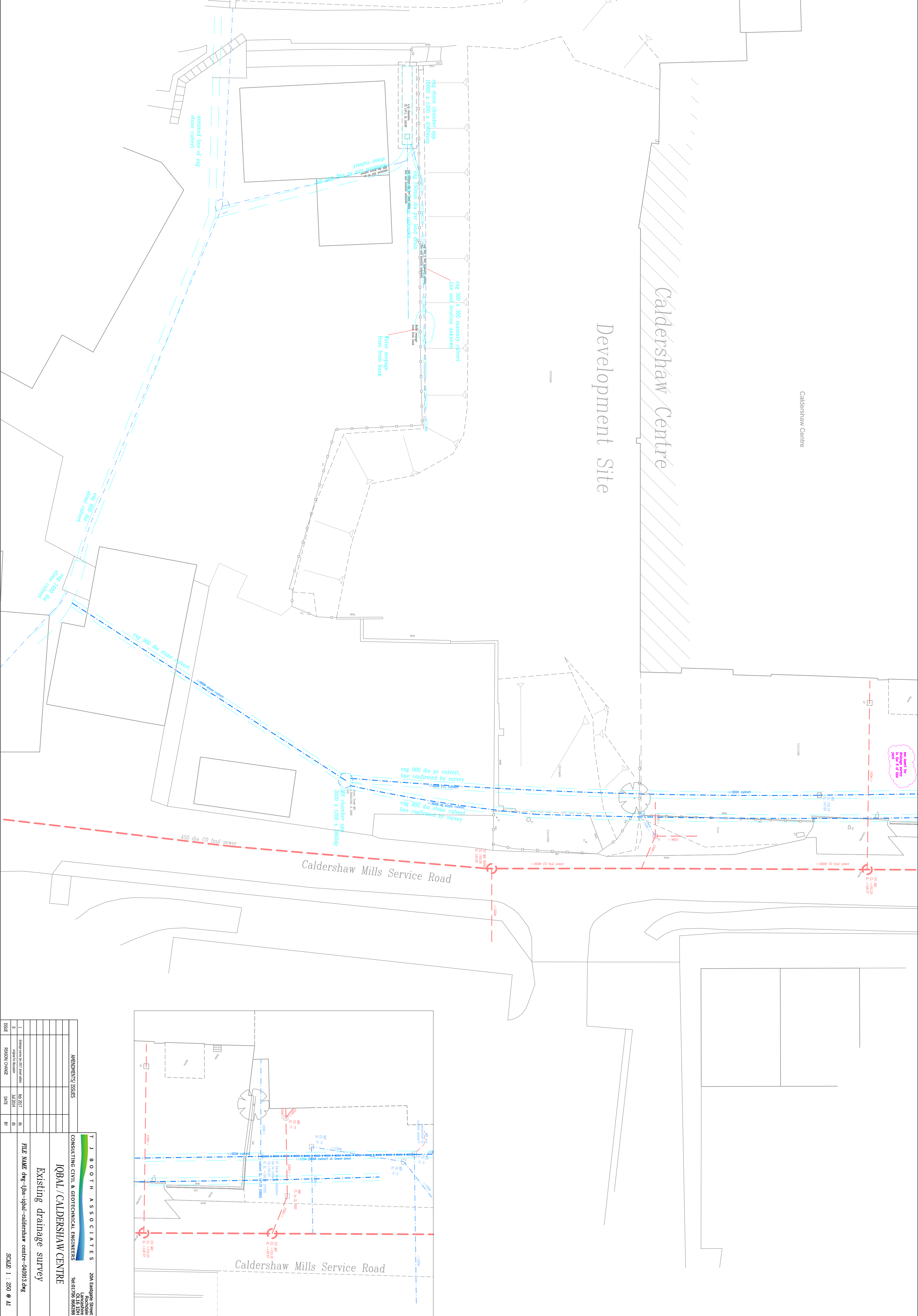


1 Proposed - Site Plan
1 : 200

				CLIENT I.Q.7. LTD		PROJECT TITLE Caldershaw Centre, Ings Lane, Rochdale	
				33 Mere Drive Clifton Swinton Manchester, M27 8SD United Kingdom M: +44 (0)746 264 4148 E: achiguma@icloud.com		PLANNING SUBMISSION	
						CLIENT TITLE Proposed Site Plan	SCALE @ A1 1 : 200
						DATE 10/09/2023	REVISION P1
				P1 Vehicle turning circle added P0 First Issue		DRAWN AC	
				CHECKED KK		DATE 10/11/2023 15/09/2023	



**APPENDIX D
EXISTING DRAINAGE SURVEY**



T J BOOTH ASSOCIATES		200 Eastgate Street
CONSULTING CIVIL & GEOTECHNICAL ENGINEERS		Leeds LS1 3BH
IQBAL / CALDERSHAW CENTRE		TEL: 0113 275 8828
Existing drainage survey		
FILE NAME: dwg-iba-iqbal-caldershaw centre-040913.dwg		
ISSUE	REVISION/CHANGE	DATE
1	dwg sent to client for 2017 input details	14/03/2017
0	original to designer	14/03/2014



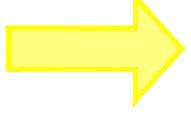
APPENDIX E
RESERVOIR BREACH MAP



NOTES

1. THIS DRAWING IS PRODUCED FOR USE IN THIS PROJECT ONLY AND MAY NOT BE USED FOR ANY OTHER PURPOSE. THE CONSULTING ENGINEERS ACCEPT NO LIABILITY FOR THE USE OF THIS DRAWING OTHER THAN THE PURPOSE FOR WHICH IT WAS INTENDED IN CONNECTION WITH THIS PROJECT AS RECORDED ON THE TITLE BLOCK FIELDS 'PURPOSE FOR ISSUE' AND 'FILE STATUS CODE'.
2. THIS DRAWING MAY NOT BE REPRODUCED IN ANY FORM WITHOUT PRIOR WRITTEN AGREEMENT FROM ADVANT ENGINEERS.
3. DO NOT SCALE FROM THE DRAWING. USE WRITTEN DIMENSIONS ONLY.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
5. DISCREPANCIES MUST BE REPORTED BACK TO THE ENGINEER PRIOR TO CONSTRUCTION.
6. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ADVANT ENGINEERS DRAWINGS AND SPECIFICATIONS.

KEY

 FLOW ARROW

A	INITIAL ISSUE	MJM	07.07.25
REV	AMENDMENTS	BY	DATE

FOR APPROVAL

STATUS	CHK'D
PRELIMINARY	MJM
FOR COMMENT	MJM
FOR APPROVAL	MJM
FOR CONSTRUCTION	
AS BUILT	



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Unit 6 Benton Office Park, Bennett Avenue
Horbury, Wakefield, West Yorkshire, WF4 5RA
01924 654108
wakefield@advantengineers.co.uk

CLIENT			
I.Q.7 LTD			

CONTRACT			
CALDERSHAW CENTRE INGS LANE ROCHDALE			

TITLE			
RESERVOIR BREACH PLAN			

DRAWN	MJM	CHK'D	MJM
SCALE	1:250 @ A1	DATE	07.07.25

JOB No	DRG No	REV
23083	104	A



**APPENDIX F
GREENFIELD CALC**

Calculated by:	Michael Mickethwaite
Site name:	Caldershaw
Site location:	Rochdale

Site Details

Latitude:	53.62693° N
Longitude:	2.18508° W
Reference:	4179044664
Date:	Mar 18 2024 15:10

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): **0.296**

Methodology

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

Notes

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

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

Soil characteristics

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

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

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

Hydrological characteristics

	Default	Edited
SAAR (mm):	1193	1193
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 $SPR/SPRHOST \leq 0.3$?

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

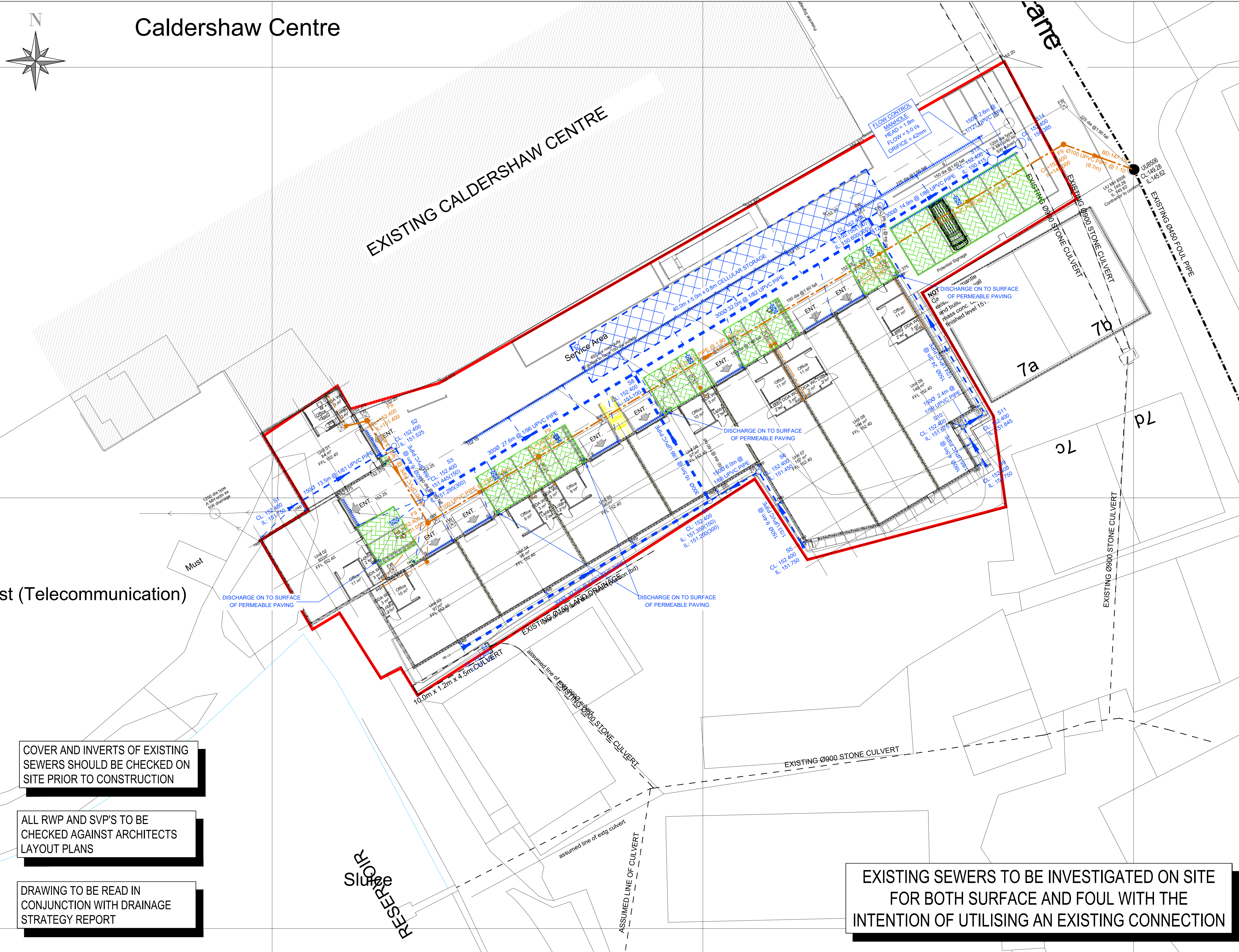
Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	2.67	2.67
1 in 1 year (l/s):	2.32	2.32
1 in 30 years (l/s):	4.53	4.53
1 in 100 year (l/s):	5.55	5.55
1 in 200 years (l/s):	6.32	6.32

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.



**APPENDIX G
DRAINAGE LAYOUT**



- NOTES
1. THIS DRAWING IS PRODUCED FOR USE IN THIS PROJECT ONLY AND MAY NOT BE USED FOR ANY OTHER PURPOSE. THE CONSULTING ENGINEERS ACCEPT NO LIABILITY FOR THE USE OF THIS DRAWING OTHER THAN THE PURPOSE FOR WHICH IT WAS INTENDED IN CONNECTION WITH THIS PROJECT AS RECORDED ON THE TITLE BLOCK FIELDS 'PURPOSE FOR ISSUE' AND 'FILE STATUS CODE'.
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 3. DO NOT SCALE FROM THE DRAWING. USE WRITTEN DIMENSIONS ONLY.
 4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
 5. DISCREPANCIES MUST BE REPORTED BACK TO THE ENGINEER PRIOR TO CONSTRUCTION.
 6. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ADVANT ENGINEERS DRAWINGS AND SPECIFICATIONS.

KEY

- EXISTING FW SEWER
- EXISTING SW SEWER
- PROPOSED SW SEWER
- PROPOSED FW SEWER
- PERMEABLE PAVING
- SUDSPOD

C	UPDATED TO LLFA COMMENTS	MJM	01.07.25
B	UPDATED TO LLFA COMMENTS	MJM	01.05.25
A	INITIAL ISSUE	MJM	19.03.24
REV	AMENDMENTS	BY	DATE

FOR APPROVAL			
STATUS		CHK'D	
PRELIMINARY		MJM	
FOR COMMENT		MJM	
FOR APPROVAL		MJM	
FOR CONSTRUCTION			
AS BUILT			

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CLIENT
I.Q.7 LTD

CONTRACT
CALDERSHAW CENTRE
INGS LANE
ROCHDALE

TITLE
PROPOSED DRAINAGE
LAYOUT PLAN

DRAWN	MJM	CHK'D	MJM
SCALE	1:200 @ A1	DATE	19.03.24

JOB No	DRG No	REV
23083	101	C

Caldershaw Centre

st (Telecommunication)

COVER AND INVERTS OF EXISTING SEWERS SHOULD BE CHECKED ON SITE PRIOR TO CONSTRUCTION

ALL RWP AND SVP'S TO BE CHECKED AGAINST ARCHITECTS LAYOUT PLANS

DRAWING TO BE READ IN CONJUNCTION WITH DRAINAGE STRATEGY REPORT

EXISTING SEWERS TO BE INVESTIGATED ON SITE FOR BOTH SURFACE AND FOUL WITH THE INTENTION OF UTILISING AN EXISTING CONNECTION



APPENDIX H DRAINAGE CALCS

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Adoptable Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
374	1200	749	1500
499	1350	900	1800

>900 Link+900 mm

Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)
1.500	1050	99.999	1200

Circular Link Type

Shape	Circular	Auto Increment (mm)	75
Barrels	1	Follow Ground	x

Available Diameters (mm)

100 | 150

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.012	5.00	152.400	900	-1.936	28.051	0.650
S2	0.011	5.00	152.400	900	11.849	28.051	0.875
S3	0.065	5.00	152.400	900	11.849	21.007	1.105
S4	0.024	5.00	152.400	900	7.220	3.799	0.650
S5	0.020	5.00	152.400	900	46.683	-5.904	0.650
S6	0.012	5.00	152.400	900	46.683	3.799	0.950
S7			152.400	900	40.070	3.799	1.200
S8	0.077	5.00	152.400	900	40.070	20.987	1.400
S9	0.007	5.00	152.400	900	69.718	-8.656	0.650
S10			152.400	900	69.718	-3.801	0.725
S11	0.024	5.00	152.400	900	72.690	-3.801	0.755
S12	0.077	5.00	152.400	900	72.690	21.007	1.800
S13			152.400	1200	88.523	21.007	1.985
S14			152.400	1200	92.327	21.007	2.015

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
3.000	S1	S2	13.785	0.600	151.750	151.525	0.225	61.3	150	5.18	50.0
3.001	S2	S3	7.044	0.600	151.525	151.445	0.080	88.1	150	5.29	50.0
3.002	S3	S8	28.221	0.600	151.295	151.000	0.295	95.7	300	5.58	50.0
1.000	S4	S7	32.850	0.600	151.750	151.200	0.550	59.7	300	5.27	50.0
1.001	S7	S8	17.188	0.600	151.200	151.000	0.200	85.9	300	5.44	50.0
2.000	S5	S6	9.703	0.600	151.750	151.450	0.300	32.3	150	5.09	50.0
2.001	S6	S7	6.613	0.600	151.450	151.350	0.100	66.1	150	5.18	50.0
1.002	S8	S12	32.620	0.600	151.000	150.600	0.400	81.6	300	5.89	48.9
4.000	S9	S10	4.855	0.600	151.750	151.675	0.075	64.7	150	5.06	50.0
4.001	S10	S11	2.972	0.600	151.675	151.645	0.030	99.1	150	5.11	50.0
4.002	S11	S12	24.808	0.600	151.645	150.750	0.895	27.7	150	5.33	50.0
1.003	S12	S13	15.833	0.600	150.600	150.415	0.185	85.6	300	6.05	48.0
1.004	S13	S14	3.804	0.600	150.415	150.385	0.030	126.8	300	6.09	47.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
3.000	1.287	22.7	1.6	0.500	0.725	0.012	0.0	27	0.749
3.001	1.071	18.9	3.1	0.725	0.805	0.023	0.0	41	0.795
3.002	1.607	113.6	11.9	0.805	1.100	0.088	0.0	65	1.054
1.000	2.038	144.0	3.3	0.350	0.900	0.024	0.0	31	0.846
1.001	1.697	119.9	7.6	0.900	1.100	0.056	0.0	51	0.959
2.000	1.776	31.4	2.7	0.500	0.800	0.020	0.0	30	1.088
2.001	1.238	21.9	4.3	0.800	0.900	0.032	0.0	45	0.969
1.002	1.742	123.1	29.3	1.100	1.500	0.221	0.0	99	1.437
4.000	1.252	22.1	0.9	0.500	0.575	0.007	0.0	21	0.626
4.001	1.009	17.8	0.9	0.575	0.605	0.007	0.0	24	0.538
4.002	1.919	33.9	4.2	0.605	1.500	0.031	0.0	35	1.308
1.003	1.700	120.2	42.8	1.500	1.685	0.329	0.0	123	1.560
1.004	1.395	98.6	42.5	1.685	1.715	0.329	0.0	137	1.344

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
3.000	13.785	61.3	150	Circular	152.400	151.750	0.500	152.400	151.525	0.725
3.001	7.044	88.1	150	Circular	152.400	151.525	0.725	152.400	151.445	0.805
3.002	28.221	95.7	300	Circular	152.400	151.295	0.805	152.400	151.000	1.100
1.000	32.850	59.7	300	Circular	152.400	151.750	0.350	152.400	151.200	0.900
1.001	17.188	85.9	300	Circular	152.400	151.200	0.900	152.400	151.000	1.100
2.000	9.703	32.3	150	Circular	152.400	151.750	0.500	152.400	151.450	0.800
2.001	6.613	66.1	150	Circular	152.400	151.450	0.800	152.400	151.350	0.900

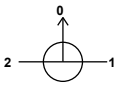
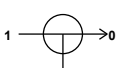
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.000	S1	900	Manhole	Adoptable	S2	900	Manhole	Adoptable
3.001	S2	900	Manhole	Adoptable	S3	900	Manhole	Adoptable
3.002	S3	900	Manhole	Adoptable	S8	900	Manhole	Adoptable
1.000	S4	900	Manhole	Adoptable	S7	900	Manhole	Adoptable
1.001	S7	900	Manhole	Adoptable	S8	900	Manhole	Adoptable
2.000	S5	900	Manhole	Adoptable	S6	900	Manhole	Adoptable
2.001	S6	900	Manhole	Adoptable	S7	900	Manhole	Adoptable

Pipeline Schedule

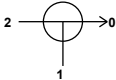
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.002	32.620	81.6	300	Circular	152.400	151.000	1.100	152.400	150.600	1.500
4.000	4.855	64.7	150	Circular	152.400	151.750	0.500	152.400	151.675	0.575
4.001	2.972	99.1	150	Circular	152.400	151.675	0.575	152.400	151.645	0.605
4.002	24.808	27.7	150	Circular	152.400	151.645	0.605	152.400	150.750	1.500
1.003	15.833	85.6	300	Circular	152.400	150.600	1.500	152.400	150.415	1.685
1.004	3.804	126.8	300	Circular	152.400	150.415	1.685	152.400	150.385	1.715

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.002	S8	900	Manhole	Adoptable	S12	900	Manhole	Adoptable
4.000	S9	900	Manhole	Adoptable	S10	900	Manhole	Adoptable
4.001	S10	900	Manhole	Adoptable	S11	900	Manhole	Adoptable
4.002	S11	900	Manhole	Adoptable	S12	900	Manhole	Adoptable
1.003	S12	900	Manhole	Adoptable	S13	1200	Manhole	Adoptable
1.004	S13	1200	Manhole	Adoptable	S14	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	-1.936	28.051	152.400	0.650	900				
						0	3.000	151.750	150
S2	11.849	28.051	152.400	0.875	900				
						0	3.001	151.525	150
S3	11.849	21.007	152.400	1.105	900				
						0	3.002	151.295	300
S4	7.220	3.799	152.400	0.650	900				
						0	1.000	151.750	300
S5	46.683	-5.904	152.400	0.650	900				
						0	2.000	151.750	150
S6	46.683	3.799	152.400	0.950	900				
						0	2.001	151.450	150
S7	40.070	3.799	152.400	1.200	900				
						2	1.000	151.200	300
						0	1.001	151.200	300
S8	40.070	20.987	152.400	1.400	900				
						1	3.002	151.000	300
						2	1.001	151.000	300
						0	1.002	151.000	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S9	69.718	-8.656	152.400	0.650	900				
						0	4.000	151.750	150
S10	69.718	-3.801	152.400	0.725	900				
						1	4.000	151.675	150
						0	4.001	151.675	150
S11	72.690	-3.801	152.400	0.755	900				
						1	4.001	151.645	150
						0	4.002	151.645	150
S12	72.690	21.007	152.400	1.800	900				
						1	4.002	150.750	150
						2	1.002	150.600	300
						0	1.003	150.600	300
S13	88.523	21.007	152.400	1.985	1200				
						1	1.003	150.415	300
						0	1.004	150.415	300
S14	92.327	21.007	152.400	2.015	1200				
						1	1.004	150.385	300

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	------

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Node S13 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.800	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	5.0		
Invert Level (m)	150.415	Diameter (m)	0.042		

Node S12 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	150.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	200.0	0.0	0.800	200.0	0.0	0.801	0.0	0.0

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	151.778	0.028	1.7	0.0277	0.0000	OK
15 minute winter	S2	10	151.569	0.044	3.3	0.0390	0.0000	OK
15 minute winter	S3	10	151.361	0.066	12.4	0.1192	0.0000	OK
15 minute winter	S4	10	151.781	0.031	3.4	0.0432	0.0000	OK
15 minute winter	S5	10	151.780	0.030	2.8	0.0378	0.0000	OK
15 minute winter	S6	10	151.499	0.049	4.5	0.0434	0.0000	OK
15 minute winter	S7	11	151.251	0.051	7.8	0.0325	0.0000	OK
15 minute winter	S8	10	151.118	0.118	30.6	0.2041	0.0000	OK
15 minute winter	S9	10	151.772	0.022	1.0	0.0188	0.0000	OK
15 minute winter	S10	11	151.699	0.024	1.0	0.0152	0.0000	OK
15 minute winter	S11	10	151.681	0.036	4.3	0.0463	0.0000	OK
180 minute winter	S12	156	150.768	0.168	13.5	32.2556	0.0000	OK
180 minute winter	S13	152	150.769	0.354	6.9	0.4005	0.0000	SURCHARGED
15 minute summer	S14	1	150.385	0.000	1.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	3.000	S2	1.7	0.521	0.074	0.0449	
15 minute winter	S2	3.001	S3	3.2	0.774	0.169	0.0291	
15 minute winter	S3	3.002	S8	12.2	0.672	0.107	0.5218	
15 minute winter	S4	1.000	S7	3.3	0.577	0.023	0.1937	
15 minute winter	S5	2.000	S6	2.8	0.752	0.089	0.0364	
15 minute winter	S6	2.001	S7	4.4	0.932	0.202	0.0314	
15 minute winter	S7	1.001	S8	7.7	0.488	0.064	0.2871	
15 minute winter	S8	1.002	S12	31.1	2.018	0.252	0.5454	
15 minute winter	S9	4.000	S10	1.0	0.579	0.044	0.0082	
15 minute winter	S10	4.001	S11	1.0	0.379	0.053	0.0075	
15 minute winter	S11	4.002	S12	4.2	1.300	0.125	0.0809	
180 minute winter	S12	1.003	S13	6.9	0.219	0.058	0.8798	
180 minute winter	S13	Orifice	S14	2.1				42.5

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	151.793	0.043	4.2	0.0436	0.0000	OK
15 minute winter	S2	10	151.598	0.073	7.9	0.0647	0.0000	OK
15 minute winter	S3	10	151.399	0.104	30.3	0.1888	0.0000	OK
15 minute winter	S4	10	151.798	0.048	8.3	0.0663	0.0000	OK
15 minute winter	S5	10	151.798	0.048	6.9	0.0597	0.0000	OK
15 minute winter	S6	10	151.533	0.083	11.1	0.0738	0.0000	OK
15 minute winter	S7	11	151.280	0.080	19.1	0.0506	0.0000	OK
15 minute winter	S8	10	151.188	0.188	75.2	0.3260	0.0000	OK
15 minute winter	S9	10	151.785	0.035	2.4	0.0297	0.0000	OK
15 minute winter	S10	10	151.716	0.041	2.4	0.0262	0.0000	OK
15 minute winter	S11	10	151.704	0.059	10.6	0.0749	0.0000	OK
180 minute winter	S12	176	151.057	0.457	26.3	87.4792	0.0000	SURCHARGED
180 minute winter	S13	176	151.057	0.642	4.4	0.7257	0.0000	SURCHARGED
15 minute summer	S14	1	150.385	0.000	2.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	3.000	S2	4.1	0.658	0.182	0.0876	
15 minute winter	S2	3.001	S3	7.8	0.970	0.412	0.0566	
15 minute winter	S3	3.002	S8	30.0	0.886	0.264	0.9610	
15 minute winter	S4	1.000	S7	8.2	0.748	0.057	0.3644	
15 minute winter	S5	2.000	S6	6.9	0.931	0.218	0.0718	
15 minute winter	S6	2.001	S7	10.9	1.162	0.498	0.0620	
15 minute winter	S7	1.001	S8	18.8	0.640	0.157	0.5267	
15 minute winter	S8	1.002	S12	75.5	2.289	0.613	1.3159	
15 minute winter	S9	4.000	S10	2.4	0.683	0.108	0.0171	
15 minute winter	S10	4.001	S11	2.4	0.461	0.132	0.0154	
15 minute winter	S11	4.002	S12	10.5	1.666	0.309	0.1627	
180 minute winter	S12	1.003	S13	4.4	0.274	0.036	1.1149	
180 minute winter	S13	Orifice	S14	2.9				59.9

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	151.800	0.049	5.4	0.0497	0.0000	OK
15 minute winter	S2	10	151.611	0.086	10.2	0.0760	0.0000	OK
15 minute winter	S3	10	151.415	0.120	39.3	0.2171	0.0000	OK
15 minute winter	S4	10	151.805	0.055	10.8	0.0754	0.0000	OK
15 minute winter	S5	10	151.805	0.055	9.0	0.0686	0.0000	OK
15 minute winter	S6	10	151.549	0.099	14.3	0.0881	0.0000	OK
15 minute winter	S7	10	151.291	0.091	24.8	0.0578	0.0000	OK
240 minute winter	S8	236	151.222	0.222	18.6	0.3862	0.0000	OK
15 minute winter	S9	10	151.790	0.040	3.1	0.0342	0.0000	OK
15 minute winter	S10	10	151.724	0.049	3.1	0.0312	0.0000	OK
15 minute winter	S11	10	151.713	0.068	13.8	0.0870	0.0000	OK
240 minute winter	S12	236	151.222	0.622	27.7	119.1843	0.0000	SURCHARGED
240 minute winter	S13	236	151.222	0.807	7.7	0.9129	0.0000	SURCHARGED
15 minute summer	S14	1	150.385	0.000	2.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	3.000	S2	5.4	0.696	0.235	0.1065	
15 minute winter	S2	3.001	S3	10.1	1.030	0.532	0.0689	
15 minute winter	S3	3.002	S8	38.9	0.939	0.342	1.1586	
15 minute winter	S4	1.000	S7	10.6	0.807	0.074	0.4402	
15 minute winter	S5	2.000	S6	8.9	0.984	0.285	0.0881	
15 minute winter	S6	2.001	S7	14.2	1.230	0.648	0.0762	
15 minute winter	S7	1.001	S8	24.4	0.673	0.203	0.6350	
240 minute winter	S8	1.002	S12	18.6	1.124	0.151	2.0622	
15 minute winter	S9	4.000	S10	3.1	0.710	0.139	0.0213	
15 minute winter	S10	4.001	S11	3.1	0.490	0.171	0.0190	
15 minute winter	S11	4.002	S12	13.6	1.782	0.402	0.2587	
240 minute winter	S12	1.003	S13	7.7	0.265	0.064	1.1149	
240 minute winter	S13	Orifice	S14	3.3				76.4

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	S1	232	152.275	0.525	1.4	0.5275	0.0000	FLOOD RISK
240 minute winter	S2	232	152.275	0.750	2.7	0.6658	0.0000	FLOOD RISK
240 minute winter	S3	232	152.275	0.980	10.4	1.7763	0.0000	FLOOD RISK
240 minute winter	S4	232	152.275	0.525	2.8	0.7214	0.0000	FLOOD RISK
240 minute winter	S5	232	152.275	0.525	2.4	0.6571	0.0000	FLOOD RISK
240 minute winter	S6	232	152.275	0.825	3.8	0.7333	0.0000	FLOOD RISK
240 minute winter	S7	232	152.275	1.075	10.2	0.6835	0.0000	FLOOD RISK
240 minute winter	S8	232	152.275	1.275	26.1	2.2129	0.0000	FLOOD RISK
240 minute winter	S9	232	152.275	0.525	0.8	0.4471	0.0000	FLOOD RISK
240 minute winter	S10	232	152.275	0.600	1.1	0.3814	0.0000	FLOOD RISK
240 minute winter	S11	232	152.275	0.630	3.6	0.8009	0.0000	FLOOD RISK
240 minute winter	S12	232	152.274	1.674	38.5	154.5931	0.0000	FLOOD RISK
240 minute winter	S13	232	152.274	1.859	6.5	2.1024	0.0000	FLOOD RISK
15 minute summer	S14	1	150.385	0.000	2.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	S1	3.000	S2	1.4	0.496	0.062	0.2427	
240 minute winter	S2	3.001	S3	2.7	0.739	0.143	0.1240	
240 minute winter	S3	3.002	S8	10.4	0.731	0.091	1.9873	
240 minute winter	S4	1.000	S7	2.8	0.543	0.019	2.3133	
240 minute winter	S5	2.000	S6	2.4	0.727	0.076	0.1708	
240 minute winter	S6	2.001	S7	3.8	0.896	0.173	0.1164	
240 minute winter	S7	1.001	S8	-7.4	0.526	-0.061	1.2104	
240 minute winter	S8	1.002	S12	25.8	1.203	0.210	2.2971	
240 minute winter	S9	4.000	S10	0.8	0.543	0.036	0.0855	
240 minute winter	S10	4.001	S11	-1.1	0.368	-0.061	0.0523	
240 minute winter	S11	4.002	S12	3.6	1.022	0.106	0.4367	
240 minute winter	S12	1.003	S13	6.5	0.299	0.054	1.1149	
240 minute winter	S13	Orifice	S14	5.0				94.2

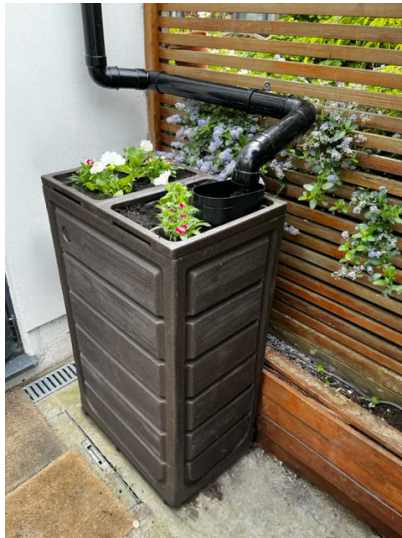


**APPENDIX I
SUDSPODS DATA SHEET**

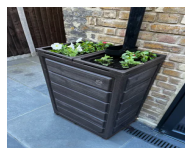
15+ years' industry knowledge
We're experts in our field

Fast Delivery
Same day dispatch on many items

Helping the
With sustain



(//www.freeflush.co.uk/cdn/shop/files/IMG_41_new_9_1400x_-_no_tap_1400x.png?v=1743423645)



Prestige 225 Litre Attenuation SuDS Planter

Top

Integrated Planter ▼

1

£309.00 ~~£349.00~~

Add to Cart



DESCRIPTION

DOCUMENTATION

DELIVERY

REVIEWS

Limited offer: Buy one item from the Prestige range and get 10% off a second prestige item. (Lower priced item will be discounted)

The Prestige Water SuDS planter is an innovation in rainwater management disguised in an elegant, robust wood effect tank.

Prestige Attenuation SuDS Planter is a sister product of the Prestige BioRetention SuDS Planter (<https://www.freeflush.co.uk/collections/suds-planters/products/prestige-235-bioretenction-suds-planter>). The key difference between the two products is the **Attenuation** SuDS planter is predominantly void and so the gross volume represents the available attenuation volume. The **BioRetention** SuDS Planter is filled with soil media and so the available attenuation volume is represented by the voids in the media.

The SuDS planter is extremely versatile allowing a number of storage and planting combinations. The optional concealed inner tank allows some rainwater to be retained if the tank is to be used as rainwater attenuation system.

The following options are available:

- Lid or planter top section

This modern planter is available in oak colour and is made from MDPE, a high quality robust material, making the water butt both weather and frost proof.

Perfect for small to medium size attenuation projects as the tanks can be connected together increasing storage.

An additional amenity enhancement is the option to store a small amount of water for rainwater harvesting by opting for the inner rainwater harvesting tank.

The Prestige Water SuDS planter has been widely adopted in the Thames region.

zendesk chat

Chat with us



Type your message here



The alternative Prestige 235 BioRetention SuDS Planter (<https://www.freeflush.co.uk/collections/suds-planters/products/prestige-235-bioretenention-suds-planter>) can be found here (<https://www.freeflush.co.uk/collections/suds-planters/products/prestige-235-bioretenention-suds-planter>).

Benefits

- Super slim, compact design, ideal for tight spots
- Versatile optional planting bowl
- Opaque plastic reduces algae/microbial growth
- Rotationally moulded for strength, durability and longevity
- Frost proof

Included Accessories:

- FlowBrake Vortex flow control device. Flow range 0.15 -0.86 l/s. Standard Flowrate 0.2l/s.
- 40mm Internal overflow

Optional Accessories:

- Downpipe offset kit (<https://www.freeflush.co.uk/products/downpipe-offset-kit>) and Leaf Catcher (https://www.freeflush.co.uk/products/leaf-catcher-passive-self-cleaning-filter-leaf-separator?_pos=1&_sid=831e99ddf&_ss=r) if a diverter is not being used
- **PLEASE PROVIDE THE OUTLET POSITION - LEFT OR RIGHT**

SuDS Planter Main Tank Dimensions:

Height 950mm

Width 600mm

Depth 400mm

Total Capacity: 225l

Empty weight: ~15kg

Planter Tray Dimensions (two per tank):

Height 160mm

Width 300mm

Depth 400mm

Total Capacity: 12l each

RELATED PRODUCTS



PlantBox Living Wall System
(</collections/above-ground-suds/products/plantbox-living-wall-system>)
From £79.00



Prestige 225 Litre Attenuation SuDS Planter - United Utilities
(</collections/above-ground-suds/products/prestige-225-litre-attenuation-suds-planter-united-utilities>)
££££ ££



Prestige Wood 2 Attenuation SuDS Planter
(</collections/above-ground-suds/products/prestige-wood-2-attenuation-suds-planter>)
££££ ££

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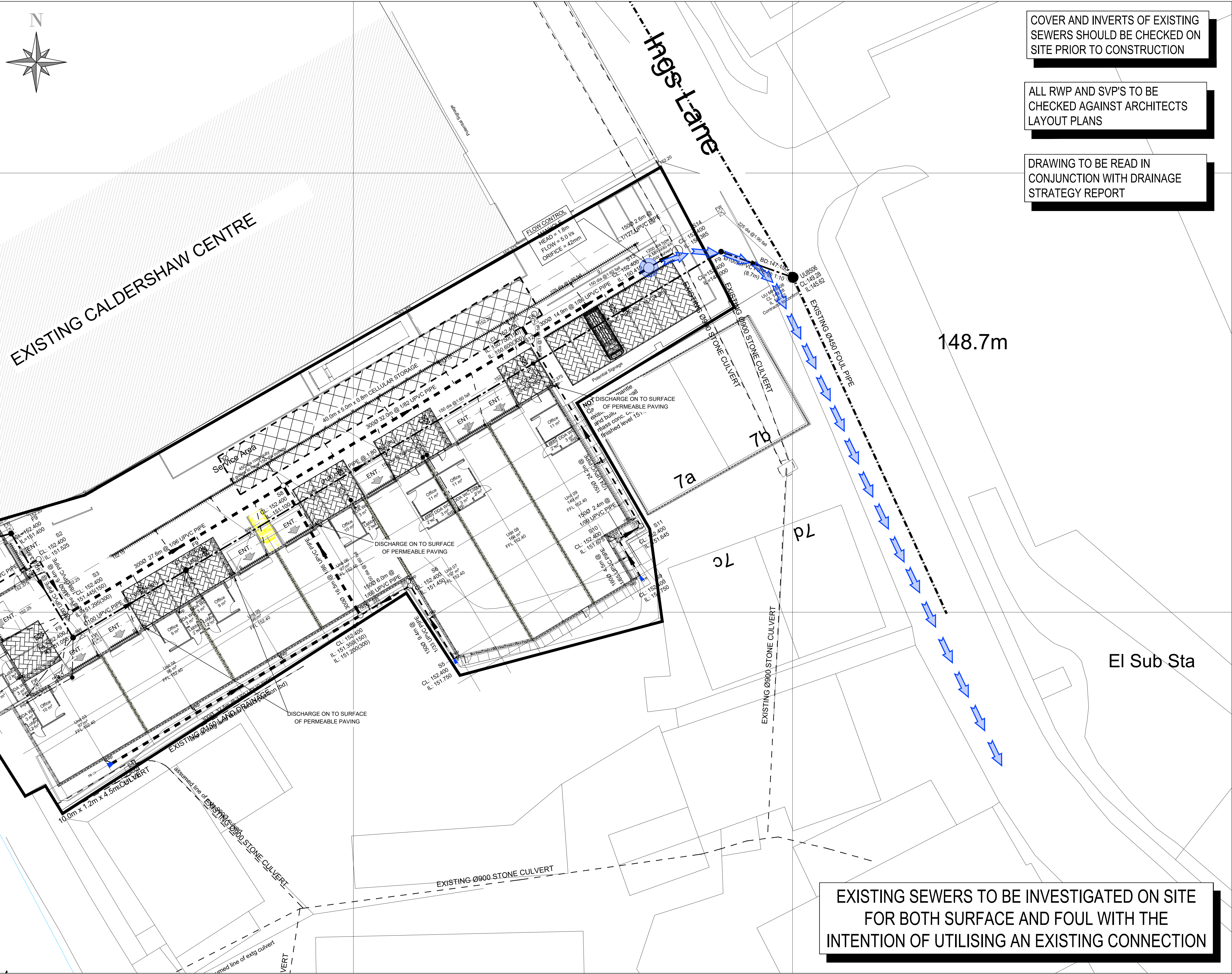
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**APPENDIX J
FLOOD EXCEEDANCE PLAN**



COVER AND INVERTS OF EXISTING SEWERS SHOULD BE CHECKED ON SITE PRIOR TO CONSTRUCTION

ALL RWP AND SVP'S TO BE CHECKED AGAINST ARCHITECTS LAYOUT PLANS

DRAWING TO BE READ IN CONJUNCTION WITH DRAINAGE STRATEGY REPORT

EXISTING SEWERS TO BE INVESTIGATED ON SITE FOR BOTH SURFACE AND FOUL WITH THE INTENTION OF UTILISING AN EXISTING CONNECTION

- NOTES
1. THIS DRAWING IS PRODUCED FOR USE IN THIS PROJECT ONLY AND MAY NOT BE USED FOR ANY OTHER PURPOSE. THE CONSULTING ENGINEERS ACCEPT NO LIABILITY FOR THE USE OF THIS DRAWING OTHER THAN THE PURPOSE FOR WHICH IT WAS INTENDED IN CONNECTION WITH THIS PROJECT AS RECORDED ON THE TITLE BLOCK FIELDS 'PURPOSE FOR ISSUE' AND 'FILE STATUS CODE'.
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 4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
 5. DISCREPANCIES MUST BE REPORTED BACK TO THE ENGINEER PRIOR TO CONSTRUCTION.
 6. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ADVANT ENGINEERS DRAWINGS AND SPECIFICATIONS.

KEY

 FLOOD EXCEEDANCE EVENT

 FLOOD FLOW PATH

B	UPDATED TO LLFA COMMENTS	MJM	08.07.25
A	INITIAL ISSUE	MJM	19.03.24
REV	AMENDMENTS	BY	DATE

FOR APPROVAL	
STATUS	CHK'D
PRELIMINARY	MJM
FOR COMMENT	MJM
FOR APPROVAL	MJM
FOR CONSTRUCTION	
AS BUILT	

**advant**
ENGINEERS

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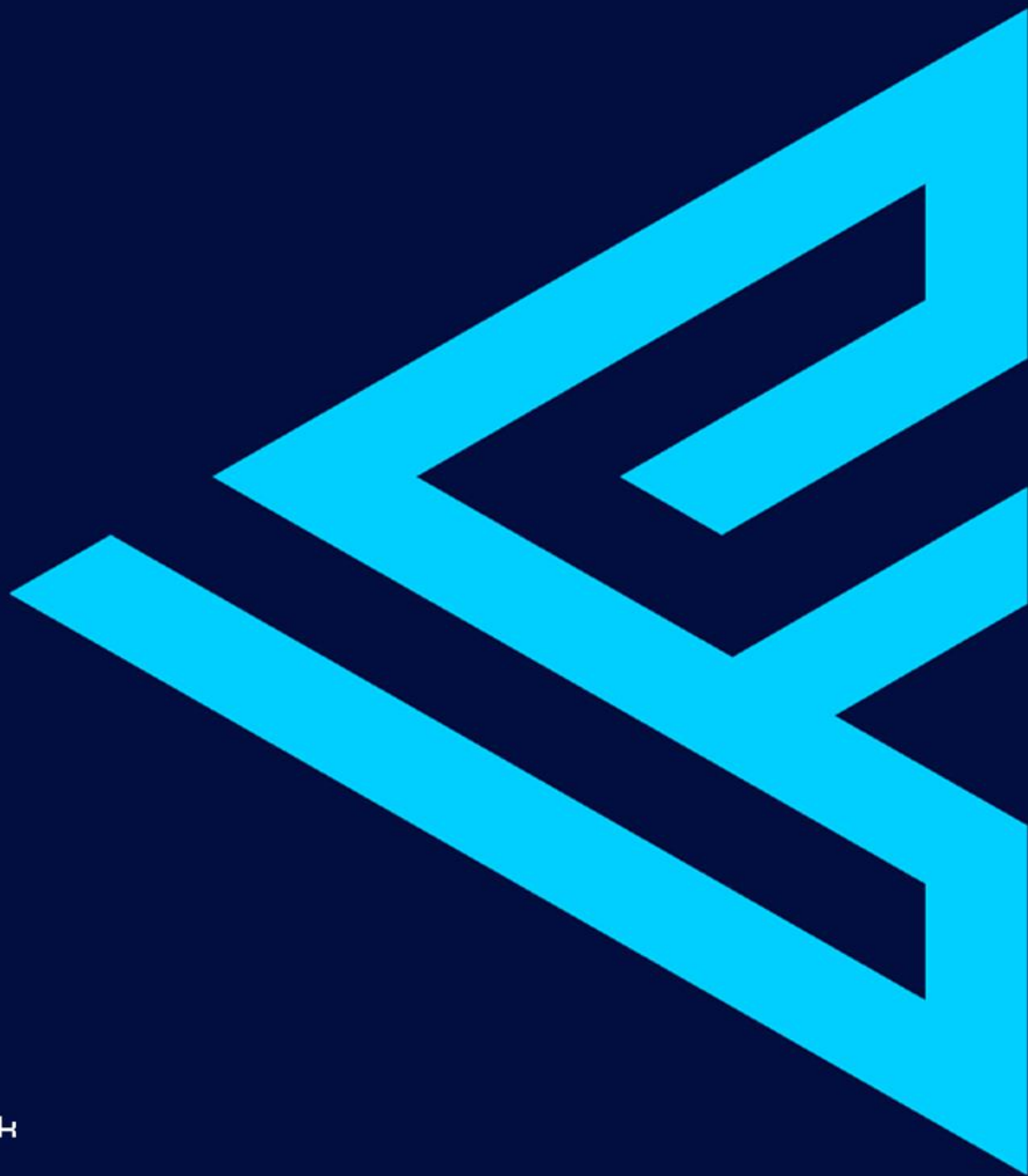
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I.Q.7 LTD

CONTRACT
CALDERSHAW CENTRE
INGS LANE
ROCHDALE

TITLE
FLOOD EXCEEDANCE
LAYOUT PLAN

DRAWN	MJM	CHK'D	MJM
SCALE	1:200 @ A1	DATE	19.03.24

JOB No	DRG No	REV
23083	103	B



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