

ADEPT

CIVIL AND STRUCTURAL CONSULTING ENGINEERS



Drainage Strategy Report George Hotel, Huddersfield

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Client: GMI Construction
Project Name: George Hotel, Huddersfield
Report Title: Drainage Strategy Report
Document ref: L054-ACE-5X-ZZ-ZZ-RP-C-0001
Date: 16.04.2025

REVISION	SUITABILITY	DATE	AUTHOR	CHECKED	APPROVED	DESCRIPTION
P01	S2	16/04/25	BHB	AL	RP	Initial issue

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1.0 Introduction

1.1 Background

Adept Consulting Engineers Ltd were appointed by GMI Construction to carry out a Drainage Strategy for the development at George Hotel, Huddersfield. The proposed scheme consists of a refurbishment of a Grade II listed building and a rebuild of the existing hotel.

1.2 Methodology

The study consisted of data collection and review, desk based research and consultation with regulatory bodies and third parties in relation to flood risk and drainage.

The Study provides a risk based assessment of potential flooding to the site caused by various sources, including fluvial, tidal, surface water/pluvial, groundwater, surcharged sewers and other man made sources. Mitigation measures are identified to address the risk to the site and any potential future risk to other land.

2.0 Limitations of report

This report has been prepared by Adept Consulting Engineers Limited on behalf of GMI Construction in accordance with the background and methodology described above in sections 1.1 and 1.2.

Preliminary calculations and a concept drainage design have been undertaken as part of this study. The preliminary calculations and concept design are based on the information and assumptions covered in this report at the time of preparation and provide a concept design for points of connection and general design parameters only.

The report is based on the interpretation and assessment of data provided by third parties. Adept Consulting Engineers Limited cannot guarantee the reliability of the third party information obtained. The conclusions and findings of the report may change if the third party data is subsequently amended or updated.

3.0 Description of the existing site

3.1 Site Location

The site is located North of Railway Street and West of John William Street. The site grid reference is SE 14417 16934 and closest postcode is HD1 1JA. As the site is refurbishment and rebuild of an existing build the entirety of the development is brownfield. The northern and eastern boundary is bounded by John Williams Street, the South Boundary is bounded with Railway Street and the eastern boundary is Huddersfield Train Station.

A site location plan is appended in Appendix A.

SITE DESCRIPTION	
Total Site Area	0.1Ha
Existing Impermeable Area	0.1Ha
Land use	Hotel
Known Site Constraints	Live Services, Huddersfield Train Station, Grade II Listed Building.

A topographical survey can be seen in Appendix B

3.2 Existing Drainage

The law regarding responsibility for drains and sewers changed on the 1st October 2011. On this date, the Government transferred the majority of drainage pipes that are either outside a property's boundary or are shared with other buildings to the sewage/water companies. However, not all transferred sewers may be shown on the sewer records.

MetGeo have produced a topographical survey dated December 2022 which shows the existing drainage arrangements serving the proposed development as shown in Figure 1. The survey indicates that the existing drainage is a combined foul and surface water system which outfalls into the Yorkshire Water sewer within Johann William street. The existing systems are routed below the existing basement levels under the proposed development.

MetGeo have also carried out a CCTV survey of the existing drainage system and the conclusion is that the surface water run-off and catchment is currently unmanaged and connects into the combined system within Johan Williams Street.

The existing George Hotel (Block A) which is a Grade II listed building the existing drainage within the basement will be retained to utilise the existing connections into John Williams Street and Railway Street. The existing foul drainage within Block A may need to be ripped out and replaced with new dependant on the condition of the sewers.

4.0 Proposed development

4.1 Development Outline

The proposed development is a refurbishment of a Grade II listed building and re build of an existing building.

Architectural plan can be seen in Appendix C.

4.2 Proposed Surface Water Drainage Strategy

The proposed drainage strategy looks to follow the hierarchical approach being;

- Infiltration
- Discharge to Surface Waters (i.e. watercourse)
- Discharge to a surface water sewer, highway drain or another drainage system
- Discharge to a combined sewer.

Infiltration has been ruled out on the proposed development as the development is on a Grade II listed building. Infiltration would not be feasible below the existing building and there is no space outside of the development boundary for infiltration too be possible.

The closet watercourse too the development is the Huddersfield Broad Canal which is 450m to the east. The nearest above ground watercourse is the River Colne located approximately 850m to the east of the site.

The proposed drainage strategy for the development is for the Surface water run off to drain below ground before being restricted to 8.7l/s via a flow control device before discharging into the existing combined sewer within existing building.

The proposed drainage strategy utilises 450 diameter pipes and 1200 diameter manholes rings to storage the surface water run off. The Half drain down time of the surface Water system is 10 minutes which allows in the case of a "Worst case" back to back storm was to happen the surface water network would be suitable to withstand it.

Consultations with Yorkshire Water have dictated the 8.7l/s discharge it the Yorkshire Water Sewer within John Williams Street. This is a 30% betterment of the existing flows which currently drain unrestricted into the Yorkshire Water sewer.

A copy of the consultation with YW can be seem in Appendix D.

As the proposed development is an existing building it is being proposed that the surface water will discharge into the existing combined water sewer within the existing building before connection into the Yorkshire Water Sewer within John Willams Street.

A copy of the drainage strategy can be seen in appendix C.

4.3 Hydraulic Calculations

The drainage strategy described above in section 6.2 has been hydraulically modelled using infodrainage. The surface water network for the development has been designed to the hydraulic standards of the Sewer Sector Guidance, these being:

- No surcharge of pipes for the 1 in 2-year storm return period.
- No flooding for the 1 in 30-year storm return period.
- Road, roofs and private hard standing areas have 100% impermeability (run-off coefficient) and full contribute to the flows in the surface water network.

The volumetric run-off values for both the summer and winter simulations have been set to 0.75 and 0.84.

A copy of the hydraulic results are appended in Appendix C.

4.4 Foul Drainage

Foul flows will connect into the existing combined water system within the building before discharging into the Yorkshire Water Sewer in Johan Williams Road.

There will be 2 separate connection points, one connection point will be utilising the Block A existing combine sewer before discharging into the Yorkshire Water Sewer within John Williams Street.

A second connection will be made by intercepting the existing 375dia combine water sewer pipe within the building before discharging into the Yorkshire Water Sewer within John Williams Street. The peak foul flow rate based off the AHR Architects floor plans is 9l/s.

A copy of the drainage strategy can be seen in appendix C.

5.0 Communications

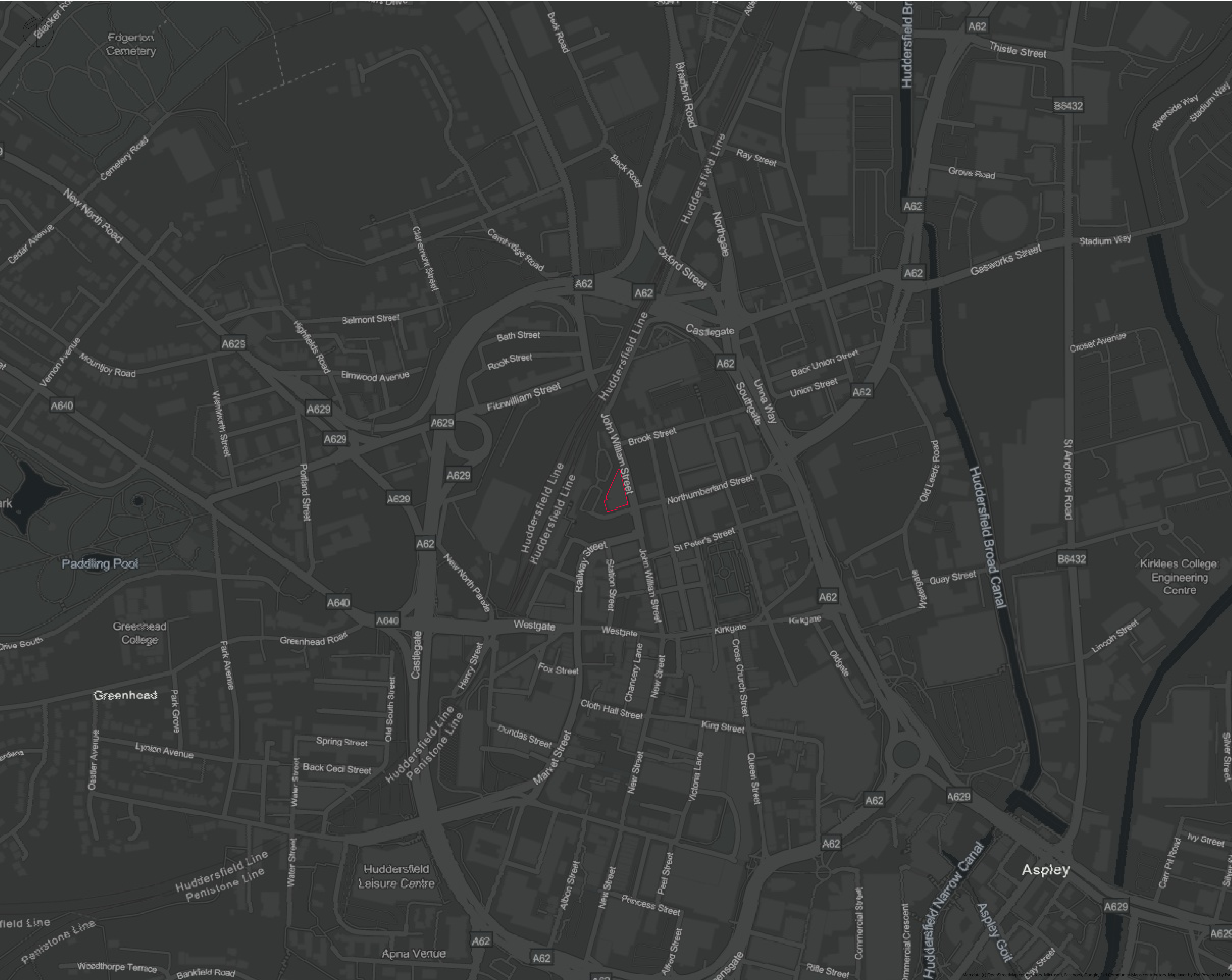
Discussions with Sewerage Undertaker - Yorkshire Water 19/07/2023

A summary of the correspondence is detailed below

CONSULTEE	DATE	SUMMARY
Yorkshire Water	19/07/2023	Unrestricted discharge into the Yorkshire Water Sewer rejected. A 30% betterment of the existing discharge rate required. Surface Water to be restricted too 8.7l/s.

Appendix A

- Location Plan (Aerial Photograph)



Do Not Scale

DESIGN REVIEW

Design review by:

**

Checked by:

**

Residual hazards:

⚠️

Health, Safety & Environmental Notes

⚠️

NOTES

Site Boundary =

Address =

St George's Square,
Springwood,
Highfields,
Huddersfield,
Kirklees,
West Yorkshire,
England,
HD1 1JA,
United Kingdom

Easting = 414418
Northing = 416929

Datum: OS Level Datum
Using the OS GPS Network and applying
OSGM15 National Geoid Model to obtain
local area conditions.

17.04.25	Initial Issue	ASe	AL	P1
Date	Description	By	Chk	Rev

ADEPT

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Project

George Hotel, Huddersfield

Title

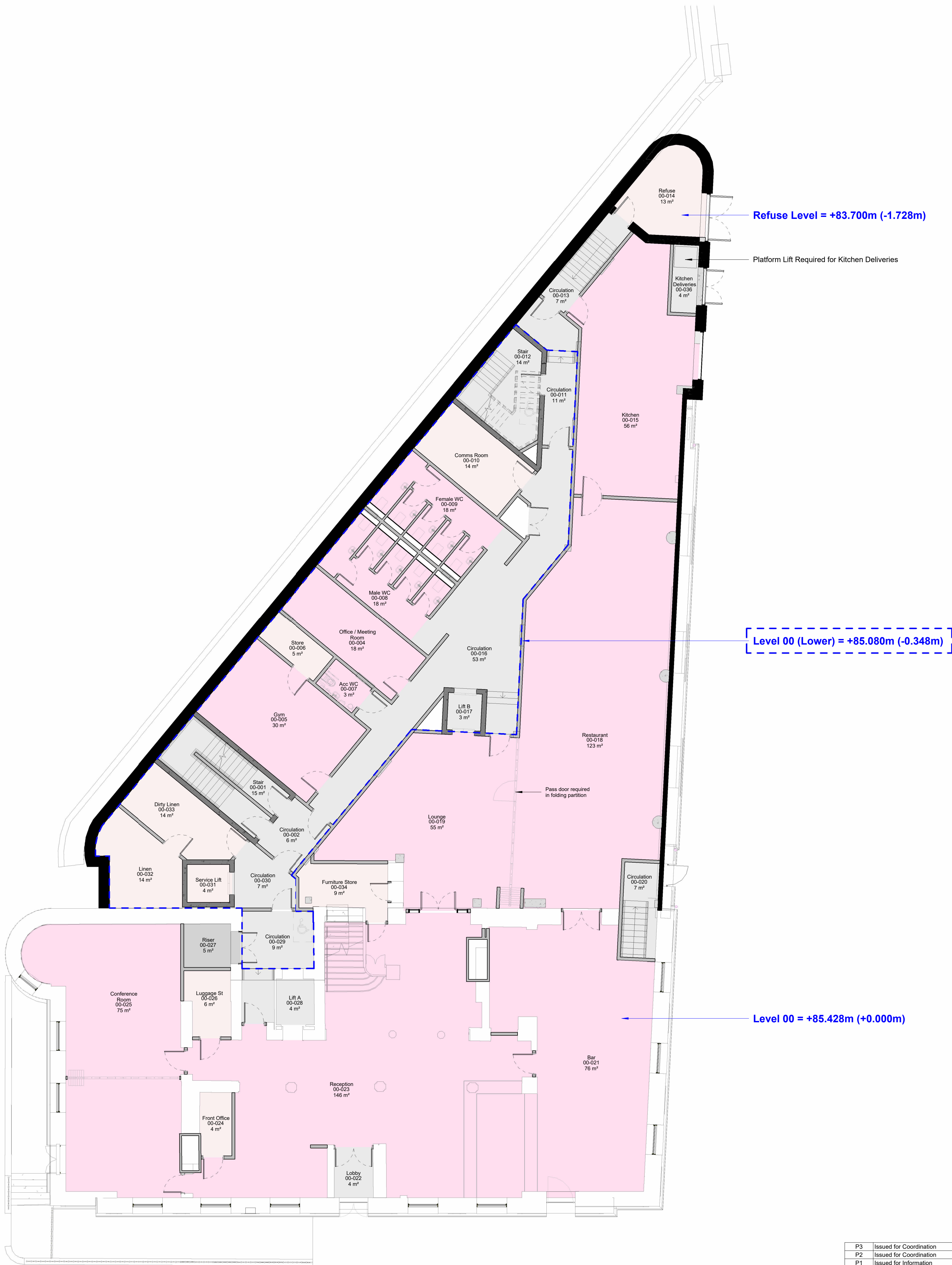
Site Location Plan

Client

GMI

Scale @ A1 1:2500	Initial author ASe	Initial checker BHB	Approver AL	Initial Date APR 25
Status S2	Purpose Preliminary			Adept Ref 00.24363
Project Number L054-ACE-5X-ZZ-ZZ-D-C-3000	Originator Volume Level Type Rule	Draw No Dwg No	Rev	

- Proposed Architectural Site Plans



P3	Issued for Coordination	12.02.2025	DR	MS
P2	Issued for Coordination	24.01.2025	DR	MS
P1	Issued for Information	15.01.2025	DR	MS
Rev	Description	Date	Dr by	App by
original by DR		date created 02/01/2025		approved by MS

AHR

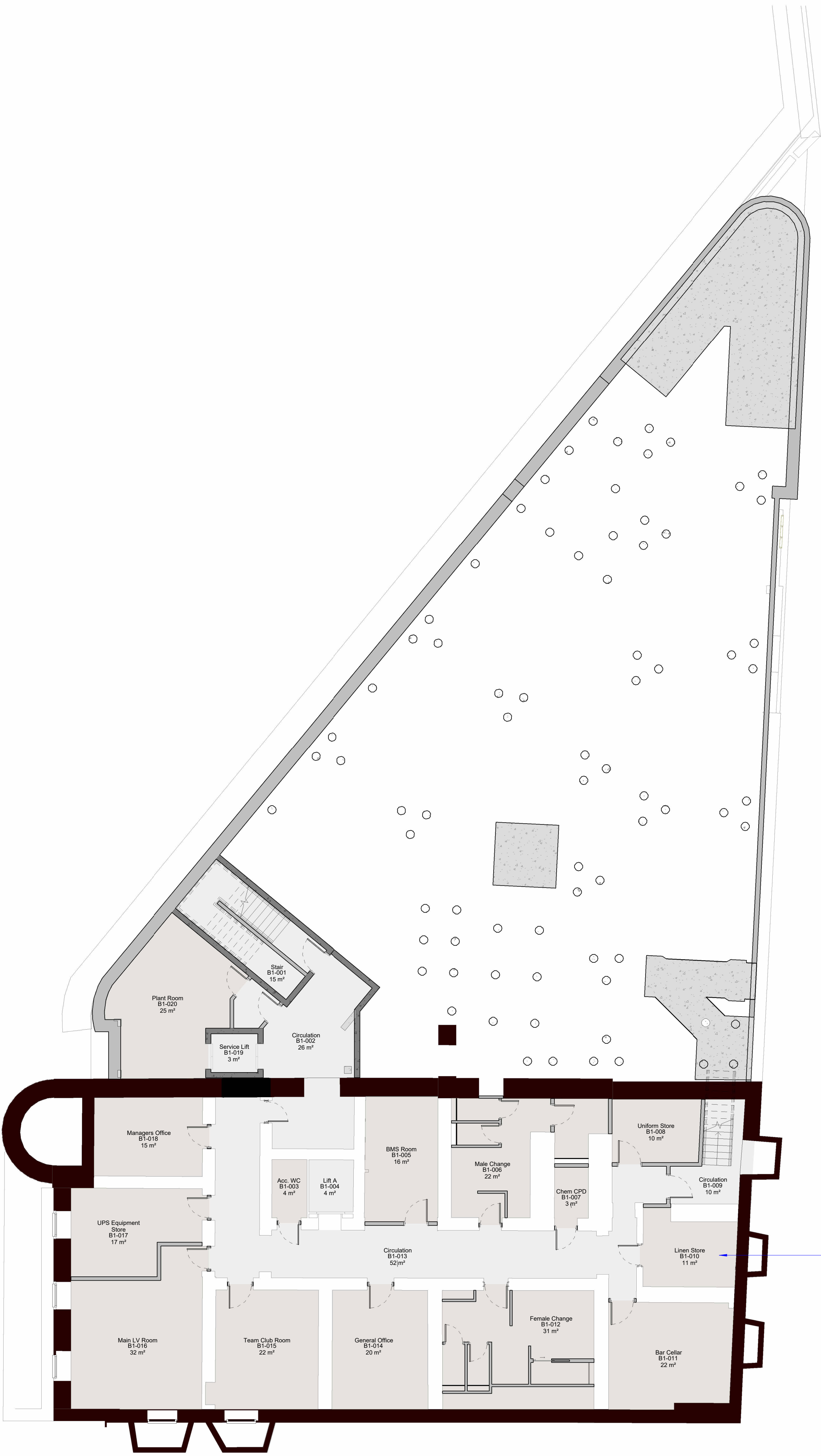
GMI

Kirklees COUNCIL

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client name GMI Construction Group			
project George Hotel Refurbishment			
drawing Level 00 - Proposed Ground Floor Plan			
computer file V:\0321110EM_Profile\Folder_redirection\daniel.rison\Documents\Revit 2024\GHH-AHR-B1-22-M3-A-00001_2024_daniel.rison.rvt		plot date	
project number 2024.00373.000		scale 1 : 100 @A1	
drawing number GHH-AHR-B1-00-DR-A-20020		rev P3	issue status S0
This drawing is to be read in conjunction with all related drawings. All dimensions must be checked and verified on site before commencing any work or producing shop drawings. The originator should be notified immediately of any discrepancy. This drawing is copyright and remains the property of AHR.			



P4	Issued for Coordination	03.03.2025	DR	MS
P3	Issued for Coordination	12.02.2025	DR	MS
P2	Issued for Coordination	24.01.2025	DR	MS
P1	Issued for Information	15.01.2025	DR	MS
Rev	Description	Date	Dr by	App by
original by	DR	date created	02/01/2025	approved by
				MS

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client name	GMI Construction Group		
project	George Hotel Refurbishment		
drawing	Level B1 - Proposed Basement Floor Plan		
computer file	\\032.1.110EM_Profile_Folder_redirection\Daniel.ston\Documents\Revit		plot date
2024\GHH-AHR-B1-22-M3-A-0001_2024_daniel.ston.rvt			
project number	2024.00373.000	scale	1 : 100 @A1
drawing number	GHH-AHR-B1-B1-DR-A-20026	rev	P4
		issue status	S0
This drawing is to be read in conjunction with all related drawings. All dimensions must be checked and verified on site before commencing any work or producing shop drawings. The originator should be notified immediately of any discrepancy. This drawing is copyright and remains the property of AHR.			

B1 Level B1 - Proposed Basement Floor Plan

1 : 100

Appendix B Existing Services

- Topographical Survey

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS AND DRAWINGS ISSUED. FOR DISCREPANCIES OR OMISSIONS CONTACT MOBILE CAD SURVEYING SOLUTIONS LTD PRIOR TO WORK COMMENCING. THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDING AND SITE DIMENSIONS AND LEVELS BEFORE WORK COMMENCES.

© COPYRIGHT MOBILE CAD SURVEYING SOLUTIONS LTD 2022
DO NOT SCALE THIS DRAWING - CHECK ALL DIMENSIONS ON SITE

Note:
Areas drawn indicatively noted and indicated by grey dashed line as line below

LEVEL DATUM & ORIENTATION

LEVELS & DRAWING ORIENTATION CO-ORDINATED TO WORLD CO-ORDINATES USING GPS EQUIPMENT (SPECTRA SP60). PERMANENT STATIONS LOCATED IN POSITIONS INDICATED ON PLAN AS FOLLOWS:

STN ABA2	E-414390.562	N-416896.974	HT - 87.280m
STN ABA1	E-414377.246	N-416927.042	HT - 88.555m
STN ABA3	E-414394.153	N-416926.966	HT - 87.920m
STN SG3	E-414385.254	N-416948.279	HT - 88.919m

ABBREVIATIONS & LEGEND:

LEVELS & HEIGHTS CL - COVER LEVEL IL - INVERT LEVEL LT - LEVEL HT - HEIGHT STN - SURVEY STATION BM - BENCH CE - CEILING J - JOISTS RA - RAFTERS E - EAVES F - FENCE UIS - UNDERSIDE OF RL - RIDGE LINE FR - FLAT ROOF HL - HIP LINE VL - VALLEY LINE PW - PARAPET WALL SL - SLAB SF - SOFFIT T - TREE THR - THRESHOLD To - TOP OF W - WALL HH - HEAD HEIGHT OH - OPENING HEIGHT SH - SILL HEIGHT	SERVICES BT - BRITISH TELECOMS CATV - CABLE TELEVISION ER - EARTHING ROD ES - ELECTRICAL SUPPLY PH - FIRE HYDRANT GAS - GAS SUPPLY PO - POST OFFICE TELEPHONE SV - STOP VALVE TSSU - TRAFFIC LIGHT SIGNALS DRAINAGE DC - DRAINAGE CHANNEL G - GULLY IC - INSPECTION CHAMBER MH - MANHOLE RE - RIDDING EYE RWP - RAIN WATER PIPE UTL - UNABLE TO LIFT SVP - SOL & VENT PIPE ST - STOP TAP WM - WATER METER TYPICAL DRAWING SYMBOLS SPOT LEVEL SPOT HEIGHT SURVEY STATION MANHOLE / INSPECTION CHAMBER SURVEY HEIGHT WINDOW TAG DOOR TAG RADIATOR TAG TOP & BOTTOM OF KERB OVERHEAD ELECTRICAL OVERHEAD TELEPHONE FENCE LINE VEGETATION OUTLINE SINGLE GATE DOUBLE GATE TREE CONTOURS SLOPING DIRECTION LINE
---	--



SITE PLAN
1:500 Scale

B	26.09.2022	STATIONS REINSTATED
A	21.09.2022	DRAWING LAYWALK AND REVIEW
REV	DATE	AMENDMENTS

MOBILE CAD Surveying Solutions

PROJECT: MEASURED BUILDING SURVEY
ADDRESS: ST. GEORGES HOTEL, HUDDERSFIELD, HD1 1JA

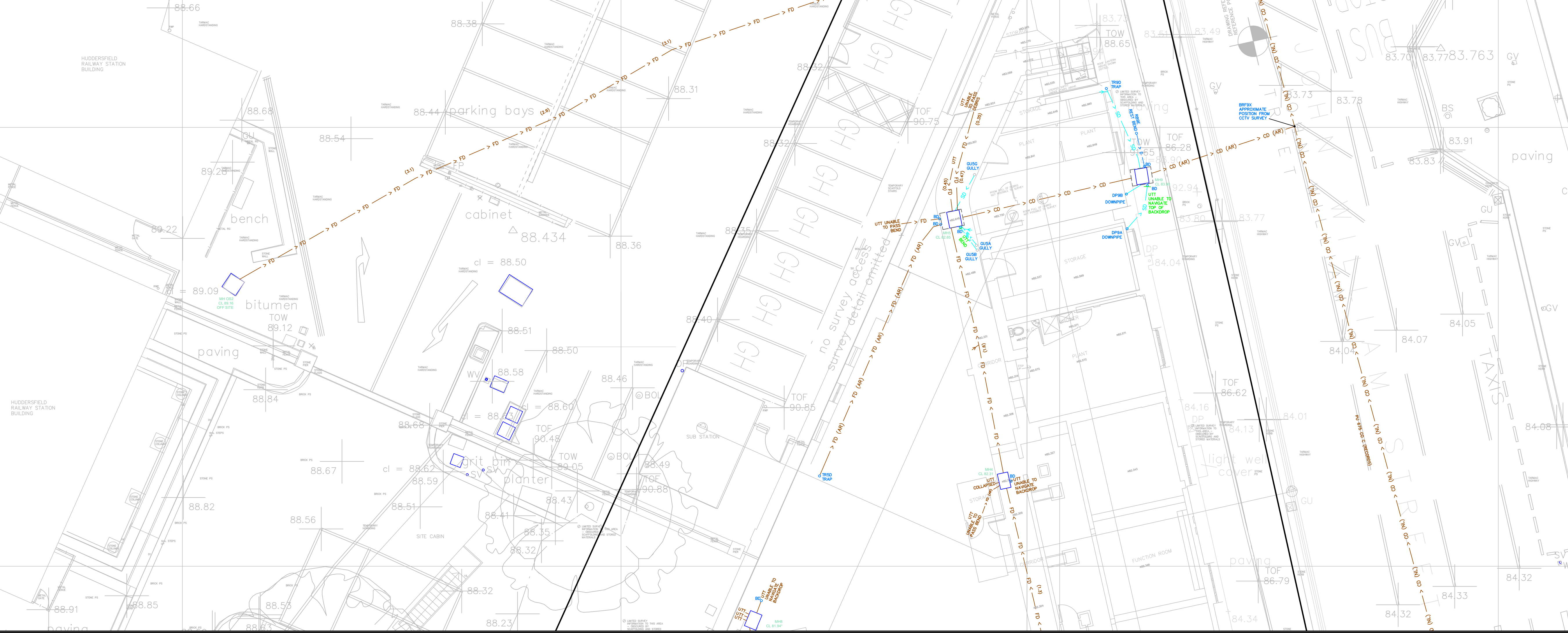
DWG NO.: 3518-01
DWG TITLE: SITE PLAN
DWG DATE: JULY 2022
DWG SIZE: SCALE AS SHOWN @ A1

DRAWN: MW
CHECKED: JH
ISSUE: B

- Existing Drainage / Sewer Records

SCHEDULES FOR DRAINAGE CHAMBERS

MH1 SURFACE CL 88.53 PIPE X: 100ø IL 86.78 PIPE A: 100ø IL 86.80 CHAMBER: 0.95X0.60	MH2 FOUL CL 88.41 PIPE X: 150ø IL 84.60 PIPE A: 150ø IL 87.12 PIPE B: 150ø IL 84.61 CHAMBER: 1.20ø	MH3 SURFACE CL 86.51 PIPE X: 300ø IL 84.18 PIPE A: 225ø IL 84.43 PIPE B: 150ø IL 84.37 CHAMBER: 0.80X0.80
MH4 FOUL CL 82.31 PIPE X: 225ø IL 80.89 PIPE A: 100ø IL 81.05 PIPE B: 225ø IL 80.90 CHAMBER: 0.70X0.70	MH5 COMBINED CL 82.65 PIPE X: 225ø IL 80.76 PIPES A&B: 100ø IL 80.94 PIPE C: 225ø IL 80.77 CHAMBER: 1.0X0.75	MH6 FOUL CL 82.32* UTR - COVER RUSTED IRONBOUND
MH7 FOUL CL 82.34 PIPE X: 150ø IL 81.24 PIPE A: 100ø IL 81.27 PIPE B: 150ø IL 81.25 CHAMBER: 0.85X0.75	MH8 FOUL CL 81.94* PIPE X: 100ø IL 81.53 PIPES A,B,C: 100ø IL 81.57 PIPE D: 100ø IL 81.54 CHAMBER: 0.70X0.45	MH9 COMBINED CL 83.90 PIPE X: 225ø IL 80.54 PIPES A,B,D,E: 100ø IL 80.72 PIPE C: 225ø IL 80.56 CHAMBER: 0.95X0.75
MH10 FOUL CL 82.31* PIPE X: 225ø IL 81.49 PIPES A,B: 150ø IL 81.66 PIPE C: 225ø IL 81.51 CHAMBER: 1.25X0.80	MH11 FOUL CL NOT AVAILABLE UTR COVER BURIED	MH12 FOUL CL NOT AVAILABLE UTR COVER BURIED
MH13 FOUL CL 82.31* PIPE X: 225ø IL 81.49 PIPES A,B: 150ø IL 81.66 PIPE C: 225ø IL 81.51 CHAMBER: 1.25X0.80	MH14 SURFACE CL 85.10 PIPE X: 150ø IL 82.97 PIPE A: 100ø IL 83.12 PIPE B: 150ø IL 82.98 CHAMBER: 0.80X0.70	MH15 SURFACE CL 84.97 PIPE X: 150ø IL 81.95 PIPE A: 150ø IL 81.97 PIPE B: 100ø IL 82.14 CHAMBER: 0.85X0.85
MH16 FOUL CL NOT AVAILABLE UTR COVER BURIED	MH17 FOUL CL 87.40 UTR - UNDER SCAFFOLD BASE	MH18 FOUL CL 87.86 UTR - COVER RUSTED IRONBOUND



Direction of North

SUB-SURFACE KEY

> FD

FOUL DRAINAGE

> CD

COMBINED DRAINAGE

> SD

SURFACE DRAINAGE

> D

UNIDENTIFIED DRAINAGE

> FD (AR)

SERVICE NOT PROVEN - ASSUMED ROUTE LOCATED THROUGH SERVICE RECORDS AND/OR ONSITE INFORMATION.

> CD (NL)

SERVICE NOT PROVEN - ROUTE LOCATED THROUGH SERVICE RECORD INFORMATION.

IL 4.71, 100ø

INVERT LEVEL OF DRAINAGE (METRES), PIPE DIAMETER (MM)

UTR

UNABLE TO RAISE

UTM

UNABLE TO MEASURE

OS

SERVICE EXTENDS OFF SITE

ø

DIAMETER OF PIPE OR DUCT

mbsg

METRES BELOW GROUND LEVEL

CL

COVER LEVEL

SL

MEASUREMENT ESTIMATED

IL

SOFFIT LEVEL OF PIPE/DUCT

IL

INVERT LEVEL OF PIPE/DUCTSITE BOUNDARYWINOSOR TRAP/INTERCEPTOR ON CHAMBER OUTFLOWBACKDROP (INTERNAL/EXTERNAL) ON CHAMBER INFLOWINFORMATION FROM CCTV INSPECTION
(ALL POSITIONS ESTIMATED FROM CCTV METERAGE)INCOMING PIPE - ORIGIN UNCERTAIN> FDEND OF SURVEY - PIPE UNSURVEYED BEYOND THIS POINTCCTV INSPECTION - PIPE IDENTIFICATIONTHE PRIMARY OUTFLOW PIPE IS LABELED M(NUMBER) X, WITH ADDITIONAL OUTFLOWS AS Y OR Z. INCOMING PIPES ARE LABELED STARTING M(NUMBER) A FROM THE FIRST PIPE CLOCKWISE FROM X, PROCEEDING TO B FOR THE NEXT PIPE CLOCKWISE.

LAYOUT KEY

NOTES

1. This drawing is based upon drawing '3518 - St. George Hotel, HD1 1JA (Issue) Rev C.dwg' and '210112 2D Topographical.dwg' provided by the client.

2. All cover levels and invert levels are in metres and relate to the '3518 - St. George Hotel, HD1 1JA (Issue) Rev C.dwg' or '210112 2D Topographical.dwg' drawing levels.

3. This drawing does not represent a full utility survey, only accessible drainage routes have been traced where possible. Additional buried utilities are expected beyond those shown on this drawing. A full utility mapping survey must be carried out, alongside up-to-date record information prior to any intrusive works.

4. This drawing must be used in conjunction with the accompanying report, "P22-01248-MET-EXT-CTV-RPT-GC" which includes full observations of the routes surveyed.

5. Unless otherwise stated, all services shown on this plan have been surveyed using approved detectors and the connections between manholes, if not traced, are assumed to be direct.

6. Should the background or topographical information for the survey area be based on an Ordnance Survey tile or a survey undertaken by a third party we are not liable for any loss that may arise due to a lack of accuracy in that digital data.

7. Locational accuracy is determined by referring to manufacturer's guidelines for the detectors used. In ideal conditions the vertical accuracy for the underground utilities located and mapped are ±10% of the depth. The horizontal accuracy is ±20 cm, although the majority of traced utilities will be much more accurate than this.

8. Depths shown on the drawing are in metres below ground level to the centre of the conductor and do not necessarily indicate the depth to a duct or pipe.

9. The results of electro-detection techniques are not infallible - although all reasonable effort is made during site detection the completeness of the underground services information cannot be guaranteed.

10. It should be noted that the technique is limited to detecting features into which a conductor can be inserted, and it cannot therefore be guaranteed to reveal the full routes of all drainage services or to detect their presence.

11. This drawing and the information contained therein is issued in confidence and is the copyright of Met Geo Environmental Ltd. Disclosure of this information to third parties and unauthorised copying or replication of this data without approval is forbidden.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING

THIS DRAWING DOES NOT REPRESENT A FULL UTILITY MAPPING SURVEY. ADDITIONAL UTILITIES ARE EXPECTED TO EXIST BEYOND THOSE SHOWN ON THIS DRAWING. BE AWARE THAT SERVICES SHOWN MAY MASK OTHER UTILITIES BURIED BENEATH THEM. ALWAYS USE THIS INFORMATION ALONGSIDE UP-TO-DATE SERVICE RECORDS AND EMPLOY SAFE DIGGING PRACTICES IN ACCORDANCE WITH H547.

-	-/-/-/-/-	--	--	--
Rev	Date	Drawn	Description	Check

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Stourton
Leeds
West Yorkshire
LS10 1SW

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F: +44 [0] 1132 008 901
E: admin@metgeoenvironmental.com
W: www.metgeoenvironmental.com

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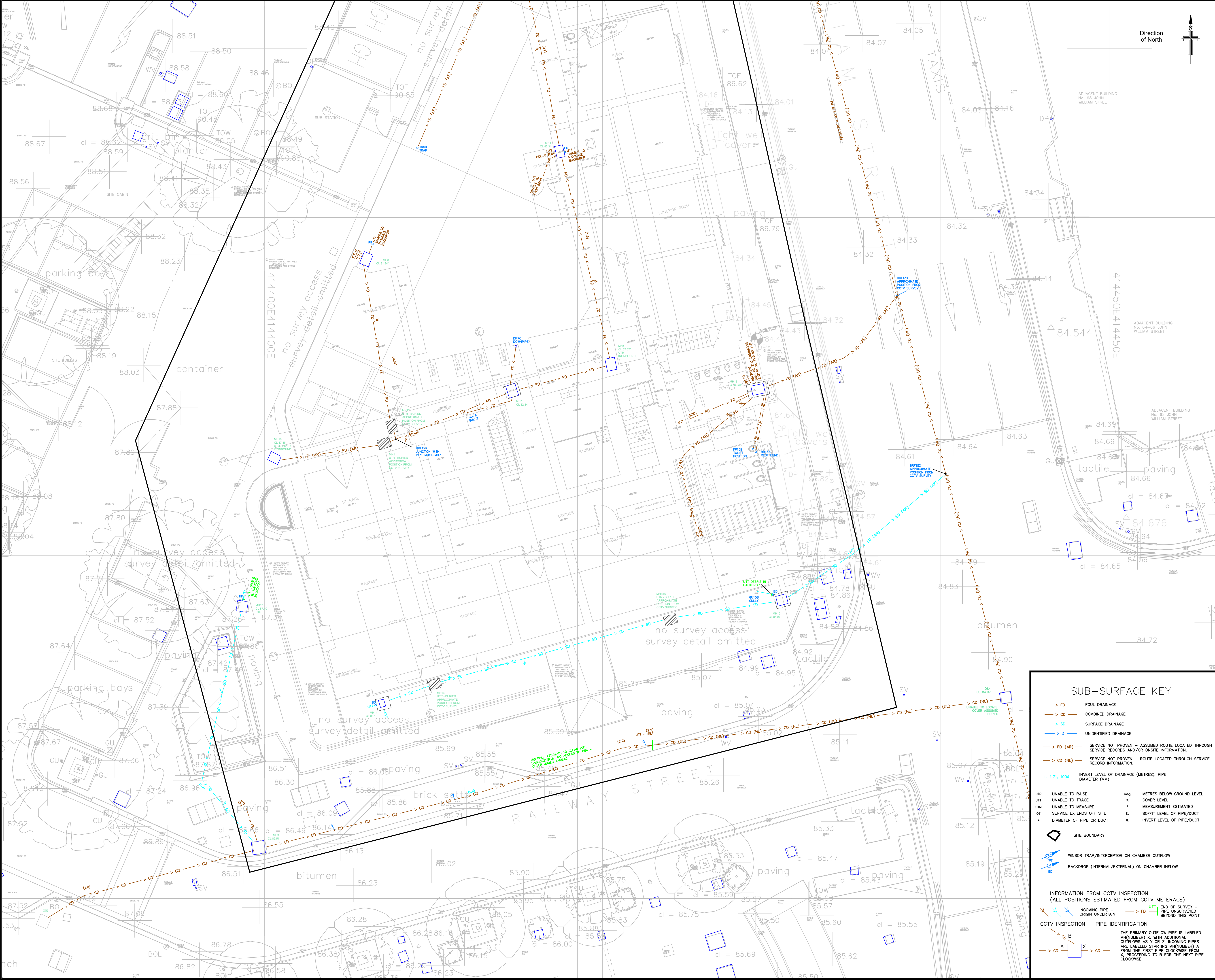
Site
GEORGE HOTEL, ST GEORGE SQUARE
HUDDERSFIELD, HD1 1JA

Title
DRAINAGE
SURVEY

Surveyed	HD, AH	Drawn	HD
Chk.	AP	Date	29/11/2022
Scale	1:100	Job No	P22-01248
		Sheet Size	A1
		Revision	01

DWG Ref

Year	Number	Originator	Zone	ID	Type	Role	Sheet
P22	01248	MET	EXT	CTV	M2	GC	001



LAYOUT KEY

NOTES

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- All cover levels and invert levels are in metres and relate to the '3518 - St. George Hotel, HD1 1JA (Issue) Rev C.dwg' or '210112 2D Topographical.dwg' drawing levels.
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- Should the background or topographical information for the survey area be based on an Ordnance Survey tile or a survey undertaken by a third party we are not liable for any loss that may arise due to a lack of accuracy in that digital data.
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- The results of electro-detection techniques are not infallible - although all reasonable effort is made during site detection the completeness of the underground services information cannot be guaranteed.
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Rev	Date	Drawn	Description	Check
-	-/-/-	--	--	--

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F: +44 [0] 1132 008 901
E: admin@metgeoenvironmental.com
W: www.metgeoenvironmental.com

Client

WILLIAM BIRCH & SONS LTD

Site

**GEORGE HOTEL, ST GEORGE SQUARE
HUDDERSFIELD, HD1 1JA**

Title

**DRAINAGE
SURVEY**

Surveyed	HD, AH	Drawn	HD
Chk.	AP	Date	29/11/2022
Scale	1:100	Job No	P22-01248
		Sheet Size	A1
		Revision	01

DWG Ref	Year	Number	Originator	Zone	ID	Type	Role	Sheet
P22	01248	MET	EXT	CTV	M2	GC	002	

Appendix C Drainage

- Proposed Drainage Plan

It should be noted that geo-cellular tanks are not generally considered suitable for adoption by water authorities and are not suitable for use within foul or combined systems.

- Distributed loads at surface of 10 kN/m²
 - Concentrated loads 50kN
 - Construction plant where confirmed by the main contractor
- Deflection of the surface shall be limited to less than 1mm by design.
- Tanks are to be fully lined and protected with a geotextile membrane to maintain full capacity. They shall instead or in addition be tanked with an impermeable membrane where loss of water into the ground is deemed undesirable.
- Levels and general layout will be indicated on Adept drawings
- Installation is to be carried out to manufacturer's specific installation requirements/drawings including points listed below:
- Preparation of the base
 - Backfill material
 - Restrictions on use of backfilled installation by site traffic.
 - Restrictions on stockpiling above the completed installation.
 - Minimum height of backfill to prevent flotation
 - Vents and maintenance points to be installed as part of the installation



- [illegible]



DESIGN REVIEW

Key:

General Notes:

1. This drawing to be read in accordance with all other relevant Adept drawings, third party drawings, specification and other supporting documentation.
2. All given dimensions are as follows.
- A. Level, coordinates and chainages in meters.
- B. Pipe diameter, trench widths and Manhole details in millimeters.
3. All works adhere to all relevant CDM Regulations, project related CDM Documentation and health & safety Risk Assessments.
4. Building layout taken from "AHR" drawing "GHH-AHR-B1-00-DR-A-20020_P2 - Level 00 - Proposed Ground Floor Plan" and "GHH-AHR-B1-B1-DR-A-20026_P2 - Level B1 - Proposed Basement Floor Plan".
5. Topo Information Taken from "Mobile CAD Surveying Solutions" Drawing "3518-01-Site Plan Issue C".
6. Existing drainage taken from "Survey Operations" drawing "23F27/001".
7. It is the contractors responsibility to verify the above information provided.
8. All drainage abandonment subject to confirmation of no flow contribution from offsite sources.
9. Where drains are to be abandoned they are to be excavated and removed unless they lie below existing buildings where they should be grouted up.
10. Final drainage design subject to receipt of all proposed external levels and confirmation of foul waste SVP, SS and RWP outlet locations by others.
11. Land contamination investigation to be completed to check plastic pipes are suitable for use before installation.

ADVERT

Scale @ A1	Initial author	Initial checker	Approver	Initial Date
1:100	BHB	TT	RP	APR 25

Status	Purpose	Adept R
S2	Preliminary	00.24363

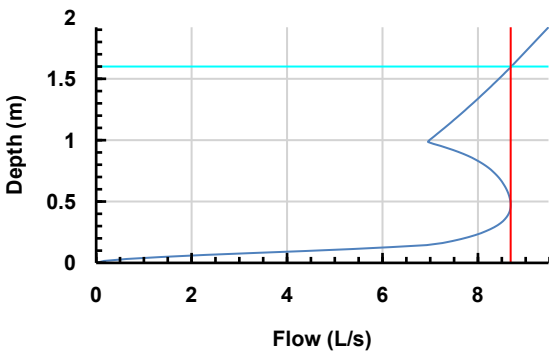
Project Number	Originator	Breakdown	Volume	Level	Type	Role	Drg.No.	Rev.
L054-ACE-5X-ZZ-ZZ-D-C-1200								P1

- Drainage Calculations

Project:	Date: 03/11/2023		
	Designed by: billy.humphreys	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Phase	Company Address:		



Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SW01	Outlet	1.001	Free Discharge
SW02	Outlet	1.002	Free Discharge
SW03	Outlet	1.003	Free Discharge
SW04 (FC)	Outlet	1.004	Hydro-Brake®
	Invert Level (m)	82.550	
	Design Depth (m)	1.600	
	Design Flow (L/s)	8.7	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☒	
	Unit Reference	SHE-0128-8700-1600-8700	
			
SW05	Outlet	1.005	Free Discharge
Simple Junction	Outlet	1.000	Free Discharge

Project:	Date: 03/11/2023		
	Designed by: billy.humphreys	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase		Company Address:	



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	Simple Junction		Time of Concentration	0.023	100	0	100	0.023
Catchment Area (1)	Simple Junction		Time of Concentration	0.044	100	0	100	0.044
TOTAL		0.0		0.068				0.068

Project:	Date: 03/11/2023			
	Designed by: billy.humphreys	Checked by:	Approved By:	
Report Title: Rainfall Analysis Criteria	Company Address:			

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall		
FSR	Type: FSR	
Region	England And Wales	
M5-60 (mm)	19.0	
Ratio R	0.323	
Summer	☒	
Winter	☒	

Return Period	
Return Period (years)	Increase Rainfall (%)
100.0	30.000

Storm Durations	
Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project:	Date: 03/11/2023		
	Designed by: billy.humphreys	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		





FSR: 100 years: Increase Rainfall (%): +30: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW01	FSR: 100 years: +30 %: 30 mins: Winter	85.40 0	82.65 7	83.899	1.242	22.9	1.778	0.000	20.2	21.825	Surcharged
SW02	FSR: 100 years: +30 %: 30 mins: Winter	85.40 0	82.64 3	83.899	1.256	20.2	1.798	0.000	16.8	21.817	Surcharged
SW03	FSR: 100 years: +30 %: 30 mins: Winter	85.40 0	82.62 9	83.899	1.270	16.8	1.818	0.000	12.0	21.770	Surcharged
SW04 (FC)	FSR: 100 years: +30 %: 30 mins: Winter	85.40 0	82.55 0	83.899	1.349	12.0	1.526	0.000	8.6	21.761	Surcharged
SW05	FSR: 100 years: +30 %: 120 mins: Winter	85.40 0	80.89 6	81.035	0.139	8.7	0.022	0.000	8.7	35.477	OK
CW01	FSR: 100 years: +30 %: 15 mins: Summer	85.40 0	80.87 5	81.025	0.150	8.6	0.000	0.000	8.6	11.995	OK
Simple Junction	FSR: 100 years: +30 %: 30 mins: Winter		83.05 0	83.914	0.864	23.6			22.9	21.775	Surcharged

Project:	Date: 03/11/2023		
	Designed by: billy.humphreys	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		





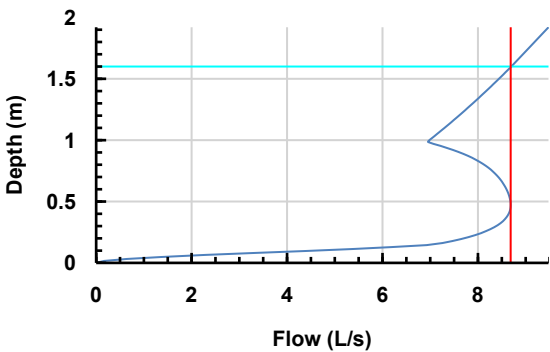
FSR: 100 years: Increase Rainfall (%): +30: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 100 years: +30 %: 15 mins: Winter	Pipe	Simple Junction	SW01	85.400	83.729	0.150	15.957	1.9	1.37	33.0	Surcharged
1.001	FSR: 100 years: +30 %: 15 mins: Winter	Pipe	SW01	SW02	85.400	83.711	0.450	15.341	0.5	0.15	27.4	Surcharged
1.002	FSR: 100 years: +30 %: 15 mins: Summer	Pipe	SW02	SW03	85.400	83.519	0.450	13.544	0.4	0.09	21.2	Surcharged
1.003	FSR: 100 years: +30 %: 15 mins: Summer	Pipe	SW03	SW04 (FC)	85.400	83.519	0.450	12.862	0.3	0.08	14.0	Surcharged
1.004	FSR: 100 years: +30 %: 120 mins: Winter	Pipe	SW04 (FC)	SW05	85.400	83.134	0.077	35.633	0.9	0.48	8.7	Surcharged
1.005	FSR: 100 years: +30 %: 120 mins: Winter	Pipe	SW05	CW01	85.400	81.035	0.145	35.477	0.5	0.49	8.7	OK

Project:	Date: 03/11/2023		
	Designed by: billy.humphreys	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Phase	Company Address:		



Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SW01	Outlet	1.001	Free Discharge
SW02	Outlet	1.002	Free Discharge
SW03	Outlet	1.003	Free Discharge
SW04 (FC)	Outlet	1.004	Hydro-Brake®
	Invert Level (m)	82.550	
	Design Depth (m)	1.600	
	Design Flow (L/s)	8.7	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☒	
	Unit Reference	SHE-0128-8700-1600-8700	
			
SW05	Outlet	1.005	Free Discharge
Simple Junction	Outlet	1.000	Free Discharge

Project:	Date: 03/11/2023		
	Designed by: billy.humphreys	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase		Company Address:	



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	Simple Junction		Time of Concentration	0.023	100	0	100	0.023
Catchment Area (1)	Simple Junction		Time of Concentration	0.044	100	0	100	0.044
TOTAL		0.0		0.068				0.068

Project:	Date: 03/11/2023			
	Designed by: billy.humphreys	Checked by:	Approved By:	
Report Title: Rainfall Analysis Criteria	Company Address:			

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FSR Type: FSR

Region	England And Wales
M5-60 (mm)	19.0
Ratio R	0.323
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	30.000
30.0	0.000
2.0	0.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project:	Date: 03/11/2023		
	Designed by: billy.humphreys	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		





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

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW01	FSR: 30 years: +0 %: 15 mins: Winter	85.400	82.657	82.975	0.318	20.2	0.455	0.000	18.1	9.500	OK
SW02	FSR: 30 years: +0 %: 15 mins: Winter	85.400	82.643	82.975	0.332	18.1	0.475	0.000	15.2	9.488	OK
SW03	FSR: 30 years: +0 %: 15 mins: Winter	85.400	82.629	82.975	0.346	15.2	0.495	0.000	11.1	9.428	OK
SW04 (FC)	FSR: 30 years: +0 %: 15 mins: Winter	85.400	82.550	82.975	0.425	11.1	0.481	0.000	8.5	9.405	Surcharged
SW05	FSR: 30 years: +0 %: 15 mins: Winter	85.400	80.896	81.035	0.139	8.5	0.022	0.000	8.5	9.234	OK
CW01	FSR: 30 years: +0 %: 15 mins: Summer	85.400	80.875	81.025	0.150	8.4	0.000	0.000	8.4	8.238	OK
Simple Junction	FSR: 30 years: +0 %: 15 mins: Winter		83.050	83.175	0.125	20.6			20.2	9.502	OK

Project:	Date: 03/11/2023		
	Designed by: billy.humphreys	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		





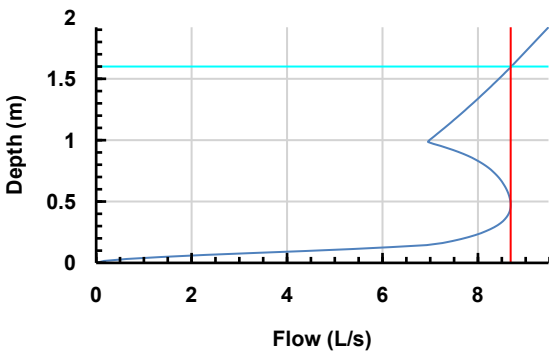
FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	Simple Junction	SW01	85.400	83.175	0.115	9.502	1.4	0.84	20.2	OK
1.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW01	SW02	85.400	82.975	0.325	9.500	0.5	0.1	18.1	OK
1.002	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW02	SW03	85.400	82.975	0.339	9.488	0.5	0.07	15.2	OK
1.003	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW03	SW04 (FC)	85.400	82.975	0.358	9.428	0.4	0.06	11.1	OK
1.004	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW04 (FC)	SW05	85.400	82.975	0.076	9.386	0.9	0.47	8.5	Surcharged
1.005	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW05	CW01	85.400	81.035	0.144	9.234	0.5	0.49	8.5	OK

Project:	Date: 03/11/2023		
	Designed by: billy.humphreys	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Phase	Company Address:		



Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SW01	Outlet	1.001	Free Discharge
SW02	Outlet	1.002	Free Discharge
SW03	Outlet	1.003	Free Discharge
SW04 (FC)	Outlet	1.004	Hydro-Brake®
	Invert Level (m)	82.550	
	Design Depth (m)	1.600	
	Design Flow (L/s)	8.7	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☒	
	Unit Reference	SHE-0128-8700-1600-8700	
			
SW05	Outlet	1.005	Free Discharge
Simple Junction	Outlet	1.000	Free Discharge

Project:	Date: 03/11/2023		
	Designed by: billy.humphreys	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase		Company Address:	



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	Simple Junction		Time of Concentration	0.023	100	0	100	0.023
Catchment Area (1)	Simple Junction		Time of Concentration	0.044	100	0	100	0.044
TOTAL		0.0		0.068				0.068

Project:	Date: 03/11/2023			
	Designed by: billy.humphreys	Checked by:	Approved By:	
Report Title: Rainfall Analysis Criteria	Company Address:			

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FSR Type: FSR

Region	England And Wales
M5-60 (mm)	19.0
Ratio R	0.323
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	30.000
30.0	0.000
2.0	0.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project:	Date: 03/11/2023		
	Designed by: billy.humphreys	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		





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

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW01	FSR: 2 years: +0 %: 30 mins: Winter	85.40 0	82.65 7	82.759	0.102	7.3	0.146	0.000	7.2	6.732	OK
SW02	FSR: 2 years: +0 %: 30 mins: Winter	85.40 0	82.64 3	82.756	0.113	7.2	0.161	0.000	7.0	6.729	OK
SW03	FSR: 2 years: +0 %: 15 mins: Winter	85.40 0	82.62 9	82.754	0.125	8.9	0.179	0.000	7.4	4.973	OK
SW04 (FC)	FSR: 2 years: +0 %: 15 mins: Winter	85.40 0	82.55 0	82.753	0.203	7.4	0.229	0.000	6.4	4.972	Surcharged
SW05	FSR: 2 years: +0 %: 15 mins: Winter	85.40 0	80.89 6	81.030	0.134	6.5	0.021	0.000	6.5	4.811	OK
CW01	FSR: 2 years: +0 %: 15 mins: Summer	85.40 0	80.87 5	81.025	0.150	6.0	0.000	0.000	6.0	4.277	OK
Simple Junction	FSR: 2 years: +0 %: 15 mins: Winter		83.05 0	83.129	0.079	10.9			10.7	5.017	OK

Project:	Date: 03/11/2023		
	Designed by: billy.humphreys	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		





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

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	Simple Junction	SW01	85.400	83.129	0.074	5.017	1.2	0.44	10.7	OK
1.001	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW01	SW02	85.400	82.755	0.105	5.017	0.4	0.05	10.0	OK
1.002	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW02	SW03	85.400	82.754	0.118	5.011	0.4	0.04	8.9	OK
1.003	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW03	SW04 (FC)	85.400	82.754	0.137	4.973	0.4	0.04	7.4	OK
1.004	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW04 (FC)	SW05	85.400	82.753	0.065	4.963	0.9	0.36	6.5	Surcharged
1.005	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW05	CW01	85.400	81.030	0.142	4.811	0.4	0.37	6.5	OK

Appendix D Communication

- Relevant Communications

