

Flood Risk Assessment

For a site at

Huyton Trade Industrial Estate,
(off Wilson Road), Huyton

Undertaken on behalf of

Derwent Estates Ltd

Report Title:	Huyton Trade Industrial Estate (off Wilson Road) Huyton Flood Risk Assessment
Report Reference:	9333/FRA/02
Client:	Derwent Estates Ltd
Issue Date:	July 2022
Drafted By:	R Hall
Authorised By:	K Tyldesley

This document has been prepared for the titled project (or named part thereof) and should not be relied upon or used for any other project without an independent check being carried out as to its suitability and prior written authorization being obtained from WML Consulting. WML accepts no responsibility or liability for the consequences of the use of this document, wholly or in part, for any other purpose than that for which it was commissioned. Any persons so using or relying upon this document for such other purpose do so at their own risk.

This report was prepared for the sole use of the Client and shall not be relied upon or transferred to any other party without the express written authorisation of WML. It May contain material subject to copyright or obtained subject to license; unauthorised copying of this report will be in breach of copyright/license.

The findings and opinions provided in this document are given in good faith and are subject to the limitations imposed by employing site assessment methods and techniques, appropriate to the time of investigation and within the limitations and constraints defined within this document. The findings and opinions are relevant to the dates when the assessment was undertaken, but should not necessarily be relied upon to represent conditions at a substantially later date.

The findings and opinions conveyed in this report are based on information obtained from a variety of sources as detailed and which WML assumes to be reliable, but has not been independently confirmed. Therefore, WML cannot and does not guarantee the authenticity or reliability of third party information it has relied upon.

Where opinions expressed in this report are based on current available guidelines and legislation, no liability can be accepted by WML for the effects of any future changes to such guidelines and legislation.

The limitations of liability of WML for the contents of this document have been agreed with the Client, as set out in the terms and conditions of offer and related contract documentation.

Revision Status / History

Rev	Date	Issue / Purpose/ Comment	Prepared	Checked	Authorised
01	01/07/2021	Planning Issue	RH	KPT	LoG
02	13/07/2022	Revised Issue	RH	KPT	LoG
03	08/09/2022	Revised Issue	RH	KPT	LoG

WML Consulting Ltd
No. 8 Oak Green, Earl Road,
Stanley Green Business Park,
Cheadle Hulme,
Cheshire
SK8 6QL

Tel: 0161 482 0600
Email: info@wmlconsulting.com
www.wmlconsulting.com

Executive Summary

Background	WML Consulting have been commissioned by Derwent Holdings Limited to undertake a Flood Risk Assessment (FRA) for a forthcoming planning application in relation to a proposed commercial development located at Huyton Trade Industrial Estate (off Wilson Road) in the district of Huyton. This report comprises an FRA, as required by the National Planning Policy Framework (NPPF). It has been carried out in accordance with BS 8533:2011 – Assessing and Managing Flood Risk in Development.
Flood Risk	The Environment Agency (EA), United Utilities (UU), and Knowsley Borough Council (KBC) have been asked to confirm if they have any information regarding past, present or future flooding issues that may affect the site. The EA have confirmed that they are unaware of any flood issues to the proposed development. A copy of their response can be found in appendix 04. UU have confirmed that they are unaware of any flood issues to the proposed development. A copy of their response can be found in appendix 05. KBC have confirmed that they are unaware of any flood issues to the proposed development. A copy of their response can be found in appendix 06. River and coastal flooding - the EA's flood mapping shows the site to be within flood zone 1. On this basis, it is considered that the risk to the development from this form of flooding is low. Sewer flood risk is currently considered to be low. Flooding from overland flows / surface water (pluvial flooding) - the online mapping indicates that the site may be at risk from surface water flooding, however we would anticipate that this is highlighting low areas within the existing site. In addition, pluvial flooding is generally considered to be of lesser risk than fluvial flooding. Flooding from reservoirs - the online mapping indicates that the site is not as risk from reservoir flooding. Given the above, the overall risk of flooding to the development is considered to be low.
Surface Water Drainage	From the site investigation information available to date it is considered that the ground conditions at the site are not suited to the use of soakaways or other infiltration techniques. There is no water course within or adjacent to the site, hence it is proposed that the surface water runoff from the site will be discharged to the existing surface water drainage system within Wilson Road. There is no water course within or adjacent to the site, combined with the site investigation information available, it is proposed that surface water from the proposed development will connect into the existing surface water sewer, via 3 No separate connections, within the footpath extents of Wilson Road. The site is classified as a brown field site, there is a requirement under Knowsley MBC SFRA guidance for a reduction in surface water runoff by 50%. The existing site has a surface water runoff rate that has been assessed as 237.7 l/sec, based upon a rainfall intensity of 50mm/hr and a total impermeable area of 1.71ha. When the SFRA reduction factor of 50% is applied the flow rate is reduced to 118.9 l/sec. It is proposed to restrict surface water flow from the proposed development to 118.9 l/sec.

CONTENTS

1.0	INTRODUCTION	1
	Appointment	1
	Development Proposals.....	1
2.0	SITE LOCATION AND DESCRIPTION.....	1
3.0	ASSESSMENT OF FLOOD RISK	2
	Correspondence	2
	Potential Sources of Flooding	2
	Mitigation Measures.....	3
	Finished Floor Levels	3
	Future Maintenance.....	3
4.0	DRAINAGE PROPOSALS	3

APPENDICES

Appendix 01	-	Site Location Plan
Appendix 02	-	Proposed Site Layout Drawing
	-	Topo Survey
Appendix 03	-	United Utilities Public Sewer Records
Appendix 04	-	Environment Agency Correspondence
Appendix 05	-	United Utilities Correspondence
Appendix 06	-	Knowsley Council Correspondence
Appendix 07	-	Online Flood Mapping
Appendix 08	-	SW Drainage Calculations
Appendix 09	-	Drainage Strategy Plan

1.0 INTRODUCTION

Appointment

- 1.1 WML Consulting have been commissioned by Derwent Estates Ltd, to undertake a Flood Risk Assessment (FRA) for a forthcoming planning application in relation to a proposed commercial development located at Huyton Trade Industrial Estate (off Wilson Road) in the district of Huyton, Ref Appendix 01.

Development Proposals

- 1.1 It is understood that the currently proposed development will comprise the construction of two single storey commercial / industrial units, comprising of 75.5K ft², and associated areas of car parking, roadway and pathways
- 1.2 The proposed development layout by RGP Architects drawing 11049-PL-X-L03 Proposed Site Plan, and the topographical survey drawings S21579-T, are presented in Appendix 02 of this report.

Objective

- 1.3 This report comprises an FRA, as required by the National Planning Policy Framework (NPPF). It has been carried out in accordance with BS 8533:2011 – Assessing and Managing Flood Risk in Development.
- 1.4 The NPPF identifies that it is the responsibility of developers to demonstrate:
- whether the development would be affected by current or future flooding from any source
 - that the development is safe and where possible reduces flood risk overall
 - whether flood risk would be increased elsewhere
 - mitigation measures for any identified flooding risks
 - that the site can be developed and occupied safely
- 1.5 The FRA identifies whether there are any flooding or surface water management issues related to the development site that may warrant further consideration, to comply with current Planning Policy and associated Flood Risk Practice Guide.

2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site comprises land forming part of the broader Huyton Industrial Trade Park, situated adjacent to Wilson Road, Huyton, Merseyside. It is centred on approximate Ordnance Survey National Grid Reference 345347E, 390124N with an indicative postcode of L36 6JG.
- 2.2 The proposed development site is bounded to the north-east by a car parking area and Wilson Road beyond, to the south-west by residential properties bounding Kipling Avenue, to the south-east by additional industrial properties within the wider Huyton Industrial Trade Park, and to the north-west by additional industrial / commercial units.
- 2.3 The subject site is currently occupied by single storey industrial / commercial units. Access into the site is via several junctions from Wilson Road, two of which are located within the proposed development area. An Existing Site Plan figure is presented in Appendix 01.
- 2.4 At the time of the intrusive investigation on 20th May 2022, the site comprised two commercial / industrial units – a large building with a footprint of approximately 44,500 m² in the south-east of the site area, and a smaller building with a footprint of approximately 650 m² in the south-west. The majority of the remainder of the site area comprises tarmac or concrete hardstanding used for car parking and open air materials storage, however a rectangular landscaped area of maintained grass of approximately 1090 m² in area is present in the north-western corner of the site.

- 2.5 The site is roughly level, and rests at an elevation of approximately 27.60 metres above ordnance datum (m AOD). The roadway / area of hardstanding in the north-east of the site, extending between the larger on-site building and
- 2.6 An electricity sub-station is located close to Wilson Road on the north-eastern site boundary. A second smaller sub-station is located to the south-east section adjacent to a gas governor. It is understood that both are to be retained as part of the proposed site redevelopment.
- 2.7 The existing on-site buildings are of low-rise steel framed construction, with steel cladding and flat roofs. The structures are divided into several smaller retail units, referenced 1 to 9, which historically included a paint decoration and plumbing, hire shop, catering and food storage, car repair / MOT garages (pre-2005), furniture outlet, general couriers and clothing manufacturer.
- 2.8 The north-eastern and south-western boundaries of the site are landscaped and comprise a mixture of grass and semi-mature / mature trees. The north-eastern boundary is also secured with steel palisade fencing and security gates.

3.0 ASSESSMENT OF FLOOD RISK

Correspondence

- 3.1 The Environment Agency (EA), United Utilities (UU), and Knowlsey Borough Council (KBC) have been asked to confirm if they have any information regarding past, present or future flooding issues that may affect the site.
- 3.2 The EA confirmed that they are unaware of any flood issues to the proposed development. A copy of their response can be found in appendix 04.
- 3.3 UU have confirmed that they are unaware of any flood issues to the proposed development. A copy of their response can be found in appendix 05.
- 3.4 KBC have confirmed that they are unaware of any flood issues to the proposed development. A copy of their response can be found in appendix 06.

Potential Sources of Flooding

- 3.5 River and coastal flooding - the EA's fluvial flood mapping shows the site to be within Flood Zone 1. Zone 1 indicates an annual exceedance probability (AEP) of not greater than 0.1% (probability 1 in 1000 year) flood risk. On this basis, it is considered that the risk to the development from this form of flooding is low.
- 3.6 Surface water flooding – a review of the on-line flood mapping shows that the proposed development may be at risk from surface water flooding, however we would anticipate that this is highlighting low areas within the existing site. In addition, pluvial flooding is generally considered to be of lesser risk than fluvial flooding, hence the mitigation referred to above would act to mitigate against this form of flood risk. A copy of the surface water flood mapping can be found in Appendix 07 and shows that during low & medium risk scenarios the proposed development is not subject to flooding. The risk of flooding from this source is considered to be low.
- 3.7 Ground water flooding - An intrusive site investigation Phase 2 Study suggests that the ground is considered to be mostly impermeable due to the nature of the anticipated cohesive glacial till and shallow mudstone. Given the above, the risk of flooding from groundwater is considered to be low.
- 3.8 Sewer flooding - United Utilities have confirmed that they are unaware of any flood issues in the vicinity of the proposed development and therefore the risk of flooding from this source is considered to be low. A copy of the public sewer records can be found in appendix 03.

3.9 Reservoir flooding - from a review of the Ordnance Survey mapping around the site it appears that the site is not in close proximity to any reservoirs, similarly from a review of the EA's on-line flood mapping, it is considered that the risk to the development from this form of flooding is low.

3.10 Water Course flooding – there is no water course within or adjacent to the site. As there is no recorded historic event of flooding to the site, it is considered the risk of flooding is low.

Mitigation Measures

3.11 From the above, it can be seen that the flood risk posed to the proposed development from other sources of flooding is considered to be low, hence it is considered that significant flood risk mitigation measures are not required as part of the development.

3.12 As the existing site will be developed with a new building and parking provisions, etc., rainfall which may previously have resulted in surface water run-off / overland flows will be collected by the new drainage system(s). It is considered that this will reduce the risk of surface water run-off / overland flows to the proposed development and the surrounding area.

Finished Floor Levels

3.13 The proposed buildings will not have a basements. In addition, it is recommended that the finished floor levels of the proposed buildings should be set at a minimum of 0.15m above adjacent ground levels. This will enable any potential surface water run-off to be conveyed safely across the site, without affecting property, in accordance with the approach promoted within DEFRA's Making Space for Water.

Future Maintenance

3.14 It is anticipated that the drainage for this development will be privately maintained.

4.0 DRAINAGE PROPOSALS

4.1 The surface water drainage proposals for the development should incorporate the principles of the NPPF and the SUDS manual.

4.2 The proposed drainage system should be designed in accordance with BS EN 752-4 and the Building Regulations Approved Document H (2010), which indicates the following hierarchy for the disposal of surface water drainage from new development sites:

1. Discharge via infiltration
2. Discharge to watercourse
3. Discharge to sewer

4.3 These options are discussed in further detail below.

4.4 Surface water discharge via infiltration - in view of the relatively impermeable nature of the cohesive Glacial Till and mudstone, the site will not be suitable for the use of soakaways / other infiltration techniques to dispose of the surface water run-off, this has been confirmed by intrusive Stage 2 site investigation.

4.5 Surface water discharge via watercourse – there is no water course within or adjacent to the site, therefore is not achievable to a watercourse.

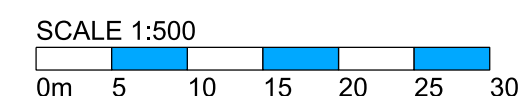
- 4.6 Surface water discharge via sewer – given the SW runoff is not achievable via infiltration or watercourse, it is proposed that surface water will need to discharge to the existing public surface water sewer, via 3 No separate connections, within the footpath extents of Wilson Road.
- 4.7 The site is classified as a brown field site, there is a requirement under Knowsley MBC SFRA guidance for a reduction in surface water runoff by 50%. The existing site has a surface water runoff rate that has been assessed as 237.7 l/sec, based upon a rainfall intensity of 50mm/hr and a total impermeable area of 1.71ha. When the SFRA reduction factor of 50% is applied the flow rate is reduced to 118.9 l/sec. It is proposed to restrict surface water flow from the proposed development to 118.9 l/sec.
- A copy of the MicroDrainage calculations can be found appended to this report (Appendix 08).
- 4.8 Knowsley MBC SFRA guidance states '*All major development should include appropriate SuDS techniques to manage surface water runoff from development based on the hierarchal approach in Part H of the Building Regulations (2000)25, the SuDS Manual (CIRIA, 2007)36 and this SFRA. Where feasible development should aim to achieve Greenfield runoff rates, and as a minimum demonstrate a 50% reduction in runoff from the existing situation for Brownfield development.*'
- 4.9 The drainage strategy put forward in this document is based on the assumption that surface water discharge is allowed to pass into the existing public surface water sewer, via 3 No separate connections, within the footpath extents of Wilson Road. The proposed site area is approx. 1.95 ha of which 1.71 ha is existing hardstanding.
- 4.10 Surface water run-off rates for the developed site should not exceed the rates noted above for the corresponding 1, 30 & 100 year return period storms plus a 40% climate change allowance.
- 4.11 For the proposed drainage it is proposed to collect hardstanding, 1.95 ha, surface water runoff from the development via 3 No separate surface water drainage systems, utilising traditional drains and gullies prior to discharging into an offline geo-cellular storage tank, located within the carpark areas, each with a flow control unit, limiting the total site discharge rate 118.9 l/sec. Each surface water system will have a full retention separator, to trap silt and contaminants, located upstream of the geo cellular storage tanks.
- 4.12 Roof water collected at the front and rear of the proposed industrial units. It is considered that surface water treatment will not be required for the drainage from industrial units and thus will discharge downstream of the full retention separator.
- 4.13 3 No hydro brake flow control unit will restrict all flows from the site to 118.9 l/sec for the 1 in 100yr + 40% Climate Change storm event. As part of the development works the existing drainage surface water system connections into the public sewer system will be reused where possible.
- 4.14 A copy of the Surface Water drainage design and simulation calculations can be found in (Appendix 08).
- 4.15 With regard to the foul water drainage for the proposed development, it is anticipated that this will discharge to the existing private foul water drainage system on site in close proximity to the proposed building footprint. The existing system has been used by the site, which in turn discharges into the existing United Utilities sewer within Wilson Road. As part of the development works parts of the existing drainage system and the connection into the public sewer system will be reused where possible.
- 4.16 We have assumed an existing foul drainage connection to the combined sewer, based on the Topo Survey and Drainage Investigation information. The existing foul water connection to the existing public combined sewer will be subject to survey, detailed design and UU approval. Refer to Appendix 09 for the proposed drainage strategy plan.

APPENDIX 01
Site Location Plan



APPENDIX 02

Proposed Site Layout Plan / Topo Survey



PARKING SCHEDULE	
STANDARD BAYS	144
ACCESSIBLE BAYS	19
VAN BAYS	13
SP NETWORKS PARKING SPACE	1
TOTAL	177
CYCLE SPACES (INTERNAL)	14
CYCLE SPACES (EXTERNAL)	8
TOTAL	22
MOTORCYCLE SPACES	8

E	23.07.22	BLOCK A UPDATED	AM
D	08.07.22	EXISTING CAR PARKING AMENDED.	CMP
C	07.07.22	HIGHWAYS ACCESS AMENDED.	CMP
B	22.06.22	SUB-STATION ADDED	AM
A	14.06.22	PROPOSED PLANS & ACOUSTIC FENCE UPDATED	AJP
	REV.	DATE	NOTES
			INIT.

CLIENT / PROJECT



HUYTON INDUSTRIAL ESTATE, LIVERPOOL

--- DRAWING TITLE

PROPOSED SITE PLAN

STATUS PLANNING

DATE	DRAWN	SCALE @ A2
24.05.22	DB	1:500

PROJECT NUMBER	STAGE	UNIT / BLOCK	TYPE & NUMBER	REVISION LETTER
-------------------	-------	-----------------	------------------	--------------------

DRAWING NO.

11049	PL	X	L03	E
Site Location Plans Sections	L 8	GA Plans Details	P D	Elevations Profile Colours

THE RATCLIFFE GROVES PARTNERSHIP

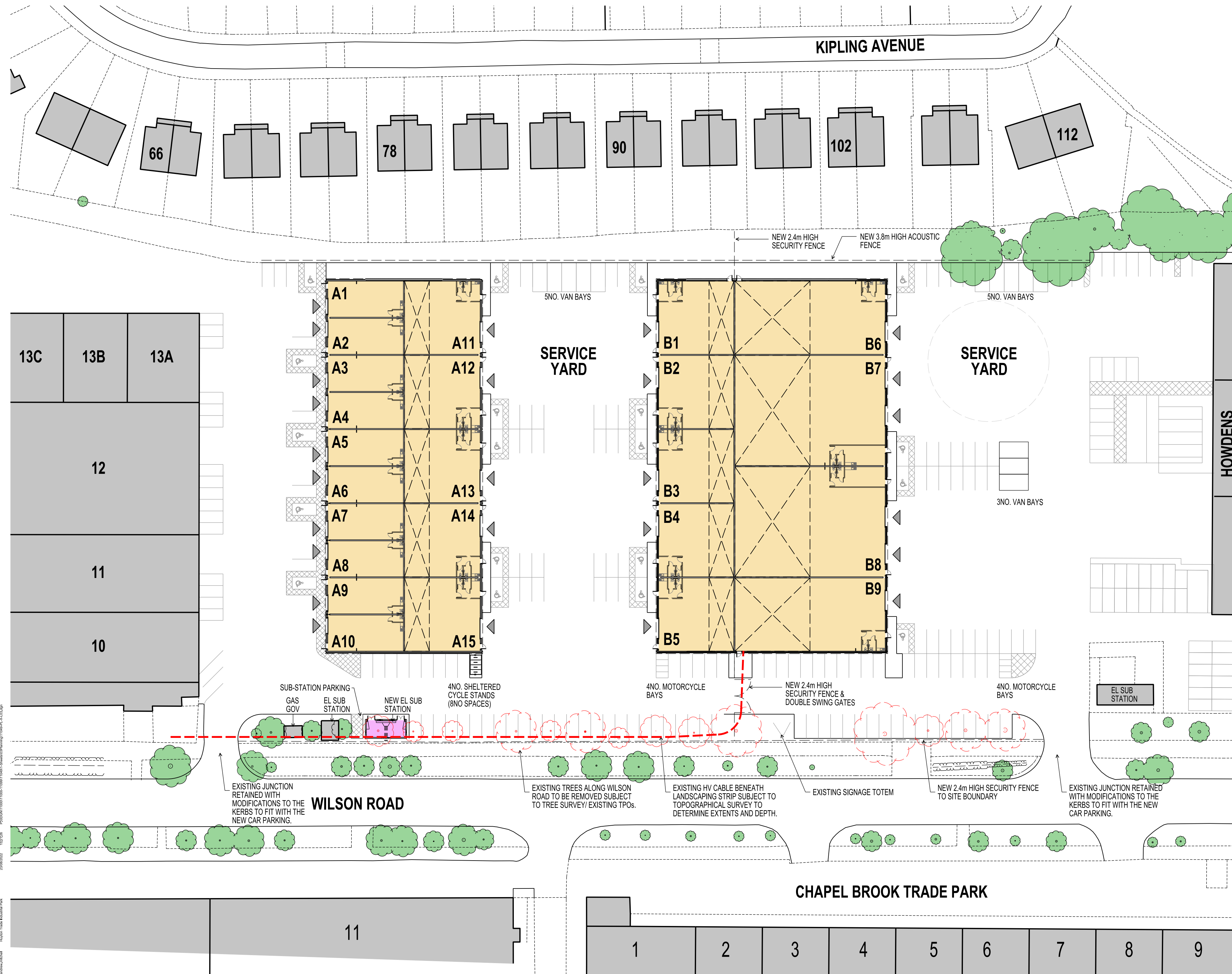
MANCHESTER
105 MANCHESTER ROAD
BURY LANCASHIRE BL9 0TD
T. 0161 797 6000 E. manchester@rgp.uk.com
www.rgp.uk.com

LONDON
19 BEDFORD ROW
LONDON WC1R 4EB
T. 020 7600 6666 E. london@rgp.uk.com



om

RGP
architects





© Survey & Engineering Projects Ltd. 2021
Reproduction in whole or in part by any means is prohibited
without the prior permission of Survey & Engineering Projects Ltd.
T: 01495 72069 F: 01495 72064 W: www.surveyandengineering.co.uk



File Name: S21579-T-301.dwg

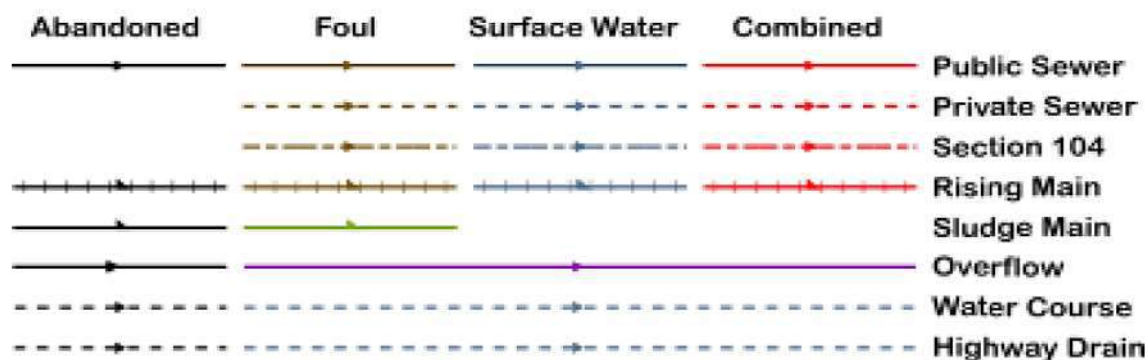
LEGEND	
AB	ABUTMENT
AD	ADJACENT
AK	AK
AL	AL
AM	AM
AN	AN
AO	AO
AP	AP
AR	AR
AS	AS
AT	AT
AV	AV
AW	AW
AX	AX
AY	AY
AZ	AZ
BA	BA
BB	BB
BC	BC
BD	BD
BE	BE
BF	BF
BG	BG
BH	BH
BI	BI
BJ	BJ
BK	BK
BL	BL
BM	BM
BN	BN
BO	BO
BP	BP
BQ	BQ
BR	BR
BS	BS
BT	BT
BU	BU
BV	BV
BW	BW
BX	BX
BY	BY
BZ	BZ
CA	CA
CB	CB
CC	CC
CD	CD
CE	CE
CF	CF
CG	CG
CH	CH
CI	CI
CJ	CJ
CK	CK
CL	CL
CM	CM
CN	CN
CO	CO
CP	CP
CQ	CQ
CR	CR
CS	CS
CT	CT
CU	CU
CV	CV
CW	CW
CX	CX
CY	CY
CZ	CZ
DA	DA
DB	DB
DC	DC
DD	DD
DE	DE
DF	DF
DG	DG
DH	DH
DI	DI
DJ	DJ
DK	DK
DL	DL
DM	DM
DN	DN
DO	DO
DP	DP
DQ	DQ
DR	DR
DS	DS
DT	DT
DU	DU
DV	DV
DW	DW
DX	DX
DY	DY
DZ	DZ
EA	EA
EB	EB
EC	EC
ED	ED
EE	EE
EF	EF
EG	EG
EH	EH
EI	EI
EJ	EJ
EK	EK
EL	EL
EM	EM
EN	EN
EO	EO
EP	EP
EQ	EQ
ER	ER
ES	ES
ET	ET
EU	EU
EV	EV
EW	EW
EX	EX
EY	EY
EZ	EZ
FA	FA
FB	FB
FC	FC
FD	FD
FE	FE
FF	FF
FG	FG
FH	FH
FI	FI
FJ	FJ
FK	FK
FL	FL
FM	FM
FN	FN
FO	FO
FP	FP
FQ	FQ
FR	FR
FS	FS
FT	FT
FU	FU
FV	FV
FW	FW
FX	FX
FY	FY
FZ	FZ
GA	GA
GB	GB
GC	GC
GD	GD
GE	GE
GF	GF
GG	GG
GH	GH
GI	GI
GJ	GJ
GK	GK
GL	GL
GM	GM
GN	GN
GO	GO
GP	GP
GQ	GQ
GR	GR
GS	GS
GT	GT
GU	GU
GV	GV
GW	GW
GX	GX
GY	GY
GZ	GZ
HA	HA
HB	HB
HC	HC
HD	HD
HE	HE
HF	HF
HG	HG
HH	HH
HI	HI
HJ	HJ
HK	HK
HL	HL
HM	HM
HN	HN
HO	HO
HP	HP
HQ	HQ
HR	HR
HS	HS
HT	HT
HU	HU
HV	HV
HW	HW
HX	HX
HY	HY
HZ	HZ
IA	IA
IB	IB
IC	IC
ID	ID
IE	IE
IF	IF
IG	IG
IH	IH
II	II
IJ	IJ
IK	IK
IL	IL
IM	IM
IN	IN
IO	IO
IP	IP
IQ	IQ
IR	IR
IS	IS
IT	IT
IU	IU
IV	IV
IW	IW
IX	IX
IY	IY
IZ	IZ
JA	JA
JB	JB
JC	JC
JD	JD
JE	JE
JF	JF
JG	JG
JH	JH
JI	JI
IJ	IJ
JK	JK
IL	IL
JM	JM
JN	JN
JO	JO
JP	JP
JQ	JQ
JR	JR
JS	JS
JT	JT
JU	JU
JV	JV
JW	JW
JX	JX
JY	JY
JZ	JZ
KA	KA
KB	KB
KC	KC
KD	KD
KE	KE
KF	KF
KG	KG
KH	KH
KI	KI
KJ	KJ
KK	KK
KL	KL
KM	KM
KN	KN
KO	KO
KP	KP
KQ	KQ
KR	KR
KS	KS
KT	KT
KU	KU
KV	KV
KW	KW
KX	KX
KY	KY
KZ	KZ
LA	LA
LB	LB
LC	LC
LD	LD
LE	LE
LF	LF
LG	LG
LH	LH
LI	LI
LJ	LJ
LK	LK
LL	LL
LM	LM
LN	LN
LO	LO
LP	LP
LQ	LQ
LR	LR
LS	LS
LT	LT
LU	LU
LV	LV
LW	LW
LX	LX
LY	LY
LZ	LZ
MA	MA
MB	MB
MC	MC
MD	MD
ME	ME
MF	MF
MG	MG
MH	MH
MI	MI
MJ	MJ
MK	MK
ML	ML
MM	MM
MN	MN
MO	MO
MP	MP
MQ	MQ
MR	MR
MS	MS
MT	MT
MU	MU
MV	MV
MW	MW
MX	MX
MY	MY
MZ	MZ
NA	NA
NB	NB
NC	NC
ND	ND
NE	NE
NF	NF
NG	NG
NH	NH
NI	NI
NJ	NJ
NK	NK
NL	NL
NM	NM
NN	NN
NO	NO
NP	NP
NQ	NQ
NR	NR
NS	NS
NT	NT
NU	NU
NV	NV
NW	NW
NX	NX
NY	NY
NZ	NZ
OA	OA
OB	OB
OC	OC
OD	OD
OE	OE
OF	OF
OG	OG
OH	OH
OI	OI
OJ	OJ
OK	OK
OL	OL
OM	OM
ON	ON
OO	OO
OP	OP
OQ	OQ
OR	OR
OS	OS
OT	OT
OU	OU
OV	OV
OW	OW
OX	OX
OY	OY
OZ	OZ
PA	PA
PB	PB
PC	PC
PD	PD
PE	PE
PF	PF
PG	PG
PH	PH
PI	PI
PJ	PJ
PK	PK
PL	PL
PM	PM
PN	PN
PO	PO
PP	PP
PQ	PQ
PR	PR
PS	PS
PT	PT
PU	PU
PV	PV
PW	PW
PX	PX
PY	PY
PZ	PZ
QA	QA
QB	QB
QC	QC
QD	QD
QE	QE
QF	QF
QG	QG
QH	QH
QI	QI
QJ	QJ
QK	QK
QL	QL
QM	QM
QN	QN
QO	QO
QP	QP
QQ	QQ
QR	QR
QS	QS
QT	QT
QU	QU
QV	QV
QW	QW
QX	QX
QY	QY
QZ	QZ
RA	RA
RB	RB
RC	RC
RD	RD
RE	RE
RF	RF
RG	RG
RH	RH
RI	RI
RJ	RJ
RK	RK
RL	RL
RM	RM
RN	RN
RO	RO
RP	RP
RQ	RQ
RR	RR
RS	RS
RT	RT
RU	RU
RV	RV
RW	RW
RX	RX
RY	RY
RZ	RZ
SA	SA
SB	SB
SC	SC
SD	SD
SE	SE
SF	SF
SG	SG
SH	SH
SI	SI
SJ	SJ
SK	SK
SL	SL
SM	SM
SN	SN
SO	SO
SP	SP
SQ	SQ
SR	SR
SS	SS
ST	ST
SU	SU
SV	SV
SW	SW
SX	SX
SY	SY
SZ	SZ
TA	TA
TB	TB
TC	TC
TD	TD
TE	TE
TF	TF
TG	TG
TH	TH
TI	TI
TJ	TJ
TK	TK
TL	TL
TM	TM
TN	TN
TO	TO
TP	TP
TQ	TQ
TR	TR
TS	TS
TT	TT
TU	TU
TV	TV
TW	TW
TX	TX
TY	TY
TZ	TZ
UA	UA
UB	UB
UC	UC
UD	UD
UE	UE
UF	UF
UG	UG
UH	UH
UI	UI
UJ	UJ
UK	UK
UL	UL
UM	UM
UN	UN
UO	UO
UP	UP
UQ	UQ
UR	UR
US	US
UT	UT
UU	UU
UV	UV
UW	UW
UX	UX
UY	UY
UZ	UZ
VA	VA
VB	VB
VC	VC
VD	VD
VE	VE
VF	VF
VG	VG
VH	VH
VI	VI
VJ	VJ
VK	VK
VL	VL
VM	VM
VN	VN
VO	VO
VP	VP
VQ	VQ
VR	VR
VS	VS
VT	VT
VU	VU
VV	VV
VW	VW
VX	VX
VY	VY
VZ	VZ
WA	WA
WB	WB
WC	WC
WD	WD
WE	WE
WF	WF
WG	WG
WH	WH
WI	WI
WJ	WJ
WK	WK
WL	WL
WM	WM
WN	WN
WO	WO
WP	WP
WQ	WQ
WR	WR
WS	WS
WT	WT
WU	WU
WV	WV
WW	WW
WX	WX
WY	WY
WZ	WZ
XA	XA
XB	XB
XC	XC
XD	XD
XE	XE
XF	XF
XG	XG
XH	XH
XI	XI
XJ	XJ
XK	XK
XL	XL
XM	XM
XN	XN
XO	XO
XP	XP
XQ	XQ
XR	XR
XS	XS
XT	XT
XU	XU
XV	XV
XW	XW
XX	XX
XY	XY
XZ	XZ
YA	YA
YB	YB
YC	YC
YD	YD
YE	YE
YF	YF
YG	YG
YH	YH
YI	YI
YJ	YJ
YK	YK
YL	YL
YM	YM
YN	YN
YO	YO
YP	YP
YQ	YQ
YR	YR
YS	YS
YT	YT
YU	YU
YV	YV
YW	YW
YX	YX
YY	YY
YZ	YZ
ZA	ZA
ZB	ZB
ZC	ZC
ZD	ZD
ZE	ZE
ZF	ZF
ZG	ZG
ZH	ZH
ZI	ZI
ZJ	ZJ
ZK	ZK
ZL	ZL
ZM	ZM
ZN	ZN
ZO	ZO
ZP	ZP
ZQ	ZQ
ZR	ZR
ZS	ZS
ZT	ZT
ZU	ZU
ZV	ZV
ZW	ZW
ZX	ZX
ZY	ZY
ZZ	ZZ

NOTES:
All measurements to O.D. (Bench) Datum. Distances using network RTK.
Survey plotted on a plane local grid, orientated to National Grid.

SURVEY STATIONS			
Name	Easting	Northing	Height
HP01	345942.160	390005.784	20.563
HP02	345340.840	389997.402	29.964
HP03	345527.605	390025.181	26.872
SA13	345203.487	390027.276	27.636
SA14	345322.991	390003.424	27.545
SA15	340421.399	390047.311	27.711
SE11	345226.780	390211.427	27.379
SE12	345314.657	39007.005	27.287
SE13	345275.776	39001.410	27.636
SE14	345333.820	390007.403	27.581
SE15	345336.850	390008.376	27.528
SE16	345398.000	390026.679	27.483
SE17	345448.816	390026.372	27.003
SE18	345387.949	39012.414	27.522

APPENDIX 03
Public Sewer Records

Wastewater Symbolology



All point assets follow the standard colour convention:

red – combined	brown - foul
blue – surface water	purple - overflow

- | | |
|------------------|--------------------------|
| Manhole | Side Entry Manhole |
| Head of System | Outfall |
| Extent of Survey | Screen Chamber |
| Rodding Eye | Inspection Chamber |
| Inlet | Bifurcation Chamber |
| Discharge Point | Lamp Hole |
| Vortex | T Junction / Saddle |
| Penstock | Catchpit |
| Washout Chamber | Valve Chamber |
| Valve | Vent Column |
| Air Valve | Vortex Chamber |
| Non Return Valve | Penstock Chamber |
| Soakaway | Network Storage Tank |
| Gully | Sewer Overflow |
| Cascade | Ww Treatment Works |
| Flow Meter | Ww Pumping Station |
| Hatch Box | Septic Tank |
| Oil Interceptor | Control Kiosk |
| Summit | |
| Drop Shaft | Change of Characteristic |
| Orifice Plate | |



Crown copyright and database rights 2017 Ordnance Survey 100022432. Unauthorised reproduction will infringe these copyrights.

APPENDIX 04
Environment Agency Correspondence

Robin Hall

From: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Sent: 13 July 2022 13:34
To: Robin Hall
Subject: GMMC266453SW Response attached from the Environment Agency
Attachments: S21579-T.PDF; 11049-L03_B.PDF; GMMC266453SW - Table.pdf; GMMC266453SW - DFM.pdf

Dear Robin,

Thank you for your enquiry which was received on 31/05/22, please accept my sincere apology for the delay.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

Please find attached the data requested and my colleague's supporting comments below;

We have no records of flooding affecting the site. However, this does not mean flooding has not occurred in the past or that it will not flood in future. We recommend that you also contact United Utilities and Knowsley Council who may hold additional information (the former especially in relation to sewer flooding).

There are no flood defences in the vicinity of the site.

There are no 2D levels available for this site.

Please be aware you can check your risk of flooding on our external website <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>

Here are some useful links below:

<https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities>

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

For reservoir and surface water information please use the Defra Data Services platform link: [Defra Data Services Platform](#)

Please refer to the [Open Government Licence](#) which explains the permitted use of this information.

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Kind regards,

Sarah

Sarah Walters | Customer and Engagement Officer
Greater Manchester, Merseyside and Cheshire

Direct email: Inforequests.GMMC@environment-agency.gov.uk

Office address: Richard Fairclough House, Knutsford Road, Latchford, Warrington, WA4 1HT

From: Robin Hall <Robin.Hall@wmlconsulting.com>
Sent: 31 May 2022 15:30
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Subject: 9333 - Huyton Trade Industrial Park

To whom it may concern:

Please see attached pdfs indicating the existing and proposed site layout for the above site, upon which new residential development is proposed. Please note the following grid reference E-392274, N-390132.

Can you please advise if you are aware of any past, present or future flood risk issues that may affect this site?

Regards

Robin Hall

WML Consulting Ltd
Civil, Structural & Geotechnical Engineers
No. 8 Oak Green | Earl Road | Stanley Green Business Park | Cheadle Hulme | Cheshire | SK8 6QL

Tel: 0161 482 0600 | email: robin.hall@wmlconsulting.com

COVID-19 UPDATE

All our staff are able to work safely and flexibly from office or home.

Visit WML's Website: www.wmlconsulting.com

This e-mail, and any file transmitted with it, contains information which is confidential and may also be legally privileged. It is intended solely for the exclusive use of the addressee. If you are not the intended addressee, please take notice that any distribution, copying, use or disclosure of its contents to any other person is prohibited. If you have received it in error, please advise the sender immediately and delete the e-mail and any copies of it from your system.

Although this email and any attachments are believed to be free of any virus, or any other defect which might affect any computer or IT system, it is the responsibility of the recipient to ensure that they are virus free, and no responsibility is accepted by WML Consulting Ltd for any loss or damage arising from receipt or use.

The Institution of
Structural Engineers



INVESTORS IN PEOPLE
We invest in people Standard

 Please consider the environment before printing this e-mail

Information in this message may be confidential and may be legally privileged. If you have received this message by mistake, please notify the sender immediately, delete it and do not copy it to anyone else. We have checked this email and its attachments for viruses. But you should still check any attachment before opening it. We may have to make this message and any reply to it public if asked to under the Freedom of Information Act, Data Protection Act or for litigation. Email messages and attachments sent to or from any Environment Agency address may also be accessed by someone other than the sender or recipient, for business purposes.

APPENDIX 05
United Utilities Correspondence

Robin Hall

From: wastewaterdeveloperservices@uuplc.co.uk
Sent: 01 June 2022 14:48
To: Robin Hall
Subject: 02232622 - 9333 - Huyton Trade Industrial Park



Good Afternoon

'I can confirm that we have no current record of sewer flooding within the vicinity of the proposed development.

Please note that United Utilities Water Limited (UW) can only record and check flooding events which are reported to us and we have to comply with our Regulators instructions on the qualification of flooding events to place on the register.

Our response does not include:

- any sewer flooding events caused by blockages or collapses which are the result of third party actions, natural events or other actions over which UW has no control and not a facet of sewer capacity; or*
- any historical sewer flooding events that have been removed from the register as a result of investment in our infrastructure.*

As with all development sites, we recommend you liaise with our water and wastewater engineers by contacting our Developer Services team so the details of your development proposal can be considered further. Details can be found at the following link.

<https://www.unitedutilities.com/services/builders-developers/>

Should you require any further information please do not hesitate to contact me.'

Thanks sue



Sue King
Customer Services Advanced
Developer Services & Metering
Customer Services
unitedutilities.com

If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow



----- Original Message -----

From: Robin Hall [robin.hall@wmlconsulting.com]
Sent: 31/05/2022 15:29
To: wastewaterdeveloperservices@uuplc.co.uk
Subject: 9333 - Huyton Trade Industrial Park

EXTERNAL EMAIL This email originated outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

To whom it may concern:

Please see attached pdfs indicating the existing and proposed site layout for the above site, upon which new residential development is proposed. Please note the following grid reference E-392274, N-390132.

Can you please advise if you are aware of any past, present or future flood risk issues that may affect this site?

Regards

Robin Hall

WML Consulting Ltd

Civil, Structural & Geotechnical Engineers

No. 8 Oak Green | Earl Road | Stanley Green Business Park | Cheadle Hulme | Cheshire | SK8 6QL

Tel: 0161 482 0600 | email: robin.hall@wmlconsulting.com

COVID-19 UPDATE

All our staff are able to work safely and flexibly from office or home.

Visit WML's Website: www.wmlconsulting.com

Visit WML's Website: www.wmlconsulting.com

This e-mail, and any file transmitted with it, contains information which is confidential and may also be legally privileged. It is intended solely for the exclusive use of the addressee. If you are not the intended addressee, please take notice that any distribution, copying, use or disclosure of its contents to any other person is prohibited. If you have received it in error, please advise the sender immediately and delete the e-mail and any copies of it from your system.

The Institution of
StructuralEngineers

CHAS


Constructionline
Gold Member



INVESTORS IN PEOPLE
We invest in people Standard

Although this email and any attachments are believed to be free of any virus, or any other defect which might affect any computer or IT system, it is the responsibility of the recipient to ensure that they are virus free, and no responsibility is accepted by WML Consulting Ltd for any loss or damage arising from receipt or use.

The Institution of
StructuralEngineers

CHAS


Constructionline
Gold Member



INVESTORS IN PEOPLE
We invest in people Standard

 Please consider the environment before printing this e-mail



The information contained in this e-mail is intended only for the individual to whom it is addressed. It may contain legally privileged or confidential information or otherwise be exempt from disclosure. If you have received this Message in error or there are any problems, please notify the sender immediately and delete the message from your computer. You must not use, disclose, copy or alter this message for any unauthorised purpose. Neither United Utilities Group PLC nor any of its subsidiaries will be liable for any direct, special, indirect or consequential damages as a result of any virus being

passed on, or arising from the alteration of the contents of this message by a third party.

United Utilities Group PLC, Haweswater House, Lingley Mere
Business Park, Lingley Green Avenue, Great Sankey,
Warrington, WA5 3LP
Registered in England and Wales. Registered No 6559020

www.unitedutilities.com
www.unitedutilities.com/subsidiaries

APPENDIX 06

Knowsley Borough Council Correspondence

Robin Hall

From: Lead Local Flood Authority <LLFA@knowsley.gov.uk>
Sent: 30 June 2022 17:03
To: Robin Hall
Subject: RE: External Mail: 9333 - Huyton Trade Industrial Park

Hi Robin,

Our search indicate that there is no flooding incidents recorded for this site. However, lack of recodes do not automatically mean the site is not at risk of flooding from any sources. A proper site flood risk assessment is required to ascertain the level and type of flood risk at the scale of a site study.

Hope this is of any help.

Regards
Vahid

Vahid Tayefi
Principal Drainage Engineer

Mobile: 07766 500208

Knowsley Council, , Knowsley,



From: Robin Hall <Robin.Hall@wmlconsulting.com>
Sent: 31 May 2022 15:31
To: Lead Local Flood Authority <LLFA@knowsley.gov.uk>
Subject: External Mail: 9333 - Huyton Trade Industrial Park

CAUTION: This email originated from an external source. If you suspect a potential phishing email, report it via the IT Self Service Portal which can be found within the Quick Links section on Bertha

To whom it may concern:

Please see attached pdfs indicating the existing and proposed site layout for the above site, upon which new residential development is proposed. Please note the following grid reference E-392274, N-390132.

Can you please advise if you are aware of any past, present or future flood risk issues that may affect this site?

Regards

Robin Hall

WML Consulting Ltd
Civil, Structural & Geotechnical Engineers

No. 8 Oak Green | Earl Road | Stanley Green Business Park | Cheadle Hulme | Cheshire | SK8 6QL

Tel: 0161 482 0600 | email: robin.hall@wmlconsulting.com

COVID-19 UPDATE

All our staff are able to work safely and flexibly from office or home.

Visit WML's Website: www.wmlconsulting.com

This e-mail, and any file transmitted with it, contains information which is confidential and may also be legally privileged. It is intended solely for the exclusive use of the addressee. If you are not the intended addressee, please take notice that any distribution, copying, use or disclosure of its contents to any other person is prohibited. If you have received it in error, please advise the sender immediately and delete the e-mail and any copies of it from your system.

Although this email and any attachments are believed to be free of any virus, or any other defect which might affect any computer or IT system, it is the responsibility of the recipient to ensure that they are virus free, and no responsibility is accepted by WML Consulting Ltd for any loss or damage arising from receipt or use.

The Institution of
Structural Engineers



INVESTORS IN PEOPLE
We invest in people Standard

 Please consider the environment before printing this e-mail

APPENDIX 07
Online Flood Mapping

Flood map for planning

Your reference	Location (easting/northing)	Created
Huyton Trade Ind Estate	345347/390124	29 Jun 2022 16:20

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

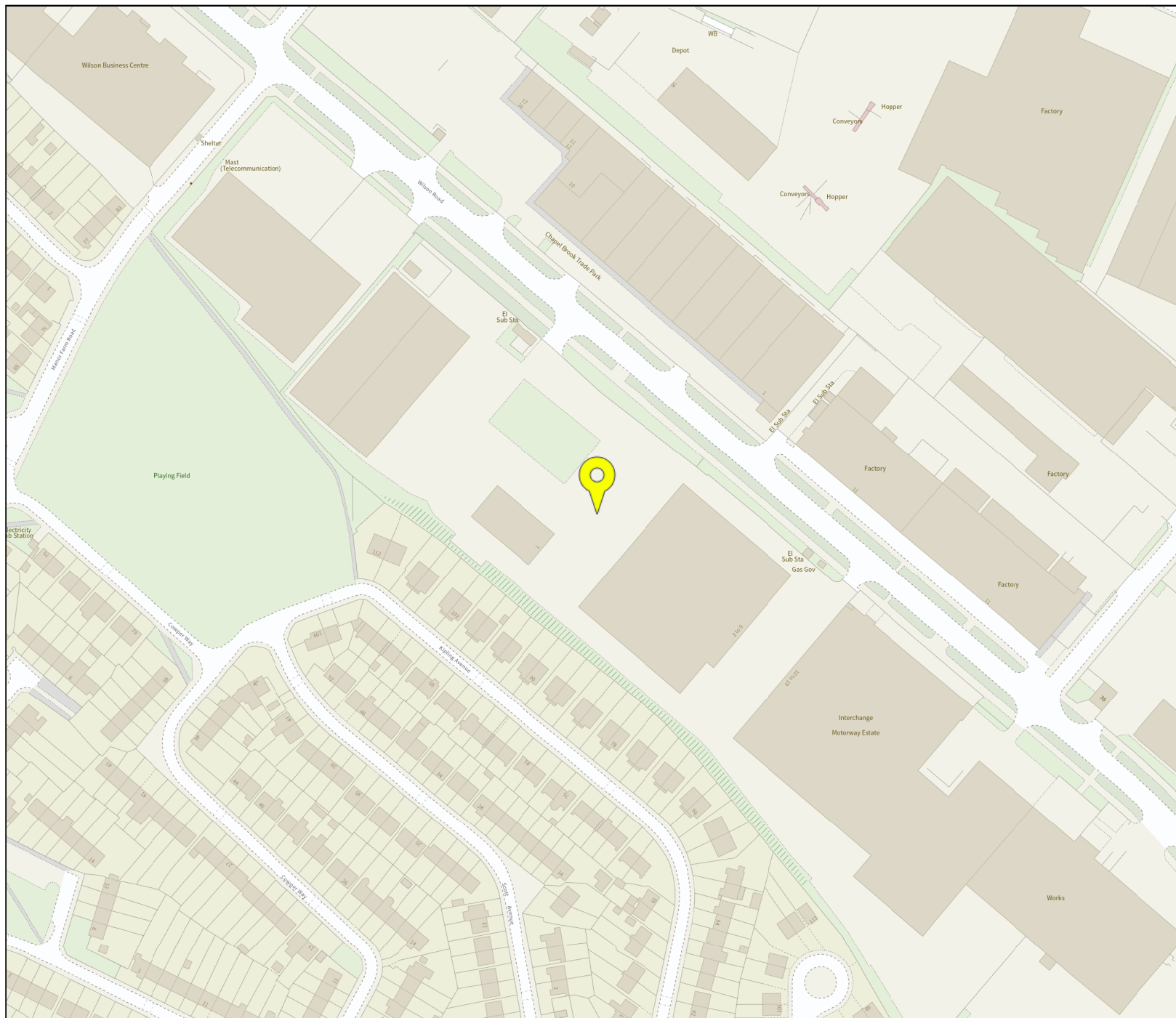
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2021 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference
Huyton Trade Ind Estate

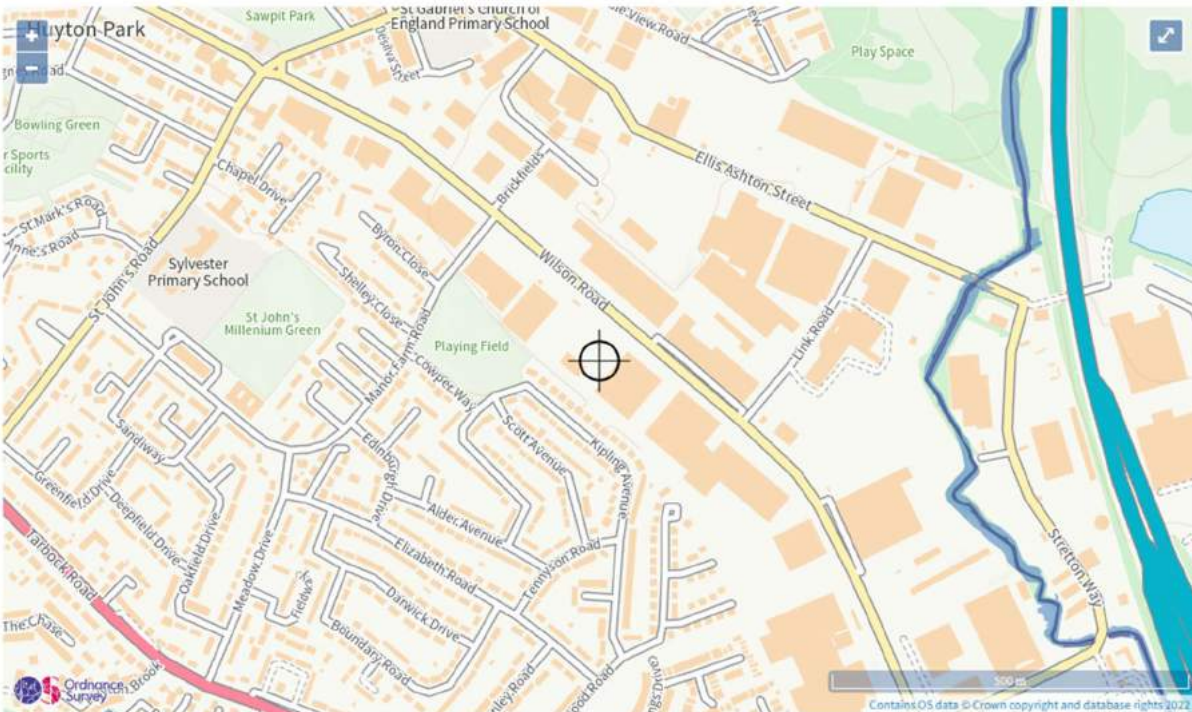
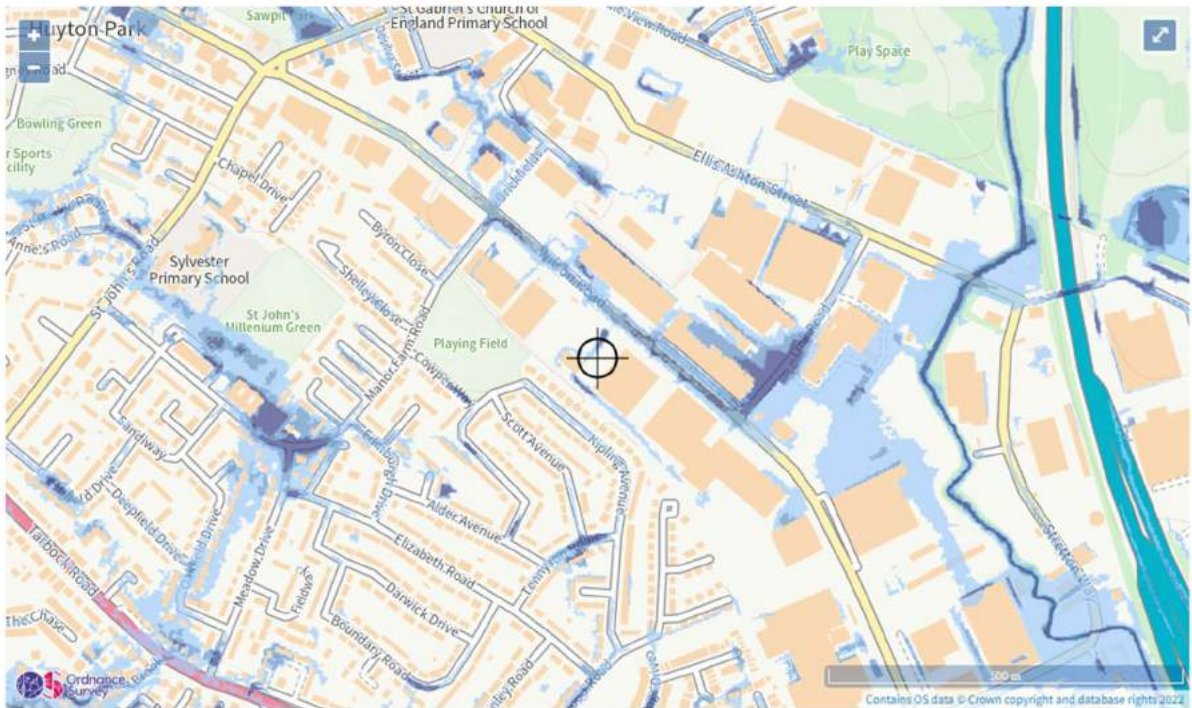
Location (easting/northing)
345347/390124

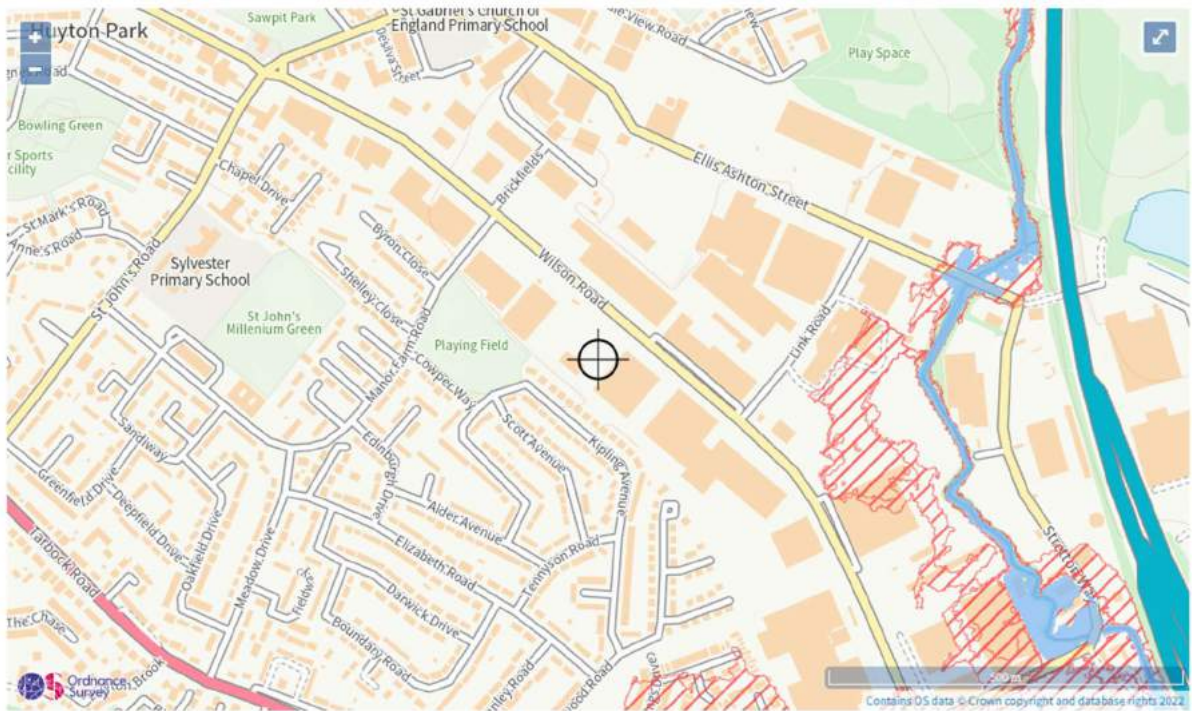
Scale
1:2500

Created
29 Jun 2022 16:20

-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefitting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area

0 20 40 60m





Maximum extent of flooding from reservoirs:

 when river levels are normal  when there is also flooding from rivers  Location you selected

APPENDIX 08
SW Drainage Calculations

WML Consulting Ltd		Page 1
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Netwrok 1	
Date June 2022 File Network 1 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	Add Flow / Climate Change (%)	0
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.396	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
S1.000	68.000	0.283	240.3	0.100	5.00	0.0	0.600	o	300	
S2.000	8.900	0.058	153.4	0.075	5.00	0.0	0.600	o	225	
S1.001	20.800	0.087	239.1	0.100	0.00	0.0	0.600	o	300	
S3.000	11.150	0.070	159.3	0.075	5.00	0.0	0.600	o	225	
S1.002	7.050	0.029	243.1	0.100	0.00	0.0	0.600	o	300	
S4.000	40.250	0.168	239.6	0.125	5.00	0.0	0.600	o	300	
S4.001	31.450	0.131	240.1	0.125	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	49.65	6.12	26.600	0.100	0.0	0.0	0.0	1.01	71.4	13.4
S2.000	50.00	5.14	26.450	0.075	0.0	0.0	0.0	1.05	41.9	10.2
S1.001	48.38	6.46	26.317	0.275	0.0	0.0	0.0	1.01	71.6	36.0
S3.000	50.00	5.18	26.375	0.075	0.0	0.0	0.0	1.03	41.1	10.2
S1.002	47.96	6.58	26.230	0.450	0.0	0.0	0.0	1.00	71.0	58.4
S4.000	50.00	5.66	26.500	0.125	0.0	0.0	0.0	1.01	71.5	16.9
S4.001	49.42	6.18	26.332	0.250	0.0	0.0	0.0	1.01	71.4	33.5

WML Consulting Ltd		Page 2
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Netwrok 1	
Date June 2022 File Network 1 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
S1.003	3.150	0.091	34.6	0.000	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.003	47.89	6.60	26.201	0.700	0.0	0.0	0.0	2.68	189.5	90.8

WML Consulting Ltd		Page 3
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		9333 Huyton Trade Ind Estate SW Network 1
Date June 2022 File Network 1 - R1.MDX		Designed by Robin Hall Checked by LoG
Innovyze		Network 2014.1.1



Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SS1	27.750	1.150	Open Manhole	1200	S1.000	26.600	300				
SS2	27.470	1.020	Open Manhole	1200	S2.000	26.450	225				
SS3	27.600	1.283	Open Manhole	1500	S1.001	26.317	300	S1.000	26.317	300	
								S2.000	26.392	225	
SS4	27.670	1.295	Open Manhole	1200	S3.000	26.375	225				
SS5	27.750	1.520	Open Manhole	1500	S1.002	26.230	300	S1.001	26.230	300	
								S3.000	26.305	225	
SS6	27.650	1.150	Open Manhole	1200	S4.000	26.500	300				
SS7	27.650	1.318	Open Manhole	1200	S4.001	26.332	300	S4.000	26.332	300	
SS8	27.750	1.549	Open Manhole	1800	S1.003	26.201	300	S1.002	26.201	300	
								S4.001	26.201	300	
S	27.650	1.540	Open Manhole	0		OUTFALL		S1.003	26.110	300	

WML Consulting Ltd		Page 4
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Netwrok 1	
Date June 2022 File Network 1 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	300	SS1	27.750	26.600	0.850	Open Manhole	1200
S2.000	o	225	SS2	27.470	26.450	0.795	Open Manhole	1200
S1.001	o	300	SS3	27.600	26.317	0.983	Open Manhole	1500
S3.000	o	225	SS4	27.670	26.375	1.070	Open Manhole	1200
S1.002	o	300	SS5	27.750	26.230	1.220	Open Manhole	1500
S4.000	o	300	SS6	27.650	26.500	0.850	Open Manhole	1200
S4.001	o	300	SS7	27.650	26.332	1.018	Open Manhole	1200
S1.003	o	300	SS8	27.750	26.201	1.249	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	68.000	240.3	SS3	27.600	26.317	0.983	Open Manhole	1500
S2.000	8.900	153.4	SS3	27.600	26.392	0.983	Open Manhole	1500
S1.001	20.800	239.1	SS5	27.750	26.230	1.220	Open Manhole	1500
S3.000	11.150	159.3	SS5	27.750	26.305	1.220	Open Manhole	1500
S1.002	7.050	243.1	SS8	27.750	26.201	1.249	Open Manhole	1800
S4.000	40.250	239.6	SS7	27.650	26.332	1.018	Open Manhole	1200
S4.001	31.450	240.1	SS8	27.750	26.201	1.249	Open Manhole	1800
S1.003	3.150	34.6	S	27.650	26.110	1.240	Open Manhole	0

WML Consulting Ltd		Page 5
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Netwrok 1	
Date June 2022 File Network 1 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.100	0.100	0.100
2.000	-	-	100	0.075	0.075	0.075
1.001	-	-	100	0.100	0.100	0.100
3.000	-	-	100	0.075	0.075	0.075
1.002	-	-	100	0.100	0.100	0.100
4.000	-	-	100	0.125	0.125	0.125
4.001	-	-	100	0.125	0.125	0.125
1.003	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.700	0.700	0.700

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
---------------------	--------------	--------------	--------------	------------------	----------	--------

S1.003	S	27.650	26.110	0.000	0	0
--------	---	--------	--------	-------	---	---

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.396		

WML Consulting Ltd		Page 6
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Netwrok 1	
Date June 2022 File Network 1 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Online Controls for Storm

Hydro-Brake Optimum® Manhole: SS8, DS/PN: S1.003, Volume (m³): 6.4

Unit Reference MD-SHE-0273-4200-1000-4200

Design Head (m) 1.000

Design Flow (l/s) 42.0

Flush-Flo™ Calculated

Objective Minimise upstream storage

Diameter (mm) 273

Invert Level (m) 26.201

Minimum Outlet Pipe Diameter (mm) 300

Suggested Manhole Diameter (mm) 1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	42.0
Flush-Flo™	0.421	41.8
Kick-Flo®	0.767	37.0
Mean Flow over Head Range	-	34.0

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.6	1.200	45.8	3.000	71.4	7.000	107.8
0.200	28.1	1.400	49.4	3.500	76.9	7.500	111.5
0.300	40.9	1.600	52.6	4.000	82.1	8.000	115.1
0.400	41.8	1.800	55.7	4.500	86.9	8.500	118.5
0.500	41.6	2.000	58.6	5.000	91.5	9.000	121.9
0.600	40.7	2.200	61.4	5.500	95.8	9.500	125.2
0.800	37.7	2.400	64.0	6.000	100.0		
1.000	42.0	2.600	66.6	6.500	104.0		

WML Consulting Ltd		Page 7
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Netwrok 1	
Date June 2022 File Network 1 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Storage Structures for Storm

Cellular Storage Manhole: SS8, DS/PN: S1.003

Invert Level (m) 26.201 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	390.0	390.0	0.800	390.0	453.2
0.400	390.0	421.6	0.801	0.0	453.2

WML Consulting Ltd		Page 8
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Netwrok 1	
Date June 2022 File Network 1 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Storage Structures 1
 Number of Online Controls 1 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.393
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 20.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0 DVD Status ON
 Analysis Timestep Fine Inertia Status OFF
 DTS Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 100
 Climate Change (%) 40

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z O/F Overflow	Act.	Lvl Exc.
S1.000	15 Winter	100	+40%	100/15 Summer				
S2.000	15 Winter	100	+40%	100/15 Summer	100/15 Summer			4
S1.001	15 Winter	100	+40%	100/15 Summer				
S3.000	15 Winter	100	+40%	100/15 Summer				
S1.002	15 Winter	100	+40%	100/15 Summer				
S4.000	15 Winter	100	+40%	100/15 Summer				
S4.001	15 Winter	100	+40%	100/15 Summer				
S1.003	60 Winter	100	+40%	100/15 Summer				

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'ed Depth (m)	Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	
S1.000	SS1	27.701	0.801	0.000	0.80	0.0	54.9	FLOOD RISK
S2.000	SS2	27.476	0.801	5.854	1.54	0.0	52.3	FLOOD
S1.001	SS3	27.488	0.871	0.000	1.89	0.0	118.3	FLOOD RISK
S3.000	SS4	27.355	0.755	0.000	1.32	0.0	45.8	FLOOD RISK
S1.002	SS5	27.238	0.708	0.000	4.15	0.0	213.5	SURCHARGED
S4.000	SS6	27.319	0.519	0.000	1.09	0.0	72.7	FLOOD RISK
S4.001	SS7	27.125	0.493	0.000	2.14	0.0	139.5	SURCHARGED
S1.003	SS8	26.791	0.290	0.000	0.55	0.0	41.8	SURCHARGED

WML Consulting Ltd		Page 1
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Network 2	
Date June 2022 File Network 2 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	Add Flow / Climate Change (%)	0
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.396	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
S1.000	44.000	0.183	240.0	0.050	5.00	0.0	0.600	o	300	
S1.001	29.450	0.123	240.0	0.075	0.00	0.0	0.600	o	300	
S1.002	10.850	0.045	241.1	0.075	0.00	0.0	0.600	o	300	
S2.000	71.650	0.301	238.0	0.075	5.00	0.0	0.600	o	300	
S3.000	34.100	0.142	240.1	0.075	5.00	0.0	0.600	o	300	
S3.001	7.900	0.059	133.9	0.075	0.00	0.0	0.600	o	300	
S1.003	13.500	0.149	90.6	0.075	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.73	26.700	0.050	0.0	0.0	0.0	1.01	71.4	6.8
S1.001	49.31	6.21	26.517	0.125	0.0	0.0	0.0	1.01	71.4	16.7
S1.002	48.65	6.39	26.394	0.200	0.0	0.0	0.0	1.01	71.3	26.3
S2.000	49.44	6.18	26.650	0.075	0.0	0.0	0.0	1.01	71.7	10.0
S3.000	50.00	5.56	26.550	0.075	0.0	0.0	0.0	1.01	71.4	10.2
S3.001	50.00	5.66	26.408	0.150	0.0	0.0	0.0	1.36	95.9	20.3
S1.003	48.15	6.53	26.349	0.500	0.0	0.0	0.0	1.65	116.8	65.2

WML Consulting Ltd		Page 2
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Network 2	
Date June 2022 File Network 2 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
S4.000	44.600	0.186	239.8	0.075	5.00	0.0	0.600	o	300	
S4.001	31.250	0.130	240.0	0.075	0.00	0.0	0.600	o	300	
S5.000	28.750	0.166	173.2	0.100	5.00	0.0	0.600	o	300	
S4.002	3.750	0.034	110.3	0.000	0.00	0.0	0.600	o	300	
S1.004	2.400	0.010	240.0	0.000	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S4.000	50.00	5.74	26.550	0.075	0.0	0.0	0.0	1.01	71.5	10.2
S4.001	49.16	6.25	26.364	0.150	0.0	0.0	0.0	1.01	71.4	20.0
S5.000	50.00	5.40	26.400	0.100	0.0	0.0	0.0	1.19	84.2	13.5
S4.002	49.01	6.29	26.234	0.250	0.0	0.0	0.0	1.50	105.8	33.2
S1.004	48.01	6.57	26.200	0.750	0.0	0.0	0.0	1.01	71.4«	97.5

WML Consulting Ltd		Page 3
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Network 2	
Date June 2022 File Network 2 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze		Network 2014.1.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SS9	27.650	0.950	Open Manhole	1200	S1.000	26.700	300				
SS10	27.650	1.133	Open Manhole	1200	S1.001	26.517	300	S1.000	26.517	300	
SS11	27.650	1.256	Open Manhole	1200	S1.002	26.394	300	S1.001	26.394	300	
SS12	27.650	1.000	Open Manhole	1200	S2.000	26.650	300				
SS13	27.600	1.050	Open Manhole	1200	S3.000	26.550	300				
SS14	27.600	1.192	Open Manhole	1200	S3.001	26.408	300	S3.000	26.408	300	
SS15	27.600	1.251	Open Manhole	1200	S1.003	26.349	300	S1.002	26.349	300	
								S2.000	26.349	300	
								S3.001	26.349	300	
SS17	27.650	1.100	Open Manhole	1200	S4.000	26.550	300				
SS18	27.650	1.286	Open Manhole	1200	S4.001	26.364	300	S4.000	26.364	300	
SS19	27.650	1.250	Open Manhole	1200	S5.000	26.400	300				
SS20	27.650	1.416	Open Manhole	1200	S4.002	26.234	300	S4.001	26.234	300	
								S5.000	26.234	300	
SS21	27.600	1.400	Open Manhole	1800	S1.004	26.200	300	S1.003	26.200	300	
								S4.002	26.200	300	
S	27.120	0.930	Open Manhole	0		OUTFALL		S1.004	26.190	300	

WML Consulting Ltd		Page 4
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Network 2	
Date June 2022 File Network 2 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	300	SS9	27.650	26.700	0.650	Open Manhole	1200
S1.001	o	300	SS10	27.650	26.517	0.833	Open Manhole	1200
S1.002	o	300	SS11	27.650	26.394	0.956	Open Manhole	1200
S2.000	o	300	SS12	27.650	26.650	0.700	Open Manhole	1200
S3.000	o	300	SS13	27.600	26.550	0.750	Open Manhole	1200
S3.001	o	300	SS14	27.600	26.408	0.892	Open Manhole	1200
S1.003	o	300	SS15	27.600	26.349	0.951	Open Manhole	1200
S4.000	o	300	SS17	27.650	26.550	0.800	Open Manhole	1200
S4.001	o	300	SS18	27.650	26.364	0.986	Open Manhole	1200
S5.000	o	300	SS19	27.650	26.400	0.950	Open Manhole	1200
S4.002	o	300	SS20	27.650	26.234	1.116	Open Manhole	1200
S1.004	o	300	SS21	27.600	26.200	1.100	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	44.000	240.0	SS10	27.650	26.517	0.833	Open Manhole	1200
S1.001	29.450	240.0	SS11	27.650	26.394	0.956	Open Manhole	1200
S1.002	10.850	241.1	SS15	27.600	26.349	0.951	Open Manhole	1200
S2.000	71.650	238.0	SS15	27.600	26.349	0.951	Open Manhole	1200
S3.000	34.100	240.1	SS14	27.600	26.408	0.892	Open Manhole	1200
S3.001	7.900	133.9	SS15	27.600	26.349	0.951	Open Manhole	1200
S1.003	13.500	90.6	SS21	27.600	26.200	1.100	Open Manhole	1800
S4.000	44.600	239.8	SS18	27.650	26.364	0.986	Open Manhole	1200
S4.001	31.250	240.0	SS20	27.650	26.234	1.116	Open Manhole	1200
S5.000	28.750	173.2	SS20	27.650	26.234	1.116	Open Manhole	1200
S4.002	3.750	110.3	SS21	27.600	26.200	1.100	Open Manhole	1800
S1.004	2.400	240.0	S	27.120	26.190	0.630	Open Manhole	0

WML Consulting Ltd		Page 5
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Network 2	
Date June 2022 File Network 2 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.050	0.050	0.050
1.001	-	-	100	0.075	0.075	0.075
1.002	-	-	100	0.075	0.075	0.075
2.000	-	-	100	0.075	0.075	0.075
3.000	-	-	100	0.075	0.075	0.075
3.001	-	-	100	0.075	0.075	0.075
1.003	-	-	100	0.075	0.075	0.075
4.000	-	-	100	0.075	0.075	0.075
4.001	-	-	100	0.075	0.075	0.075
5.000	-	-	100	0.100	0.100	0.100
4.002	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.750	0.750	0.750

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
---------------------	--------------	--------------	--------------	------------------	----------	--------

S1.004	S	27.120	26.190	0.000	0	0
--------	---	--------	--------	-------	---	---

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.396		

WML Consulting Ltd		Page 6
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Network 2	
Date June 2022 File Network 2 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Online Controls for Storm

Hydro-Brake Optimum® Manhole: SS21, DS/PN: S1.004, Volume (m³): 4.6

Unit Reference MD-SHE-0294-5000-1000-5000
Design Head (m) 1.000
Design Flow (l/s) 50.0
Flush-Flo™ Calculated
Objective Minimise upstream storage
Diameter (mm) 294
Invert Level (m) 26.200
Minimum Outlet Pipe Diameter (mm) 375
Suggested Manhole Diameter (mm) 1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	49.9
Flush-Flo™	0.444	49.9
Kick-Flo®	0.783	44.4
Mean Flow over Head Range	-	40.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	9.1	1.200	54.5	3.000	85.0	7.000	128.5
0.200	30.3	1.400	58.7	3.500	91.6	7.500	132.9
0.300	48.4	1.600	62.6	4.000	97.7	8.000	137.1
0.400	49.8	1.800	66.3	4.500	103.5	8.500	141.3
0.500	49.8	2.000	69.8	5.000	109.0	9.000	145.3
0.600	48.9	2.200	73.1	5.500	114.2	9.500	149.2
0.800	44.9	2.400	76.2	6.000	119.1		
1.000	49.9	2.600	79.3	6.500	123.9		

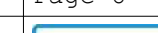
WML Consulting Ltd		Page 7
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Network 2	
Date June 2022 File Network 2 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Storage Structures for Storm

Cellular Storage Manhole: SS21, DS/PN: S1.004

Invert Level (m) 26.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	416.0	416.0	0.800	416.0	481.3
0.400	416.0	448.6	0.801	0.0	481.3

WML Consulting Ltd		Page 8
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Network 2	
Date June 2022 File Network 2 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

```
Margin for Flood Risk Warning (mm) 450.0      DVD Status   ON
      Analysis Timestep   Fine Inertia Status OFF
      DTS Status          OFF
```

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	40

			Return	Climate	First X		First Y		First Z	O/F	Lvl
PN	Storm	Period	Change		Surcharge		Flood		Overflow	Act.	Exc.
S1.000	15	Winter	100	+40%	100/15	Summer	100/15	Summer			2
S1.001	15	Winter	100	+40%	100/15	Summer	100/15	Winter			1
S1.002	15	Winter	100	+40%	100/15	Summer					
S2.000	15	Winter	100	+40%	100/15	Summer					
S3.000	15	Winter	100	+40%	100/15	Summer	100/15	Winter			1
S3.001	15	Winter	100	+40%	100/15	Summer					
S1.003	15	Winter	100	+40%	100/15	Summer					
S4.000	15	Winter	100	+40%	100/15	Summer					
S4.001	15	Winter	100	+40%	100/15	Summer					
S5.000	15	Winter	100	+40%	100/15	Summer					
S4.002	60	Winter	100	+40%	100/15	Summer					
S1.004	60	Winter	100	+40%	100/15	Summer					

PN	US/MH Name	Water	Surch'd Depth (m)	Flooded	Flow / Cap.	O'flow	Pipe	Status
		Level (m)		Volume (m³)		Flow (l/s)	Flow (l/s)	
S1.000	SS9	27.652	0.652	2.485	0.58	0.0	38.6	FLOOD
S1.001	SS10	27.650	0.834	0.224	0.87	0.0	56.3	FLOOD
S1.002	SS11	27.587	0.893	0.000	1.64	0.0	92.9	FLOOD RISK
S2.000	SS12	27.568	0.618	0.000	0.56	0.0	38.7	FLOOD RISK
S3.000	SS13	27.600	0.750	0.331	0.62	0.0	40.4	FLOOD
S3.001	SS14	27.555	0.847	0.000	1.22	0.0	75.0	FLOOD RISK

WML Consulting Ltd		Page 9
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9333 Huyton Trade Ind Estate SW Network 2	
Date June 2022 File Network 2 - R1.MDX	Designed by Robin Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m³)	Flow / Cap.	O'flow (l/s)	Flow (l/s)	
S1.003	SS15	27.460	0.811	0.000	2.49	0.0	239.3	FLOOD RISK
S4.000	SS17	27.093	0.243	0.000	0.62	0.0	41.2	SURCHARGED
S4.001	SS18	27.006	0.342	0.000	1.23	0.0	79.8	SURCHARGED
S5.000	SS19	26.897	0.197	0.000	0.75	0.0	57.5	SURCHARGED
S4.002	SS20	26.830	0.296	0.000	1.10	0.0	67.5	SURCHARGED
S1.004	SS21	26.762	0.262	0.000	0.94	0.0	49.8	SURCHARGED

WML Consulting Ltd		Page 1
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9339 Huyton Trade Ind Estate SW Network 3	
Date June 2022 File Network 3 - R1.MDX	Designed by R Hall Checked by LoG	
Innovyze	Network 2014.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	Add Flow / Climate Change (%)	0
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.395	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
S1.000	68.750	0.458	150.1	0.100	5.00	0.0	0.600	o	225	
S1.001	6.900	0.146	47.3	0.100	0.00	0.0	0.600	o	225	
S2.000	44.750	0.298	150.2	0.075	5.00	0.0	0.600	o	225	
S2.001	29.100	0.194	150.0	0.075	0.00	0.0	0.600	o	225	
S2.002	12.800	0.112	114.3	0.050	0.00	0.0	0.600	o	225	
S1.002	10.600	0.071	149.3	0.100	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	49.77	6.08	26.275	0.100	0.0	0.0	0.0	1.06	42.3	13.5
S1.001	49.54	6.14	25.817	0.200	0.0	0.0	0.0	1.91	75.8	26.8
S2.000	50.00	5.70	26.275	0.075	0.0	0.0	0.0	1.06	42.3	10.2
S2.001	49.46	6.16	25.977	0.150	0.0	0.0	0.0	1.07	42.4	20.1
S2.002	48.81	6.33	25.783	0.200	0.0	0.0	0.0	1.22	48.6	26.4
S1.002	48.31	6.47	25.671	0.500	0.0	0.0	0.0	1.28	90.8	65.4

WML Consulting Ltd		Page 2
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9339 Huyton Trade Ind Estate SW Network 3	
Date June 2022 File Network 3 - R1.MDX	Designed by R Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
SS21	27.650	1.375	Open Manhole	1200	S1.000	26.275	225				
SS22	27.650	1.833	Open Manhole	1200	S1.001	25.817	225	S1.000	25.817	225	
SS23	27.600	1.325	Open Manhole	1200	S2.000	26.275	225				
SS24	27.650	1.673	Open Manhole	1200	S2.001	25.977	225	S2.000	25.977	225	
SS25	27.650	1.867	Open Manhole	1200	S2.002	25.783	225	S2.001	25.783	225	
SS26	27.600	1.929	Open Manhole	2400	S1.002	25.671	300	S1.001	25.671	225	
								S2.002	25.671	225	
S	27.630	2.030	Open Manhole	0		OUTFALL		S1.002	25.600	300	

WML Consulting Ltd		Page 3
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9339 Huyton Trade Ind Estate SW Network 3	
Date June 2022 File Network 3 - R1.MDX	Designed by R Hall Checked by LoG	
Innovyze	Network 2014.1.1	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	SS21	27.650	26.275	1.150	Open Manhole	1200
S1.001	o	225	SS22	27.650	25.817	1.608	Open Manhole	1200
S2.000	o	225	SS23	27.600	26.275	1.100	Open Manhole	1200
S2.001	o	225	SS24	27.650	25.977	1.448	Open Manhole	1200
S2.002	o	225	SS25	27.650	25.783	1.642	Open Manhole	1200
S1.002	o	300	SS26	27.600	25.671	1.629	Open Manhole	2400

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	68.750	150.1	SS22	27.650	25.817	1.608	Open Manhole	1200
S1.001	6.900	47.3	SS26	27.600	25.671	1.704	Open Manhole	2400
S2.000	44.750	150.2	SS24	27.650	25.977	1.448	Open Manhole	1200
S2.001	29.100	150.0	SS25	27.650	25.783	1.642	Open Manhole	1200
S2.002	12.800	114.3	SS26	27.600	25.671	1.704	Open Manhole	2400
S1.002	10.600	149.3	S	27.630	25.600	1.730	Open Manhole	0

WML Consulting Ltd		Page 4
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9339 Huyton Trade Ind Estate SW Network 3	
Date June 2022 File Network 3 - R1.MDX	Designed by R Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.100	0.100	0.100
1.001	-	-	100	0.100	0.100	0.100
2.000	-	-	100	0.075	0.075	0.075
2.001	-	-	100	0.075	0.075	0.075
2.002	-	-	100	0.050	0.050	0.050
1.002	-	-	100	0.100	0.100	0.100
				Total	Total	Total
				0.500	0.500	0.500

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
---------------------	--------------	--------------	--------------	------------------	----------	--------

S1.002	S	27.630	25.600	0.000	0	0
--------	---	--------	--------	-------	---	---

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.395		

WML Consulting Ltd		Page 5
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9339 Huyton Trade Ind Estate SW Network 3	
Date June 2022 File Network 3 - R1.MDX	Designed by R Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Online Controls for Storm

Hydro-Brake Optimum® Manhole: SS26, DS/PN: S1.002, Volume (m³): 9.4

Unit Reference MD-SHE-0224-2650-1000-2650
Design Head (m) 1.000
Design Flow (l/s) 26.5
Flush-Flo™ Calculated
Objective Minimise upstream storage
Diameter (mm) 224
Invert Level (m) 25.671
Minimum Outlet Pipe Diameter (mm) 300
Suggested Manhole Diameter (mm) 1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	26.4
Flush-Flo™	0.364	26.4
Kick-Flo®	0.736	22.8
Mean Flow over Head Range	-	22.0

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.5	1.200	28.8	3.000	44.8	7.000	67.6
0.200	22.3	1.400	31.1	3.500	48.3	7.500	69.9
0.300	26.2	1.600	33.1	4.000	51.5	8.000	72.1
0.400	26.4	1.800	35.0	4.500	54.5	8.500	74.3
0.500	26.0	2.000	36.9	5.000	57.4	9.000	76.4
0.600	25.3	2.200	38.6	5.500	60.1	9.500	78.4
0.800	23.8	2.400	40.2	6.000	62.7		
1.000	26.4	2.600	41.8	6.500	65.2		

WML Consulting Ltd		Page 6
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9339 Huyton Trade Ind Estate SW Network 3	
Date June 2022 File Network 3 - R1.MDX	Designed by R Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Storage Structures for Storm

Cellular Storage Manhole: SS26, DS/PN: S1.002

Invert Level (m) 25.671 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	236.0	236.0	0.800	236.0	285.2
0.400	236.0	260.6	0.801	0.0	285.2

WML Consulting Ltd		Page 7
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL	9339 Huyton Trade Ind Estate SW Network 3	
Date June 2022 File Network 3 - R1.MDX	Designed by R Hall Checked by LoG	
Innovyze	Network 2014.1.1	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Storage Structures 1
 Number of Online Controls 1 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.396
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 20.000 Cv (Winter) 0.840

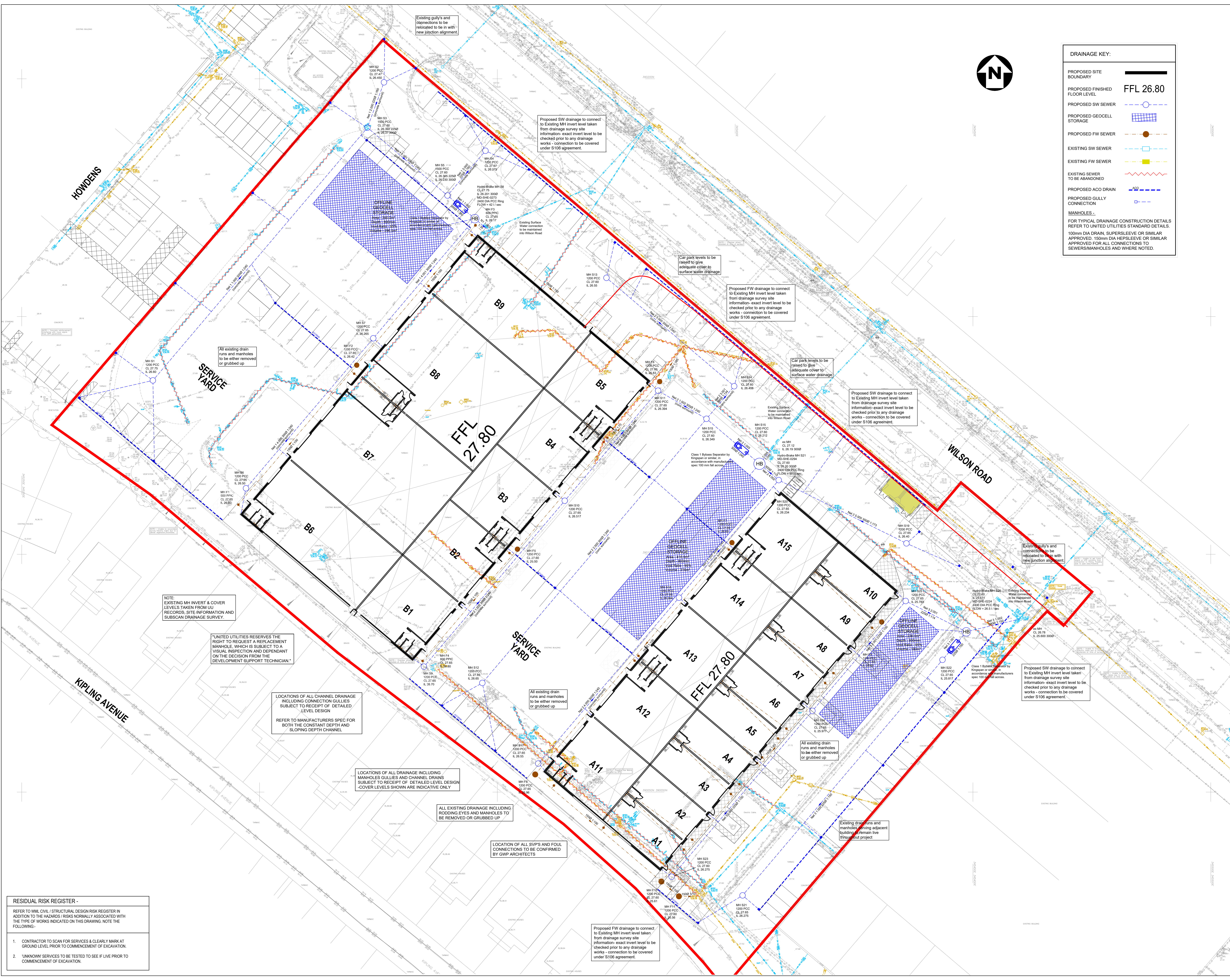
Margin for Flood Risk Warning (mm) 450.0 DVD Status ON
 Analysis Timestep Fine Inertia Status OFF
 DTS Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 100
 Climate Change (%) 40

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	100	+40%	100/15	Summer			
S1.001	15 Winter	100	+40%	100/15	Summer			
S2.000	15 Winter	100	+40%	100/15	Summer			
S2.001	15 Winter	100	+40%	100/15	Summer			
S2.002	15 Winter	100	+40%	100/15	Summer			
S1.002	60 Winter	100	+40%	100/15	Summer			

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m³)	Flow / Cap.	O'flow (l/s)	Flow (l/s)	
S1.000	SS21	27.317	0.817	0.000	1.27	0.0	51.9	FLOOD RISK
S1.001	SS22	26.523	0.481	0.000	1.91	0.0	102.7	SURCHARGED
S2.000	SS23	27.563	1.063	0.000	0.96	0.0	39.0	FLOOD RISK
S2.001	SS24	27.289	1.087	0.000	1.85	0.0	73.0	FLOOD RISK
S2.002	SS25	26.608	0.600	0.000	2.33	0.0	97.5	SURCHARGED
S1.002	SS26	26.395	0.424	0.000	0.39	0.0	26.3	SURCHARGED

APPENDIX 09
Drainage Strategy Plan



GENERAL NOTES

DO NOT SCALE FROM THIS DRAWING WORK TO FIGURED DIMENSIONS ONLY.
NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS ALLOWED WITHOUT PRIOR PERMISSION IN WRITING.
ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
THE CONTRACTOR SHALL INCORPORATE ALL THE REQUIREMENTS OF THE PRE-TENDER STAGE HEALTH AND SAFETY PLAN.

SURFACE WATER DRAINAGE STRATEGY

THE SURFACE WATER DRAINAGE PROPOSALS HAVE BEEN DESIGNED IN ACCORDANCE WITH BS EN 752-4 AND THE BUILDING REGULATIONS APPROVED DOCUMENT H (2010), WHICH INDICATES THE FOLLOWING HIERARCHY FOR THE DISPOSAL OF SURFACE WATER DRAINAGE FROM DEVELOPMENT SITES:-

- DISCHARGE VIA INFILTRATION;
- DISCHARGE TO WATERCOURSE;
- DISCHARGE TO SEWER.

THESE OPTIONS ARE DISCUSSED IN FURTHER DETAIL BELOW.

SURFACE WATER DISCHARGE VIA INFILTRATION

ALTHOUGH THERE IS NO EXPLORATORY HOLE DATA AT THE MOMENT, THE BGS INDICATES THAT ANY MADE GROUND (PROBABLY COLLIERY SPILL) IS UNDERLAIN DIRECTLY BY THE PENNING COAL MEASURES STRATA. THESE ARE LIKELY TO BE MAINLY MUDSTONE. FROM THE INFORMATION AVAILABLE TO DATE, IT WOULD APPEAR THAT THE GROUND CONDITIONS ARE NOT SUITABLE FOR THE USE OF INFILTRATION/ SOAKAWAY TECHNIQUES. IT IS CONSIDERED TO NOT BE FEASIBLE.

SURFACE WATER DISCHARGE VIA WATERCOURSE

THERE ARE NO EXISTING WATERCOURSES IN THE VICINITY OF THE SITE. ON THIS BASIS, IT IS CONSIDERED NOT FEASIBLE TO DISCHARGE THE SURFACE WATER RUNOFF FROM THE PROPOSED DEVELOPMENT TO AN EXISTING WATERCOURSE.

SURFACE WATER DISCHARGE TO EXISTING U/S SEWER

THERE IS AN EXISTING PRIVATE SURFACE WATER DRAINAGE SYSTEM ON SITE IN CLOSE PROXIMITY TO THE PROPOSED BUILDING FOOTPRINT. THE EXISTING SYSTEM HAS BEEN USED BY THE SITE, DISCHARGING INTO AN EXISTING UNITED UTILITIES SEWER WITHIN WILSON ROAD. AS PART OF THE DEVELOPMENT WORKS PARTS OF THE EXISTING DRAINAGE SYSTEM AND THE CONNECTION INTO THE PUBLIC SEWER SYSTEM WILL BE REUSED WHERE POSSIBLE.

AS THE SITE IS CLASSIFIED AS A BROWN FIELD SITE, THERE IS A REQUIREMENT UNDER THE SPRA FOR A REDUCTION IN SURFACE WATER RUNOFF OF 30%.

THE EXISTING SITE HAS A SURFACE WATER RUNOFF RATE THAT HAS BEEN ASSESSED AS 237.7 l/sec, BASED UPON A RAINFALL INTENSITY OF 50mm/hr AND A TOTAL IMPERMEABLE AREA OF 1.71ha. WHEN THE SPRA REDUCTION FACTOR IS APPLIED THIS IS FLOW RATE IS REDUCED TO 118.9 l/sec.

THE PROPOSED DEVELOPMENT INCREASES THE SITE IMPERMEABLE AREA FROM CIRCA 1.71ha TO CIRCA 1.84ha, EQUATING TO 256.7 l/sec, THUS INCREASING THE SITE RUNOFF RATE. IT IS PROPOSED TO RESTRICT SURFACE WATER FLOW FROM THE PROPOSED DEVELOPMENT TO 118.9 l/sec.

A PRELIMINARY ASSESSMENT BASED UPON AN IMPERMEABLE AREA OF 1.84ha AND AN ALLOWABLE RUNOFF RATE OF 118.9 l/sec FOR A 1:100 YEAR STORM EVENT PLUS 40% CLIMATE CHANGE. THIS EXERCISE INDICATES A REQUIRED ATTENUATION VOLUME OF AROUND 800 m³. THIS IS PROBABLY BEST PROVIDED IN GEO-CELLULAR STORAGE TANKS OR OVERSIZED PERFORM LOCATED BENEATH THE PROPOSED CAR PARK AREAS AND/ OR SERVICE YARD, AS THE PROPOSED SITE LAYOUT HAS LITTLE IN THE WAY OF SOFT LANDSCAPED AREAS WITHIN WHICH ABOVE GROUND ATTENUATION FEATURES COULD BE LOCATED.

THE DRAINAGE STRATEGY PUT FORWARD IN THIS DOCUMENT IS BASED ON THE ASSUMPTION THAT SURFACE WATER DISCHARGE IS ALLOWED TO PASS INTO THE EXISTING PUBLIC SURFACE WATER SEWER, AT 3 EXISTING LOCATIONS. THE STORAGE AND DISCHARGE RATE WILL BE SPLIT BETWEEN THESE 3 SW SYSTEMS.

IT IS PROPOSED TO COLLECT HANDSTANDING SURFACE WATER RUNOFF FROM THE FRONT OF THE DEVELOPMENT VIA TRADITIONAL CHANNELS, DRAINS AND GULLIES PRIOR TO DISCHARGING INTO A GEO CELLULAR STORAGE TANKS LOCATED WITHIN THE CAR PARK AREA.

FULL RETENTION SEPARATORS WILL BE USED TO TRAP SILT AND CONTAMINANTS PRIOR UPSTREAM OF THE GEO CELLULAR STORAGE TANKS.

ROOF WATER, COLLECTED AT THE REAR OF THE PROPOSED BUILDING. DUE TO THE ABSENCE OF VEHICULAR TRAFFIC, IT IS CONSIDERED THAT SURFACE WATER TREATMENT WILL NOT BE REQUIRED FOR THE BUILDING AND WILL DISCHARGE DIRECTLY INTO THE HYDROBRAKE.

THE HYDROBRAKE FLOW CONTROL UNIT WILL RESTRICT ALL FLOWS FROM THE DEVELOPMENT TO 118.9 l/sec. WITH THE GEOCELL STORAGE CRATES PROVIDING ATTENUATION TO ACCOMMODATE THE 1 in 100yr + 40% CC STORM EVENT.

ALL MANHOLE CONNECTION INVERT LEVEL IS TO BE IDENTIFIED PRIOR TO DETAILED DESIGN.

FOUL WATER DESIGN

SIMILAR TO THE SURFACE WATER DRAINAGE PROPOSALS, THERE IS AN EXISTING PRIVATE FOUL WATER DRAINAGE SYSTEM ON SITE IN CLOSE PROXIMITY TO THE PROPOSED BUILDING FOOTPRINT. THE EXISTING SYSTEM HAS BEEN USED BY THE SITE, DISCHARGING INTO AN EXISTING UNITED UTILITIES SEWER WITHIN WILSON ROAD. AS PART OF THE DEVELOPMENT WORKS PARTS OF THE EXISTING DRAINAGE SYSTEM AND THE CONNECTION INTO THE PUBLIC SEWER SYSTEM WILL BE REUSED WHERE POSSIBLE.

DRAINAGE NOTES

RWP AND SUP LOCATIONS ARE INDICATIVE ONLY AND ARE TO BE CONFIRMED BY THE ARCHITECT PRIOR TO DETAILED DESIGN.

FINAL FOUL WASTE WATER CONNECTION POINT IS TO BE CONFIRMED BY OTHERS PRIOR TO DETAILED DESIGN.

ASSUME ALL EXISTING BELOW GROUND DRAINAGE WITHIN THE SITE IS ABANDONED.

PRELIMINARY DRAWING

P04	PLANNING ISSUE, UPDATED SITE LAYOUT ADDED	08/09/22	RH	LoG
P03	PLANNING ISSUE, UPDATED SITE LAYOUT ADDED	13/07/22	RH	LoG
P02	PLANNING ISSUE, UPDATED SITE LAYOUT ADDED	16/06/22	RH	LoG
P01	PRELIMINARY ISSUE	13/05/21	RH	LoG
Rev	Amendment	Date	By	Chkd

Project

HUYTON TRADE INDUSTRIAL ESTATE

Client

DERWENT ESTATES LTD

Title

PROPOSED SITE DRAINAGE APPRAISAL

WML Job No.	Drawn	Checked	Date	Scale
9333	RH	LOG	MAY 2021	1:250 @ A0

WML CONSULTING
Civil, Structural & Geotechnical Engineers

No 8 Oak Green
East Road
Sharncliffe Business Park
Cheshire SK6 6JL
Tel 0161 462 0000
Fax 0161 466 9210
email info@wmlconsulting.com
www.wmlconsulting.com

Drawing No.	Project	Originator	Volume	Level	Type	Role	Number	Rev
	9333	- WML -	- ZZ -	- XX -	- DR -	- C -	1001	P04

RESIDUAL RISK REGISTER -	
REFER TO WML CIVIL / STRUCTURAL DESIGN RISK REGISTER IN ADDITION TO THE HAZARDS / RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORKS INDICATED ON THIS DRAWING. NOTE THE FOLLOWING:-	
1.	CONTRACTOR TO SCAN FOR SERVICES & CLEARLY MARK AT GROUND LEVEL PRIOR TO COMMENCEMENT OF EXCAVATION.
2.	'UNKNOWN' SERVICES TO BE TESTED TO SEE IF LIVE PRIOR TO COMMENCEMENT OF EXCAVATION.