RLRE Consulting Engineers

560 Sipson Road

West Drayton

Drainage Strategy

560 SIPSON ROAD

WEST DRAYTON

DRAINAGE STRATEGY

For

PHULL EMPIRE

JULY 2022

REV: P02

P18-403

18403-RLL-22-XX-RP-C-001

Document History

Prepared by	:	**Alex Parkes**
Position	:	**Senior Engineer**
Date	:	**30th June 2022**
Authorised by	:	**Matt Leask**
Position	:	**Principal Engineer**
Date	:	**30th June 2022**
Document Status	:	**Preliminary**
Revision	:	**P01**

Revision	Date	Comment	Editor	Checked by
P01	30/06/22	Issued for comment	AP	ML
P02	12/07/22	Drawing updated	AP	ML

Contents

Appendices

1 Introduction and Brief

1.1.1 Rodgers Leask Ltd has been commissioned by Phull Empire to undertake a Drainage Strategy for a site off Sipson Road in London.

1.1.2 The proposed development will include the construction of a seven-storey hotel with basement parking.

1.1.3 This report has been commissioned in support of a full planning application to Hillingdon London Borough Council.

1.1.4 This report will consider both foul and surface water drainage and will make recommendations regarding proposed points of connection. For surface water, consideration will be given to proposed contributing impermeable areas and any attenuation requirements.

1.1.5 This report is to be read in conjunction with Rodgers Leask Drawing 18403-RLL-19-XX-DR-C-2000 External Works.

1.1.6 This report has been produced on behalf of the client and no responsibility is accepted to any third party for all or any part. This report should not be relied upon or transferred to any other parties without the express written authorisation of Rodgers Leask Ltd.

2 Site Description and Flood Risk

2.1.1 The site is located adjacent to Sipson Road, north of Heathrow Airport and has an overall area of approximately 0.13 hectares; the site previously housed a Royal British Legion club which has since been demolished.

2.1.2 A topographical survey of the site has been undertaken and is included within **Appendix A**. Levels on site are generally flat at around 25.50mAOD.

2.1.3 Surface water runoff generated by the site currently drains via overland flow to the historical positive drainage network serving the site.

2.1.4 The site is located wholly within Flood Zone 1, and the long term flood risk mapping does not identify any significant areas of surface water flood risk; the site is also not at risk of reservoir flooding.

2.1.5 As the site area is below 1 hectare and there are no significant sources of flood risk, a detailed flood risk assessment has not been undertaken as part of this report.

3 Proposed Developed Site Surface Water Strategy

3.1.1 A historical site investigation was undertaken on the site, dated September 2016, which identified made ground over sands and gravels over London clay underlying the site. Due to the presence of a basement level, however, drainage via infiltration is not considered to be a suitable means of surface water discharge for the site.

3.1.2 As there are no watercourses in close proximity to the site, an outfall to the adjacent surface water sewer has been chosen as the preferred outfall in accordance with the hierarchy for SuDS. Attenuation has been calculated based on a restricted discharge rate of 2l/s.

3.1.3 A 40% allowance for climate change has been included within the calculations in line with the assumed 60-year design life of the scheme; this is in accordance with the Environment Agency's 'climate change allowances' guidance.

3.1.4 It is proposed that the surface water system to serve the site will provide sufficient attenuation to ensure that there is no off-site flooding for return periods up to and including the 1 in 100 year plus 40% climate change event. This will ensure that post development, the risk to adjacent properties is effectively reduced.

3.1.5 The surface water network has been modelled up to and including the 100 year + 40% allowance for climate change using MicroDrainage software, the results of which can be viewed in **Appendix B**; as the drainage network is split over 3 levels with significant elevation changes between each level, dummy pipe runs have been used to represent the network with a conservative base flow of 1.9l/s to represent the pumped flow from the basement.

3.1.6 It is proposed to attenuate flows within a blue roof system, and within the permeable sub-base and 2no below ground tanks on the podium deck outside the building entrance.

3.1.7 Overland flow routes will be carefully considered for blockage and exceedance events to ensure that routing is away from both existing and proposed properties.

3.1.8 It is considered that by adhering to the strategy outlined above, the additional volumes of surface water runoff generated by the redeveloped site will be managed such that the residual risk to adjacent properties is negligible. As such, it is considered that the site will be at a low risk of flooding from either flows generated on-site, or from overland flows from off-site.

3.1.9 It is proposed that the on-site surface water pipe network would remain private.

3.1.10 A copy of the Drainage Strategy drawing (18403-RLL-19-XX-DR-C-2000) is contained within **Appendix C**.

4 SuDS

4.1.1 SuDS have been considered as part of the drainage solution. Typically, SuDS techniques are used to mimic the natural drainage of the land, infiltrating surface water into the ground or discharging it into a local water course. Where this occurs, it is important to ensure that the quality of water is as clean as possible to prevent the spread of any pollutants. This is also the case when discharging surface water to a surface water sewer, as in most cases these types of sewers discharge into water courses.

4.1.2 Permeable paving was reviewed as part of the drainage strategy, however it is considered that permeable surfacing within the vehicular trafficked areas to the front of the proposed building is likely to be subject to trafficking by delivery vehicles up to 7.5t and would therefore be prone to premature failure. An impermeable surface with positive drainage into an underlying permeable sub-base has therefore been proposed to maintain the water treatment characteristics of a permeable paved system.

4.1.3 Rainwater harvesting is also proposed via a 12m^3 storage tank in the basement in accordance with Policy SI 5 of the London Plan 2021.

4.1.4 Water treatment will generally be provided via the underdrained swale and permeable sub-base on the podium slab.

4.1.5 In accordance with CIRIA C753, the vehicular trafficked are the highest risk areas in terms of potential pollutants, with pollution hazard indices of 0.5, 0.4 and 0.4 for total suspended solids, metals and hydrocarbons respectively. These areas drain via the permeable sub-base, the mitigation indices for which are set out in the table below:

	Mitigation indices		
Type of SuDS component	**TSS**	**Metals**	**Hydrocarbons**
Permeable pavement*	0.7	0.6	0.7

**The mitigation indices for a permeable pavement have been chosen to represent treatment provided by the permeable sub-base as outlined in paragraph 4.1.2 above.*

4.1.6 It is therefore considered that by adhering to the SuDS strategy above, the necessary treatment will be provided to allow compliance with CIRIA C753 guidance.

5 SuDS Maintenance

5.1.1 The SuDS features will be maintained by a private management company.

5.1.2 The below ground attenuation serving the site will require regular maintenance including:

- Inspections after every major storm event, at the end of winter, at the end of summer, and after autumn leaf fall to check for debris build-up.
- Catchpits, gullies and channels feeding into the attenuation tank, and the control chamber at the outfall should be cleaned and emptied as necessary to prevent build-up of silt within the system.

5.1.3 The underdrained swale serving the site will require regular maintenance including:

- Regular litter removal
- Grass cutting and removal of cuttings
- Clearing of debris and settlement from inlets, culverts and outlets
- Repair of eroded or damaged areas
- Clearing blockages from perforated pipework as required

5.1.4 The orifice flow control unit should be maintained in accordance with the manufacturer's recommendations.

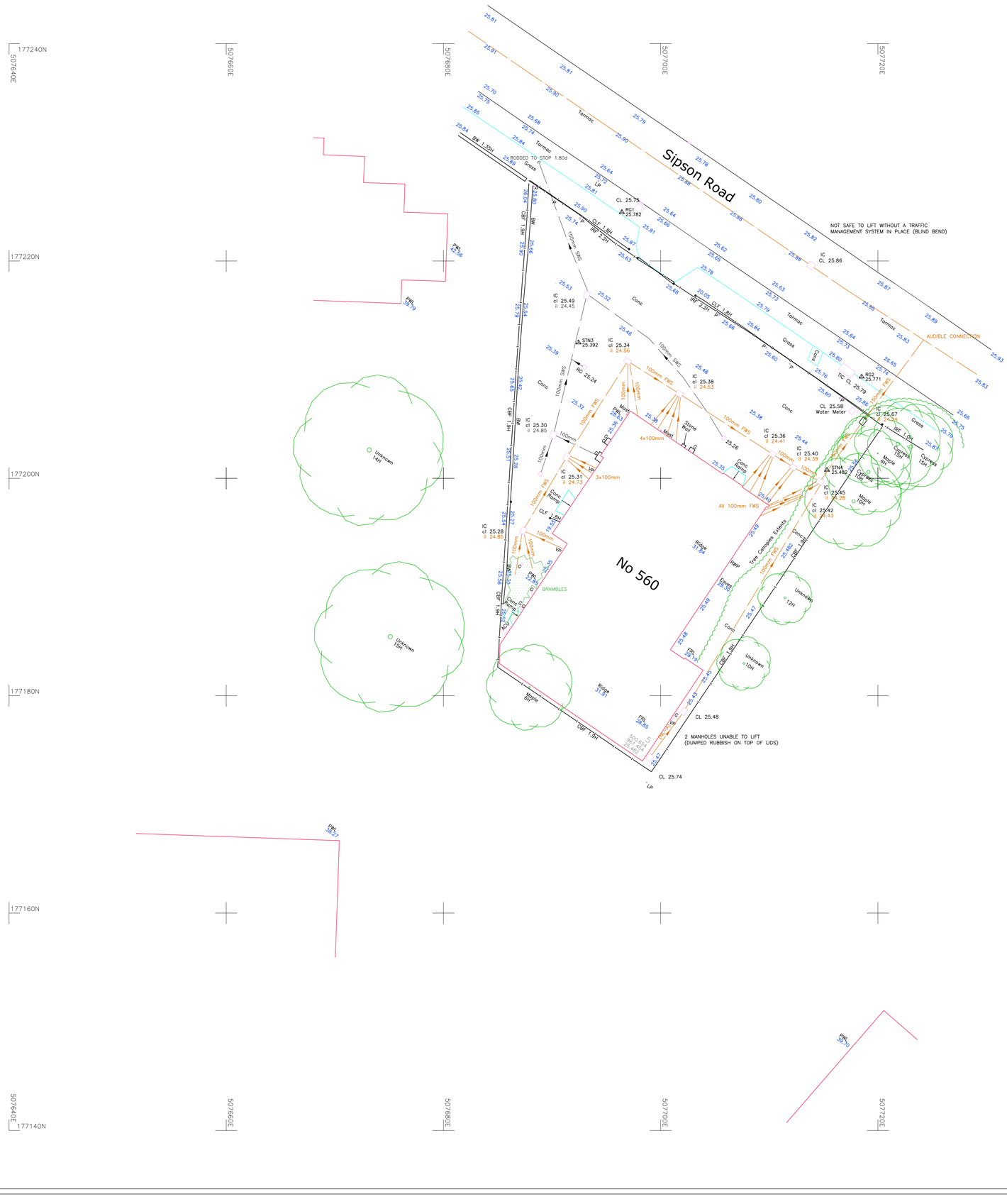
6 Proposed Developed Site Foul Water Strategy

6.1.1 It is proposed to pump foul flows from the site via a private pumping station within the basement. The pumped flows will outfall to a break chamber within the site boundary before draining via gravity to the existing Thames Water foul sewer in Sipson Road.

6.1.2 Discussions will be held with Thames Water at the detailed design stage to establish an acceptable discharge rate into the existing foul sewer; this will then inform the design of the private pumping station.

Appendices

Appendix A – Topographical Survey



Station	Easting	Northing	Level
RG1	507696.426	177224.500	25.782
RG2	507718.508	177209.341	25.771
STN3	507692.435	177212.492	25.392
STN4	507715.313	177200.768	25.482

Topographic Legend

- Building (footprint)
- Building canopy (overhead) /foundations/ruins
- Kerb / hard surface (levels at channel)
- Verge/ change of surface / ditch
- Bank
- Fence — cb Closed board; cp Conc. panel; hr Hand rail; bw Barbed wire; pc Post & chain; pr Post & rail; sec Security Fence; ob Open board; clf Chain link; pw Post & wire; ir Iron railings
- Armco Safety barrier
- Overhead cable
- Tree — Gn,n =girth
- Gate
- Bench Mark — 52.47 level
- Hedge
- BT IC — TV IC — bh Borehole
- foliage/tree canopy

bol	Bollard	mp	Mile post
bin	Litter bin	Mic	Mercury Telecom IC
bp	Block Paving	rnp	Road Name plate
bs	Bus stop	prn	Parking meter
BT	British Telecom IC	po	Post
cab	Cabinet	re	Rodding eye
cps	Concrete Paving Slabs	rs	Road sign (electrical)
tv	Cable television cover	rwp	Rain water pipe
dl	Data Logger	sp	Sign Post
dp	Down Pipe	st	Stop tap
ejb	electric junction box	sv	Stop valve
ep	Elec. pole	stay	Cable stay
fl	Floodlight	tcb	Telephone call box
fm	Flow Meter	tl	Traffic light
fp	Flagpole	tp	Telegraph pole
gp	Gate post	vp	Vent pipe
gy	Gully	wm	Water meter
gv	Gas valve	wo	Water outlet
fh	Hydrant	ufl	Unable to Lift
ht	Height	uts	Unable to Survey
ic	Inspection Cover		
jb	Junction box	Level prefix descriptions	
ko	Kerb outlet	ah	Arch level
lb	Letter box	bl	Bed level
lp	Lamp post	cl	Cover level
mkr	Utility marker	el	Eaves level
mb	Multi-bole tree trunk	ffl	Finished Floor level
		il	Invert level
Drainage abbreviations		pl	Parapet level
bd	Back drop	rl	Roof/Ridge level
lh	Lamp hole	sfl	Soffit level
re	Rodding eye	tow	Top of wall level
of	Overflow	twl	Top water level
ww	Wash water	wl	Water level

Please note surveyed boundaries may not represent the extent of legal ownership of the land.

Contractor should check crucial dimensions on site before commencement of any work.

Grid Orientation and Level Datum:

A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15 and OSGM02 transformation models.
The survey has been correlated to this point and a further one or more OSGB36 points established to create a true O.S. bearing for angle orientation

Services Survey Key

- HV ELECTRIC CABLES
- LV ELECTRIC CABLES
- TELEPHONE
- CABLE TV
- DATA CABLES
- GAS MAINS
- WATER MAINS
- UNIDENTIFIED
- FOUL WATER SEWERS — FWS
- COMBINED WATER SEWERS — CWS
- STORM WATER SEWERS — SWS
- RISING MAIN
- ABANDONED SERVICE
- OVERHEAD SERVICE
- OTHER SERVICES
- END OF TRACE (EOT)

av	air valve	mkr	marker
bd	back drop	NL	not located
bk	brick	o/f	overflow
BT	British Telecom IC	PE	polyethylene
cab	cabinet	prv	pressure reducing valve
cl	cover level	re	rodding eye
dp	down pipe	rs	road sign
ejb	electricity junction box	rts	rodded to stop
EOR	end of rodding	rwp	rain water pipe
EOT	end of trace	sc	stop cock
ep	electricity pole	sv	stop valve
fl	flood light	tp	telegraph pole
ffl	finished floor level	tv	cable tv ic
fh	fire hydrant	UTL	unable to lift
gs	gas syphon	UTS	unable to survey
gv	gas valve	vp	vent pipe
ic	inspection chamber	wl	water level
il	invert level	wm	water meter
lh	lamp hole	wo	washout
lp	lamp post		

Services Survey Notes

SERVICES DETECTION INCLUDING ELECTROMAGNETIC AND GROUND PROBING RADAR HAVE BEEN USED TO LOCATE UNDERGROUND SERVICES. RGI SURVEYS HAVE SUCCESSFULLY USED THESE METHODS SINCE OUR ESTABLISHMENT IN 1989. IDENTIFICATION OF SERVICES IS ONLY POSSIBLE THROUGH CONFIRMATION WITH RECORD DRAWINGS & WITH SURVEYOR'S EXPERIENCE IN THE FIELD. PLEASE BE AWARE THAT RESULTS ARE NOT FLAWLESS AND WHERE CRITICAL WE ADVISE CONFIRMATION OF SERVICES BY TRIAL EXCAVATIONS.
THE SERVICES SURVEY SHOULD BE READ IN CONJUNCTION WITH UTILITY RECORD DRAWINGS. SINGLE CABLE LINES MAY REPRESENT MULTIPLE CABLES AND DUCTS.
STATUTORY UTILITY RECORDS CAN BE OBTAINED THROUGH LINESEARCH.ORG. ALTHOUGH ALL EFFORTS ARE MADE TO PROVIDE A COMPLETE & COMPREHENSIVE SURVEY AS POSSIBLE, RUGBY GROUND INFORMATION LTD CANNOT GUARANTEE THE COMPLETENESS OF THE SURVEY.
ONLY BT CONTRACTORS ARE ALLOWED TO ACCESS BT COVERS THEREFORE OUR SURVEY FOR BT CABLES MAY BE RESTRICTED. WE ADVISE CONTACTING OPENREACH TO ARRANGE TELECOMS LOCATION BY OPENREACH ENGINEERS PRIOR TO ANY EXCAVATION. ADDITIONAL SERVICES MAY EXIST WITHIN THE SURVEY AREA.
DEPTHS TO SERVICES (eg 1.00d) ARE PROVIDED AS A GUIDANCE ONLY AND ARE NOT INFALLIBLE. WHERE CRITICAL WE ADVICE CONFIRMATION BY TRIAL EXCAVATIONS TO DETERMINE LOCATION, DEPTH AND IDENTITY.
DRAINAGE DEPTHS ARE INVERTS FROM COVER LEVEL.
DRAINAGE SURVEYS HAVE BEEN CARRIED OUT BY NON-MAN ENTRY MEANS, UNLESS OTHERWISE STATED. PIPE SIZES & DEPTHS ARE AS ACCURATE AS POSSIBLE WHEN SURVEYED FROM THE SURFACE.
WHERE SURVEY INCLUDES SERVICES AND ANOMALIES DETERMINED UTILISING GPR ON A REALTIME BASIS WITH A SINGLE FREQUENCY SYSTEM. PLEASE NOTE GPR RESULTS ARE OPEN TO INTERPRETATION AND DEPENDANT UPON GROUND CONDITIONS. RESULTS ARE TO THE BEST OF OUR ABILITIES.
Services not electronically located are annotated as follows:

GPR	GROUND PROBING RADAR
NL-A	NOT LOCATED – plotted in an assumed position
NL-I	NOT LOCATED – plotted from on site information
NL-R	NOT LOCATED – taken from records
NL-TS	NOT LOCATED – plotted from visible trench scars

Services Survey verified with Utility Record Plans
CHECK MUST BE MADE BY ANOTHER SURVEYOR

Utility Type	Company	Checked	Verified
Electricity			
Water			
Drainage			
Gas			
Cable TV			
Telecoms			
Oil Pipelines	NOT APPLICABLE		
Other			

Rev Details

Client: GHW Consulting

Project Title: Location and Mapping of Underground Drainage

560 Sipson Road
Sipson, West Drayton

drawing no.	date
7917 Sipson	5th Dec 2016

surveyed	drawn	chkd	scale	plot
OM RW	OM	SB	1 : 200	A1

SURVEYS · TOPOGRAPHIC · UTILITIES · BUILDING
The Old Stables, 70a Oxford Street, Rugby, Warwickshire, CV21 3NE
Tel: 01788 546093
Fax: 01788 546093
mail@rgisurveys.com
www.rgisurveys.com
Cert No.GB2002292

Appendix B – Surface Water MicroDrainage Calculations

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)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	40
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

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)	Section Type	Auto Design
1.000	10.000	0.200	50.0	0.038	5.00	1.9	0.600	o	150	Pipe/Conduit	
2.000	10.000	0.200	50.0	0.004	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	10.000	0.200	50.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.12	2.200	0.038	1.9	0.0	2.8	1.43	25.2	9.9
2.000	50.00	5.12	2.200	0.004	0.0	0.0	0.2	1.43	25.2	0.8
1.001	50.00	5.23	1.025	0.042	1.9	0.0	3.0	1.43	25.2	10.6

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)
1.001		2.700	0.825	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 * 10m³/ha Storage	2.500
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 Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 1	Number of Storage Structures 2	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.400		

Online Controls for Storm

Orifice Manhole: 3, DS/PN: 1.001, Volume (m³): 2.1

Diameter (m) 0.028 Discharge Coefficient 0.590 Invert Level (m) 1.025

Storage Structures for Storm

Swale Manhole: 2, DS/PN: 2.000

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	13.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	2.0
Safety Factor	2.0	Slope (1:X)	0.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	2.325	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.2	Include Swale Volume	Yes

Tank or Pond Manhole: 3, DS/PN: 1.001

Invert Level (m) 2.075

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	145.3	0.300	145.3	0.301	0.0

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	2.500
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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.950

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

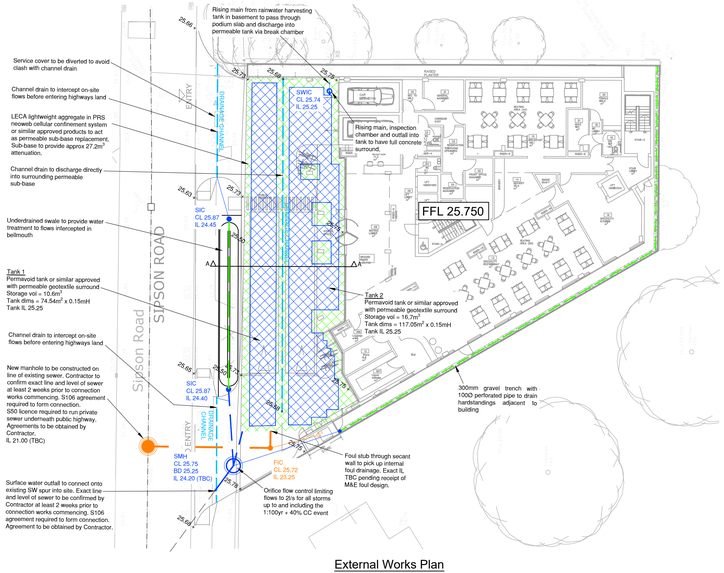
Profile(s)	Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	2	1440 Winter	100	+40%	30/1440 Winter			
2.000	2	1440 Winter	100	+40%	30/1440 Winter			
1.001	3	1440 Winter	100	+40%	1/15 Winter	100/960 Winter		

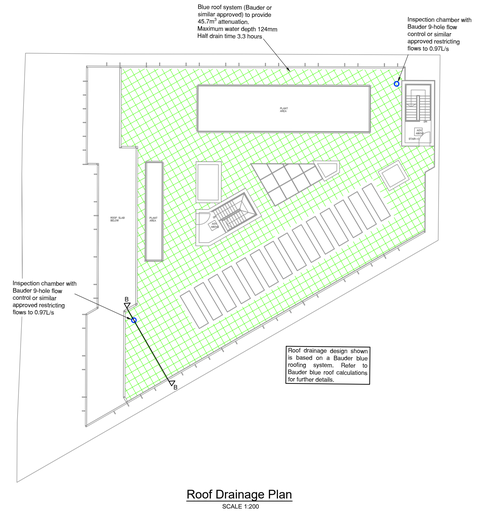
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	2	2.607	0.257	0.000	0.14			3.1	FLOOD RISK	
2.000	2	2.600	0.250	0.000	0.01		995	0.2	FLOOD RISK	
1.001	3	2.600	1.425	3.245	0.09			2.0	FLOOD	2

Appendix C – External Works Drawing

A0



External Works Plan
SCALE 1:200



Roof Drainage Plan
SCALE 1:200

General Notes

1. This drawing is to be read in conjunction with all other relevant Engineering and Architect's details.

2. All dimensions are in metres unless otherwise stated.

3. The Contractor shall be responsible for checking all tie-ins for line and level with existing foul and surface water systems before commencing any works.

4. The Engineer shall be notified immediately, in writing, should any errors or discrepancies be found prior to the commencement or continuation of any works.

5. All work is to be carried out in accordance with current British Standards, Building Regulations and NHBC Standards.

6. All drainage work is to be strictly in accordance with the requirements of the Building Regulations 2010, Approved Document Part H, "Drainage and waste disposal" (2015 Edition).

7. It is the responsibility of the Contractor to execute the works at all times in strict accordance with the requirements of the Health and Safety at Work Act 1974, and the C.D.M. Regulations 2015. The Contractor will be deemed to have allowed for full compliance, including full liaison with the principal designer, within his rates.

8. All existing land drains encountered on site during construction are to be re-connected.

9. Should any departure from the proposed slab or external levels be considered, agreement shall be sought from the Engineer immediately and prior to the commencement or continuation of any works. Proposals should take full account of all restrictions to the slab level.

10. Temporary protection to be provided to drainage work during construction as necessary.

Specification Notes

11. The following types of pipe may be used unless noted or agreed otherwise;

- Pipes up to 450mm diameter to be Structured Walled to BS EN 13476, Polypropylene to BS EN 1852 or PVC-U to BS EN 1401.
- Pipes over 450mm diameter to be Concrete to BS 5911.

12. Both Clay and Concrete pipes shall be strength class 120 (100/150mm min crushing strength 28kN/m). Thermoplastic pipes shall have a minimum ring stiffness of SN4.

13. Pipes which run adjacent to buildings shall be installed in strict accordance with Part H, Clauses 2.23 to 2.25.

14. All pipes, chambers and fittings shall be installed, bedded and backfilled in accordance with the manufacturers instructions subject to the following minimum requirements;

Pipe Location	Cover to crown	Clay/Concrete Pipe * Bedding	Plastic Pipe Bedding	Backfill
Roads (HGV)	>1.2m <1.2m	Class S Class 'A' (Concrete)	Class S (S1or2) Class 'A' (Concrete)	Type 1Granular or suitable, approved as dug material
Drives / car parking	>0.9m<0.9m	Class S Class 'A' (Concrete)	Class S (S1or2) Class 'A' (Concrete)	Type 1 Granular or suitable, approved as dug material
Hard and soft Landscaping	>0.6m<0.6m	Class S Class 'A' (Concrete)	Class S (S1or2) Class 'A' (Concrete)	Suitable as dug material

15. The first flexible joint in pipes adjoining a manhole shall be a maximum length of 600mm from the inside face of the manhole, connecting to a rocker pipe. The length of the rocker pipe shall be as follows;

Pipe diameter	Length of Rocker pipe
150-600mm	600mm
675-750mm	1000mm
over 750mm	1250mm

16. All manholes and inspection chambers situated in areas subject to vehicular loading to have class D400 covers and frames to BS EN124 and those not subject to vehicular loading to have class B125 covers and frames.

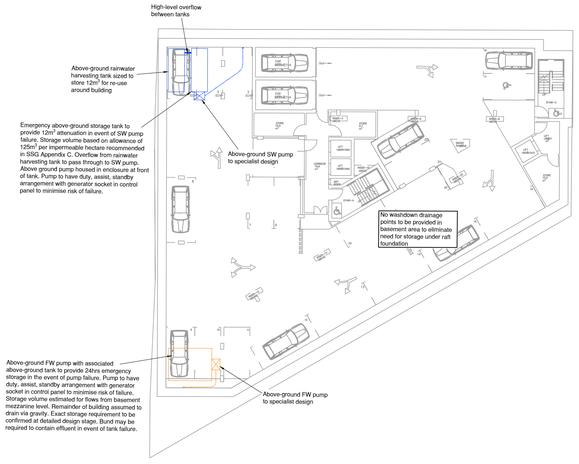
17. Drainage frames must be tied to manhole risers by use of manufacturers ties (eg. Polypipe ref FRK500 fixing kit and FRK501 black ties.) The ground works contractor will be held fully responsible for any accidents due to incorrect fitting or failure to use the correct manufacturers fixing equipment.

18. All drains in the vicinity of existing or proposed trees to be constructed in accordance with the requirements of NHBC Practice Note 3.

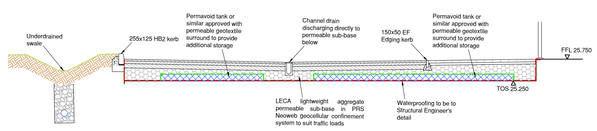
19. All drainage MH cover and frames to be orientated so that they are square and perpendicular to the block paving patterns. MH cover location also to avoid building door opening locations where possible.

Key

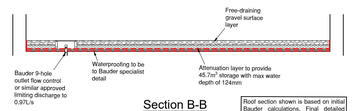
- Surface water drainage
- Drainage Channel — Linear drainage channel
- Perforated surface water pipe
- Surface water rising main
- Extents of permeable sub-base / blue roof system
- Extents of permavoid tank
- Existing surface water lateral
- Foul water drainage
- Foul water rising main
- Proposed foul bin store gully with lateral shown
- Existing foul sewer



Basement Drainage Plan
SCALE 1:200



Section A-A
SCALE 1:50



Section B-B
SCALE 1:50

Roof section shown is based on initial Bauder calculations. Final detailed design to be undertaken by Bauder following receipt of planning approval.

Outline Private Drainage Maintenance Plan

Manholes/Catchpits and Sewers - To be inspected quarterly and immediately after extreme rainfall events.

Inspect Manhole/Catchpit cover and frame for any defects; repair and replace as necessary.

Inspect Manhole/Catchpit Interior, benching and incoming and outgoing pipe connections for the build up of silt and debris. Removal of silt and debris to be by means of vacuum suction and/or jetting/rodding.

Inspect Manhole/Catchpit Interior for evidence of Vermin. Sewers and structures are to be dusted or baited when evidence of infestations are observed during an inspection or in response to a service request or complaint.

Ensure Manhole access steps/ladders are secured and inspect for corrosion.

Inspect for any deleterious industrial waste and noxious odours.

Ensure there is no evidence of settlement above sewer lines.

Ensure that contractor is fully aware of the depths of pipe drains and other services present, to ensure these are not damaged.

Keep a detailed log of when the drainage systems are inspected, maintained, emptied and serviced. Also record specific events relating to the drainage systems such as cleaning, repairs, accidents and incidents.

Gullies and Channels - To be inspected quarterly and immediately after extreme rainfall events.

Inspect cover and frame for any defects; repair and replace as necessary.

Inspect channels for the build up of silt and debris. Removal of silt and debris to be by means of vacuum suction and/or jetting/rodding.
Inspect sumps and outgoing pipework for the build up of silt and debris. Removal of silt and debris to be by means of vacuum suction and/or jetting/rodding.

Keep a detailed log of when the drainage systems are inspected, maintained, emptied and serviced. Also record specific events relating to the drainage systems such as cleaning, repairs, accidents and incidents.

Hydro-Brake Flow Control Device

It is recommended that the unit is inspected monthly for the first three months and thereafter at six monthly intervals. Hose down if required. Further maintenance to be undertaken in accordance with Manufacturer's guidance.

Blue Roof System

Outlets to be visually inspected following any significant storm event to ensure no blockage has occurred.

Visually inspect outlets after any significant remedial works to ensure they are still draining freely.

Inspect each outlet quarterly for any build-up of debris. Any debris to be removed from roof and not simply flushed down pipes.

Visually inspect waterproofing at all upstands to ensure integrity during any maintenance visits.

Further maintenance to be undertaken as per Manufacturer's guidance.

The outline maintenance plan shown here is for planning purposes only. This plan should be re-visited following practical completion of the scheme to ensure that the recommendations made within do not contradict either the Manufacturers' maintenance requirements for specific products or the Client's operational requirements.

Rev	Date	Amendments	By	Chk
P05	12.07.22	Layout updated	AP	ML
P04	30.06.22	Layout updated. Discharge rate reduced to 2l/s. Design amended to suit LLFA comments	AP	ML
P03	30.08.19	Blue roof design updated in line with Bauder calculations. Additional storage provided on podium slab.	AP	BD
P02	17.06.19	Outline drainage maintenance plan added	AP	BD
P01	17.04.19	Layouts updated	AP	AP

RLRE

Client

PHULL EMPIRE

Project

560 SIPSON ROAD
WEST DRAYTON

Drawing Title

EXTERNAL WORKS
AND DRAINAGE

Status

INFORMATION

Scale	Drawn	Checked	Date
A0@ As Shown	AP	BD	05.04.19

Drawing No. Rev.

18403-RLL-19-XX-DR-C-2000 P05

Scale Bar:

1:200 0 2 4 6 8 10 12 14

St James House • Stonefield Road • Ayr • KA7 3TS • Tel: 01292 265000 • Fax: 01292 291709 • www.rodgersleask.co.uk

Rodgers Leask Limited & Rodgers Leask Environmental Limited
01332 285000 • rlderby@rodgersleask.co.uk • **rodgersleask.co.uk**
St James House, St Mary's Wharf, Mansfield Road, Derby DE1 3TQ
Seven House, 18 High Street, Longbridge, Birmingham B31 2UQ