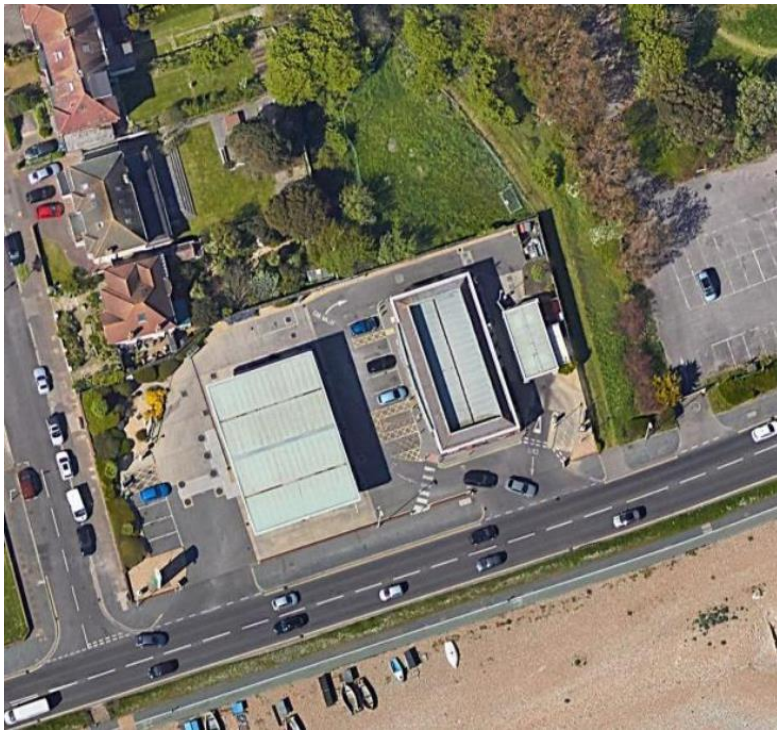
MFG BROOKLANDS SERVICE STATION
DRAINAGE STRATEGY AND CALCULATIONS



CLIENT:	MFG
ARCHITECT:	Jennings Design Ltd
SITE ADDRESS:	311 Brighton Road, Worthing, BN11 2HP
REFERENCE (REV):	24230-DCE-XX-XX-T-C-001-P03
DATE:	13/11/24

AUTHOR:	George Dermentzoglou	DATE:	November 2024
CHECKER:	Sebastian Reid	DATE:	November 2024

CONTENTS

EXISTING SITE 1

PROPOSED DEVELOPMENT 1

SURFACE WATER DRAINAGE STRATEGY 2

FOUL WATER DRAINAGE STRATEGY 4

MAINTENANCE OF DRAINAGE SYSTEMS 5

DRAINAGE DESIGN PARAMETERS 7

REVISION	DATE	AUTHOR	CHECKER	COMMENTS
P01	02/07/2024	G. Dermentzoglou	Seb Reid	First Issue
P02	15/10/2024	G. Dermentzoglou	Seb Reid	SW Drainage Strategy revised
P03	13/11/2024	G. Dermentzoglou	Seb Reid	Revised to suit LLFA comments

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EXISTING SITE

The site is an existing operational service station with a shop building, forecourt and car wash. It is located along Brighton Road (A259) in Worthing, and it is bounded with Brighton Road to the south, Seamill Park Avenue to the west, private properties to the north and public car park to the east. The site is overall flat with existing levels vary between 4.90 and 4.10m AOD. The site has an entry and an exit access as shown on the Topographical Survey in the appendices.

There is an existing private drainage system serving the service station. The system is split into a surface water system which collects water from the canopy and building roof, a foul water system which picks up flows from the car wash and the building, and a brown water system which serves the forecourt and external areas which passes through a forecourt interceptor. The surface water system outfalls to a demarcation chamber to the west of the site and then connects into an existing surface water public sewer in Seamill Park Avenue via a junction connection. The foul water system connect to the existing foul pumping station and then pumped for few metres to a demarcation chamber before the discharge into an existing foul water public manhole in Seamill Park Avenue.

An existing foul water rising main runs along the southern part of the site and connects into the existing foul water manhole in Seamill Park Avenue. A 3.0m easement will be provided within the site to protect this existing Southern Water asset and allow access for future maintenance. A Utility Survey has been scheduled to confirm all the above, however for the purposes of this report, the depth of the foul water demarcation manhole has been assumed based on the public sewer invert levels obtained by Southern Water records.

PROPOSED DEVELOPMENT

The existing service station is proposed to be partially redeveloped at the east end of the site with the main area of works to be approximately 730m^2, including the new compound at northeast. Please refer to drawing ''240479-01 General Site Layout'' in the appendices for details and extents of the proposed works. The proposals include the extension of existing sales building to accommodate a new food store and a drive-thru lane, removal of the existing car wash, provision of two new jet washes at the west of the site, reconfiguration of car parking, a new bin store and associated works such as tarmac resurfacing.

The majority of the existing services, including the drainage system, will be retained. The proposed jet wash bays will replace the existing car wash and the foul flows pre and post development are estimated to be similar, if not reduced, therefore no capacity increase on the public foul water sewer. The roof of the existing shop is currently draining into the surface water system but is proposed to be redirected to the new surface water system which will attenuate water into a new basin and this will offer a significant flow reduction to the private system and the surface water public sewer further downstream.

The impermeable area of works is 730m^2 with an area of 100m^2 at the south of the existing building to be included in the calculations, due to levels falling towards the drive thru, as shown on drawing ''241230-DCE-XX-XX-D-C-103 - Proposed Impermeable Areas'' in the appendices. Most of the site levels are proposed to be retained as existing with the extension store FFL to be set at 4.50m to match the existing building FFL. External levels will be adjusted in the drive thru lane to suit the proposed extension FFL and the existing levels along the eastern boundary.

SURFACE WATER DRAINAGE STRATEGY

DESIGN STANDARDS

Drainage systems on this site have been designed in accordance with the following standards as required:

- CIRIA C753 – The SuDS Manual (2015)
- British Standard 8582:2013 – Code of Practice for Surface Water Management for Development Sites
- British Standard 752:2017 – Drain and Sewer Systems Outside Building – Sewer System Management
- British Standard 8533:2017 - Assessing and managing flood risk in development - code of practice
- Building Regulations Part H
- Sewerage Industry Guidance – Codes for Adoption
- Design Manual for Roads and Bridges
- APEA Guidance for Design, Construction, Modification, Maintenance and Decommissioning of Filling Stations

SURFACE WATER DRAINAGE HIERARCHY

Re-use of Surface Water
The option of rainwater harvesting for the reuse of water has been considered however there is very low demand for the type and use of the site and this will be an unviable option for surface water discharge.

Reduction of Runoff
The site is very constrained in terms of available space to allow SuDS features such as green roofs, tree pits or rain gardens to be proposed for the reduction of the volume of water running off the site, so this option has been excluded.

Infiltration
The site is located in a freely draining area with a potential of water infiltration into the ground in accordance with the Soilscapes Viewer of Cranfield University. The proximity to the sea and the groundwater table suggests that water might drain underground with no obstructions up to 3-4m deep. Site specific soakaway tests and investigation have been carried out in October 2024 confirming that this option is not feasible. Please refer to the Trial Pit Soakage Testing report by SLR Consulting in the appendices.

Watercourse
The site is located in a dense urban area and therefore there is no existing watercourse in the vicinity.

Surface Water Drainage
There is an existing public surface water sewer in Seamill Park Avenue as indicated in the Southern Water sewer records plan in the appendices. The site has an existing lateral connection into this sewer and discharges at an unrestricted brownfield rate.

Foul / Combined Water Drainage
There is an existing foul water sewer in Seamill Park Avenue with a foul water rising main located within the site. The site has an existing lateral connection into this sewer and discharges at an unrestricted rate.
There is no combined water sewer in the surrounding area according to Southern Water sewer records.

RUNOFF DESTINATIONS AND SOURCE CONTROL

As described above, the preferred discharge option of infiltration into the ground has been proven unviable. Therefore, the alternative discharge point is the existing public sewer in Seamill Park Ave, utilising the existing lateral connection from the site. To achieve this, the proposed system will require pumping to the outfall demarcation manhole, located at the west side of the site, at a reduced brownfield rate.

The existing area to be redeveloped is 600m^2 as shown on drawing ''241230-DCE-XX-XX-D-C-102 – Existing Impermeable Areas'' in the appendices. Using the modified rational method the existing unrestricted brownfield rate, for the above area only, has been calculated at 0.060ha x 140l/s/ha = 8.4l/s. A 50% reduction of the existing rate into the public surface water sewer is proposed with a discharge rate of 4.2l/s.

The main area of works is served by the brown water drainage system, which is discharging into the existing public surface water sewer. During extreme storm events, both systems encounter high volumes of rainwater which surcharge the downstream pipes and the forecourt interceptor and create potential flooding risk to the Southern Water systems. To provide betterment, water from the existing building roof is proposed to be collected by the new surface water system, as well as from the redeveloped area, and will be attenuated into the new basin offering a significant flow reduction to the private system and the surface water public sewer further downstream.

A Section 106 application and associated approval by Southern Water should be required for the alterations in the private surface water system, even though the lateral connection to public sewer will be retained.

SUSTAINABLE DRAINAGE SYSTEMS

The Strategy has considered the most appropriate SuDS Methods for this type and use of the development and having in mind the available landscaped area north of the site, it proposes an attenuation basin to provide adequate storage for up to 1:100 + 45% climate change scenario with the maximum water level to be 220mm below the top of the basin, avoiding any flooding within the site. The basin will cover a base area of 40.0m^2 and will be 1.0m deep with 1:3 side slopes, providing a total volume of 87.5m^3. The size of the basin has been confirmed to be adequate by the hydraulic calculations, which are included in the appendices.

DRAINAGE DESIGN

The proposed system will be located at the east of the drive thru lane collecting water from the external areas, including the new compound area northeast, via gullies and the existing/proposed roof via downpipes. The system will head north towards the landscaped area and discharge into the attenuation basin after passing through a vortex separator to mitigate any pollution risk from the medium risk areas. A pumping station is proposed, south of the basin, to pump water at a reduced rate of 4.2l/s into the existing outfall manhole which is circa 0.6m higher. The final discharge point is the public sewer via the existing lateral pipe.

The drainage design has been developed as shown on drawing ''24230-DCE-XX-XX-D-C-100 - Drainage Strategy'' and has been hydraulically modelled using FEH Rainfall Data to ensure it will operate with no above ground flooding as it is indicated on the Hydraulic Calculations document in the appendices. Flood exceedance flow arrows added on the drainage drawing to demonstrate the direction of excess water in the extreme event beyond the design when water within the basin might overtop the top of embankments.

AMENITY AND BIODIVERSITY

The site has a landscaped area at the north, which is proposed to be utilised for the proposed attenuation basin with good quality planting following the excavation of the basin. This will create a more aesthetically pleasing place and increase the attractiveness of the petrol station, while at the same time supports natural local habitat and species and will continue to improve biodiversity and amenity within the site.

WATER QUALITY AND POLLUTION CONTROL

The proposals have been assessed for pollution risk in accordance with Table 26.2 of the CIRIA SuDS Manual 2016 using the Simple Index Approach method. The area of works has been reviewed as two separate areas according to the hazard level as shown on the table below. The roof of the existing/proposed buildings and the drive thru lane, including the surrounding hardstanding areas.

Areas – Pollution Hazard Indices				
	Hazard Level	**TSS**	**Metals**	**Hydrocarbons**
Existing / Proposed Building Roof	Low	0.3	0.2	0.05
Commercial Road / Drive Thru	Medium	0.7	0.6	0.7
Hazard Levels - Proposed Pollution Mitigation				
Vortex Separator SDS Aqua Swirl	x 1.0	0.8	0.5	0.7
Detention Basin	x 0.5	0.5	0.5	0.6
Mitigation Index Achieved		> 1.0	0.75	1.0
Medium Hazard Mitigation Index Required		0.7	0.6	0.7

As it is demonstrated on the above table, the proposed attenuation basin, which uses the associated values of a detention basin, along with the vortex separator provide sufficient pollution mitigation, for suspended solids, metals and hydrocarbons of the medium hazard areas.

FOUL WATER DRAINAGE STRATEGY

The proposed extension will require some existing private foul water sewers to be abandoned and a new foul water system to be built around the drive thru and pick up pop-up connections from the new food store collecting standard foul flows from toilets, kitchen and similar facilities. This new system is proposed to connect to the same foul water manhole that the existing area, including the car wash, is discharging into. It will then follow the existing route to the foul water pumping station and into the public foul water manhole in Seamill Park Avenue.

The two jet wash bays proposed at the west of the site, will actually be a replacement of the existing car wash and the foul flows pre and post development are estimated to be similar, if not reduced, therefore there is no capacity increase on the public foul water sewer. A new washdown and silt separator, to remove silt and debris from water run-off, is proposed prior to the connection into the existing foul demarcation manhole, the depth of which must be confirmed on site. If it is proven shallower than estimated, the separator will connect at the manhole upstream of the existing foul water pumping station, located in the same area.

As per Southern Water's consultee response in planning, a trade effluent discharge license is required prior to connection of the jet washes into the public foul water sewer. In addition to this licence, a Section 106 application and associated approval by Southern Water should be sought for the alterations in the private foul water system, even though the lateral connection to public sewer will be retained.

MAINTENANCE OF DRAINAGE SYSTEMS

The private systems will be managed by the landowner and the individual tenants for the site. The system has been designed so that the drainage system is fully accessible and maintainable with flooding easily visible if it occurs. The maintenance schedule for the individual elements of the scheme is as per manufacturer's recommendations and as follows.

Pipe Network	
Operation	**Frequency**
Inspect and identify any areas that are not operating correctly, if required, take remedial actions.	Monthly for 3 months as a part of normal post completion monitoring, then biannually. If flooding is identified, take immediate action.
Debris removal from manholes (where may cause risk performance)	As required, but at least twice a year
Where rainfall into network from above, check surface or filter for blockage or silt, algae or other matter by jetting	As required, but at least twice a year
Remove sediment from pipework by jetting.	Annually or as required
Inspect/check all inlets, outlets, and overflow pipes to ensure that they are in good condition and operating as designed	Annually, or as required and after large storms

Washdown and Silt Separator	
Operation	**Frequency**
Desludging and removal of debris	Every 3 months or as recommended by the Manufacturer
Inspect and identify any areas that are not operating correctly, if required, take remedial actions	Monthly for first half year of operation, then every six months, or as required by the Manufacturer.
Repair/check all inlets, outlets and overflow pipes	As required
Replace malfunctioning parts or structures	As required
Inspect filter media and establish appropriate replacement frequencies	Six monthly or as required by the Manufacturer.
Note – All Vortex Interceptors should be maintained and monitored under a Service Plan which is compatible with the Manufacturer's warranty and suited to the plant used.	

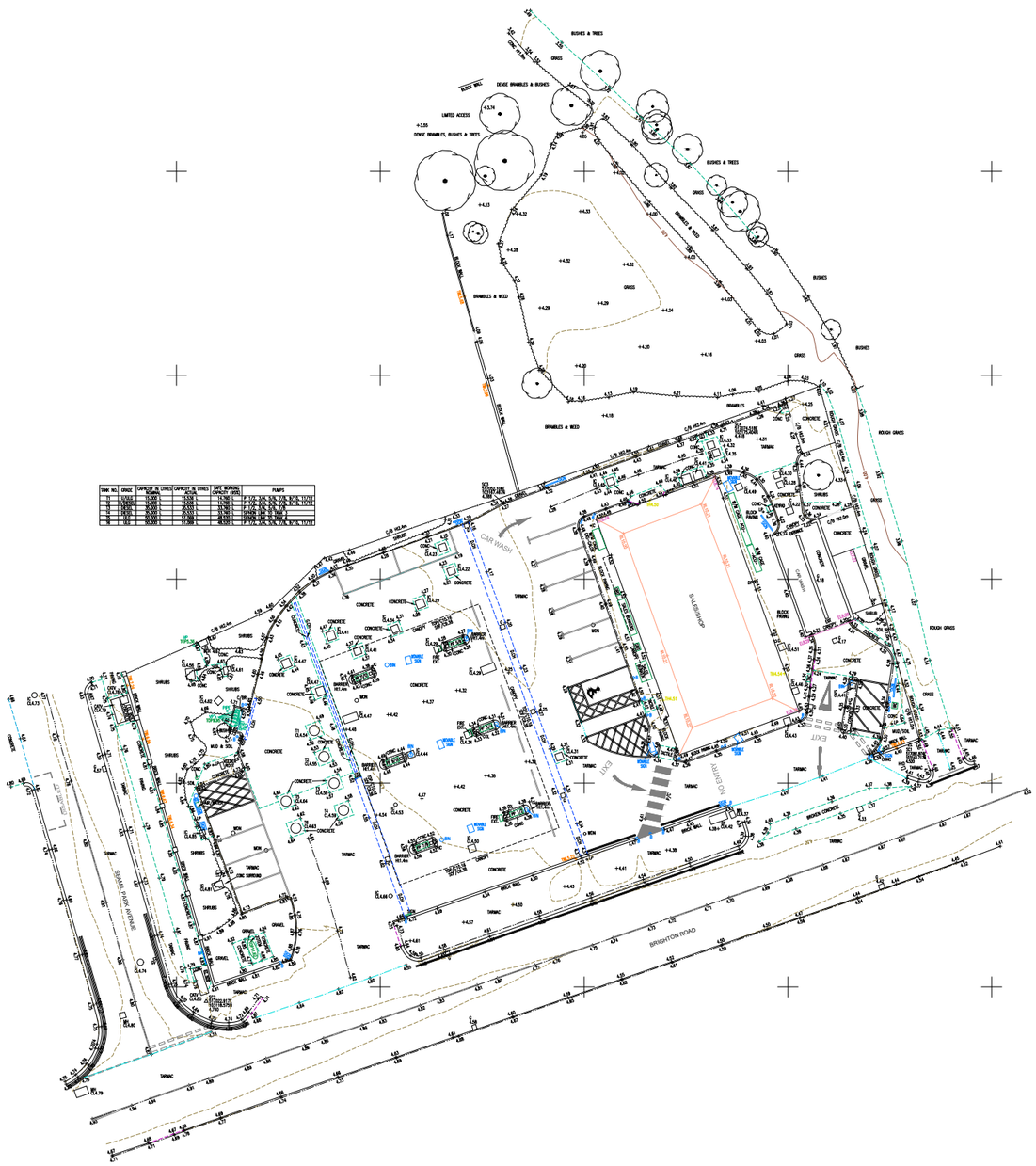
Vortex Separator	
Operation	**Frequency**
Desludging and removal of debris	Every 3 months or as recommended by the Manufacturer
Inspect and identify any areas that are not operating correctly, if required, take remedial actions	Monthly for first half year of operation, then every six months, or as required by the Manufacturer.
Repair/check all inlets, outlets and overflow pipes	As required
Replace malfunctioning parts or structures	As required
Inspect filter media and establish appropriate replacement frequencies	Six monthly or as required by the Manufacturer.
Note – All Vortex Interceptors should be maintained and monitored under a Service Plan which is compatible with the Manufacturer's warranty and suited to the plant used.	

Attenuation Basin	
Operation	**Frequency**
Inspect and identify any areas that are not operating correctly, if required, take remedial actions	Monthly for 3 months, then six monthly
Remove sediment from upstream surface water network by jetting.	Annually or as required
Remove litter and debris	Monthly or as required.
Cut grass	Monthly during growing season.
Manage vegetation	Monthly at start, then as required.
Inspect incoming pipework, clear if required.	Monthly
Inspect banks, slopes, structures, inlets for damage	Monthly, then as required. Remedials may be necessary.
Reseed areas of poor vegetation growth and monitor vegetation coverage.	As required.
Inspect filter drain surface, pipework and other systems for clogging, ponding or damage	Monthly
Repair Erosion or other damage to banks, base	As required.
Remove tree roots where they are encroaching the sides of the basin.	As required
Clear pipework of blockages.	As required
Replace filter media.	Every 10 – 20 years, or if identified by inspector.
Removal of unsuitable residue (oil, pollutants, silt)	As required.
Re-level uneven surface and reinstate design levels if damaged	As required.

The maintenance of the drainage network and SuDS features are to be linked with the wider site maintenance. A log of all maintenance activities is to be kept and made available to the local planning authority (LPA) and / or the Lead Local Flood Authority (LLFA) on request.

DRAINAGE DESIGN PARAMETERS

Drainage Outfalls	**Rainwater Reuse**	Not a viable option
	Soakaway Viable	No feasible following infiltration tests on site
	Watercourse	No watercourse in the proximity
	Surface Water Sewer	SW public sewer in Seamill Park Avenue
	Foul / Combined Sewer	FW public sewer in Seamill Park Avenue
	Proposed Discharge Outfall Point	SW public sewer via an existing connection
	Invert Level of Outfall	Outfall demarcation manhole 3.850 (TBC)
Surface Water Drainage Assessment Constants	**Scenarios to be Tested**	1:2, 1:30, 1:30+40% cc, 1:100, 1:100+45% cc
	Existing Impermeable Area	600.0m^2 / 0.060ha
	Existing Brownfield Discharge Rate	0.060 x 140l/s/ha = 8.4l/s
	Proposed Reduced Discharge Rate	4.2l/s (50% reduction)
	Proposed Impermeable Area	830.0m^2 / 0.083ha
	Attenuation Storage Method	Attenuation Basin
	Proposed Basin Structure	1.0m deep, 40.0m^2 base area, 1:3 side slopes Total storage volume: 87.5m^3
	Max water level during the 1:100 +45% CC critical storm event	3.982 (220mm clear from top of basin)
Surface Water Hydraulic Modelling Parameters	**Rainfall Methodology**	FEH Rainfall Data
	Modelling Parameters assume MADD of 0, Default Time of Entry of 5 Mins and Summer and Winter Coefficients of 1.0. Default Rainfall of 50mm used with 720min drain down.	
SUDS	**Water Quality**	Vortex Separator, Detention Basin
	Pollution Control Risk Level	Low/Medium Hazard
	Mitigation Indices achieved	TSS, Metals, Hydrocarbons
	Hydrocarbon Interceptor	Vortex Separator
	Silt Capture Method	Vortex Separator, Washdown & Silt Separator
Appendices	Topographical Survey Proposed Site Layout Southern Water Sewer Records 24230-DCE-XX-XX-D-C-100-P03 - Drainage Strategy 24230-DCE-XX-XX-D-C-102-P01 - Existing Impermeable Areas 24230-DCE-XX-XX-D-C-103-P02 - Proposed Impermeable Areas SW Hydraulic Calculations Rev P03 Vortex Separator SDS Aqua Swirl datasheet & mitigation indices Trial Pit Soakage Testing report by SLR Consulting	



TANK NO.	GRADE	CAPACITY IN LITRES	CAPACITY IN LITRES	SAFE WORKING	PUMPS
		TANKAGE	PUMPS	CAPACITY (LPM)	
T1	UNLEAD	120,000	114,000	114,000	4 NO. 3.0L 3.0L 3.0L 3.0L 114LPM
T2	UNLEAD	120,000	114,000	114,000	4 NO. 3.0L 3.0L 3.0L 3.0L 114LPM
T3	DERV	80,000	76,000	76,000	3 NO. 3.0L 3.0L 3.0L
T4	DERV	80,000	76,000	76,000	3 NO. 3.0L 3.0L 3.0L
T5	SUPER	80,000	76,000	76,000	3 NO. 3.0L 3.0L 3.0L
T6	SUPER	80,000	76,000	76,000	3 NO. 3.0L 3.0L 3.0L
T7	LPG	100,000	95,000	95,000	4 NO. 4.0L 4.0L 4.0L 4.0L 152LPM
T8	LPG	100,000	95,000	95,000	4 NO. 4.0L 4.0L 4.0L 4.0L 152LPM

Survey Notes

Grid: Local, plane metric related to National Grid fixed to SC1

Levels: OS datum from GNSS positioning converted using the National Geoid Model OSGM15

Notes

Topographical Survey Legend

BUILDINGS AND WALLS

Building
Building Open Sided
Ruin — RUIN
Passage
Wall with Height — Wall +0.1.5m
Retaining Wall — R/W

FENCE STYLES AND DESCRIPTIONS

Close Boarded — C/B
Corrugated Iron — C/I
Chestnut Paling — C/P
Chainlink — C/L
Handrail — H/R
Intersexion — MN
Iron Railings — I/R
Lattice — L/T
Miscellaneous — Misc
Palisade — PAL
Post & Chain — P/C
Post & Rail — P/R
Post & Wire — P/W
Post & Barbed Wire — B/W
Wire mesh — W/M
Stile
Gate
Fence Breakpie

ROADS

Kerbs
Edge of Surfacing
Pedestrian Crossing — PC
Track
Footpath

STREET FURNITURE

Bollards Beacon — + BB
Bus Stop — + BS
Bollard — + B
Cats Eye — + CE
Cast Chute — + CC
Closed Circuit TV — + CCTV
Drain — + DR
Electricity Pole — + EP
Flood Light — + FL
Flag Staff — + FS
Lamp Post — + LP
Letter Box — O LB
Name Plate (street) — — NP
Mooring Ring — + MR
Mile Post or Mooring Post — + MP
Service Marker — + MK
Mile Stone — + MS
Post — + P
Parking Meter — + PM
Reflector Post — + RP
Reading Eye — + RE
Road Sign — + RS
Speed Camera — + S/CAM
Information Sign — + SIGN
Stop — + SY
Traffic Light — + TL
Telegraph Pole — + TP
Traffic Light Push Button Post — + TLP
Traffic Light Control — + TLC/P
Control Box — □ C/BOX
British Telecom Box — □ BT BOX
Electricity Box — □ EL BOX
Gas Box — □ GAS BOX

INSPECTION CHAMBERS AND PIPES

Inspection Cover — □ IC
Inspection Cover (Elec) — □ IC/EL
Manhole — □ MH
British Telecom Cover — □ BT
Inspection Cover (Comms) — □ IC/COM
Cable TV — □ CATV
Inspection Cover Traffic Signals — □ IC/TL
Gully — □
Kerb Outlet — □ KO
Vent Pipe — + VP
Down Pipe — + DP
Rain Water Pipe — + RWP
Soil Pipe — + SVP
Gas Pipe — + G-PIPE
Unable to lift cover — UTL
Stop Tap — + ST
Stop Valve — + SV
Lamphole — + LH
Hydrant — + HYD
Earth Rod — + ER
Gas Valve — + GV
Water Meter — + WM
Washout — + WO
Reading Eye — + RE

GEOTECHNICAL INFORMATION

Borehole — BH
Trial Pit — TP
Monitor Pin — + MON
Probe Hole — + PH
Window Sample — + WS

GENERAL INFORMATION

Petrol Pump — PP
Basement Light — BL
Footbridge — FB
Slab Type Channel — SLAB
Slot Type Channel — SLOT
Grate Type Channel — GRATE
Tactile Paving — TAC
Crash Barrier — C/BR
Column — COL
Stanchion — STAN
Car Vacuum — VAC
Offset Fill — + OF
Air Valve — + AV
Trough — TR
Chimney — CHY
Telephone Call Box — TCB

OVERHEAD FEATURES

Electricity Pylon — E/PYLON
Electricity — E/L
Telephone — T/L

WATER FEATURES

Canal
Stream
Ditch
Weir
Culvert — Culv
Drip (Land Drain)
Spring — + SPR

RELIEF AND VEGETATION

Hedge
Edge of wood/Bushes
Stump — STUMP
Individual Tree
Stones with Height Greater than 1m
Cliff Face
Marsh
Reeds

LEVEL AND HEIGHT INFORMATION

Standard Spot Height — + 123.45
Predicted Spot Height — ? 123.456
Bed Level — + BL53.92
Water Level — + W.L4.92
Soffit Level — + SL25.92
Threshold Level — + THR5.68
Cover Level — + CL26.45
Invert Level — + I.L25.15
Pipe Soffit Level — + PSL5.00
Floor Level — + FL6.00
Finished Floor Level — + FFL6.00
Top of Tank Level — + TT7.00
Eave Level — + EL7.00
Ridge Level — + RL9.00
Roof Hip Level — + RHL8.00
Flat Roof Level — + FRL7.00
Top of Canopy Level — + TOP/CT.00
Underside of Canopy Level — + SOF/CSL00
Window Sill Level — + WSL8.00
Window Head Level — + WHL9.00
Springing Level — + SPL8.00
Arch Level — + AL7.00
Cable Level — + CHTR.00
Top of Wall Level — + TBL15.00
Underside of Beam Level — + UBL8.55
General Height — + HTR.00

SURVEY INFORMATION SIGNS

Permanent Ground Marker
O.S. Trig Station
O.S. Bench Mark

Sheet Index

Rev.	Date	Description

MALCOLM HUGHES
CHARTERED LAND SURVEYORS
2 Allen Road, Livingston, West Lothian
EH54 6TQ. Tel: 01506 467 910
www.malcolmhughes.co.uk
livingston@mhls.co.uk

Accreditations

Client
MRH RETAIL
HANOVER HOUSE, 18 THE AVENUE
EGHAM, SURREY, TW20 94B

Project
BROOKLANDS PFS
331 BRIGHTON ROAD
WORTHING, BN11 2HP

Drawing Title
TOPOGRAPHICAL SURVEY

Drawn By	Checked by	Survey Date	Scale
ER 19/10/17	CT 23/10/17	SEPTEMBER 2017	1:200@A0

Drawing No: 50385_01
Revision:

NORTH

SEAMILL PARK AVENUE

EXISTING DRAINAGE CHANNEL

Existing 2.4m high timber fence

Existing 2.4m high timber fence

EXISTING FOUL WATER PUMPING STATION CONTROL CABINET

EXISTING FOUL WATER PUMPING STATION

EX FWMH

EXISTING LANDSCAPING

WASH INTERCEPTOR

Existing PI Vent

EX SWMH

DP

Existing DCD to be removed

EXISTING DRAINAGE IC

EXISTING ABOVE GROUND OFFSET FILLS AND VENTS

EXISTING PETROL INTERCEPTOR

EXISTING TANK CHAMBER

EXISTING CONCRETE SURFACING

EXISTING TANK CHAMBER

EXISTING TANK CHAMBER

EXISTING TANK CHAMBER

EXISTING TANK CHAMBER

EXISTING TANK CHAMBER

Note - there is an existing drainage run (sw) under the new jet wash screens, depth to be reviewed. No inverts available on drainage network.

Relocated FL

Silt trap

JET WASH

Ex Low Level Wall

Existing Air / Water Bay with existing machine

Existing drainage chamber may need relocating to suit the jet wash foundations - depth to be reviewed on site.

EXISTING ID SIGN

Existing Costa Cup

Existing kerb line

Ex Sign

Ex Low Level Wall

EXISTING ENTRY CROSSING

EXISTING CUSTOMER PARKING

Existing drainage IC

EX DP

Existing drainage IC

EX DP

Existing drainage IC

EX DP

EXISTING PUMP

EXISTING PUMP

EXISTING CONCRETE SURFACING

EXISTING CHAMBER

NO WORKS PROPOSED TO THE SITE FUEL INFRASTRUCTURE

EXISTING PUMP

EXISTING PUMP

EXISTING CONCRETE SURFACING

EXISTING MACADAM - PLANE AND NEW WEARING COURSE

EXISTING PUMP

EXISTING PUMP

EXISTING DRAINAGE IC

EXISTING CANOPY OVER FORECOURT

Existing Gully

Existing Gully

Existing Gully

Existing Gully

Ex Sign

Ex Low Level Wall

Relocated amazon locker exact location tbc on site - concrete base needed. and power.

Ex Sign

Burger King Directional Signage

New Fence Line - 2.4m high

DP

Existing Kerb line removed and pushed back

New Burger King height restrictor sign to be installed on concrete base specific by engineer.

Existing drainage IC

New Kerb Line

1500mm

Existing drainage inspection chambers

Existing Drawpits

DRIVE THRU ONLY

Dished concrete drain repaired

EXISTING CUSTOMER PARKING

BK Pre Reader

Existing Delivery access

Ex Bol

Ex Bol

Burger King pre reader board, Design to be reviewed, if ground mounted kerb line will need to be replaced, however proximity to existing electrical drawpits may cause an issue. Suggest wall mounted. Burger King to review

Chiller set off wall and existing soil and vent pipe retained and extended vertically to ensure access from high level over the new chiller for rodding.

WALK IN CHILLER / FREEZER

EXISTING BUILDING

Existing Chamber - New lid to be installed. Propose smaller lid to ensure installation of the Pret AC whilst maintaining access to chamber.

Concrete pad for AC - AC to be measured and wall mounted if clashes with inspection chamber.

Ex Bol

Ex Bol

Ex Bol

Ex Bol

Ex Bol

New gully installed to address ponding water issued within this area

Propose new fence screening to existing external chiller and freezer units - Exact extent and height to be agreed. Will require access for maintenance. And height may affect air flow.

EXISTING MACADAM - PLANE AND NEW WEARING COURSE

Ex Sign

Ex Low Level Wall

EXISTING EXIT CROSSING

NEW INFILTRATION POND

Existing storage container to be relocated to within new compound as shown.

Existing fence line to be removed and set back to allow installation of Burger King signage and to also open up the area

Allowance for 2No. new external condensing pack units to replace the existing lost during the extension works. Exact size and number to be confirmed by shopfitter.

DP

New FL

New Fence Line - 2.4m high

2000mm

Dashed line denotes line of approved compounds on Wyeth planning drawings

Double Gates to be formed with a galv steel frame and to receive Cladded to match fence. 2m wide.

New gully

Services trench for refrigeration pipework

Burger King order point

Burger King Menu Board

New B

New B

New FL

Fence to be replaced with new concrete post fence and gravel board to dress any minor issues in levels.2.5m high dropping to 1m high to match existing.

New Kerb Line

New gully

Existing Car Wash demolished

Bollard Potentially cranked - BK to review.

PROPOSED EXTENSION

Bollard to corner of building. Potentially cranked - BK to review.

EXISTING PRET WALK IN CHILLER / FREEZER

New B

7982.5mm Overall Width Extension (Brickwork Dimensions)

13682.5mm Overall Length Extension (Brickwork Dimensions)

New gully

New Kerb Line

Change in height of fence

Fence to be replaced with new concrete post fence and gravel board to dress any minor issues in levels.2.5m high dropping to 1m high to match existing.

(suggest keeping existing concrete posts if in good condition)

Ex Fl

Existing valet machines removed

Ex Sign

Ex Sign

EXISTING PUBLIC FOOTPATH

Existing 2.4m high fence line

BRIGHTON ROAD

ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE LOCAL LICENSING AUTHORITY AND ALL CURRENT APEA/IP BLUE BOOK DOCUMENTATION AND SUBSEQUENT REVISIONS

HEALTH & SAFETY
The main contractor shall ensure compliance of the works including IP Guidance for the Design Construction Modification and Maintenance of Petrol Filling Stations, IP Code of Practice for Contractors Working on Petrol Filling Stations and to the satisfaction and approval of the Licensing Authority.

During the course of the works the main contractor is to allow for maintaining the quality of the services roads / existing forecourt at all times including integrity and cleaning.

EXISTING SITE LAYOUT:
The existing site features, levels have been taken As Built drawings, produced by Wyeth Projects for extension and external works 2019. Various items have been updated following site visit. All below ground lines are shown assumed and should be surveyed prior to works commencing. Sub scan survey awaited.

Any existing borehole that are to be lost are to be reviewed by environmental consultant prior to the works. any new or additional boreholes are to be reviewed and confirmed also.
Allow for WAC, soil & ground water sampling/testing throughout the duration of the works.

SHOP
Existing shop is to be retained, fit out internally and extended as shown to form a new Burger King facility, access to the Burger King is through the existing external wall which a new opening is to be formed. For further information refer to JDL building package (see issue sheet) New drive thru lane formed and all order equipment as BK details.

BOLLARDS (DENOTED "B")
Spec and locations to be agreed with BK.

FLOODLIGHTS (FL)
Existing floodlights generally retained, new floodlights where indicated. Locations subject to a luminance review of the site.

KERBS
All kerbs to comprise of 255x125mm HB2 concrete kerbs, set in 350x150mm grade 20 concrete bed and haunching. Dropped kerbs to be installed where shown to facilitate DDA access. Kerb edgings to comprise of 150x50mm PC kerbs, in 150x150mm concrete bed and haunching.

COMPOUND
New compound formed in back land owned by MFG. fence 2.4m high to match existing all as MFG standards.

CANOPY SOFFIT.
Canopy soffit may be replaced, costs are currently being reviewed by MFG

SERVICE TRENCH
A service trench is to be installed from the new compound area to the existing shop location for the purposes of installing refrigeration pipework below ground following the relocation / potential replacement of the external condense units.. which require relocation due to the proposed extension.

The service trench is to be confirmed by engineers but propose 200mm thick concrete situ cast channel with mesh reinforcement. May need concrete margin and tying in with dowel bars, engineer to confirm.

To the top of the trench allow for casting in framework for Fibrelite service trench covers.

Trench to be laid to falls and have a Drain in the base, drain to outfall to foul

EXISTING FENCES
It is noted generally about the site boundary fencing plank tops have failed due to exposure to weather. GM to further review whether these are reduced in height to remove the decayed section and capped.

EXISTING BOLLARDS
there are 4 damaged bollards about the site. These are to be repaired / replaced as necessary.

DESIGN RISK ASSESSMENT
As an appointed designer for the project under the Construction (Design & Management) Regulations 2015 - Regulation 8 & Regulation 9, JDL have a duty to consider risk to health & safety relating to the our design & highlight any significant or unusual risks that may not be apparent to a Contractor & Principal Designer. It is assumed that the Client has employed designers & contractors who are competent & have experience working on Petrol Filling Stations.
Risks are as follows;

1. Coastal location
2. No Sub scan information
3. Site is a live petrol station and all hazardous zones are to be maintained and observed
4. Right of way - there is a historic right of way across the back land of the site the exact route of this is to be confirmed.

A	26.07.24	Drive thru lane adjusted. BK Signage updated. Existing DCD removed. AW upgraded to combi machine. Parking arrangement adjusted.	MDB

PRE-CONSTRUCTION

PROJECT
BROOKLANDS SERVCICE STATION
A259, 311 Brighton Road
Worthing, BN11 2HP

TITLE
GENERAL SITE LAYOUT

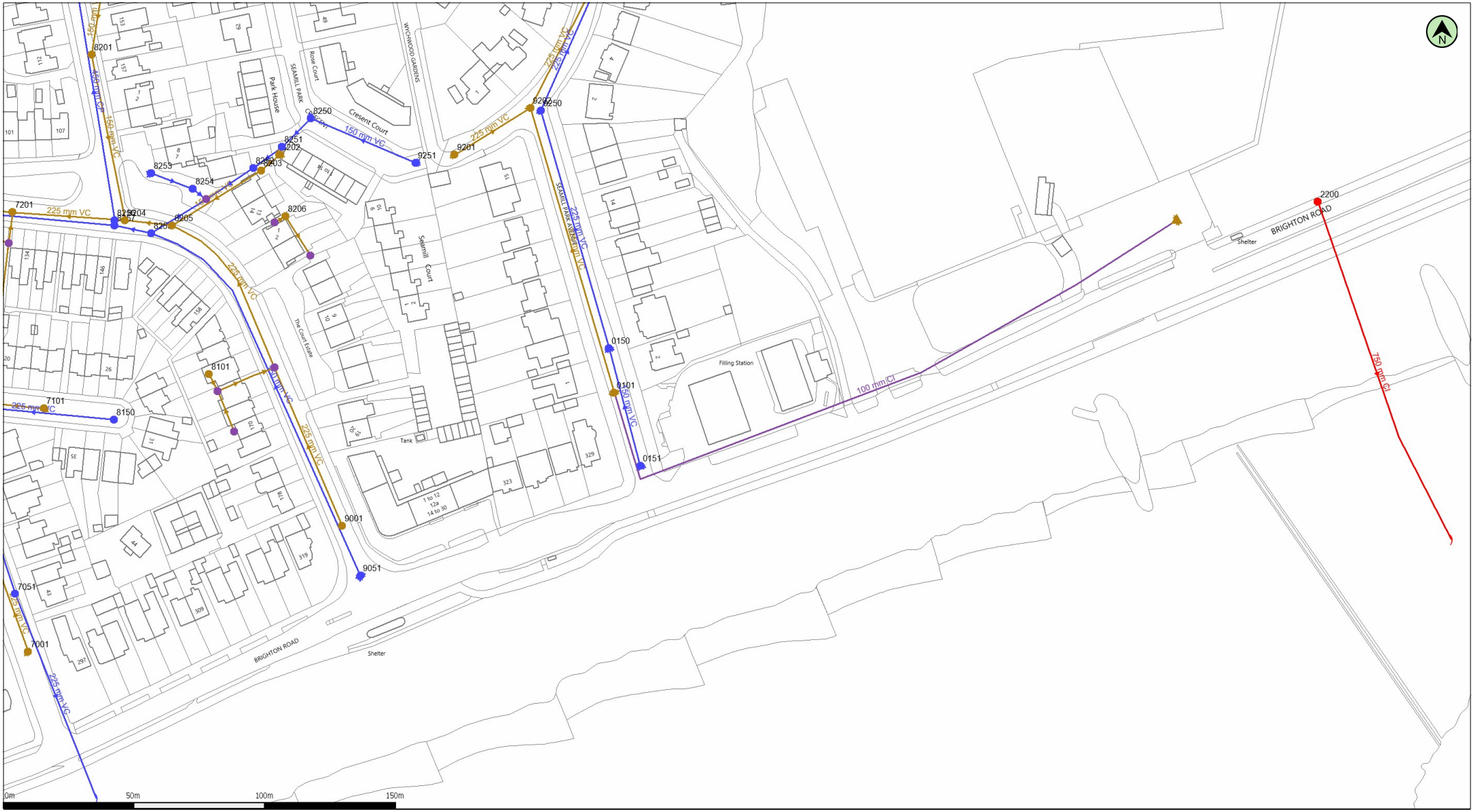
CLIENT
MFG

JENNINGS DESIGN
8 Feast Field, Horsforth, Leeds, West Yorkshire, LS18 4TJ
www.jennings-design.com 01274 395422 office@jennings-design.com

Drawn:	Check:	Scale:	Date:
MDB	JHU	1:100 @ A0	June 2024

Plot Number: 240479-01

0 5 10
SCALE - METRES - 1:100



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The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2024 Ordnance Survey 100031673 .This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

Foul Gravity Sewer
Combined Gravity Sewer
Culverted Water Course or Treated Effluent
Surface Water Gravity Sewer
Rising Main, Vacuum or Syphon
Combined Outfall
Surface Water Outfall
Foul Outfall
Surface Water Inlet
Combined Pumping Station
Surface Water Pumping Station
Foul Pumping Station
WWTW Water Treatment Works
Section 104 Area
Building Over Agreement Area
Foul Manhole
Combined Manhole
Surface Water Manhole
Side Entry Manhole, Decarcation Chamber, Dummy Manhole or Surface Water Soakaway

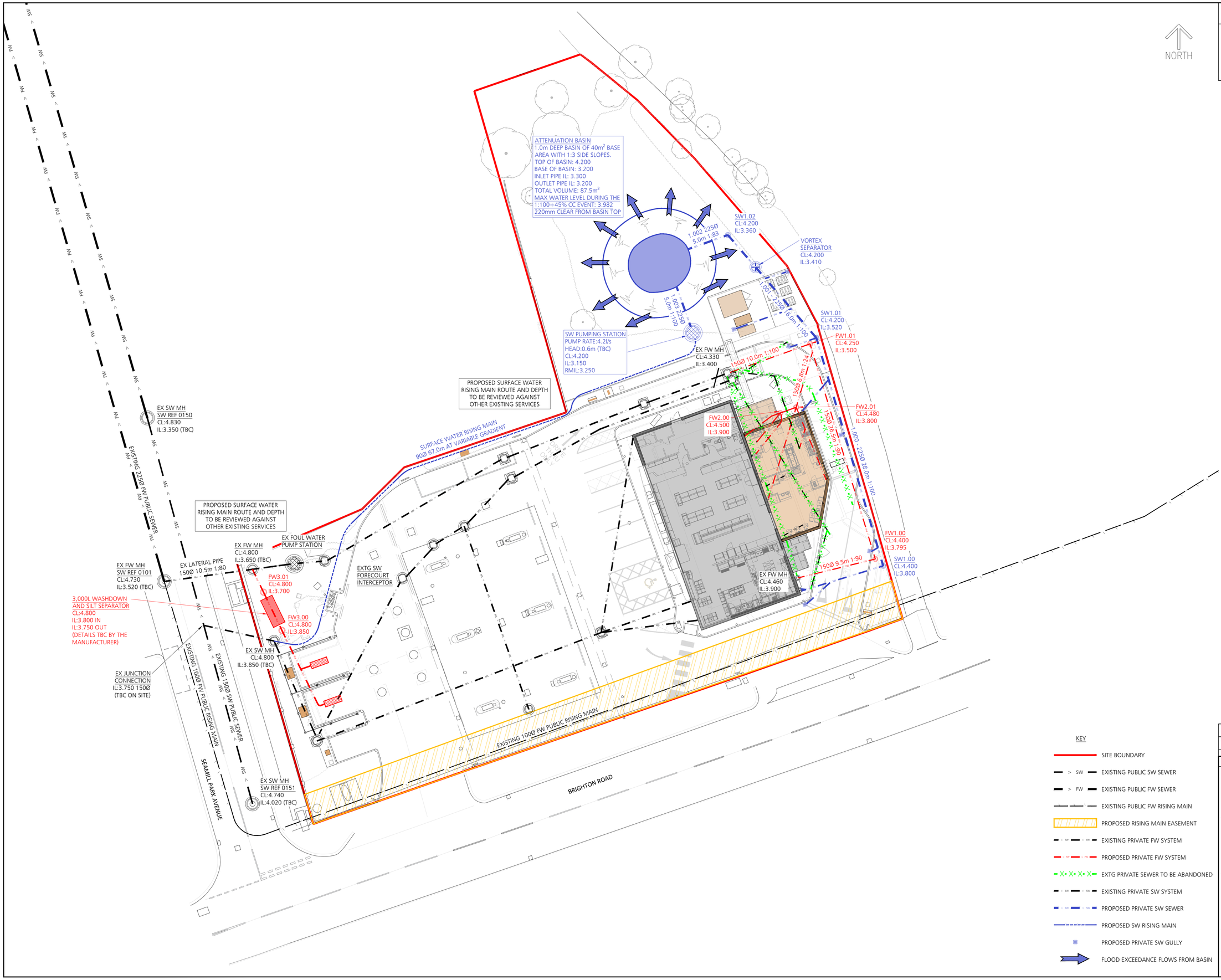
stats@utilitymaps4u.co.uk

WATER for LIFE from Southern Water

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
2200	C	4.35	0.00	
0101	F	4.88	3.52	
7001	F	5.46	4.66	
7101	F	5.66	4.39	
7201	F	7.21	3.03	
8101	F	0.00	0.00	
8201	F	6.85	0.00	
8202	F	6.40	4.31	
8203	F	6.57	4.19	
8204	F	7.09	0.00	
8205	F	6.87	3.37	
8206	F	0.00	0.00	
9001	F	5.73	0.00	
9201	F	5.31	4.45	
9202	F	5.00	2.94	
0150	S	4.83	3.35	
0151	S	4.88	4.02	
7051	S	5.30	3.75	
8150	S	5.72	0.00	
8250	S	6.08	4.52	
8251	S	6.25	4.26	
8252	S	6.56	4.13	
8253	S	6.61	5.89	
8254	S	6.49	5.29	
8255	S	6.81	3.39	
8256	S	7.11	3.02	
8257	S	0.00	0.00	
9051	S	5.53	4.12	
9250	S	4.90	3.00	
9251	S	5.80	5.00	

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert



DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

IT IS ASSUMED THAT ALL WORKS WILL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT. IN ADDITION TO THE HAZARDS TYPICALLY ASSOCIATED WITH THE TYPES OF CONSTRUCTION DETAILED ON THIS DRAWING, ANY KNOWN ABNORMAL HAZARDS SPECIFIC TO THIS SCHEME HAVE BEEN IDENTIFIED.

ABNORMAL HAZARD REFERENCE

NOTES

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE REPRODUCED IN COLOUR.
3. IF ANY DISCREPANCIES ARE FOUND IN THIS DRAWING, PLEASE REPORT TO DUDLEYS CONSULTING ENGINEERS.
4. THIS DRAWING HAS BEEN ORIENTATED TO OS BRITISH NATIONAL GRID (EPSG:27700 OSGB36). EXISTING SURVEY STATIONS ARE SHOWN ON THE TOPOGRAPHICAL SURVEY.
5. THIS DRAWING IS BASED ON THE FOLLOWING INFORMATION:
   - 5.1. 50385-01 - TOPOGRAPHICAL SURVEY BY MALCOLM HUGHES DATED OCTOBER 2017.
   - 5.2. 240479-01 - GENERAL SITE LAYOUT BY JENNINGS DESIGN DATED JUNE 2024.
   - 5.3. WASTEWATER PLAN BY SOUTHERN WATER DATED JUNE 2024.
6. ALL WORK TO BE UNDERTAKEN IN ACCORDANCE WITH THE CURRENT EDITION OF THE BUILDING REGULATIONS AND SEWERAGE SECTOR CODES OF PRACTICE.
7. ALL THE EXISTING MANHOLE INVERT LEVELS MUST BE CONFIRMED ON SITE PRIOR TO ANY DRAINAGE WORKS.
8. ALL PROPOSED MANHOLES TO BE 450mmØ PPIC WITH B125 COVER.
9. ALL PROPOSED PIPES TO BE PVC OR SIMILAR PLASTIC MATERIAL.

KEY

- SITE BOUNDARY
- EXISTING PUBLIC SW SEWER
- EXISTING PUBLIC FW SEWER
- EXISTING PUBLIC FW RISING MAIN
- PROPOSED RISING MAIN EASEMENT
- EXISTING PRIVATE FW SYSTEM
- PROPOSED PRIVATE FW SYSTEM
- EXTG PRIVATE SEWER TO BE ABANDONED
- EXISTING PRIVATE SW SYSTEM
- PROPOSED PRIVATE SW SEWER
- PROPOSED SW RISING MAIN
- PROPOSED PRIVATE SW GULLY
- FLOOD EXCEEDANCE FLOWS FROM BASIN

DATE	REVISION DESCRIPTION	BY	CHK.	REV.
13.11.24	ATTENUATION BASIN DESIGN AMENDED FLOOD EXCEEDANCE FLOWS ADDED FOR THE BASIN.	GD	SDR	P03
09.10.24	SW PUMP STATION AND RISING MAIN ADDED. SW OUTFALL AMENDED TO PUBLIC SEWER.	GD	SDR	P02
02.07.24	PRELIMINARY ISSUE	GD	SDR	P01

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info@dudleys.co.uk

PROJECT
BROOKLANDS SERVICE STATION
311 BRIGHTON ROAD
WORTHING, BN11 2HP

JOB 24230

TITLE
DRAINAGE STRATEGY

SCALE	PAPER	STATUS
1:200	A1	PRELIMINARY

DRAWING NO.
24230-DCE-XX-XX-D-C-100

REV.
P03

NORTH

EXISTING 225Ø FW PUBLIC SEWER

EXISTING 100Ø FW PUBLIC RISING MAIN

EXISTING 150Ø SW PUBLIC SEWER

EXISTING 100Ø FW PUBLIC RISING MAIN

EXISTING SHOP ROOF
300m² / 0.030ha

EXISTING EXTERNAL AREA EXCLUDING THE CAR WASH
300m² / 0.030ha

BRIGHTON ROAD

DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

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DATE	REVISION DESCRIPTION	BY	CHK.	REV.
09.10.24	PRELIMINARY ISSUE	GD	SDR	P01

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PROJECT
BROOKLANDS SERVICE STATION
311 BRIGHTON ROAD
WORTHING, BN11 2HP

JOB 24230

TITLE
EXISTING IMPERMEABLE AREAS

SCALE	PAPER	STATUS
1:200	A1	PRELIMINARY

DRAWING NO. 24230-DCE-XX-XX-D-C-102

REV. P01

NORTH



DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

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ABNORMAL HAZARD REFERENCE

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DATE	REVISION DESCRIPTION	BY	CHK.	REV.
09.10.24	MINOR UPDATES TO SUIT LATEST SITE LAYOUT	GD	SDR	P02
02.07.24	PRELIMINARY ISSUE	GD	SDR	P01

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PROJECT | JOB 24230

BROOKLANDS SERVICE STATION
311 BRIGHTON ROAD
WORTHING, BN11 2HP

TITLE

PROPOSED IMPERMEABLE AREAS

SCALE	PAPER	STATUS
1:200	A1	PRELIMINARY

DRAWING NO. 24230-DCE-XX-XX-D-C-103 | REV. P02

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	x
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
SW1.00	0.040	5.00	4.400	450	517090.809	103150.451	0.600
SW1.01	0.040	5.00	4.200	450	517082.934	103177.321	0.680
SW1.02	0.003	5.00	4.200	450	517072.496	103189.447	0.840
BASIN			4.200		517065.250	103186.858	1.000
PUMP MH			4.200	1500	517068.373	103177.935	1.050

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	SW1.00	SW1.01	28.000	0.600	3.800	3.520	0.280	100.0	225	5.36	50.0
1.001	SW1.01	SW1.02	16.000	0.600	3.520	3.360	0.160	100.0	225	5.56	49.9
1.002	SW1.02	BASIN	5.000	0.600	3.360	3.300	0.060	83.3	225	5.62	49.7
1.003	BASIN	PUMP MH	5.000	0.600	3.200	3.150	0.050	100.0	225	5.68	48.9

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.307	52.0	7.2	0.375	0.455	0.040	0.0	57	0.928
1.001	1.307	52.0	14.4	0.455	0.615	0.080	0.0	80	1.119
1.002	1.433	57.0	14.9	0.615	0.675	0.083	0.0	79	1.214
1.003	1.307	52.0	14.7	0.775	0.825	0.083	0.0	81	1.125

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	28.000	100.0	225	Circular	4.400	3.800	0.375	4.200	3.520	0.455
1.001	16.000	100.0	225	Circular	4.200	3.520	0.455	4.200	3.360	0.615
1.002	5.000	83.3	225	Circular	4.200	3.360	0.615	4.200	3.300	0.675
1.003	5.000	100.0	225	Circular	4.200	3.200	0.775	4.200	3.150	0.825

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW1.00	450	Manhole	Adoptable	SW1.01	450	Manhole	Adoptable
1.001	SW1.01	450	Manhole	Adoptable	SW1.02	450	Manhole	Adoptable
1.002	SW1.02	450	Manhole	Adoptable	BASIN		Junction	
1.003	BASIN		Junction		PUMP MH	1500	Manhole	Adoptable

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Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW1.00	4.400	0.600	450				
				0	1.000	3.800	225
SW1.01	4.200	0.680	450	1	1.000	3.520	225
							
				0	1.001	3.520	225
SW1.02	4.200	0.840	450	1	1.001	3.360	225
							
				0	1.002	3.360	225
BASIN	4.200	1.000		1	1.002	3.300	225
							
				0	1.003	3.200	225
PUMP MH	4.200	1.050	1500	 1	1.003	3.150	225

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	1.000	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	1.000	Drain Down Time (mins)	720	Check Discharge Volume	x

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
30	40	0	0
100	0	0	0
100	45	0	0

Node PUMP MH Online Pump Control

Flap Valve	x	Design Depth (m)	1.000	Switch off depth (m)	0.250
Replaces Downstream Link	✓	Design Flow (l/s)	4.2		
Invert Level (m)	3.150	Switch on depth (m)	0.750		

Depth (m)	Flow (l/s)
1.000	4.200

Node BASIN Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	3.200
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	296

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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	40.0	0.0	1.000	135.0	0.0

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Results for 2 year Critical Storm Duration. Lowest mass balance: 97.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1.00	10	3.857	0.057	7.4	0.0090	0.0000	OK
1440 minute summer	SW1.01	1800	3.691	0.171	1.4	0.0272	0.0000	OK
1440 minute summer	SW1.02	1800	3.691	0.331	1.5	0.0526	0.0000	SURCHARGED
1440 minute summer	BASIN	1770	3.691	0.491	3.8	31.0948	0.0000	SURCHARGED
1440 minute summer	PUMP MH	1980	3.691	0.541	0.1	0.9561	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1.00	1.000	SW1.01	7.3	0.682	0.140	0.3021	
1440 minute summer	SW1.01	1.001	SW1.02	1.4	0.465	0.027	0.5775	
1440 minute summer	SW1.02	1.002	BASIN	3.8	0.337	0.066	0.1989	
1440 minute summer	BASIN	1.003	PUMP MH	0.1	0.081	0.002	0.1989	
1440 minute summer	PUMP MH	Pump		0.0				0.0

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Results for 30 year Critical Storm Duration. Lowest mass balance: 97.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	SW1.00	885	3.899	0.099	1.2	0.0158	0.0000	OK
960 minute winter	SW1.01	885	3.899	0.379	2.4	0.0603	0.0000	SURCHARGED
960 minute summer	SW1.02	870	3.899	0.539	3.5	0.0857	0.0000	SURCHARGED
960 minute summer	BASIN	870	3.899	0.699	5.3	51.1343	0.0000	SURCHARGED
960 minute winter	PUMP MH	885	3.899	0.749	3.0	1.3237	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
960 minute winter	SW1.00	1.000	SW1.01	1.2	0.409	0.023	0.7925	
960 minute winter	SW1.01	1.001	SW1.02	2.3	0.553	0.043	0.6363	
960 minute summer	SW1.02	1.002	BASIN	5.3	0.460	0.093	0.1989	
960 minute summer	BASIN	1.003	PUMP MH	3.1	0.207	0.059	0.1989	
960 minute winter	PUMP MH	Pump		3.1				47.8

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Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 97.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1.00	10	3.916	0.116	27.9	0.0184	0.0000	OK
360 minute winter	SW1.01	248	3.904	0.384	7.8	0.0611	0.0000	FLOOD RISK
360 minute winter	SW1.02	256	3.903	0.543	8.8	0.0864	0.0000	FLOOD RISK
360 minute winter	BASIN	256	3.903	0.703	7.6	51.6216	0.0000	FLOOD RISK
360 minute winter	PUMP MH	240	3.905	0.755	3.2	1.3341	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1.00	1.000	SW1.01	27.7	0.880	0.533	0.8451	
360 minute winter	SW1.01	1.001	SW1.02	7.4	0.708	0.142	0.6363	
360 minute winter	SW1.02	1.002	BASIN	7.6	0.654	0.133	0.1989	
360 minute winter	BASIN	1.003	PUMP MH	3.2	0.176	0.061	0.1989	
360 minute winter	PUMP MH	Pump		3.2				59.1

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Results for 100 year Critical Storm Duration. Lowest mass balance: 97.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1.00	10	3.909	0.109	25.2	0.0173	0.0000	OK
360 minute winter	SW1.01	288	3.900	0.380	6.8	0.0605	0.0000	FLOOD RISK
360 minute winter	SW1.02	288	3.900	0.540	6.7	0.0858	0.0000	SURCHARGED
360 minute winter	BASIN	288	3.900	0.700	9.6	51.2462	0.0000	SURCHARGED
360 minute winter	PUMP MH	288	3.902	0.752	4.9	1.3285	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1.00	1.000	SW1.01	25.0	0.875	0.481	0.7883	
360 minute winter	SW1.01	1.001	SW1.02	6.4	0.724	0.122	0.6363	
360 minute winter	SW1.02	1.002	BASIN	9.6	0.654	0.169	0.1989	
360 minute winter	BASIN	1.003	PUMP MH	4.9	0.172	0.094	0.1989	
360 minute winter	PUMP MH	Pump		3.2				50.4

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 97.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1.00	11	4.206	0.406	36.5	0.0645	0.0000	FLOOD RISK
15 minute summer	SW1.01	11	4.050	0.530	70.3	0.0843	0.0000	FLOOD RISK
360 minute winter	SW1.02	256	3.983	0.623	10.1	0.0990	0.0000	FLOOD RISK
360 minute winter	BASIN	256	3.982	0.782	11.5	60.3839	0.0000	FLOOD RISK
360 minute winter	PUMP MH	256	3.982	0.832	3.5	1.4704	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1.00	1.000	SW1.01	35.4	0.905	0.681	1.1136	
15 minute summer	SW1.01	1.001	SW1.02	70.7	1.777	1.360	0.6363	
360 minute winter	SW1.02	1.002	BASIN	11.5	0.657	0.203	0.1989	
360 minute winter	BASIN	1.003	PUMP MH	3.5	0.275	0.067	0.1989	
360 minute winter	PUMP MH	Pump		3.5				78.0

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STORMWATER TREATMENT

SDS
Water Infrastructure Systems

SDS Aqua-Swirl™

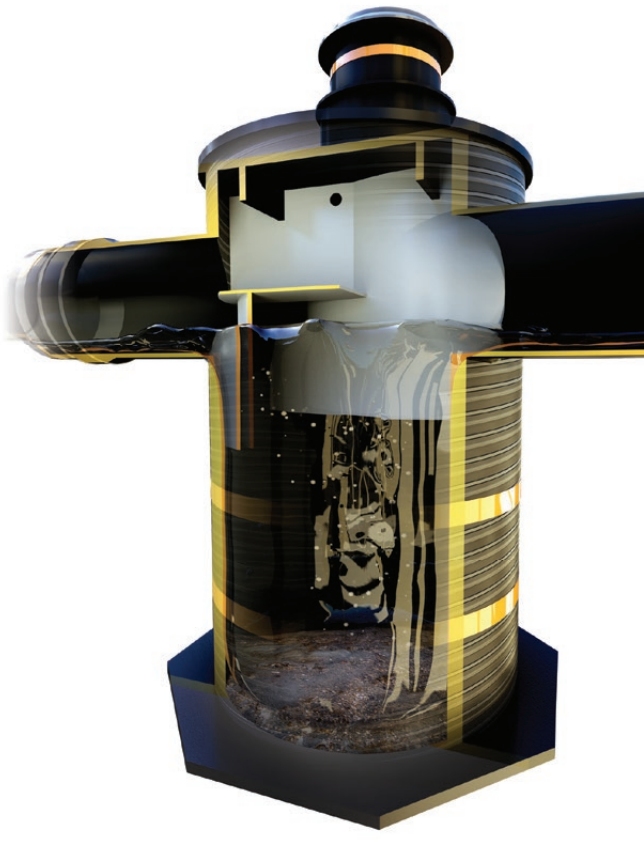
Hydrodynamic Vortex Separator

SDS Aqua-Swirl™ is a custom engineered, flow through water quality device that utilises hydrodynamic separation technology to maximise the removal of sediment, debris and free floating oil within surface water runoff.

SYMBiotIC™

When connected to a SDS SYMBiotIC™ system, SDS Aqua-Swirl™ provides real time data on a broad range of key operating factors such as pollutant loads and silt capture level.

- *BBA HAPAS approved*
- *HDPE plastic construction*
- *No moving parts*
- *Sealed baffle*
- *Large debris storage chamber*
- *Lifting supports*
- *Compact dimensions*
- *Available in 9 different sizes*
- *Bespoke sizing available*



SDS Aqua-Swirl™ is sized according to water quality treatment flow rates which are based on the initial movement of pollutants into the storm drainage system. This flow rate typically represents approximately 90% to 95% of the total pollutants in the runoff volume.

The treatment flow rate of the SDS Aqua-Swirl™ system is engineered to meet or exceed the local water quality treatment criteria and form an intrinsic part of the SuDS solution train.

SDS Ltd, Clearwater House, Castlemills, Biddisham, Somerset, BS26 2RE

T: +44 (0)1934 751303
E: info@sdslimited.com

Features	Benefits
Available with performance monitoring via SDS SYMBiotIC™.	Provides bespoke suite of operating data, such as silt levels and pollutants, viewable via a secure web portal dashboard with live notifications via email and text.
BBA HAPAS certified.	Approved for installation under roads and pavements; adoptable by the Highways Agency.
Manufactured from HDPE high strength plastic Weholite.	Offers a durable, light weight and low cost alternative to concrete. Easy and quick to install resulting in substantial cost savings.
Specialised sealed baffle.	Delivers the most effective performance of any vortex separator.
Internal bypass with pollution retention.	Able to treat localised rain and larger storm events while retaining captured pollutants.
NJDEP verified performance.	Verification accepted by UK Government environmental regulators (as cited in the CIRIA C753 SuDS Manual).
Single swirl chamber.	Simplifies inspection and maintenance facilities with no special equipment required.
Compact dimensions.	Reduces ground excavation and product installation costs.
Small footprint design.	Can be retro-fitted with minimal disruption to existing infrastructure utilities or surface features, extending the ability to meet new regulations.
Certified installation lifting supports.	Easy installation without the need for large, expensive cranes.
Suitable for use during site construction programme.	Can be put into operation prior to completion of the site build, with the inclusion of a planned maintenance schedule.
Available in 9 different standard sizes and also bespoke.	Provides greater design flexibility and assists the removal of sediments at a greater rate than comparable systems.

SPECIFICATIONS

SDS Aqua-Swirl™ Model No.	Maximum ID pipe connection (mm) BYP[1]	Chamber Internal Diameter (mm)	Water Quality Treatment Flow Rate NJDEP (l/s) Fine	Water Quality Treatment Flow Rate (l/s) OK110 Coarse	Oil/debris storage capacity litres	Sediment storage capacity m^3	Aqua-Swirl™ Weight kg
AS-2	375	750	16	30	136	0.3	300
AS-3	500	1050	31	53	416	0.6	700
AS-4	600	1200	40	77	644	0.8	1000
AS-5	750	1500	63	120	1382	1.3	1100
AS-6	900	1800	91	173	1439	1.8	1400
AS-7	1050	2100	123	235	1987	2.5	1700
AS-8	1200	2400	161	307	2612	3.3	2200
AS-9	1350	2800	220	418	3596	4.4	2600
AS-10	1500	3000	252	480	4164	5.1	3100

[1]BYP (Internal Bypass) provides full treatment of the first flush of water while the peak design storm is diverted and channelled through the main conveyance pipe.

Notes:
Details of pollution mitigation indices, head loss and CAD details, standard drawings and Installation Guides available upon request.
The sediment storage capacity has been calculated in accordance with the relevant test protocol and is not a physical maximum; any additional sediment capacity required is achieved with bespoke deeper units.
For assistance in design and specific sizing using historical rainfall data, please contact SDS.

A-S DS/0819

SDS Ltd, Clearwater House, Castlemills, Biddisham, Somerset, BS26 2RE
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SDS Limited mitigation indices for stormwater treatment devices November 2018

The pollution mitigation indices are as follows:

Device	Total suspended solids mitigation index	Total metals mitigation index	Soluble metals mitigation index[1]	Hydrocarbons[3]
Aqua-swirl™ vortex grit separator	0.8 (0.5 on trunk roads and motorways where the suspended solids level is very high)	0.5[4]	The Aquaswirl™ is not designed to remove soluble pollutants	0.7[3]
Aqua-filter™ stormwater filtration unit	0.8	0.8	0.6	0.7[3]
Aqua-swirl™ and Aqua-filter™ in sequence	1.2[2]	0.9	0.6	1.0[2,3]
Aqua-Xchange™	0.8 when installed as a layer in a filter drain	0.9	1.0	0.6 when installed as a layer in a filter drain

These indices can only be assumed when the treatment device is properly sized for the anticipated rate of runoff and the level of pollution in the runoff is not unusually high.

[1] When drainage schemes are designed for road developments in accordance with the Design Manual for Roads and Bridges, the mitigation index for soluble metals is required because particulate metals are considered separately in the total suspended solids assessment

[2] When designing in accordance with the SuDS Manual (Ciria C753), when two devices are used in sequence to target the same pollutant, half of the mitigation index of the second component should be allowed in the calculation.

[3] The test procedures applied to manufactured treatment devices do not include measurement of hydrocarbon removal. Therefore, we have estimated that the Aqua-swirl™ removes free-phase hydrocarbons by flotation, and also removes hydrocarbons that are adhered to suspended solids. However, hydrocarbons are known to preferentially adhere to the smaller particles so the Aqua-filter™ will also remove a high proportion of those hydrocarbons as it is more effective at removing smaller suspended particles.

[4] Where metals are present in the runoff in particulate form, particularly from vehicle emissions, the Aqua-swirl™ will effectively remove those particles in admixture with other suspended solids.

3 October 2024

Motor Fuel Group Ltd
10 Bricket Road
St Albans
Hertfordshire
AL1 3JX

SLR Project No.: 409.010156.00001

RE: Brooklands Service Station – Trial Pit Soakage Testing

1.0 Introduction

In September 2024 SLR Consulting Ltd (SLR) was commissioned by Motor Fuel Group Ltd (MFG) to undertake infiltration testing to support redevelopment at Brooklands Service Station, 331 Brighton Road, Worthing, BN11 2HP (the site).

The proposed redevelopment of the petrol filling station (PFS) requires modification of the site's current drainage system. The proposed modifications involve the construction of an infiltration basin in an area of undeveloped land to the immediate northeast of the PFS. A proposed development plan is shown on Drawing 01, attached as Appendix A.

The purpose of this technical note is to present the findings of the initial infiltration testing to ascertain whether the soils in this area of the site are conducive to the disposal of water via the planned method.

2.0 Geology

SLR excavated three trial pits (TP101 to TP103) to depths of between 3.0m and 3.3m bgl across the site. TP101 was initially advanced within the boundary of the proposed infiltration basin however due to significant deposits of Made Ground the further two trial pits were excavated at other locations across the site. The trial pit locations are shown on Drawing 01, attached as Appendix A.

The ground conditions encountered generally comprised four distinct deposits as summarised below. Logs of the trial pits are attached as Appendix B.

Topsoil

At the grounds surface to a maximum depth of 0.10m bgl a topsoil layer was encountered in all trial pits, comprising of dark brown clayey gravelly sand with frequent rootlets.

Made Ground

Made Ground was encountered in all three of the trial pits to a maximum depth of 3.05m bgl (TP101). The Made Ground generally comprised of brown/dark brown slightly clayey gravelly sand with frequent inclusions of anthropogenic material such as brick, concrete, asphalt, metal, plastic and glass. A suspected fragment of asbestos cement sheeting was identified within the Made Ground in TP103 at a depth of 2.1m bgl.

Clay

In TP101 and TP102 brownish grey sandy gravelly clay was encountered from 2.40m bgl to a maximum depth of 3.30m bgl.

Storm Beach Deposits

In TP102 and TP103 yellowish brown sandy gravel was encountered from a depth of 2.45m bgl to maximum depth of 3.30m bgl.

Groundwater

SLR has previously carried out groundwater monitoring at the PFS. Groundwater levels within the monitoring wells on the PFS are recorded as between 2.95m and 3.61m bgl and found to be resting within the superficial deposits. No groundwater was encountered in the trial pits during the investigation, the area in which the trial pits were excavated is at a slightly higher elevation than the PFS. Due to the proximity of the sea the groundwater level is influenced by the tide. SLR has previously assessed the tides influence on the groundwater by installing level loggers in the monitoring wells, the analysis found the groundwater level fluctuated by approximately 0.5m with a 2-hour lag time[1].

3.0 Soakage testing

Water cannot be discharged into Made Ground, therefore natural soils are required for carrying out soakage testing. TP102 was found to have the thickest deposits of natural soils and therefore the soakage test was carried out within this trial pit. TP101 and TP103 were not found to have sufficient deposits of natural soils and therefore soakage tests were not carried out.

A single soakage test was carried out in TP102. The test was carried out in general accordance with best practice guidance as set out in BRE Digest 365. Once the trial pit was excavated it was rapidly filled with water to the top of the natural strata and allowed to drain while the depth to water from ground level was measured at regular intervals.

4.0 Infiltration Test Results

The result of the soakage test is attached as Appendix C. BRE 365 stipulates that an infiltration rate can be established from the time taken for the volume of water to drop from 75% volume to 25% and ideally this would be repeated three times. Due to the nature of the geology encountered the water did not drain to 75% capacity of the initial volume of water added, therefore only one “fill” was carried out rather than the three outlined in the guidance.

As the drop from 75% volume to 25% was not achieved in this instance, BRE 365 would define this as a failed test. In some instances, it is possible to extrapolate the data collected in the field to produce approximate infiltration rates. This approach is not recommended by BRE 365, and in this instance even if extrapolated the calculated infiltration rate would be lower than the cut-off rate of 10^{-6}m/s outlined in the SuDS Manual[2]. The soakage test result shows that the ground conditions are unlikely to be favourable for shallow soakaways due to the limited infiltration rates and the encountered depths of Made Ground. In light of these findings, it may be necessary to consider an alternative drainage strategy for the proposed development.

We trust our findings meet with your requirements and that you will not hesitate to contact us with any further questions or queries.

Regards,

SLR Consulting Limited

[1] 230717_427.009935.00001_Brooklands_DQRA
[2] CIRIA, C753: The SuDS Manual, 2015



Dominic Goodchild-James, MCIWEM
Associate Consultant

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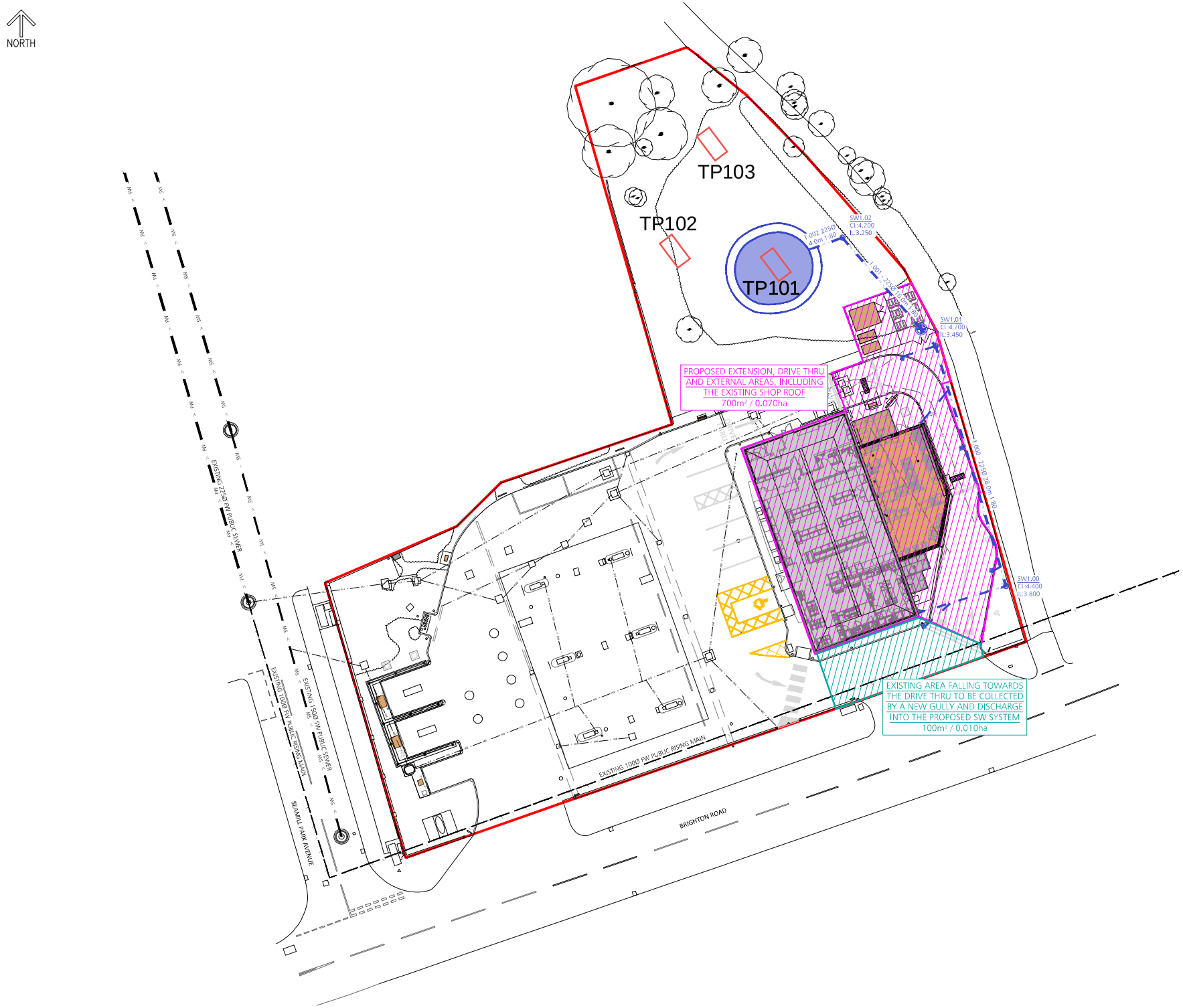
Mobile 07816 332000
dgoodchild-james@slrconsulting.com

Appendix A Drawings

Brooklands Service Station – Trial Pit Soakage Testing

SLR Project No.: 409.010156.00001

3 October 2024



DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

IT IS ASSUMED THAT ALL WORKS WILL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT. IN ADDITION TO THE HAZARDS TYPICALLY ASSOCIATED WITH THE TYPES OF CONSTRUCTION DETAILED ON THIS DRAWING, ANY KNOWN ABNORMAL HAZARDS SPECIFIC TO THIS SCHEME HAVE BEEN IDENTIFIED.

ABNORMAL HAZARD REFERENCE

NOTES

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE REPRODUCED IN COLOUR.
3. IF ANY DISCREPANCIES ARE FOUND IN THIS DRAWING, PLEASE REPORT TO DUDLEYS CONSULTING ENGINEERS.
4. THIS DRAWING HAS BEEN ORIENTATED TO OS BRITISH NATIONAL GRID (EPSG:27700 OSGB36). EXISTING SURVEY STATIONS ARE SHOWN ON THE TOPOGRAPHICAL SURVEY.
5. THIS DRAWING IS BASED ON THE FOLLOWING INFORMATION:
   5.1. 50385-01 - TOPOGRAPHICAL SURVEY BY MALCOLM HUGHES DATED OCTOBER 2017.
   5.2. 240479-01 - GENERAL SITE LAYOUT BY JENNINGS DESIGN DATED JUNE 2024.
   5.3. WASTEWATER PLAN BY SOUTHERN WATER DATED JUNE 2024.
6. ALL WORK TO BE UNDERTAKEN IN ACCORDANCE WITH THE CURRENT EDITION OF THE BUILDING REGULATIONS AND SEWERAGE SECTOR CODES OF PRACTICE.

DATE	REVISION DESCRIPTION	BY	CHK.	REV.
02.07.24	PRELIMINARY ISSUE	GD	SDR	P01

DUDLEYS CONSULTING ENGINEERS
Tithe House
35 Town Street
Leeds, LS18 5JJ
0113 258 3611
info@dudleys.co.uk

PROJECT: BROOKLANDS SERVICE STATION
311 BRIGHTON ROAD
WORTHING, BN11 2HP

JOB: 24230

TITLE: PROPOSED IMPERMEABLE AREAS

SCALE	PAPER	STATUS
1:200	A1	PRELIMINARY

DRAWING NO.: 24230-DCE-XX-XX-D-C-103

REV.: P01

Appendix B Trial Pit Logs

Brooklands Service Station – Trial Pit Soakage Testing

SLR Project No.: 409.010156.00001

3 October 2024

TRIAL PIT LOG

TRIAL PIT No **TP101**

Client: **MFG Ltd**

Project: **Brooklands PFS Soakage Testing**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
409.010156.00001	18/09/2024			1 of 1

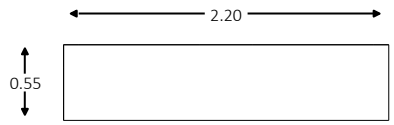
SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
							(0.10) 0.10	Dark brown slightly clayey slightly gravelly sand with frequent rootlets. Sand is fine to medium. Gravel is subangular to rounded, fine to coarse flint.	
							(0.10) 0.20	TOPSOIL	
								Brown slightly clayey slightly gravelly sand. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of flint, chalk and brick. MADE GROUND	
							(1.00)	Brown slightly clayey slightly gravelly sand. Sand is fine to medium. Gravel is angular to subrounded fine to coarse of flint, concrete, chalk and brick. Occasional cobbles of brick and concrete. MADE GROUND	
1							1.20		
1.40								Dark brown gravelly sand. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of flint, concrete, chalk, brick, slate and asphalt. Occasional rope and metal. Occasional cobbles of brick and concrete. MADE GROUND	
2							(1.40)		
							2.60		
							(0.35)	Soft light yellowish brown slightly gravelly sandy clay. Sand is fine to medium. Gravel is subangular to subrounded, fine to coarse of flint, brick and concrete. MADE GROUND	
							2.95		
3							(0.10) 3.05	Dark brown slightly gravelly sand. Sand is fine to medium. Gravel is subangular to subrounded, fine to coarse of flint, concrete, brick and chalk. Frequent glass, metal and slate. Frequent cobbles of brick and concrete. MADE GROUND	
							3.10		
							(0.20)	Firm brownish grey sandy CLAY. Sand is fine to medium.	
							3.30	Soft brownish grey sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse of flint.	
								Trial Pit Complete at 3.30m	

GENERAL REMARKS:

Excavation backfilled with arisings.

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
J = Jar Sample
D = Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor: Woodmancote Contractors Ltd	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:25	Plant: JCB 3CX		DC	

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

TRIAL PIT LOG

TRIAL PIT No
TP102

Client:
MFG Ltd

Project:
Brooklands PFS Soakage Testing

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
409.010156.00001	18/09/2024			1 of 1

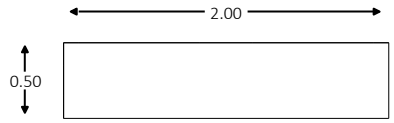
SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							(0.10) 0.10	Dark brown slightly clayey slightly gravelly sand with frequent rootlets. Sand is fine to medium. Gravel is subangular to rounded, fine to coarse flint. TOPSOIL	
0.50							(1.20)	Brown slightly clayey slightly gravelly sand. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of flint, chalk, asphalt and brick. Frequent cobbles of brick and concrete. MADE GROUND	
1							1.30		
							(1.10)	Light yellowish brown gravelly sand. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of flint, brick and concrete. Frequent cobbles of brick and concrete. MADE GROUND *1.30 - 1.50 Black staining.*	
2							2.40		
							2.45	Firm brownish grey gravelly sandy CLAY. Sand is fine to medium. Gravel is angular to subrounded, fine to coarse of flint.	
							(0.85)	Yellowish brown very sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to rounded, fine to coarse of flint. STORM BEACH DEPOSITS	
3							3.30		
								Trial Pit Complete at 3.30m	

GENERAL REMARKS:

Excavation backfilled with arisings. Soakage test carried out in trial pit.

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
J = Jar Sample
D = Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor: Woodmancote Contractors Ltd	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:25	Plant: JCB 3CX		DC	

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

TRIAL PIT LOG

TRIAL PIT No
TP103

Client:
MFG Ltd

Project:
Brooklands PFS Soakage Testing

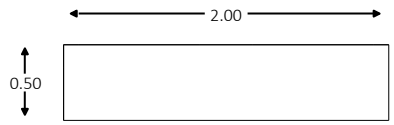
Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
409.010156.00001	18/09/2024			1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							(0.10) 0.10	Dark brown slightly gravelly, slightly clayey sand. Sand is fine to medium. Gravel is subangular to subrounded, fine to coarse of flint. TOPSOIL	
							(0.80) 0.90	Brown slightly gravelly slightly clayey sand. Sand is fine to medium. Gravel is subrounded, fine to medium of flint, chalk, concrete and brick. Occasional cobbles of brick and concrete. MADE GROUND	
1.00	1						(1.30) 2.20	Brown gravelly sand. Sand is fine to medium. Gravel is angular to subangular, fine to coarse of flint, chalk, brick, conrete and slate. Frequent cobbles of brick and concrete. Frequent metal, glass and plastic. MADE GROUND	
2								*2.10 Asbestos cement sheeting.*	
							(0.60) 2.80	Dark brown clayey gravelly sand. Sand is fine to medium. Gravel is angular to subrounded, fine to coarse of flint, brick, concrete and slate. Frequent cobbles of brick and concrete. Frequent metal and glass. MADE GROUND	
3							(0.20) 3.00	Light yellowish brown clayey, sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to rounded, fine to coarse of flint. STORM BEACH DEPOSITS	
								Trial Pit Complete at 3.00m	

GENERAL REMARKS:
Excavation backfilled with arisings.

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
J = Jar Sample
D = Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:
Stability:

All dimensions in metres Scale 1:25	Contractor: Woodmancote Contractors Ltd Plant: JCB 3CX	Method: Trial pit/trench	Logged By: DC	Approved By:

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

Appendix C Infiltration Rate Data

Brooklands Service Station – Trial Pit Soakage Testing

SLR Project No.: 409.010156.00001

3 October 2024

SOP FORM 3.3.3 - SOIL INFILTRATION RATE TEST

(See B.R.E. Digest 365, 1991, Soakaway Design.)

Project:	MFG Brooklands Service Station (FS609)
Project No.:	427.009935.00001
Date of Test:	18/09/2024

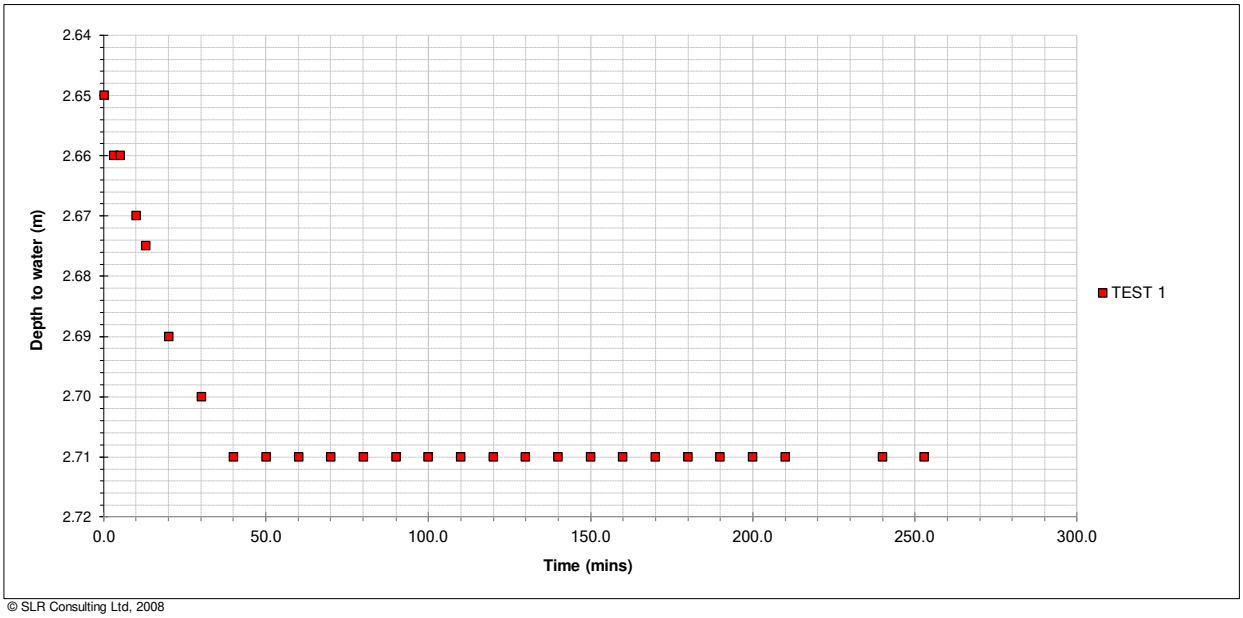
Trial Pit No.:	TP2	
TP Length:	2.00	m
TP Width:	0.50	m
TP Depth:	3.30	m
Groundwater Level:	Dry	mbgl

Remarks -
See logs. Made Ground encountered to 2.4m bgl.
Test carried out in natural soils, filled to 2.65m bgl.

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.0	2.65				
3.0	2.66				
5.0	2.66				
10.0	2.67				
13.0	2.68				
20.0	2.69				
30.0	2.70				
40.0	2.71				
50.00	2.71				
60.0	2.71				
70.0	2.71				
80.0	2.71				
90.0	2.71				
100.0	2.71				
110.0	2.71				
120.0	2.71				
130.0	2.71				
140.0	2.71				
150.0	2.71				
160.0	2.71				
170.0	2.71				
180.0	2.71				
190.0	2.71				
200.0	2.71				
210.0	2.71				
240.0	2.71				
253.0	2.71				

Effective Storage Depth	m	0.65		
75% Effective Storage Depth	m	0.49		
(i.e. depth below GL)	m	2.81		
25% Effective Storage Depth	m	0.16		
(i.e. depth below GL)	m	3.14		
Effective Storage Depth 75%-25%	m	0.33		
Time to fall to 75% effective depth	mins	Not reached - FAIL		
Time to fall to 25% effective depth	mins	Not reached - FAIL		
V (75%-25%)	m3	0.33		
a (50%)	m2	2.63		
t (75%-25%)	mins	Not reached - FAIL		
SOIL INFILTRATION RATE	m/s	Not reached - FAIL		

DESIGN SOIL INFILTRATION RATE, f Not reached - FAIL



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