

TORSION HINCKLEY

DRAINAGE STRATEGY AND CALCULATIONS



CLIENT:	Torsion Care
ARCHITECT:	G4 Architects
SITE ADDRESS:	Former Leisure Centre Site,
REFERENCE (REV):	25202-DCE-XX-XX-T-C-001-P01
DATE:	10/02/2026

AUTHOR:	Seb Reid	DATE:	10/02/2026
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REVISION	DATE	AUTHOR	CHECKER	COMMENTS
P01	10/02/2026	Seb Reid	Rob Thompson	Initial Issue

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EXISTING SITE

The existing site is a brownfield site which housed a former leisure centre which has since been demolished and the site remediated. The site has approval under planning applications 18-01237-FUL for a care home, apartment block and several privately owned dwellings. The subject of this drainage strategy is the care home which is approved under planning application 25/00354/FUL. The remainder of the site is to be covered in other drainage designs.

Under this planning application, the site is bound to discharge planning conditions 23 to 25 which require the surface water drainage scheme to be approved the LLFA with ongoing maintenance and temporary surface water management, prior to any development occurring on site. This document is written to discharge these conditions, and to also meet the client and BREEAM requirements.

Confirmation from the LLFA has been established that under the 18/01237/FUL Planning Permission, Condition discharge of condition 17 regarding drainage was achieved by the previous design team, Millward Consulting Engineers. Their approved drainage drawing is MA11495-200 Rev C, and this is included in the appendices to this document. The previous consultant also produced a Flood Risk Assessment for the development MA12204-FRA-R01, and this document is relied upon to inform the flood risk issues on the site.

Under this permission, the site has permission to discharge surface water at a rate of 50% better than the existing runoff rate.

The remediated site has a reasonable fall from the northwest to the southeast from 117m AOD to 111.5m AOD.

The existing site has existing flowing and operational drainage connections. There is an existing surface water sewer to the west within Marchant Road. There is a smaller surface water drain located on the eastern site boundary with three manholes within the site boundary, all linked and proved by CCTV survey. This 150mm drain has an unknown discharge point and is currently dry.

There is an existing combined drain which carried foul from the leisure centre and this runs along the western boundary with Marchant Road, along the southern boundary and connects to an existing manhole at the far southern boundary of the site, which is the approved drainage connection to the Severn Trent Water sewer.

The existing site, as agreed in the 18/01237/FUL application, is 100% impermeable and has an area of 9,190m². Assuming 50mm rainfall and 140l/s/ha, the existing runoff from the site is 130l/s. This needs to be reduced by a minimum of 50% to 64.8l/s. The care home is a small parcel within this development and 25.3l/s is the agreed upon discharge rate.

PROPOSED DEVELOPMENT

The proposals are shown on plan 260120 G40003 A003 Proposed Site Ground Floor Plan REV I, which is appended to this document.

The proposed development is for a new 72-bedroom, three-storey care home with associated car parking and landscaping and access road.

The total site area is 4,725m² of which 2,445m² is impermeable (65% impermeable) and the remaining is permeable falling away from the proposed building and towards trees and landscaped areas.

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 Sector Guidance – Codes for Adoption
- National Standards for Sustainable Drainage Systems – July 2025



SURFACE WATER DRAINAGE HEIRARCHY

Re-use of Surface Water In-Situ

While re-use of water on site has been considered, the use of rainwater harvesting has been discounted due to a limited use of the water within the scheme.

Irrigation is not being provided from the SW drainage system to the landscaped areas and it is expected that these areas will be watered from the mains or from informal rainwater harvesting which may be implemented at the operational phase.

The site is also a secure site and gardening facilities are not being offered to residents and there is no use for water by use of residents.

Reduction of Runoff

Green roofs are not proposed as the building roof is to be used for solar generation and other uses.

Due to the site having a raised plateau around 70% or more of the building, and access around the perimeter being constrained, additional measures such as SUDS planters on rainwater downpipes, are not proposed as there is limited scope for access and ongoing maintenance.

Infiltration

A full phase 1 and 2 SI has been undertaken and BRE365 soakaway tests undertaken at multiple locations by the contractor a summary of which is included at the rear of this document. Soakaway Tests were submitted to the planning authority as they were a pre-development condition, 26. This has been accepted.

The findings of the soakaway tests were summarised in 25202-260123 Torsion Hinckley Soakaway Testing Letter which is summarised below.

The trial pits were undertaken at the proposed base level of the new drainage systems. In all cases, the drainage systems will sit within firm clays which are topped with made ground. It is evident from the lack of the movement in the groundwater that these clays are not permeable and no change in water level was noted over a period of up to 24 hours. Following these observations, full BRE365 soakaway tests were not undertaken as from these observations the tests would have been unsuccessful in establishing an infiltration rate.

On this basis, infiltration is discounted as the principal method of water disposal on the site.

Watercourse

The site is remote from any existing watercourses.

Surface Water Sewer

The site has a surface water sewer on Marchant Road at an invert level of 114.64 reducing to 113.2mAOD. Unfortunately this sewer is not accessible by the development due to third party land, and the size of the pipework is not sufficient for the site flows.

An existing 150mm surface water drain has been located on the eastern boundary of the site, however this is too shallow and in too poor a condition for a surface water drainage connection. It is understood that it connects to a 150mm drain within the highway, but this is not known at the time due to the poor condition of the pipe and manholes within the middle of the highway.

Combined Sewer

The approved planning condition and STW correspondence has the site utilising an existing 300mm combined sewer connection located at the southern boundary of the site. The outlet level is approximately 110.1mAOD and is deep enough to allow for attenuation at a suitable location.

Approval has been granted by STW 12/01/2022 (Ref No 1029907) for a 50% betterment of existing runoff to this sewer at manhole SP42933701 for the entire development. STW advise that, where possible, sites should seek to discharge at greenfield rates where possible (5l/s/ha).



RUNOFF DESTINATIONS AND SOURCE CONTROL

Existing Site Runoff Destination

The greenfield runoff rates have been calculated using the HR Wallingford UKSuds Greenfield Runoff Calculator, FEH 22 Rainfall data, and using the total site area.

The existing site falls towards the low spot of the site, which is the existing combined sewer chamber at the southern boundary of the site. As water does not pond in this area, it is reasonable to assume that this manhole allows limited drainage from the site into the sewer.

Table 1: Existing and Proposed Greenfield Runoff Rates

Scenario	Red Line Boundary	Existing Imp Area	Proposed Imp Area
	4,725m ²	3,600m ²	2,445m ²
Brownfield Runoff	66 l/s	50 l/s	35l/s
QBAR	1.9	1.4	1.0
1 in 1 year	1.6	1.2	0.8
1 in 2 year	1.7	1.3	0.9
1 in 30 year	3.8	2.9	2.0
1 in 100 year	4.9	3.7	2.6
1 in 200 year	5.8	4.4	3.0

Proposed Site Runoff Destination

The approval under planning app 18/01237/FUL is for a site which has an existing impermeable area of 9,190m², an existing runoff of 128.66l/s and a 50% betterment of this, 64.33l/s. 64.8l/s was the approved discharge rate for the entire site. Millward have approval for 25.3l/s discharge for an area of approximately 2,520m² impermeable area.

The care home development cannot be assessed in isolation and ensuring that the rest of the development can benefit from the discharge, an assessment has been undertaken of the proportional discharge of the care home against the rest of the development.

Table 2 - Whole Development Discharge Rate Split

Area	Ext Imp Area	Ext Discharge Rte	Prop Imp Area	Prop Rate	Betterment
HIGHWAY	400	5.6	400	5.60	0%
G4 APARTMENTS	1900	26.6	1000	13.30	50%
G4 HOUSES	1200	16.8	800	6.00	64%
HIGHWAY 2	470	6.58	470	6.50	1%
TORSION CARE HOME	4725	60.55	2445	24.00	60%
G4 AREA 2	400	5.6	400	5.60	0%
	8695	121.73	5515	61	50%

Allowing for minimum discharge rates for the rest of the site, and taking into the approved rate, it is appropriate for the Torsion Care development to have a proportional discharge rate of 24l/s. This rate allows for a reduction of 60% over the existing impermeable discharge rate and is less than the 5x Greenfield rate within the NPPF (5 x 1:100 Greenfield Rate 4.9l/s = 24.5l/s).

A comparative assessment of the existing runoff rates for the development compared to the proposed is shown below. The existing rates are calculated using the modified rational method with a rainfall of 50mm/hr (140l/s/ha) and the proposed rates are taken from the Causeway Flow hydraulic modelling.



Table 3: Existing and Proposed Discharge Rates

Care Home				
Scenario	Greenfield Runoff Rate (l/s)	Existing Runoff Rate (l/s)	Proposed Discharge Rate (l/s)	Betterment (%) (Proposed vs Existing)
Contributing Area (m ²)	4725 m ²	3600 m ²	2445 m ²	48%
1 in 1 year	1.6	25	13.6	46%
1 in 2 year	1.7		13.6	
1 in 30 year	3.8	50	23.7	53%
1 in 30 year + 35% cc			24	
1 in 100 year	5.8	64.25	24	63%
1 in 100 year + 40% cc			24	
1 in 100 year + 50% cc			24	

In general, the site achieves a 50% betterment from the existing situation in all scenarios within a nominal tolerance and is therefore in compliance with the STW requirements

PEAK FLOW CONTROL FROM SITE

In accordance with national standards, as the site is brownfield and currently developed, a “Relaxation factor” under Standard 3.21 is applicable. This allows the site to discharge at a restricted rate of up to 5 times the greenfield runoff rate to the target 50% AEP (1 in 2) and 1% AEP (1:100) events. To achieve the required BREEAM level for the care development, the rate needs to be reduced to meet the national standards.

For simplicity’s sake, only the 1:100 rate is considered as the site will have a single flow control unit. The proposed discharge rate is 24l/s which is less than the 5x1:100 rate of 24.5l/s.

Surface water around the building is directed away from the thresholds towards the car park, patios and landscaped areas. Water is collected in gullies and drainage channels before being conveyed into a surface water drainage system.

Due to existing tree root protection areas and the made ground within the site there is limited opportunity for excavations to take place for the construction of water retaining SUDS features of a larger magnitude within the site boundary.

The car park is to be used for construction traffic and is not suitable for permeable paving. The attenuation tank and flow control are to be located at the existing and proposed low spot of the site at the southern boundary.

While the site uses flat roofs, the roof space is used for plant decks, solar panels and is to be man-accessible, and green roofs are not proposed.

The flow controls for the site is a vortex unit with a minimum orifice size above 90mm to minimise the risk of blockages. Further blockage protection is provided within the site with both developments using vortex separators or treatment bypass separators to remove and filter out blockage risks and to manage sedimentation.

The development uses geocellular attenuation tanks designed to accommodate the 1:100 + 50% CC storm event and these are designed outside of areas where HGV and construction traffic are expected to operate.

The hydraulic calculations show that there is no surcharging of the surface water system in the 1 in 2 year event, and no surface water flooding in the 1 in 30, 1 in 30 + 35% climate change, 1 in 100, and the 1 in 100 year + 50% climate change storm events, in line with local and national policies.

The climate change allowances that have been used are the Tame Anker and Mease Management Catchment peak upper end peak rainfall allowances for the 2070s epoch, in line with the Flood Risk and Coastal Change planning practice guidance.



WATER QUALITY AND POLLUTION CONTROL

The site has been assessed for pollution risk in accordance with Table 26.2 of the CIRIA SuDS Manual 2015 using the Simple Index Approach. It is split into the following areas according to their level of risk:

- Residential Roof (Very Low Risk)
- Car Park (Low Risk) (Care Home)

Table 4 - Simple Index Approach Assessments

Residential Roof (Very Low Risk)				
Proposed Pollution Risk				
	Hazard Level	TSS	Metals	Hydrocarbons
Residential Roof	Very Low	0.2	0.2	0.05
Proposed Pollution Mitigation				
Vortex Separator	X 1.0	0.5	0.5	0.8
Mitigation Index Achieved		0.5	0.5	0.8
		OK	OK	OK

Car Park (Low Risk) (Care Home)				
Proposed Pollution Risk				
	Hazard Level	TSS	Metals	Hydrocarbons
Residential / Infrequent Use Car Park	Low	0.5	0.4	0.4
Proposed Pollution Mitigation				
Vortex Separator	X 1.0	0.5	0.5	0.8
Mitigation Index Achieved		0.5	0.5	0.8
		OK	OK	OK

For the care home, the car parking will be predominantly used by small vehicles except for twice weekly deliveries to the site and refuse vehicles. This puts the development into a lower risk category as the car park will be more lightly used with a service case like a residential apartment block as the vehicle movements are under 300 vehicles per day. During the construction phase the car park will be used by more commercial vehicles, and this increases the risk of siltation, and it is suggested that during the construction phase, more frequent maintenance of the separator and monitoring is undertaken to manage water quality in accordance with the construction phase plan.

Table 4 above shows the amount of treatment is suitable for the proposed usage of the site and for the designated outfall point.



FOUL WATER DRAINAGE STRATEGY

The site is serviced by mains sewerage via an existing Severn Trent combined sewer located within the red line boundary on the southern extents of the site. This manhole is privately owned. A new foul connection from the care home is proposed onto this manhole and Severn Trent Water have confirmed that they are happy to accept the connection in their original consultation response.

DRAINAGE DESIGN

Using the above information, the drainage design has been developed and is shown on drawing 25202-DCE-XX-XX-D-C-100-P01 Drainage Strategy.



FLOOD RISK AND FLOOD EXCEEDANCE

A Flood Risk Assessment by AAH Planning Consultants, Ref A3907 Rev A 28/11/18, has been submitted and approved under the 18/01237/FUL Planning Permission. This satisfies the need for a Flood Risk Assessment at the Stage 2 phase of the project. However since this original permission, the flood risk models for the country have been updated, and so this document will include the current flood modelling and mapping information.

The site is in Flood Zone 1, shown on the flood map for planning below. The DEFRA website for historical flood data shows that there is no record of historical flooding on the site.



Figure 1 - Flood Map for Planning (EA)

Fluvial Flooding (Flooding from Rivers or the Sea)

Figure 1 shows that there is no risk of flooding from Rivers or the Sea and this is confirmed in Figure 2.

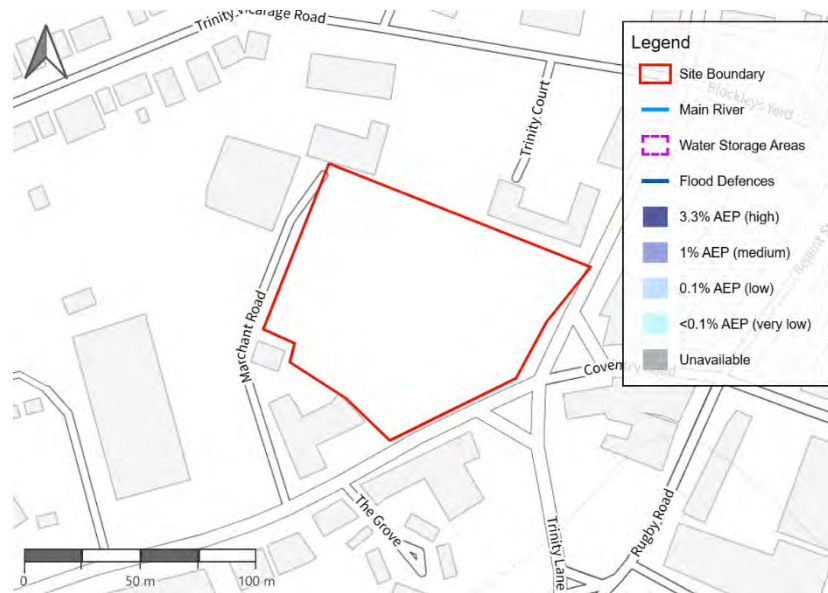


Figure 2 - Fluvial Flooding (EA)

Pluvial (Surface Water) Flooding

The map below shows that there is an area of low to high surface water flood risk within the site due to the level survey showing various low spots which will not exist in the final scheme. This area of flooding is significantly below the proposed floor level, and is located at the outfall so any water buildup will be routed into the drainage system and attenuated before release into the sewerage system.



Figure 3 – Pluvial Flooding Extents (EA)

Groundwater Flooding

The EA flood risk summary indicates that the risk of groundwater flooding is low in this area.

Sewer Flooding

There is no record of sewer flooding in the immediate vicinity.

Reservoir and Other Artificial Sources of Flooding

The map below shows that there is no risk of flooding from reservoirs or other artificial sources. Therefore, the risk of reservoir flooding is considered to be low.



Figure 4 – Reservoir Flooding (EA)

Flood Exceedance

While the system is designed to attenuate flows within the site and manage extreme events up to 1:100 + 50% climate change underground, it is envisaged that in a more extreme storm scenario water may exceed the capacity of this system and water will leave the drainage system causing flooding. In an event beyond the design, water would be directed towards the southern boundary and will then re-enter the drainage system via the flow control chamber.



TEMPORARY, CONSTRUCTION PHASE AND LAND DRAINAGE STRATEGY

The construction phase plan, developed by the Principal Contractor, will detail temporary management of water on the site. It is expected that water will be intercepted locally on the site, with silt and other runoff filtered and pumped from the site to an acceptable discharge point. This will be detailed within the Principal Contractor's Construction Phase Plan.

It is expected that early during the construction programme the attenuation tank and main manholes, flow control and separators will be constructed, and this will allow for the ongoing management of surface water from the site during the construction phase.

MAINTENANCE OF DRAINAGE SYSTEMS

The private systems will be managed by the landowner 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 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.

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.	



Flow Control	
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
Debris removal from manholes (where may cause risk performance)	Monthly
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
Repair/check all inlets, outlets and overflow pipes	As required
Inspect/check all inlets, outlets, and overflow pipes to ensure that they are in good condition and operating as designed	Annually and after large storms

Attenuation Tank	
Operation	Frequency
Inspect and identify any areas that are not operating correctly, if required, take remedial actions	Monthly for 3 months, then six monthly
Debris removal from attenuation tank (where may cause risk performance)	As required, but at least twice a year
Where rainfall into attenuation tank 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 upstream surface water network 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 and after large storms with remedials as required.
Survey inside of tank for sediment build up and remove if necessary.	Every 5 years.

Filter and Land Drainage	
Operation	Frequency
Remove litter and debris from filter drain surface, access chambers	Monthly or as required.
Manage Vegetation and remove nuisance plants	Twice during growing season.
Inspect filter drain surface, pipework and other systems for clogging, ponding, erosion, contamination or damage	Monthly at start, then six monthly.
Inspect chambers and perforated pipework for silt accumulation. Establish silt removal process.	Six Monthly
Remove sediment treatment devices and pipework and chambers.	Six Monthly or as required.
Remove tree roots where they are encroaching the sides of the filter drain.	As required
Repair erosion and damage to drainage	As required
Scarify surface and break up silt deposits and compacted materials. Remove build up of sediment on filter trench.	As required.
Clear pipework of blockages.	As required



Filter and Land Drainage	
Operation	Frequency
Replace filter media	Every 10 – 20 years, or if identified by inspector. Higher if located in areas of very high pollution loads.

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.



BREEAM COMPLIANCE

This section outlines how the proposals meet the criteria in Pol 03 Flood and Surface Water Management under the BREEAM guidance.

Flood Risk

The “Flood Risk and Flood Exceedance” section above confirms the site is in Flood Zone 1 and assesses the flood risk from the following sources:

- i) Fluvial – Figure 1/2
- ii) Tidal – Figure 1/2
- iii) Surface Water – Figure 3
- iv) Groundwater – Page 10
- v) Sewers – Page 10
- vi) Reservoirs, canals and other artificial sources – Page 10

Page 9 confirms that there are no historical reports of flooding at the site, and the “Surface Water Drainage Strategy” section indicates appropriate climate change allowances to be used in the surface water drainage design to account for future sources of flooding.

Surface Water Run-off Destination

The surface water drainage system has been designed to consider the specific site requirements, based on the existing site and proposed development. Pages 3 to 5 demonstrate how the priority levels detailed in the methodology have been followed with suitable justification for discharging surface water to the combined sewer.

Infiltration has been discounted following detailed testing which is evidenced in the rear of this document.

Surface Water Run-off Rate

The site is a brownfield development. The revised National Standards for Sustainable Drainage Systems requires that all existing development comply with a maximum “relaxation” of 5 times the greenfield runoff rate for the 50% AEP and 1% AEP events.

The site has been designed to these standards, and achieves a 50% reduction from existing runoff, with peak flows restricted to 24l/s during the 1% AEP (5x QBAR). This therefore meets the requirement under POL03 for reduction of runoff.

The “Maintenance of Drainage Systems” section details the recommended maintenance requirements for the drainage and SuDS systems, which the developer of the site will need to include within any maintenance agreements for the drainage facilities.

Surface Water Run-off Volume

As confirmed in the “Flood Risk and Exceedance” section, the buildings are raised above the surrounding areas, and surface water will flow to the existing exceedance route to the south of the site.

The post-development runoff volume has been assessed against the pre-development runoff volume in the 1 in 100 year +50% climate change 6-hour rainfall event.

The hydraulic calculations show a pre-development discharge volume of 320m³ in the 1 in 100 year 6-hour winter scenario based on 3,600m² Existing Impermeable Area which covers the whole site. The hydraulic calculations for the proposed drainage system show a discharge volume of 221m³ in the same scenario for a drained area of 2445m². The greenfield runoff volume for the same scenario is 148m³ for the same area (60.61mm rainfall for 1 in 100 6 hr period over 3,600m² drained area for the car park and care home)

The site reduces the runoff volume to below the existing level and therefore meets the requirement for this credit.

Minimising Watercourse Pollution

The proposed drainage system should prevent the first 5mm of rainfall from discharging to the watercourse, known as Interception in the SuDS Manual. The following table has been adapted from Table 24.6 of the SuDS Manual to list potential Interception mechanisms that could be incorporated into the design.



Interception Mechanism	Reasoning
Green roofs	The building is to have solar panels and plant located on the roof and a green roof is not proposed due to the loading on the structure.
Soakaway or other infiltration system	Infiltration is not possible on the site.
Permeable Pavements	This is not possible on the site as the only area which could be permeable is being used for construction.
Swales	These features are not suitable due to the vulnerable patients using the site and the fall / trip hazards they generate. There are also significant constraints in the non-secure area of the site with root protection areas which prevents the use of these types of features.
Filter Drains	Filter drainage is used for land drainage only.
Detention Basins	These features are not suitable due to the vulnerable patients using the site and the fall / trip hazards they generate.
Bioretention planter units	These are not proposed due to the limited space available to maintain these units around the building.
Rain Gardens	Not proposed as the rear gardens have limited space outside of existing RPA to accommodate these features.
Ponds	These features are not suitable due to the vulnerable patients using the site and the fall / trip hazards they generate.

The 5mm runoff is unlikely to be intercepted on the site as there are no proposed infiltration or bioretention systems proposed.

Areas of the site with a low pollution risk use appropriate SuDS techniques to provide the required level of pollution prevention, using treatment and separation systems as detailed within this document.

All SuDS features and pollution prevention systems will need to be designed in accordance with the SuDS Manual, the pollution prevention for business guidance, and the building regulations, as confirmed in the “Surface Water Drainage Design” section above.

Copies of the as-built drainage plans, following construction of the building, should be made available on site for the building occupier and owner.

BREEAM Summary

The information contained within this Drainage Strategy report demonstrates the development could be awarded four credits under the BREEAM Assessment for Flood and Surface Water Management: two for Flood Resilience, one for Surface Water Volume and one for Minimising Watercourse Pollution.

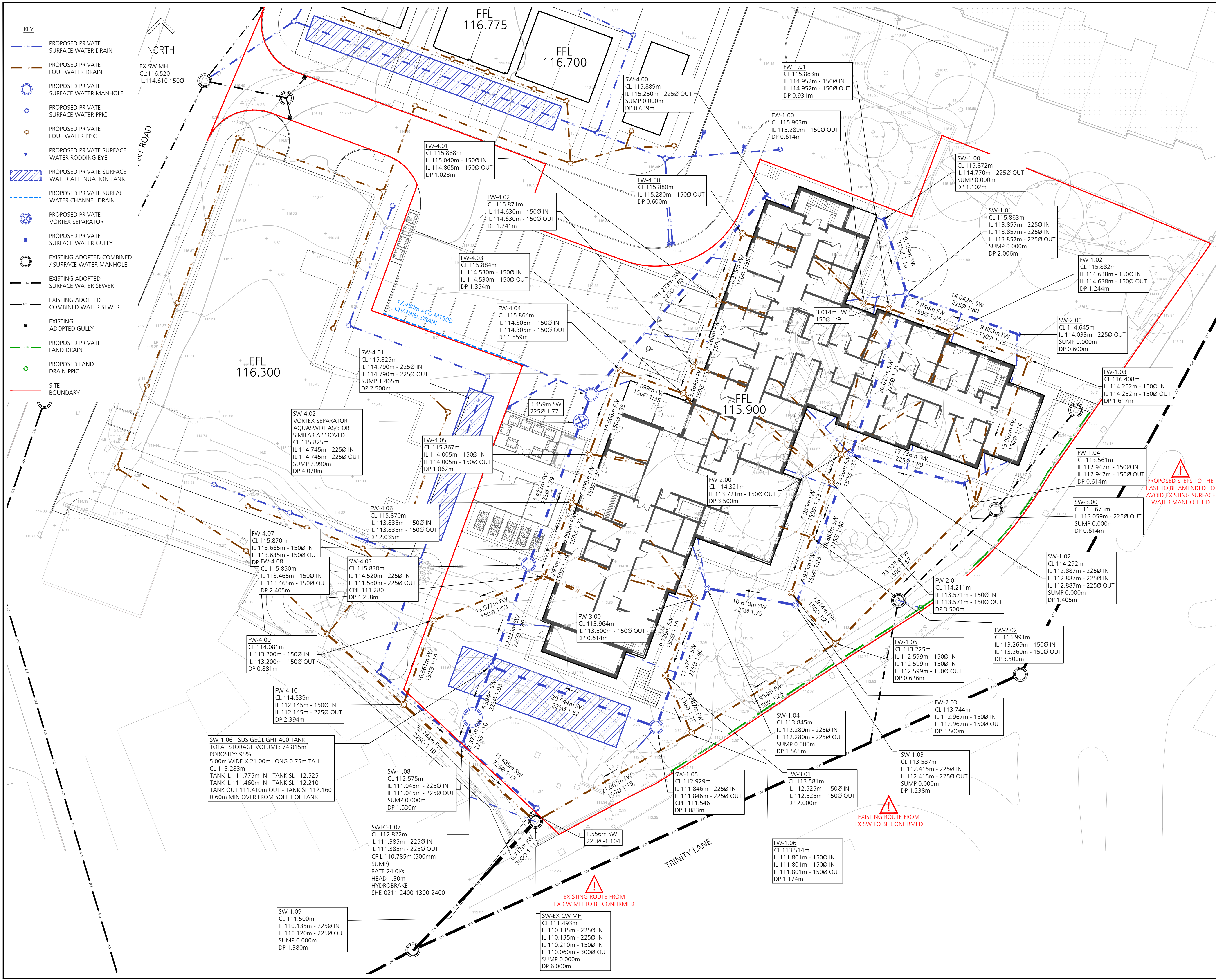


DRAINAGE DESIGN PARAMETERS

Drainage Outfalls	Consultation with LLFA/IDB/EA/Water Auth	Undertaken and Drainage Conditions discharged under application 18-01237-FUL. STW Consulted on runoff location and rate.
	Rainwater Reuse	Not viable
	Soakaway Viable / Rate	Not viable as tests failed.
	Groundwater Level	Generally quite low and now found during soakaway tests.
	Watercourse	None.
	Surface Water Sewer	Not accessible from the site
	Foul / Combined Sewer	Combined sewer 300mm on site boundary. Used for Foul and Surface discharge
	Other Outfall	N/A
	Agreed Discharge Outfall Points	SW + FW: Existing Connection to Combined Sewer in London Road via EX CW MH SP42933701
	Invert Level of Outfalls	SW: 110.135mAOD FW: 110.135mAOD
Surface Water Drainage Assessment Constants	Scenarios to be Tested	1:2, 1:30, 1:30+35%CC, 1:100, 1:100+40%CC, 1:100+50%CC
	Agreed discharge rate	24l/s for Care Home
	Proposed Impermeable Area	2,445m ² / 0.245 ha
	Attenuation Storage Method	SDS Geolight 400 Tank 5 x 21 x 0.75m, 74.8m ³
	Soakaway Half Drain Down Time	N/A
	Proposed Attenuation Volume	As above
	Flow Control Unit	Hydrobrake Optimum, Curved Plate, 1.3m head, 24l/s. SHE-0211-2400-1300-2400 500mm sump required
	Surcharged Outfall	N/A
Surface Water Hydraulic Modelling Parameters	Rainfall Model Parameters (FEH/FSR)	FEH-22 data used
	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 960min drain down.	
Foul Water Drainage	Assessment Method and Assumptions (DU, F&L4, BR Part H2, SSG)	F&L4 and BR Part H2
	Foul Discharge Quantity	Not assessed
SUDS	Water Quality – Primary Treatment	Vortex Separator
	Water Quality – Secondary Treatment	Varies
	Water Quality – Tertiary Treatment	Varies
	Pollution Control Risk Level	Low
	Silt Capture Method Spec	Catchpits, Vortex Separator
	Green SUDS Method Spec	N/A
	Ponds / Swales Spec	N/A
	Permeable Pavement Spec	N/A
Appendices	<u>DCE Drawings:</u> 25202-DCE-XX-XX-D-C-100-P01 Drainage and Levels Strategy 25202-DCE-XX-XX-D-C-102-P01 Existing Impermeable Areas 25202-DCE-XX-XX-D-C-103-P01 Proposed Impermeable Areas 25202-DCE-XX-XX-D-C-155-P01 External Levels <u>Documents:</u> 1104-1C Topographic Survey CCTV Drainage Survey by Torsion Projects 260120 G40003 A003_Proposed Site Ground Floor Plan_J Drainage and Water Search Result – 12/01/2022	



	Hydraulic Calculations Soakaway Testing Letter Greenfield Runoff Rate Calculations Hydrobrake Flow Control Details SDS Geolight Geocellular Tank Details Vortex Separator Specification
--	--



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 OSG836). EXISTING SURVEY STATIONS ARE SHOWN ON THE TOPOGRAPHICAL SURVEY.

5. THIS DRAWING IS BASED ON THE FOLLOWING INFORMATION:

5.1. 1104-1C - REV C - TOPOGRAPHICAL SURVEY BY CLB SURVEYS LTD DATED MAY 2017

5.2. G40003-A003-REV G - SITE LAYOUT PLAN BY GREEN 4 ARCHITECTS DATED JANUARY 2026

6. ALL WORK TO BE UNDERTAKEN IN ACCORDANCE WITH THE CURRENT EDITION OF THE BUILDING REGULATIONS, SEWERAGE SECTOR CODES OF PRACTICE, AND THE RELEVANT LOCAL HIGHWAY AUTHORITY STANDARDS.

7. THE POSITIONS OF EXISTING UTILITIES SHOWN ON THIS DRAWING HAVE BEEN BASED ON INFORMATION EXTRACTED FROM RECORDS OBTAINED FROM UTILITY PROVIDERS. THESE MUST BE REGARDED AS APPROXIMATE ONLY. THE ACCURACY OR COMPLETENESS OF THE INFORMATION OR THE LOCATION OF SUCH APPARATUS IS NOT GUARANTEED AND NO WARRANTY IS GIVEN OR IMPLIED REGARDING THE POSITION, DEPTH, SIZE OR GRADIENT THEREOF. THE CONTRACTOR MUST MAKE THEIR OWN ENQUIRIES OF THE UTILITY PROVIDERS AND PUBLIC AUTHORITIES AND SATISFY THEMSELVES AS TO THE EXACT POSITION, DEPTH, SIZE AND GRADIENT OF SERVICES. IN THE INTEREST OF SAFETY, THE APPROXIMATE POSITION OF UNDERGROUND CABLES SHOULD BE OBTAINED BY USE OF ELECTRONIC CABLE LOCATORS AND THIS POSITION CONFIRMED BY CAREFUL TRIAL-HOLING USING HAND-DUG METHODS.

8. BEFORE UNDERTAKING ANY DRAINAGE WORKS, THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THE LOCATION AND DEPTH OF THE FINAL CONNECTION POINT(S). ANY DISCREPANCIES MUST BE NOTIFIED TO DUDLEYS CONSULTING ENGINEERS IMMEDIATELY TO ALLOW SUFFICIENT TIME FOR ANY NECESSARY DESIGN CHANGES. COMMENCING NEW DRAINAGE WORKS WITHOUT FIRST ESTABLISHING THE CONNECTION IS ENTIRELY AT THE CONTRACTOR'S OWN RISK AND MAY RESULT IN ABORTIVE WORK IF THE POSITION OR DEPTH OF THE CONNECTION POINT(S) DIFFERS TO WHAT IS DETAILED ON THIS DRAWING.

9. SOIL VENTILATION PIPES AND RAIN WATER PIPES SHOWN ON THE PLAN ARE INDICATIVE. FINAL LOCATIONS TO BE CONFIRMED BY ARCHITECTS.

10. SURFACE WATER DRAINAGE FOR FOOTPATH AROUND BUILDING TO BE CONFIRMED AND DISCUSSED. CURRENTLY NOT SHOWN ON PLANS, BUT ASSUMED WITHIN RUNOFF RATES. EXPECTED THAT GULLIES AND CHANNELS TO BE PROVIDED WITH CONNECTIONS TO RAINWATER PIPES. DESIGN TEAM TO CONFIRM.

11. LAND DRAINAGE TO BE PROVIDED TO LOWER GARDEN AREAS TO PREVENT WATERLOGGING.

10.02.26 PRELIMINARY ISSUE

DATE

REVISION DESCRIPTION

OR

SDR

P01

BY

CHK.

REV.

DUDLEYS

CONSULTING ENGINEERS

PROJECT

COVENTRY ROAD, HINCKLEY, LE10 0JR

TITLE

DRAINAGE STRATEGY

SCALE

1:200

PAPER

A1

STAGE

PRELIMINARY

STATUS

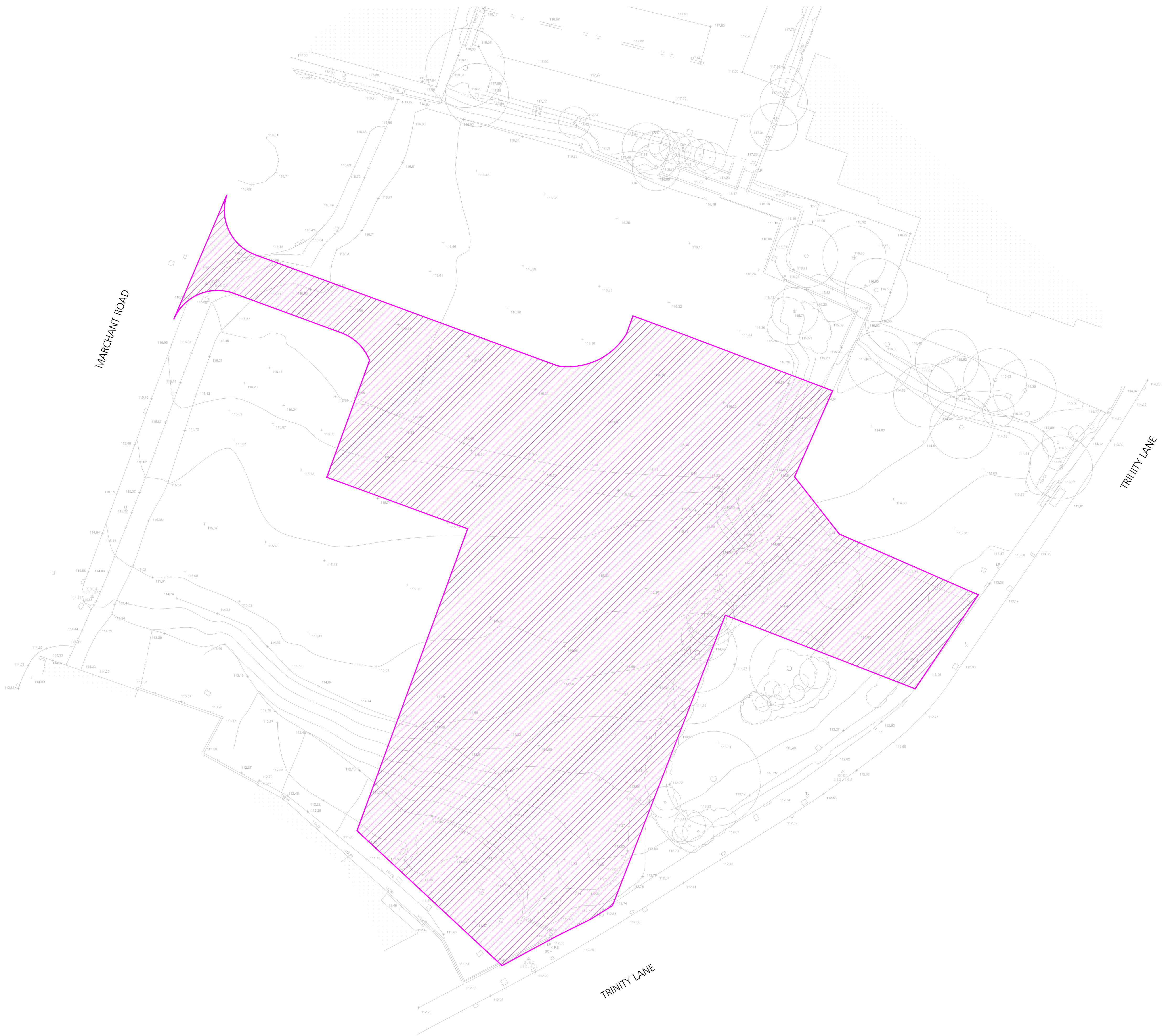
DRAWING NO.

25202-DCE-XX-XX-D-C-100

REV.

P01

Tithe House
35 Town Street
Leeds, LS18 5UJ
0113 258 3611
info@dudleys.co.uk



DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

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ABNORMAL
HAZARD
REFERENCE

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- THIS DRAWING IS BASED ON THE FOLLOWING INFORMATION:
5.1. 1104-1C - REV C - TOPOGRAPHICAL SURVEY BY CLB SURVEYS LTD DATED MAY 2017

KEY

-  EXISTING IMPERMEABLE AREA: 3600m² / 0.360ha
-  TOTAL SITE AREA: 4725m² / 0.473ha

10.02.26	PRELIMINARY ISSUE	OB	SDR	P01
DATE	REVISION DESCRIPTION	BY	CHK.	REV.



PROJECT
**COVENTRY ROAD,
HINCKLEY,
LE10 0JR**

TITLE
EXISTING IMPERMEABLE AREA

SCALE	PAPER	STAGE	STATUS
1:200	A1	PRELIMINARY	
DRAWING NO.	25202-DCE-XX-XX-D-C-102		REV.
			P01



DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

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ABNORMAL
HAZARD
REFERENCE

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- THIS DRAWING IS BASED ON THE FOLLOWING INFORMATION:
 - 1104-1C - REV C - TOPOGRAPHICAL SURVEY BY CLB SURVEYS LTD DATED MAY 2017
 - G40003-A003-REV G - SITE LAYOUT PLAN BY GREEN 4 ARCHITECTS DATED JANUARY 2026

KEY

- PROPOSED BUILDING & FOOTPATH
AREA: 1705m² / 0.171Ha
- PROPOSED ACCESS ROAD &
CAR PARK AREA: 575m² / 0.058Ha
- PROPOSED BIN STORE, ASHP
& BIKE STORE AREA: 160m² / 0.016Ha
- PROPOSED SUB-STATION
AREA: 5m² / 0.005Ha
- TOTAL PROPOSED
IMPERMEABLE AREA: 2445m² / 0.245Ha
- SITE
BOUNDARY

10.02.26	PRELIMINARY ISSUE	OB	SDR	P01
DATE	REVISION DESCRIPTION	BY	CHK.	REV.



PROJECT
**COVENTRY ROAD,
HINCKLEY,
LE10 0JR**

TITLE
PROPOSED IMPERMEABLE AREAS

SCALE	PAPER	STAGE	STATUS
1:200	A1	PRELIMINARY	

DRAWING NO.	REV.
25202-DCE-XX-XX-D-C-103	P01



DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

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ABNORMAL
HAZARD
REFERENCE

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- THIS DRAWING IS BASED ON THE FOLLOWING INFORMATION:
5.1. 1104-1C - REV C - TOPOGRAPHICAL SURVEY BY CLB SURVEYS LTD DATED MAY 2017
5.2. G40003-A003-REV E - SITE LAYOUT PLAN BY GREEN 4 ARCHITECTS DATED JULY 2025
- ALL WORK TO BE UNDERTAKEN IN ACCORDANCE WITH THE CURRENT EDITION OF THE BUILDING REGULATIONS, SEWERAGE SECTOR CODES OF PRACTICE, AND THE RELEVANT LOCAL HIGHWAY AUTHORITY STANDARDS.
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KEY

- 115.900 PROPOSED SPOT LEVELS
- 115.900 PROPOSED FINISHED FLOOR LEVELS
- 113.800 EXISTING SPOT LEVELS
- PROPOSED RETAINING WALL
- PROPOSED GRADIENT
- SITE BOUNDARY

09.02.26	PRELIMINARY ISSUE	OB	SDR	POT
DATE	REVISION DESCRIPTION	BY	CHK.	REV.



PROJECT
**COVENTRY ROAD,
HINCKLEY,
LE10 0JR**

TITLE
LEVELS STRATEGY

SCALE	PAPER	STAGE	STATUS
1:250	A1	PRELIMINARY	

DRAWING NO.	REV.
25202-DCE-XX-XX-D-C-155	P01



NO DIMENSIONS TO BE SCALED FROM THIS DRAWING

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THIS DRAWING IS TO BE READ IN COLOUR PRINT

CDM - RESIDUAL RISKS

The following are considered to be significant risks relevant to this drawing, which could not be fully mitigated or removed through design. Further possible control measures have been identified within the Design Risk Assessments which may help to mitigate these and other identified risks further during the construction / maintenance process.

GENERAL

All dimensions to be checked on site. No responsibility is accepted for works by building contractor and sub-contractors. All works to be carried out in accordance with current Codes of Practice and British Standards.

STRUCTURAL

All Structural Design and Calculations to be provided by Structural Engineer

NOTES:

Application Boundary Line

REVISION NOTES

Rev	Date	Description
A	04/06/2025	Fire safety redesign
B	17/07/2025	Proposed footpath relocation
C	22/07/2025	Widened Carpark access
D	23/07/2025	Note regarding Footpath
E	23/07/2025	Marchant Road Footpath Widening
F	12/12/2025	Bin store moved to allow turning circle Proposed Footpath access to Building ASHP Compound added Sub-station Location Ramp to North Elevation.
G	07/01/2026	Revision as per Torsion comments received on 17/12/2025
H	15/01/2026	Revision as per Torsion comments received on 12/01/2026
I	20/01/2026	Revision as per Torsion comments received on 15/01/2026
J	21/01/26	Footpath corner and front site access ramp revision

The Barn
Hopwell Hall
Ockbrook
Derbyshire
DE72 3RW



PROJECT NAME

G40003 Hinkley Care Home

TYPOLOGY

PROJECT ADDRESS

Coventry Road
Hinckley
LE10 0JR

CLIENT / USER NAME

Hinckley Project 1 Ltd.

DRAWING NAME

Proposed Site Ground Floor Plan

FULL DOCUMENT REFERENCE

Originator Project Number	Series	Drawing No	Sheet Issue Date
G40003	---	A003	23/01/2026

STATUS

Planning

Sheet size

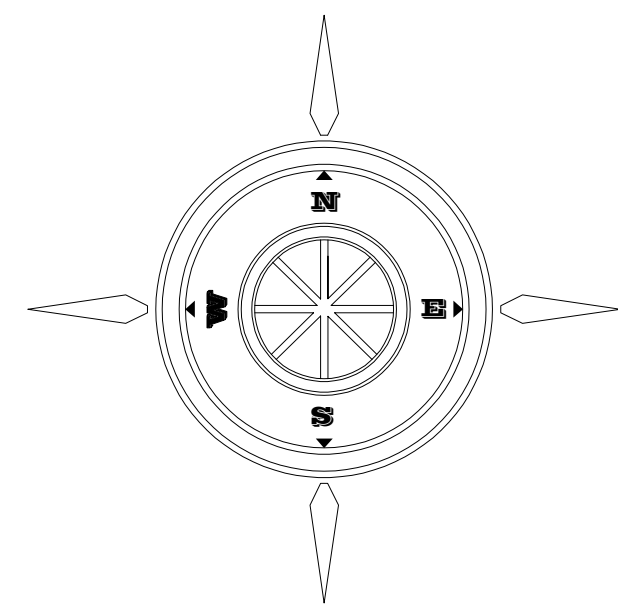
A1L

Scale

As indicated

Revision

J



ALL LEVELS ARE RELATED TO ODSM SITUATED ON THE ROYAL MAIL BUILDING ON THE CORNER OF STATION ROAD AND LANCASTER ROAD WITH A VALUE OF 113.364M

Station	Eastings	Northings	Levels	Description
S001	1039.609	1023.553	112.743	Pk Nail
S002	1000.000	1000.000	112.435	Pk Nail
S003	972.331	1023.043	112.356	Pk Nail
S004	944.923	1045.680	114.687	Pk Nail
S005	959.321	1085.162	116.526	Pk Nail

Legend

rock face	conifer screen
service cover	per
bank line	irregular marsh
fence	spreadump
cutting or bank	stake
grass channel	fence
gate	fence
ledge	fence
road	edge of surface
vegetation line	station Name and Level
tree	50.00 ground level

SC	stop cock	BOL	bolting
MT	manhole	EP	earth rod
WP	well pipe	GP	gate post
PE	padding eye	ELE	electric
RT	telephone	FP	fence post
WC	water out	FL	flow post
TV	television	SH	shrub
SV	water valve	BO	back inlet gully
TS	tap	FTL	Finished floor level
TV	television	TGR	Tree cut box
WH	water hydrant	G	gully
WW	water valve	BH	bone hole
IS	inspection cover	TH	trial hole
SL	water line	FP	flag post
RS	road sign	UL	lamp hole
BS	bus stop	P	post
EP	earth post	PP	peg
EP	electric pole	T	traffic light
TP	telegraph pole	ST	stop top

Levels are generally shown on the side of the detail to which it relates.
Levels shown along with lines are taken in the channel.



Rev	Date	Description
C	May 17	Level survey undertaken after demolition

This plan has been surveyed to the scale shown. Caution should be exercised when enlargements are made. Some services may not have been surveyed due to parked vehicles or other obstructions.

All dimensions have been measured or estimated from ground level, unless stated otherwise.

Tree species shown should be treated with caution and expert identification is advised.

Drainage information has been taken from a surface inspection and should be treated as approximate only.

All critical dimensions should be confirmed onsite prior to the commencement of any works.

PROJECT
Former Hinckley Leisure
Centre Site

CLIENT
Hinckley & Bosworth Borough Council

TOPOGRAPHICAL SURVEY

Orig. No. 1104-10 Date: April 2010

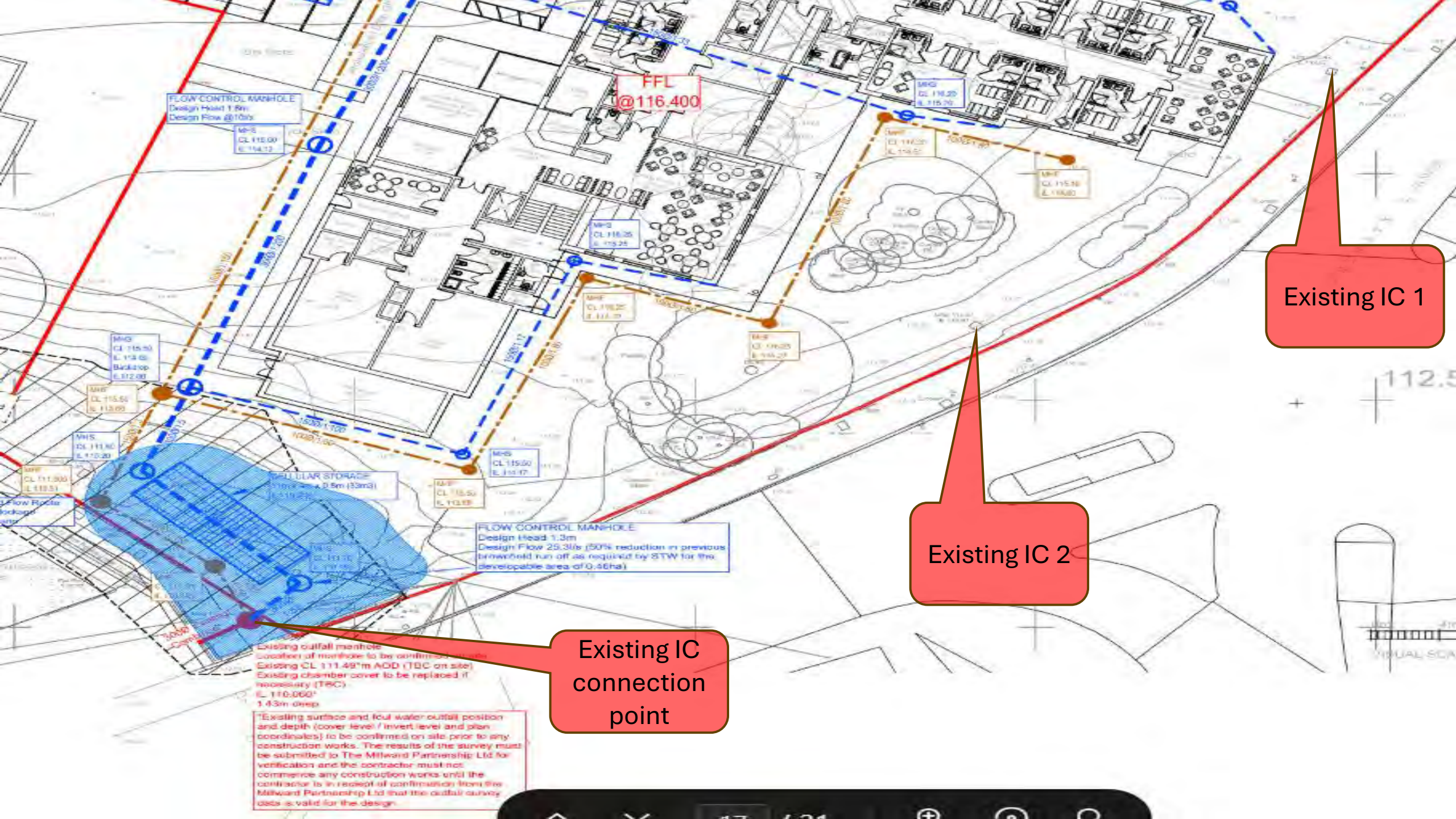
Drawn by: A.T.C. Scale: 1:200(A0)

Units: mm Cad Scale 1:1

C L B Surveys Ltd
38 Forest View
Overseal
Swadlincote
Derbyshire
DE12 6GZ

Telephone: 01283 331788
Email: admin@clbsurveys.co.uk

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Existing IC 1

Existing IC 2

Existing IC connection point

Existing outfall manhole
Location of manhole to be confirmed on site
Existing CL 111.48m AOD (TBC on site)
Existing chamber cover to be replaced if necessary (TBC)
E. 110.000
1.43m deep

*Existing surface and foul water outfall position and depth (cover level / invert level and plan coordinates) to be confirmed on site prior to any construction works. The results of the survey must be submitted to The Milward Partnership Ltd for verification and the contractor must not commence any construction works until the contractor is in receipt of confirmation from the Milward Partnership Ltd that the outfall survey data is valid for the design.

Existing IC 1



Location of the existing
IC 1



Location of the existing
IC 1



IC 1 open



IC 1 view

IC 1 has a CL to IL of 860mm

Existing IC 2



Location of the
existing IC 2



Location of the
existing IC 2



Location of the
existing IC 2



View into IC 2



View into IC 2

IC 2 has a CL to IL of 2460mm, the channel looks to flow off the site and towards Sainsburys

Existing IC connection point



Location of
proposed
connection IC



Location of
proposed
connection IC



View into the
proposed
connection IC

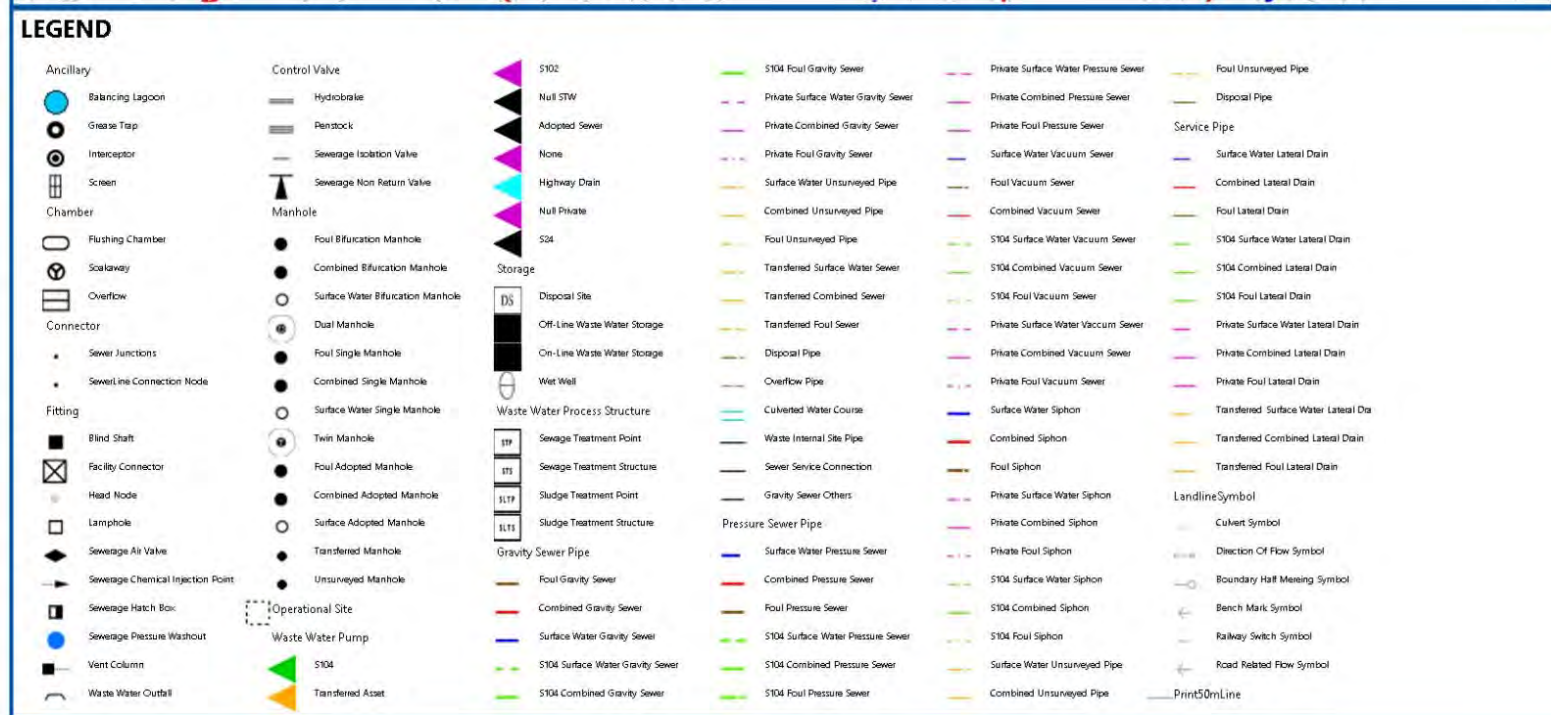


View into the
proposed
connection IC



View into the
proposed
connection IC

Existing IC connection point has a CL to IL of 1440mm, the location of this IC is 2100mm from Coventry Road and 3250mm from the Co-Op existing wall. This is to centre of the chamber.

[illegible]

Design Settings

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

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
SW 1.00	0.012	5.00	115.872	320	442375.530	293799.719	1.102	114.770
SW 4.00	0.015	5.00	115.864	450	442360.057	293800.698	0.614	115.250
SW 1.01	0.018	5.00	115.863	450	442378.194	293790.987	2.006	113.857
SW 4.03	0.030	5.00	115.838	1200	442333.863	293759.165	4.258	111.580
SW 4.01	0.073	5.00	115.825	1200	442341.089	293779.146	1.035	114.790
SW 4.02	0.022	5.00	115.825	1200	442339.899	293775.898	1.080	114.745
SW 2.00	0.011	5.00	114.645	450	442391.379	293786.154	0.612	114.033
SW 1.02	0.028	5.00	114.292	450	442371.637	293772.064	1.405	112.887
SW 1.04			113.845	450	442354.708	293756.357	1.565	112.280
SW 3.00	0.010	5.00	113.673	450	442384.925	293768.585	0.614	113.059
SW 1.03	0.008	5.00	113.587	450	442365.139	293754.335	1.172	112.415
SW 1.06 TANK			113.283	450	442329.350	293747.115	1.833	111.450
SW 1.05	0.016	5.00	113.246	1200	442348.731	293740.005	1.400	111.846
SW FC 1.07			112.822	1800	442327.171	293741.118	1.437	111.385
SW 1.08			112.575	450	442325.940	293737.959	1.530	111.045
SW 1.09			111.500	450	442334.637	293730.458	1.380	110.120
EX CW MH			111.493	1200	442334.541	293728.905	1.433	110.060

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	SW 1.00	SW 1.01	9.129	0.600	114.770	113.857	0.913	10.0	225	5.04	50.0
1.001	SW 1.01	SW 1.02	20.027	0.600	113.857	112.887	0.970	20.6	225	5.28	50.0
1.002	SW 1.02	SW 1.03	18.882	0.600	112.887	112.415	0.472	40.0	225	5.43	50.0
1.003	SW 1.03	SW 1.04	10.618	0.600	112.415	112.280	0.135	78.7	225	5.55	50.0
1.004	SW 1.04	SW 1.05	17.375	0.600	112.280	111.846	0.434	40.0	225	5.69	50.0
1.005	SW 1.05	SW 1.06 TANK	20.644	0.600	111.846	111.450	0.396	52.1	225	5.88	50.0
2.000	SW 2.00	SW 1.01	14.042	0.600	114.033	113.857	0.176	79.8	225	5.16	50.0
3.000	SW 3.00	SW 1.02	13.736	0.600	113.059	112.887	0.172	79.9	225	5.16	50.0
4.000	SW 4.00	SW 4.01	28.710	0.600	115.250	114.790	0.460	62.4	225	5.29	50.0
4.001	SW 4.01	SW 4.02	3.459	0.600	114.790	114.745	0.045	76.9	225	5.33	50.0
1.007	SW FC 1.07	SW 1.08	3.377	0.600	111.385	111.045	0.340	9.9	225	5.97	49.6
1.008	SW 1.08	SW 1.09	11.485	0.600	111.045	110.120	0.925	12.4	225	6.02	49.4
1.006	SW 1.06 TANK	SW FC 1.07	6.394	0.600	111.450	111.385	0.065	98.4	225	5.96	49.7
4.003	SW 4.03	SW 1.06 TANK	12.833	0.600	111.580	111.450	0.130	98.7	225	5.69	50.0
1.009	SW 1.09	EX CW MH	1.556	0.600	110.120	110.060	0.060	25.9	225	6.03	49.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	4.162	165.5	2.2	0.877	1.781	0.012	0.0
1.001	2.892	115.0	7.4	1.781	1.180	0.041	0.0
1.002	2.074	82.5	14.4	1.180	0.947	0.080	0.0
1.003	1.476	58.7	15.9	0.947	1.340	0.088	0.0
1.004	2.073	82.4	15.9	1.340	1.175	0.088	0.0
1.005	1.815	72.2	18.9	1.175	1.608	0.105	0.0
2.000	1.465	58.2	1.9	0.387	1.781	0.011	0.0
3.000	1.464	58.2	1.9	0.389	1.180	0.010	0.0
4.000	1.658	65.9	2.7	0.389	0.810	0.015	0.0
4.001	1.493	59.4	16.0	0.810	0.855	0.088	0.0
1.007	4.176	166.0	43.8	1.212	1.305	0.244	0.0
1.008	3.733	148.4	43.6	1.305	1.155	0.244	0.0
1.006	1.318	52.4	43.8	1.608	1.212	0.244	0.0
4.003	1.316	52.3	25.2	4.033	1.608	0.140	0.0
1.009	2.579	102.5	43.6	1.155	1.208	0.244	0.0

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)
4.002	SW 4.02	SW 4.03	17.822	0.600	114.745	114.520	0.225	79.2	225	5.53	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
4.002	1.470	58.5	19.9	0.855	1.093	0.110	0.0

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	9.129	10.0	225	Circular	115.872	114.770	0.877	115.863	113.857	1.781
1.001	20.027	20.6	225	Circular	115.863	113.857	1.781	114.292	112.887	1.180
1.002	18.882	40.0	225	Circular	114.292	112.887	1.180	113.587	112.415	0.947
1.003	10.618	78.7	225	Circular	113.587	112.415	0.947	113.845	112.280	1.340
1.004	17.375	40.0	225	Circular	113.845	112.280	1.340	113.246	111.846	1.175
1.005	20.644	52.1	225	Circular	113.246	111.846	1.175	113.283	111.450	1.608
2.000	14.042	79.8	225	Circular	114.645	114.033	0.387	115.863	113.857	1.781
3.000	13.736	79.9	225	Circular	113.673	113.059	0.389	114.292	112.887	1.180
4.000	28.710	62.4	225	Circular	115.864	115.250	0.389	115.825	114.790	0.810
4.001	3.459	76.9	225	Circular	115.825	114.790	0.810	115.825	114.745	0.855

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW 1.00	320	Manhole	Adoptable	SW 1.01	450	Manhole	Adoptable
1.001	SW 1.01	450	Manhole	Adoptable	SW 1.02	450	Manhole	Adoptable
1.002	SW 1.02	450	Manhole	Adoptable	SW 1.03	450	Manhole	Adoptable
1.003	SW 1.03	450	Manhole	Adoptable	SW 1.04	450	Manhole	Adoptable
1.004	SW 1.04	450	Manhole	Adoptable	SW 1.05	1200	Manhole	Adoptable
1.005	SW 1.05	1200	Manhole	Adoptable	SW 1.06 TANK	450	Junction	
2.000	SW 2.00	450	Manhole	Adoptable	SW 1.01	450	Manhole	Adoptable
3.000	SW 3.00	450	Manhole	Adoptable	SW 1.02	450	Manhole	Adoptable
4.000	SW 4.00	450	Manhole	Adoptable	SW 4.01	1200	Manhole	Adoptable
4.001	SW 4.01	1200	Manhole	Adoptable	SW 4.02	1200	Manhole	Adoptable

Pipeline Schedule

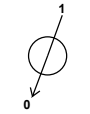
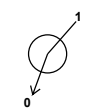
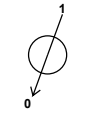
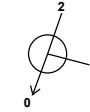
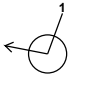
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.007	3.377	9.9	225	Circular	112.822	111.385	1.212	112.575	111.045	1.305
1.008	11.485	12.4	225	Circular	112.575	111.045	1.305	111.500	110.120	1.155
1.006	6.394	98.4	225	Circular	113.283	111.450	1.608	112.822	111.385	1.212
4.003	12.833	98.7	225	Circular	115.838	111.580	4.033	113.283	111.450	1.608
1.009	1.556	25.9	225	Circular	111.500	110.120	1.155	111.493	110.060	1.208
4.002	17.822	79.2	225	Circular	115.825	114.745	0.855	115.838	114.520	1.093

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.007	SW FC 1.07	1800	Manhole	Adoptable	SW 1.08	450	Manhole	Adoptable
1.008	SW 1.08	450	Manhole	Adoptable	SW 1.09	450	Manhole	Adoptable
1.006	SW 1.06 TANK	450	Junction		SW FC 1.07	1800	Manhole	Adoptable
4.003	SW 4.03	1200	Manhole	Adoptable	SW 1.06 TANK	450	Junction	
1.009	SW 1.09	450	Manhole	Adoptable	EX CW MH	1200	Manhole	Adoptable
4.002	SW 4.02	1200	Manhole	Adoptable	SW 4.03	1200	Manhole	Adoptable

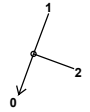
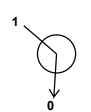
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW 1.00	442375.530	293799.719	115.872	1.102	320		0	1.000	114.770	225
SW 4.00	442360.057	293800.698	115.864	0.614	450		0	4.000	115.250	225
SW 1.01	442378.194	293790.987	115.863	2.006	450		1 2 0	2.000 1.000 1.001	113.857 113.857 113.857	225 225 225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW 4.03	442333.863	293759.165	115.838	4.258	1200		1	4.002	114.520	225
							0	4.003	111.580	225
SW 4.01	442341.089	293779.146	115.825	1.035	1200		1	4.000	114.790	225
							0	4.001	114.790	225
SW 4.02	442339.899	293775.898	115.825	1.080	1200		1	4.001	114.745	225
							0	4.002	114.745	225
SW 2.00	442391.379	293786.154	114.645	0.612	450		0	2.000	114.033	225
SW 1.02	442371.637	293772.064	114.292	1.405	450		1	3.000	112.887	225
							2	1.001	112.887	225
							0	1.002	112.887	225
SW 1.04	442354.708	293756.357	113.845	1.565	450		1	1.003	112.280	225
							0	1.004	112.280	225
SW 3.00	442384.925	293768.585	113.673	0.614	450		0	3.000	113.059	225
SW 1.03	442365.139	293754.335	113.587	1.172	450		1	1.002	112.415	225
							0	1.003	112.415	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW 1.06 TANK	442329.350	293747.115	113.283	1.833	450		1	4.003	111.450	225
						2	1.005	111.450	225	
						0	1.006	111.450	225	
SW 1.05	442348.731	293740.005	113.246	1.400	1200		1	1.004	111.846	225
						0	1.005	111.846	225	
SW FC 1.07	442327.171	293741.118	112.822	1.437	1800		1	1.006	111.385	225
						0	1.007	111.385	225	
SW 1.08	442325.940	293737.959	112.575	1.530	450		1	1.007	111.045	225
						0	1.008	111.045	225	
SW 1.09	442334.637	293730.458	111.500	1.380	450		1	1.008	110.120	225
						0	1.009	110.120	225	
EX CW MH	442334.541	293728.905	111.493	1.433	1200		1	1.009	110.060	225

Simulation Settings

Rainfall Methodology	FEH-22	Winter CV	1.000	Drain Down Time (mins)	960	Check Discharge Rate(s)	x
Rainfall Events	Singular	Analysis Speed	Detailed	Additional Storage (m³/ha)	0.0	Check Discharge Volume	x
Summer CV	1.000	Skip Steady State	✓	Starting Level (m)			

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 %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0	100	0	0	0
30	0	0	0	100	40	0	0
30	35	0	0	100	50	0	0

Node SW FC 1.07 Online Hydro-Brake® Control

Flap Valve	x	Design Flow (l/s)	24.0	Min Outlet Diameter (m)	0.225
Replaces Downstream Link	x	Objective	(HE) Minimise upstream storage	Min Node Diameter (mm)	1800
Invert Level (m)	111.385	Sump Available	✓		
Design Depth (m)	1.300	Product Number	CTL-SHE-0211-2400-1300-2400		

Node SW 1.06 TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	111.450
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	31

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	105.0	0.0	0.750	105.0	0.0	0.751	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.34%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.00	10	114.788	0.018	2.1	0.0014	0.0000	OK
15 minute summer	SW 4.00	10	115.280	0.030	2.6	0.0048	0.0000	OK
15 minute summer	SW 1.01	10	113.895	0.038	7.2	0.0060	0.0000	OK
15 minute summer	SW 4.03	10	111.690	0.110	23.9	0.1241	0.0000	OK
15 minute summer	SW 4.01	10	114.884	0.094	15.4	0.1059	0.0000	OK
15 minute summer	SW 4.02	10	114.837	0.092	18.9	0.1041	0.0000	OK
15 minute summer	SW 2.00	10	114.061	0.028	1.9	0.0044	0.0000	OK
15 minute summer	SW 1.02	10	112.949	0.062	13.9	0.0098	0.0000	OK
15 minute summer	SW 1.04	11	112.346	0.066	15.1	0.0105	0.0000	OK
15 minute summer	SW 3.00	10	113.086	0.027	1.8	0.0043	0.0000	OK
15 minute summer	SW 1.03	10	112.499	0.084	15.2	0.0134	0.0000	OK
30 minute summer	SW 1.06 TANK	23	111.578	0.128	37.2	12.7569	0.0000	OK
15 minute summer	SW 1.05	10	111.926	0.080	17.9	0.0900	0.0000	OK
30 minute summer	SW FC 1.07	22	111.581	0.196	14.7	0.4979	0.0000	OK
30 minute summer	SW 1.08	22	111.091	0.046	13.6	0.0073	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	SW 1.00	1.000	SW 1.01	2.1	0.745	0.013	0.0267	
15 minute summer	SW 4.00	4.000	SW 4.01	2.6	0.290	0.039	0.2696	
15 minute summer	SW 1.01	1.001	SW 1.02	7.1	1.090	0.062	0.1326	
15 minute summer	SW 4.03	4.003	SW 1.06 TANK	23.8	1.852	0.455	0.2195	
15 minute summer	SW 4.01	4.001	SW 4.02	15.1	0.980	0.255	0.0534	
15 minute summer	SW 4.02	4.002	SW 4.03	18.7	1.277	0.320	0.2618	
15 minute summer	SW 2.00	2.000	SW 1.01	1.9	0.529	0.032	0.0504	
15 minute summer	SW 1.02	1.002	SW 1.03	13.7	1.231	0.167	0.2117	
15 minute summer	SW 1.04	1.004	SW 1.05	15.1	1.393	0.184	0.1918	
15 minute summer	SW 3.00	3.000	SW 1.02	1.8	0.323	0.031	0.0792	
15 minute summer	SW 1.03	1.003	SW 1.04	15.1	1.309	0.257	0.1227	
30 minute summer	SW 1.06 TANK	1.006	SW FC 1.07	14.7	0.518	0.280	0.1907	
15 minute summer	SW 1.05	1.005	SW 1.06 TANK	18.2	1.790	0.252	0.2968	
30 minute summer	SW FC 1.07	1.007	SW 1.08	13.6	2.241	0.082	0.0204	
30 minute summer	SW 1.08	1.008	SW 1.09	13.5	1.669	0.091	0.0936	

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.34%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	SW 1.09	22	110.190	0.070	13.5	0.0112	0.0000	OK
30 minute summer	EX CW MH	22	110.114	0.054	13.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	SW 1.09	1.009	EX CW MH	13.2	1.485	0.129	0.0140	23.3

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.15%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.00	10	114.797	0.027	5.2	0.0022	0.0000	OK
15 minute summer	SW 4.00	10	115.297	0.047	6.4	0.0075	0.0000	OK
15 minute summer	SW 1.01	10	113.916	0.059	17.4	0.0093	0.0000	OK
30 minute summer	SW 4.03	19	111.841	0.261	52.6	0.2950	0.0000	SURCHARGED
15 minute summer	SW 4.01	10	114.963	0.173	37.4	0.1959	0.0000	OK
15 minute summer	SW 4.02	10	114.909	0.164	46.0	0.1850	0.0000	OK
15 minute summer	SW 2.00	10	114.075	0.042	4.5	0.0067	0.0000	OK
15 minute summer	SW 1.02	10	112.988	0.101	33.7	0.0160	0.0000	OK
15 minute summer	SW 1.04	10	112.390	0.110	36.8	0.0175	0.0000	OK
15 minute summer	SW 3.00	10	113.101	0.042	4.4	0.0066	0.0000	OK
15 minute summer	SW 1.03	10	112.559	0.144	37.1	0.0229	0.0000	OK
30 minute summer	SW 1.06 TANK	24	111.786	0.336	91.4	33.5474	0.0000	SURCHARGED
15 minute summer	SW 1.05	10	111.975	0.129	43.7	0.1455	0.0000	OK
30 minute summer	SW FC 1.07	25	111.768	0.383	24.5	0.9744	0.0000	SURCHARGED
30 minute summer	SW 1.08	25	111.106	0.061	23.7	0.0096	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	SW 1.00	1.000	SW 1.01	5.2	0.982	0.031	0.0500	
15 minute summer	SW 4.00	4.000	SW 4.01	6.3	0.333	0.096	0.5568	
15 minute summer	SW 1.01	1.001	SW 1.02	17.3	1.372	0.150	0.2549	
30 minute summer	SW 4.03	4.003	SW 1.06 TANK	51.9	1.598	0.992	0.5104	
15 minute summer	SW 4.01	4.001	SW 4.02	36.8	1.155	0.620	0.1102	
15 minute summer	SW 4.02	4.002	SW 4.03	45.5	1.558	0.779	0.5213	
15 minute summer	SW 2.00	2.000	SW 1.01	4.5	0.676	0.077	0.0936	
15 minute summer	SW 1.02	1.002	SW 1.03	33.5	1.518	0.406	0.4156	
15 minute summer	SW 1.04	1.004	SW 1.05	36.7	1.732	0.445	0.3709	
15 minute summer	SW 3.00	3.000	SW 1.02	4.4	0.406	0.075	0.1529	
15 minute summer	SW 1.03	1.003	SW 1.04	36.8	1.598	0.628	0.2443	
30 minute summer	SW 1.06 TANK	1.006	SW FC 1.07	24.5	0.616	0.467	0.2543	
15 minute summer	SW 1.05	1.005	SW 1.06 TANK	43.7	1.890	0.605	0.6272	
30 minute summer	SW FC 1.07	1.007	SW 1.08	23.7	2.552	0.143	0.0314	
30 minute summer	SW 1.08	1.008	SW 1.09	23.7	1.876	0.160	0.1464	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.15%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	SW 1.09	25	110.219	0.099	23.7	0.0158	0.0000	OK
30 minute summer	EX CW MH	25	110.133	0.073	23.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	SW 1.09	1.009	EX CW MH	23.7	1.692	0.231	0.0219	57.9

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.30%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.00	10	114.802	0.031	7.0	0.0025	0.0000	OK
15 minute summer	SW 4.00	10	115.305	0.055	8.7	0.0087	0.0000	OK
15 minute summer	SW 1.01	10	113.926	0.068	23.5	0.0109	0.0000	OK
15 minute summer	SW 4.03	12	112.064	0.484	76.6	0.5479	0.0000	SURCHARGED
15 minute summer	SW 4.01	11	115.083	0.293	50.5	0.3312	0.0000	SURCHARGED
15 minute summer	SW 4.02	11	115.013	0.268	60.3	0.3035	0.0000	SURCHARGED
15 minute summer	SW 2.00	10	114.082	0.049	6.1	0.0078	0.0000	OK
15 minute summer	SW 1.02	10	113.010	0.122	45.5	0.0195	0.0000	OK
15 minute summer	SW 1.04	10	112.414	0.133	49.5	0.0212	0.0000	OK
15 minute summer	SW 3.00	10	113.107	0.048	5.9	0.0076	0.0000	OK
15 minute summer	SW 1.03	10	112.594	0.179	49.9	0.0284	0.0000	OK
60 minute summer	SW 1.06 TANK	43	111.947	0.497	91.6	49.5282	0.0000	SURCHARGED
15 minute summer	SW 1.05	11	112.007	0.161	58.7	0.1823	0.0000	OK
60 minute summer	SW FC 1.07	43	111.928	0.543	25.4	1.3811	0.0000	SURCHARGED
30 minute summer	SW 1.08	21	111.106	0.061	24.0	0.0097	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	SW 1.00	1.000	SW 1.01	7.0	1.068	0.042	0.0619	
15 minute summer	SW 4.00	4.000	SW 4.01	8.6	0.343	0.131	0.6778	
15 minute summer	SW 1.01	1.001	SW 1.02	23.3	1.455	0.203	0.3232	
15 minute summer	SW 4.03	4.003	SW 1.06 TANK	75.4	2.034	1.441	0.5104	
15 minute summer	SW 4.01	4.001	SW 4.02	48.5	1.220	0.818	0.1376	
15 minute summer	SW 4.02	4.002	SW 4.03	60.4	1.575	1.033	0.6874	
15 minute summer	SW 2.00	2.000	SW 1.01	6.1	0.739	0.104	0.1160	
15 minute summer	SW 1.02	1.002	SW 1.03	45.1	1.596	0.547	0.5279	
15 minute summer	SW 1.04	1.004	SW 1.05	49.4	1.800	0.599	0.4763	
15 minute summer	SW 3.00	3.000	SW 1.02	5.9	0.426	0.101	0.1941	
15 minute summer	SW 1.03	1.003	SW 1.04	49.5	1.688	0.844	0.3099	
60 minute summer	SW 1.06 TANK	1.006	SW FC 1.07	25.4	0.638	0.484	0.2543	
15 minute summer	SW 1.05	1.005	SW 1.06 TANK	58.3	1.928	0.808	0.7247	
60 minute summer	SW FC 1.07	1.007	SW 1.08	24.0	2.559	0.145	0.0317	
30 minute summer	SW 1.08	1.008	SW 1.09	24.0	1.881	0.162	0.1478	

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.30%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW 1.09	56	110.220	0.100	24.0	0.0159	0.0000	OK
60 minute summer	EX CW MH	56	110.134	0.074	24.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW 1.09	1.009	EX CW MH	24.0	1.696	0.234	0.0221	97.9

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.17%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.00	10	114.800	0.030	6.5	0.0024	0.0000	OK
15 minute summer	SW 4.00	10	115.303	0.053	8.0	0.0083	0.0000	OK
15 minute summer	SW 1.01	10	113.923	0.066	21.8	0.0105	0.0000	OK
30 minute summer	SW 4.03	19	112.002	0.422	66.6	0.4775	0.0000	SURCHARGED
15 minute summer	SW 4.01	11	115.011	0.221	46.9	0.2505	0.0000	OK
15 minute summer	SW 4.02	11	114.949	0.204	57.3	0.2312	0.0000	OK
15 minute summer	SW 2.00	10	114.080	0.047	5.7	0.0075	0.0000	OK
15 minute summer	SW 1.02	10	113.004	0.117	42.3	0.0185	0.0000	OK
15 minute summer	SW 1.04	10	112.407	0.127	46.1	0.0202	0.0000	OK
15 minute summer	SW 3.00	10	113.105	0.046	5.5	0.0074	0.0000	OK
15 minute summer	SW 1.03	10	112.584	0.169	46.4	0.0268	0.0000	OK
60 minute summer	SW 1.06 TANK	43	111.911	0.461	86.6	45.9717	0.0000	SURCHARGED
15 minute summer	SW 1.05	11	111.997	0.151	54.6	0.1705	0.0000	OK
60 minute summer	SW FC 1.07	43	111.892	0.507	25.2	1.2904	0.0000	SURCHARGED
60 minute winter	SW 1.08	47	111.106	0.061	24.0	0.0097	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	SW 1.00	1.000	SW 1.01	6.5	1.044	0.039	0.0588	
15 minute summer	SW 4.00	4.000	SW 4.01	7.9	0.339	0.121	0.6689	
15 minute summer	SW 1.01	1.001	SW 1.02	21.7	1.439	0.189	0.3047	
30 minute summer	SW 4.03	4.003	SW 1.06 TANK	65.6	1.684	1.253	0.5104	
15 minute summer	SW 4.01	4.001	SW 4.02	45.8	1.183	0.772	0.1341	
15 minute summer	SW 4.02	4.002	SW 4.03	57.0	1.597	0.975	0.6365	
15 minute summer	SW 2.00	2.000	SW 1.01	5.7	0.726	0.097	0.1103	
15 minute summer	SW 1.02	1.002	SW 1.03	41.9	1.579	0.508	0.4973	
15 minute summer	SW 1.04	1.004	SW 1.05	45.9	1.790	0.557	0.4457	
15 minute summer	SW 3.00	3.000	SW 1.02	5.5	0.422	0.094	0.1828	
15 minute summer	SW 1.03	1.003	SW 1.04	46.1	1.669	0.785	0.2921	
60 minute summer	SW 1.06 TANK	1.006	SW FC 1.07	25.2	0.633	0.480	0.2543	
15 minute summer	SW 1.05	1.005	SW 1.06 TANK	55.5	1.920	0.768	0.7024	
60 minute summer	SW FC 1.07	1.007	SW 1.08	24.0	2.559	0.145	0.0317	
60 minute winter	SW 1.08	1.008	SW 1.09	24.0	1.881	0.162	0.1478	

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.17%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	SW 1.09	47	110.220	0.100	24.0	0.0159	0.0000	OK
60 minute winter	EX CW MH	47	110.134	0.074	24.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	SW 1.09	1.009	EX CW MH	24.0	1.696	0.234	0.0221	92.5

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.24%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.00	10	114.806	0.036	9.1	0.0029	0.0000	OK
15 minute summer	SW 4.00	11	115.355	0.105	11.3	0.0166	0.0000	OK
15 minute summer	SW 1.01	10	113.936	0.079	30.6	0.0125	0.0000	OK
15 minute summer	SW 4.03	12	112.365	0.785	98.2	0.8880	0.0000	SURCHARGED
15 minute summer	SW 4.01	11	115.338	0.548	65.1	0.6197	0.0000	SURCHARGED
15 minute summer	SW 4.02	11	115.224	0.479	77.4	0.5418	0.0000	SURCHARGED
15 minute summer	SW 2.00	10	114.090	0.057	8.0	0.0090	0.0000	OK
15 minute summer	SW 1.02	11	113.043	0.156	59.3	0.0247	0.0000	OK
15 minute summer	SW 1.04	12	112.553	0.273	63.9	0.0434	0.0000	SURCHARGED
15 minute summer	SW 3.00	10	113.114	0.055	7.7	0.0087	0.0000	OK
15 minute summer	SW 1.03	11	112.747	0.331	64.5	0.0527	0.0000	SURCHARGED
60 minute summer	SW 1.06 TANK	46	112.172	0.722	117.8	71.9940	0.0000	SURCHARGED
30 minute summer	SW 1.05	20	112.287	0.441	68.2	0.4987	0.0000	SURCHARGED
60 minute summer	SW FC 1.07	46	112.154	0.769	26.3	1.9582	0.0000	SURCHARGED
180 minute summer	SW 1.08	140	111.106	0.061	24.0	0.0097	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	SW 1.00	1.000	SW 1.01	9.1	1.146	0.055	0.0748	
15 minute summer	SW 4.00	4.000	SW 4.01	12.0	0.408	0.182	0.8303	
15 minute summer	SW 1.01	1.001	SW 1.02	30.5	1.502	0.265	0.4141	
15 minute summer	SW 4.03	4.003	SW 1.06 TANK	96.7	2.431	1.848	0.5104	
15 minute summer	SW 4.01	4.001	SW 4.02	62.0	1.560	1.045	0.1376	
15 minute summer	SW 4.02	4.002	SW 4.03	77.1	1.938	1.318	0.7013	
15 minute summer	SW 2.00	2.000	SW 1.01	8.0	0.794	0.137	0.1415	
15 minute summer	SW 1.02	1.002	SW 1.03	58.3	1.614	0.706	0.6519	
15 minute summer	SW 1.04	1.004	SW 1.05	63.2	1.820	0.766	0.6910	
15 minute summer	SW 3.00	3.000	SW 1.02	7.7	0.438	0.132	0.2509	
15 minute summer	SW 1.03	1.003	SW 1.04	63.9	1.695	1.089	0.4223	
60 minute summer	SW 1.06 TANK	1.006	SW FC 1.07	26.3	0.662	0.502	0.2543	
30 minute summer	SW 1.05	1.005	SW 1.06 TANK	65.6	1.782	0.909	0.8210	
60 minute summer	SW FC 1.07	1.007	SW 1.08	24.0	2.559	0.144	0.0317	
180 minute summer	SW 1.08	1.008	SW 1.09	24.0	1.881	0.162	0.1478	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.24%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute summer	SW 1.09	140	110.220	0.100	24.0	0.0159	0.0000	OK
180 minute summer	EX CW MH	140	110.134	0.074	24.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute summer	SW 1.09	1.009	EX CW MH	24.0	1.696	0.234	0.0221	176.2

Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 99.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.00	10	114.807	0.037	9.8	0.0030	0.0000	OK
15 minute summer	SW 4.00	11	115.424	0.174	12.1	0.0277	0.0000	OK
15 minute summer	SW 1.01	10	113.939	0.082	32.7	0.0130	0.0000	OK
60 minute summer	SW 4.03	46	112.737	1.156	73.1	1.3080	0.0000	SURCHARGED
15 minute summer	SW 4.01	11	115.417	0.627	66.9	0.7088	0.0000	SURCHARGED
15 minute summer	SW 4.02	11	115.290	0.545	82.2	0.6159	0.0000	SURCHARGED
15 minute summer	SW 2.00	10	114.091	0.058	8.5	0.0093	0.0000	OK
15 minute summer	SW 1.02	12	113.105	0.218	63.4	0.0346	0.0000	OK
60 minute summer	SW 1.04	47	112.740	0.460	47.3	0.0732	0.0000	SURCHARGED
15 minute summer	SW 3.00	10	113.116	0.057	8.2	0.0090	0.0000	OK
15 minute summer	SW 1.03	12	112.848	0.433	68.7	0.0689	0.0000	SURCHARGED
60 minute summer	SW 1.06 TANK	47	112.726	1.276	125.2	74.8624	0.0000	SURCHARGED
60 minute summer	SW 1.05	47	112.734	0.888	55.4	1.0043	0.0000	SURCHARGED
60 minute summer	SW FC 1.07	47	112.709	1.324	26.9	3.3690	0.0000	FLOOD RISK
60 minute winter	SW 1.08	86	111.106	0.061	24.0	0.0097	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	SW 1.00	1.000	SW 1.01	9.8	1.173	0.059	0.0786	
15 minute summer	SW 4.00	4.000	SW 4.01	14.0	0.388	0.212	1.0444	
15 minute summer	SW 1.01	1.001	SW 1.02	32.6	1.507	0.283	0.5117	
60 minute summer	SW 4.03	4.003	SW 1.06 TANK	72.0	1.811	1.376	0.5104	
15 minute summer	SW 4.01	4.001	SW 4.02	65.7	1.651	1.106	0.1376	
15 minute summer	SW 4.02	4.002	SW 4.03	82.1	2.064	1.404	0.7016	
15 minute summer	SW 2.00	2.000	SW 1.01	8.5	0.805	0.145	0.1484	
15 minute summer	SW 1.02	1.002	SW 1.03	62.0	1.610	0.752	0.7470	
60 minute summer	SW 1.04	1.004	SW 1.05	46.6	1.753	0.565	0.6910	
15 minute summer	SW 3.00	3.000	SW 1.02	8.2	0.437	0.140	0.3183	
15 minute summer	SW 1.03	1.003	SW 1.04	67.7	1.703	1.154	0.4223	
60 minute summer	SW 1.06 TANK	1.006	SW FC 1.07	26.9	0.676	0.513	0.2543	
60 minute summer	SW 1.05	1.005	SW 1.06 TANK	53.2	1.649	0.737	0.8210	
60 minute summer	SW FC 1.07	1.007	SW 1.08	24.0	2.559	0.144	0.0317	
60 minute winter	SW 1.08	1.008	SW 1.09	24.0	1.881	0.162	0.1478	

Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 99.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	SW 1.09	86	110.220	0.100	24.0	0.0159	0.0000	OK
60 minute winter	EX CW MH	86	110.134	0.074	24.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	SW 1.09	1.009	EX CW MH	24.0	1.696	0.234	0.0221	139.0

Torsion Projects

Tomlinson House

Capitol Boulevard

Morley

Leeds

LS27 0TS

FAO Gareth Hicks / Abigail Sadler

RE: Torsion Hinckley – Discharge of Condition 26 – Soakaway Testing

This letter has been prepared for the benefit of Torsion Projects in relation to the new development between Marchant Road and Coventry Road. The site has planning permission for the 72 bed care home under planning application 25/00354/FUL, approved 02/04/25. Condition 26 of this permission is worded as follows:

No development approved by this planning permission shall take place until such time as infiltration testing has been carried out (or suitable evidence to preclude testing) to confirm or otherwise, the suitability of the site for the use of infiltration as a drainage element, has been submitted to and approved in writing by the Local Planning Authority.

To assist with the discharge of this condition and enable development to commence on site, the groundworker was instructed to undertake BRE365 soakaway tests at several locations on site. These locations are shown on 25202-DCE-XX-XX-D-C-SK010 - Soakaway Tests. Results are as follows:

- Soakaway Trench 1 – New Car Park. Excavation to 2m total depth into natural ground. 1m of made ground. 1m of firm clay. Water ingress was noted during the works. Water level raised during the works. Water stayed perched within the pit at same depth after 12 – 16 hours (overnight). Groundwater is assumed to be perched within the made ground layer and infiltration is not possible into the clay layer.
- Soakaway Trench 2 – Attenuation tank location. Excavation to 1.5m total depth into natural ground. Water ingress was noted during the works. Water level raised during the works. Water stayed perched within the pit at same depth after 12 – 16 hours (overnight). Groundwater is assumed to be perched, and infiltration is not possible. It is noted that there is a blocked manhole nearby which has an equivalent groundwater level.
- Soakaway Trench 3 – Future garden. Excavation to 1.0m total depth into natural ground. No water ingress noted. Topsoil and rubble down to 0.5m. Firm clay beyond.
- Two further trial holes dug under the building footprint to 2.5m. Made ground noted down to 1.8m in both, with firm clay beyond to the bottom of the excavation. No water ingress noted.

The above information is consistent with the Phase 2 Site Investigation by Solmek. Photographs of the excavations by the contractor is at the rear of this document, 160126 Torsion Projects Hinckley Soak Away Testing

The trial pits were undertaken at the proposed base level of the new drainage systems. In all cases, the drainage systems will sit within firm clays which are topped with made ground. It is evident from the lack of the movement in the groundwater that these clays are not permeable and no change in water level was noted over a period of up to 24 hours.



Following these observations, full BRE365 soakaway tests were not undertaken as from these observations the tests would have been unsuccessful in establishing an infiltration rate.

On this basis, infiltration is not possible on this site and the original drainage outfall route, via the Severn Trent Sewer at the south east corner of the site, is to be utilised as per the previous planning submissions.

Yours faithfully

A handwritten signature in black ink, appearing to read 'Sebastian Reid', located below the 'Yours faithfully' text.

Sebastian Reid CEng MICE MCIHT
Technical Director
For Dudleys Consulting Engineers Ltd

Soak Away 1



- Depth of fill material approx. 1 meter dark clay after 1 meter. Slight water ingress during excavation, water still present to 300mm depth after being left overnight.

Soak Away 2

Fill material approx. 500mm deep, excavated down to 1500mm, water ingress during excavation, clay material after 500mm, water still present at 800mm after being left overnight.





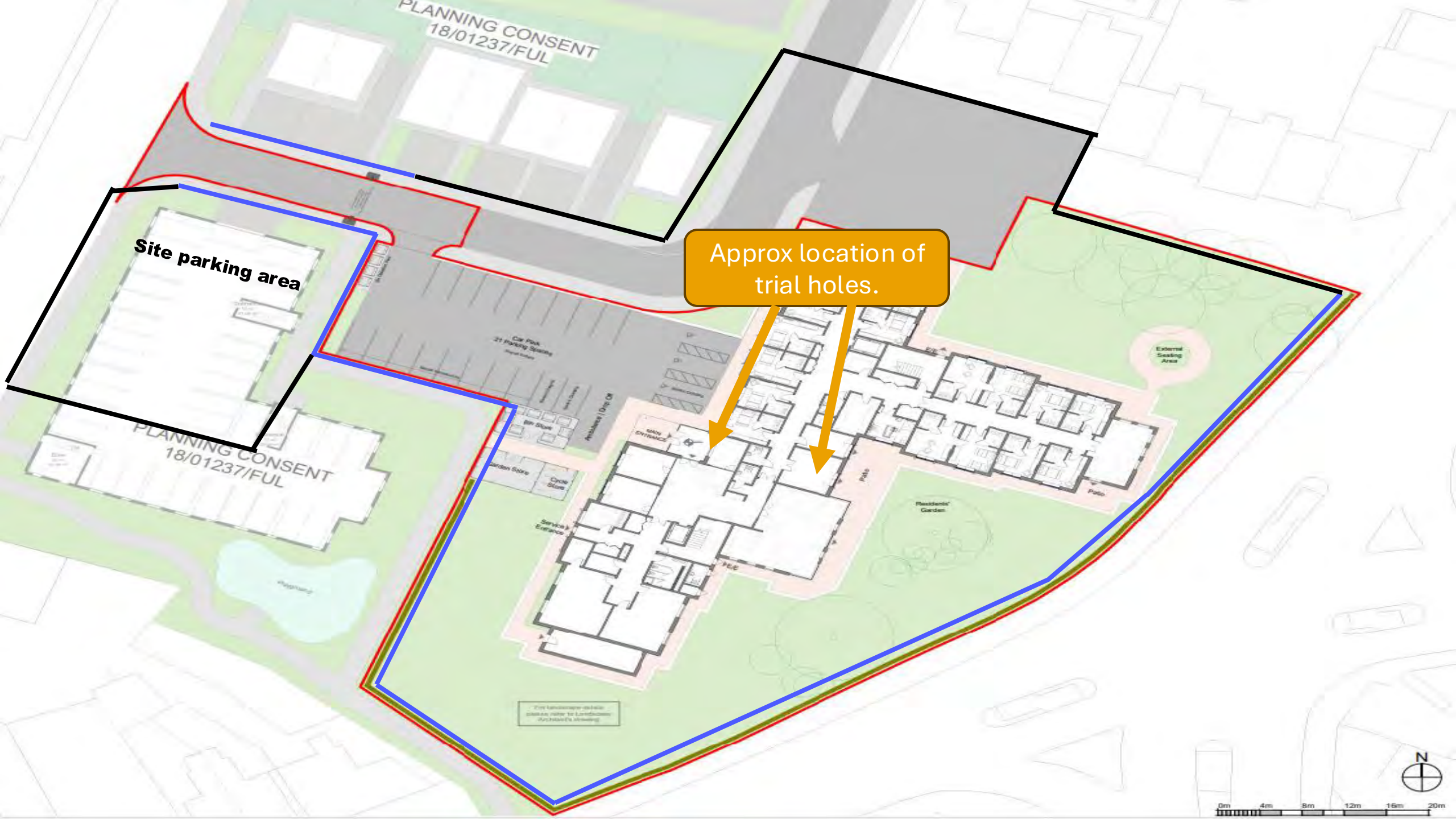
Soak Away 3

Dry brown clay found at 500mm below surface, no water ingress during excavation.

Trial Holes

Extar two trial holes dug to a depth of approx. 2.5m. Firm clay found at approx. 1.8m in both holes, no water ingress during the excavation.





PLANNING CONSENT
18/01237/FUL

Site parking area

PLANNING CONSENT
18/01237/FUL

Approx location of
trial holes.

Car Park
21 parking spaces

Residents' Garden

External Seating Area

The landscaping details shown refer to Landscape Architect's drawing

0m 4m 8m 12m 16m 20m



Technical Specification

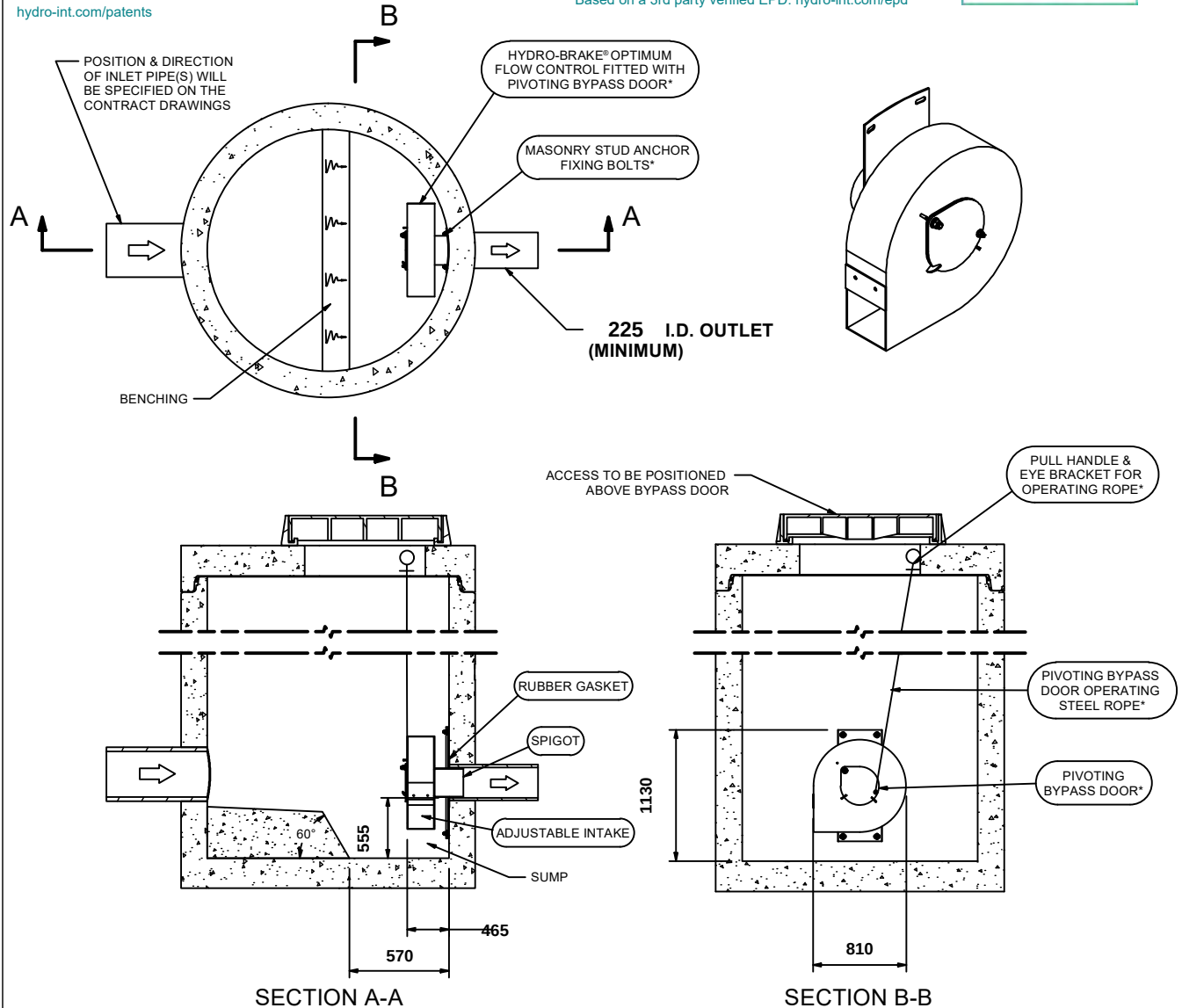
Control Point	Head (m)	Flow (l/s)
Primary Design	1.300	24.000
Flush-Flo™	0.410	23.995
Kick-Flo®	0.898	20.112
Mean Flow		20.507

hydro-int.com/patents

This Hydro-Brake® Optimum includes:

- All in 5 mm Grade 304L stainless steel
- Integral pivoting by-pass door allowing clear line of sight through to outlet, c/w operating rope
- Media blasted for corrosion resistance
- Variable flow rate post installation via adjustable inlet (if necessary)
- Indicative Weight: 85 kg
- Product Carbon Footprint: 359.65 kgCO2e

Based on a 3rd party verified EPD: hydro-int.com/epd



IMPORTANT: ○ LIMIT OF HYDRO INTERNATIONAL SUPPLY
THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
ALL CIVIL AND INSTALLATION WORK BY OTHERS
* WHERE SUPPLIED
HYDRO-BRAKE® IS A REGISTERED TRADEMARK FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY
HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE



The head/flow characteristics of this SHE-0211-2400-1300-2400 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro International
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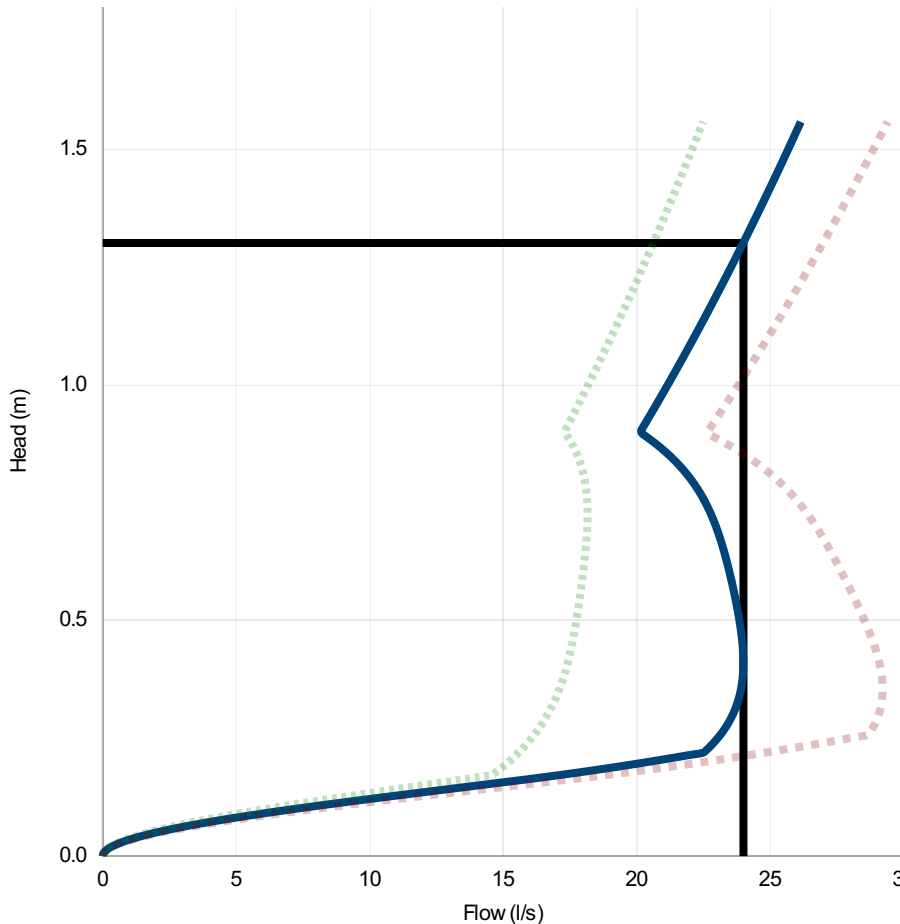
DATE	10/02/2026 11:15	SHE-0211-2400-1300-2400 Hydro-Brake® Optimum
SITE	Torsion Hinckley	
DESIGNER	Seb Reid	
REF	S1.07	

Technical Specification

	Original Setting		Minimum Setting		Maximum Setting	
Control Point	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
Primary Design	1.300	24.000	1.300	20.625	1.300	26.982
Flush-Flo™	0.410	23.995	0.726	18.159	0.354	29.214
Kick-Flo®	0.898	20.112	0.898	17.280	0.896	22.608
Mean Flow		20.507		16.350		23.742



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Head (m)	Flow (l/s)
0.000	0.000
0.045	1.616
0.090	5.914
0.134	11.872
0.179	18.060
0.224	22.601
0.269	23.286
0.314	23.703
0.359	23.921
0.403	23.994
0.448	23.965
0.493	23.867
0.538	23.726
0.583	23.557
0.628	23.362
0.672	23.132
0.717	22.842
0.762	22.456
0.807	21.923
0.852	21.185
0.897	20.187
0.941	20.572
0.986	21.032
1.031	21.481
1.076	21.921
1.121	22.351
1.166	22.772
1.210	23.186
1.255	23.591
1.300	23.989

DESIGN ADVICE



The head/flow characteristics of this SHE-0211-2400-1300-2400 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro
International
A CRH COMPANY

DATE 10/02/2026 11:15

Site Torsion Hinckley

DESIGNER Seb Reid

Ref S1.07

SHE-0211-2400-1300-2400

Hydro-Brake® Optimum

SDS GEOLight®

Stormwater Management System

Product Profile

SDS GEOLight® is an ultra lightweight honeycombed modular structure made from recycled PVC. The ready to install units are preformed to provide an underground stormwater storage facility, for the application of stormwater attenuation or infiltration.

The high void rate (>95%), high compressive strength (to 1000KN/m²) and low resistance to water flow makes

SDS GEOLight® an ideal material for cost efficient and maintainable underground water storage during storm conditions.

SDS GEOLight® Benefits

- High compressive strength – can be located under all roads, car parks and amenity area surfaces.
- Reduced excavation costs – the very high void rate (95%) minimises the required volume of earthworks.
- Speed of installation – 1000m³ reservoir, completed in one week.
- Light and easy to handle.
- Excellent hydraulic characteristics.
- The honeycomb structure is highly permeable, offering low resistance to water flow.
- SDS GEOLight®'s unique lateral and vertical filling arrangement requires a minimum amount of pipework and stone.
- Depth of tank invert reduced by using patented lateral supply.
- Simplified distribution pipe network, easy maintenance – dispensing with costly and complicated pipework configurations.
- Modular format offers design flexibility to overcome topographical constraints and architectural requirements.
- Greatly reduces the risk of flooding when used as stormwater storage.
- Can also be used for water recycling and combining with irrigation systems.
- Can virtually eliminate pollution when used in combination with specialist separation and filtration technology such as SDS Aqua-Swirl™ and SDS Aqua-Filter™.
- Design service available, including calculations.



APPLICATIONS



RETAIL



INFRASTRUCTURE



INDUSTRIAL



RESIDENTIAL



COMMERCIAL



PUBLIC SECTOR



Material	Recycled Rigid PVC		
Colour	Dark grey to black		
Standard length of a block	2000 mm	2000 mm	2000 mm
Standard width of a block	500 mm	500 mm	500 mm
Standard height of a block*	750 mm	750 mm	750 mm

Void Ratio	> 95%	> 95%	> 95%
Compressive Strength	420 kN/m ²	610 kN/m ²	800 kN/m ²



SDS GEOLight® 400	SDS GEOLight® 600	SDS GEOLight® 800
APPLICATIONS		
Stormwater Management		
Attenuation / Infiltration		
Bacterial filter-bed for biological treatment		
Hydrocarbon Separation		
Filtration and Separation Units		
SPECIFICATIONS		
Recycled Rigid PVC		
Dark grey to black		
2000 mm	2000 mm	2000 mm
500 mm	500 mm	500 mm
750 mm	750 mm	750 mm
*Other block sizes available on request		
> 95%	> 95%	> 95%
420 kN/m ²	610 kN/m ²	800 kN/m ²
ADVANTAGES		
Highly cost effective		
Reduced excavation costs		
High void capacity		
Good UV resistance		
Good hydrocarbon resistance		

STORMWATER TREATMENT

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 coarse sediment, debris and free-floating oil from surface water runoff.

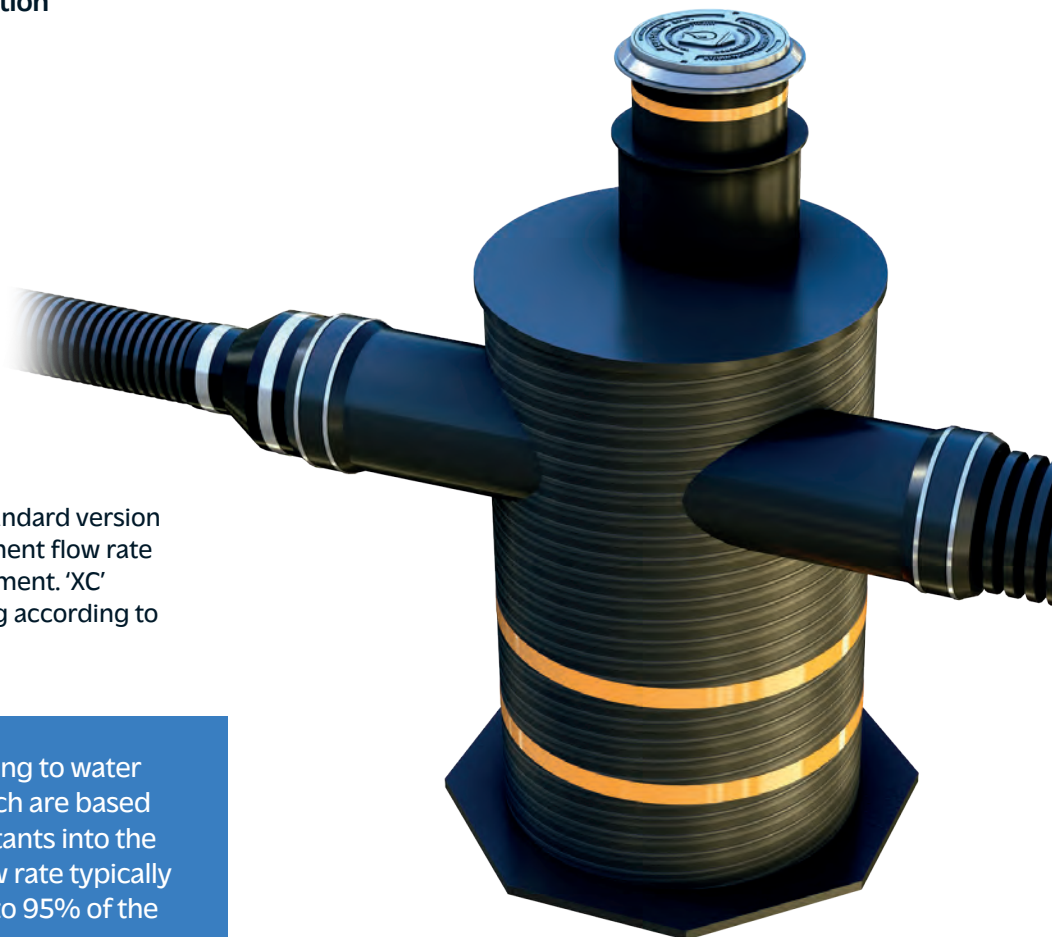
When connected to a SDS SYMBiotIC™ system, SDS Aqua-Swirl® provides real time data on a broad range of key operating factors such as pollutant loads and silt capture level.

SYMBiotIC™

- BBA HAPAS approved
- HDPE plastic modular 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 supplied in the standard version when sizing to its water quality treatment flow rate according to OK-110 (coarse) test sediment. 'XC' versions are also available when sizing according to the NJDEP (finer) test sediment.

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.



Features	Benefits
Performance monitoring available 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 National Highways.
NJCAT/NJDEP-verified performance for sediment removal and retention.	Verification accepted by the Environment Agency (as cited in the CIRIA C753 SuDS Manual).
'XC' models meet NJDEP testing protocol.	Ensures that particulates and adhered pollutants are not mobilised during major storm events, maximising the capture of floating debris, oil and hydrocarbons.
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.
Bespoke construction.	No on-site assembly required.
Specialised sealed baffle.	Prevents captured floatables from escaping.
Internal bypass with pollution retention.	Able to treat localised rain and larger storm events while retaining captured pollutants.
Single easy-access chamber for pollutant removal and storage.	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

Aqua-Swirl® Model No.	Maximum ID Pipe Connection (mm) BYP ¹	Chamber Internal Diameter (mm)	Water Quality Treatment Flow Rate OK-110 Coarse (l/s) Model AS- ²	Water Quality Treatment Flow Rate NJDEP Fine (l/s) Model XC-	Oil/ Debris Storage Capacity (litres)	Sediment Storage Capacity (m³)	Aqua-Swirl® Weight (kg)
AS-2/XC-2	375	750	30	16	136	0.3	300
AS-3/XC-3	500	1050	53	31	416	0.6	700
AS-4/XC-4	600	1200	77	40	644	0.8	1000
AS-5/XC-5	750	1500	120	63	1382	1.3	1100
AS-6/XC-6	900	1800	173	91	1439	1.8	1400
AS-7/XC-7	1050	2100	235	123	1987	2.5	1700
AS-8/XC-8	1200	2400	307	161	2612	3.3	2200
AS-9/XC-9	1350	2800	418	220	3596	4.4	2600
AS-10/XC-10	1500	3000	480	252	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.

² Based on the Tennessee Tech University 'Laboratory Evaluation of TSS Removal Efficiency for the Aqua-Swirl® Concentrator Stormwater Treatment System'.

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/0125

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.