Our Reference : D4707-L-01
Date : 29th September 2025

St Cecilia's Car Park Extension, Longridge, Preston
Surface Water Drainage Supporting Statement

Introduction

PSA Design have been asked to undertake the detailed surface water drainage design for a car park extension at St Cecilias RC High School, Chapel Hill, Longridge, Preston, PR3 2XA.

The design relates to Planning Application Reference - (3/2024/1020). The associated drainage condition is extracted and reproduced below.

Condition 3 -

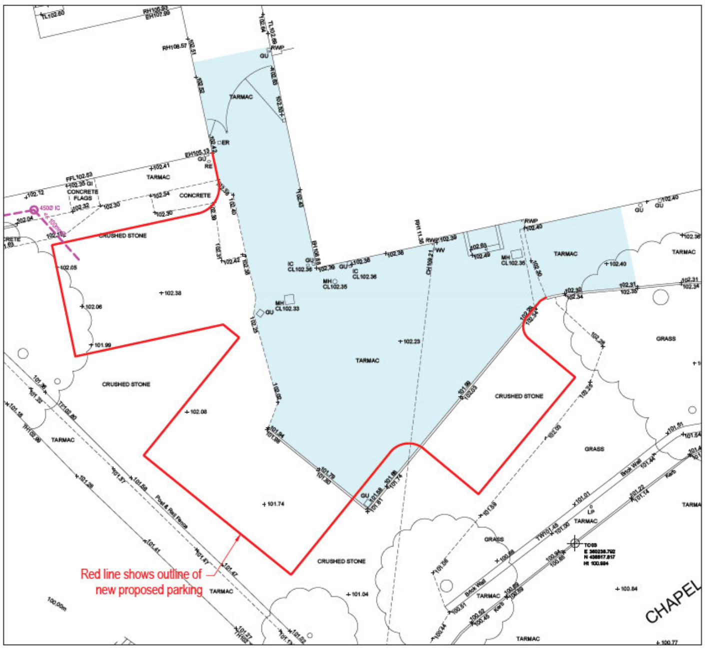
Prior to commencement of the development details of the drainage strategy shall be submitted to and approved in writing by the Local Planning Authority. The surface water from the approved car park should be collected within the site and drained to a suitable internal outfall. The scheme shall be implemented in accordance with the approved details.

Proposed Works

In so far as the surface water drainage works relate, the proposed works have been transferred onto PSA Design Drawing D4707-D-01, which is included in **Annex 1**.

Existing Site and Drainage Regime

The existing car park area is to the south of the school, immediately adjacent to Chapel Hill. The existing topographical survey is shown on PSA Design Drawing D4707-D-01 and an extract included below.



The area highlighted in blue represents the existing impermeable contributing area entering the existing drainage system. Surface water is collected via 2 road gullies. The total area is calculated at 300m^2. Using a simple estimation, 300m^2 would equate to 4.2l/s and 12l/s during a 1 in 1yr and 1 in 100yr run-off event respectively.

The existing drainage records are also highlighted on PSA Drawing D4707-D-01. As can be seen, the site is well served by foul and surface water sewers and the detail records were available following recent construction works on the wider development. Foul sewage exists the site via the car park entrance into the adopted foul sewer running down Chapel Hill. Surface water outfalls into a large 450mm dia pipe which exits the site to the east.

Consideration of Sustainable Drainage Systems

There are a number of options for the provision of surface water drainage for the proposed development:

- Discharge via infiltration.
- Discharge to local watercourse.
- Discharge to public sewer.

Based on the hierarchical approach, the first option to be considered for surface water disposal for all proposed development must be infiltration into the ground. Even when there are alternative sewer connections or watercourses available, infiltration must still be utilised unless it is proved unfeasible. Normally to identify the suitability of the ground for infiltration, percolation testing is carried out to calculate the infiltration rate.   Where the underlying soil conditions are relatively impermeable, for example clay, the infiltration rate may be too low for soakaways to be designed to adequately cope with storm events from the site.

Accordingly, insitu percolation tests, supervised by a Chartered Engineer, were undertaken on the site on the 3rd September 2025 with the results re-produced at **Annex 2**.   Two pits were excavated as shown in the photographs below.

Following review of BGS Mapping, not surprisingly, the observed soil consisted of solid clay. Both pit experienced zero drop in water over a period of 3 hours. Drainage via infiltration is therefore ruled out.

The next preferred hierarchical solution for dealing with surface water run-off from a development is discharge to a watercourse. There are no culverted or open watercourses in or surrounding the site that offer a viable means of connection.

It is therefore proposed to drain the surface water drainage from the site utilising the same surface water sewer that drains the existing car park and wider school area.

Surface Water Management Strategy

National Planning Policy Framework (NPPF, 2024), outlines that SuDS must be included within any proposed development scheme where it is practicable to do so. In order to demonstrate that the development will meet with the requirements, the drainage strategy should show;

- That it will be feasible to balance surface water run-off to the Greenfield run-off rate, or existing run-off rate in terms of certain brownfield developments, for all events up to the 1 in 100-year storm and set out how this will be achieved.

As the development site is located within the Ribble Management Catchment area, reference to the peak rainfall allowance map sets out the allowances below.

Scenario	Event	Central Allowance	Upper End Allowance
3.3% annual exceedance rainfall event	2050s	25%	35%
	2070s	30%	40%
1% annual exceedance rainfall event	2050s	25%	40%
	2070s	35%	50%

Therefore, CC should also be taken into account by increasing the proposed rainfall intensity by 40% when assessing against the 3.3% (1 in 33) storm event and 50% when assessing against the 1% (1 in 100) storm event

As the site is being redeveloped, in accordance with SuDS best practice, the site will be considered "greenfield".

Proposed Foul & Surface Water Drainage Design

PSA Design drawing presents the proposed drainage based on the above criteria. The scheme Drawings are included as **Annex 1.**

Regardless of this existing regime, to meet with the guidance set out above, any surface water discharge from the redeveloped site must be restricted to existing greenfield run-off rates. Equivalent greenfield run-off rates on at this site would equate to <1.0l/s. It is therefore proposed that the minimum allowable discharge rate for the site should be restricted to 2l/s. Any rate lower than this is likely to have maintenance issues in providing a compliant solution. In any event, this rate will be discussed and approved with the relevant authority at detailed design stage.

A simple piped drainage system, combined with a cellular attenuation and a purpose made orifice control chamber is proposed.

The design drawing shows that the catchment area from the proposed new extended car park also includes for the wider contributing area, which, due to topography, will inevitably make its way into the new system.

The system has been modelled in Causeway's "Flow" software. The results are included as **Annex 3**. Based on a 0.8m deep cellular storage system, calculations indicate a minimum 22m^3 would be required to wholly contain the 1 in 100yr + 50%cc event. This equates to a storage footprint of 30m^2

The outfall from the controlled system would be run easterly (exact details to be agreed on site) with eventual outfall into the existing surface water MH.

As noted above, the proposed SuDS system represents a significant betterment compared to the existing scenario. Proposed flow rates will be more than half the existing during 1 in 1yr run-off events and a sixth of the existing peak 1 in 100yr event. The proposals also cater for a 50% increase relating to a climate change allowance.

Exceedance Flow Routes

Exceedance flood flow routes would be unaltered to those of the existing site. Exceedance flows would naturally follow the topography of the land onto the grassed area to the south before leaving the site and draining into the road drainage system associated with Chapel Hill.

Maintenance of the Proposed System

Maintenance of the proposed drainage system would be incorporated into the existing school maintenance regime. The Controflow® chamber has an inbuilt silt trap and debris filter and all upstream inspection chambers incorporate silt traps to aide and reduce maintenance.

Summary

It has therefore been demonstrated that a SuDS solution that meets with the requirements of current legislation is deliverable within the constraints of the site and will ensure that flood risk both on and off site will actually be reduced.

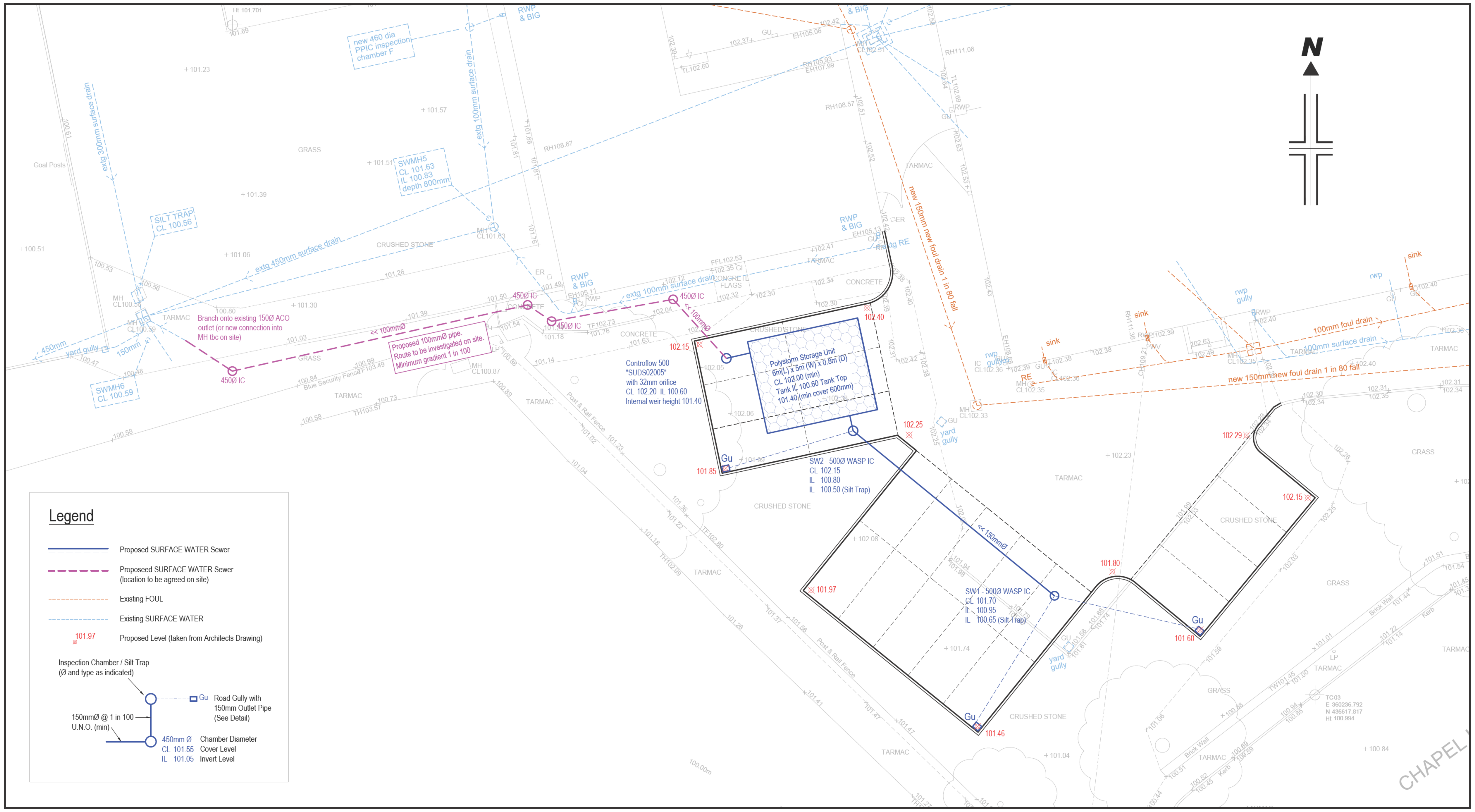
Yours sincerely,

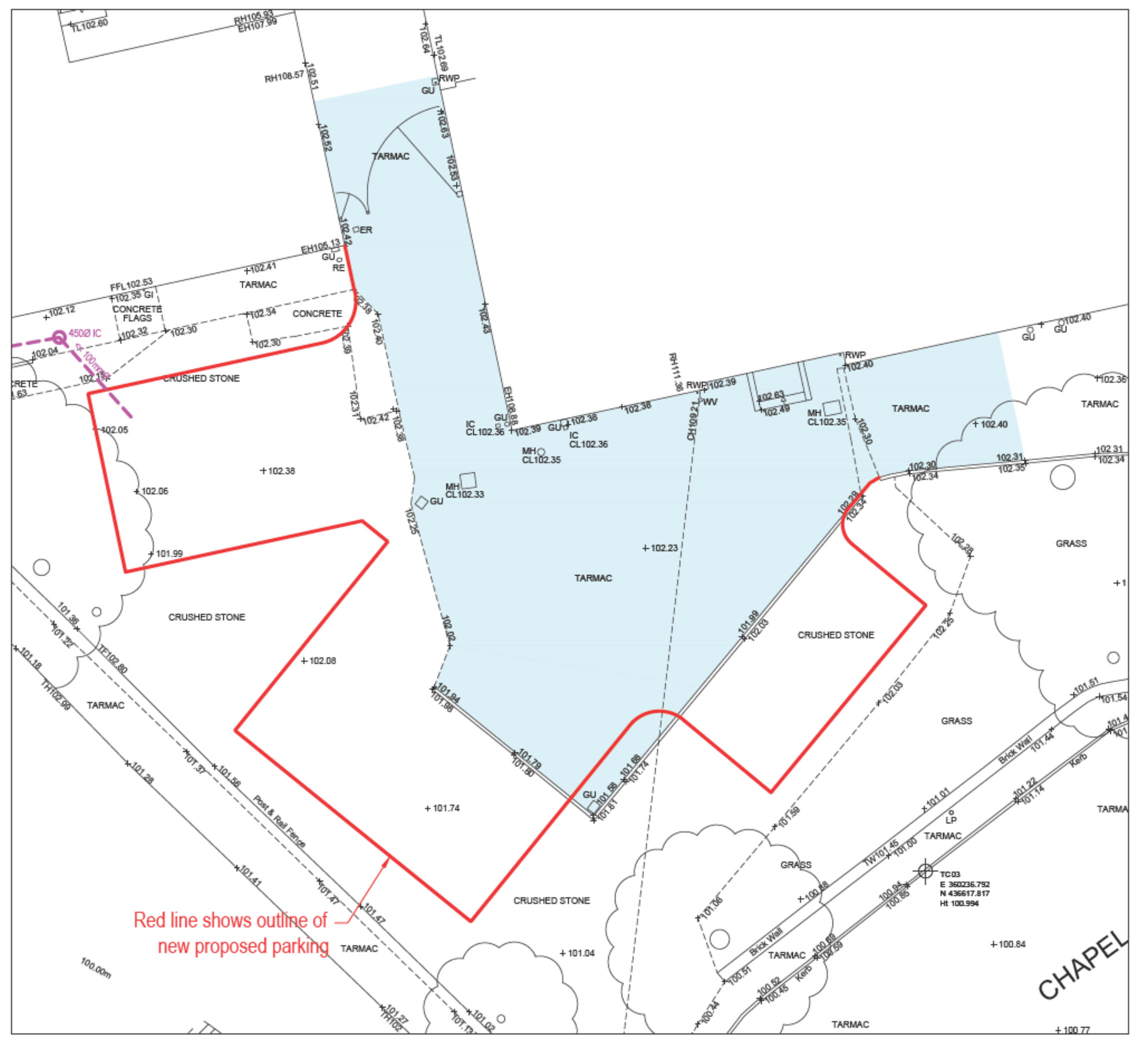
[redacted]

Director, PSA Design Ltd.

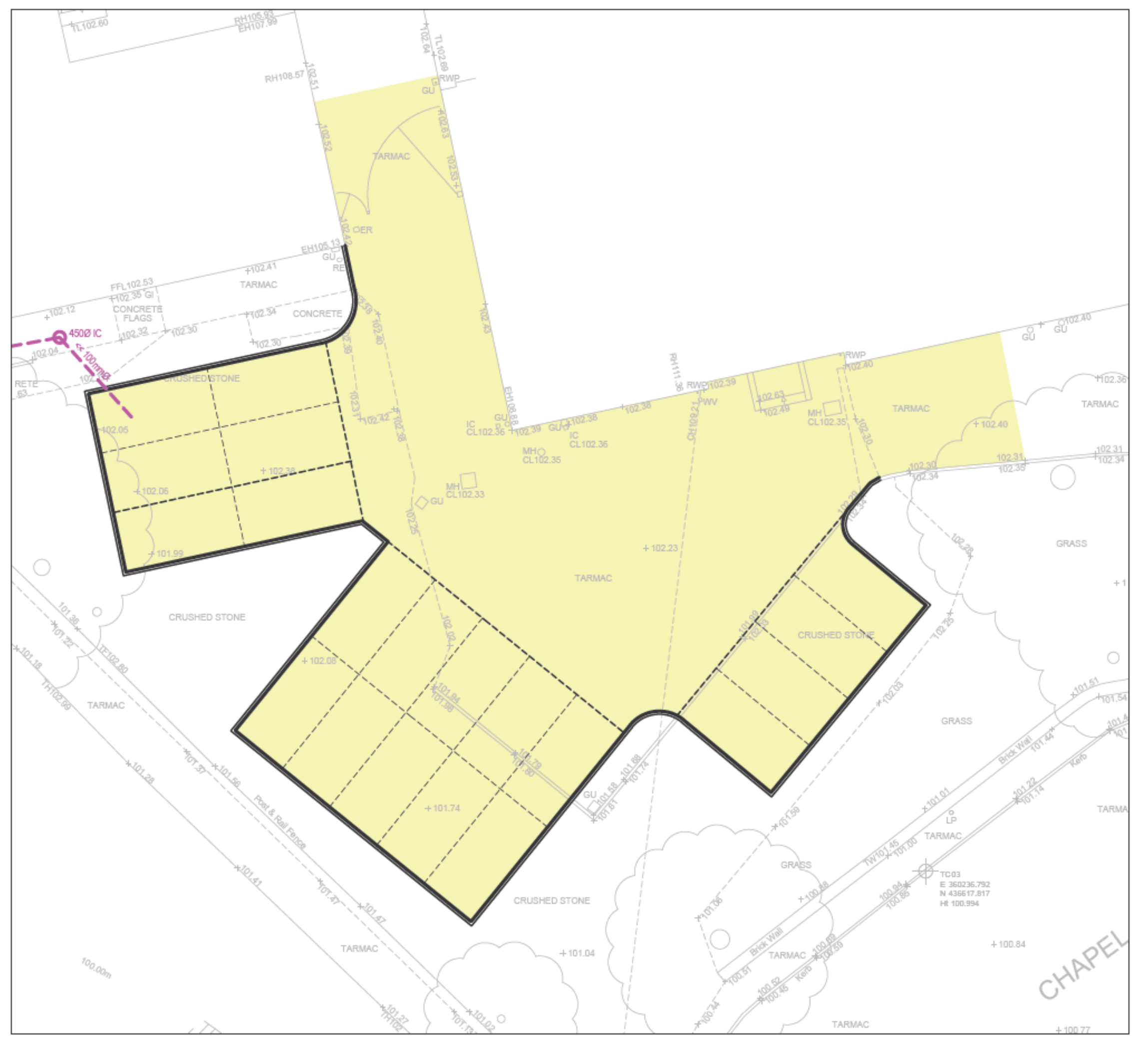
Annex 1

PSA Design Proposed SW Drainage Drawing





Existing Drained Impermeable Area = 300m^2



Proposed Drained Impermeable Area = 510m^2

Notes

1. Do not scale from this drawing, work to levels and dimensions shown, if not available refer to notes, if in doubt, refer to Engineer.
2. The Engineer shall be notified immediately, in writing, should any errors or discrepancies be found prior to to be commencement or continuation of any works.
3. Drawing to be read in conjunction with all other scheme drawings and relevant specifications.
4. Contractor to be responsible for the location and protection of all existing services.
5. Work to be undertaken in accordance in accordance with Design and Construction Guidance for foul and surface water sewers (App Ver 2.3) and Building Regulations - Document H.
6. All existing land drains encountered on site during construction are to be re-connected/diverted as necessary (not connected into the new system without prior approval)
7. All drains to be laid soffit to soffit unless otherwise indicated.
8. Cover levels shown are approximate only and should be altered to suit finished surface levels.
9. Minimum depth of cover to crown of pipe without protection should be as follows:
   0.35m - Gardens and Pathways with no vehicular loading
   0.50m - Driveways, Parking Areas and Narrow Accesses with height restrictions to prevent entry by vehicles with a gross weight in excess of 7.5 tonnes
   0.9m - Driveways, Parking Areas and Narrow Accesses with limited access to vehicles with a gross weight in excess of 7.5 tonnes. Agricultural land and public open space.
   1.2m - Other Highways and Parking Areas with unrestricted access to vehicles with a gross weight in excess of 7.5 tonnes
10. Unless stipulated otherwise or invert levels are provided, all surface water pipes to be minimum 150mm dia. laid at 1 in 100.
11. Inspection Chambers and access points are to be as those defined in Design and Construction Guidance for foul and surface water sewers (App Ver 2.3). IC diameters specified are minimum diameters and if necessary should be increased to accommodate minimum benching widths.
12. <600Ø diameter IC's > 1.0m deep to include reducing ring to reduce opening to max 350mm Ø
13. Drainage subject to vehicle loading - Pipes up to 300mmØ to be structured walled PVCu (comply with the relevant provisions of BS EN 13476-1 and WIS 4-35-01 and BS EN 13476-2 or BS EN 13476-3) or Clay (complying with the relevant requirements of BS EN 295-1 and BS 65). Pipes greater than 300Ø to be Concrete (complying with BS 5911-1 and BS EN 1916). All pipes to be in accordance with Design and Construction Guidance for foul and surface water sewers (App Ver 2.3).
15. All MH and IC chamber covers to be suitable for intended vehicle loading (i.e. D400 in areas subject to heavy vehicle loading, C250 standard vehicle loading, B125 light vehicle loading and A15 pedestrian only loading).
16. Road gullies shall be trapped 450Ø x 900mm deep with Class D 400 frame and grating to BS EN 124 (unless otherwise approved. Outlets to be minimum 150mm diameter.
17. All drains in the vicinity of existing or proposed trees to be suitably protected.
18. Where drain is within 1m of a building, the trench is filled with concrete up to the underside of the foundations and where the trench is further away than 1m from the building, the trench is filled with concrete to a level below the lowest level for the building equal to the distance from the building, less 150mm.
19. All outfall levels and existing pipe levels should be checked prior to construction to ensure the design is deliverable and no clashes occur. Contractor to report any discrepancies to Engineer immediately.
20. Condition of any existing drainage to be used as part of proposed system to be checked prior to construction and any defects remedied.

Attenuation and Flow Control

1. Attenuation tank to be a Polystorm system (or similar approved) suitable for installation at depths indicated (manufacturer to check and advise). Unit size - 6.0m (L) x 5.0m (W) x 0.8m (D). Minimum cover should be checked with manufacturer when ordering to ensure unit is capable of withstanding proposed loading requirements at depths shown. Formation level to achieve CBR of 3-5%. **System to be fitted with all necessary vents and access points** and constructed strictly in accordance with manufacturers guidelines.

1. Flow control unit to be 500mm Ø Controflow 500 IC (from SEL Environmental) with 32mm Orifice (based on 0.8m head, max 2l/s)

2. System to be fitted with all necessary strictly in accordance with manufacturers guidelines.

Please read all notes carefully.

Refer to drawing D4707-D-02 for typical details

Drawing based on (and reference should be made to) Greenhalgh and Williams Drawing "4974/P04", togther with all other associated scheme drawings

REV	DATE	AMENDMENT DETAILS	DRAWN	CHECKED	APPROVED
P1	25/09/25	For Approval	GS	DLW	GS

Greenhalgh & Williams Ltd

St Cecilia's RC High School, Longridge Additional Car Parking	Drwg No. **D4707-D-01**	Rev. **P1**
Proposed Surface Water Drainage Layout	Scale **1:125**	Sheet Size **A1**

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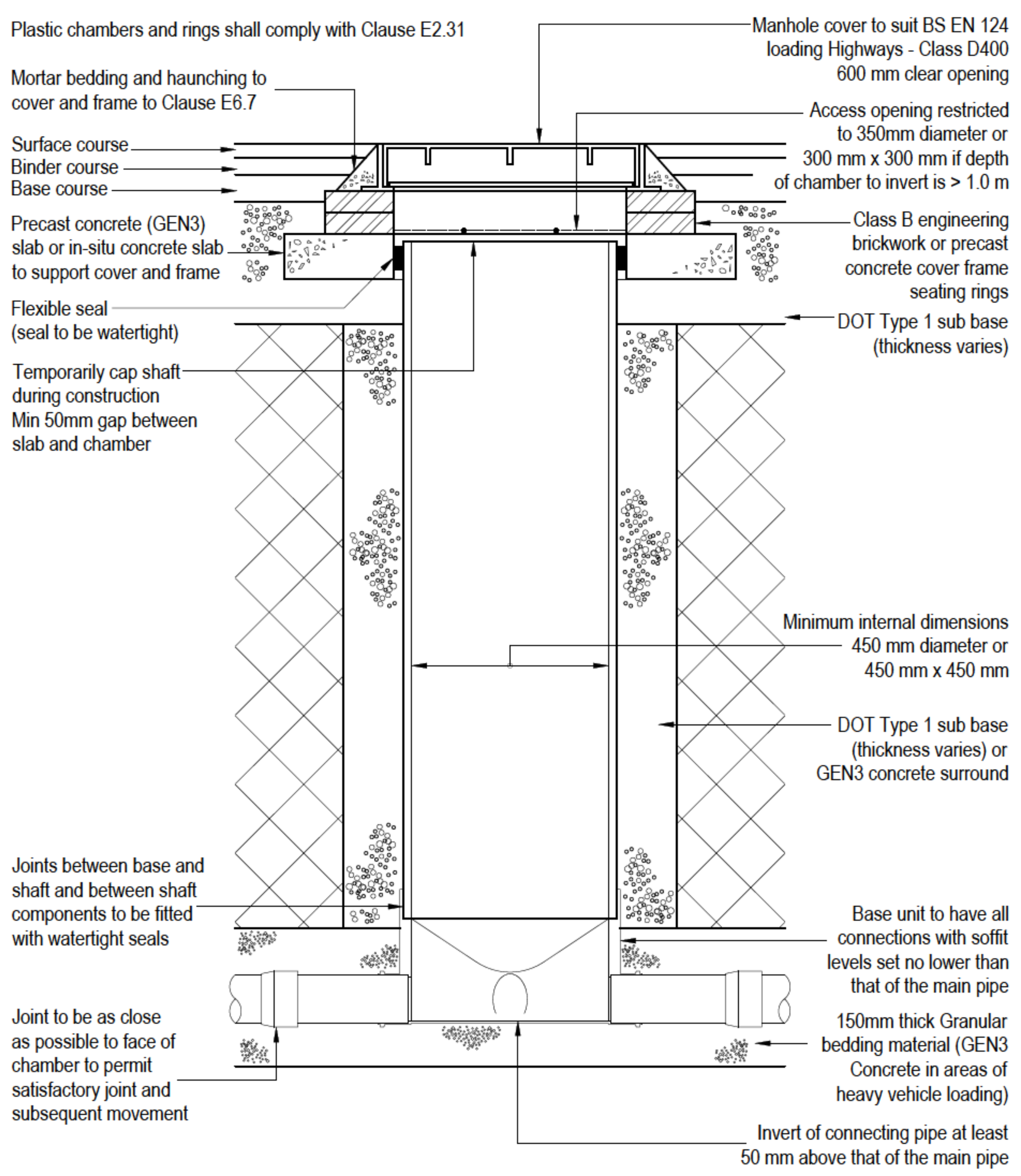
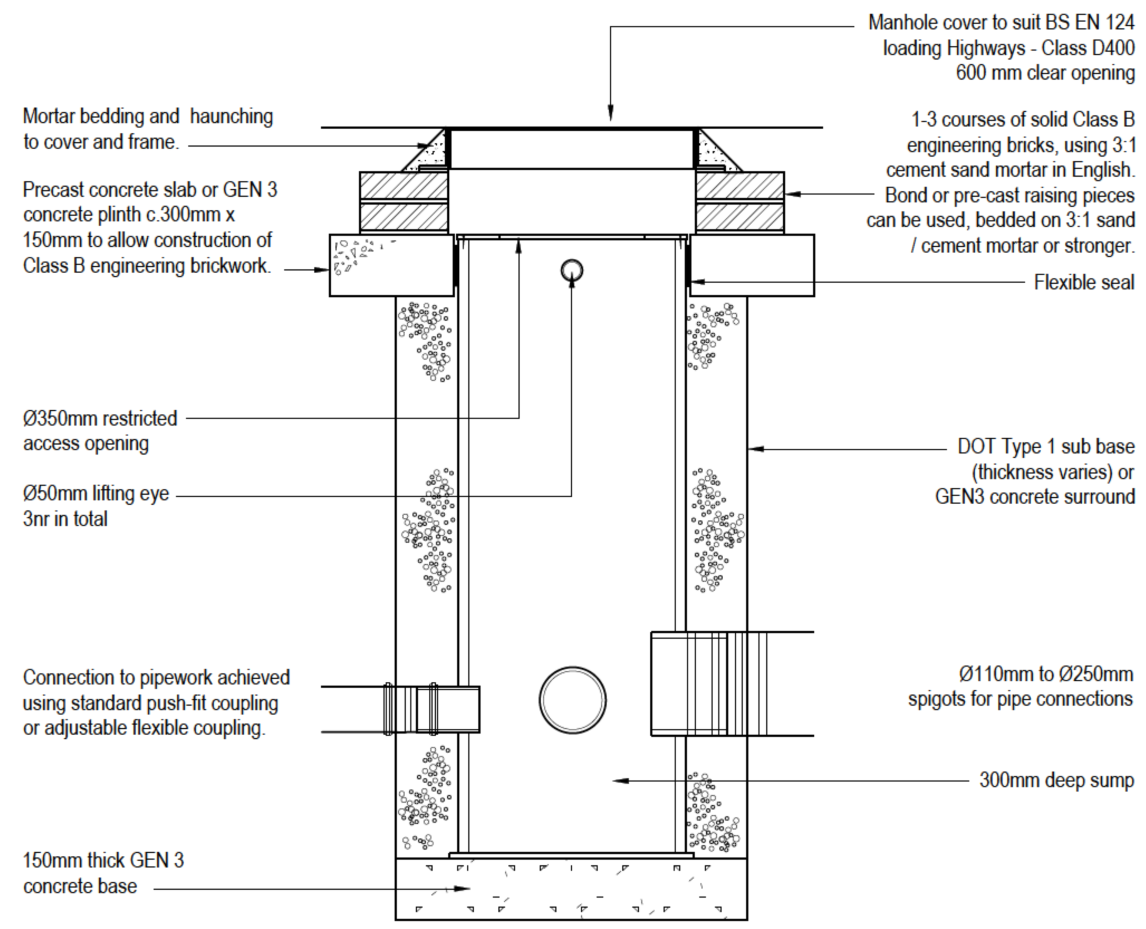
Date **25th Sept 2025**

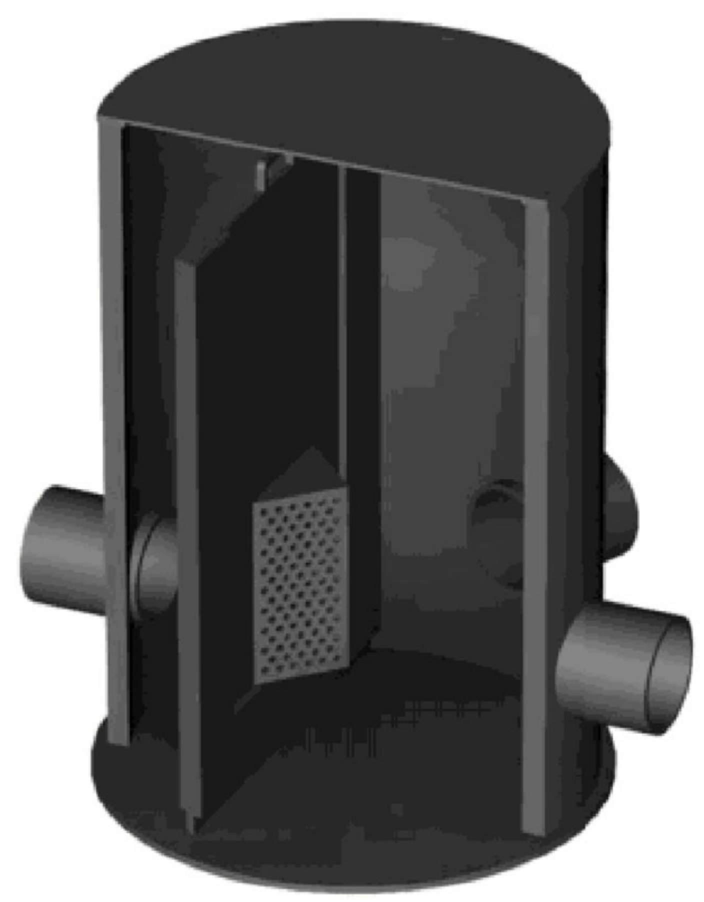
Drawn	Checked	Approved
GS	DW	GS

Inspection Chamber - (HV)
(suitable for heavy vehicle loading)



WASP05050 Series
(Prefabricated Ø500 Catchpit Chamber)





Controflow 500 Flow Control Chamber

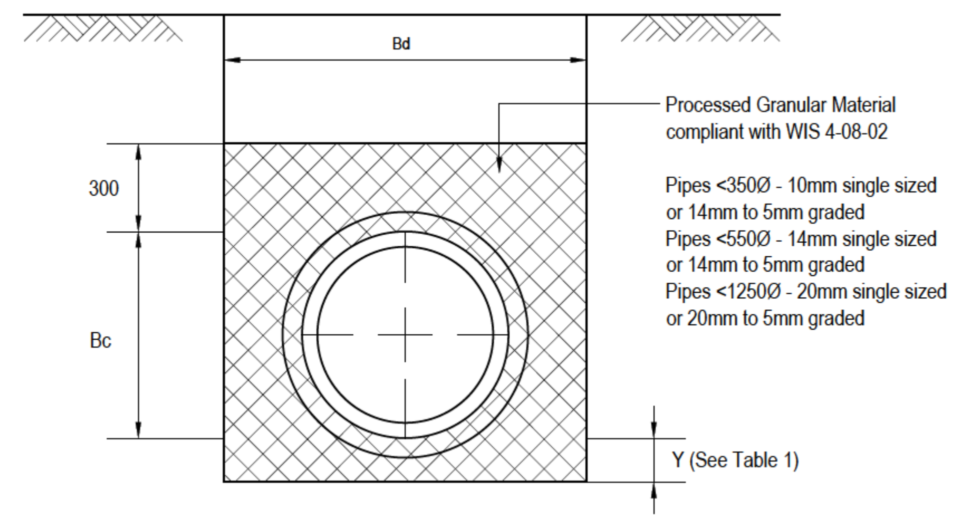
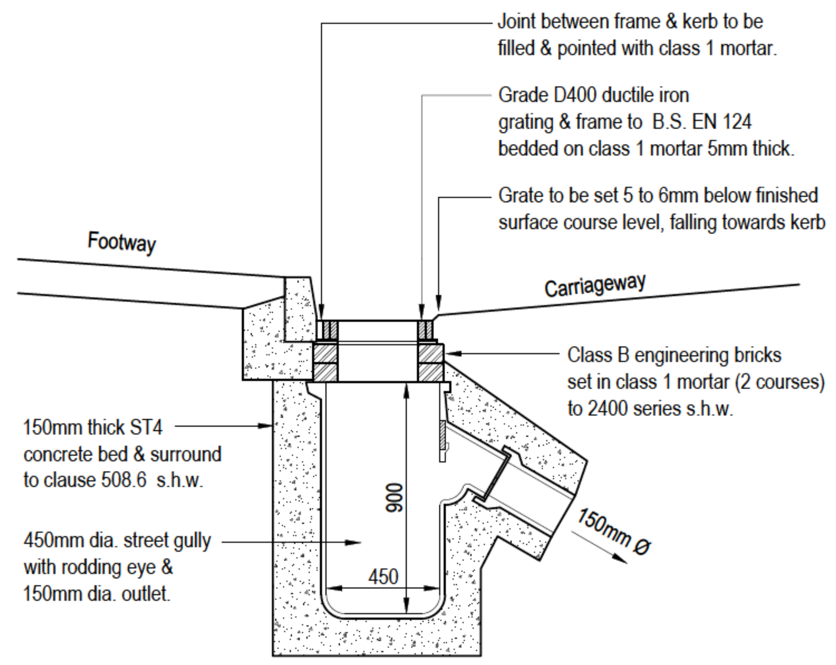


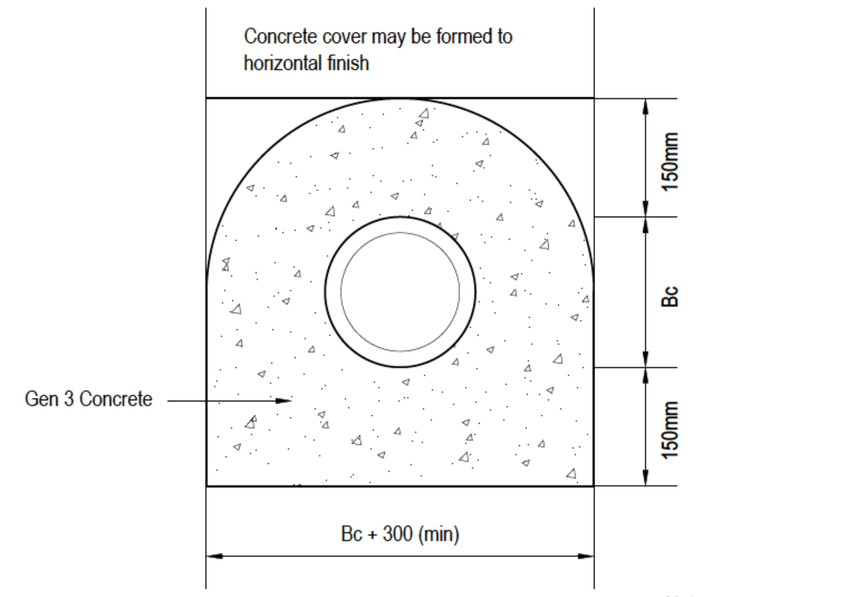
Table 1 - Dimension Y
Minimum Effective Embedment Dimensions for Flexible and Semi Rigid Pipes

Nominal Int Pipe Dia	Even trench bottom	Rock or uneven trench bottom	Minimum Effective Trench Width Bd
<400	100	200	Bc+300
400-700	150	250	Bc+450
725-900	225	300	Bc+600
1200	250	350	Bc+800

*Note:
The minimum depth of processed granular material under pipe sockets shall be 50mm for even trench bottom and 150mm for uneven trench bottom.



Road Gully

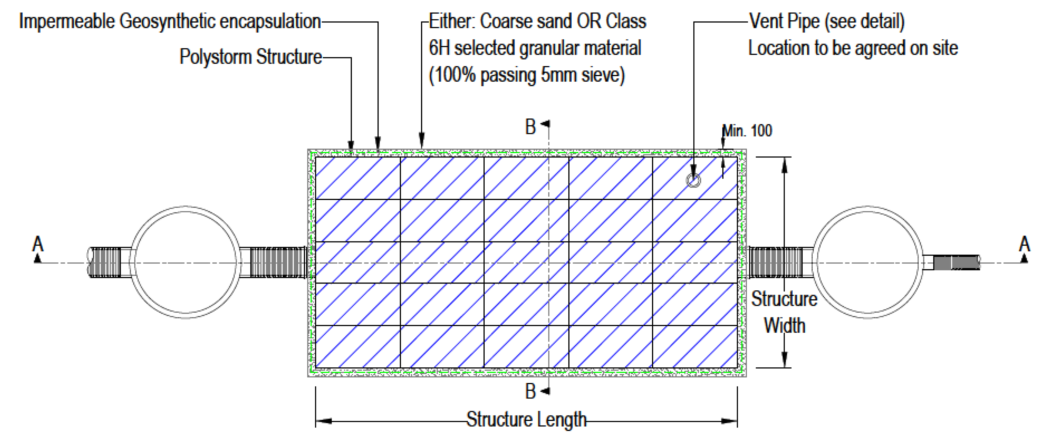


Concrete Surround
(Pipes < 300mmØ)

Note:
Bc = outside Ø of pipe

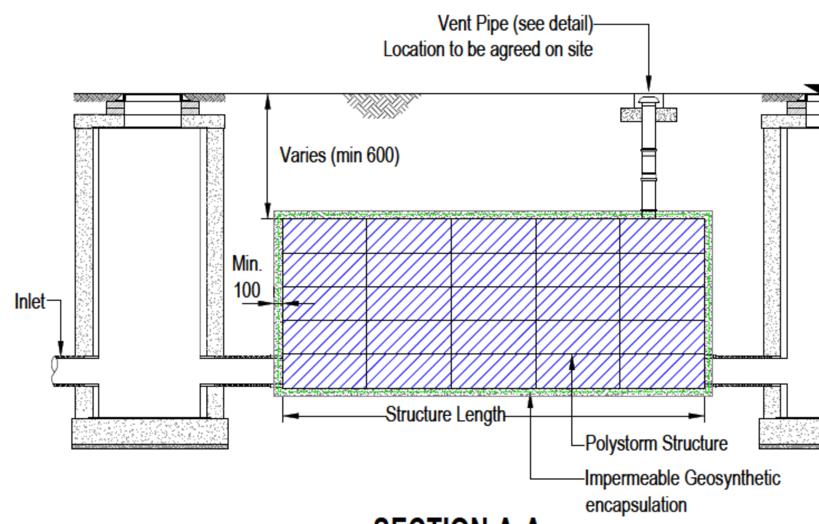
*Note:
Min. 18mm thick Compressible filler joint to be installed at each socket / joint

Drainage Pipe Embedment Details

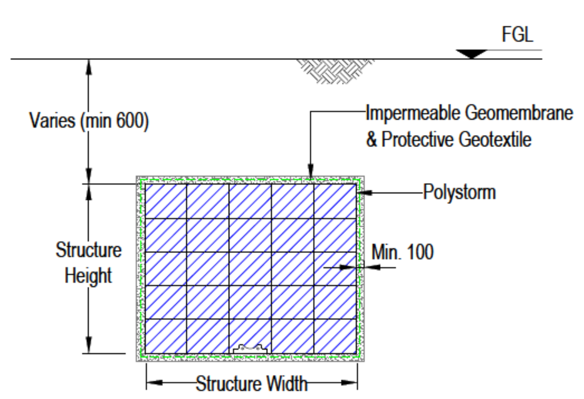


This drawing is intended for guidance only. Details and information contained within it should be confirmed with manufacturer and reference made to their installation details prior to ordering and construction.

KEY:
POLYSTORM (PSM1 CELL)

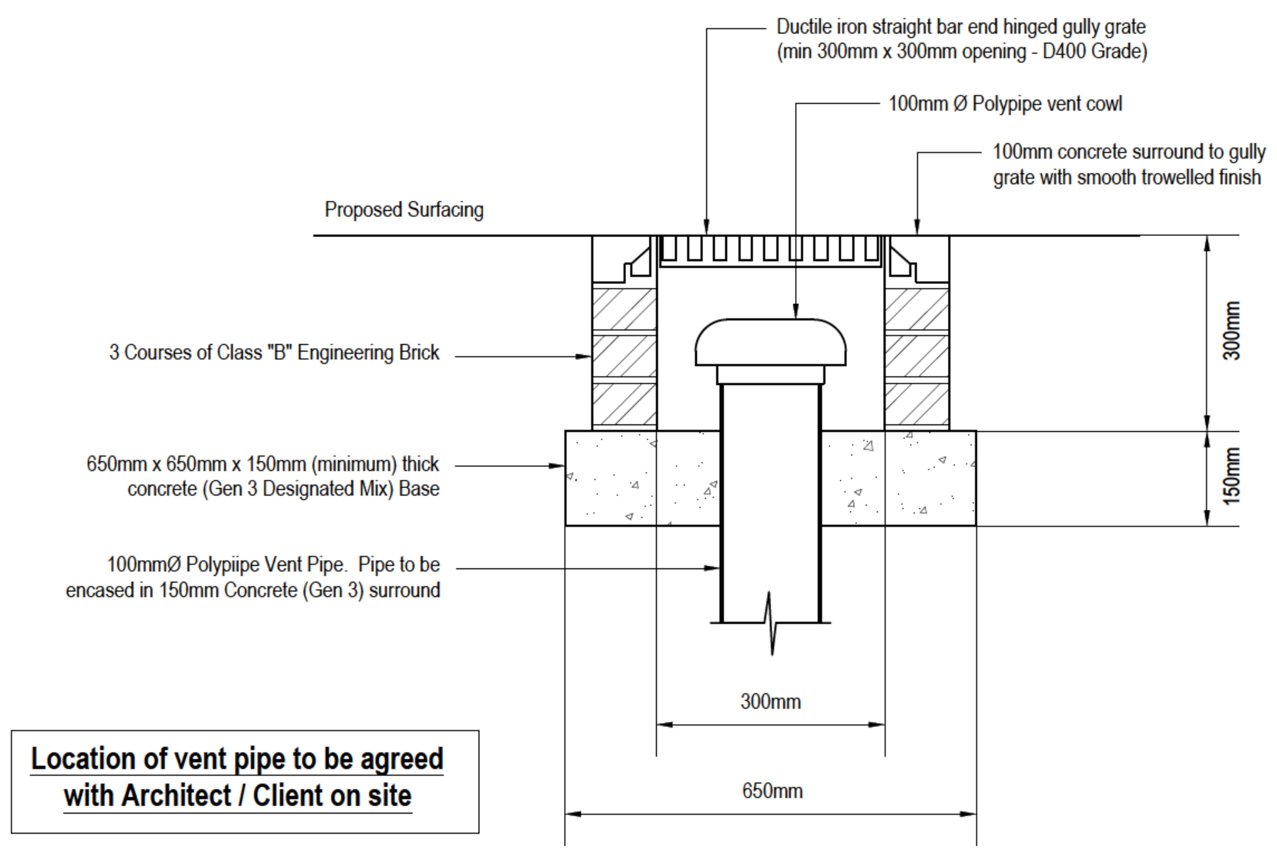


SECTION A-A



SECTION B-B

Typical Polystorm Attenuation Detail



Location of vent pipe to be agreed with Architect / Client on site

Polystorm Tank Vent Pipe Detail (Hardstanding Areas)

Refer to drawing D4707-D-01 for layout and associated notes

REV	DATE	AMENDMENT DETAILS	DRAWN	CHECKED	APPROVED
P1	25/09/25	For Approval	GS	DLW	GS

Greenhalgh & Williams Ltd

St Cecilia's RC High School, Longridge
Additional Car Parking

Proposed Surface Water Drainage
Typical Details

Drwg No.	Rev.
D4707-D-02	P1

Scale	Sheet Size
1:125	A1

Date: 25th Sept 2025

Drawn	Checked	Approved
GS	DW	GS

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Annex 2

Percolation Tests

Percolation Test

Site St Cecilia's RC High School, Longridge

Date 03/09/2025

Hole ID 1

Calculation of Infiltration Rate

Run No. 1

Elapsed time (minutes)	Depth to water (m)
0	0.76
25	0.76
67	0.76
111	0.76
165	0.76
194	0.76

Dimensions of hole (m)

length	breadth	depth
1	0.3	1.04

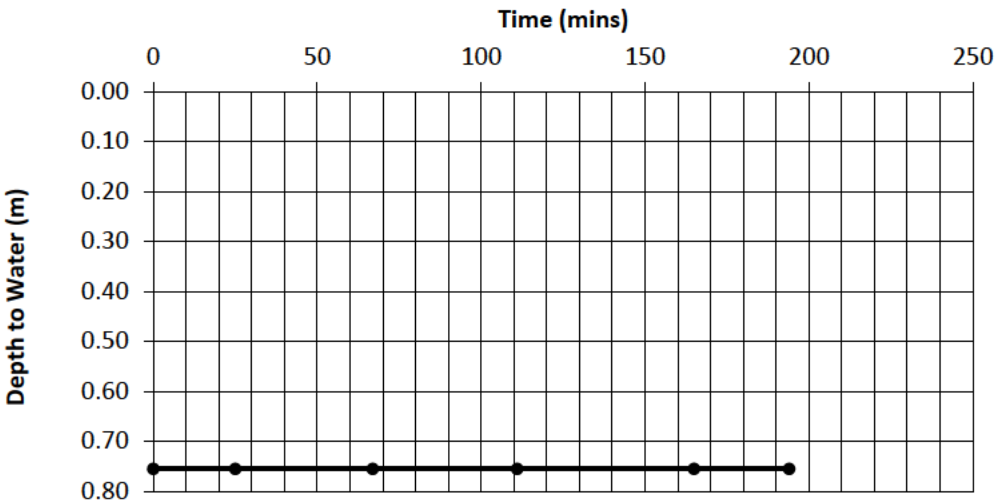
Water Level (mbgl)		Time(m)
75% full (D25)	0.83	N/A
50% full		
25% full (D75)	0.97	N/A

Pit Analysis

(m^3)	0.04275
Internal Surface Area a_{p50}	0.6705
Time $t_{p75\text{-}25}$ (secs)	#VALUE!

Effective Depth (m)	0.29

Infiltration Rate ***#VALUE!*** **m/sec**
#VALUE! **m/hr**



Remarks: Test abandoned as test start level not reached. Solid clay.

Percolation Test

Site St Cecilia's RC High School, Longridge

Date 03/09/2025

Hole ID 2

Calculation of Infiltration Rate

Run No. 1

Elapsed time (minutes)	Depth to water (m)
0	0.95
10	0.95
52	0.95
96	0.95
150	0.95
179	0.95

Dimensions of hole (m)

length	breadth	depth
0.9	0.3	1.22

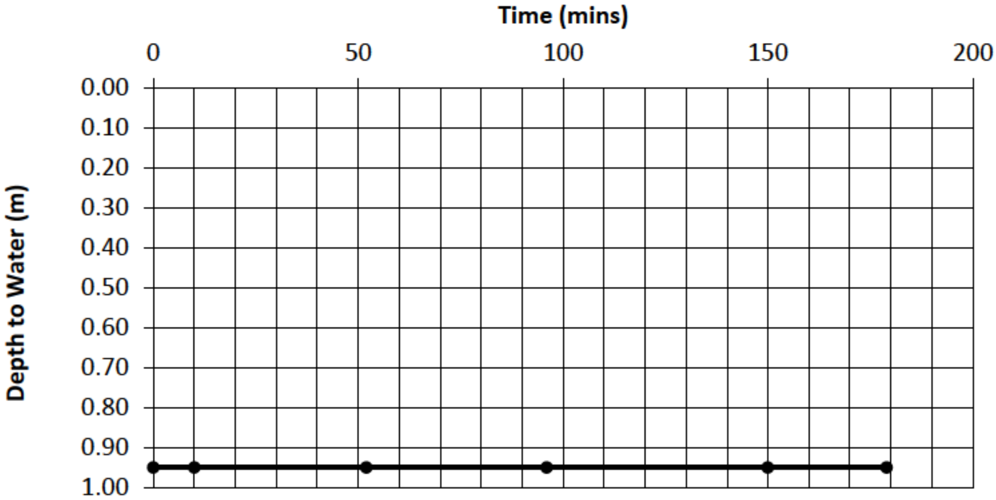
Water Level (mbgl)		Time(m)
75% full (D25)	1.02	N/A
50% full		
25% full (D75)	1.15	N/A

Pit Analysis

(m^3)	0.03645
Internal Surface Area a_{p50}	0.594
Time t_{p75-25} (secs)	#VALUE!

Effective Depth (m)	0.27

Infiltration Rate ***#VALUE!*** **m/sec**
#VALUE! **m/hr**



Remarks: Test abandoned as test start level not reached. Solid clay.


concrete hard standing
crushed stone
crushed stone
bitmac
bitmac
T17 – Birch
T18 – Horse Chestnut
boundary railings
crushed stone
5
4
3
2
1
Trial Pit 2
crushed stone
grass
T28 – Beech
T27 – Beech
low level stone boundary wall
Trial Pit 1
crushed stone
public footpath
T21 – Field Maple removed Aug 2024
T22 – Silver Birch removed Aug 2024
grass
T24 – Cypress
school bus lay-by
T23 – Silver Birch
section of low level stone boundary

Annex 3

Causeway Flow Calculations

Design Settings

Rainfall Methodology	FSR
Return Period (years)	1
Additional Flow (%)	0
FSR Region	England and Wales
M5-60 (mm)	17.000
Ratio-R	0.400
CV	0.750
Time of Entry (mins)	4.00

Maximum Time of Concentration (mins)	30.00
Maximum Rainfall (mm/hr)	1.0
Minimum Velocity (m/s)	1.00
Connection Type	Level Soffits
Minimum Backdrop Height (m)	0.200
Preferred Cover Depth (m)	1.200
Include Intermediate Ground	✓
Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.037	4.00	101.700	500	539.717	18.666	1.050
S2	0.014	4.00	102.150	500	528.976	27.466	1.650
Storage			102.000		526.877	30.583	1.400
Control			102.200	500	522.217	31.327	1.601
Out			102.000	500	518.975	33.073	1.450

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	S1	S2	13.886	0.600	100.950	100.800	0.150	92.6	150	4.22	1.0
1.001	S2	Storage	3.758	0.600	100.800	100.600	0.200	18.8	150	4.25	1.0
1.002	Storage	Control	4.719	0.600	100.600	100.599	0.001	4719.0	150	4.82	1.0
1.003	Control	Out	3.682	0.600	100.599	100.550	0.049	75.1	100	4.89	1.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.045	18.5	0.1	0.600	1.200	0.037	0.0	8	0.266
1.001	2.334	41.2	0.1	1.200	1.250	0.051	0.0	7	0.539
1.002	0.138	2.4	0.1	1.250	1.451	0.051	0.0	25	0.073
1.003	0.889	7.0	0.1	1.501	1.350	0.051	0.0	10	0.340

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	13.886	92.6	150	Circular	101.700	100.950	0.600	102.150	100.800	1.200
1.001	3.758	18.8	150	Circular	102.150	100.800	1.200	102.000	100.600	1.250
1.002	4.719	4719.0	150	Circular	102.000	100.600	1.250	102.200	100.599	1.451
1.003	3.682	75.1	100	Circular	102.200	100.599	1.501	102.000	100.550	1.350

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	500	Manhole	Adoptable	S2	500	Manhole	Adoptable
1.001	S2	500	Manhole	Adoptable	Storage		Junction	
1.002	Storage		Junction		Control	500	Manhole	Adoptable
1.003	Control	500	Manhole	Adoptable	Out	500	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	539.717	18.666	101.700	1.050	500	0	1.000	100.950	150
S2	528.976	27.466	102.150	1.650	500	1	1.000	100.800	150
						0	1.001	100.800	150
Storage	526.877	30.583	102.000	1.400		1	1.001	100.600	150
						0	1.002	100.600	150
Control	522.217	31.327	102.200	1.601	500	1	1.002	100.599	150
						0	1.003	100.599	100
Out	518.975	33.073	102.000	1.450	500	1	1.003	100.550	100

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	19.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.300	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	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 %)
100	50	0	0

Node Storage Online Orifice Control

Flap Valve	x	Design Depth (m)	0.800	Discharge Coefficient	0.660
Replaces Downstream Link	x	Design Flow (l/s)	2.0		
Invert Level (m)	100.600	Diameter (m)	0.032		

Node Storage Depth/Area Storage Structure

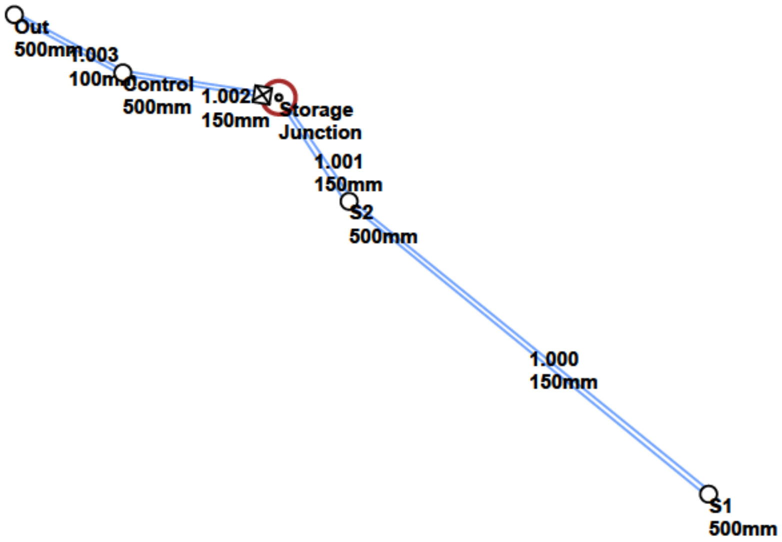
Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	100.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	144

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	30.0	0.0	0.800	30.0	0.0	0.801	0.0	0.0

Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
180 minute winter	S1	136	101.376	0.425	6.0	0.5033	0.0000	SURCHARGED
180 minute winter	S2	136	101.374	0.574	8.0	0.2319	0.0000	SURCHARGED
180 minute winter	Storage	140	101.373	0.773	7.8	22.0425	0.0000	SURCHARGED
180 minute winter	Control	140	100.638	0.039	2.0	0.0077	0.0000	OK
180 minute winter	Out	140	100.587	0.037	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m^3)	Discharge Vol (m^3)
180 minute winter	S1	1.000	S2	5.7	0.944	0.310	0.2445	
180 minute winter	S2	1.001	Storage	7.8	1.505	0.189	0.0662	
180 minute winter	Storage	1.002	Control	2.0	0.416	0.819	0.0227	
180 minute winter	Control	1.003	Out	2.0	0.731	0.285	0.0100	32.2


Out
500mm
1.003
100mm
Control
500mm
1.002
150mm
Storage
Junction
1.001
150mm
S2
500mm
1.000
150mm
S1
500mm