ENGINEERING
& CAD SERVICES LTD
Flood Risk - Drainage - SuDS - External Works - Earthworks Modelling

DRAINAGE STRATEGY DOCUMENT

Document Reference. 26-0017-CSD-XX-XX-T-D-0002

Revision. 01

Date. 21.06.2026

Planning Application No	3/2025/0991
Site Location	Dilworth Cottage Ward Green Lane Longridge PR3 2ZL
Description	Demolition of existing dwelling and erection of new detached self-build dwelling including external landscaping
Applicant Name	Mr John Barton

Planning Application	**FULL**

CONTENTS

CSD Engineering & CAD Services Ltd.
csdengineering@hotmail.com

1 - DRAINAGE STRATEGY DOCUMENT

This document has been produced, along with supporting drawings and calculations to discharge planning condition 6, relating to the Surface and Foul water drainage proposals for the site.

SURFACE WATER DISCHARGE

Recommended Drainage Hierarchy for surface water discharge.

Option 1 – Infiltration Soakaway

Investigate first through BRE365 testing.

Option 2 – Attenuated Discharge to Ordinary Watercourse (Currently considered the most likely ultimate solution.)

Typical arrangement:

- Sustainable drainage features.
- Below ground attenuation systems.
- Restricted discharge -Hydro brake flow control.
- Gravity connection to nearby watercourse.
- Ordinary watercourse consent if required.

INFILTRATION

In lieu of a ground / site investigation report, we have undertaken a desktop study to assess the possibility of infiltration being a viable means of surface water discharge, in accordance with the drainage hierarchy, option 1 above.

Based on the planning documents, the site location, and the regional geology, we would classify infiltration at this site as **possible but unlikely**, not a site where I would expect a soakaway to work without testing.

The site sits at the junction of Lower Road and Ward Green Lane on elevated ground east of Longridge. The elevated position is favourable because groundwater is unlikely to be shallow and there is no obvious floodplain influence.

Longridge area commonly contains glacial till (clayey deposits) over bedrock, which often produces low infiltration rates. However, there are localised permeable sand, gravel and sandstone horizons around Longridge, so infiltration can sometimes work on one plot and fail on the next.

The site lies on the western flank of Longridge Fell. Across this area, the underlying bedrock is typically part of the Mudstone Grit sequence, consisting predominantly of

sandstone with interbedded mudstone and siltstones. Sandstone bedrock can be moderately permeable where fractured and weathered. However, the key factor for infiltration is usually not the bedrock but the superficial deposits above it.

The Longbridge/Dilworth area is widely mantled by glacial till (bounder clay) left by the last glaciation. Glacial till commonly contains clay, silt, sand and gravel mixed together, but from a drainage perspective it generally behaves as a low-permeability clayey deposit. Where till is present, soakaways frequently perform poorly unless they penetrate into more permeable strata beneath.

The most likely outcome is variable infiltration, dependant on the thickness and make up of the glacial till. Cohesive soils i.e. clay, generally provide very poor infiltration results, where as sand and gravel provide good permeability.

Advising prior to ground investigation on infiltration testing, my expectation would be:

Depth	Likely material	Infiltration potential
0–0.5 m	Topsoil/subsoil	Variable
0.5–2.0 m	Clayey glacial till	Poor
2–4 m+	Weathered sandstone / mixed deposits	Moderate if encountered

The key unknown is the thickness of the till. If the sandstone is shallow, BRE 365 testing could produce acceptable infiltration rates. If there is 2–4 m of stiff till, soakaways often become impractical.

Based on the above, our overall conclusion is that the site should not currently be regarded as proven suitable for infiltration drainage.

We would recommend that infiltration testing in accordance with BRE 365 is carried out to confirm viability and to satisfy the local authority, as noted in Condition 6.

DRAINAGE DESIGN

Given the uncertainty of infiltration being a viable solution, to provide a drainage scheme that is viable, we propose to discharge surface water to watercourse, in accordance with Option 2.

Following testing, should infiltration be viable, the surface water drainage design is to be updated to a soakaway system, removing the connection to watercourse.

TOPOGRAPHY

The site occupies a local high point adjacent to Lower Road. Ground generally falls south, south-west, towards Ward Green Lane. This topography is favourable for gravity drainage.

WATERCOURSE

Ward Green Lane Ditches

Following a site walkover, roadside drainage ditches are present to the east of Ward Green Lane, and this would provide a good location for surface water discharge, given the proximity to the site.

We have assumed a depth of c.500mm based on a visual inspection; however, this is to be proven via survey. Should a gravity connection not be viable, a small surface water package pumping station maybe required.

The likely outfall of the Ward Green Lane Ditches is to Page Brook, approximately 350m south of the site.

SUSTAINABLE DRAINAGE SYSTEMS (SuDS)

Roof Areas

Green and blue roof systems have been considered for this scheme however discounted due to the nature of the development and roof proposal, being pitched.

Rainwater harvesting is recommended where possible for non-potable use (i.e. toilet flushing). This is to be confirmed viable by the Architect.

Rainwater harvesting can also be used for irrigation purposes, we therefore recommend the use of water butts at the base of the roof rainwater pipes, with an overflow connecting to the surface water drainage network.

External Areas

In line with the proposed Architects site plan, all external hard standing areas are to be permeable. We recommend permeable surfaces to be Type B, with partial infiltration. This will allow surface water to natural percolate into the ground, if possible, at shallow depths, however, will be positively connected to the drainage system, as required.

The remainder of the site will be made up of soft landscaping areas.

The above proposals will retain the first 5mm rainfall on site.

Attenuation will be provided in the sub-base reservoir of permeable paving systems, and any additional will be in the form of below ground cellular storage, pipes and chambers.

A flow restriction of 1.5l/s has been calculated based on the greenfield run-off rate. This will restrict surface water run-off, prior to discharge, in the form of a hydro-brake or similar device.

Stone trenches with perforated pipework are proposed, to convey surface water flows as well as providing a natural filtration.

The estimated attenuation required is 16m3 based on 1.5l/s.

The drainage system has been designed to the 1 in 100 year plus 50% for climate change (Upper end allowance). All storage will be contained below ground, with the exception of the water butts.

Ordinary watercourse approval will be required from the Local Authority to discharge surface water flows to the watercourse.

PROPOSED FOUL WATER

Foul water will continue to discharge as existing, to local watercourse via a sewage treatment plant (STP).

The condition of the existing treatment plant is to be assessed and confirmed acceptable/fit for purpose. The size of the existing STP is to be confirmed suitable for the new facilities.

Should the existing STP be in poor condition and/or not sized sufficiently, it is recommended that this is replaced with a new system (Klargester BioDisc or similar approved), to suit the proposed development needs.

DRAINAGE MAINTENANCE

A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regular and the routine maintenance and cleansing regime should be documented.

It is assumed that the maintenance of the drainage network will be the responsibility of the client/owner of the property.

2 - Drainage Design Pack

Drainage GA - 26-0017-CSD-DIL-XX-XX-DR-D-0001

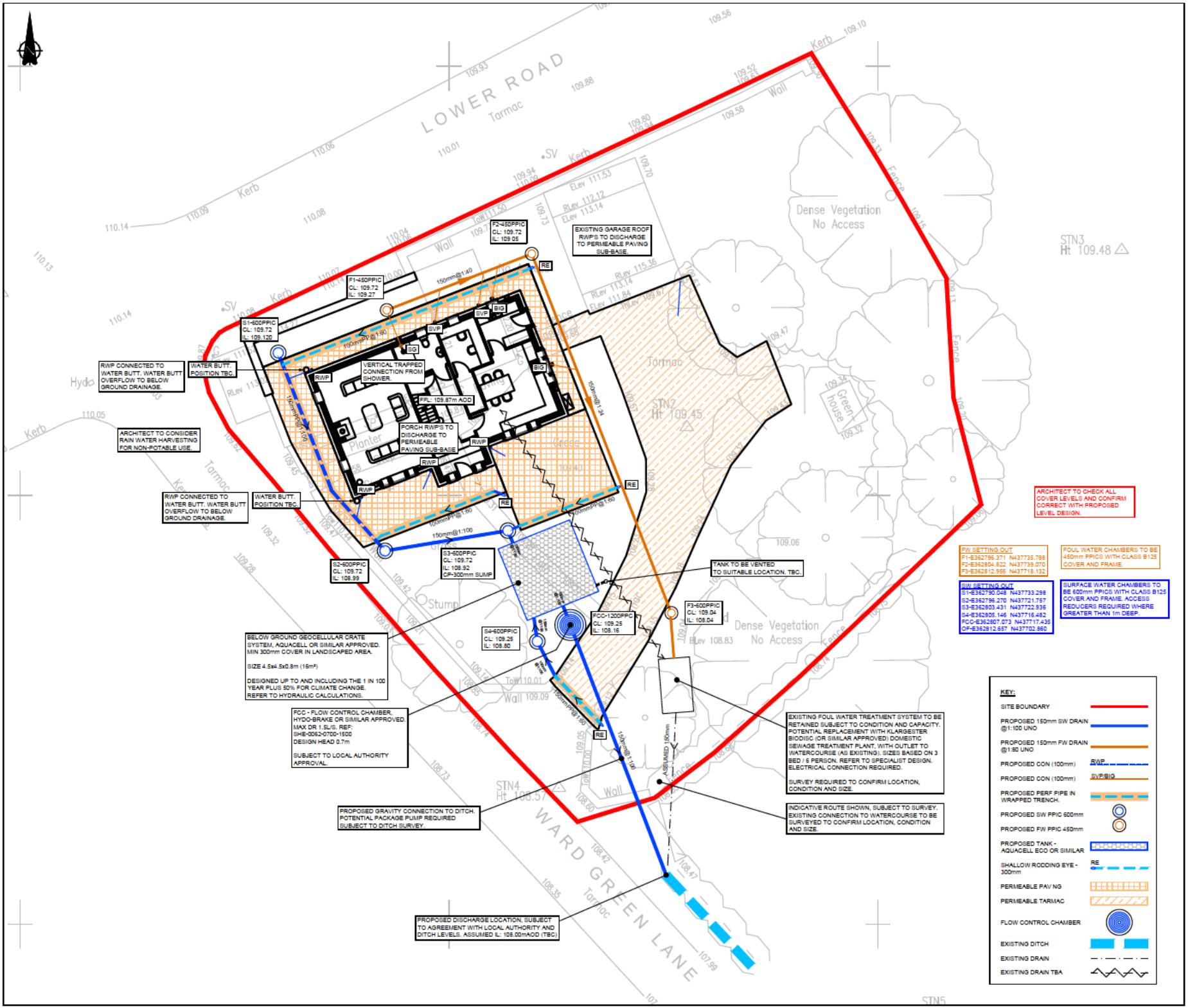
Drainage Catchments - 26-0017-CSD-DIL-XX-XX-DR-D-0002

Drainage Details 1 - 26-0017-CSD-DIL-XX-XX-DR-D-0004

Drainage Details 2 - 26-0017-CSD-DIL-XX-XX-DR-D-0004

Hydraulic Calculations - 26-0017-CSD-DIL-XX-XX-CAL-D-0001

Hydro-brake details, AquaCell Eco details, Greenfield Calculation and the Architects Site Plan including FFL and external levels have been provided.



GENERAL NOTES:

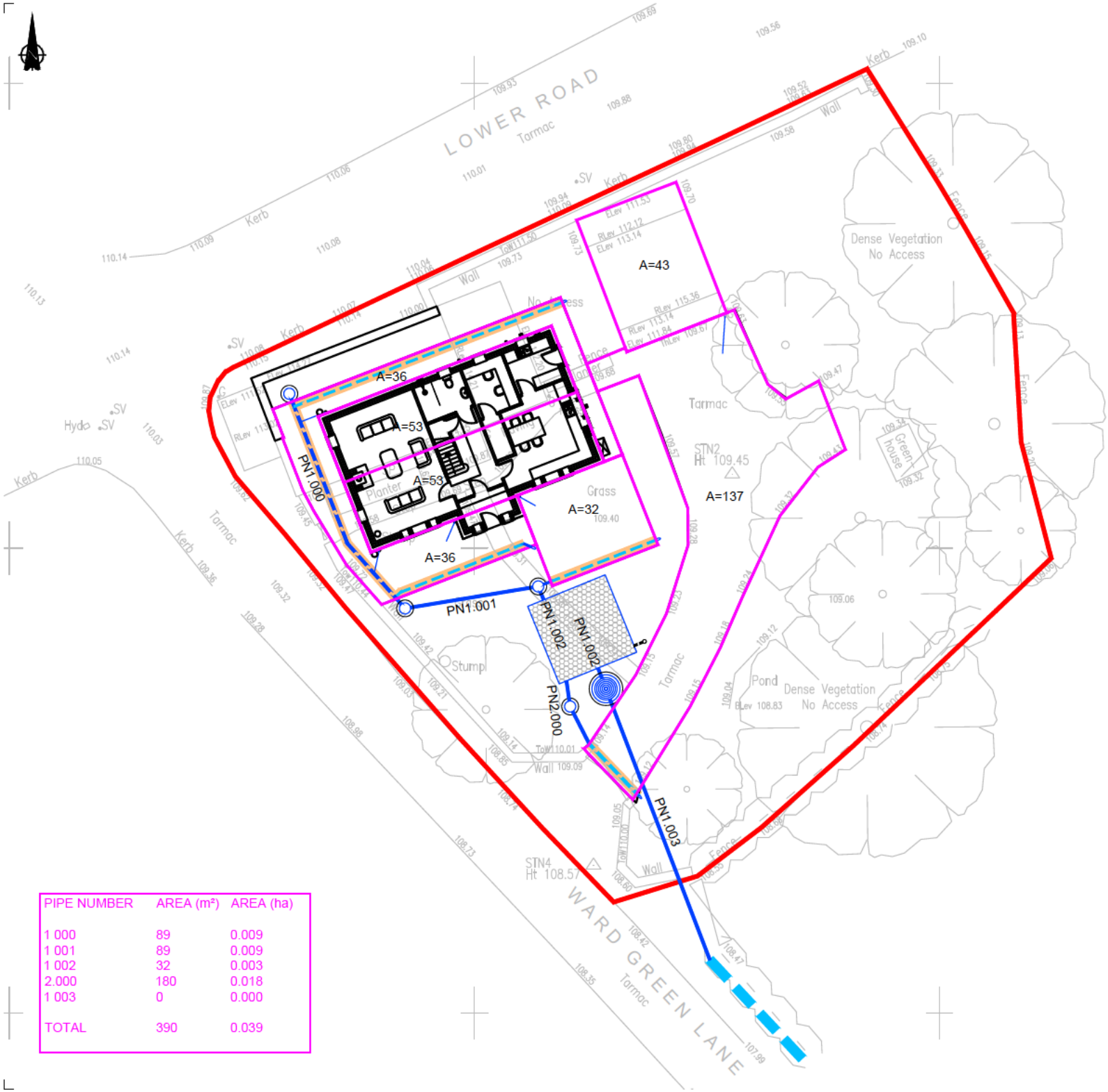
1. THIS DRAW NG IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAW NGS AND SPECIFICATIONS.
2. ALL PRIVATE DRAINAGE WORKS TO BE IN ACCORDANCE WITH THE DRAINAGE SPECIFICATION, "CIVIL ENG NEER NG SPEC FICATION FOR THE WATER INDUSTRY 7th EDITION", BS EN 752:2017 "DRAIN AND SEWER SYSTEMS OUTSIDE BUILD NGS" AND THE BUILD NG REGULATIONS APPROVED 'DOCUMENT H'.
3. DO NOT SCALE THIS DRAW NG. ANY AMBIGUIT ES, OMISSIONS AND ERRORS ON DRAW NGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL D MENSIONS MUST BE CHECKED / VERIFIED ON SITE.
4. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND SURVEY NFORMATION AVA LABLE AT THE T ME OF THE DESIGN.
5. ALL D MENSIONS ARE N METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
6. COVER LEVELS, GULLY POSITIONS, AND BUILDINGS LOCATION ARE APPROX MATE AND SHALL BE CONF RMED BY ARCHITECT. CONTRACTOR TO ALLOW FOR ADJUSTMENT TO SUIT AGREED POSITIONS AND F NISHED LEVELS, AND CONFIRM ALL COVER LEVELS ON SITE.
7. ALL DRA NAGE CONNECTIONS ARE PROVIDED TO POSITIONS SHOWN ON ARCHITECT DRAWINGS. REFER TO D MENSIONED LOCATIONS AND DIAMETERS ON ARCHITECT'S GROUND FLOOR SETTING-OUT PLANS.
8. ALL UNDERGROUND FOUL DRAINAGE SHOULD BE SUITABLY VENTED AT OR NEAR TO THE HEAD OF RUNS.
9. ALL ACCESS FITTINGS, STACKS, RWPS AND GULLIES TO BE RODDABLE. ALL TO HAVE LOW LEVEL RODDING ACCESS PLATES UNLESS AN ALTERNATIVE MEANS OF ACCESS IS AGREED. ACCESS POINT TO BE ABOVE ANY GROUND FLOOR CONNECTED APPLIANCE SPILL LEVEL.
10. LARGE ACCESS FITT NG REQU RED ABOVE GROUND WHERE GREATER THAN 12m UP TO 22m TO A JUNCTION. SMALL ACCESS FITTING REQUIRED UP TO 12mTO A JUNCTION.
11. ALL GULLY AND CHANNEL DRAIN OUTLETS AND TERMINATION POINTS TO BE TRAPPED AND RODDABLE. NTERNAL GULL ES AND CHANNEL DRA NS TO BE SPECIFIED BY OTHERS.
12. WHERE NO WC'S ARE CONNECTED UPSTREAM, UNDERSLAB FW DRAINAGE TO BE LAID AT 1:40 M N. AFTER THE CONNECTION OF AT LEAST 1NO WC, A M N. FALL OF 1:80 APPL ES.
13. ALL CONNECTIONS FROM POP-UPS TO BE LA D AT A CONSTANT GRADIENT TO JUNCTION/ NSPECTION CHAMBER/ MANHOLE UNLESS NOTED OTHERWISE. ANY ISSUES RELATING TO CLASHES WITH FOUNDATIONS ARE TO BE FORWARDED TO THE ENG NEER, ALLOW NG SUFFICIENT TIME FOR AN ALTERNATIVE SOLUTION TO BE PROPOSED.
14. NVERT LEVELS AT MANHOLES/ NSPECTION CHAMBERS TO BE USED TO SET OUT PIPEWORK. P PE GRADIENTS ARE SHOWN NDICATIVELY ONLY.
15. ALL P PE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS.
16. ALL SEWERS, UNLESS AGREED OTHERWISE STATED, SHALL BE:
    - 100mm to 300mm DIA TO BE VITRIFIED CLAY.
19. AS AN ALTERNATIVE THE CONTRACTOR MAY USE AN APPROVED UNPLASTICISED POLYV NYL CHLOR DE (PVCU) WITH APPROVAL FROM THE ENGINEER.
20. SEWER P PES TO BE LAID N MAX MUM 3 METRE LENGTHS UNLESS THERE IS A SPEC FIC OPERATIONAL NEED TO LAY LONGER LENGTHS.
21. THE FIRST PIPE OUT OF MANHOLES TO BE AS SHORT AS PRACTICABLE SO AS TO PROVIDE A FLEXIBLE JO NT AS CLOSE AS POSSIBLE TO THE OUTS DE FACE OF THE CONCRETE SURROUND AND CONNECTED TO A LENGTH OF ROCKER P PE.
22. ALL PRIVATE DRAINAGE P PES WITH A COVER OF LESS THAN 600mm IN NON-TRAFFICKED AREAS AND LESS THAN 900mm IN TRAFFICKED AREAS TO BE BEDDED AND SURROUNDED N CONCRETE (CLASS 2). COMPRESSIBLE MATERIAL SHALL BE PROVIDED AT EVERY PIPE JOINT. WHERE COVER EXCEEDS THIS DEPTH, P PES ARE TYPICALLY BEDDED AND SURROUNDED IN CLASS S. REFER TO PIPE EMBEDMENT DETAILS DRAWING FOR SPECIFIC TYPES.
23. WHERE DRAINAGE P PES ARE LESS THAN 300mm BELOW THE UNDERS DE OF THE GROUND FLOOR SLAB, CONCRETE ENCASEMENT IS REQUIRED (CLASS 2). COMPRESS BLE JOINTS ARE TO BE PROVIDED AT EVERY PIPE JOINT WITH N THE CONCRETE.
24. WHERE PIPES ARE MORE THAN 300mm BELOW THE UNDERSIDE OF THE SLAB, CLASS S BEDD NG IS ACCEPTABLE.
25. SULPHATE RESISTANT CEMENT (C30-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROV DED TO PROVE THAT SUCH PRECAUTIONS ARE NOT REQUIRED.
26. WHERE FOUL SEWERS RUN ABOVE SURFACE SEWERS, CONCRETE PROTECTION MAY BE REQUIRED AT CROSSOVERS TO PREVENT ANY POTENTIAL CONTAMINATION.
27. ALL CONNECTIONS PASS NG THROUGH BASES OR EDGE BEAMS TO BE IN SEALED SLEEVES. ALTERNATIVELY CONNECTIONS MAY BE CAST-IN WITH FLEXIBLE JOINTS NOT GREATER THAN 150mm FROM FACE OF CONCRETE.
28. UNLESS NOTED OTHERWISE IN THE MANHOLE SCHEDULE, ALL MANHOLE, GULLY AND CHANNEL COVERS (IRONWORK) SHOULD BE THE FOLLOW NG SPECIFICATION:
    - B125 LOAD CLASS IN PEDESTRIAN AREAS
    - D400 LOAD CLASS N VEHICULAR AREAS.
30. ALL PROPR ETARY PRODUCTS TO BE NSTALLED N STRICT ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS, INSTRUCTIONS AND RECOMMENDATIONS.

Rev	Date	Description	By	Check
P01	21.06.26	PRELIM NARY	CD	CD

Client	MR JOHN BARTON
Project	DILWORTH COTTAGE
Office	WARRINGTON
Discipline	CIVILS
Title	DRAINAGE G.A.
Scale @ A1	NTS
Status	PELIMINARY

CSD ENGINEERING & CAD SERVICES LTD

Job Number	Originator	Building/Zone	Level
26-0017	CSD	XX	XX
Type	**Discipline**	**Drawing No.**	**Revision**
DR	C	0001	P01



PIPE NUMBER	AREA (m²)	AREA (ha)
1 000	89	0.009
1 001	89	0.009
1 002	32	0.003
2.000	180	0.018
1 003	0	0.000
TOTAL	390	0.039

GENERAL NOTES:

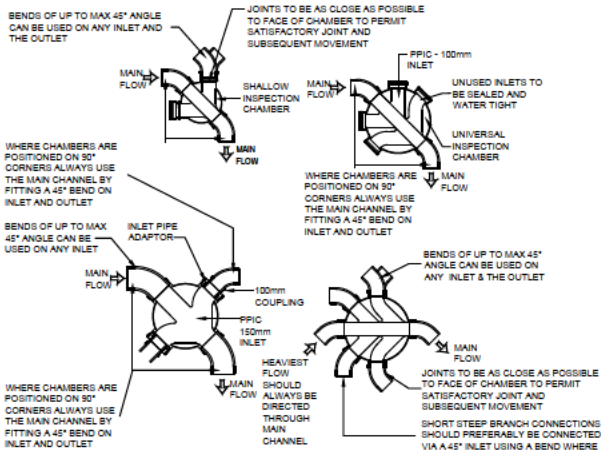
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. ALL PRIVATE DRAINAGE WORKS TO BE IN ACCORDANCE WITH THE DRAINAGE SPECIFICATION, "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 7th EDITION", BS EN 752:2017 'DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS' AND THE BUILDING REGULATIONS APPROVED 'DOCUMENT H'.
3. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
4. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND SURVEY INFORMATION AVAILABLE AT THE TIME OF THE DESIGN.
5. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
6. COVER LEVELS, GULLY POSITIONS, AND BUILDINGS LOCATION ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT. CONTRACTOR TO ALLOW FOR ADJUSTMENT TO SUIT AGREED POSITIONS AND FINISHED LEVELS, AND CONFIRM ALL COVER LEVELS ON SITE.
7. ALL DRAINAGE CONNECTIONS ARE PROVIDED TO POSITIONS SHOWN ON ARCHITECT DRAWINGS. REFER TO DIMENSIONED LOCATIONS AND DIAMETERS ON ARCHITECT'S GROUND FLOOR SETTING-OUT PLANS.
8. ALL UNDERGROUND FOUL DRAINAGE SHOULD BE SUITABLY VENTED AT OR NEAR TO THE HEAD OF RUNS.
9. ALL ACCESS FITTINGS, STACKS, RWP'S AND GULLIES TO BE RODDABLE. ALL TO HAVE LOW LEVEL RODDING ACCESS PLATES UNLESS AN ALTERNATIVE MEANS OF ACCESS IS AGREED. ACCESS POINT TO BE ABOVE ANY GROUND FLOOR CONNECTED APPLIANCE SPILL LEVEL.
10. LARGE ACCESS FITTINGS REQUIRED ABOVE GROUND WHERE GREATER THAN 12m UP TO 22m TO A JUNCTION. SMALL ACCESS FITTING REQUIRED UP TO 12m TO A JUNCTION.
11. ALL GULLY AND CHANNEL DRAIN OUTLETS AND TERMINATION POINTS TO BE TRAPPED AND RODDABLE. INTERNAL GULLIES AND CHANNEL DRAINS TO BE SPECIFIED BY OTHERS.
12. WHERE WC'S ARE CONNECTED UPSTREAM, UNDERSLAB FW DRAINAGE TO BE LAID AT 1:40 MIN. AFTER THE CONNECTION OF AT LEAST 1NO WC, A MIN. FALL OF 1:80 APPLIES.
13. ALL CONNECTIONS FROM POP-UPS TO BE LAID AT A CONSTANT GRADIENT TO JUNCTION/ INSPECTION CHAMBER/ MANHOLE UNLESS NOTED OTHERWISE. ANY ISSUES RELATING TO CLASHES WITH FOUNDATIONS ARE TO BE FORWARDED TO THE ENGINEER, ALLOWING SUFFICIENT TIME FOR AN ALTERNATIVE SOLUTION TO BE PROPOSED.
14. INVERT LEVELS AT MANHOLES/ INSPECTION CHAMBERS TO BE USED TO SET OUT PIPEWORK. PIPE GRADIENTS ARE SHOWN INDICATIVELY ONLY.
15. ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS.
16. ALL SEWERS, UNLESS AGREED OTHERWISE STATED, SHALL BE:
    - 100mm to 300mm DIA TO BE VITRIFIED CLAY.
19. AS AN ALTERNATIVE THE CONTRACTOR MAY USE AN APPROVED UNPLASTICISED POLYVINYL CHLORIDE (PVCU) WITH APPROVAL FROM THE ENGINEER.
20. SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS.
21. THE FIRST PIPE OUT OF MANHOLES TO BE AS SHORT AS PRACTICABLE SO AS TO PROVIDE A FLEXIBLE JOINT AS CLOSE AS POSSIBLE TO THE OUTSIDE FACE OF THE CONCRETE SURROUND AND CONNECTED TO A LENGTH OF ROCKER PIPE.
22. ALL PRIVATE DRAINAGE PIPES WITH A COVER OF LESS THAN 600mm IN NON-TRAFFICKED AREAS AND LESS THAN 900mm IN TRAFFICKED AREAS TO BE BEDDED AND SURROUNDED IN CONCRETE (CLASS Z). COMPRESSIBLE MATERIAL SHALL BE PROVIDED AT EVERY PIPE JOINT. WHERE COVER EXCEEDS THIS DEPTH, PIPES ARE TYPICALLY BEDDED AND SURROUNDED IN CLASS S. REFER TO PIPE EMBEDMENT DETAILS DRAWING FOR SPECIFIC TYPES.
23. WHERE DRAINAGE PIPES ARE LESS THAN 300mm BELOW THE UNDERSIDE OF THE GROUND FLOOR SLAB, CONCRETE ENCASEMENT IS REQUIRED (CLASS Z). COMPRESSIBLE JOINTS ARE TO BE PROVIDED AT EVERY PIPE JOINT WITHIN THE CONCRETE.
24. WHERE PIPES ARE MORE THAN 300mm BELOW THE UNDERSIDE OF THE SLAB, CLASS S BEDDING IS ACCEPTABLE.
25. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED TO PROVE THAT SUCH PRECAUTIONS ARE NOT REQUIRED.
26. WHERE FOUL SEWERS RUN ABOVE SURFACE SEWERS, CONCRETE PROTECTION MAY BE REQUIRED AT CROSSOVERS TO PREVENT ANY POTENTIAL CONTAMINATION.
27. ALL CONNECTIONS PASSING THROUGH BASES OR EDGE BEAMS TO BE IN SEALED SLEEVES. ALTERNATIVELY CONNECTIONS MAY BE CAST-IN WITH FLEXIBLE JOINTS NOT GREATER THAN 150mm FROM FACE OF CONCRETE.
28. UNLESS NOTED OTHERWISE IN THE MANHOLE SCHEDULE, ALL MANHOLE, GULLY AND CHANNEL COVERS (IRONWORK) SHOULD BE THE FOLLOWING SPECIFICATION:
    - B125 LOAD CLASS IN PEDESTRIAN AREAS
    - D400 LOAD CLASS IN VEHICULAR AREAS.
30. ALL PROPRIETARY PRODUCTS TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS, INSTRUCTIONS AND RECOMMENDATIONS.

Rev	Date	Description	By	Check
P01	21 06 26	PRELIMINARY	CD	CD

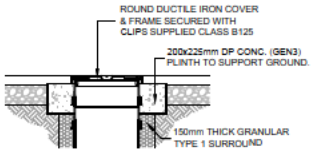
Client	MR JOHN BARTON
Project	DILWORTH COTTAGE
Office	WARRINGTON
Discipline	CIVILS
Title	DRAINAGE CATCHMENTS
Scale @ A1	NTS
Status	PELIMINARY

CSD ENGINEERING & CAD SERVICES LTD

Job Number	Originator	Building/Zone	Level
26-0017	CSD	XX	XX
Type	**Discipline**	**Drawing No.**	**Revision**
DR	C	0002	P01

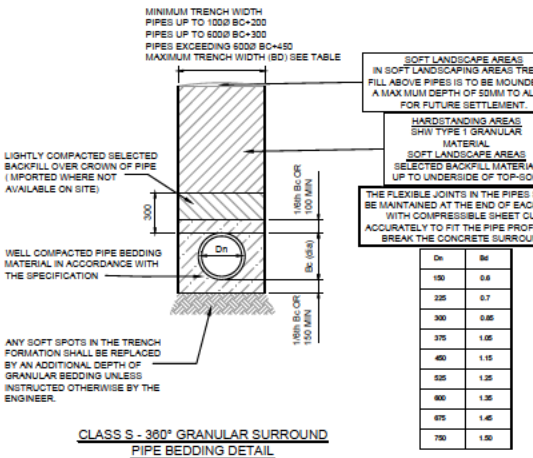


TYPICAL INSPECTION CHAMBER BASE DETAILS
SCALE 1:20



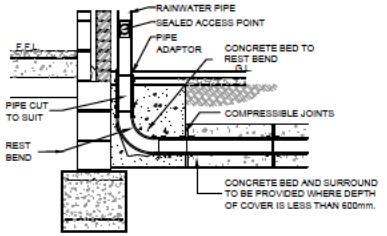
COVER SITED IN LANDSCAPED AREAS / FOOTPATHS WITH STANDARD ROUND COVER

TYPICAL INSPECTION CHAMBER COVER DETAIL
SCALE 1:20

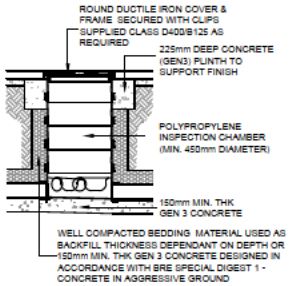


CLASS S - 360° GRANULAR SURROUND PIPE BEDDING DETAIL
SCALE 1:20

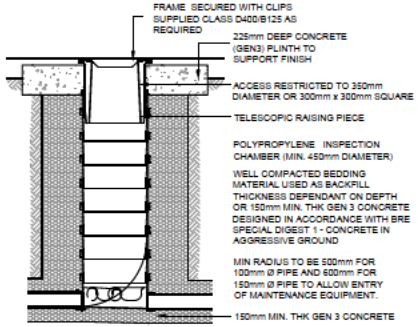
CLASS Z - CONCRETE BED & SURROUND SURROUND PIPE BEDDING DETAIL
COVER < 900mm IN VEHICULAR LOADING AND OPEN FIELD.
COVER <600mm ELSEWHERE EXCEPT UNDER BUILDINGS.
SCALE 1:20



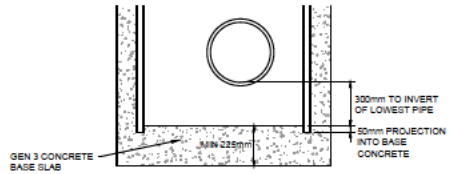
TYPICAL RAINWATER PIPE DETAIL WITH STACK ACCESS
SCALE 1:20



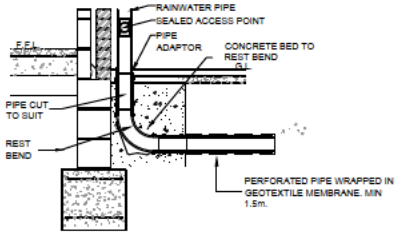
SHALLOW PPIC INSPECTION CHAMBER DETAIL
MAXIMUM DEPTH 1.2m



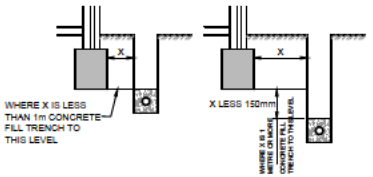
DEEP PPIC INSPECTION CHAMBER DETAIL
DEPTHS BETWEEN 1.2m & 3.0m



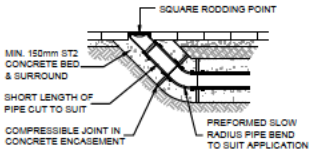
TYPICAL CATCH PIT BASE DETAIL
SCALE 1:20



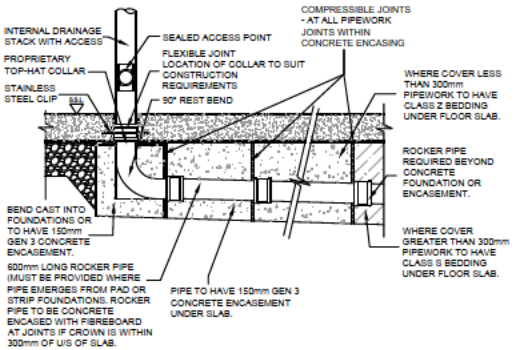
TYPICAL RAINWATER PIPE DETAIL WITH STACK ACCESS TO SUB-BASE
SCALE 1:20



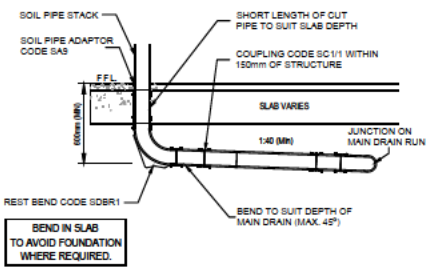
TYPICAL DETAIL WHERE DRAINAGE TRENCH IS DEEPER THAN ADJACENT FOUNDATION
SCALE 1:20



TYPICAL SHALLOW RODDING EYE DETAIL
WHERE DEPTH TO COVER IS LESS THAN 600mm
SCALE 1:20



TYPICAL DETAIL SVP & SHALLOW UNDERSLAB DRAINAGE WITH CONCRETE ENCASEMENT
SCALE 1:20



TYPICAL SVP CONNECTION TO MAIN DRAIN RUN DETAIL
SCALE 1:20

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. ALL PRIVATE DRAINAGE WORKS TO BE IN ACCORDANCE WITH THE DRAINAGE SPECIFICATION, "CIVIL ENGINEER ING SPECIFICATION FOR THE WATER INDUSTRY 7th EDITION", BS EN 752 2017 "DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS" AND THE BUILDING REGULATIONS APPROVED DOCUMENT H.
3. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
4. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND SURVEY INFORMATION AVAILABLE AT THE TIME OF THE DESIGN.
5. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
6. COVER LEVELS, GULLY POSITIONS, AND BUILDING INSPECTION CHAMBER LOCATIONS ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT. CONTRACTOR TO ALLOW FOR ADJUSTMENT TO SUIT AGREED POSITIONS AND FINISHED LEVELS, AND CONFIRM ALL COVER LEVELS ON SITE.
7. ALL DRAINAGE CONNECTIONS ARE PROVIDED TO POSITIONS SHOWN ON ARCHITECTURAL DRAWINGS. REFER TO DIMENSIONED LOCATIONS AND DIAMETERS ON ARCHITECTS GROUND FLOOR SETTING-OUT PLANS.
8. ALL UNDERGROUND FOUL DRAINAGE SHOULD BE SUITABLY VENTED AT OR NEAR TO THE HEAD OF RUNS.
9. ALL ACCESS FITTINGS, STACKS, RWPS AND GULLIES TO BE RODDABLE. ALL TO HAVE LOW LEVEL RODDING ACCESS PLATES UNLESS AN ALTERNATIVE MEANS OF ACCESS IS AGREED. ACCESS POINT TO BE ABOVE ANY GROUND FLOOR CONNECTED APPLIANCE SPILL LEVEL.
10. LARGE ACCESS FITTINGS REQUIRED ABOVE GROUND WHERE GREATER THAN 12m UP TO 22m TO A JUNCTION. SMALL ACCESS FITTINGS REQUIRED UP TO 12m TO A JUNCTION.
11. ALL GULLY AND CHANNEL DRAIN OUTLETS AND TERMINATION POINTS TO BE TRAPPED AND RODDABLE. INTERNAL GULLIES AND CHANNEL DRAINS TO BE SPECIFIED BY OTHERS.
12. WHERE NO WC'S ARE CONNECTED UPSTREAM, UNDERSLAB PIPE DRAINAGE TO BE LAID AT 1:40 MIN. AFTER THE CONNECTION OF AT LEAST ONE WC, A MIN. FALL OF 1:80 APPLIES.
13. ALL CONNECTIONS FROM POP-UPS TO BE LAID AT A CONSTANT GRADIENT TO JUNCTION/INSPECTION CHAMBER/MANHOLE UNLESS NOTED OTHERWISE. ANY ISSUES RELATING TO CLASHES WITH FOUNDATIONS ARE TO BE FORWARDED TO THE ENGINEER, ALLOWING SUFFICIENT TIME FOR AN ALTERNATIVE SOLUTION TO BE PROPOSED.
14. INVERT LEVELS AT MANHOLES/ INSPECTION CHAMBERS TO BE USED TO SET OUT PIPEWORK. PIPE GRADIENTS ARE SHOWN INDICATIVELY ONLY.
15. ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS.
16. ALL SEWERS, UNLESS AGREED OTHERWISE STATED, SHALL BE:
    - 100mm to 300mm DIA TO BE VITRIFIED CLAY.
19. AS AN ALTERNATIVE THE CONTRACTOR MAY USE AN APPROVED UNPLASTICISED POLYVINYL CHLORIDE (PVCU) WITH APPROVAL FROM THE ENGINEER.
20. SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS.
21. THE FIRST PIPE OUT OF MANHOLES TO BE AS SHORT AS PRACTICABLE SO AS TO PROVIDE A FLEXIBLE JOINT AS CLOSE AS POSSIBLE TO THE OUTSIDE FACE OF THE CONCRETE SURROUND AND CONNECTED TO A LENGTH OF ROCKER PIPE.
22. ALL PRIVATE DRAINAGE PIPES WITH A COVER OF LESS THAN 600mm IN NON-TRAFFICKED AREAS AND LESS THAN 900mm IN TRAFFICKED AREAS TO BE BEDDED AND SURROUNDED IN CONCRETE (CLASS Z). COMPRESSIBLE MATERIAL SHALL BE PROVIDED AT EVERY PIPE JOINT. WHERE COVER EXCEEDS THIS DEPTH, PIPES ARE TYPICALLY BEDDED AND SURROUNDED IN CLASS S. REFER TO PIPE EMBEDMENT DETAILS DRAWING FOR SPECIFIC TYPES.
23. WHERE DRAINAGE PIPES ARE LESS THAN 300mm BELOW THE UNDERSIDE OF THE GROUND FLOOR SLAB, CONCRETE ENCASEMENT IS REQUIRED (CLASS Z). COMPRESSIBLE JOINTS ARE TO BE PROVIDED AT EVERY PIPE JOINT WITHIN THE CONCRETE.
24. WHERE PIPES ARE MORE THAN 300mm BELOW THE UNDERSIDE OF THE SLAB, CLASS S BEDDING IS ACCEPTABLE.
25. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED TO PROVE THAT SUCH PRECAUTIONS ARE NOT REQUIRED.
26. WHERE FOUL SEWERS RUN ABOVE SURFACE SEWERS, CONCRETE PROTECTION MAY BE REQUIRED AT CROSSOVERS TO PREVENT ANY POTENTIAL CONTAMINATION.
27. ALL CONNECTIONS PASSING THROUGH BASES OR EDGE BEAMS TO BE IN SEALED SLEEVES. ALTERNATIVELY CONNECTIONS MAY BE CAST-IN WITH FLEXIBLE JOINTS NOT GREATER THAN 150mm FROM FACE OF CONCRETE.
28. UNLESS NOTED OTHERWISE IN THE MANHOLE SCHEDULE, ALL MANHOLE, GULLY AND CHANNEL COVERS (IRONWORK) SHOULD BE THE FOLLOWING SPECIFICATION:
    - B125 LOAD CLASS IN PEDESTRIAN AREAS.
    - D400 LOAD CLASS IN VEHICULAR AREAS.
30. ALL PROPRIETARY PRODUCTS TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS, INSTRUCTIONS AND RECOMMENDATIONS.

Rev	Date	Description	By	Check
P01	21 06 26	PRELIMINARY	CD	CD

Client	MR JOHN BARTON
Project	DILWORTH COTTAGE
Office	WARRINGTON
Discipline	CIVILS
Title	DRAINAGE DETAILS SHEET 1
Scale @ A1	NTS
Status	PELIMINARY

CSD ENGINEERING & CAD SERVICES LTD

Job Number	Originator	Building/Zone	Level
26-0017	CSD	XX	XX
Type	**Discipline**	**Drawing No.**	**Revision**
DR	C	0003	P01

SURFACE WATER STORAGE TANK DESIGN

REFER TO DRAINAGE LAYOUT.

DESIGN BASED ON WAVIN AQUACELL ECO.

THE MANUFACTURER WILL NEED TO CONFIRM THAT THE TANK HAS SUFFICIENT STRENGTH FOR THE LOCATION IN ACCORDANCE WITH CIRIA C737.

BASE OF THE TANK TO BE LAID TO FALL.

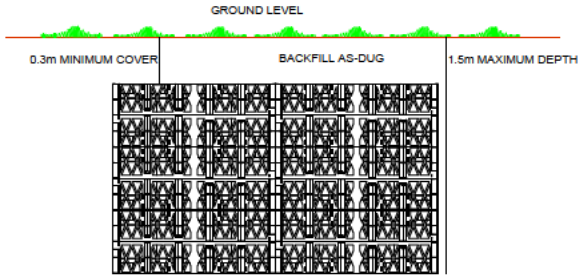
INVERT LEVEL = REFER TO DRAINAGE DESIGN
TANK HEIGHT = REFER TO DRAINAGE DESIGN
REQUIRED VOLUME = REFER TO DRAINAGE DESIGN

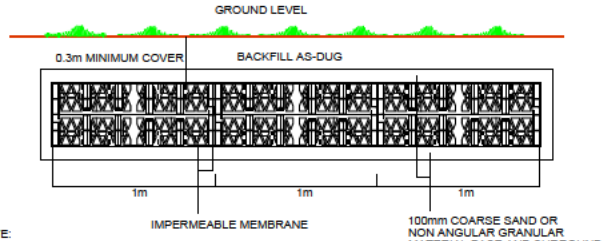
IMPERMEABLE MEMBRANE, BED AND SURROUND TO BE CONFIRMED WITH THE MANUFACTURER.

REFER TO DRAINAGE LAYOUT FOR TANK INLETS / OUTLET LOCATIONS.

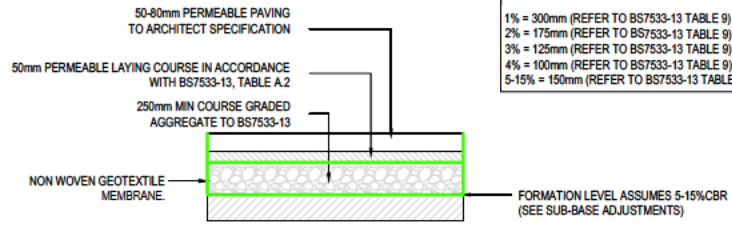
GROUND WATER LEVELS TBC WITH CORRECT GROUND LEVELS AND FLOTATION REQUIREMENTS TO BE CONFIRMED BY MANUFACTURER. ANTI-FLOTATION MAYBE REQUIRED I.E. CONCRETE SLAB, ANCHORAGE ETC. CONTRACTOR TO MAKE ALLOWANCE.

DESIGN OF TANK TO BE CONFIRMED BY SELECTED MANUFACTURER. CONTRACTOR TO CONFIRM AND ISSUE TO ENGINEER FOR APPROVAL.





NOTE:
0.3m MINIMUM COVER,BUT 0.5M COVER IS RECOMMENDED TO PREVENT ACCIDENTAL DAMAGE.

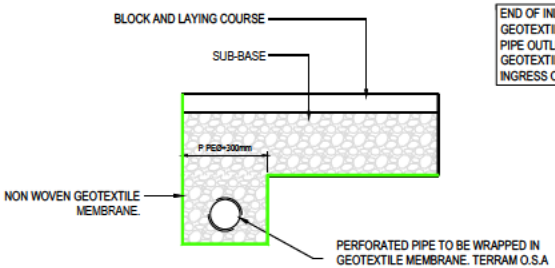


SUB-BASE ADJUSTMENTS (CBR%)

1% = 300mm (REFER TO BS7533-13 TABLE 9)
2% = 175mm (REFER TO BS7533-13 TABLE 9)
3% = 125mm (REFER TO BS7533-13 TABLE 9)
4% = 100mm (REFER TO BS7533-13 TABLE 9)
5-15% = 150mm (REFER TO BS7533-13 TABLE 9)

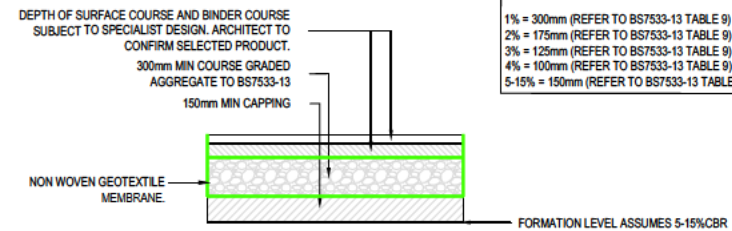
PERMEABLE PAVING - SYSTEM B (PART INFILTRATION)

PEDESTRIAN LOADING ONLY



END OF INLET PIPE TO BE WRAPPED IN GEOTEXTILE MEMBRANE. TERRAM O.S.A. PIPE OUTLET ALSO TO BE WRAPPED IN GEOTEXTILE MEMBRANE TO PREVENT INGRESS OF STONE.

LINED PIPE TRENCH DETAIL BELOW PERMEABLE SURFACING



SUB-BASE ADJUSTMENTS (CBR%)

1% = 300mm (REFER TO BS7533-13 TABLE 9)
2% = 175mm (REFER TO BS7533-13 TABLE 9)
3% = 125mm (REFER TO BS7533-13 TABLE 9)
4% = 100mm (REFER TO BS7533-13 TABLE 9)
5-15% = 150mm (REFER TO BS7533-13 TABLE 9)

PERMEABLE TARMAC - SYSTEM B (PART INFILTRATION)

PEDESTRIAN LOADING ONLY

FOR SEWAGE TREATMENT PLANT (STP) REFER TO MANUFACTURER DESIGN DRAWINGS FOR SPECIFICATION AND SIZING. TO BE PROVIDED AS REQUIRED SUBJECT TO CONDITION OF EXISTING STP.

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. ALL PRIVATE DRAINAGE WORKS TO BE IN ACCORDANCE WITH THE DRAINAGE SPECIFICATION, "CIV L ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 7th EDITION", BS EN 752 2017 'DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS' AND THE BUILDING REGULATIONS APPROVED 'DOCUMENT H'.
3. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
4. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND SURVEY INFORMATION AVAILABLE AT THE TIME OF THE DESIGN.
5. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
6. COVER LEVELS, GULLY POSITIONS, AND BUILDINGS LOCATION ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT. CONTRACTOR TO ALLOW FOR ADJUSTMENT TO SUIT AGREED POSITIONS AND FINISHED LEVELS, AND CONFIRM ALL COVER LEVELS ON SITE.
7. ALL DRAINAGE CONNECTIONS ARE PROVIDED TO POSITIONS SHOWN ON ARCHITECT DRAWINGS. REFER TO DIMENSIONED LOCATIONS AND DIAMETERS ON ARCHITECT'S GROUND FLOOR SETTING-OUT PLANS.
8. ALL UNDERGROUND FOUL DRAINAGE SHOULD BE SUITABLY VENTED AT OR NEAR TO THE HEAD OF RUNS.
9. ALL ACCESS FITTINGS, STACKS, RWP'S AND GULLEYS TO BE RODDABLE. ALL TO HAVE LOW LEVEL RODDING ACCESS PLATES UNLESS AN ALTERNATIVE MEANS OF ACCESS IS AGREED. ACCESS POINT TO BE ABOVE ANY GROUND FLOOR CONNECTED APPLIANCE SPILL LEVEL.
10. LARGE ACCESS FITTING REQUIRED ABOVE GROUND WHERE GREATER THAN 12m UP TO 22m TO A JUNCTION. SMALL ACCESS FITTING REQUIRED UP TO 12m TO A JUNCTION.
11. ALL GULLY AND CHANNEL DRAIN OUTLETS AND TERMINATION POINTS TO BE TRAPPED AND RODDABLE. INTERNAL GULLIES AND CHANNEL DRAINS TO BE SPECIFIED BY OTHERS.
12. WHERE NO WC'S ARE CONNECTED UPSTREAM, UNDERSLAB FW DRAINAGE TO BE LAID AT 1:40 MIN. AFTER THE CONNECTION OF AT LEAST ONE WC, A MIN. FALL OF 1:80 APPLIES.
13. ALL CONNECTIONS FROM POP-UPS TO BE LAID AT A CONSTANT GRADIENT TO JUNCTION/ INSPECTION CHAMBER/ MANHOLE UNLESS NOTED OTHERWISE. ANY ISSUES RELATING TO CLASHES WITH FOUNDATIONS ARE TO BE FORWARDED TO THE ENGINEER, ALLOWING SUFFICIENT TIME FOR AN ALTERNATIVE SOLUTION TO BE PROPOSED.
14. INVERT LEVELS AT MANHOLES/ INSPECTION CHAMBERS TO BE USED TO SET OUT PIPEWORK. PIPE GRADIENTS ARE SHOWN INDICATIVELY ONLY.
15. ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS.
16. ALL SEWERS, UNLESS AGREED OTHERWISE STATED, SHALL BE:
    - 100mm to 300mm DIA TO BE VITRIFIED CLAY.
19. AS AN ALTERNATIVE THE CONTRACTOR MAY USE AN APPROVED UNPLASTICISED POLYVINYL CHLORIDE (PVCU) WITH APPROVAL FROM THE ENGINEER.
20. SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS.
21. THE FIRST PIPE OUT OF MANHOLES TO BE AS SHORT AS PRACTICABLE SO AS TO PROVIDE A FLEXIBLE JOINT AS CLOSE AS POSSIBLE TO THE OUTSIDE FACE OF THE CONCRETE SURROUND AND CONNECTED TO A LENGTH OF ROCKER PIPE.
22. ALL PRIVATE DRAINAGE PIPES WITH A COVER OF LESS THAN 600mm IN NON-TRAFFICKED AREAS AND LESS THAN 900mm IN TRAFFICKED AREAS TO BE BEDDED AND SURROUNDED IN CONCRETE (CLASS Z). COMPRESSIBLE MATERIAL SHALL BE PROVIDED AT EVERY PIPE JOINT. WHERE COVER EXCEEDS THIS DEPTH, PIPES ARE TYPICALLY BEDDED AND SURROUNDED IN CLASS S. REFER TO PIPE EMBEDMENT DETAILS DRAWING FOR SPECIFICTYPES.
23. WHERE DRAINAGE PIPES ARE LESS THAN 300mm BELOW THE UNDERSIDE OF THE GROUND FLOOR SLAB, CONCRETE ENCASEMENT IS REQUIRED (CLASS Z). COMPRESSIBLE JOINTS ARE TO BE PROVIDED AT EVERY PIPE JOINT WITHIN THE CONCRETE.
24. WHERE PIPES ARE MORE THAN 300mm BELOW THE UNDERSIDE OF THE SLAB, CLASS S BEDDING IS ACCEPTABLE.
25. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED TO PROVE THAT SUCH PRECAUTIONS ARE NOT REQUIRED.
26. WHERE FOUL SEWERS RUN ABOVE SURFACE SEWERS, CONCRETE PROTECTION MAY BE REQUIRED AT CROSSOVERS TO PREVENT ANY POTENTIAL CONTAMINATION.
27. ALL CONNECTIONS PASSING THROUGH BASES OR EDGE BEAMS TO BE IN SEALED SLEEVES. ALTERNATIVELY CONNECTIONS MAY BE CAST-IN WITH FLEXIBLE JOINTS NOT GREATER THAN 150mm FROM FACE OF CONCRETE.
28. UNLESS NOTED OTHERWISE IN THE MANHOLE SCHEDULE, ALL MANHOLE, GULLY AND CHANNEL COVERS (IRONWORK) SHOULD BE THE FOLLOWING SPECIFICATION:
    - B125 LOAD CLASS IN PEDESTRIAN AREAS
    - D400 LOAD CLASS IN VEHICULAR AREAS.
30. ALL PROPRIETARY PRODUCTS TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS, INSTRUCTIONS AND RECOMMENDATIONS.

Rev	Date	Description	By	Check
P01	21 06 26	PRELIMINARY	CD	CD

Client	MR JOHN BARTON
Project	DILWORTH COTTAGE
Office	WARRINGTON
Discipline	CIVILS
Title	DRAINAGE DETAILS SHEET 2
Scale @ A1	NTS
Status	PELIMINARY

CSD ENGINEERING & CAD SERVICES LTD

Job Number	Originator	Building/Zone	Level
26-0017	CSD	XX	XX
Type	**Discipline**	**Drawing No.**	**Revision**
DR	C	0004	P01

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.009	5.00	109.720	600	362790.048	437733.293	0.600
S2	0.009	5.00	109.720	600	362796.270	437721.757	0.731
S3	0.003	5.00	109.720	600	362803.431	437722.936	0.804
S4	0.018	5.00	109.250	600	362805.146	437716.482	0.450
FCC	0.000		109.250	1200	362807.073	437717.435	1.090
OF	0.000		108.500		362812.657	437702.860	0.496

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	13.107	0.600	109.120	108.989	0.131	100.0	150	5.22	46.1
1.001	S2	S3	7.257	0.600	108.989	108.916	0.073	100.0	150	5.34	45.7
1.002	S3	FCC	6.597	0.600	108.916	108.850	0.066	100.0	150	5.45	45.4
2.000	S4	FCC	2.150	0.600	108.800	108.779	0.021	100.0	150	5.04	46.7
1.003	FCC	OF	15.608	0.600	108.160	108.004	0.156	100.0	150	5.71	44.5

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	1.005	17.8	1.1	0.450	0.581	0.009	0.0	25	0.560
1.001	1.005	17.8	2.2	0.581	0.654	0.018	0.0	36	0.690
1.002	1.005	17.8	2.6	0.654	0.250	0.021	0.0	38	0.715
2.000	1.005	17.8	2.3	0.300	0.321	0.018	0.0	36	0.690
1.003	1.005	17.8	4.7	0.940	0.346	0.039	0.0	52	0.848

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	13.107	100.0	150	Circular	109.720	109.120	0.450	109.720	108.989	0.581
1.001	7.257	100.0	150	Circular	109.720	108.989	0.581	109.720	108.916	0.654
1.002	6.597	100.0	150	Circular	109.720	108.916	0.654	109.250	108.850	0.250
2.000	2.150	100.0	150	Circular	109.250	108.800	0.300	109.250	108.779	0.321

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	600	Manhole	Adoptable	S2	600	Manhole	Adoptable
1.001	S2	600	Manhole	Adoptable	S3	600	Manhole	Adoptable
1.002	S3	600	Manhole	Adoptable	FCC	1200	Manhole	Adoptable
2.000	S4	600	Manhole	Adoptable	FCC	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)
1.003	15.608	100.0	150	Circular	109.250	108.160	0.940	108.500	108.004	0.346

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.003	FCC	1200	Manhole	Adoptable	OF		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	362790.048	437733.293	109.720	0.600	600	0	1.000	109.120	150
S2	362796.270	437721.757	109.720	0.731	600	1	1.000	108.989	150
						0	1.001	108.989	150
S3	362803.431	437722.936	109.720	0.804	600	1	1.001	108.916	150
						0	1.002	108.916	150
S4	362805.146	437716.482	109.250	0.450	600	0	2.000	108.800	150
FCC	362807.073	437717.435	109.250	1.090	1200	1	2.000	108.779	150
						2	1.002	108.850	150
						0	1.003	108.160	150
OF	362812.657	437702.860	108.500	0.496		1	1.003	108.004	150

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

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

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

Node FCC Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	108.160	Product Number	CTL-SHE-0062-1500-0700-1500
Design Depth (m)	0.700	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.5	Min Node Diameter (mm)	1200

Node FCC Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	108.160
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	89

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	20.0	0.0	0.800	20.0	0.0	0.801	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	11	109.145	0.025	1.1	0.0072	0.0000	OK
15 minute winter	S2	11	109.026	0.037	2.2	0.0104	0.0000	OK
15 minute winter	S3	11	108.957	0.041	2.6	0.0115	0.0000	OK
15 minute winter	S4	10	108.840	0.040	2.3	0.0114	0.0000	OK
60 minute winter	FCC	43	108.257	0.096	2.7	1.9419	0.0000	OK
15 minute summer	OF	1	108.004	0.000	1.2	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)
15 minute winter	S1	1.000	S2	1.1	0.418	0.062	0.0348
15 minute winter	S2	1.001	S3	2.2	0.612	0.124	0.0262
15 minute winter	S3	1.002	FCC	2.6	0.698	0.146	0.0246
15 minute winter	S4	2.000	FCC	2.3	0.641	0.128	0.0077
60 minute winter	FCC	Hydro-Brake®	OF	1.4			

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	109.160	0.040	2.8	0.0113	0.0000	OK
15 minute winter	S2	10	109.050	0.061	5.6	0.0174	0.0000	OK
15 minute winter	S3	11	108.983	0.067	6.3	0.0189	0.0000	OK
15 minute winter	S4	10	108.866	0.066	5.6	0.0188	0.0000	OK
60 minute winter	FCC	51	108.478	0.317	6.9	6.3910	0.0000	SURCHARGED
15 minute summer	OF	1	108.004	0.000	1.5	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)
15 minute winter	S1	1.000	S2	2.8	0.527	0.155	0.0690
15 minute winter	S2	1.001	S3	5.4	0.761	0.306	0.0518
15 minute winter	S3	1.002	FCC	6.3	0.880	0.357	0.0474
15 minute winter	S4	2.000	FCC	5.6	0.808	0.313	0.0148
60 minute winter	FCC	Hydro-Brake®	OF	1.5			

Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	109.175	0.055	5.2	0.0156	0.0000	OK
15 minute winter	S2	10	109.081	0.092	10.3	0.0261	0.0000	OK
15 minute winter	S3	10	109.015	0.099	11.9	0.0279	0.0000	OK
60 minute winter	S4	60	108.900	0.100	6.1	0.0282	0.0000	OK
60 minute winter	FCC	60	108.900	0.740	13.1	14.8881	0.0000	SURCHARGED
15 minute summer	OF	1	108.004	0.000	1.5	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)
15 minute winter	S1	1.000	S2	5.1	0.598	0.290	0.1128
15 minute winter	S2	1.001	S3	10.2	0.862	0.573	0.0857
15 minute winter	S3	1.002	FCC	11.8	1.016	0.662	0.0763
60 minute winter	S4	2.000	FCC	6.1	0.828	0.344	0.0297
60 minute winter	FCC	Hydro-Brake®	OF	1.5			

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	0.700	1.500
Flush-Flo™	0.211	1.495
Kick-Flo®	0.446	1.227
Mean Flow		1.310

This Hydro-Brake® Optimum includes:

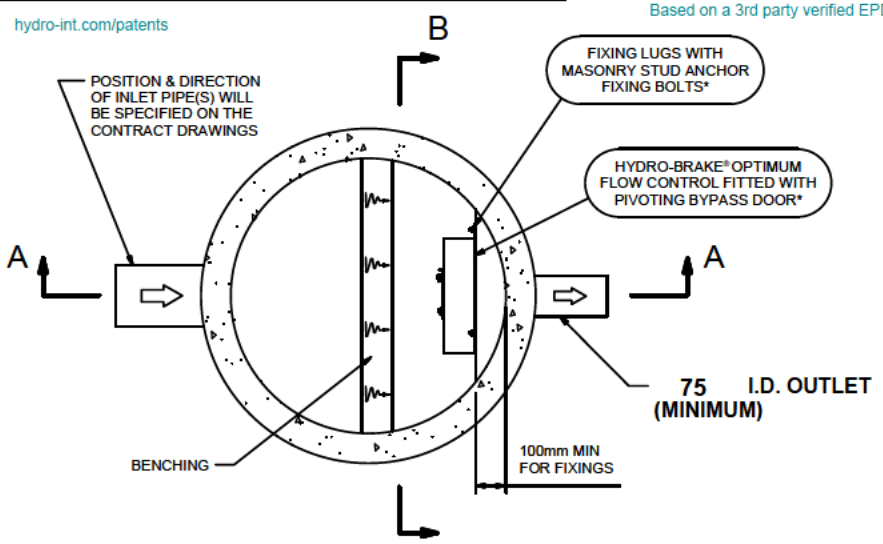
- •All in **3 mm** Grade **304L** stainless steel
- Integral pivoting by-pass door allowing clear line of sight through to outlet, c/w operating rope
- Media blasted for corrosion resistance
- Variable flow rate post installation via adjustable inlet (if necessary)
- Indicative Weight: **10 kg**
- Product Carbon Footprint: 25.8 kgCO2e

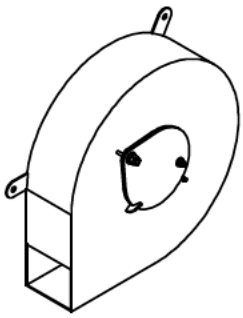
Based on a 3rd party verified EPD: hydro-int.com/epd

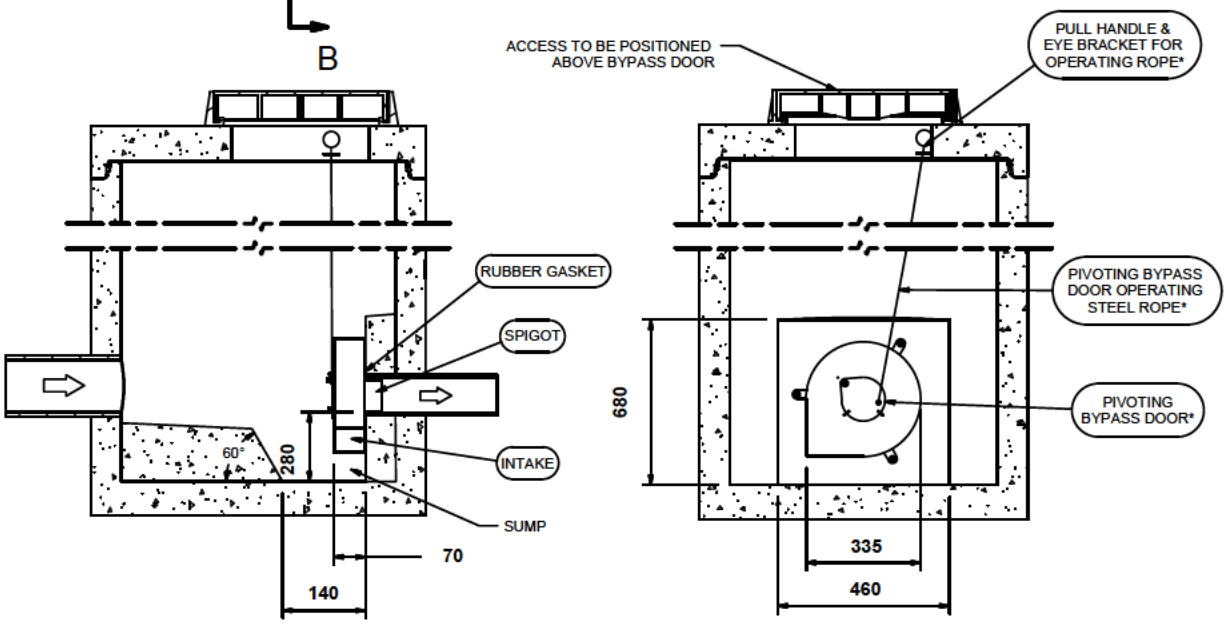
BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 08/4596

wrc approved PT/503/0422

hydro-int.com/patents







SECTION A-A SECTION B-B

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-0062-1500-0700-1500 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	21/06/2026 14:28
SITE	Dilworth Cottage
DESIGNER	CARL DAWSON
REF	26-0017

SHE-0062-1500-0700-1500
Hydro-Brake® Optimum

 Hydro International Ltd • Unit 2, Rivermead Court • Kenn Business Park • Windmill Road • Kenn • Clevedon • BS21 6FT • Tel: 01275 878371 • Website: hydro-int.com • Email: stormwater@hydro-int.com

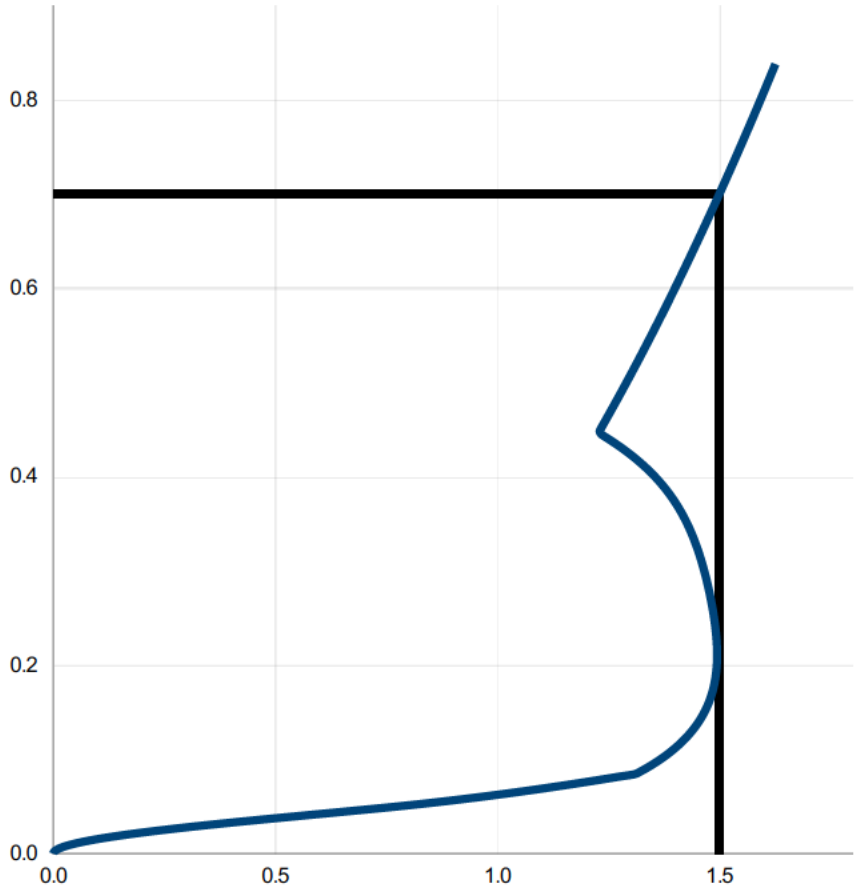
CSDEngineering@hotmail.com

Technical Specification		
Control Point	Head (m)	Flow (l/s)
Primary Design	0.700	1.500
Flush-Flo™	0.211	1.495
Kick-Flo®	0.446	1.227
Mean Flow		1.310

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4596

wrc approved
PT/503/0422

hydro-int.com/patents



Head (m)	Flow (l/s)
0.000	0.000
0.024	0.231
0.048	0.738
0.072	1.150
0.097	1.356
0.121	1.420
0.145	1.460
0.169	1.483
0.193	1.493
0.217	1.495
0.241	1.491
0.266	1.483
0.290	1.472
0.314	1.457
0.338	1.439
0.362	1.414
0.386	1.380
0.410	1.333
0.434	1.269
0.459	1.242
0.483	1.270
0.507	1.298
0.531	1.325
0.555	1.352
0.579	1.378
0.603	1.403
0.628	1.428
0.652	1.452
0.676	1.476
0.700	1.499

DESIGN ADVICE

!

The head/flow characteristics of this SHE-0062-1500-0700-1500 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	21/06/2026 14:28
Site	Dilworth Cottage
DESIGNER	CARL DAWSON
Ref	26-0017

SHE-0062-1500-0700-1500

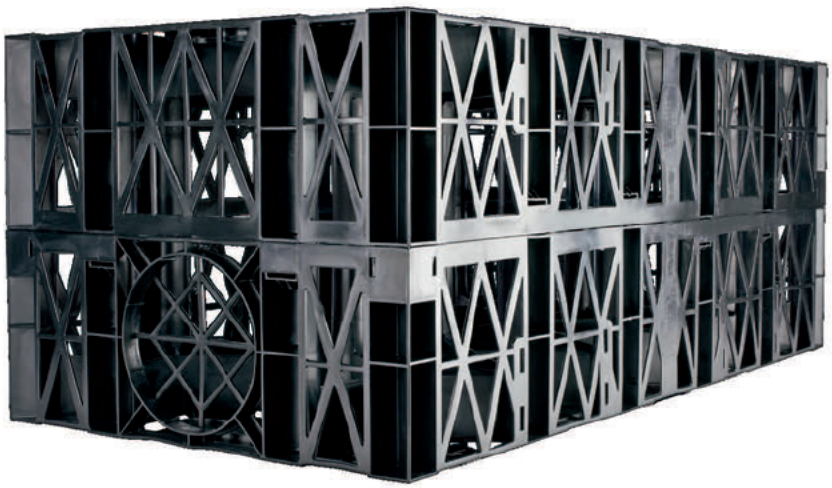
Hydro-Brake® Optimum

Product Datasheet

AquaCell

Product description

AquaCell Eco is manufactured from specially reformulated, recycled material and has been specifically designed for shallow, non-trafficked, landscaped applications. AquaCe Eco is NOT suitable for locations subject to high water tables.



Technical specification

Cat code	6LB025	**Void ratio**	95%
Colour	Black	**Material**	Recycled PP
Dimensions	1m x 0.5m x 0.4m	**Vertical loading**	21.3 tonnes/m² (213 kN/m²)
Weight	7kg	**Lateral loading**	5.2 tonnes/m² (52 kN/m²)
Storage volume	190 litres	**BBA approval**	Certificate 03/4018

Maximum installation depths

Typical soil type	Maximum depth of installation – to base of units (m)[1]		
	Soil weight kN/m³	Angle of internal friction φ (degrees)[2, 3]	Landscaped areas
Over consolidated stiff clay	20	24	1.53
Silty sandy clay	19	26	1.68
Loose sand and gravel	18	30	2.08
Medium dense sand and gravel	19	34	2.35
Dense sand and gravel	20	38	2.68

Minimum cover depths

	Landscaped areas
Minimum cover depth (m)	0.30[3]

1. These values relate to installations where the groundwater is a minimum of one metre below the base of the excavation.
2. AquaCell Eco units should not be used where groundwater is present.
3. 0.5m cover is required where a ride-on mower may be used.

Assumptions made:

- Ground surface is horizontal
- Shear planes or other weaknesses are not present within the structure of the soil

Source: BBA

Wavin Limited | Edlington Lane | Edlington | Doncaster | DN12 1BY
Orders 0844 856 5152 | **Technical Advice** 0844 856 5165 | **Email** technical.design@wavin.co.uk | **Website** aquacell.wavin.co.uk

August 2020

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	20/06/2026
Calculated by	CD
Reference	26-0017
Model version	2.2.3

Location

Site name	Dilworth Cottage
Site location	Dilworth

Site easting (British National Grid)	362812
Site northing (British National Grid)	437725

Site details

Total site area (ha)	0.1192 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	1278 mm		
BFIHOST19scaled	0.396		
QMed-QBar conversion	1.075		1.075
QMed (l/s)	1.4 l/s		
QBar (FEH statistical 2025) (l/s)	1.5 l/s		

Growth curve factors

	My value		Map value
Hydrological region	10		10
1 year growth factor	0.87		
2 year growth factor	0.93		
10 year growth factor	1.38		
30 year growth factor	1.7		
100 year growth factor	2.08		
200 year growth factor	2.37		

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	1.3 l/s
Flow rate 2 year (l/s)	1.4 l/s
Flow rate 10 years (l/s)	2.0 l/s
Flow rate 30 years (l/s)	2.5 l/s
Flow rate 100 years (l/s)	3.0 l/s
Flow rate 200 years (l/s)	3.5 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

Permeable perimeter path paving in sandstone buff colour

Permeable patio paving in light sandstone buff colour

Permeable tarmac vehicular access and driveway surface

3) All dimensions shown on this drawing are in meters/millimeters unless otherwise noted.

3) The contractor is to confirm all dimensions on site prior to commencing work and advise of any discrepancies immediately to the Architect

OGDEN DESIGN CONSULTANTS

T : [redacted]

E :

W : WWW.OGDENDESIGNCONSULTANTS.CO.UK

PROJECT

Mr John Barton
Dilworth Cottage,
Ward Green Lane,
Longridge, PR3 2ZL

DRAWING TITLE

Proposed Site Plan

DATE	June 2026	DRAWN BY	RCO
SCALE	1:100@A1	CHECKED	RO
DWG No	1403 - W05	REVISION	-