SuDS Management and Maintenance Plan

Proposed Development, New Dwellings, 1515 Ashton Old Road, Fairfield Manchester

CLIENT
KMM Homes

DOCUMENT NUMBER
23065-AJF-ZZ-ZZ-RP-D-001

AJF ENGINEERING CONSULTANTS Ltd
Thursby House, 1 Thursby Road
Bromborough, Wirral, CH62 3PW

0151 374 0545
info@ajfengineering.co.uk
ajfengineering.co.uk

Prepared by:	Sulo Sitali MEng(Hons) CEng MICE		March 2023
Checked by:	B Patel MEng(Hons)		March 2023
Approved by:	Alex Fairhurst MEng(Hons) CEng MIStructE		March 2023

Rev:	Date:	By:	Chkd:	Aprvd:	Summary:
T01	31/03/2023	CLS	BP	AJF	For Information

CONTENTS

1. INTRODUCTION....1
2. SuDS Layout and Design....2
3. SuDS Management & Maintenance....2
4. APPENDICES....6

Appendices

Appendix A - Proposed Drainage Foul & Surface Water Layout

Appendix B – c753 SuDS Manual Maintenance Inspection Checklist

Appendix C – Manufacturers' Product Maintenance Guidance Sheets

Appendix D – SuDS Maintenance Access Plan

1. INTRODUCTION

1.1. This report has been prepared to set out the principles for the post completion management and maintenance of the proposed surface water Sustainable Drainage Systems (SuDS) and serviceable drainage infrastructure at the proposed residential development at the Former Grove Pub, 1515 Ashton Old Road, Fairfield, Manchester.

1.2. The purpose of this document is to outline the roles and responsibilities of the adopting managing company for the robust inspection and maintenance programme, ensuring the optimum operation of the surface water drainage network is continually maintained for the lifetime of the development and therefore prevent the any increasing risk of flooding (both on- and off-site) over time as a result of drainage elements losing functionality.

1.3. This plan has been comprised of and is directly referenced from the latest technical SuDS guidance within the CIRIA Report C753 The SuDS Manual (2015) and other applicable guidance.

1.4. This document will include the following specific sections in the order stated below:

- A description of the SuDS components present on site, their capacities/controls and intended uses.
- Details of the intended arrangements for managing/maintaining of the SuDS elements and access arrangements.
- Maintenance requirements for each SuDS component and frequencies.
- Inspection requirement and frequencies.

1.5. The listed activities are generic to the relative SuDS types and represent the minimum maintenance and inspection requirements, however additional tasks or varied maintenance frequency may be instructed by the maintenance company as required. In any case, the manufacturers manual and warrantee information of the specific SuDS feature should be provided to the maintenance company. Specific maintenance needs of the SuDS elements should be monitored and maintenance schedules adjusted to suit requirements. In some cases, this may require personnel to attend site from the SuDS manufacturing company and sign-off from their behalf.

1.6. All those responsible for maintenance should follow relevant health and safety legislation for all activities listed within this report (including lone working, if relevant) and risk assessments should always be undertaken.

1.7. A copy of the Health & Safety File should be made available to the prospective property owners and managing company for their guidance and background information.

1.8. This plan is to be read in conjunction with drawings 23065-AJF-ZZ-ZZ-DR-D-001 - Proposed Foul & Surface Water Drainage, 23065-AJF-ZZ-ZZ-DR-C-011 – SuDS Maintenance Access Plan, and as well as the relevant construction details.

2. SuDS Layout and Design

2.1. The main SuDS components with the surface water drainage strategy are:

- SuDS Geocellular / Storage Crates/Tank
  Drainage of roofs, external pavements, parking areas and access road drain via the use of impermeable macadam and block paved surfaces into surface water tank formed from pre-formed crates with 95% air void ratios, before discharging into the combined United Utilities Sewer at a restricted rate of 2 l/s. The attenuation tank has a storage volume of 4m^3. The upstream and downstream manholes will have a 400mm - 600mm catchpit sump to aid cleaning and inspection. The responsibility of inspecting the catch pit and identifying any drainage systems that are not operating properly lies with the property owner or management company.

- Inspection Chambers and Rodding eyes.
  Inspection Chambers and rodding eyes are used on bends or where pipes come together or at the head of drainage runs. They allow cleaning of the system if necessary.

- Soft Landscaped areas
  The design includes plenty of open grassed and vegetated areas in the front and rear gardens that will contribute to SuDS. These are to be regularly maintained by the property owners.

3. SuDS Management & Maintenance

3.1. The sustainable drainage management and maintenance plan should include arrangements for the sustainable drainage systems to be adopted by an appropriate management and maintenance body. In this case, as the development comprises a single-family dwelling the property owners or residents will need to appoint an appropriate management company to manage and maintain the SuDS within the development. This will be no different to any other maintenance arrangements within the development. The property owners or residents will be liable for the maintenance of the system as set out in their title documents or maintenance schedule / arrangements. The property owners shall be supplied with this SuDS document as part of the information provided to them upon completion of the construction works. The table below outlines the adopting body for the site SuDS elements.

SuDS Feature	**Management/Maintenance Responsibility**
Pipework and Chambers	Property Owner / Management Company
Permeable Paving	Property Owner / Management Company
Geocellular Storage Tanks / Rainwater Harvesting Tanks including Soakaways	Property Owner / Management Company
Drainage outfall from hardstanding areas to positive drainage network within site	Property Owner / Management Company
Soft Landscaped areas (grasses, shrubs)	Property Owner / Management Company
Existing Drainage Outside of site boundary	Statutory Undertaker / Owner of Existing Assets

3.2. The management and maintenance plan should also include arrangements for inspection and ongoing maintenance of all elements of the sustainable drainage system to secure the operation of the surface water drainage scheme throughout its lifetime.

3.3. CIRIA C753 provides guidance on the operation and maintenance requirements of sustainable drainage systems and shall be referred to during the detailed design for the proposed development. The Construction (Design and Management) Regulations 2015 also requires designers to consider all maintenance risks and ensure they are eliminated, reduced, or controlled where appropriate. The project health and safety file will be required to contain this information.

3.4. The design life of some SuDS elements and drainage elements of the proposed system is shorter than the predicted design life of the development. Therefore, the design and maintenance regime account for any potential replacement works (such as replacing permeable paving).

3.5. Though not a SuDS feature as such, rodding eyes have also been allowed for in accordance with Building Regulation Part H to allow for the unblocking of lateral drains via rodding.

3.6. There are three categories of maintenance activities referred to in this report:

- **Regular maintenance (including inspections and monitoring).**
  Consists of basic tasks done on a frequent and predictable schedule, including vegetation management, litter and debris removal, and inspections.
- **Occasional maintenance**
  Comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example).
- **Remedial maintenance**
  Comprises intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict.

3.7. The tables below outline the regular operation and maintenance regimes recommended for the site in accordance with CIRIA C753.

Operation and Maintenance Recommendations for Surface Water Systems (pipes, chambers, etc)		
Maintainance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Inspection for sediment and debris in catchpit manholes and gullies. Clean out as required.	Twice Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required base on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	Remove sediment and debris from catchpits, gullies, attenuation devices and inside of concrete manhole rings	As required, based on inspections
Remedial Actions	Reconstruct and/or replace components, if performance deteriorates or failure/blockage occur	As required
	Replacement of clogged components (flow restriction)	As required
Monitoring	Inspect silt traps/gullies/catchpits and note rate of sediment accumulation	Monthly in the first year and then annually
	Check flow control chamber and attenuation devices	Annually

Operation and Maintenance Recommendations for Attenuation Structure (Tank)		
Maintainance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockages by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually (or as required)
Remedial Actions	Repair/ rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Operation and Maintenance Recommendations for Flow Control Devices (Not required)		
Maintainance Schedule	**Required Action**	**Typical Frequency**
Monitoring	Initial inspection	Monthly for 3 months after installation
	Inspect silt accumulation rates	Annually
	Monitor inspection and hydrobrake chambers	Annually, 48h after large storms

Operation and Maintenance Recommendations for Pervious Paving Systems		
Maintainance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations
Occasional Maintenance	Stabilise and mow any contributing and adjacent areas.	As required, based on inspections
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
Monitoring	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly for the first 6 months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Operation and Maintenance Recommendations for Channel / Slot Drains		
Maintainance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Remove litter (including leaf litter) and debris from channel drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect channel drain surface, inlet/outlet pipework and control systems for blockages, clogging standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six Monthly

3.10. United Utilities own and operate the existing drainage network that we propose to connection to. The foul and surface water outfall is located at the side of the development, the main sewer within Club Street is managed and maintained by United Utilities. Upstream of the outfall into the site will be manage and maintained by the property owner or resident's management company. Access to the outfall is easily available.

4. Future Alterations to the Development

4.1. Any future alterations to the proposed drainage systems should be confirmed by a specialist and / or engineer. The property owner is to liaise with the drainage engineer and any specialist suppliers to ensure any changes to the drainage will not impact the operation of the drainage systems.

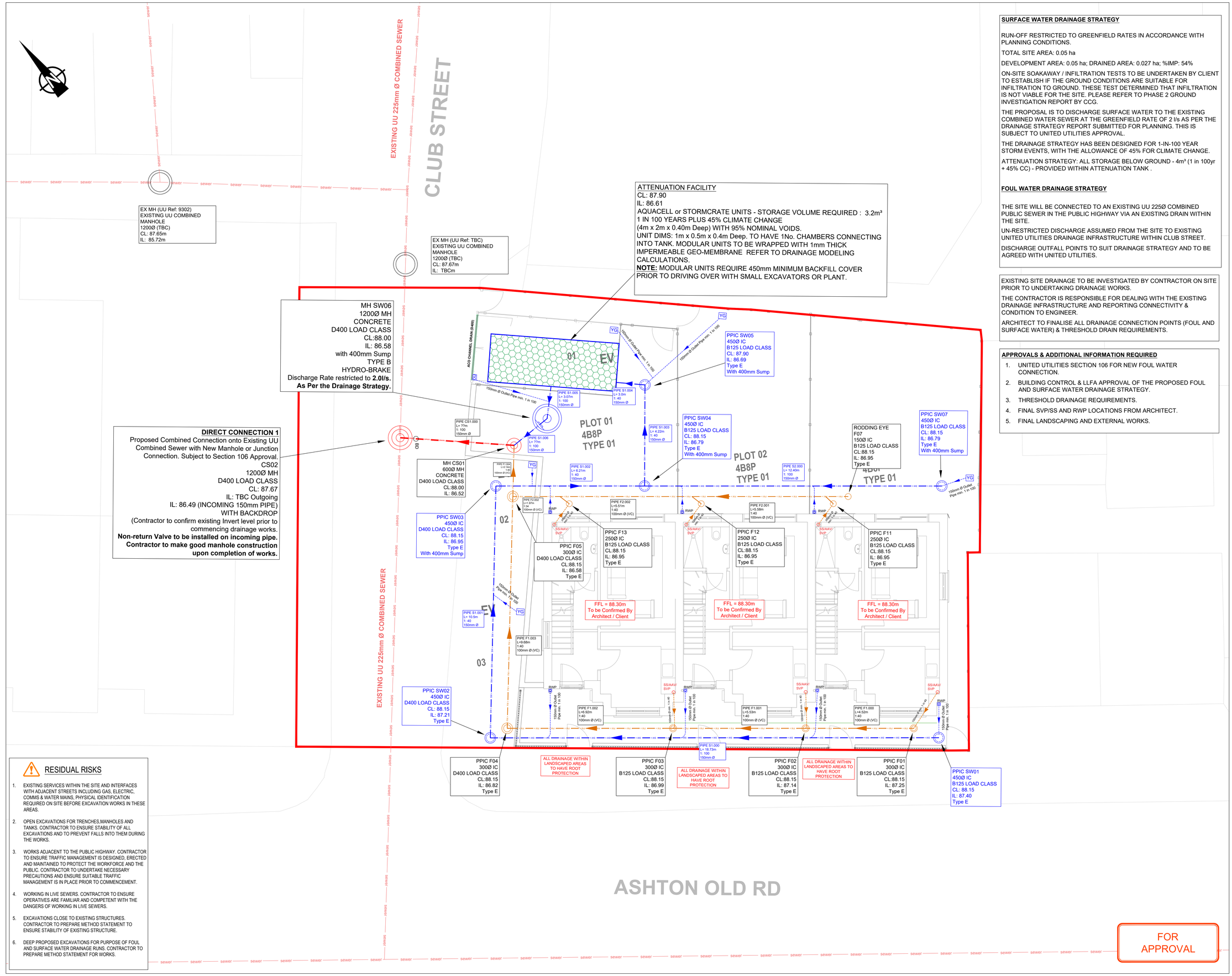
4.2. All alterations are to be carried out in line with the latest specifications and guidance.

5. APPENDICES

Appendix A

Proposed Drainage Foul & Surface Water Layout

ISO A0 841mm x 1189mm



SURFACE WATER DRAINAGE STRATEGY

RUN-OFF RESTRICTED TO GREENFIELD RATES IN ACCORDANCE WITH PLANNING CONDITIONS.

TOTAL SITE AREA: 0.05 ha

DEVELOPMENT AREA: 0.05 ha; DRAINED AREA: 0.027 ha; %IMP: 54%

ON-SITE SOAKAWAY / INFILTRATION TESTS TO BE UNDERTAKEN BY CLIENT TO ESTABLISH IF THE GROUND CONDITIONS ARE SUITABLE FOR INFILTRATION TO GROUND. THESE TEST DETERMINED THAT INFILTRATION IS NOT VIABLE FOR THE SITE. PLEASE REFER TO PHASE 2 GROUND INVESTIGATION REPORT BY CCG.

THE PROPOSAL IS TO DISCHARGE SURFACE WATER TO THE EXISTING COMBINED WATER SEWER AT THE GREENFIELD RATE OF 2 l/s AS PER THE DRAINAGE STRATEGY REPORT SUBMITTED FOR PLANNING. THIS IS SUBJECT TO UNITED UTILITIES APPROVAL.

THE DRAINAGE STRATEGY HAS BEEN DESIGNED FOR 1-IN-100 YEAR STORM EVENTS, WITH THE ALLOWANCE OF 45% FOR CLIMATE CHANGE.

ATTENUATION STRATEGY: ALL STORAGE BELOW GROUND - 4m³ (1 in 100yr + 45% CC) - PROVIDED WITHIN ATTENUATION TANK .

FOUL WATER DRAINAGE STRATEGY

THE SITE WILL BE CONNECTED TO AN EXISTING UU 225Ø COMBINED PUBLIC SEWER IN THE PUBLIC HIGHWAY VIA AN EXISTING DRAIN WITHIN THE SITE.

UN-RESTRICTED DISCHARGE ASSUMED FROM THE SITE TO EXISTING UNITED UTILITIES DRAINAGE INFRASTRUCTURE WITHIN CLUB STREET.

DISCHARGE OUTFALL POINTS TO SUIT DRAINAGE STRATEGY AND TO BE AGREED WITH UNITED UTILITIES.

EXISTING SITE DRAINAGE TO BE INVESTIGATED BY CONTRACTOR ON SITE PRIOR TO UNDERTAKING DRAINAGE WORKS.

THE CONTRACTOR IS RESPONSIBLE FOR DEALING WITH THE EXISTING DRAINAGE INFRASTRUCTURE AND REPORTING CONNECTIVITY & CONDITION TO ENGINEER.

ARCHITECT TO FINALISE ALL DRAINAGE CONNECTION POINTS (FOUL AND SURFACE WATER) & THRESHOLD DRAIN REQUIREMENTS.

APPROVALS & ADDITIONAL INFORMATION REQUIRED

1. UNITED UTILITIES SECTION 106 FOR NEW FOUL WATER CONNECTION.
2. BUILDING CONTROL & LLFA APPROVAL OF THE PROPOSED FOUL AND SURFACE WATER DRAINAGE STRATEGY.
3. THRESHOLD DRAINAGE REQUIREMENTS.
4. FINAL SVP/SS AND RWP LOCATIONS FROM ARCHITECT.
5. FINAL LANDSCAPING AND EXTERNAL WORKS.

RESIDUAL RISKS

1. EXISTING SERVICES WITHIN THE SITE AND INTERFACES WITH ADJACENT STREETS INCLUDING GAS, ELECTRIC, COMMS & WATER MAINS, PHYSICAL IDENTIFICATION REQUIRED ON SITE BEFORE EXCAVATION WORKS IN THESE AREAS.
2. OPEN EXCAVATIONS FOR TRENCHES,MANHOLES AND TANKS. CONTRACTOR TO ENSURE STABILITY OF ALL EXCAVATIONS AND TO PREVENT FALLS INTO THEM DURING THE WORKS.
3. WORKS ADJACENT TO THE PUBLIC HIGHWAY. CONTRACTOR TO ENSURE TRAFFIC MANAGEMENT IS DESIGNED, ERECTED AND MAINTAINED TO PROTECT THE WORKFORCE AND THE PUBLIC. CONTRACTOR TO UNDERTAKE NECESSARY PRECAUTIONS AND ENSURE SUITABLE TRAFFIC MANAGEMENT IS IN PLACE PRIOR TO COMMENCEMENT.
4. WORKING IN LIVE SEWERS. CONTRACTOR TO ENSURE OPERATIVES ARE FAMILIAR AND COMPETENT WITH THE DANGERS OF WORKING IN LIVE SEWERS.
5. EXCAVATIONS CLOSE TO EXISTING STRUCTURES. CONTRACTOR TO PREPARE METHOD STATEMENT TO ENSURE STABILITY OF EXISTING STRUCTURE.
6. DEEP PROPOSED EXCAVATIONS FOR PURPOSE OF FOUL AND SURFACE WATER DRAINAGE RUNS. CONTRACTOR TO PREPARE METHOD STATEMENT FOR WORKS.

NOTES

1. DO NOT SCALE FROM THIS DRAWING. USE ONLY WRITTEN DIMENSIONS.
2. ALL PIPE DIAMETERS ARE IN MILLIMETRES AND ALL LEVELS ARE IN METRES UNLESS OTHERWISE STATED.
3. LOCATIONS AND LEVELS OF CONNECTIONS TO EXISTING SEWERS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO COMMENCING WORKS. ANOMALIES ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
4. COVER LEVELS FOR MANHOLES AND INSPECTION CHAMBERS ARE INDICATIVE ONLY - THEY SHALL BE LAID FLUSH WITH THE ADJACENT SURFACING.
5. ALL WORKS TO COMPLY WITH "DESIGN & CONSTRUCTION GUIDE LATEST EDITION". ALL WORKMANSHIP TO BE IN ACCORDANCE WITH CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY (CESWI) UNLESS OTHERWISE STATED.
6. PROPOSED PIPEWORK WITH LESS THAN THE FOLLOWING DEPTHS TO SOFFIT REQUIRES A CONCRETE SURROUND:
   - PROPOSED PIPEWORK WITH <1.2m DEPTH TOSOFFIT IN ROADS/SERVICE AREAS.
   - OR <0.9m DEPTH TO SOFFIT IN PEDESTRIAN AREAS.
   - OR 0.6m DEPTH TO SOFFIT IN LANDSCAPED AREAS REQUIRES CLASS Z BEDDING.
7. INSPECTION CHAMBERS IN DRIVEWAYS ARE TO HAVE CLASS C250 COVERS AND FRAMES.
8. PIPEWORK BUILT THROUGH STRUCTURAL WALL SHALL HAVE 50mm CLEARANCE AND A SUITABLE LINTEL INSTALLED TO OPENING.FLEXIBLE JOINTS EITHER SIDE OF THE WALL SHOULD BE LOCATED NOT MORE THEN 150mm FROM THE FACE.
9. TYPE 3 AND 4 PPIC'S ARE BY WAVIN OR SIMILAR APPROVED.
10. ANY 100mm DIA PIPE WITHOUT A WC CONNECTION SHOULD NOT BE FLATTER THAN 1:40
11. ALL RWP'S ARE TO OUTFALL VIA PLASTIDRAIN INLET HOPPER GULLY - BN 110 PIE OR SIMILAR APPROVED.
12. A 30mm REDUCTION IN LEVEL HAS BEEN ALLOWED FOR IN THE CALCULATION OF INVERT LEVELS FOR ALL BRANCH CONNECTIONS TO PLASTIC INSPECTION CHAMBERS (AS PER WAVIN DETAILS). INVERT LEVELS REFER TO MAIN CHANNEL. IF ALTERNATIVE CHAMBERS ARE PROPOSED THIS VALUE MAY VARY AND THE DESIGNER SHOULD BE CONSULTED.
13. ALL AREAS TO BE SCANNED FOR EXISTING BURIED SERVICES OR OTHER OBSTRUCTIONS PRIOR TO EXCAVATION WORKS.
14. PROPOSED FOUL DRAINAGE TO BE CONSTRUCTED IN ACCORDANCE WITH BUILDING REGULATIONS 2010 DRAINAGE & WASTE DISPOSAL - PART H 2015 EDITION.
15. ALL MANHOLE COVER LEVELS AND EXTERNAL FINISHED FLOOR LEVELS ARE TO BE CONFIRMED BY THE ARCHITECT. COVER LEVELS FOR MANHOLES AND INSPECTION CHAMBERS ARE INDICATIVE ONLY - THEY SHALL BE LAID FLUSH WITH THE ADJACENT SURFACING.
16. CONTRACTOR TO CONFIRM INVERT LEVELS OF PROPOSED CONNECTION ON EXISTING WELSH WATER SEWERS.
17. ALL SOIL STACK CONNECTIONS TO BELOW GROUND DRAINAGE TO BE 100mm Ø LAID AT MINIMUM 1:80 GRADIENT (MIN. 1WC), UNLESS OTHERWISE STATED ON DRAWING.
18. ANY REQUIRED FOUNDATION PENETRATION DETAILS TO BE PROVIDED BY STRUCTURAL ENGINEER.
19. CONNECTIONS UPSTREAM TO SVP/SS TO BE DESIGNED BY OTHERS.
20. THE DEVELOPER MUST SELF-VET AND CERTIFY THAT THE DESIGN CRITERIA, MATERIAL STANDARDS AND WORKMANSHIP SPECIFICATIONS FOR THE PROPOSED ADOPTABLE LATERAL DRAIN ARE IN ACCORDANCE WITH THOSE SET OUT IN 'SEWERS FOR ADOPTION' 7TH EDITION, AND THE REQUIREMENTS OF UU AS THE STATUTORY SEWERAGE UNDERTAKER.
21. FOUL PIPEWORK TO BE VITRIFIED CLAY OR PLASTIC .VITRIFIED CLAY PIPES SHOULD COMPLY WITH REQUIREMENTS BS EN 295 FOR FOUL PIPES.
22. PLASTIC PIPEWORK IS TO BE INSTALLED (POLYPIPE OR SIMILAR APPROVED) IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATION. ALL THERMOPLASTIC PIPEWORK SHALL COMPLY WITH THE REQUIREMENTS OF E2.21 & E2.22 (PAGE 89) OF SEWERS FOR ADOPTION 7TH EDITION.
23. ANY PIPE RUNS WITH LESS THAN 0.9m COVER LOCATED WITHIN NON-TRAFFICKED AREAS ARE TO BE 150mm GEN CONCRETE BED AND SURROUND.
24. ANY INTERNAL MANHOLES COVERS ARE TO BE LAID FLUSH WITH FINISHED FLOOR LEVEL AND ARE TO BE DOUBLE SEALED AIR TIGHT ODOUR-LESS COVERS.
25. THE LOCATION OF ANY INTERNAL MANHOLES TO BE CONFIRMED WITH ARCHITECT TO ENSURE MANHOLES ARE SUITABLE AND ACCESSIBLE WITH RESPECT TO FLOOR FINISHES.
26. ANY GREASE DRAINS THAT ARE DIRECTED TO GREASE TRAPS MUST USE CAST IRON PIPING SYSTEMS THAT ALLOW MECHANICAL CLEANING WHEN BLOCKAGES OCCUR.
27. ALL SVP LOCATIONS AND DISCHARGE UNITS ARE PROVIDED BY M&E ENGINEER OR ARCHITECT.
28. ALL SVPs ARE TO HAVE LOW LEVEL ACCESS PLATES.
29. FOUL DRAINAGE REST BENDS TO BE MINIMUM -450mm DEEP.
30. DRAINAGE CONNECTIONS TO BE MADE SOFFIT TO SOFFIT FOR SURFACE WATER.
31. A SECTION 106 APPLICATION TO CONNECT TO THE FOUL & SURFACE WATER DRAINAGE SYSTEMS MUST BE MADE TO UNITED UTILITIES, THE DEVELOPER SHALL GIVE 21 DAYS' NOTICE PRIOR TO CONNECTION. THE WORKS MAY ONLY BE UNDERTAKEN BY AN SSIP HEALTH AND SAFETY APPROVED CONTRACTOR."

KEY

- SITE BOUNDARY
- SW 1 — PROPOSED SURFACE WATER DRAIN
- TW 1 — PROPOSED SURFACE WATER DRAIN
- sewer — EXISTING UU COMBINED SEWER
- sewer — EXISTING UU SURFACE WATER SEWER
- PROPOSED OUTLET PIPE
- PROPOSED COMBINED SEWER
- PROPOSED COMBINED WATER PRECAST MANHOLE - TYPE B (600 - 1500mmØ)
- PROPOSED COMBINED WATER PRECAST MANHOLE - TYPE B (1050 -1800mmØ)
- PROPOSED SURFACE WATER POLYPROPYLENE INSPECTION CHAMBER - TYPE E (300mm Ø - 600mmØ)
- PROPOSED SURFACE WATER OSMA SIC BY WAVIN OR SIMILAR APPROVED. TYPE E (250mm Ø)
- PROPOSED FOUL WATER POLYPROPYLENE INSPECTION CHAMBER - TYPE E (300mm Ø - 450mm Ø)
- PROPOSED SURFACE WATER OSMA SIC BY WAVIN OR SIMILAR APPROVED. TYPE E (250mm Ø)
- SVP — SOIL VENT PIPE
- RWP — RAINWATER PIPE DOWNPIPE
- CU — CHANNEL DRAIN OUTLET UNIT
- ACO M100D D400 SLOPED CHANNEL DRAIN
- YG — YARD / ROAD GULLY
- PROPOSED ROOT PROTECTION BARRIER (EXACT SPECIFICATION BY ARCHITECT)
- PROPOSED ATTENUATION - AQUACELL OR STORMCRATE UNITS BY WAVIN / BRETT MARTIN OR SIMILAR APPROVED

FOR APPROVAL

Rev:	Date:	Description:
R1	31/03/23	For Approval

Copyright AJF Engineering Consultants Ltd. All rights Reserved. This document is not to be copied wholly or in part, or used by any third party without express written consent of AJF Engineering Consultants Ltd. AJF Engineering Consultants Ltd accepts no responsibility or liability which may arise from reliance or use of this document by any other party or for any other purpose.

Project:
Proposed Development, New Dwellings, 1515 Ashton Old Road, Manchester
Client:
KMM Homes Ltd

Drawing Title:
Proposed Foul & Surface Water Drainage Layout

Scale (@ A0):	Drawn by:	Chkd by:	Aprvd by:
1:50	CLS	BP	AJF

Drawing Number:	Date:	Rev:
23065-AJF-ZZ-ZZ-DR-D-001	March 23	R1

AJF Engineering Consultants Ltd
Thursby House, 1 Thursby Road
Bromborough, Wirral, CH62 3PW
0151 374 0545
info@ajfengineering.co.uk
ajfengineering.co.uk

Filename: C:\USERS\BUILDS\TAL\AJF STRUCTURAL ENGINEERING LTD\AJF ENGINEERING - GENERAL\AJF\JOBS\23\23065 THE FAIRFIELDS, OPENSHAW\04_DRAWINGS\DRAINAGE\23065-AJF-ZZ-ZZ-DR-D-001 R1 - PROPOSED FW & SW DRAINAGE LAYOUT.DWG

Appendix B

Appendix B – c753 SuDS Manual Maintenance Inspection Checklist

Table B.25 SuDS maintenance inspection checklist			
General information			
Site ID			
Site location and co-ordinates (GIS if appropriate)			
Elements forming the SuDS scheme		Approved drawing reference(s)	
Inspection frequency		Approved specification reference	
Type of development		Specific purpose of any parts of the scheme (eg biodiversity, wildlife and visual aspects)	

Inspection date								
	Details	**Y/N**	**Action required**	**Date completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
General inspection items								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours or nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Is there any deterioration in the surface of permeable or porous surfaces (eg rutting, spreading of blocks or signs of ponding water)?								

Silt/sediment accumulation								
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes, state depth (mm) and extent. Is removal required? If yes, state waste disposal requirements and confirm that all waste management requirements have been complied with (consult environmental regulator)								
Is surface clogging visible (potentially problematic where water has to soak into the underlying construction or ground (eg underdrained swale or infiltration basin)?								
Does permeable or porous surfacing require sweeping to remove silt?								
System blockages and litter build-up								
Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?								
Is there any evidence of any other clogging or blockage of outlets or drainage paths?								
Vegetation								
Is the vegetation condition satisfactory (density, weed growth, coverage etc)? (Check against approved planting regime.)								
Does any part of the system require weeding, pruning or mowing? (Check against maintenance frequency stated in approved design.)								
Is there any evidence of invasive species becoming established? If yes, state action required								
Infrastructure								
Are any check dams or weirs in good condition?								
Is there evidence of any accidental damage to the system (eg wheel ruts?)								

Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow controls?								
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.)								
Other observations								
Information appended (eg photos)								
Suitability of current maintenance regime								
Continue as current Increase maintenance Decrease maintenance								
Next inspection								
Proposed date for next inspection								

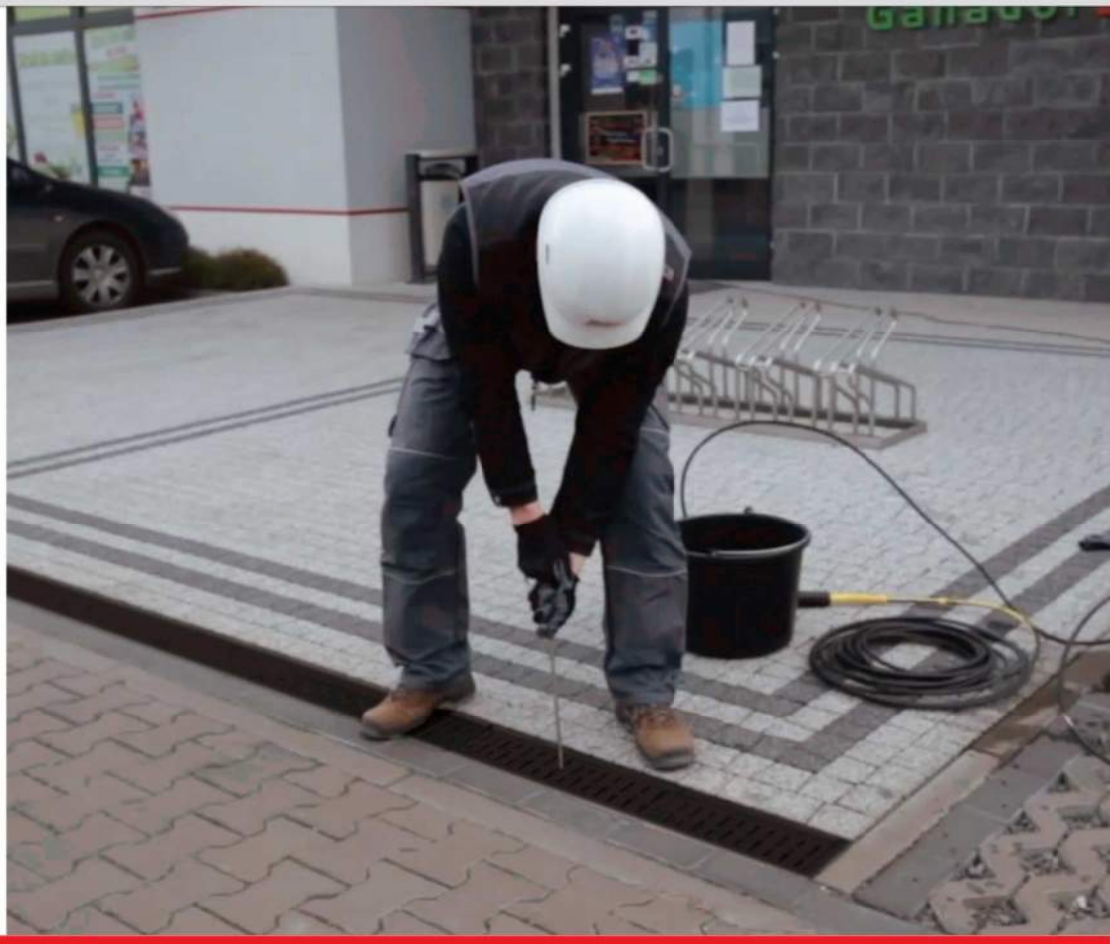
Appendix C

Appendix C – Manufacturers' Product Maintenance Guidance Sheets

ACO Water Management:
Civils + Infrastructure

Uniclass L2123 + JR12 + JS10 + L71121 + L731	EPIC J3413
CI/SfB (52.5)	

ACO Maintenance Guide







ACO Maintenance Guide

Channel drainage, ACO KerbDrain® and ACO Qmax®

Introduction to the ACO Group

Throughout the world ACO branded drainage and surface water management systems are recognised for their innovative design, high quality manufacture, environmental excellence and industry leading performance.

Today the ACO Group has a research and production base that reaches across four continents. This unmatched resource pioneers the development of solutions that are tailored to individual applications, meeting the need for high performance, sustainable products that deliver optimum value throughout their operational life.



The ACO Group / www.aco.com

ACO Technologies plc

ACO operates as ACO Technologies plc in the United Kingdom. Founded over 30 years ago, the company has grown quickly on a reputation for design innovation and customer service.

There are now 2 divisions within ACO Technologies that serve every sector of the construction industry, providing solutions for applications as diverse as rail, highways, airports, landscaping, retail, distribution centres and environmentally sensitive projects.



To help architects, designers and contractors meet the legal requirements that now tightly control the way surface water is managed, ACO has created its unique system chain that combines a 'Surface Water Management Cycle' – Collect, Clean, Hold, Release, with the service support of Train, Design, Support and Care.

These processes enable ACO to offer a combination of product and service expertise necessary for the complete and sustainable management of surface water drainage.

Contents

Introduction to channel drain maintenance	4
Maintenance of grates	4
Access through grates	7
Access units	8
Maintenance of domestic channel systems	11
Maintenance of commercial channel systems	12
Maintenance of ACO KerbDrain®	13
Maintenance of ACO Qmax®	14
ACO Qmax® life cycle testing & other maintenance information	15

Introduction to channel drainage maintenance

ACO supports effective asset management in channel drainage – from site design through to life-cycle maintenance. ACO have a comprehensive range of gullies and access units for silt management, with easy access for maintenance and cleaning.

What is good channel maintenance?

Inspection routines are essential to maintain efficient performance of drainage channels and they should be carried out at frequent and regular intervals. The frequency will depend upon the location and the environment, and should be based on local knowledge, but inspections should be carried out at least once a year.

Benefits of maintenance

- Maintains the original hydraulic capacity of the drainage system
- Maintains the aesthetic appearance of a site
- Ensures safety issues for pedestrians and vehicle traffic are identified with regular inspections



Health and Safety

Contractors undertaking cleaning activities should consult the Health and Safety at Work etc Act (1974), the Construction (Health, Safety and Welfare) Regulations (1996) and EN 1829: High pressure cleaners, High pressure water jet machines-Safety requirements. The safety aspects to be addressed relating to jetting, are not limited to practices concerning high pressure water, possible infection from the drain contents, working on the highway and in some circumstances, working in confined spaces.

By giving maintenance advice, ACO accepts no liability for injury or loss caused by such activities.



Maintenance of grates

ACO grates are available in a variety of materials; ductile iron, composite, galvanised and stainless steel. Each has their own characteristic oxidisation cycle. The following information documents the expected performance of ACO grates, focusing on the four main grates, which depending on customer aesthetic standards, may require maintenance during the life of the grate types. One piece polymer channels like MonoDrain/RoadDrain/H Range do not have separate grates as the inlets are integral to the channel. This reduces the risk of stolen or incorrectly installed grate types.

	Grate Material Type			
	ACO Ductile Iron	**ATec Ductile Iron**	**Composite**	
				
Coating at delivery	Black paint	Electrochemical coating, black	No coating present, no possibility of oxidisation	
Protection achieved	Minimal protection, may require painting to retain black appearance if not frequently trafficked	High protection, may require occasional touch-ups	No possibility of oxidisation	
Possible treatments	Acrylic black paint /rust inhibitor	Acrylic black paint /rust inhibitor	N/A	
Low traffic areas	✓ Ideal*	✓ Ideal*	✓ Ideal	
High traffic areas	✓ Ideal	✓ Ideal	✓ Ideal	

*Application of paint my be prefered over time

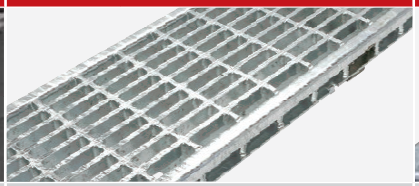
ACO Ductile Iron

Ductile iron has long been used in outdoor drainage situations, as over time oxidation forms an insoluble graphitic layer which protects the iron from further attack. This is a natural process called patination. The structural integrity of a grating made of ductile iron will not be negatively affected by surface oxidation and the formation of a protective surface film. Areas with moderate traffic will help to buff the grates into the characteristic aged cast iron usually seen and do not require painting.

The water based paint with which ACO coat our gratings, is intended to protect the grating for a short period of time after manufacture. It is not intended to be either a long term or architectural finish. In areas of low traffic it may be preferred to apply a proprietary rust inhibitor.



Images showing stages in the process of patination. The period of oxidation depends on the environmental conditions. Photo on the right shows a stable buffed grate

	Polymer*	Galvanised Steel	Stainless Steel
			
	No coating present, no possibility of oxidisation	Zinc oxide coating	Inherent protection due to high grade SS
	No possibility of oxidisation	High protection from oxidisation. Any materials damaged or cut to fit on site will require recoating on their cut or damaged surface	High protection from oxidisation
	N/A	Galvanised metal paint	N/A
	✓ Ideal	✓ Ideal	✓ Ideal
	✓ Ideal	✓ Ideal	✓ Ideal

ACO ATec Ductile Iron

ACO ATec coating is a high performance finish offering superior resistance to corrosion and enhanced long term durability in demanding environments. ATec uses an electrophoretic process, which uses current to deposit organic coatings on electrically conductive parts, this is then cured at high temperatures forming a strong and durable coating. The benefit of ATec or KTL coatings is that any scratches or damage will not result in the oxidisation undercutting or spreading under the painted surface, and this results in overall lower levels of visible oxidisation.

ATec is particularly suited to low trafficked areas, or areas where high aesthetic appearance is required, as it provides an easily maintained system compared to water based surface coatings. ATec provides a chemically stable platform for the application of secondary paint finishes if preferred. In moderate traffic areas the coating will eventually wear away and form the polished ductile iron surface common to architectural ductile iron as discussed above.

ACO Stainless Steel

Stainless steel gives very high protection from oxidation due to the high grade steel used, and the use of pickle passivation process during production. Along with polymer and composite, stainless steel grates are a good choice for coastal applications where environmental salt levels are high. Stainless steel products in coastal applications will require regular cleaning to remove salt build up, and a proprietary protective coating may be advisable depending on the aesthetic required.

In most standard drainage situations stainless steel will not require any maintenance, and will retain a high standard of appearance over the life of the grate.

Maintenance of grates

ACO Galvanised Steel

Galvanised grates are hot dipped in zinc, which gives long lasting protection from environmental effects. During the coating process the zinc reacts with the steel, giving a demarcation free transition of alloy layers.

The quality of zinc coating applied by hot dip galvanization is specified in the technical standard EN ISO 1461. For mild steel sheet material thickness >1.5mm and <3mm minimum local coating thickness is required to be 45 microns (to average coating thickness 55 microns). ACO's galvanised steel zinc coating can measure between 60 to 80 microns, giving extra protection to the underlying steel.

The zinc corrodes in preference to the steel in a process called sacrificial protection.

Zinc will react with the environment, creating a thin white protective layer. Damage to the coating will result in the zinc deposits resealing it from the atmosphere and therefore protecting from corrosion.

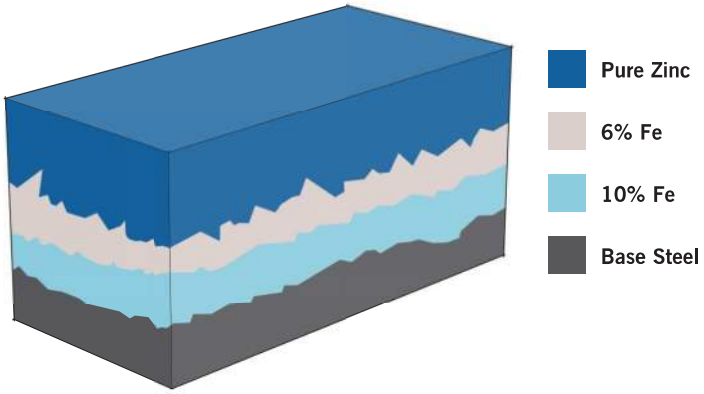
The distance of the installation from the coast will effect the level of protection achieved as the salt accelerates the oxidisation process. For more information please refer to the Galvanizers Association website: www.galvanizing.org.uk/ corrosion-map/ Divide 60 microns by the microns/ year figure to get a rough estimate on the level of protection. This figure gives a guide to the maximum time before the zinc coating is oxidised due to varying levels of wear. The base metal will still be functional and may require an application of zinc based protection to retain the aesthetic.



Newly galvanised



Protective oxidised layer



ACO Channel Edge Rails

Channel edge rails improve the strength and durability of grated channels, and their dimensions and performance must conform to EN1433:2002. There are three types of edge rail available, ductile iron, galvanised and stainless steel depending on the channel system chosen.



Users who wish to have the highest resistance to oxidisation should select stainless steel edged channels. These are made from 304 Stainless steel. The percentage of nickel and chromium that is present in 304 stainless steel equips this metal with good corrosion resistance, in particular from moderately caustic and acidic solutions.

Due to the wet nature of their environment and their exposure to chemicals, metal components will naturally oxidise at varying rates depending on wear. Metal edges have been selected for their long term performance, but for customers who demand specific aesthetics, maintenance may be required in the form of painting the edge rails as required. In most cases rails and grates are left untouched for the life of the product, with ACO drainage channels being renowned for their high performance.

Access through grates





Locking systems

BS EN 1433 recommends that all gratings and covers, at or above Load Class C 250, should be locked in position. ACO gratings can be secured by a variety of locking arrangements. These will vary according to the channel system, grating type and Load Class. With the exception of the heavy-duty S system, which is provided with eight bolts per metre length, gratings will generally be locked every 500mm. Part of your maintenance procedure should be to check that all grates are secure and that no bolts or locking mechanisms are missing/broken.

Current locking systems:

1. Drainlock™ bar-less locking; used in the MultiDrain range of grates
2. Bolt direct into integrally-cast frame; used in S Range channels
3. Powerlock® boltless locking system; used on some access covers

Older locking systems:

1. Quicklock® bayonet and bar boltless locking system
2. Bolt and locking bar

Grated and non-grated channel systems will have access to the channels through the sump or access unit. If access is through a grate, ensure that any security locks (where fitted) or bolts are removed prior to lifting the grate.

Bolted grates

Bolts can be removed using a spanner or socket set. Greasing or oiling bolts before refitting is suggested.

Security locks and Drainlock™

Round M6 security screws, mean that the grate has been installed with ACO's security locking system. Both of these screws need loosening before the grate can be removed

Drainlock™ systems are the standard locking mechanisms identified by black squares.

LIFTING GRATES

When lifting gratings, use the Drainlock™ grating lifting tool (part number 1367). Insert the tool in from the end of the grate as shown, and gently lift the grate until the Drainlock™ clips release taking care not to bend or damage the grate.

Lifting with/without the lifting tool at the end of a grate, may result in damage/ bending of the grate (particularly the composite and steel grates). Always lift closer to the Drainlock™ clips as shown.





Access to Brickslot





To remove the ACO Brickslot access unit tray, insert two lifting tools as shown.



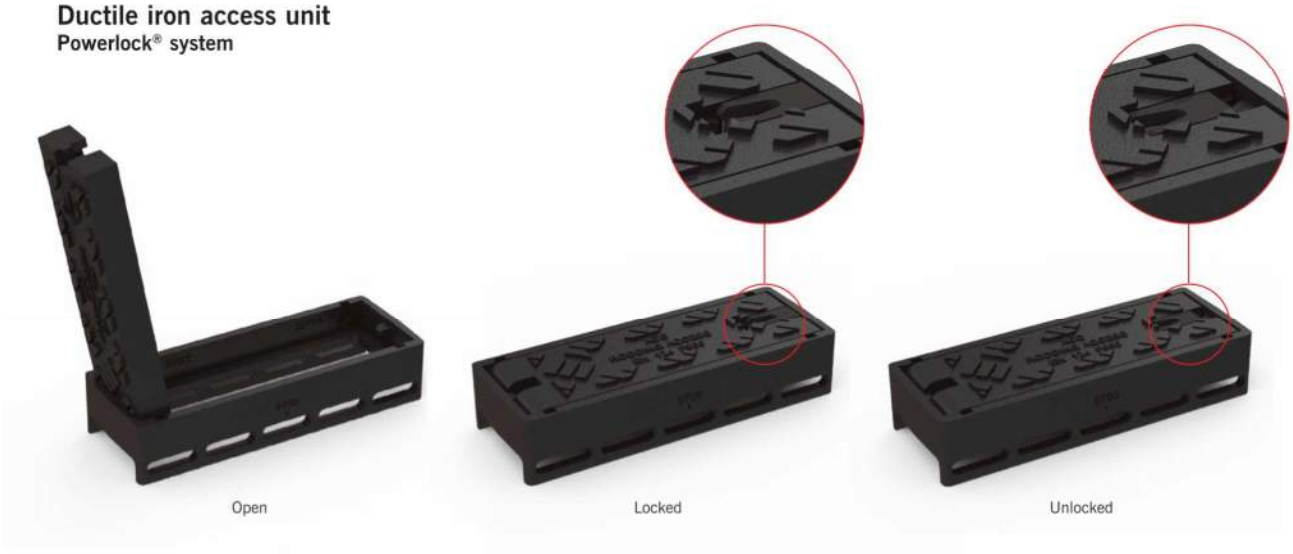
Then lift the tray vertically from the frame.

Be aware that this unit complete with surfacing material, may be very heavy and safety precautions should be taken.

Access units

Other than grates on sumps, there are two types of solid access covers, Ductile iron and Composite. Composite access units are present in all new production of MonoDrain, KerbDrain and RoadDrain.

Ductile iron access unit
Powerlock® system



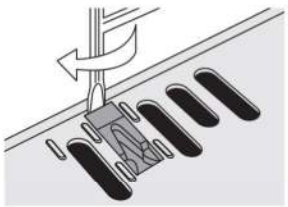


The orientation of the cover can be changed dependent on traffic direction. It is recommended the cover is orientated so that it opens against the traffic direction, please ensure that the lid is installed/replaced in the correct position and locked after use.

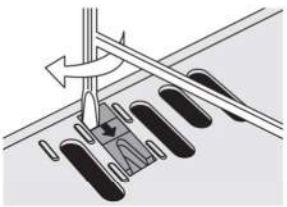
Ductile iron access units were replaced by composite access units in 2018.

POWERLOCK

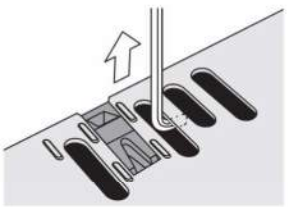
Used on the older systems, Powerlock® provides secure locking without bolts or screws and simple, rapid installation, using the ACO locking tool.



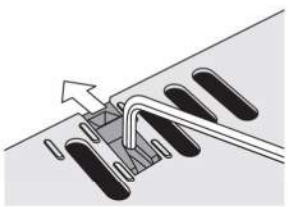
1. **To open:** slip chamfered end of locking tool into the slot behind the back of the Powerlock mechanism as shown.



2. Rotate the tool through 90" until the lock mechanism slides across and clicks. Repeat for each lock.



3. Lift grating with the hook at the end of tool.



4. **To close:** fit one side of grating under lugs in channel rail and lower grating into position. Use the hook on the locking tool in the recess of the lock mechanism to push clip back towards the closed position, until a click is heard. Repeat for all locks.



ACO Locking Tool

Composite access units



MonoDrain access unit



KerbDrain access unit

COMPOSITE ACCESS UNIT - TO OPEN



1. Using a standard, medium duty drain lifting key, insert the key head through the keyway slot and press down.



2. Rotate the drain lifting key 90° - ensuring the key remains vertical.



3. Lift the key and cover as a complete unit and remove from the frame. (If you wish to remove the key, hold the cover and twist the key 90°.)

COMPOSITE ACCESS UNIT - TO CLOSE



1. If the key is still in the cover, closing is the reverse of opening. If the key is not used see above.



2. To fit the cover in the frame, simply push the cover down onto the frame - The locking pins will retract and snap into place to lock the cover.

   The steel crossbar will rise to the top to identify the cover is secure.

Always ensure that access units are securely closed and locked after use.

Access through universal gullys and access chambers

UNIVERSAL GULLYS







- Universal gullys may be installed with MultiDrain, MonoDrain, RoadDrain and S Range channels.
- There are two types of ductile iron cover, the D400 version will be bolted (remove bolts before lifting), whilst the F 900 version is hinged (open as shown). Care should be taken when lifting the cover.

ACO QMAX® ACCESS CHAMBERS

- Access chambers are installed with ACO Qmax® channels. There are three types of access lid depending on the channel system installed. The covers may/may not be bolted in the corners, and these require removing prior to lifting. The cover may be hinged, and opened as shown above.
- Access chambers installed with ACO Qmax® Q-Slot grates will have a recessed steel cover and frame. Remove the M8 screws with an allen key, and lift out the tray using appropriate lifting method. When replacing ensure the screws are fully tightened through the tray and into the frame.
- The top of the screw should not project above the top of the tray, maximum tightening torque 18Nm.
- Removal and lifting of access covers will require on-site assessment of H&S manual handing procedures.







Maintenance of domestic channel systems

Channel systems which have silt buckets can use method 1 or 2, including channels with grates or Brickslot.

Alternatively method 2 can be used for grated systems with or without silt buckets. For instructions on lifting grates please refer to page 7.

Equipment needed: ACO recommend using a domestic pressure jetting machine with jetting hose attachment for method 1, or small trowel for method 2.



ACO RainDrain



ACO HexDrain Brickslot



ACO HexDrain

METHOD 1



1. Remove the grate located over the outlet or sump using an ACO Drainlock™ lifting tool (refer to page 7).
2. Remove the silt bucket, disposing of any contents and clean.
3. Return the silt bucket to the sump, this will catch any flushed out debris.



4. Insert the jetting hose, and push until it reaches the end of the channel system. Cover the channel system to prevent spray or debris damaging nearby vehicles/buildings.
5. Turn on the pressure jet machine and slowly pull out of the channel system. The jetting machine will flush debris into the silt bucket.



6. If cleaning brickslot, pressure jet down through the slot with a standard hand held attachment, and repeat the flushing of the channel.
7. Remove the silt bucket and clean.
8. Replace the silt bucket and grate.

METHOD 2



1. Remove the grates along the entire channel system using an ACO Drainlock™ lifting tool (refer to page 7).



2. Using a trowel remove any debris.
3. Empty the silt bucket if applicable.
4. Replace silt bucket and all grates.

Using boiling water or cleaning agents is not recommended. If you want to use cleaning agents, please consult the cleaning product's manufacturer for information on compatibility with the material properties.

Turning Water Around…®

Hydro International Warranty, Maintenance and COSHH Statement

This statement covers all Hydro International Hydro-Brake® Optimum, Hydro-Brake® and S-Type Vortex Flow Control units (hereafter referred to as "Flow Control").

Defects Liability Period Warranty

The standard Hydro International warranty covers products for one year from date of purchase and will only be considered for those defects or faults reported directly to Hydro International in writing. Warranties will not be considered for defects or faults caused by accident, acts of vandalism or unauthorised repair/rectification. Please Contact Hydro International for product specific details.

Maintenance

Normally, little maintenance is required as there are no moving parts within the Flow Control. Experience has shown that if blockages occur they do so at the intake, and the cause on such occasions has been due to a lack of attention to engineering detail such as approach velocities being too low, inadequate benching, or the use of units below the minimum recommended size. The Flow Control (where applicable) is fitted with a pivoting bypass door, which allows the manhole chamber to be drained down should blockage occur. The smaller conical units, below the minimum recommended size, are also supplied with rodding facilities or vortex suppressor pipes as standard.

Following installation of the Flow Control it is vitally important that any extraneous material i.e. building materials are removed from the unit and the chamber. After the system is made live, and assuming that the chamber design is satisfactory, it is recommended that each unit be inspected monthly for three months and thereafter at six monthly intervals with hose down if required. If problems are experienced, please do not hesitate to contact the company so that an investigation may be made.

All Flow Control units are typically manufactured from grade 304 Stainless Steel, and if required they can also be manufactured in grade 316 Stainless Steel. Both materials have an estimated life span in excess of the design life of drainage systems.

COSHH

Flow Control units are manufactured from Stainless Steel, which is not regarded as hazardous to health and exhibits no chemical hazard when used under normal circumstances for the stated applications.

Manual Handling

The handling of Flow Control units should be in accordance with the current legislation and regulations:

- The Health and Safety at Work Act 1972
- The Management of Health and Safety at Work Regulations 1999
- The Manual Handling Operations Regulations 1992

All published and printed by the Health and Safety Executive.

Hydro International (UK) Ltd, Shearwater House, Clevedon Hall Estate, Victoria Road, Clevedon, BS21 7RD
Tel: 01275 878371 Fax: 01275 874979 Web: www.hydro-int.com

Registered In England No. 1474012, Registered Office: as above.
A subsidiary of Hydro International Ltd

Osma/Wavin Chambers

Testing

All testing of these non-man entry chambers and connecting pipework must be undertaken at ground level.

For guidance, please use the following:

Air Testing using remote test bags: equipment required

- 3 x 1 metre x 8mm Steel Drainage Rods
- 50mm Double Worm Screw for use with Steel Drainage Rods
- PVC sealing bags fitted with Schrader Valve and 6 metre hose
- Steel drain plug with testing point
- Bicycle Pump
- Tyre pressure gauge to ensure correct inflation pressure of the test bags

Air Testing procedure

1. Assemble drain rods to 3 metres in length with double worm attachment on end.
2. Remove as much air as possible from the PVC Sealing Bag.

Method: hold valve open and squeeze bag flat.

Tip: folding the bag in half to make it as small as possible will make it easier to locate.

3. Twist neck of PVC Sealing Bag into double worm attachment until it has firm grip on bag.
4. Ensure valve end of hose is secure with no danger of falling down the chamber.
5. Hold drain rods and hose from the PVC Sealing Bag together. Start to lower the test bag into the base.

Tip: Keep hose tight while lowering bag. This helps to keep bag in place.

6. When bag is in chamber base, position it into the channel of the run to be tested.
7. By using the channel as a guide, slide test bag into the mouth of the pipe, and as far as possible into the pipe.

Method: use rods to push bag into position.

8. Leave rods attached (this ensures bag is held in position). Start to pump the bag up using a bicycle pump.

NOTE: When inflating the test bags, follow manufacturer's instructions to ensure pressure is not exceeded. Use tyre pressure valve to monitor bag pressure.

9. If required, remove rods by twisting them in an anti-clockwise direction to release the double worm. Check the valve end of hose is safely positioned.
10. Place a similar sealing bag or a steel drain plug at the other end of the pipe length to be tested. (This could be another chamber or a terminal access point.) Both bag and steel drain plug must include a suitable testing point.
11. Attach a manometer. Carry out required air test method.
12. Remove sealing bag.

Method: twist double worm attachment around the hose at ground level. Lower it down the hose, guiding the rods to the bottom of the chamber and once again grip the bag.

NOTE: No requirement to grip bag tightly. This is simply to aid its removal. Release as much air as possible from bag. Then slide bag back out the pipe with the rods. When this is done, lift/remove all test equipment out of the chamber.

Maintenance

As with all Osma/Wavin Chambers, the smooth interior bore of chamber channels and associated pipe systems will aid the flow of water and waste through the system.

Because man-entry of Osma/Wavin chambers is not possible, maintenance work such as Rodding, Jetting and CCTV inspection must be undertaken at ground level.

Always follow the Health & Safety and Operational procedures of equipment suppliers.

Polystorm Range

PRODUCT INFORMATION

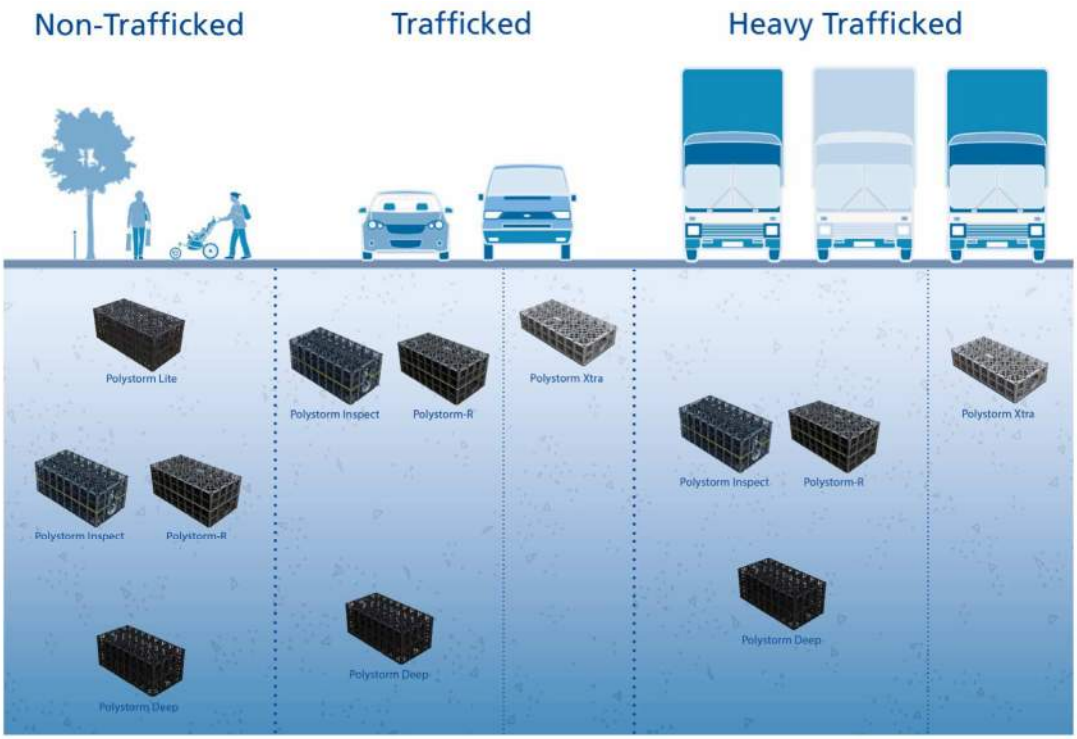
ISSUE 7 - FEB 19

The tried and tested Polystorm range for the management of surface water is designed to provide retention, attenuation or infiltration at a variety of depths. The Polystorm range can accommodate a wide range of loadings, from pedestrianised areas to large HGV parks. The current range comprises of five modular cells and two access options for both horizontal and vertical inspection.

Key Features and Benefits:

- High void ratio providing greater water storage capacity and reduced excavation and disposal costs
- Suitable for retention, attenuation and infiltration systems
- Light weight yet robust, affording excellent Health and Safety and installation benefits
- Modular units allow flexibility of shape, making them ideal for shallow excavation systems, narrow strips or for restricted areas
- Units available from 20 tonnes per square metre vertical load bearing capacity, up to a maximum of 83 tonnes per square metre vertical load bearing capacity
- Can be utilised in non-trafficked, trafficked or heavily trafficked applications
- Unique rounded corners for ease of handling and reduces likelihood of punctures to membranes
- BBA Approved *Polystorm, Polystorm-R & Polystorm Lite (Polystorm Xtra and Polystorm Deep pending)
- Up to 60 year design life
- Polystorm modular cells are manufactured from polypropylene
- Polystorm Access is manufactured from HDPE
- 100% recyclable at the end of useful life

BBA BRITISH BOARD OF AGREMENT CERTIFICATE No. 06/4297



- Polystorm Xtra is for use in shallow non-sub-base replacement applications
- Our Polystorm (PSM1) modular cell can also be used in place of Polystorm-R (PSM1A)

Polypipe Civils,
Charnwood Business Park, Loughborough, Leicestershire LE11 1LE
Tel: +44 (0)1509 615100 Fax: +44 (0)1509 610215
Email: civils@polypipe.com
www.polypipe.com/civils

Polypipe

Polystorm Range

PRODUCT INFORMATION | ISSUE 7 - FEB 19

Polystorm Lite (PSM2)

Specifically designed for non-trafficked applications within landscaped areas, pedestrianised areas or public open spaces such as playgrounds. With 20 tonne per square metre vertical compressive strength, it can take the load of general maintainance vehicles such as grass cutters.



Polystorm (PSM1)

With 44 tonne per square metre vertical compressive strength, made from virgin material, Polystorm is ideally suited for trafficked and loaded areas. It is used frequently for housing delvelopments, car parks and commercial developments.



Polystorm-R (PSM1A)

Similar to the Polystorm cell, Polystorm-R is used for trafficked and loaded applications and has a vertical compressive strength of 61 tonne per square metre. Polystorm-R has the added benefit of having up to 100% recycled material content. It is ideally suited for housing, commercial and infrastructure projects.



Polystorm Xtra (PSM3)

Designed for use in heavily trafficked areas for shallow, non sub-base applications where a reduced cover is required. It has an impressive vertical compressive strength of 83 tonnes per square metre.



Polystorm Deep (PSM5)

Polystorm Deep has been designed for use in trafficked applications such as lorry parks and industrial access roads. It can be buried deeper than any other Polystorm cell and can be value engineered as part of a hybrid system with Polystorm, Polystorm-R and Polystorm Lite.



Polystorm Access (please see datasheet for codes)

Polystorm Access provides a 1m x 0.5m shaft within a Polystorm structure to enable surface access for remote camera inspection and maintainance activities such as flushing and rodding. The system consists of a 500mm diameter shaft which extends from surface level to the top of a Polystorm structure, at which point a turret provides an interface between the shaft and the inspection chamber within the system.



Polystorm Inspect (PSM4)

Polystorm Inspect provides a tunnel along the length of a fully installed Polystorm structure to enable access for inspection and maintainance. Polystorm Inspect can be combined with Polystorm Access for full inspection and maintainance activities such as fushing and rodding.



Geomembranes and Geotextiles

Polystorm Geotextiles are UV-stabilized, polypropylene, continuous filament needle-punched non-woven geotextiles, designed to complement the range of Polystorm modular cells. They are suitable for infiltration applications and can also be incorporated into drainage trenches.



Polypipe Civils,
Charnwood Business Park, Loughborough, Leicestershire LE11 1LE
Tel: +44 (0)1509 615100 Fax: +44 (0)1509 610215
Email: civils@polypipe.com
www.polypipe.com/civils

Polypipe

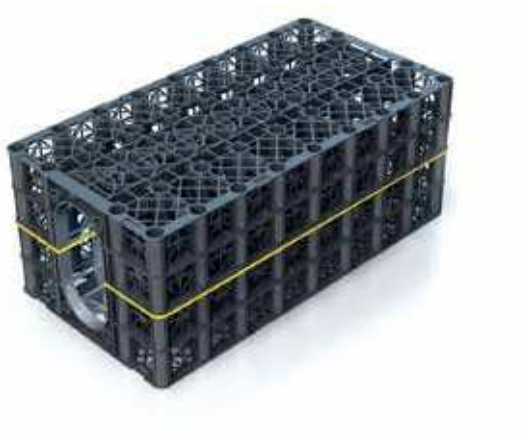
Polystorm Inspect

Data Sheet

PRODUCT INFORMATION **P1** **ISSUE 2 - JAN 2016**

Product code: PSM4

The Polystorm Inspect cell is complementary to the Polystorm range of modular cell solutions. Its primary purpose is to provide a tunnel along the length of a fully installed Polystorm structure to enable access for inspection and maintenance. Polystorm Inspect is a high strength thermoplastic cell which evenly distributes its load through the Polystorm structure.
The tunnel end is left open by default but the unit can be closed off if required by clipping into place the moulded end plate. For purposes of identification the cell features a yellow centre section and end plate.



Key Benefits

- Creates a horizontal tunnel running through the middle of the tank to provide access for inspection and maintenance, i.e. jetting and rodding
- Can be used with Polystorm Lite, Polystorm-R and Polystorm (cannot be used in the same layer as Polystorm Xtra as the Polystorm Inspect cell is deeper)
- Tunnel can be used as a flow inlet track achieving greater stormwater flow distribution within the unit
- Large access tunnel (height 320mm and width 172mm nominal) – allows maximum field of vision while maintaining the system's structural performance
- High strength to weight ratio
- Light weight cell allows easier handling and reduced Health and Safety risk
- Utilises the same Shear Connectors and Clips as the Polystorm range
- The tunnel restricts the dissipation of silt in to the overall structure making inspection and maintenance easier
- Polystorm Inspect cells with 225mm (PSM4CRD225) or 300mm (PSM4CRD300) inlets are available

Applications

Polystorm Inspect is designed to work with the rest of the Polystorm range within a layered hybrid system enabling an intelligently engineered attenuation or infiltration structure to be created. It is intended to be used from the inlet point of the Polystorm structure. If used other than along an inlet tract, the Polystorm Inspect end plate should be used to cap off the tunnel entrance. The most cost effective way to create a tank is to use a combination of Polystorm Inspect cells and other Polystorm modular cells.

UNIT TYPE	VALUE
PHYSICAL PROPERTIES	
Length	1m
Width	0.5m
Depth	0.4m
Total volume	0.2m³
Unit weight	11.6kg*
Cube storage volume	0.188m³ (188 litres)
Volumetric void ratio	94%
SHORT TERM COMPRESSIVE STRENGTH	
Vertical	Minimum 440kN/m²
Lateral	Minimum 63kN/m²
SHORT TERM DEFLECTION	
Short-term vertical deflection	Minimum 70.1kN/m²
LONG TERM DEFLECTION	
Estimated long term vertical deflection (creep)	0.6113Ln (design life in hrs)

Note: The table above is applicable to PSM4 without the end plate.
*Approximate weight
End plates to be purchased separately as required.

Please note: The use of Polystorm Inspect does not negate the requirement for a Silt Trap to be installed prior to the Polystorm structure. The use of a Silt Trap or other silt prevention device would always be recommended.

Technical Support

Detailed guidance and assistance is available.
For further information, please contact our Technical Team on **+44 (0) 1509 615100** or email **civils@polypipe.com**

Polypipe Civils
Charnwood Business Park, Loughborough, Leicestershire LE11 1LE
Tel: +44 (0) 1509 615100 Fax: +44 (0) 1509 610215 Email: civils@polypipe.com
www.polypipe.com/wms

Polypipe

Polystorm Inspect

Data Sheet

RECOMMENDED MAXIMUM DEPTH OF INSTALLATION (to cell invert) [m]

TYPICAL SOIL TYPE	TYPICAL ANGLE OF SHEAR RESISTANCE	WITHOUT GROUNDWATER (below base of cells) NORMAL CASE		WITH GROUNDWATER AT 1M BELOW GROUND LEVEL AND UNITS WRAPPED IN GEOMEMBRANE	
		Pedestrian	Trafficked (cars)	Pedestrian	Trafficked (cars)
Stiff over consolidated clay e.g. London clay	24°	2.3	2.0	1.8	1.7
Normally consolidated silty sandy clay e.g. alluvium, made ground	26°	2.4	2.2	1.9	1.7
Loose sand and gravel	30°	2.8	2.6	2.0	1.8
Medium dense sand and gravel	33°	3.2	2.9	2.1	1.9
Dense sand and gravel	38°	3.9	3.6	2.2	2.1

Note:

1) Stated depths based on the calculation methodology detailed within CIRIA C680 (2008)
2) Assuming a soil density = 19 kN/m³ water density = 9.81 kN/m³
3) Assumed ultimate limit state (ULS) partial factor of safety applied to: Material = 2.75 Live load = 1.5 Dead load = 1.35

Notes:

1. Unless stated, all values are nominal and may vary within normal production tolerances.
2. Polypipe reserve the right to change product specifications without prior notice.
3. This document is uncontrolled and updates will not be issued automatically.

RECOMMENDED MINIMUM COVER LEVELS [m]

LIVE LOAD CONDITIONS	PEDESTRIAN	LIGHT TRAFFICKED
		Car park with vehicle mass <6000kg
Minimum cover depth required (m)	0.50	0.60

Note:

1) Stated depths based on the calculation methodology detailed within CIRIA C680 (2008)
2) Assumed serviceability limit state (SLS) partial factor of safety applied to: Material = 1.5 Live load = 1.0 Dead load = 1.0
3) Shallower minimum burial depths may be applicable subject to specific site conditions.

All descriptions and illustrations in this publication are intended for guidance only and shall not constitute a 'sale by description'. All dimensions given are nominal and Polypipe may modify and change the information, products and specifications from time to time for a variety of reasons, without prior notice. The information in this publication is provided 'as is' on January 2016. Updates will not be issued automatically. This information is not intended to have any legal effect, whether by way of advice, representation or warranty (express or implied). We accept no liability whatsoever (to the extent permitted by law) if you place any reliance on this publication you must do so at your own risk. All rights reserved. Copyright in this publication belongs to Polypipe and all such copyright may not be used, sold, copied or reproduced in whole or part in any manner in any media to any person without prior consent. Polypipe is a registered trademark of Polypipe. All Polypipe products are protected by Design Right under CDPA 1988. Copyright © 2016 Polypipe. All rights reserved.

Polypipe Civils
Charnwood Business Park, Loughborough, Leicestershire LE11 1LE
Tel: +44 (0) 1509 615100 Fax: +44 (0) 1509 610215 Email: civils@polypipe.com
www.polypipe.com/wms

Polypipe

MAINTENANCE

4.0

Responsibility

The responsibility for maintenance should be clearly defined before handover of the completed system (*see* **Section 3**).

Soakaways

For soakaways to individual houses, the only necessary maintenance of the AquaCell system is to keep gullies clear of debris such as leaves.

Large installations

For large installations, or where the receiving waters are environmentally sensitive, a system of regular inspections should be established.

The main aim of these will be to prevent siltation of the system (*see* **Section 2.3.4**) which, if allowed to develop, would reduce its effectiveness.

Inspection agenda

The following elements should be inspected regularly as part of this preventative routine:

- Catchpits
- Control manholes
- Interceptors
- Inspection chambers.

They should also be inspected after every major storm event.

Catchpits and interceptors should be emptied regularly to prevent them from becoming full. The frequency of this being necessary will be determined on the basis of the regular inspections.

Paved surfaces above any AquaCell installation should be inspected at the same time to ensure the units continue to provide the required structural support.

© Published by Wavin Plastics Limited 2002

Appendix D

SuDS Maintenance Access Plan

ISO A0 841mm x 1189mm

CLUB STREET

NO EASEMENT REQUIRED FOR ANY OF THE DRAINAGE ELEMENTS (PIPES, DRAINS & SEWERS)

01 EV

PLOT 01
4B8P
TYPE 01

PLOT 02
4B8P
TYPE 01

PLOT 03
4B8P
TYPE 01

EV

ACCESS/EGRESS FOR MAINTENANCE

MAINTENANCE VEHICLE / PLANT LAYDOWN AREA

PROPOSED DWELLINGS

ASHTON OLD RD

NOTES

1. DO NOT SCALE FROM THIS DRAWING. USE ONLY WRITTEN DIMENSIONS.
2. ALL PIPE DIAMETERS ARE IN MILLIMETRES AND ALL LEVELS ARE IN METRES UNLESS OTHERWISE STATED.
3. THIS DRAWING SHOULD BE USED FOR INFORMATION PURPOSES ONLY.

KEY

SITE BOUNDARY

SuDS MAINTENANCE ACCESS / LAYDOWN AREA

Filename: C:\USERS\LOUIS\ITALIA\AJF STRUCTURAL ENGINEERING LTD\AJF ENGINEERING - GENERAL\AJF\JOBS\23\23065 THE FAIRFIELDS, OPENSHAW\02_CALCULATIONS\DRAINAGE\SUDS MAINTENANCE PLAN\23065-AJF-ZZ-ZZ-DR-C-011 R1 - SUDS MAINTENANCE ACCESS PLAN.DWG

R1 31/03/23 For Information.
Rev: Date: Description:

Copyright AJF Engineering Consultants Ltd. All rights Reserved. This document is not to be copied wholly or in part, or used by any third party without express written consent of AJF Engineering Consultants Ltd. AJF Engineering Consultants Ltd accepts no responsibility or liability which may arise from reliance or use of this document by any other party or for any other purpose.

Project:
Proposed Development, New Dwellings, 1515 Ashton Old Road, Manchester

Client:
KMM Homes Ltd

Drawing Title:
SuDS Maintenance Access Plan

Scale (@ A0):	Drawn by:	Chkd by:	Aprvd by:
1:80	CLS	BP	AJF

Drawing Number:	Date:	Rev:
23065-AJF-ZZ-ZZ-DR-D-011	March 23	R1

AJF Engineering Consultants Ltd
Thursby House, 1 Thursby Road
Bromborough, Wirral, CH62 3PW

0151 374 0545
info@ajfengineering.co.uk
ajfengineering.co.uk