

B RMF Wrexham DO

Drainage Specification

November 2020

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November 2020

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
P01	11/11/20	A Precious	A Simpson	A Simpson	For Tender

Document reference: WRDO-MMD-ZZ-XX-SP-D-0001

Information class: Standard

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00-05-10 Project Definition

101 Project description

- **Project reference:** WRDO
- **Project title:** B RMF Wrexham DO
- **Project description:** Construction of an extension to the existing Wrexham Delivery Office.

00-05-15 Works Terminology

110 Terminology

- **Meaning:** Terms, derived terms and synonyms used are as defined in this section or in the appropriate referenced document.

210 Description terminology

- **Attendance:** Includes
The use of the Main Contractor's temporary roads, pavings and paths, standing scaffolding, standing power operated hoisting plant,
The provision of temporary lighting of an equivalent brightness to the finished lighting brightness,
The provision of water,
The clearing away of rubbish and paying all charges in connection with its disposal, the provision of secure hard standing space for the sub-contractor's own offices, plant and material storage,
The use of standing mess rooms, sanitary accommodation and welfare facilities and
The provision of all Health and Safety facilities and all Fire Safety precautions, services, equipment, signage, facilities, Marshalls and the like necessary to comply with the relevant parts of the Joint Fire Code.
Additional requirements should be described as 'Special attendance'.
- **Building Manual:** A document containing information of use to subsequent building owners, occupiers and users about the requirements and procedures for effective operation, maintenance, decommissioning and demolition of the building.
- **Construction Work:** Permanent work together with temporary work.
- **Contractor:** The party who undertakes to perform the services, supply goods or carry out work defined in a contract. Includes Main Contractor, Prime Contractor, Supplier, Service provider, Builder, Subcontractor, etc. as the context dictates, which may be defined terms in certain standard contract forms.
- **Contractor's choice:** Selection delegated to the Contractor, but liability to remain with the specifier.
- **Contractor's design:** Design to be carried out or completed by the Contractor, supported by appropriate contractual arrangements, to correspond with specified requirements.
- **Cost:** The amount paid or given by one party to another in exchange for goods, work, supplies or services.
- **Designer:** A person or organization carrying out design on a project.
- **Deviation:** Difference between a specified dimension or position and the actual dimension or position.
- **Drawings:** Definitions as [BSRIA Building Applications Guide: Design framework for building services. 5th edition](#)
- **Employer:** The party to the Contract for whom the goods, work, supplies or services are provided. Includes Client (in consultancy contracts and CDM Regulations), the Employer, Building owner or Purchaser (in construction contracts), the Developer (in development agreements and funding agreements), or the 'Main' contractor in

contractor/ subcontractor agreements - which may be defined terms in certain standard contract forms

- **Estimate:** An approximate evaluation of quantity, number, extent, time or cost of part or the whole of a project.
- **Execute:** To complete a task fully and put into effect. To fix, apply, install or lay products securely, accurately, plumb and in alignment.
- **Existing:** Items retained in place to receive new work.
- **Fastener:** Device for mechanically attaching something to something else.
- **Manufacturer and Product reference:** Manufacturer – the person or legal entity under whose name or trademark the particular product, component or system is marketed. Product reference – the proprietary brand name and/ or identifier by which the particular product, component or system is described. References are as specified in the manufacturer's technical literature current on the date specified.
- **Manufacturer's standard:** Where used in conjunction with a specified proprietary product, accessories to be those recommended by the product manufacturer.
- **Permanent Work:** Work to be constructed and completed in accordance with the Contract.
- **Price:** An indication of the amount required to be paid by one party to another in exchange for goods, work or services.
- **Product:** Material, both manufactured and naturally occurring, goods and accessories for permanent incorporation into the Works.
- **Requirements:** A description in outline or detailed form of the development, or a part of it, which one party wants another to undertake, design and/ or construct.
- **Schedule of rates:** The subdivision of product and execution prices by a pre-determined unit basis.
- **Schedule of Work/ Work Schedule:** The subdivision of work items by a pre-determined classification. Can form the basis of a pricing document where Bills of Quantities are not used.
- **Schematic:** A drawing of a system showing components, products, systems and their interconnections.
- **Site equipment:** The Contractor's apparatus, appliances, machinery, vehicles or things of whatsoever nature required in or about the construction for the execution and completion of the Works and the remedying of defects. Includes Appliances, vehicles, consumables, tools, temporary work, scaffolding, cabins and other site facilities. Excludes: Temporary work, Employer's products and equipment or anything intended to form or forming part of the permanent Works.
- **Specification:** Written description of requirements.
- **System:** Products, components, equipment, accessories, controls, supports and ancillary items, including installation, necessary for that section of the work to function.
- **Temporary work:** Incidental work to undertaken during construction but not intended to form part of the completed work.

310 Activity terminology

- **Advise:** See 'Communicate'.
- **Agree:** See 'Communicate'.

- **Approve:** Record conformance of work to specified criteria by giving formal or official sanction.
- **Communicate:** Includes advise, inform, agree, confirm, notify, seek or obtain information, consent or instructions, or make arrangements.
- **Confirm:** See 'Communicate'.
- **Ease:** Adjust moving parts of designated products, systems or work to achieve free movement and good fit in open and closed positions.
- **Fix:** Receive, unload, handle, store, protect, place and fasten in position; dispose of waste and surplus packaging; to include labour, materials and site equipment for that purpose.
- **Give notice:** Communicate in writing to the person administering the Contract at the address listed therein.
- **Inform:** See 'Communicate'.
- **Keep for recycling:** As 'keep for use' but relates to a naturally occurring material rather than a manufactured product.
- **Keep for reuse:** Do not damage designated products, systems or work. Clean off bedding and jointing materials. Stack neatly, adequately protect and store until required by the Employer or Purchaser, or for use in the Works as instructed.
- **Make good:** Execute local remedial work to designated work. Make secure, sound and neat.
- **Match existing:** Provide products and work of the same appearance and features as the original, excluding ageing and weathering. Make joints between existing and new work as inconspicuous as possible.
- **Notify:** See 'Communicate'.
- **Quote:** Use 'Estimate'.
- **Recycle:** Collect, sort, process and convert discarded or recovered components into raw materials for use in the creation of new products.
- **Refix:** Fix previously removed products.
- **Remove:** Disconnect, dismantle as necessary and take out the designated products or work, together with associated accessories, fixings, supports, linings and bedding materials. Dispose of unwanted materials.
Removal of a system includes this work.
- **Remediate:** Action or measures taken to lessen, clean-up, remove or mitigate the existence of hazardous materials existing on a property; in accordance with standards, specifications or requirements as may be required by statutes, rules, regulations or specification.
- **Repair:** Execute remedial work to restore something to its original working state. Make secure, sound and neat.
Excludes redecoration and replacement.
- **Replace:** Supply and fix new products matching those removed. Execute work to match the original new state of that removed.
- **Reuse:** Recover complete items to be fixed or used in the project or elsewhere without the requirement for recycling.
- **Submit:** Deliver in a specified format to a specified person within a specified timeframe.
- **Submit proposals:** Submit information in response to specified requirements.
- **Supply and fix:** Supply of products, components or systems to be fixed, together with everything necessary for their fixing.

00-05-20 Project Participants

Design roles

265 Civil engineer

- **Name:** Mott MacDonald
- **Address:** Mott MacDonald, 4th Floor, Derwent House, 150 Arundel Gate, Sheffield, S1 2JY
- **Contact:** Alan Simpson
- **Telephone:** 0114 228 3828
- **Email address:** alan.simpson@mottmac.com

00-05-70 Project Location

110 Project location

- **Details:** Wrexham Delivery Office
- **Address:**
 - **Street:** 94 Regent St, Wrexham
 - **City:** Wrexham
 - **Post code:** LL11 1AA
- **Site Ordnance Survey grid reference:** SJ 33056 50649
- **Site altitude:** 85m

130 Existing buildings on, or adjacent to the site

- **Details:** Existing delivery office, with the main building to be retained and two of the smaller buildings to be demolished.

150 Surrounding land and building uses

- **Details:** Site is in the centre of Wrexham, surrounded predominately by residential buildings and some retail units.

170 Access

- **Details:** Access from the A541 through Wrexham.

Outline Specification

10 Preparatory systems

Chemically resistant liner for site attenuation system

10-10-95 Underground services survey systems

Establish condition of existing system to which proposed system connects and survey the proposed system when completed.

110 Underground services survey

- **Function:** Condition, capacity and connectivity of existing system is established

20 Roof, floor and paving systems

Impermeable and Chemically Resistant Liner

20-05-95 Water retention sheet lining systems

110 Ground supported water retention sheet lining system

Lining for attenuation and SuDS features

40-35 Ground based flora systems

Contractor to provide a locally suitable seed mix for bio retention areas

40-35-35 Lawn and meadow planting systems

190 Amenity grass maintenance system

Planting of SuDS features to be approved by SAB

195 Meadow grass maintenance system

Planting of SuDS features to be approved by SAB

50-10-10 Below ground drainage monitoring and control systems

125 Plastics shallow inspection chamber system for below ground drainage

PPIC Manholes less than 1.2m deep

130 Plastics deep non entry inspection chamber system for below ground drainage

Type 3 - Depth greater than 1.2m

140 Precast concrete silt trap and flow control chamber system for below ground drainage

Silt traps required in bioretention areas

150 Precast concrete manhole system for below ground drainage

Type 1 and 2 to BS EN 1915, BS EN 752 and in accordance with National Annex NA and in accordance with Sewers for Adoption 7th.

50-10-15 Below ground gravity drainage systems

Drainage systems design to BSEN 752, Sewers for Adoption 7th Edition and Building Regulations Part H as required. No surface flooding for 1 in 30 year plus climate change event with safe performance of the system for 1 in 100 year plus climate change

110 Below ground surface water gravity drainage pipeline system

115 Below ground foul wastewater gravity drainage pipeline system

50-50-75 Sustainable drainage systems (SUDS)

108 SuDS bioretention area system

Bioretention area as part of SuDS system adjacent to new building

164 SuDS permeable pavement system

Concrete block permeable paving to car park area

10-10-95/110 Underground services survey

System outline

10-10-95/110 Underground services survey

- **Function:** Condition, capacity and connectivity of existing system is established
- **Extent of survey:**
 - **Location:** Existing.
 - **Scope:** Confirm Foul water and surface water off-site connection point locations, level and condition.
Royal Mail Compliance database below ground utilities drawing
 - **Objectives:** Confirm off site drainage connection locations, invert levels and condition.
Establish route of culverted watercourse and mark on surface
- **Execution:** [10-10-95/620 Method of survey](#);
[10-10-95/630 Surveyor competence](#);
and [10-10-95/640 Requirements](#).
- **System completion:** [10-10-95/810 Survey report](#).

System performance

10-10-95/220 Detail and accuracy

- **Survey detail:** full survey in area of work including condition assessment of existing manholes.
- **Survey accuracy:** Levels to Ordnance Survey GPS

Execution

10-10-95/620 Method of survey

- **Specific requirements as to method:** Visual inspection and photographic record
Cover and invert levels.
CCTV survey of existing drainage runs to be retained

10-10-95/630 Surveyor competence

- **Accreditation:** [United Kingdom Accreditation Service \(UKAS\)](#).
- **Evidence:** Submit prior to commencement.

10-10-95/640 Requirements

- **General:** Confirm proposed off-site connection location points and levels
- **Jetting:** As required to complete survey

System completion

10-10-95/810 Survey report

- **Data collection method:** Computer based system.
- **Report:**
 - **Content:** Visual records
 - **Format:** Electronic.

Ω End of system

20-05-95/110 Ground supported water retention sheet lining system

System outline

20-05-95/110 Ground supported water retention sheet lining system

- **Description:** Lining for attenuation and SuDS features
- **Substrate protection:**
 - **Bedding layer:** [45-55-06/308 Fine aggregates for bases, beds and fill.](#)
- **Water retention sheets:**
 - **Material:** [45-65-50/363 Polymeric membranes](#) and [45-65-35/345 Geosynthetic clay liners \(GCLs\).](#)
 - **Jointing:** Factory jointed and Site jointed. Welded and airtight
- **Surface protection sheets:** [45-65-50/325 Plastics sheets.](#)
- **Edge treatment:** Anchor trenching and Anchored.
- **Execution:** [20-05-95/620 Suitability of excavated substrates;](#)
[20-05-95/630 Laying fine aggregate bedding to excavated substrates;](#)
[20-05-95/640 Laying geotextile substrate protection layers;](#)
[20-05-95/650 Laying and jointing flexible water retention sheet liners;](#)
[20-05-95/660 Laying geosynthetic clay liners;](#)
[20-05-95/670 Joint testing to flexible sheet liners;](#)
[20-05-95/680 Laying geotextile surface protection layers;](#)
and [20-05-95/690 Forming anchor trench for flexible sheet liners.](#)
- **System completion:** [20-05-95/810 System guarantee.](#)

Products

45-55-06/308 Fine aggregates for bases, beds and fill

- **Supplied by:** Marshalls or similar
- **Standard:** To [BS EN 13242](#)
- **Material:** Crushed gravel, rock or sand;
Natural sand;
and Partially crushed gravel sand.
- **Geometrical properties:**
 - **Aggregate size:** 4 to 20mm

45-65-50/325 Plastics sheets

- **Manufacturer:** Marshalls M380
HBB Power Scrim 400
- **Material:** High density polyethylene (PE-HD);
Low density polyethylene (PE-LD);
and Polypropylene.
- **Purpose:** Drainage layer;
Geomembrane;

Protection layer;
and Root barrier.

- **Standard:** Manufacturer's standard.
- **Third party certification:** British Board of Agrément (BBA) Certificate.
- **Form:** Micro-perforated (Needle punched) and Non-woven.
- **Physical properties:**
 - **Dimensions:**
Thickness (minimum): 1 mm.
- **Performance:**
 - **Tensile strength (minimum):** Submit proposals.
 - **Tear resistance:** 220 N.
 - **Elongation to break:** Submit proposals.
 - **Resistant to underground gases:** yes
 - **Flame retardance:** Required.
 - **UV stabilization:** To [BS EN 13859-2](#), 5000 hours.
 - **Antistatic properties:** Required.
 - **Colour:** Black topside with brown underside.
- **Execution:** [45-65-50/630 Installing geotextile sheet](#).

45-65-50/363 Polymeric membranes

- **Supplied by:** Marshalls M380
HBB Power Scrim 400
- **Material:** Ethylene propylene diene monomer (EPDM);
Flexible polyolefin (FPO). Polyisobutylene (PIB);
and Polyisobutylene isoprene (IIR) (butyl rubber).
- **Integral backing fleece:** Manufacturer's standard.
- **Standard:** To [BS EN 13956](#).
- **Performance criteria:** Submit proposals.
- **Third party product certification:** British Board of Agrément (BBA) Certificate and FM Approval.
- **Thickness (minimum):** min 1.2 mm.
- **Colour:** Manufacturer's standard.

Execution

20-05-95/620 Suitability of excavated substrates

- **Preparation:**
 - **Contours:** Gently grade without sudden changes of level and direction.
 - **Finish:** Roll or compact to a smooth surface.

20-05-95/630 Laying fine aggregate bedding to excavated substrates

- **Thickness (minimum):** 50 mm.

20-05-95/640 Laying geotextile substrate protection layers

- **Jointing:**
 - **Method:** Wide overlap.

- **Side laps (minimum):** 300 mm.
 - **End laps:** 300 mm.
- **Timing:** Do not lay more geotextile than will be covered in same day.

20-05-95/650 Laying and jointing flexible water retention sheet liners

- **Quality assurance system:**
 - **Construction quality assurance programme:** Required.
 - **Jointing record:**
 - Each joint:** Record joint code number, name of operative, machine used, date and time, ambient temperature, weather conditions.
 - Records:** Submit.
- **Competence of operatives:**
 - **Standard:** In accordance with [BS EN 13067](#).
 - **Qualifications:** At least two operatives with The Welding Institute Certification scheme for welding and inspection personnel (TWI/CSWIP) full certification.
 - **Certification:** Submit.
- **Linings:**
 - **Laying:** Neatly. Do not pull out all slack.
 - **Overlaps between adjacent sheets and ends of rolls (minimum):** 300 mm.
 - **Movement before jointing:** Prevent.
 - **Bonded joints:** Use materials and procedures recommended by lining manufacturer.
 - **Water inlet locations and penetrations:** Provide double layer of geomembrane.
 - **Damaged areas:** Repair and test before placing protective layer.
 - **Surface at completion:** Smooth and even.
- **Effect of inclement weather:** Provide temporary protection or suspend laying and jointing operations, during wet or windy weather or if temperature of laying surface or air temperature is below 5°C.

20-05-95/660 Laying geosynthetic clay liners

- **Quality assurance system:**
 - **Construction quality assurance programme:** Required.
 - **Jointing record:**
 - Each joint:** Record joint code number, name of operative, machine used, date and time, ambient temperature, weather conditions.
 - Records:** Submit.
- **Lining:**
 - **Orientation:** Lay neatly with correct side up.
 - **Damage:** Prevent by using procedures recommended by lining manufacturer.
 - **Overlaps between adjacent sheets (minimum):** 150 mm.
 - **Overlaps between ends of rolls (minimum):** 300 mm.
 - **Exposed lining:** Cover overnight.
- **Penetrations:**
 - **Requirement:** Provide double layer of geomembrane.
 - **Overlap (minimum):** 300 mm.
- **Jointing:** Bentonite enhanced overlap.

- **Damaged areas:** Repair before placing protective layer.
- **Premature hydration:** Give notice.
- **Surface at completion:** Smooth and even.
- **Effect of inclement weather:** Provide temporary protection or suspend laying and jointing operations, during wet or freezing conditions.
- **Protection:** Protect GCL from hydration prior to completion of the system and before subsequent construction is laid.

20-05-95/670 Joint testing to flexible sheet liners

- **Testing regime:**
 - **Requirement:** Carry out destructive and non-destructive joint and membrane tests.
 - **Methods and frequency:** In accordance with installation contractor's [BS EN ISO 9001](#) quality management scheme.
 - **Destructive strength testing:**
 - Testing site:** Accredited laboratory.
 - Testing frequency:** In accordance with installation contractor's [BS EN ISO 9001](#) quality management scheme.
 - **Non-destructive continuity testing:**
 - Extent:** Test entire length of joints.
 - Method:** In accordance with installation contractor's [BS EN ISO 9001](#) quality management scheme.

20-05-95/680 Laying geotextile surface protection layers

- **Jointing:**
 - **Method:** Wide overlap.
 - **Side laps (minimum):** 300 mm.
 - **End laps:** 300 mm.
- **Timing:** Do not lay more lining than will be covered in same day.

20-05-95/690 Forming anchor trench for flexible sheet liners

- **Cross section size (minimum):** 400 x 400 mm.
- **Position:** Crest of lining perimeter.
- **Liner installation:**
 - **Coverage:** Entire trench floor.
 - **Rear wall:** Do not extend up rear wall.
- **Backfill:** Selected excavated material.

45-65-35/630 Installing geosynthetic clay liners

- **Construction quality assurance programme:** Required.
- **Jointing record:** Submit project records of joint code numbers, names of operatives, machines used, dates and times, ambient temperatures and weather conditions.
- **Inclement weather:** Provide temporary protection to liner and suspend laying and jointing operations during wet or freezing conditions.
- **Lining:**
 - **Orientation:** Lay neatly with correct side up.

- **Overlaps between adjacent sheets (minimum):** 150 mm.
 - **Overlaps between ends of rolls (minimum):** 300 mm.
- **Protection:** Prevent premature hydration of liner. Do not leave liner uncovered between periods of work.
- **Penetrations:**
 - **Requirement:** Provide double layer of liner.
 - **Overlap (minimum):** 300 mm.
- **Jointing:** Bentonite enhanced overlap and tape.
- **Continuity:** Repair defective areas before placing protective layer.
- **Surface at completion:** Smooth and even.

45-65-50/630 Installing geotextile sheet

- **Preparation of subgrade:** Before laying sheet, remove humps and sharp projections and Fill hollows.
- **Jointing:**
 - **Joint type:** Single welt with two rows of staggered, corrosion resistant staples.
 - **Overlap (minimum):** 300 mm.
- **Protection of geotextile sheet:** Protect from exposure to light and Protect from contaminants.
- **Tears in geotextile sheet:** Repair with patch of same material with a minimum overlap of 300 mm beyond extent of damage.

System completion

20-05-95/810 System guarantee

- **Format:** Insurance backed fully comprehensive.
- **Amount:** Submit proposals.
- **Minimum period of cover:** 20 years from initial laying, testing and acceptance (by covering or otherwise) of the water retention sheet lining system.
- **Documentation:** Submit.

Ω End of system

40-35-35/190 Amenity grass maintenance system

System outline

40-35-35/190 Amenity grass maintenance system

- **Description:** Planting of SuDS features to be approved by SAB
- **Fertilizer:** [40-35-35/505 Designed organic fertilizer](#).
- **Seed mix:** [40-35-35/501 Custom seed mix](#).
- **System facility management:** required for 12 months

Ω End of system

40-35-35/195 Meadow grass maintenance system

System outline

40-35-35/195 Meadow grass maintenance system

- **Description:** Planting of SuDS features to be approved by SAB
- **Seed mix:** [40-35-35/501 Custom seed mix](#). To be agreed with SAB
- **System facility management:** Required for 12 months

Ω End of system

50-10-10/125 Plastics shallow inspection chamber system for below ground drainage

System outline

50-10-10/125 Plastics shallow inspection chamber system for below ground drainage

- **Description:** PPIC Manholes less than 1.2m deep
- **System manufacturer:** Contractor's choice.
- **Bedding:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Base:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Chamber:** [90-05-20/342 Plastics inspection chambers](#).
- **Surround:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Seating:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Cover:** [90-05-20/320 Access covers and frames type A](#).
- **Backfill:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Execution:** [50-10-10/615 Formation for beddings in below ground drainage monitoring and control systems](#);
[50-10-10/640 Installing plastics shallow access chambers for below ground drainage](#);
and [50-10-10/685 Installing access covers and frames to chambers for below ground drainage type A](#).
- **System completion:** [50-10-10/810 Removal of debris and cleaning below ground drainage monitoring and control systems](#);
[50-10-10/815 Water testing of manholes and inspection chambers for below ground drainage monitoring and control systems](#);
[50-10-10/820 Testing of ancillary components in below ground drainage monitoring and control systems](#);
and [50-10-10/830 Documentation](#).

Products

90-05-20/320 Access covers and frames type A

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); [50-10-10/150 Precast concrete manhole system for below ground drainage](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Type:** A
- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS EN 124](#).
- **Form:** Double seals and grease;
Gratings;
Non-rocking;
and Recessed covers for paviour filling.
- **Materials:** Ductile cast iron and Steel.

- **Finish:** Black bitumen painted. Marker plate to show flow in manhole (FW SW or combined)
- **Sizes:** min 600x600
- **Loading grades:** Minimum BS EN 124 grade D400 in trafficked areas C250 elsewhere or E600 as shown on drawings
- **Edging trims:** Manufacturer's standard.
- **Integral accessories:** Manufacturer's standard.

Execution

50-10-10/615 Formation for beddings in below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Timing:** Excavate to formation immediately before laying bases or beddings.
- **Mud, rock projections, boulders and hard spots:** Remove. Replace with consolidated bedding material.
- **Local soft spots:** Harden by tamping in bedding material.
- **Inspection of excavated formations:** Give notice.

50-10-10/640 Installing plastics shallow access chambers for below ground drainage

- **Standards:** To [BS EN 752](#), and in accordance with relevant parts of the National Annex (NA).
- **Bedding:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Chamber depth (cover level to pipeline invert):** As manhole schedule.
- **Concrete surround:** 150 mm thick in areas that may be trafficked.
- **Backfilling:**
 - **Laying fill:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
 - **Compaction:** By hand in 100 mm layers.

50-10-10/685 Installing access covers and frames to chambers for below ground drainage type A

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Type:** A
- **Bedding and haunching of frames:** Top of haunching 30 mm below surrounding surfaces.
- **Vertical positioning of frames:** Level or marry in with levels of surrounding surfaces.
- **Permissible deviation in level of external covers and frames:** +0 to -6 mm.

System completion

50-10-10/810 Removal of debris and cleaning below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Preparation:**
 - **Requirements:** Lift covers to manholes, inspection chambers and access points. Remove mortar droppings, debris and loose wrappings.
 - **Timing:** Before cleaning, final testing, CCTV inspection if specified, and immediately before handover.
- **Cleaning:**
 - **Requirements:** Thoroughly flush pipelines with water to remove silt and check for blockages. Rod pipelines between access points if there is any indication that they may be obstructed.
 - **Washings and detritus:** Do not discharge into sewers or watercourses.
- **Covers:** Securely replace after cleaning and testing.

50-10-10/815 Water testing of manholes and inspection chambers for below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Timing:** Before backfilling.
- **Testing:**
 - **Exfiltration:** To [BS EN 1610](#).
 - **Method:** Testing with water (method W).
 - **Infiltration:** No identifiable flow of water penetrating the chamber.

50-10-10/820 Testing of ancillary components in below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Components:** Attenuation chambers.
- **Testing:**
 - **Standard:** To [BS EN 1610](#).
 - **Tests:** Infiltration.
 - **Method:** Testing with air (method L) and Testing with water (method W).

50-10-10/830 Documentation

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Operating and maintenance instructions:**
 - **Scope:** Submit for the system giving optimum settings for controls.
 - **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - **Format:** Paper copy and Electronic
 - **Number of copies:** 1
- **Record drawings:**
 - **Content:** Location, size and route of below ground drainage services and Location of outlets.
Manhole Card with cover and invert levels and orientation of base pipework set to North
 - **Format:** A1 paper print and Electronic.
 - **Number of copies:** 1
- **Submittal date:** At handover.

Ω End of system

50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage

System outline

50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage

- **Description:** Type 3 - Depth greater than 1.2m
- **System manufacturer:** Contractor's choice.
- **Bedding:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Base:** Integral with chamber.
- **Chamber:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Surround:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Collar:** Restrictor collar required for depths greater than 1.2m
- **Seating:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Cover:** [90-05-20/320 Access covers and frames type A](#).
- **Backfill:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Execution:** [50-10-10/615 Formation for beddings in below ground drainage monitoring and control systems](#) and [50-10-10/685 Installing access covers and frames to chambers for below ground drainage type A](#).
- **System completion:** [50-10-10/810 Removal of debris and cleaning below ground drainage monitoring and control systems](#); [50-10-10/815 Water testing of manholes and inspection chambers for below ground drainage monitoring and control systems](#); [50-10-10/820 Testing of ancillary components in below ground drainage monitoring and control systems](#); and [50-10-10/830 Documentation](#).

Products

90-05-20/320 Access covers and frames type A

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); [50-10-10/150 Precast concrete manhole system for below ground drainage](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Type:** A
- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS EN 124](#).
- **Form:** Double seals and grease;
Gratings;
Non-rocking;

and Recessed covers for paviour filling.

- **Materials:** Ductile cast iron and Steel.
- **Finish:** Black bitumen painted. Marker plate to show flow in manhole (FW SW or combined)
- **Sizes:** min 600x600
- **Loading grades:** Minimum BS EN 124 grade D400 in trafficked areas C250 elsewhere or E600 as shown on drawings
- **Edging trims:** Manufacturer's standard.
- **Integral accessories:** Manufacturer's standard.

Execution

50-10-10/615 Formation for beddings in below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Timing:** Excavate to formation immediately before laying bases or beddings.
- **Mud, rock projections, boulders and hard spots:** Remove. Replace with consolidated bedding material.
- **Local soft spots:** Harden by tamping in bedding material.
- **Inspection of excavated formations:** Give notice.

50-10-10/685 Installing access covers and frames to chambers for below ground drainage type A

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Type:** A
- **Bedding and haunching of frames:** Top of haunching 30 mm below surrounding surfaces.
- **Vertical positioning of frames:** Level or marry in with levels of surrounding surfaces.
- **Permissible deviation in level of external covers and frames:** +0 to -6 mm.

System completion

50-10-10/810 Removal of debris and cleaning below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Preparation:**
 - **Requirements:** Lift covers to manholes, inspection chambers and access points. Remove mortar droppings, debris and loose wrappings.
 - **Timing:** Before cleaning, final testing, CCTV inspection if specified, and immediately before handover.
- **Cleaning:**
 - **Requirements:** Thoroughly flush pipelines with water to remove silt and check for blockages. Rod pipelines between access points if there is any indication that they may be obstructed.
 - **Washings and detritus:** Do not discharge into sewers or watercourses.
- **Covers:** Securely replace after cleaning and testing.

50-10-10/815 Water testing of manholes and inspection chambers for below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Timing:** Before backfilling.
- **Testing:**
 - **Exfiltration:** To [BS EN 1610](#).
 - **Method:** Testing with water (method W).
 - **Infiltration:** No identifiable flow of water penetrating the chamber.

50-10-10/820 Testing of ancillary components in below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Components:** Attenuation chambers.
- **Testing:**
 - **Standard:** To [BS EN 1610](#).
 - **Tests:** Infiltration.
 - **Method:** Testing with air (method L) and Testing with water (method W).

50-10-10/830 Documentation

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Operating and maintenance instructions:**
 - **Scope:** Submit for the system giving optimum settings for controls.

- **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - **Format:** Paper copy and Electronic
 - **Number of copies:** 1
- **Record drawings:**
 - **Content:** Location, size and route of below ground drainage services and Location of outlets.
Manhole Card with cover and invert levels and orientation of base pipework set to North
 - **Format:** A1 paper print and Electronic.
 - **Number of copies:** 1
- **Submittal date:** At handover.

Ω End of system

50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage

System outline

50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage

- **Description:** Silt traps required in bioretention areas
- **Base slabs:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Shafts:**
 - **Precast concrete sections:** [90-05-20/370 Precast concrete manholes – chamber sections.](#)
 - **Jointing and sealing:** [45-55-50/302 Cement gauged designed mix mortar](#) and [45-75-90/413 Resin impregnated pre-compressed foam sealing strips.](#)
- **Access components:** [90-05-20/324 Access chamber ladders.](#)
- **Covers:**
 - **Cover slabs:** [90-05-20/372 Precast concrete manholes and soakaways – cover slabs.](#)
 - **Seating:** [45-55-50/302 Cement gauged designed mix mortar.](#)
 - **Covers and frames:** [90-05-20/320 Access covers and frames type A.](#) Grating required to act as overflow
- **Surround:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Backfill:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Execution:** [50-10-10/615 Formation for beddings in below ground drainage monitoring and control systems;](#)
[50-10-10/635 Installing precast concrete access chambers and shafts for below ground drainage;](#)
[50-10-10/660 Fixing steps in below ground drainage monitoring and control systems;](#)
[50-10-10/665 Jointing precast concrete below ground drainage access chamber sections;](#)
and [50-10-10/685 Installing access covers and frames to chambers for below ground drainage type A.](#)
- **System completion:** [50-10-10/810 Removal of debris and cleaning below ground drainage monitoring and control systems;](#)
[50-10-10/815 Water testing of manholes and inspection chambers for below ground drainage monitoring and control systems;](#)
[50-10-10/820 Testing of ancillary components in below ground drainage monitoring and control systems;](#)
and [50-10-10/830 Documentation.](#)

Products

90-05-20/320 Access covers and frames type A

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); [50-10-10/150 Precast concrete manhole system for below ground drainage](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Type:** A
- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS EN 124](#).
- **Form:** Double seals and grease;
Gratings;
Non-rocking;
and Recessed covers for paviour filling.
- **Materials:** Ductile cast iron and Steel.
- **Finish:** Black bitumen painted. Marker plate to show flow in manhole (FW SW or combined)
- **Sizes:** min 600x600
- **Loading grades:** Minimum BS EN 124 grade D400 in trafficked areas C250 elsewhere or E600 as shown on drawings
- **Edging trims:** Manufacturer's standard.
- **Integral accessories:** Manufacturer's standard.

90-05-20/370 Precast concrete manholes – chamber sections

- **Manufacturer:** Submit proposals.
- **Standards:** To [BS 5911-3](#) and [BS EN 1917](#).
- **Third party product certification:** BSI Kitemark.
- **Concrete quality:** Manufacturer's standard.
- **Cement type and content:** Sulphate resisting.
- **Sizes (nominal):** Refer to Drawings.

90-05-20/372 Precast concrete manholes and soakaways – cover slabs

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS 5911-3](#) and [BS EN 1917](#).
- **Third party certification:** BSI Kitemark certified.
- **Concrete quality:** Manufacturer's standard.
- **Dimensions:**
 - **Sizes (nominal):** Refer Drawings.
 - **Thickness:** Manufacturer's standard.
 - **Openings:** min 675 x 675. Flow control chamber to permit extraction of flow control device
- **Integral accessories:** Galvanized steel lifting rings.

90-05-20/390 Orifice plate flow control units

- **Manufacturer:** Submit proposals.

- **Material:** Stainless steel or Glass Reinforced Plastic
- **Flow rate (maximum):** orifice size set to 50mm

Execution

50-10-10/615 Formation for beddings in below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Timing:** Excavate to formation immediately before laying bases or beddings.
- **Mud, rock projections, boulders and hard spots:** Remove. Replace with consolidated bedding material.
- **Local soft spots:** Harden by tamping in bedding material.
- **Inspection of excavated formations:** Give notice.

50-10-10/635 Installing precast concrete access chambers and shafts for below ground drainage

Shared by: [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Standards:** To [BS EN 752](#), and in accordance with relevant parts of the National Annex (NA) and In accordance with relevant parts of [Sewers for adoption](#).
- **Base slab thickness:** minimum 225 mm, to suit ground conditions.
- **Chamber dimensions:**
 - **Depth (cover level to pipeline invert):** As manhole schedule or drawings
- **Concrete surround:** min 150 mm thick.
- **Backfilling:**
 - **Laying fill:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
 - **Compaction:** By hand in 100 mm layers.

50-10-10/660 Fixing steps in below ground drainage monitoring and control systems

Shared by: [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Fixing:** Secure to chamber wall.
- **Positioning:** 300 mm vertical centres staggered 300 mm horizontally, with lowest step 300 mm (maximum) above benching and top step 450 mm (maximum) below top of cover.

50-10-10/665 Jointing precast concrete below ground drainage access chamber sections

Shared by: [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Inner joint surface:** Trim surplus jointing material extruded into chamber and point neatly.

50-10-10/685 Installing access covers and frames to chambers for below ground drainage type A

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Type:** A
- **Bedding and haunching of frames:** Top of haunching 30 mm below surrounding surfaces.
- **Vertical positioning of frames:** Level or marry in with levels of surrounding surfaces.
- **Permissible deviation in level of external covers and frames:** +0 to -6 mm.

System completion

50-10-10/810 Removal of debris and cleaning below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Preparation:**
 - **Requirements:** Lift covers to manholes, inspection chambers and access points. Remove mortar droppings, debris and loose wrappings.
 - **Timing:** Before cleaning, final testing, CCTV inspection if specified, and immediately before handover.
- **Cleaning:**
 - **Requirements:** Thoroughly flush pipelines with water to remove silt and check for blockages. Rod pipelines between access points if there is any indication that they may be obstructed.
 - **Washings and detritus:** Do not discharge into sewers or watercourses.
- **Covers:** Securely replace after cleaning and testing.

50-10-10/815 Water testing of manholes and inspection chambers for below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Timing:** Before backfilling.
- **Testing:**

- **Exfiltration:** To [BS EN 1610](#).
- **Method:** Testing with water (method W).
- **Infiltration:** No identifiable flow of water penetrating the chamber.

50-10-10/820 Testing of ancillary components in below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Components:** Attenuation chambers.
- **Testing:**
 - **Standard:** To [BS EN 1610](#).
 - **Tests:** Infiltration.
 - **Method:** Testing with air (method L) and Testing with water (method W).

50-10-10/830 Documentation

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Operating and maintenance instructions:**
 - **Scope:** Submit for the system giving optimum settings for controls.
 - **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - **Format:** Paper copy and Electronic
 - **Number of copies:** 1
- **Record drawings:**
 - **Content:** Location, size and route of below ground drainage services and Location of outlets.
Manhole Card with cover and invert levels and orientation of base pipework set to North
 - **Format:** A1 paper print and Electronic.
 - **Number of copies:** 1
- **Submittal date:** At handover.

Ω End of system

50-10-10/150 Precast concrete manhole system for below ground drainage

System outline

50-10-10/150 Precast concrete manhole system for below ground drainage

- **Description:** Type 1 and 2 to BS EN 1915, BS EN 752 and in accordance with National Annex NA and in accordance with Sewers for Adoption 7th.
- **System performance:** [50-10-10/210 Design of access chambers for below ground drainage type A](#).
- **System manufacturer:** Contractor's choice.
- **Base slabs:** see drawings WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Shafts:**
 - **Precast concrete sections:** [90-05-20/374 Precast concrete manholes – shaft sections](#).
 - **Jointing and sealing:** [45-55-50/302 Cement gauged designed mix mortar](#) and [45-75-90/413 Resin impregnated pre-compressed foam sealing strips](#).
- **Preformed channels and benching:**
 - **Preformed channels:** [90-05-20/380 Vitrified clay channels for access chambers](#).
 - **Benching:** [45-55-20/330 Designated concrete type B](#).
 - **Topping:** [45-55-10/350 Concrete \(granolithic\) wearing screed mix](#).
- **Access components:** [90-05-20/324 Access chamber ladders](#) and [90-05-20/326 Access chamber steps](#).
- **Covers:**
 - **Cover slabs:** see drawings WRDO-MMD-XX-XX-DR-D-1001 and 1002
 - **Seating:** see drawings WRDO-MMD-XX-XX-DR-D-1001 and 1002
 - **Covers and frames:** [90-05-20/320 Access covers and frames type A](#).
- **Surround:** see drawings WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Backfill:** see drawings WRDO-MMD-XX-XX-DR-D-1001 and 1002
- **Execution:** [50-10-10/615 Formation for beddings in below ground drainage monitoring and control systems](#);
[50-10-10/635 Installing precast concrete access chambers and shafts for below ground drainage](#);
[50-10-10/665 Jointing precast concrete below ground drainage access chamber sections](#);
[50-10-10/685 Installing access covers and frames to chambers for below ground drainage type A](#);
and [50-10-10/660 Fixing steps in below ground drainage monitoring and control systems](#).
- **System completion:** [50-10-10/810 Removal of debris and cleaning below ground drainage monitoring and control systems](#);
[50-10-10/815 Water testing of manholes and inspection chambers for below ground drainage monitoring and control systems](#);

[50-10-10/820 Testing of ancillary components in below ground drainage monitoring and control systems;](#)
and [50-10-10/830 Documentation.](#)

Products

45-55-10/350 Concrete (granolithic) wearing screed mix

- **Cement:** Portland.
- **Coarse aggregate:** Required.
- **Fine aggregate:** Required.

90-05-20/320 Access covers and frames type A

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage;](#) [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage;](#) [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage;](#) [50-10-10/150 Precast concrete manhole system for below ground drainage;](#) and [50-50-75/108 SuDS bioretention area system.](#)

- **Type:** A
- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS EN 124.](#)
- **Form:** Double seals and grease;
Gratings;
Non-rocking;
and Recessed covers for paviour filling.
- **Materials:** Ductile cast iron and Steel.
- **Finish:** Black bitumen painted. Marker plate to show flow in manhole (FW SW or combined)
- **Sizes:** min 600x600
- **Loading grades:** Minimum BS EN 124 grade D400 in trafficked areas C250 elsewhere or E600 as shown on drawings
- **Edging trims:** Manufacturer's standard.
- **Integral accessories:** Manufacturer's standard.

90-05-20/326 Access chamber steps

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS EN 13101.](#)
- **Form:** Submit proposals.
- **Material:** Plastics coated steel.

90-05-20/374 Precast concrete manholes – shaft sections

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS 5911-3](#) and [BS EN 1917.](#)
- **Third party certification:** BSI Kitemark certified.

- **Concrete quality:** Submit proposals. Suitable for ground conditions noted in Geotechnical Reports
- **Sizes (nominal):** As scheduled.
- **Integral accessories:** Ladders and Steps.

Execution

50-10-10/615 Formation for beddings in below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Timing:** Excavate to formation immediately before laying bases or beddings.
- **Mud, rock projections, boulders and hard spots:** Remove. Replace with consolidated bedding material.
- **Local soft spots:** Harden by tamping in bedding material.
- **Inspection of excavated formations:** Give notice.

50-10-10/635 Installing precast concrete access chambers and shafts for below ground drainage

Shared by: [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Standards:** To [BS EN 752](#), and in accordance with relevant parts of the National Annex (NA) and In accordance with relevant parts of [Sewers for adoption](#).
- **Base slab thickness:** minimum 225 mm, to suit ground conditions.
- **Chamber dimensions:**
 - **Depth (cover level to pipeline invert):** As manhole schedule or drawings
- **Concrete surround:** min 150 mm thick.
- **Backfilling:**
 - **Laying fill:** see drawing WRDO-MMD-XX-XX-DR-D-1001 and 1002
 - **Compaction:** By hand in 100 mm layers.

50-10-10/660 Fixing steps in below ground drainage monitoring and control systems

Shared by: [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Fixing:** Secure to chamber wall.
- **Positioning:** 300 mm vertical centres staggered 300 mm horizontally, with lowest step 300 mm (maximum) above benching and top step 450 mm (maximum) below top of cover.

50-10-10/665 Jointing precast concrete below ground drainage access chamber sections

Shared by: [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Inner joint surface:** Trim surplus jointing material extruded into chamber and point neatly.

50-10-10/685 Installing access covers and frames to chambers for below ground drainage type A

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Type:** A
- **Bedding and haunching of frames:** Top of haunching 30 mm below surrounding surfaces.
- **Vertical positioning of frames:** Level or marry in with levels of surrounding surfaces.
- **Permissible deviation in level of external covers and frames:** +0 to -6 mm.

System completion

50-10-10/810 Removal of debris and cleaning below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Preparation:**
 - **Requirements:** Lift covers to manholes, inspection chambers and access points. Remove mortar droppings, debris and loose wrappings.
 - **Timing:** Before cleaning, final testing, CCTV inspection if specified, and immediately before handover.
- **Cleaning:**
 - **Requirements:** Thoroughly flush pipelines with water to remove silt and check for blockages. Rod pipelines between access points if there is any indication that they may be obstructed.
 - **Washings and detritus:** Do not discharge into sewers or watercourses.
- **Covers:** Securely replace after cleaning and testing.

50-10-10/815 Water testing of manholes and inspection chambers for below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

[ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Timing:** Before backfilling.
- **Testing:**
 - **Exfiltration:** To [BS EN 1610](#).
 - **Method:** Testing with water (method W).
 - **Infiltration:** No identifiable flow of water penetrating the chamber.

50-10-10/820 Testing of ancillary components in below ground drainage monitoring and control systems

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Components:** Attenuation chambers.
- **Testing:**
 - **Standard:** To [BS EN 1610](#).
 - **Tests:** Infiltration.
 - **Method:** Testing with air (method L) and Testing with water (method W).

50-10-10/830 Documentation

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); and [50-10-10/150 Precast concrete manhole system for below ground drainage](#).

- **Operating and maintenance instructions:**
 - **Scope:** Submit for the system giving optimum settings for controls.
 - **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - **Format:** Paper copy and Electronic
 - **Number of copies:** 1
- **Record drawings:**
 - **Content:** Location, size and route of below ground drainage services and Location of outlets.
Manhole Card with cover and invert levels and orientation of base pipework set to North
 - **Format:** A1 paper print and Electronic.
 - **Number of copies:** 1
- **Submittal date:** At handover.

Ω End of system

50-10-15/110 Below ground surface water gravity drainage pipeline system

System outline

50-10-15/110 Below ground surface water gravity drainage pipeline system

- **System manufacturer:** Contractor's choice.
- **Surface water collectors:** [90-05-20/402 Concrete one piece gullies](#);
[90-05-20/404 Plastics one piece gullies](#);;
[90-05-20/408 Vitrified clay one piece gullies](#);
[90-05-20/420 Combined drainage and kerb units](#);
[90-05-20/422 Drainage channels with gratings](#);
[90-05-20/424 Filtration drainage channels](#);
[90-05-20/426 Linear slot drainage channels](#);
[90-05-20/434 Concrete silt traps](#);
[90-05-20/436 Plastics silt traps](#);
[90-05-20/432 Vitrified clay silt traps](#);
and [90-05-20/430 Silt buckets](#).
- **Pipelines:**
 - **Pipes, bends and junctions:** [90-10-20/422 Polyethylene \(HDPE\) structured wall below ground drainage pipelines for flexible jointing](#);
[90-10-20/424 Polypropylene \(PP\) structured wall below ground drainage pipelines for flexible jointing](#);
[90-10-20/426 Polypropylene solid wall below ground drainage pipelines for flexible jointing](#);
[90-10-20/428 Precast concrete plain wall below ground drainage pipelines for flexible jointing](#);
and [90-10-20/434 Vitrified clay plain wall below ground drainage pipelines for flexible jointing](#).
 - **Pipeline accessories:** [90-10-20/452 Adaptors for above ground pipe connections to clay drainage pipelines](#);
[90-10-20/454 Adaptors for above ground pipe connections to plastics drainage pipelines](#);
[90-10-20/458 Flexible couplings between below ground drainage pipelines](#);
and [90-90-55/440 Warning marker tapes](#).
- **Pipeline beddings and surrounds:**
 - **Pipe bedding and surround classes:** [50-10-15/695 Laying class Z concrete surround for below ground drainage pipelines](#).
 - **Pipe bedding and surround materials:**
 - Blinding:** [45-55-20/330 Designated concrete type A](#).
 - Lower bedding:** To BS EN 1610
 - Upper bedding:** To BS EN 1610
 - Sidefill:** To BS EN 1610
 - Initial backfill:** To BS EN 1610
 - **Beddings and surrounds to pipeline fittings or accessories:**
 - Bedding:** To BS EN 1610

Surround: To BS EN 1610

Backfill: To BS EN 1610

- **Execution:** [50-10-15/605 Removing or capping unused below ground drainage pipelines;](#)
[50-10-15/610 Retaining existing below ground drainage pipelines;](#)
[50-10-15/615 Excavating drainage trenches generally;](#)
[50-10-15/625 Excavating combined trenches for below ground drainage pipelines at different levels;](#)
[50-10-15/620 Excavating and filling drainage trenches in public roads and pavings;](#)
[50-10-15/700 Laying and jointing below ground drainage pipelines generally;](#)
[50-10-15/705 Protecting below ground drainage pipelines in trenches near foundations;](#)
[50-10-15/710 Protecting below ground rigid drainage pipelines at crossovers;](#)
[50-10-15/715 Installing below ground drainage pipelines passing through structures type A;](#)
[50-10-15/720 Jointing below ground drainage pipes of different materials or sizes using clamped flexible couplings;](#)
[50-10-15/740 Connecting to public sewers;](#)
[50-10-15/745 Installing backdrop pipelines outside manhole walls;](#)
[50-10-15/750 Initial testing of below ground drainage pipelines;](#)
[50-10-15/755 Backfilling to below ground drainage pipelines generally;](#)
[50-10-15/760 Backfilling to below ground drainage pipelines over concrete surrounds;](#)
[50-10-15/765 Laying warning marker tapes for below ground drainage;](#)
and [50-10-15/715 Installing below ground drainage pipelines passing through structures type B.](#)
- **System completion:** [50-10-15/810 Removal of debris and cleaning below ground drainage;](#)
[50-10-15/815 Testing and inspection of below ground drainage;](#)
[50-10-15/820 Final testing of private gravity drains and sewers up to DN 300;](#)
[50-10-15/825 Final testing of adoptable and large private sewers;](#)
[50-10-15/830 CCTV inspection of private below ground drainage pipelines;](#)
[50-10-15/835 CCTV inspection of adoptable below ground drainage pipelines;](#)
and [50-10-15/850 Documentation.](#)

Products

45-55-20/330 Designated concrete type A

- **Type:** A
- **Standards:** To [BS EN 206](#), [BS 8500-1](#), and [BS 8500-2](#).
- **Concrete designation:** Compliant with Sewers for Adoption, Ground conditions and Manufacturer's standard where appropriate.
- **Properties:**
 - **Chloride class:** Suitable for ground conditions identified in Ground Investigation Report
- **Execution:** [45-55-20/630 Placing normal weight concrete generally.](#)

90-05-20/402 Concrete one piece gullies

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS 5911-6](#).
- **Third party product certification:** BSI Kitemark or BBA Agrément certificate.

- **Concrete quality:** Contractor's choice.
- **Form:** Road gully.
- **Sizes:** Submit proposals.
- **Outlet sizes:** min 150mm
- **Integral accessories:** Gully slabs.

90-05-20/404 Plastics one piece gullies

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS EN 1253-1](#), [BS EN 1253-2](#), [BS EN 1253-3](#), [BS EN 1253-4](#) and [BS EN 1253-5](#).
- **Third party product certification:** BSI Kitemark or BBA Agrément certificate.
- **Form:** Contractor's choice.
- **Sizes:** Contractor's choice.
- **Outlet sizes:** min 150mm
- **Integral accessories:** Gratings;
Raising pieces;
and Sealing plates.

90-05-20/408 Vitrified clay one piece gullies

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS EN 295-1](#).
- **Third party product certification:** BSI Kitemark and BBA Agrément certificate.
- **Form:** Contractor's choice.
- **Sizes:** Contractor's choice.
- **Outlet sizes:** min 150mm
- **Integral accessories:** Gratings;
Raising pieces;
and Sealing plates.

90-05-20/422 Drainage channels with gratings

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS EN 1433](#).
- **Third party certification:** BSI Kitemark.
- **Channels:**
 - **Material:** Contractor's choice.
 - **Colour:** Submit proposals.
- **Gratings:**
 - **Material:** Contractor's choice.
 - **Form:** Contractor's choice - Integral Lids.
- **Load class (minimum):** C250 in Pedestrian only areas
D400 minimum elsewhere
E600 as noted on drawings
- **Channel unit dimensions:**
 - **Width (nominal):** Contractor's choice.
 - **Depth (nominal):** Contractor's choice.
 - **Length:** Manufacturer's standard.

- **Integral accessories:** Manufacturer's standard.
Rodding access at head of each run

90-05-20/430 Silt buckets

- **Manufacturer:** Contractor's choice.
- **Material:** Manufacturer's standard.
- **Size (nominal):** Submit proposals.

90-05-20/432 Vitrified clay silt traps

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS EN 295-1](#).
- **Third party product certification:** BSI Kitemark.
- **Form:** Contractor's choice.
- **Inlet:** Contractor's choice.
- **Outlet:** Submit proposals.
- **Silt buckets:** Contractor's choice.

90-05-20/434 Concrete silt traps

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS 5911-6](#).
- **Third party product certification:** BSI Kitemark or BBA Agrément certificate.
- **Sizes:** Submit proposals.
- **Inlet:** Contractor's choice.
- **Outlet:** Contractor's choice.
- **Silt buckets:** Contractor's choice.

90-05-20/436 Plastics silt traps

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS 4660](#).
 - **Third party product certification:** BSI Kitemark.
- **Inlet:** Contractor's choice.
- **Outlet:** Contractor's choice.
- **Silt buckets:** Submit proposals.

90-10-20/422 Polyethylene (HDPE) structured wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS EN 13476-1](#) and [BS EN 13476-2](#) or [BS EN 13476-3](#).
- **Third party certification:** BBA Agrément certificate.
- **Material:** Polyethylene (PE).
- **Puncture resistance and longitudinal bending:** To [WIS 04-35-01:2008](#).
- **Recycled content:** Contractor's choice.

- **Integral accessories:** Manufacturer's standard.

90-10-20/424 Polypropylene (PP) structured wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS EN 13476-1](#) and [BS EN 13476-2](#) or [BS EN 13476-3](#).
- **Third party certification:** BBA Agrément certificate.
- **Material:** Polypropylene (PP).
- **Puncture resistance and longitudinal bending:** To [WIS 04-35-01:2008](#).
- **Integral accessories:** Manufacturer's standard.

90-10-20/426 Polypropylene solid wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS EN 1852-1](#).
- **Third party certification:** Manufacturer's standard.
- **Application area code:** UD.
- **Recycled content:** Manufacturer's standard.
- **Integral accessories:** Manufacturer's standard.

90-10-20/428 Precast concrete plain wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS 5911-1](#) and [BS EN 1916](#).
- **Third party certification:** BSI Kitemark certified.
- **Form:** Circular, solid wall.
- **Cement type and content:** Sulphate resisting.
- **Jointing type:** Spigot and socket joints with sealing ring.
- **Integral accessories:** Manufacturer's standard.

90-10-20/434 Vitrified clay plain wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Manufacturer:** Contractor's choice.
- **Material and standard:** Vitrified clay to [BS EN 295-1](#).

- **Third party certification:** BSI Kitemark certified.
- **Crushing strength (minimum):** FN40.
- **Jointing type:** Plastics sleeve, for flexible jointing.
- **Integral accessories:** Manufacturer's standard.

90-10-20/452 Adaptors for above ground pipe connections to clay drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS EN 295-1](#).
- **Third party product certification:** BSI Kitemark.

90-10-20/454 Adaptors for above ground pipe connections to plastics drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS 4660](#) or to [BS EN 1401-1](#).
- **Third party product certification:** BSI Kitemark.
- **Size:** Contractor's choice.

90-10-20/458 Flexible couplings between below ground drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS EN 295-4](#).
- **Third party product certification:** BSI Kitemark or BBA Agrément certificate.
- **Materials:** Elastomeric with [BS EN 10088-2](#), 1.4401 (316) stainless steel clamping bands.
- **Integral accessories:** Manufacturer's standard.

90-90-55/440 Warning marker tapes

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS EN 12613](#).
- **Material:** Heavy gauge polyethylene.
- **Colour:** Manufacturer's standard.
- **Widths:** 200 mm.
- **Legend:** Manufacturer's standard.
- **Wire detection aid:** Required.
- **Execution:** [90-90-55/700 Installing warning markers](#).

Execution

45-55-20/630 Placing normal weight concrete generally

- **Timing:** Place as soon as practicable after mixing and while sufficiently plastic for full compaction.
- **Temperature:**
 - **Limitations:** Do not place against frozen or frost covered surfaces and Do not place concrete when air temperature is below 3°C on a falling thermometer. Do not resume placing of concrete until rising air temperature has reached 3°C.
 - **Temperature (maximum):** 30°C.
 - **Temperature (minimum):** 3°C.
- **Continuity of pours:** Place in final position in one continuous operation up to construction or movement joints. Avoid formation of cold joints.
- **Discharging concrete:** Prevent uneven dispersal, segregation or loss of ingredients or any adverse effect on the formwork or formed finishes.
- **Thickness of layers:** To suit methods of compaction and achieve efficient amalgamation during compaction.
- **Compaction:** Fully compact concrete to full depth to remove entrapped air. Continue until air bubbles cease to appear on the top surface;
Ensure full compaction under void formers, waterbars, around cast-in accessories and at vertical joints;
Avoid over compaction which may cause segregation of aggregates;
and Thoroughly compact at edges to give level, abutted joints with no lipping.
- **Consecutive batches of concrete:** Amalgamate without damaging adjacent partly hardened concrete.
- **Methods of compaction:** To suit consistence class and use of concrete.
- **Records:** Maintain for time, date and location of pours.

50-10-15/605 Removing or capping unused below ground drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Extent of stripping out:** 1m deep minimum
- **Jetting and Emptying:** Existing drainage systems to be jetted and emptied prior to commencement of stripping out.
Debris to be disposed to appropriate waste transfer station or sewerage treatment works.
- **Grouting:** to be aerated concrete or suitable grout

50-10-15/610 Retaining existing below ground drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Setting out:** Before starting work, check invert levels and positions of existing drains, sewers, inspection chambers and manholes against drawings. Report discrepancies.
- **Protection:** Protect existing drains to be retained and maintain normal operation if in use.

- **Jetting:** All retained existing drainage to be jetted and inspected

50-10-15/615 Excavating drainage trenches generally

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Type of subsoil:**
 - **Assumed type:** Refer to Geotechnical Investigation report - Core Geotechnics Limited - Ground Investigation - 21009 dated 10/10/2020
 - **Discrepancies found during excavations:** Notify.
- **Trenches (up to 300 mm above crown of pipe):**
 - **Sides:** Vertical.
 - **Width (minimum):** To [BS EN 1610](#), tables 1 and 2.
 - **Width (maximum):**
 - DN 100 pipelines more than 6.0 m deep: 600 mm.
 - DN 150 pipelines more than 5.4 m deep: 700 mm.
 - DN 225 pipelines more than 4.0 m deep: 800 mm.
 - DN 300 pipelines more than 2.9 m deep: 900 mm.
- **Excavating to trench bottom:**
 - **Timing:** Excavate to formation immediately before laying beddings or pipes.
 - **Mud, rock projections, boulders and hard spots:** Remove. Replace with consolidated bedding material.
 - **Local soft spots:** Harden by tamping in bedding material.
 - **Inspection of excavated formations:** Give notice.
- **Excavated materials:** Separate out reusable materials. Set aside for use in reinstatement.

50-10-15/620 Excavating and filling drainage trenches in public roads and pavings

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Excavating and backfilling of trenches:** To Department for Transport '[New roads and street works act 1991: Specification for the reinstatement of openings in highways: code of practice. 3rd edition \(England\)](#)'.
- **Using foamed concrete:**
 - **Preparation:** Seal off openings in, and ends of, abandoned pipelines and ducts. Seal off cavities in or next to the excavation which are not to be filled.
 - **Backfilling:** To British Cement Association '[Foamed concrete - a specification for use in the reinstatement of openings in highways](#)'.

50-10-15/625 Excavating combined trenches for below ground drainage pipelines at different levels

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Subtrench:** Permitted provided soil of step is stable and unlikely to break away.
- **Subtrench not permitted or used:** Trench depth as required for lower pipe. Increase thickness of bedding to upper pipe as necessary.

- **Lower pipe:** Backfill with compacted granular material to at least half way up higher pipe.
- **Clear horizontal distance between pipes (minimum):**
 - **Pipes up to DN 700:** 250 mm.
 - **Pipes exceeding DN 700:** 500 mm.

50-10-15/695 Laying class Z concrete surround for below ground drainage pipelines

- **Blinding:**
 - **Thickness (minimum):** 50 mm.
 - **Width:** Full width of trench.
 - **Curing period:** Allow to set before proceeding.
- **Pipes:**
 - **Temporary supports:** Folding wedges of bitumen impregnated fibreboard. Prevent flotation.
 - **Clearance under pipes (minimum):** 100 mm.
 - **Adjustments:** Adjust to line and gradient. Maintain minimum clearance under pipes.
- **Initial testing before placing surround:** Required.
- **Surround:**
 - **Thickness:** To 150 mm above crown of pipe.
 - **Width:** Full width of trench.
- **Vertical construction joints:**
 - **Position:** At face of flexible pipe joints.
 - **Material:** 18 mm thick bitumen impregnated fibreboard precut to profile of pipe.
 - **Socketed pipes:** Fill gaps between spigots and sockets with mineral wool, or other inert resilient material, to prevent entry of concrete.

50-10-15/700 Laying and jointing below ground drainage pipelines generally

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Laying:**
 - **Gradient:** To true line and regular gradient on even bed for full length of barrel with sockets (if any) facing up the gradient.
 - **Ingress of debris:** Prevent. Seal exposed ends during construction.
 - **Timing:** Minimize time between laying and testing.
- **Jointing:**
 - **Connections:** Durable, effective and free from leakage.
 - **Junctions, including to differing pipework systems:** With adaptors intended for the purpose.
 - **Cut ends of pipes:** Clean and square. Remove burrs and swarf. Chamfer pipe ends before inserting into ring seal sockets.
 - **Jointing or mating surfaces:** Clean and, where necessary, lubricate immediately before assembly.
 - **Allowance for movement:** Provide and maintain appropriate clearance at ends of spigots as fixing and jointing proceeds.
 - **Jointing material:** Do not allow to project into bore of pipes and fittings.

50-10-15/705 Protecting below ground drainage pipelines in trenches near foundations

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Trench less than 1 m from foundation and bottom of trench lower than bottom of foundation:**
 - **Protection:** Provide class Z concrete surround.
 - **Level:** Top of concrete surround not lower than bottom of foundation.
- **Trench more than 1 m from foundation and bottom of trench lower than bottom of foundation:**
 - **Protection:** Provide class Z concrete surround.
 - **Offset:** Determine values of horizontal distance of trench from foundation, less 150 mm.
 - **Level:** Top of concrete surround not lower than calculated offset value below bottom of foundation.

50-10-15/710 Protecting below ground rigid drainage pipelines at crossovers

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Protection:** Provide class Z concrete surround where two pipelines (other than plastics pipes) cross with less than 300 mm separation.
- **Extent, on both pipes:** 1 m centred on the crossing point, and beyond as necessary to come within 150 mm of nearest flexible joints.

50-10-15/715 Installing below ground drainage pipelines passing through structures type A

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Type:** A
- **Pipelines that must be cast in or fixed to structures (including manholes, catchpits and inspection chambers):**
 - **Provision of rocker pipes:** Provide (max) 600 mm long rocker pipes adjacent to the external face of the structure (or both faces where appropriate, e.g. walls to footings), with flexible joints at both ends.
 - **Distance to rocker pipe from structure (maximum):** 150 mm.
- **Provision for movement for pipelines:** Provide (max) 600 mm long rocker pipes adjacent to the external face of the structure (or both faces where appropriate, e.g. walls to footings), with flexible joints at both ends, distance from structure to rocker pipe to be 150mm maximum; and Openings in the structures to give 50 mm minimum clearance around the pipeline. Closely fit an inert rigid sheet to each side of opening to prevent ingress of fill and vermin.

50-10-15/715 Installing below ground drainage pipelines passing through structures type B

- **Pipelines that must be cast in or fixed to structures (including manholes, catchpits and inspection chambers):**
 - **Provision of rocker pipes:** Provide 600 mm long rocker pipes adjacent to the external face of the structure (or both faces where appropriate, e.g. walls to footings), with flexible joints at both ends.
 - **Distance to rocker pipe from structure (maximum):** 150 mm.
- **Provision for movement for pipelines:** Provide 600 mm long rocker pipes adjacent to the external face of the structure (or both faces where appropriate, e.g. walls to footings), with flexible joints at both ends.

50-10-15/720 Jointing below ground drainage pipes of different materials or sizes using clamped flexible couplings

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Ends of pipes to be joined:** Cut cleanly and square.
- **Outer surfaces of pipes to be joined:** Clean and smooth. Where necessary, e.g. on concrete or iron pipes, smooth out mould lines.
- **Clamping bands:** Tighten carefully to make gastight and watertight seals.

50-10-15/740 Connecting to public sewers

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Requirement:** Connect new pipework to existing adopted sewers to the requirements of the adopting authority or its agent.
Direct or Indirect Section 106 and Trade Effluent Notice approval will be required.
Contractor to provide all relevant applications and permissions to make connections to the satisfaction of the Local Water Company

50-10-15/745 Installing backdrop pipelines outside manhole walls

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Pipeline bedding and surround:** 150 mm (minimum).

50-10-15/750 Initial testing of below ground drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Before testing:**
 - **Cement mortar jointing:** Leave 24 h.
 - **Solvent welded pipelines:** Leave 1 h.
- **Method:** Block open ends of pipelines to be tested and pressurise. Air test short lengths to [BS EN 1610](#).

50-10-15/755 Backfilling to below ground drainage pipelines generally

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Backfilling above top of surround or protective cushion:** Material excavated from trench, compacted in layers 300 mm (maximum) thick.
- **Heavy compactors:** Do not use before there is 600 mm (total) of material over pipes.

50-10-15/760 Backfilling to below ground drainage pipelines over concrete surrounds

- **Minimum times from placing concrete:**
 - **Backfilling generally:** 24 h.
 - **Heavy compactors and traffic loads:** 72 h.

50-10-15/765 Laying warning marker tapes for below ground drainage

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Installation:** During backfilling, lay continuously over pipelines.
- **Depth:** 300–400 mm.
- **Pipelines deeper than 2 m:** Lay an additional tape 600 mm above the top of the pipeline.

90-90-55/700 Installing warning markers

- **Installation:** Lay along the route of the pipelines during backfilling of excavation.
- **Marker position:**
 - **Pipelines less than 2 m:** Continuously, 200–300 mm above service pipe or cable.
 - **Pipelines deeper than 2 m:** Lay additional marker 600 mm above the top of the pipeline.
- **Location, depth, colour and markings:** To requirements of service undertaker.

System completion

50-10-15/810 Removal of debris and cleaning below ground drainage

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Preparation:** Lift covers to manholes, inspection chambers and access points. Remove mortar droppings, debris and loose wrappings.
- **Timing:** Before cleaning, final testing, CCTV inspection if specified, and immediately before handover.
- **Cleaning:** Thoroughly flush pipelines with water to remove silt and check for blockages. Rod pipelines between access points if there is any indication that they may be obstructed.
- **Washings and detritus:** Do not discharge into sewers or watercourses.
- **Covers:** Securely replace after cleaning and testing.

50-10-15/815 Testing and inspection of below ground drainage

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Dates for testing and inspection:** Give notice.
- **Period of notice (minimum):** 48h

50-10-15/820 Final testing of private gravity drains and sewers up to DN 300

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Before testing:**
 - **Cement mortar jointing:** Leave 24 h.
 - **Solvent welded pipelines:** Leave 1 h.
- **Standard:** In accordance with Building Regulations Approved/ Technical documents.
- **Method:** Contractor's choice.

50-10-15/825 Final testing of adoptable and large private sewers

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Standard (sewers up to and including size DN 750):**
 - **England and Wales:** To WRc '[Sewers for adoption](#)'.
- **Method:** Air.

50-10-15/830 CCTV inspection of private below ground drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Requirement:** Carry out and record internal inspection using CCTV equipment.
- **Locations to be inspected:** Foul wastewater and surface water drains and Private foul wastewater and surface water sewers.
- **Illumination:** Of adequate intensity.
- **Recording:**
 - **Requirement:** Allow for continuous position recording, still photographs and stopping of the camera at any point.
 - **Recording and documentation:** Submit.

50-10-15/835 CCTV inspection of adoptable below ground drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Requirement:** Permit the Adopting Authority or its agent to carry out and record internal CCTV inspection of pipelines and associated manholes after completion.
- **Locations to be inspected:** Adoptable foul and surface water sewers.
- **Pipelines under highways:** Complete construction, except for laying of wearing course, before inspection.

50-10-15/850 Documentation

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Operating and maintenance instructions:**
 - **Scope:** Submit for the system giving optimum settings for controls.
 - **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - **Format:** Paper copy and electronic format
 - **Number of copies:** Two.
- **Record drawings:**
 - **Content:** Location, size and route of drainage services.
 - **Format:** A1 paper print and Electronic.
 - **Number of copies:** Two.
- **Submittal date:** At handover.

Ω End of system

50-10-15/115 Below ground foul wastewater gravity drainage pipeline system

System outline

50-10-15/115 Below ground foul wastewater gravity drainage pipeline system

- **System manufacturer:** Contractor's choice.
- **Pipelines:**
 - **Pipes, bends and junctions:** [90-10-20/422 Polyethylene \(HDPE\) structured wall below ground drainage pipelines for flexible jointing](#);
[90-10-20/424 Polypropylene \(PP\) structured wall below ground drainage pipelines for flexible jointing](#);
[90-10-20/426 Polypropylene solid wall below ground drainage pipelines for flexible jointing](#);
[90-10-20/428 Precast concrete plain wall below ground drainage pipelines for flexible jointing](#);
[90-10-20/432 PVC-U structured wall below ground drainage pipelines for flexible jointing](#);
and [90-10-20/434 Vitrified clay plain wall below ground drainage pipelines for flexible jointing](#).
 - **Pipeline accessories:** [90-10-20/452 Adaptors for above ground pipe connections to clay drainage pipelines](#);
[90-10-20/454 Adaptors for above ground pipe connections to plastics drainage pipelines](#);
[90-10-20/456 Saddle connectors to below ground drainage pipelines](#);
[90-10-20/458 Flexible couplings between below ground drainage pipelines](#);
[90-10-60/440 Rat barrier pipes](#);
and [90-90-55/440 Warning marker tapes](#).
- **Pipeline beddings and surrounds:**
 - **Pipe bedding and surround classes:** Appropriate to pipe material chosen by the Contractor. see drawing WRDO-MMD-XX-XX-DR-D-1001
- **Execution:** [50-10-15/605 Removing or capping unused below ground drainage pipelines](#);
[50-10-15/610 Retaining existing below ground drainage pipelines](#);
[50-10-15/615 Excavating drainage trenches generally](#);
[50-10-15/620 Excavating and filling drainage trenches in public roads and pavings](#);
[50-10-15/625 Excavating combined trenches for below ground drainage pipelines at different levels](#);
[50-10-15/700 Laying and jointing below ground drainage pipelines generally](#);
[50-10-15/705 Protecting below ground drainage pipelines in trenches near foundations](#);
[50-10-15/710 Protecting below ground rigid drainage pipelines at crossovers](#);
[50-10-15/715 Installing below ground drainage pipelines passing through structures type A](#);
[50-10-15/720 Jointing below ground drainage pipes of different materials or sizes using clamped flexible couplings](#);
[50-10-15/740 Connecting to public sewers](#);

[50-10-15/745 Installing backdrop pipelines outside manhole walls;](#)
[50-10-15/750 Initial testing of below ground drainage pipelines;](#)
[50-10-15/755 Backfilling to below ground drainage pipelines generally;](#)
and [50-10-15/765 Laying warning marker tapes for below ground drainage.](#)

- **System completion:** [50-10-15/810 Removal of debris and cleaning below ground drainage;](#)
[50-10-15/815 Testing and inspection of below ground drainage;](#)
[50-10-15/820 Final testing of private gravity drains and sewers up to DN 300;](#)
[50-10-15/825 Final testing of adoptable and large private sewers;](#)
[50-10-15/830 CCTV inspection of private below ground drainage pipelines;](#)
[50-10-15/835 CCTV inspection of adoptable below ground drainage pipelines;](#)
and [50-10-15/850 Documentation.](#)

Products

90-10-20/422 Polyethylene (HDPE) structured wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system;](#) [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system;](#) and [50-50-75/108 SuDS bioretention area system.](#)

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS EN 13476-1](#) and [BS EN 13476-2](#) or [BS EN 13476-3.](#)
- **Third party certification:** BBA Agrément certificate.
- **Material:** Polyethylene (PE).
- **Puncture resistance and longitudinal bending:** To [WIS 04-35-01:2008.](#)
- **Recycled content:** Contractor's choice.
- **Integral accessories:** Manufacturer's standard.

90-10-20/424 Polypropylene (PP) structured wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system;](#) [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system;](#) and [50-50-75/108 SuDS bioretention area system.](#)

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS EN 13476-1](#) and [BS EN 13476-2](#) or [BS EN 13476-3.](#)
- **Third party certification:** BBA Agrément certificate.
- **Material:** Polypropylene (PP).
- **Puncture resistance and longitudinal bending:** To [WIS 04-35-01:2008.](#)
- **Integral accessories:** Manufacturer's standard.

90-10-20/426 Polypropylene solid wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system;](#) [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system;](#) and [50-50-75/108 SuDS bioretention area system.](#)

- **Manufacturer:** Contractor's choice.

- **Standard:** To [BS EN 1852-1](#).
- **Third party certification:** Manufacturer's standard.
- **Application area code:** UD.
- **Recycled content:** Manufacturer's standard.
- **Integral accessories:** Manufacturer's standard.

90-10-20/428 Precast concrete plain wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS 5911-1](#) and [BS EN 1916](#).
- **Third party certification:** BSI Kitemark certified.
- **Form:** Circular, solid wall.
- **Cement type and content:** Sulphate resisting.
- **Jointing type:** Spigot and socket joints with sealing ring.
- **Integral accessories:** Manufacturer's standard.

90-10-20/432 PVC-U structured wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS EN 13476-1](#) and [BS EN 13476-2](#) or [BS EN 13476-3](#).
- **Third party certification:** BBA Agrément certificate.
- **Material:** PVC-U.
- **Puncture resistance and longitudinal bending:** To [WIS 04-35-01:2008](#).
- **Recycled content:** Manufacturer's standard.
- **Integral accessories:** Manufacturer's standard.

90-10-20/434 Vitrified clay plain wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Manufacturer:** Contractor's choice.
- **Material and standard:** Vitrified clay to [BS EN 295-1](#).
- **Third party certification:** BSI Kitemark certified.
- **Crushing strength (minimum):** FN40.
- **Jointing type:** Plastics sleeve, for flexible jointing.
- **Integral accessories:** Manufacturer's standard.

90-10-20/452 Adaptors for above ground pipe connections to clay drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS EN 295-1](#).
- **Third party product certification:** BSI Kitemark.

90-10-20/454 Adaptors for above ground pipe connections to plastics drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS 4660](#) or to [BS EN 1401-1](#).
- **Third party product certification:** BSI Kitemark.
- **Size:** Contractor's choice.

90-10-20/456 Saddle connectors to below ground drainage pipelines

- **Manufacturer:** Contractor's choice.
- **Material:** Contractor's choice.
- **Third party product certification:** BSI Kitemark.
- **Sizes (nominal):** DN 100/300.

90-10-20/458 Flexible couplings between below ground drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS EN 295-4](#).
- **Third party product certification:** BSI Kitemark or BBA Agrément certificate.
- **Materials:** Elastomeric with [BS EN 10088-2](#), 1.4401 (316) stainless steel clamping bands.
- **Integral accessories:** Manufacturer's standard.

90-10-60/440 Rat barrier pipes

- **Manufacturer:** Contractor's choice.
- **Material:** Submit proposals.
- **Integral accessories:** Manufacturer's standard.

90-90-55/440 Warning marker tapes

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS EN 12613](#).
- **Material:** Heavy gauge polyethylene.
- **Colour:** Manufacturer's standard.
- **Widths:** 200 mm.
- **Legend:** Manufacturer's standard.
- **Wire detection aid:** Required.
- **Execution:** [90-90-55/700 Installing warning markers](#).

Execution

50-10-15/605 Removing or capping unused below ground drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Extent of stripping out:** 1m deep minimum
- **Jetting and Emptying:** Existing drainage systems to be jetted and emptied prior to commencement of stripping out.
Debris to be disposed to appropriate waste transfer station or sewerage treatment works.
- **Grouting:** to be aerated concrete or suitable grout

50-10-15/610 Retaining existing below ground drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Setting out:** Before starting work, check invert levels and positions of existing drains, sewers, inspection chambers and manholes against drawings. Report discrepancies.
- **Protection:** Protect existing drains to be retained and maintain normal operation if in use.
- **Jetting:** All retained existing drainage to be jetted and inspected

50-10-15/615 Excavating drainage trenches generally

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Type of subsoil:**
 - **Assumed type:** Refer to Geotechnical Investigation report - Core Geotechnics Limited - Ground Investigation - 21009 dated 10/10/2020
 - **Discrepancies found during excavations:** Notify.
- **Trenches (up to 300 mm above crown of pipe):**
 - **Sides:** Vertical.
 - **Width (minimum):** To [BS EN 1610](#), tables 1 and 2.
 - **Width (maximum):**
 - DN 100 pipelines more than 6.0 m deep: 600 mm.
 - DN 150 pipelines more than 5.4 m deep: 700 mm.
 - DN 225 pipelines more than 4.0 m deep: 800 mm.
 - DN 300 pipelines more than 2.9 m deep: 900 mm.
- **Excavating to trench bottom:**
 - **Timing:** Excavate to formation immediately before laying beddings or pipes.
 - **Mud, rock projections, boulders and hard spots:** Remove. Replace with consolidated bedding material.
 - **Local soft spots:** Harden by tamping in bedding material.
 - **Inspection of excavated formations:** Give notice.
- **Excavated materials:** Separate out reusable materials. Set aside for use in reinstatement.

50-10-15/620 Excavating and filling drainage trenches in public roads and pavings

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Excavating and backfilling of trenches:** To Department for Transport '[New roads and street works act 1991: Specification for the reinstatement of openings in highways: code of practice. 3rd edition \(England\)](#)'.
- **Using foamed concrete:**
 - **Preparation:** Seal off openings in, and ends of, abandoned pipelines and ducts. Seal off cavities in or next to the excavation which are not to be filled.
 - **Backfilling:** To British Cement Association '[Foamed concrete - a specification for use in the reinstatement of openings in highways](#)'.

50-10-15/625 Excavating combined trenches for below ground drainage pipelines at different levels

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Subtrench:** Permitted provided soil of step is stable and unlikely to break away.
- **Subtrench not permitted or used:** Trench depth as required for lower pipe. Increase thickness of bedding to upper pipe as necessary.
- **Lower pipe:** Backfill with compacted granular material to at least half way up higher pipe.
- **Clear horizontal distance between pipes (minimum):**
 - **Pipes up to DN 700:** 250 mm.
 - **Pipes exceeding DN 700:** 500 mm.

50-10-15/700 Laying and jointing below ground drainage pipelines generally

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Laying:**
 - **Gradient:** To true line and regular gradient on even bed for full length of barrel with sockets (if any) facing up the gradient.
 - **Ingress of debris:** Prevent. Seal exposed ends during construction.
 - **Timing:** Minimize time between laying and testing.
- **Jointing:**
 - **Connections:** Durable, effective and free from leakage.
 - **Junctions, including to differing pipework systems:** With adaptors intended for the purpose.
 - **Cut ends of pipes:** Clean and square. Remove burrs and swarf. Chamfer pipe ends before inserting into ring seal sockets.
 - **Jointing or mating surfaces:** Clean and, where necessary, lubricate immediately before assembly.
 - **Allowance for movement:** Provide and maintain appropriate clearance at ends of spigots as fixing and jointing proceeds.
 - **Jointing material:** Do not allow to project into bore of pipes and fittings.

50-10-15/705 Protecting below ground drainage pipelines in trenches near foundations

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Trench less than 1 m from foundation and bottom of trench lower than bottom of foundation:**
 - **Protection:** Provide class Z concrete surround.
 - **Level:** Top of concrete surround not lower than bottom of foundation.
- **Trench more than 1 m from foundation and bottom of trench lower than bottom of foundation:**
 - **Protection:** Provide class Z concrete surround.
 - **Offset:** Determine values of horizontal distance of trench from foundation, less 150 mm.
 - **Level:** Top of concrete surround not lower than calculated offset value below bottom of foundation.

50-10-15/710 Protecting below ground rigid drainage pipelines at crossovers

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Protection:** Provide class Z concrete surround where two pipelines (other than plastics pipes) cross with less than 300 mm separation.
- **Extent, on both pipes:** 1 m centred on the crossing point, and beyond as necessary to come within 150 mm of nearest flexible joints.

50-10-15/715 Installing below ground drainage pipelines passing through structures type A

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Type:** A
- **Pipelines that must be cast in or fixed to structures (including manholes, catchpits and inspection chambers):**
 - **Provision of rocker pipes:** Provide (max) 600 mm long rocker pipes adjacent to the external face of the structure (or both faces where appropriate, e.g. walls to footings), with flexible joints at both ends.
 - **Distance to rocker pipe from structure (maximum):** 150 mm.
- **Provision for movement for pipelines:** Provide (max) 600 mm long rocker pipes adjacent to the external face of the structure (or both faces where appropriate, e.g. walls to footings), with flexible joints at both ends, distance from structure to rocker pipe to be 150mm maximum; and Openings in the structures to give 50 mm minimum clearance around the pipeline. Closely fit an inert rigid sheet to each side of opening to prevent ingress of fill and vermin.

50-10-15/720 Jointing below ground drainage pipes of different materials or sizes using clamped flexible couplings

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Ends of pipes to be joined:** Cut cleanly and square.
- **Outer surfaces of pipes to be joined:** Clean and smooth. Where necessary, e.g. on concrete or iron pipes, smooth out mould lines.
- **Clamping bands:** Tighten carefully to make gastight and watertight seals.

50-10-15/740 Connecting to public sewers

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Requirement:** Connect new pipework to existing adopted sewers to the requirements of the adopting authority or its agent.
Direct or Indirect Section 106 and Trade Effluent Notice approval will be required.
Contractor to provide all relevant applications and permissions to make connections to the satisfaction of the Local Water Company

50-10-15/745 Installing backdrop pipelines outside manhole walls

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Pipeline bedding and surround:** 150 mm (minimum).

50-10-15/750 Initial testing of below ground drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Before testing:**
 - **Cement mortar jointing:** Leave 24 h.
 - **Solvent welded pipelines:** Leave 1 h.
- **Method:** Block open ends of pipelines to be tested and pressurise. Air test short lengths to [BS EN 1610](#).

50-10-15/755 Backfilling to below ground drainage pipelines generally

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Backfilling above top of surround or protective cushion:** Material excavated from trench, compacted in layers 300 mm (maximum) thick.
- **Heavy compactors:** Do not use before there is 600 mm (total) of material over pipes.

50-10-15/765 Laying warning marker tapes for below ground drainage

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Installation:** During backfilling, lay continuously over pipelines.

- **Depth:** 300–400 mm.
- **Pipelines deeper than 2 m:** Lay an additional tape 600 mm above the top of the pipeline.

90-90-55/700 Installing warning markers

- **Installation:** Lay along the route of the pipelines during backfilling of excavation.
- **Marker position:**
 - **Pipelines less than 2 m:** Continuously, 200–300 mm above service pipe or cable.
 - **Pipelines deeper than 2 m:** Lay additional marker 600 mm above the top of the pipeline.
- **Location, depth, colour and markings:** To requirements of service undertaker.

System completion

50-10-15/810 Removal of debris and cleaning below ground drainage

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Preparation:** Lift covers to manholes, inspection chambers and access points. Remove mortar droppings, debris and loose wrappings.
- **Timing:** Before cleaning, final testing, CCTV inspection if specified, and immediately before handover.
- **Cleaning:** Thoroughly flush pipelines with water to remove silt and check for blockages. Rod pipelines between access points if there is any indication that they may be obstructed.
- **Washings and detritus:** Do not discharge into sewers or watercourses.
- **Covers:** Securely replace after cleaning and testing.

50-10-15/815 Testing and inspection of below ground drainage

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Dates for testing and inspection:** Give notice.
- **Period of notice (minimum):** 48h

50-10-15/820 Final testing of private gravity drains and sewers up to DN 300

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Before testing:**
 - **Cement mortar jointing:** Leave 24 h.
 - **Solvent welded pipelines:** Leave 1 h.
- **Standard:** In accordance with Building Regulations Approved/ Technical documents.
- **Method:** Contractor's choice.

50-10-15/825 Final testing of adoptable and large private sewers

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Standard (sewers up to and including size DN 750):**
 - **England and Wales:** To WRc '[Sewers for adoption](#)'.
- **Method:** Air.

50-10-15/830 CCTV inspection of private below ground drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Requirement:** Carry out and record internal inspection using CCTV equipment.
- **Locations to be inspected:** Foul wastewater and surface water drains and Private foul wastewater and surface water sewers.
- **Illumination:** Of adequate intensity.
- **Recording:**
 - **Requirement:** Allow for continuous position recording, still photographs and stopping of the camera at any point.
 - **Recording and documentation:** Submit.

50-10-15/835 CCTV inspection of adoptable below ground drainage pipelines

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Requirement:** Permit the Adopting Authority or its agent to carry out and record internal CCTV inspection of pipelines and associated manholes after completion.
- **Locations to be inspected:** Adoptable foul and surface water sewers.
- **Pipelines under highways:** Complete construction, except for laying of wearing course, before inspection.

50-10-15/850 Documentation

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); and [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#).

- **Operating and maintenance instructions:**
 - **Scope:** Submit for the system giving optimum settings for controls.
 - **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - **Format:** Paper copy and electronic format
 - **Number of copies:** Two.
- **Record drawings:**
 - **Content:** Location, size and route of drainage services.
 - **Format:** A1 paper print and Electronic.
 - **Number of copies:** Two.
- **Submittal date:** At handover.

Ω End of system

50-50-75/108 SuDS bioretention area system

System outline

50-50-75/108 SuDS bioretention area system

- **Description:** Bioretention area as part of SuDS system adjacent to new building
- **Inflows:**
 - **Point inflows:** Includes flows from Linear drainage serving parking bays
 - **Surface inflows:** Runoff From access road
 - **Erosion control and pre-treatment:**
 - Erosion control:** Planting and suitably sized rock
 - Point inflow protection:** ACO SuDS inlet plus flag stone or suitably sized rock
 - Pre-treatment:** [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#) unit from Linear Channel
- **Construction:**
 - **Lining:** [20-05-95/110 Ground supported water retention sheet lining system](#).
 - **Underdrainage:** 150mm geotextile wrapped granular layer
 - **Pipe beddings and surrounds:**
 - Material:** 4-20 OGCR or [45-55-28/380 Type 3 unbound mixture](#).
 - Geotextile capping to pipe bedding and surround:** Terram 700 or approved similar
 - **Inspection pipes and fittings:**
 - Pipelines:** [90-10-20/422 Polyethylene \(HDPE\) structured wall below ground drainage pipelines for flexible jointing](#);
 - [90-10-20/424 Polypropylene \(PP\) structured wall below ground drainage pipelines for flexible jointing](#);
 - [90-10-20/426 Polypropylene solid wall below ground drainage pipelines for flexible jointing](#);
 - [90-10-20/428 Precast concrete plain wall below ground drainage pipelines for flexible jointing](#);
 - [90-10-20/432 PVC-U structured wall below ground drainage pipelines for flexible jointing](#);
 - and [90-10-20/434 Vitrified clay plain wall below ground drainage pipelines for flexible jointing](#).
 - Access covers:** [90-05-20/320 Access covers and frames type A](#) and [90-05-20/320 Covers, gratings and frames for access chambers type B](#).
 - **Filter layers:**
 - Material:** Root Zone for planting and SHW Type B filter material
 - Geotextile capping to filter layer:** Terram 700 or approved similar
 - **Edge restraints:** Traffic kerb system.
 - **Vegetation:**
 - Planting medium:** Min. 300mm 70:30 Rootzone with 10% coarse grade green waste compost
 - Planting:** Submit proposals. In discussion with Landscape Architect
- **Outflows:**

- **Outflow pipelines:** [50-10-15/110 Below ground surface water gravity drainage pipeline system](#).
- **Overflows:** High level overflow required to swale/bio retention area via grate on manhole
- **Execution:** [50-50-75/610 Forming SuDS bioretention areas](#).
- **System completion:** [50-50-75/810 Documentation](#) and [50-50-75/815 Maintenance](#).

Products

90-05-20/320 Access covers and frames type A

Shared by: [50-10-10/125 Plastics shallow inspection chamber system for below ground drainage](#); [50-10-10/130 Plastics deep non entry inspection chamber system for below ground drainage](#); [50-10-10/140 Precast concrete silt trap and flow control chamber system for below ground drainage](#); [50-10-10/150 Precast concrete manhole system for below ground drainage](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Type:** A
- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS EN 124](#).
- **Form:** Double seals and grease;
Gratings;
Non-rocking;
and Recessed covers for paviour filling.
- **Materials:** Ductile cast iron and Steel.
- **Finish:** Black bitumen painted. Marker plate to show flow in manhole (FW SW or combined)
- **Sizes:** min 600x600
- **Loading grades:** Minimum BS EN 124 grade D400 in trafficked areas C250 elsewhere or E600 as shown on drawings
- **Edging trims:** Manufacturer's standard.
- **Integral accessories:** Manufacturer's standard.

90-10-20/422 Polyethylene (HDPE) structured wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS EN 13476-1](#) and [BS EN 13476-2](#) or [BS EN 13476-3](#).
- **Third party certification:** BBA Agrément certificate.
- **Material:** Polyethylene (PE).
- **Puncture resistance and longitudinal bending:** To [WIS 04-35-01:2008](#).
- **Recycled content:** Contractor's choice.
- **Integral accessories:** Manufacturer's standard.

90-10-20/424 Polypropylene (PP) structured wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS EN 13476-1](#) and [BS EN 13476-2](#) or [BS EN 13476-3](#).
- **Third party certification:** BBA Agrément certificate.
- **Material:** Polypropylene (PP).
- **Puncture resistance and longitudinal bending:** To [WIS 04-35-01:2008](#).
- **Integral accessories:** Manufacturer's standard.

90-10-20/426 Polypropylene solid wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Manufacturer:** Contractor's choice.
- **Standard:** To [BS EN 1852-1](#).
- **Third party certification:** Manufacturer's standard.
- **Application area code:** UD.
- **Recycled content:** Manufacturer's standard.
- **Integral accessories:** Manufacturer's standard.

90-10-20/428 Precast concrete plain wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS 5911-1](#) and [BS EN 1916](#).
- **Third party certification:** BSI Kitemark certified.
- **Form:** Circular, solid wall.
- **Cement type and content:** Sulphate resisting.
- **Jointing type:** Spigot and socket joints with sealing ring.
- **Integral accessories:** Manufacturer's standard.

90-10-20/432 PVC-U structured wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Manufacturer:** Contractor's choice.
- **Standards:** To [BS EN 13476-1](#) and [BS EN 13476-2](#) or [BS EN 13476-3](#).
- **Third party certification:** BBA Agrément certificate.
- **Material:** PVC-U.

- **Puncture resistance and longitudinal bending:** To [WIS 04-35-01:2008](#).
- **Recycled content:** Manufacturer's standard.
- **Integral accessories:** Manufacturer's standard.

90-10-20/434 Vitrified clay plain wall below ground drainage pipelines for flexible jointing

Shared by: [50-10-15/110 Below ground surface water gravity drainage pipeline system](#); [50-10-15/115 Below ground foul wastewater gravity drainage pipeline system](#); and [50-50-75/108 SuDS bioretention area system](#).

- **Manufacturer:** Contractor's choice.
- **Material and standard:** Vitrified clay to [BS EN 295-1](#).
- **Third party certification:** BSI Kitemark certified.
- **Crushing strength (minimum):** FN40.
- **Jointing type:** Plastics sleeve, for flexible jointing.
- **Integral accessories:** Manufacturer's standard.

Execution

50-50-75/610 Forming SuDS bioretention areas

- **Inflow pipelines:** Submit proposals.
- **Underdrainage:**
 - **Pipeline sizes:** Submit proposals.
- **Inspection pipes and fittings:** Submit proposals.
- **Filter layers:**
 - **Depth (minimum):** 300 mm.
- **Planting medium:**
 - **Depth (minimum):** 500mm
- **Mulch:**
 - **Depth (minimum):** 100 mm.
- **Outflow pipelines:** Submit proposals.

System completion

50-50-75/810 Documentation

Shared by: [50-50-75/108 SuDS bioretention area system](#); and [50-50-75/164 SuDS permeable pavement system](#).

- **Operation and maintenance instructions:** Submit.
- **Record drawings:** Submit.

50-50-75/815 Maintenance

Shared by: [50-50-75/108 SuDS bioretention area system](#); and [50-50-75/164 SuDS permeable pavement system](#).

- **Servicing and maintenance:** Undertake.
- **Duration:** Until 24 months after Practical Completion.

Ω End of system

50-50-75/164 SuDS permeable pavement system

System outline

50-50-75/164 SuDS permeable pavement system

- **Description:** Concrete block permeable paving to car park area
- **Construction:**
 - **Permeable pavements:** Permeable small unit paving system. see drawing WRDO-MMD-XX-XX-DR-D-1002
 - **Edge restraints:** Traffic kerb. see drawing WRDO-MMD-XX-XX-DR-D-0002
- **System completion:** [50-50-75/810 Documentation](#) and [50-50-75/815 Maintenance](#).

System completion

50-50-75/810 Documentation

Shared by: [50-50-75/108 SuDS bioretention area system](#); and [50-50-75/164 SuDS permeable pavement system](#).

- **Operation and maintenance instructions:** Submit.
- **Record drawings:** Submit.

50-50-75/815 Maintenance

Shared by: [50-50-75/108 SuDS bioretention area system](#); and [50-50-75/164 SuDS permeable pavement system](#).

- **Servicing and maintenance:** Undertake.
- **Duration:** Until 24 months after Practical Completion.

Ω End of system

