



**STRUCTURAL ENGINEERING
NBS SPECIFICATION**

for

**Middleton on Sea
Care Home**

Prepared by

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WJP

NBS Specification Index

R12 Below Ground Drainage Systems

R12 Below ground drainage systems

To be read with Preliminaries/ General Conditions.

GENERALLY

100 EXISTING DRAINS:

- Before starting work, check invert levels and positions of existing drains, offsite public sewers, inspection chambers and manholes against information shown on drawings and report any discrepancies to Engineer prior to beginning the works to allow changes to be made to the design.
- Particular attention must be given to the watercourse to the east of the site that currently accepts surface water flows from the college via two, known, headwalls. The watercourse will require cleaning out and desilting. A level survey will be required prior to beginning the works to allow changes to be made to the design.
- Adequately protect existing drains and maintain normal operation during construction.

106 IN SITU CONCRETE:

- Unless specified otherwise, in situ concrete for use in drainage below ground to be to BS EN 206.1, mix GEN 1 or an equivalent or better mix subject to approval.
- Different mixes may be used for different parts of the drainage work.

110 BELOW GROUND DRAINAGE SYSTEMS As drawing 10889-502

- Surface water and rainwater drainage sources: One piece gullies and covers and rainwater downpipes (non siphonic).
- Foul drainage sources: Discharge stack and branch pipes and floor gullies
- Land drainage sources: None.
- Pressure relief drainage sources: None.
- Pipes, bends and junctions:
 - Clay – flexible joints.
 - Plastics – structured wall: and
 - PVC-U – solid wall.
- Accessories: as drawings.
- Manholes, inspection chambers, traps, and separators;
 - Inspection chambers – plastics.
 - Manhole and inspection chambers – concrete.
 - Oil and petrol separator units – plastics.
- Accessories:
 - Manhole Channels and branches – conventional;
 - Manhole channel and branches – preformed plastics;
 - Manhole steps;
 - Sealing for concrete manholes – mortar.
- Disposal: to private drains, sewers, modular storage attenuation, drainage blanket
- Accessories – general:
 - Access covers and frames;
 - Access covers and frames- precast concrete seatings;
 - Concrete (general) and
 - Concrete (adoptable manhole benching's and surrounds).

PRODUCTS

311 CONNECTORS TO PLASTIC DRAINAGE

- Material and standard: Plastics to BS 4660 certified or to BS EN 1401-1 and Kitemark certified.
- Type: As drawings.
- Manufacturer: Submit proposals.
- Product reference: Submit proposals.

- 313 ONE PIECE GULLIES ROADS AND CAR PARKS – Not Required
- Standards: To BS EN 1253-1, -2, -3, -4 and -5; or
 - Concrete: To BS 5911-6 and Kitemark certified, or Agrément certified.
 - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
 - Polypropylene: To BS EN 1852-1.
 - Material: Concrete.
 - Manufacturer: Contractors choice.
 - Product reference: Contractors choice.
 - Sizes: 900 x 450 mm.
 - Outlet sizes: DN 150.
 - Silt buckets: None.
 - Product reference: N/A.

PRODUCTS

- 315 ONE PIECE GULLIES AND COVERS - Not Required.
- Standards: To BS EN 1253-1, -2, -3, -4 and -5; or
 - Concrete: To BS 5911-6 and Kitemark certified, or Agrément certified.
 - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
 - Polypropylene: To BS EN 1852-1.
 - Material: Clay.
 - Manufacturer: Submit proposals.
 - Product reference: Submit proposals.
 - Sizes: 595x225mm minimum: Submit proposals
 - Outlet sizes: DN 100 and DN 150.
 - Covers: as drawing
 - Product reference: Submit proposals.
 - Type: Hinged Grating.
 - Material: Ductile Cast Iron.
 - Sizes: As drawing.
 - Loading grades to BS EN 124: B125 and D400.
 - Silt buckets:
 - Product reference: Submit proposals
- 329 PIPES, BENDS AND JUNCTIONS - SUPPLY
- Pipes and fittings: From same manufacturer for each pipeline.
- 336 PIPES, BENDS AND JUNCTIONS - CLAY - FLEXIBLE JOINTS Not Required
- Material and standard: Vitrified clay to BS EN 295-1, Kitemark certified.
 - Manufacturer: Submit proposals. Including approved by local water authority when offered for adoption under Sewers For Adoption 6th or 7th Edition
 - Product reference: Submit proposals.
 - Sizes: DN 100, DN150.
 - Crushing strength (minimum): FN40.
 - Jointing type: Spigot and socket joints with sealing ring.
- 342 PIPES, BENDS AND JUNCTIONS - CONCRETE SURFACE WATER DRAINAGE
- Standards: To BS 5911-1 and BS EN 1916, with flexible joints.
 - Manufacturer: Submit proposals. Culvert Capable of withstanding highway loading
 - Product reference: Submit proposals.
 - Sizes: DN300; DN375; DN450; D600.
 - Shapes: Circular.
 - Cement type and content: To BS5911-1 and BS EN 1916
 - Accessories: Cast in lifting anchors.

- 344 PIPES, BENDS AND JUNCTIONS - PLASTICS - STRUCTURED WALL SURFACE WATER DRAINAGE AND FOUL DRAINAGE
- Standard: To BS EN 13476-1 and -2 or -3 Kitemark or Agrément certified
 - Supplementary requirements: Puncture resistance, jetting resistance and longitudinal bending to requirements of WIS 4-35-01, issue 2.
 - Material: PVC-U.
 - Manufacturer: Submit proposals. Including approved by local water authority when offered for adoption under Sewers For Adoption 6th or 7th Edition. (Not applicable)
 - Product reference: Submit proposals.
 - Recycled content: Contractors choice.
 - Sizes: DN 110; DN 150; DN 225; DN 300; DN 450; DN 600
 - Jointing type: Spigot and socket.
- 346 PIPES, BENDS AND JUNCTIONS - PVC-U - PLAIN WALL SURFACE AND FOUL WATER DRAINAGE. PRIVATE ONLY NOT SUITABLE FOR ADOPTION BY WATER AUTHORITY
- Standard: BS EN 1401-1, class SN4, with flexible joints, Kitemark certified.
 - Manufacturer: Submit proposals.
 - Product reference: Submit proposals.
 - Recycled content: Contractors choice.
 - Sizes: DN 110; DN 150.
 - Application area code: UD
- 357 CONNECTORS – SADDLE. Not Required
- Standards:
 - Cast iron: To BS 437 and Kitemark certified, or Agrément certified.
 - Clay: To BS EN 295-1 and Kitemark certified, or Agrément certified.
 - Concrete: To BS 5911-6 and Kitemark certified, or Agrément certified.
 - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
 - Material: Clay & Concrete & Plastics.
 - Manufacturer: Submit proposals.
 - Product reference: Submit proposals.
- 359 FLEXIBLE COUPLINGS
- Standard: To BS EN 295-4 or WIS 04-41-01 and Kitemark certified, or Agrément certified.
 - Manufacturer: Submit proposals.
 - Product reference: Submit proposals.
- 371 RODDING POINTS Refer to site specific drawings
- Standards:
 - Cast iron: To BS 437 and Kitemark certified, or Agrément certified.
 - Clay: To BS EN 295-1 and Kitemark certified, or Agrément certified.
 - Concrete: To BS 5911-6 and Kitemark certified, or Agrément certified.
 - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
 - Material: Clay & Plastics.
 - Manufacturer: Submit proposals.
 - Product reference: Submit proposals.
 - Sizes: DN 100; DN110; DN 150; DN 160.
- 379 WARNING MARKER TAPES SURFACE WATER DRAINAGE AND FOUL DRAINAGE Not Required
- Type: Heavy gauge polyethylene.
 - Manufacturer: Submit proposals.
 - Product reference: Submit proposals.
 - Colour: Red with black lettering.
 - Widths: 200mm.
 - Message: FOUL SEWER BELOW or SURFACE WATER SEWER BELOW.
 - Wire detection aid: Not required.

- 401 INSPECTION CHAMBERS - PLASTICS As drawing 10889-2
- Standard: To BS 7158 or BS EN 13598-1, or Agrément certified.
 - Diameter: 225mm;250mm; 450mm:600mm
 - Manufacturer: Osma Wavin or similar approved
 - Bases:
 - Product reference: Contractors choice.
 - Shaft units:
 - Product reference: Contractors choice
 - Access covers and frames:
 - Product reference: Contractors choice.
 - Loading grades to BS EN 124: As drawings.
- 407 MANHOLES AND INSPECTION CHAMBERS - CONCRETE As drawing 10889-502
- Standards:
 - To BS 5911-3 and BS EN 1917 and Kitemark certified; or
 - To BS 5911-4 and BS EN 1917.
 - Including approved by local water authority when offered for adoption under Sewers For Adoption 6th or 7th Edition
 - Manufacturer: Contractors choice
 - Shape: Circular
 - Sizes: DN 1050; DN 1200; DN 1350; DN 1500; DN 1800.
 - Cement type and content: to BS 5911-1 and BS EN 1916
 - Chamber sections:
 - Product reference: Contractors choice.
 - Jointing type: Proprietary sealant.
 - Cover slabs:
 - Product reference: Contractors choice.
 - Thickness: refer to clause 468
 - Loading grades to BS EN 124: As drawings
 - Openings: To suit access covers.
 - Steps: Required in chambers over 900mm deep. Refer to Sewers for Adoption 6th or 7th Edition when offered for adoption
- 421 OIL AND PETROL SEPARATOR UNITS – PLASTICS Not Required
- Standards: To Environment Agency PPG 3 and BS EN 858-1, with oil level alarm.
 - Manufacturer:....
 - Product reference:.....
 - Size:.....
 - Inlet pipe size:
 - Outlet pipe size:
 - Accessories:
- 433 MANHOLE CHANNELS AND BRANCHES – CONVENTIONAL Not Required
- Material: Clay.
 - Manufacturer: Submit proposals.
 - Product reference: Submit proposals.
- 435 MANHOLE CHANNELS AND BRANCHES - PREFORMED PLASTICS
- Manufacturer: Osma Wavin or similar approved.
 - Product reference: Submit proposals.
- 464 STORMWATER ATTENUATION UNITS
- Manufacturer: Polypipe Permavoid System with rodding points
 - Product reference: Stormbloc Optimum or equal approved
 - Unit Size: Refer to drawings.
 - Capacity / size (minimum) refer to drawing 10889-500

- 468 PRECAST CONCRETE COVER SLABS.
- Standard: To BS 5911-3.
 - Manufacturer: Contractors choice.
 - Product reference: Submit proposals.
 - Size: 150mm depth for 900:1050:1200:1350: diameter
170mm depth for 1500: diameter
175mm depth for 1800: diameter
180mm depth for 210mm: 2400: diameter
225mm depth for 3000 diameter
 - Openings: To suit access covers.
- 471 ACCESS COVERS AND FRAMES SURFACE WATER MANHOLES AND FOUL MANHOLES
- Standard: To BS EN 124.
 - Types: As drawing.
 - Manufacturer: Contractors choice.
 - Product reference: Submit proposals.
 - Materials: Ductile cast iron
 - Finishes: Self finish.
 - Sizes: 450 x450 mm;
 - Loading grades to BS EN 124: Refer to drawing 10775-501
 - Edging trims: Not required
 - Accessories: None
- 483 CONCRETE (GENERAL)
- Standard: To BS 8500-2.
 - Concrete: Designated, GEN 1 or Standardised prescribed, ST2
- 487 CONCRETE (ADOPTABLE MANHOLE BENCHINGS AND SURROUNDS) Not Required
- Standard:
 - England and Wales: Refer to Sewers for Adoption 6th or 7th Edition when offered for adoption
 - Concrete: In situ.
- 489 CONCRETE (ADOPTABLE MANHOLE BENCHING TOPPING) Not Required
- Standard:
 - England and Wales: Refer to Sewers for Adoption 6th or 7th Edition when offered for adoption
 - Concrete: High strength.
- 492 GEOTEXTILE MEMBRANES – FILTER
- Manufacturer: Refer to site specific drawings
 - Product reference: as above
- 494 GEOTEXTILE MEMBRANES – IMPERVIOUS Refer to site specific drawings
- Manufacturer: Contractors choice.
 - Product reference: Submit proposals.
 - Membrane to be high performance with fully welded joints
- 498 GRANULAR SUB-BASE MATERIAL
- Standard: To Highways Agency Volume 1, 'Specification for Highway Works', Type 1 Unbound mixtures for sub-base.
 - Recycled content: Contractors choice.
- 510 VERMIN GRATINGS FOR OUTFALLS AND OUTLET HEADWALLS
- Construction: Mild steel frame extending 75 mm beyond pipe opening all around, with 25 mm maximum opening steel mesh grille. Top hinged on built-in fish-tail straps and with bottom pin lock.
 - Finish: Galvanized to BS EN ISO 1461 after fabrication.
 - Submit: Shop drawings.

- Timing: Before manufacture.

EXECUTION

610 STRIPPING OUT

- Extent of stripping out: None apparent from survey.
- Exposed ends of existing drainage to be abandoned: Seal with concrete (general).

611 EXISTING DRAINS

- 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.

613 EXCAVATED MATERIAL

- Turf, topsoil, hardcore, etc: Set aside for use in reinstatement.

616 SELECTED FILL FOR BACKFILLING

- Selected fill: As-dug material, free from vegetable matter, rubbish, frozen soil and material retained on a 40 mm sieve.
- Compaction: By hand in 100 mm layers.

623 LOWER PART OF TRENCH – GENERAL

- Trench up to 300 mm above crown of pipe: Vertical sides, width as small as practicable.
- Width (minimum): External diameter of pipe plus 300 mm.

625 LOWER PART OF TRENCH - TRANSITION DEPTH

- Trench widths up to 300 mm above crown of pipe (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.

631 TYPE OF SUBSOIL

- General: Where type of subsoil at level of crown of pipe differs from that stated for the type of bedding, surround or support, give notice.

635 FORMATION FOR BEDDINGS

- 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.

641 PIPES AT DIFFERENT LEVELS IN COMMON TRENCH

- Subtrench: Permissible provided soil of step is stable and unlikely to break away.
- Subtrench not permissible: 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: 350 mm.
- Pipes exceeding DN 700: 500 mm.

667 CLASS S SURROUND As drawings

- Type of subsoil: Refer to SI.
- Trench width up to 300 mm above crown of pipe (maximum):
- DN 100 nominal pipe size: 600 mm.

- DN 150 nominal pipe size: 700 mm.
- DN 225 nominal pipe size: 800 mm.
- DN 300 nominal pipe size: 900 mm.
- Granular material: Contractors choice
- Pipe sizes DN 100 and DN 150: Size 4/10.
- Pipe sizes DN 225 and DN 300: Size 4/10, 10/20 or 4/20.
- Pipe sizes DN 375-500: Size 10/20 or 4/20.
- Pipe sizes DN 600 and above: Size 10/20, 20/40, 4/20 or 4/40.
- Bedding:
- Material: Granular, compacted over full width of trench.
- Thickness (minimum): 50 mm for sleeve jointed pipes, 100 mm for socket jointed pipes. Where trench bottom is uneven, increase depth by 100 mm.
- Pipes: Dig slightly into bedding, rest uniformly on barrels and adjust to line and gradient.
- Initial testing before placing surround: Required
- Surround:
- Material: Granular.
- Depth: To 50 mm above crown of pipe.
- Compaction: By hand in 100 mm layers.
- Backfilling:
- Material: Protective cushion of selected fill.
- Depth: 150 mm (250 mm for adoptable sewers) above crown of pipe.
- Compaction: By hand in 100 mm layers.

678 CLASS Z SURROUND As drawings

- Type of subsoil: Refer to SI
- Blinding:
- Material: Concrete (general).
- Thickness (minimum): 25 mm.
- Width: Full width of trench.
- Allow to set before proceeding.
- Pipes:
- Temporary support: Folding wedges of compressible board. Prevent flotation.
- Clearance under pipes (minimum): 100 mm.
- Adjust pipes to line and gradient.
- Initial testing before placing surround: Required
- Surround:
- Material: Refer to drawings.
- Depth: To 150 mm above crown of pipe.
- Width: Full width of trench.
- Vertical construction joints:
- Location: At face of flexible pipe joints.
- Material: 18 mm thick compressible board pre-cut to profile of pipe.
- Socketed pipes: Fill gaps between spigots and sockets with resilient material to prevent entry of concrete.

680 CONCRETE SURROUND FOR PIPE RUNS NEAR FOUNDATIONS

- Class Z surround: Provide in locations where bottom of trench is lower than bottom of foundation and as follows (horizontal clear distance between nearest edges of foundations and pipe trenches):
- Trenches less than 1 m from foundations: Top of concrete surround not lower than bottom of foundation.
- Trenches more than 1 m from foundations: Top of concrete surround not lower than D mm below bottom of foundation, where D mm is horizontal distance of trench from foundation, less 150 mm.

683 LAYING PIPELINES

- Laying pipes: 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: Seal exposed ends during construction.
- Timing: Minimize time between laying and testing.

685 JOINTING PIPELINES

- 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.

687 CONCRETE SURROUND FOR CROSSOVERS

- Class Z surround: Provide 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.

689 PIPELINES PASSING THROUGH STRUCTURES

- Pipelines that must be cast in or fixed to structures (including manholes, catchpits and inspection chambers): 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 that need not be cast in or fixed to structures (e.g. walls to footings):
- Rocker pipes as specified above; or
- Openings in the structures to give 50 mm minimum clearance around the pipeline. Closely fit a rigid sheet to each side of opening to prevent ingress of fill or vermin.

691 BENDS AT BASE OF SOIL STACKS

- Type: Long radius rest bends refer to drawings
- Radius to centreline of pipe (minimum): 250mm
- Height of invert of horizontal drain at base of stack below centreline of lowest branch pipe (minimum): 450mm
- Bedding: Do not impair flexibility of pipe couplings.
- Material: refer to drawings

693 DIRECT CONNECTION OF GROUND FLOOR WCS TO DRAINS

- Drop from crown of WC trap to invert of drain (maximum): 1.3m.
- Horizontal distance from the drop to a ventilated drain (maximum): 6 m.

697 INSTALLING FLEXIBLE COUPLINGS

- 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 and/ or apply a cement grout over the sealing area.
- Clamping bands: Tighten carefully to make gastight and watertight seals.

699 CONNECTIONS TO SEWERS

- General: Connect new pipework to existing adopted sewers to the requirements of the adopting authority or its agent. A Section 106 Agreement under the Water Industry Act must be in place and correct notice period given to adopting authority

- 705 INITIAL TESTING OF PIPELINES
- 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.
 - Refer to drawings for below ground floor testing regime
- 711 TRENCH SUPPORTS
- Removal of trench supports and other obstacles: Sufficient to permit compacted filling of all spaces.
- 713 INSTALLING ROOT BARRIERS
- Root barrier installation: Full depth of excavation. Fit closely to trench wall nearest the tree. Refer to detail on drawing
- 715 BACKFILLING TO PIPELINES
- 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.
- 718 BACKFILLING OVER CONCRETE
- Minimum times from placing concrete:
 - Backfilling generally: 24 h.
 - Heavy compactors and traffic loads: 72 h.
- 720 BACKFILLING UNDER ROADS AND PAVINGS
- Backfilling from top of surround or protective cushion up to formation level: Granular sub-base material, laid and compacted in 150 mm layers.
- 722 PUBLIC ROADS AND PAVINGS – E&W, SCOT
- Excavating and backfilling of trenches: To Department for Transport 'Specification for the reinstatement of openings in highways'.
- 726 FOAMED CONCRETE BACKFILL
- 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 - specification for use in the reinstatement of openings in highways'.
- 732 TEMPORARY BRIDGES
- Trench bridges: As necessary to prevent construction traffic damaging pipes after backfilling.
- 734 INSTALLING ACCESS POINTS AND GULLIES
- Bedding:
 - Material: refer to drawings
 - Thickness (minimum): refer to drawings
 - Surround:
 - Material: refer to drawings
 - Thickness (minimum): refer to drawings.
 - Height: refer to drawings
 - Backfilling: refer to drawings.
 - Material: refer to drawings
 - Compaction: By hand in 100 mm layers.
 - Setting out relative to adjacent construction features: Square and tightly jointed.
 - Permissible deviation in level of external covers and gratings: +0 to -6 mm.

- Raising pieces (clay and concrete units): Joint with 1:3 cement: sand mortar.
 - Exposed openings: Fit purpose made temporary caps. Protect from traffic.
- 736 INSTALLING RODDING POINTS
- Bedding and surround:
 - Material: Concrete (general).
 - Thickness (minimum): 150mm.
 - Permissible deviation in level of external covers and gratings: +0 to -3 mm.
- 741 INSTALLING INSPECTION CHAMBERS - PLASTICS
- Bedding:
 - Material: Concrete (general)
 - Thickness (minimum): 150mm.
 - Surround: Highway Area only
 - Material: Concrete (general)
 - Thickness (minimum): 150mm.
 - Backfilling: Selected fill.
 - Compaction: By hand in 100 mm layers.
 - Concrete collar: To trafficked areas.
 - Material: Concrete (structural).
 - Thickness (minimum): 200mm.
 - Width (minimum): 300mm.
 - Seating: Not required.
- 743 INSTALLING CONCRETE MANHOLES Refer to site specific drawings
- Bases:
 - Material: Concrete (structural).
 - Thickness (minimum): 225mm.
 - Surround:
 - Material: Concrete (general)
 - Thickness (minimum): 150mm.
 - Height: Full height.
 - Backfilling:
 - Material: Selected fill
 - Compaction: By hand in 100 mm layers.
- 753 FIXING MANHOLE STEPS Not required
- Fixing: Refer to Sewers for Adoption 7th Edition
- 755 JOINTING CONCRETE MANHOLE CHAMBER SECTIONS
- Jointing and sealing: Mortar
 - Inner joint surface: Trim surplus jointing material extruded into chamber and point neatly.
- 757 LAYING CONVENTIONAL CHANNELS, BRANCHES AND BENCHING
- Refer to Sewers for Adoption 7th Edition
- 759 LAYING PREFORMED PLASTICS CHANNELS, BRANCHES AND BENCHING
- Main channel: Bed solid in 1:3 cement: sand mortar.
 - Branches: Connect to channel, preferably at half pipe level, so that discharge flows smoothly in direction of main flow.
 - Connecting angles more than 45° to direction of flow: Use three-quarter section channel bends.
 - Bedding: 1:3 cement: sand mortar. Use clips or ensure adequate mechanical key.
 - Benching:
 - Material: Concrete (general).
 - Profile: Rise vertically from top of main channel to a level not lower than soffit of outlet pipe, then slope upwards at 10% to walls.

- Topping:
Material: refer to drawings
Application: Before benching concrete has set, and with dense smooth uniform finish.
- 761 LAYING SEALED ACCESS FITTINGS, BRANCHES AND BENCHING
- Unused branches: Fit caps.
 - Bedding: 1:3 cement: sand mortar.
 - Benchings:
 - Material: Concrete (general).
 - Profile: 10% fall from manhole walls to component rim.
 - Topping:
Material: refer to drawings
Application: Before benching concrete has set, and with dense smooth uniform finish.
- 771 INSTALLING OUTFALLS Not required
- Pipe outflow invert (minimum): Seasonal peak level or 150 mm above normal water level, whichever is the higher.
 - Pipe surround and backfill to the last 2 m run of drain: Excavated subsoil, rammed home.
- 773 INSTALLING ACCESS COVERS AND FRAMES
- Seating: Square with and tightly jointed to adjacent construction as appropriate
 - Bedding and haunching of frames: Continuously.
 - Material: Refer to drawings
 - Top of haunching: 30 mm below surrounding surfaces.
 - Horizontal positioning of frames:
 - Centred over openings.
 - Square with joints in surrounding paving.
 - Vertical positioning of frames:
 - Level; with adjacent finish
 - Marry in with levels of surrounding paving.
 - Permissible deviation in level of external covers and frames: +0 to -6 mm.
- 776 EXPOSED OPENINGS IN INSPECTION CHAMBERS, ACCESS POINTS, FITTINGS AND EQUIPMENT
- General: Fit purpose made temporary caps. Protect from site traffic.
- COMPLETION**
- 901 REMOVAL OF DEBRIS AND CLEANING
- Preparation: Lift covers to manholes, inspection chambers and access points. Remove mortar droppings, debris and loose wrappings.
 - Timing: Before cleaning, final testing, CCTV inspection, 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.
- 903 TEMPORARY MEASURES
- Water used to stabilize tanks and the like during installation: Drain.
- 911 TESTING AND INSPECTION
- Dates for testing and inspection: Give notice.
 - Period of notice: Refer to drawing

- 921 FINAL TESTING OF PRIVATE GRAVITY DRAINS AND SEWERS UP TO DN 300
- Before testing:
 - Cement mortar jointing: Leave 24 h.
 - Solvent welded pipelines: Leave 1 h.
 - Standard: To Building Regulations.
 - Method: Block open ends of pipelines to be tested and pressurise. Air test short lengths to BS EN 1610
- 931 FINAL TESTING OF ADOPTABLE AND LARGE PRIVATE SEWERS
- Standard (sewers up to and including size DN 750):
 - England, Wales and Northern Ireland: To WRc 'Sewers for adoption'.
 - Method: Testing of the system should comply with the requirements of Sewers for adoption 7th edition Part E
- 941 WATER TESTING OF MANHOLES AND INSPECTION CHAMBERS
- Timing: Before backfilling.
 - Standard:
 - Exfiltration: To BS EN 1610.
 - Method: Testing with water (method W).
 - Infiltration: No identifiable flow of water penetrating the chamber.
- 971 CCTV INSPECTION OF PRIVATE PIPELINES
- General: Carry out and record internal inspection using CCTV equipment.
 - Locations to be inspected: as instructed by engineer but allow for all I pipelines
 - Illumination: Of adequate intensity.
 - Recording: Provide continuous position recording, still photographs and stopping of the camera at any point.
 - Copy of videotape recording: Submit.
- 976 CCTV INSPECTION OF ADOPTABLE PIPELINES
- General: 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: as instructed by engineer but allow for all I pipelines
 - Pipelines under highways: Complete construction, except for laying of wearing course, before inspection.
- 978 LIFTING KEYS
- Lifting keys: Supply suitable keys for each type of access cover.
 - Timing: At completion.
- 980 INSTRUCTIONS
- Manufacturer's user instructions: _____.