- Quality: Of a known suitability for use in sub-bases, free from excessive dust, well graded, all pieces less than 75 mm in any direction, minimum 10% fines value of 50 kN when tested in a soaked condition to BS 812-111 or a resistance to fragmentation of LA50 for the Los Angeles test to BS EN 1097-2, and in any one layer only one of the following:
    - Crushed rock (other than argillaceous rock) or quarry waste with not more binding material than is required to help hold the stone together.
    - Crushed concrete, crushed brick or tile, free from plaster, timber and metal.
    - Gravel or hoggin with not more clay content than is required to bind the material together, and with no large lumps of clay.
    - Natural gravel.
    - Natural sand.
- Filling: Spread and levelled in 150 mm maximum layers, each layer thoroughly compacted.

215 COARSE GRADED AGGREGATE FOR PERMEABLE PAVING - UNBOUND
.

- Material: Clean crushed stone.
    - Standard: To BS EN 13242 and Interpave publication 'Guide to the design, construction and maintenance of concrete block permeable pavements edition 6'.
    - Aggregate size: 4/20.
    - Grading: As Interpave 'Guide to the design, construction and maintenance of concrete block permeable pavements edition 6', table 12.
    - Other properties: As Interpave 'Guide to the design, construction and maintenance of concrete block permeable pavements edition 6', table 13.
- Testing:
    - Materials: Provide suppliers' certificates for grading and specified properties.
    - Sub-base: Not required.
- Laying: Lay in 150 mm thick layers and lightly compact to ensure maximum density and aggregate interlock without crushing individual particles or unacceptably reducing the void ratio.
- Protection: Prevent damage by traffic and contamination by mud and soil.

220 FROST SUSCEPTIBLE GRANULAR MATERIAL

- Definition (non frost susceptible material): To Highways Agency 'Specification for highway works' clause 801.8.
- Depth of frost susceptible material below final surface of paving (minimum): 450 mm.
- Testing: Test materials used if required and supply certificates.

225 PLACING OF MATERIAL WITH HIGH SULFATE CONTENT

- Standard: To Highways Agency 'Specification for highway works', clauses 801.2 and 801.3.
    - Separation distance (minimum): 500 mm.

230 PLACING GRANULAR MATERIAL GENERALLY

- Preparation: Loose soil, rubbish and standing water removed.
- Structures, membranes and buried services: Ensure stability and avoid damage.

240 LAYING GRANULAR SUB-BASES FOR VEHICULAR AREAS

- General: Spread and levelled in layers. As soon as possible thereafter compact each layer.
- Standard: To Highways Agency ‘Specification for highway works’ clause 802.
- At drainage fittings, inspection covers, perimeters and where local excavation and backfilling

has taken place: Take particular care to compact fully.

310 ACCURACY

- Permissible deviation from required levels, falls and cambers (maximum):
- Subgrades:

  Roads and parking areas: +20 -30 mm.

  Footways and recreation areas: ± 20 mm.
- Sub-bases:

  Roads and parking areas: ± 20 mm.

  Footways and recreation areas: ± 12 mm.

330 COLD WEATHER WORKING

- Frozen materials: Do not use.
- Freezing conditions: Do not place fill on frozen surfaces. Remove material affected by frost. Replace and recompact if not damaged after thawing.

340 PROTECTION

- Sub-bases: As soon as practicable, cover with subsequent layers, specified elsewhere.
- Subgrades and sub-bases: Prevent degradation by construction traffic, construction operations and inclement weather.

12.0 Q22 ASPHALT ROADS/ PAVINGS

To be read with Preliminaries/ General conditions.

12.1 TYPES OF PAVING

110 ASPHALT CONCRETE PAVING TO SERVICE ROAD

- Standard: To BS EN 13108-1.
- Subgrade improvement layer: As drawing 14576-HOP-EN-GF-C-601
    - Compacted thickness: 300 mm.
- Geotextile: Sheet.
    - Manufacturer: Contractor's choice.
        Product reference: Contractor's choice.
- Granular sub-base: As section Q20.
    - Compacted thickness: 300 mm.
- Base: AC 32 dense base.
    - Paving grade: 100/150.
    - Compacted thickness: 130mm.
- Reclaimed content:
    - Standard: To BS EN 13108-8.
    - Value (maximum): Contractor's choice.
- Surface treatment: Not required.
- Other requirements: NONE.
    - Slip/ Skid resistance: No requirement.
    - Compacted thickness: Not applicable.
- Reclaimed content:
    - Standard: To BS EN 13108-8.
    - Value (maximum): Contractor's choice.
- Surface treatment: Not required.
- Other requirements: NONE.

12.2 PREPARATORY WORK/ REQUIREMENTS

220 BITUMINOUS MATERIALS GENERALLY

- Suppliers names: Submit.
    - Timing (minimum): Two weeks before starting work.
- Test certificates: At the time of delivery for each manufacturing batch submit certificate:
    - Confirming compliance with this specification and the relevant standard.
    - Stating full details of composition of mix.

240 ACCEPTANCE OF SURFACES

- Surface: Sound, clean and suitably close textured.
- Level tolerances: To BS 594987.
- Kerbs and edgings: Complete, adequately bedded and haunched and to the required levels.

12.3 LAYING

310 LAYING GENERALLY

- Preparation: Remove all loose material, rubbish and standing water.
- Adjacent work: Form neat junctions. Do not damage.
- Channels, kerbs, inspection covers etc: Keep clean.
- New paving:
    - Keep traffic free until it has cooled to prevailing atmospheric temperature.
    - Do not allow rollers to stand at any time.
    - Prevent damage.
    - Lines and levels: With regular falls to prevent ponding.
    - Overall texture: Smooth, even and free from dragging, tearing or segregation.
    - State on completion: Clean.

320 ADVERSE WEATHER

- Frozen materials: Do not use.
- Suspend laying:
    - During freezing conditions
    - If the air temperature reaches 0°C, or in calm dry conditions -3°C, on a falling thermometer.
    - Hot rolled asphalt: During periods of continuous or heavy rain or if there is standing water on the base.

330 LEVELS

- Permissible deviation from the required levels, falls and cambers (maximum): In accordance with BS 594987, clause 5.2.

340 FLATNESS/ SURFACE REGULARITY

- Deviation of surface: Where appropriate in relation to the geometry of the surface, the variation in gap under a 3 m straightedge placed anywhere on the surface to be not more than:
    - Base: Hand laid, 25 mm and Machine laid, 25 mm.
    - Binder course: Hand laid, 13 mm and Machine laid, 13 mm.
    - Surface course: Hand laid, 10 mm and Machine laid, 7 mm.
    - Where a straightedge cannot be used the surface must be of a comparable standard of accuracy when judged by eye.

350 CONTRACTOR'S USE OF PAVEMENTS

- Before use:
    - Timing: allow newly laid sections to cool before trafficking.
    - Open-grained surface: Fill with 0/4 mm size coated grit. Remove surplus.
    - Finish: Uncoated chipping and binder surface treatment.
- Preparation for final surfacing:
    - Timing: Defer laying until as late as practicable.
    - Immediately before laying final surfacing: Clean and make good the base/ binder course. Allow to dry.
    - Adhesion: Tack coat to BS 434-1 or BS EN 13808.

  Application rate: As manufacturer's recommendation.

  Accuracy: Uniform, without puddles.

- Finishing: Allow emulsion to break completely before applying surface.

12.4 COMPLETION

390 DOCUMENTATION

- Standard: BS EN 13108-1.
  - Declaration of conformity: Submit.
- Number of copies: ONE.
- Submission: Two weeks prior to date when Contractor expects work to be complete.

395 SLIP RESISTANCE TESTING

- Surfaces to be tested: 110 SERVICE ROAD.
  - Surface condition: Dry and wet.
- Timing: As agreed with contract administrator.
- Period of notice (minimum): 3 working days.
- Test standard: To BS 1134.
  - Testing authority: A UKAS accredited laboratory.
  - Witnessing/ Certification: Arrange for tests to be witnessed/ certified by: Contract administrator.
  - Report: Submit.

  Format: As required under BS 1134.

13.0 R12 BELOW GROUND DRAINAGE SYSTEMS

To be read with Preliminaries/ General conditions.

13.1 GENERAL

110 BELOW GROUND DRAINAGE SYSTEM

- Surface water and rainwater drainage sources:
  - Composite gullies;
  - Rainwater filter and collection units; and
- Rainwater downpipes (nonsiphonic), as section R10.
- Foul drainage sources: Composite gullies; Sanitary appliances, as N13; Floor drains, as section R11; Discharge stack and branch pipes, as section R11.
- Land drainage sources: None .
- Pressure relief drainage sources: None .
- Pipes, bends and junctions: PVC-U - solid wall.
  - Accessories: Connectors - saddle and Root barriers.
- Manholes, inspection chambers, traps, and separators: Inspection chambers - plastics and Manholes and inspection chambers - concrete.
  - Accessories: Manhole channels and branches - preformed plastics and Sealing for concrete manholes - proprietary sealant.
- Disposal: To modular stormwater soakaway units and To sewers.
- Accessories – general:
  - Access covers and frames - precast concrete seatings;
  - Brickwork, as section F10;
  - Concrete;
  - Geotextile - filter;
  - Granular sub-base material; and
- Silt traps, as section R16.

122 ATTENUATION SYSTEM – PLASTICS UNITS SURFACE WATER MANAGEMENT

- Rainwater drainage sources: Below ground rainwater pipelines.
- Foul drainage sources: None.
- Attenuation units: As section R17.
  - Accessories: Geotextile membranes - filter.
- Pipes, bends and junctions: NONE.

13.2 PRODUCTS

317 COMPOSITE GULLIES PAVED AREAS

- Standards: To BS EN 1253-1, -2, -3, -4 and -5; or
  - Cast iron: To BS 437 and Kitemark certified, or Agrément certified.
  - Clay: To BS EN 295-1 and Kitemark certified, or Agrément certified.
  - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
  - Polypropylene: To BS EN 1852-1.
- Material: TBC.
- Manufacturer: Contractor's choice.
- Traps:
  - Product reference: Contractor's choice.

- Raising pieces:
  - Product reference: Contractor's choice.
  - Heights: TO SUIT.
- Hoppers:
  - Product reference: Contractor's choice.
- Covers:
  - Product reference: Contractor's choice.
  - Type: TBC.
  - Material: TBC.
  - Sizes: NOMINALLY 250 x 250 mm.
  - Loading grades to BS EN 124: B125.
- Silt buckets: Plastics.
  - Product reference: Contractor's choice.

329 PIPES, BENDS AND JUNCTIONS - SUPPLY

- Pipes and fittings: From same manufacturer for each pipeline.

346 PIPES, BENDS AND JUNCTIONS - PVC-U - SOLID WALL SURFACE WATER AND FOUL WATER

- Standard: BS EN 1401-1 with flexible joints.
  - Class: SN4 or SN8.
- Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.
- Recycled content: Contractor's choice.
- Sizes: As drawings 14576-HOP-EN-GF-DR-C-501&502.
- Application area code: UD.

357 CONNECTORS - SADDLE SURFACE WATER AND FOUL WATER

- 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, BS EN 13598-1 or Agrément certified.
- Material: Plastics.
- Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.
- Sizes: As drawings 14576-HOP-EN-GF-DR-C-501&502.

401 INSPECTION CHAMBERS - PLASTICS SURFACE WATER AND FOUL WATER

- Standard: To BS EN 13598-1, BS EN 13598-2 or Agrément certified.
- Diameter: 450 mm.
- Manufacturer: Contractor's choice.
- Bases:
  - Product reference: Contractor's choice.
- Shaft units:
  - Product reference: Contractor's choice.
- Access covers and frames:
  - Product reference: Contractor's choice.
  - Loading grades to BS EN 124: B125.

407 MANHOLES AND INSPECTION CHAMBERS - CONCRETE SURFACE WATER AND FOUL WATER

- Standards:
  - To BS 5911-3 and BS EN 1917 and Kitemark certified; or
  - To BS 5911-4 and BS EN 1917.
- Manufacturer: Contractor's choice.
- Shape: Circular.
- Sizes: As drawings 14576-HOP-EN-GF-DR-C-501&502.
- Cement type and content: To BS 5911-1 and BS EN 1916.
- Chamber sections:
  - Product reference: Contractor's choice.
  - Jointing type: Proprietary sealant.
- Cover slabs:
  - Product reference: Contractor's choice.
  - Thickness: 200 mm.
  - Loading grades to BS EN 124: D400.
  - Openings: To suit access covers.
- Steps: Not required.
- Vortex flow control unit: Not required.

433 MANHOLE CHANNELS AND BRANCHES - CONVENTIONAL SURFACE WATER AND FOUL WATER

- Material: Plastics.
- Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.

435 MANHOLE CHANNELS AND BRANCHES - PREFORMED PLASTICS SURFACE WATER AND FOUL WATER

- Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.

448 SEALING FOR CONCRETE MANHOLES - SEALANT

- Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.

468 PRECAST CONCRETE COVER SLABS

- Standard: To BS 5911-3 and BS EN 1917 and Kitemark certified.
- Manufacturer: CONTRACTOR'S CHOICE.
  - Product reference: Contractor's choice.
- Size: Contractor's choice.
- Openings: 600 x 600 mm (minimum).

471 ACCESS COVERS AND FRAMES SURFACE WATER AND FOUL WATER MANHOLES

- Standard: To BS EN 124.
- Types: Recessed covers for concrete filling.
- Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.
- Material: Ductile cast iron.
- Finishes: AS LANDSCAPE ARCHITECT'S DETAILS.
- Sizes: As drawings 14576-HOP-EN-GF-DR-C-501&502.
- Loading grades to BS EN 124: D400.

- Edging trims: AS LANDSCAPE ARCHITECT'S DETAILS.
- Accessories: NONE.

483 CONCRETE GENERALLY

- Standard: To BS 8500-2.
- Concrete: Designated, GEN1 or Standardized prescribed, ST2, as section E10.

492 GEOTEXTILE MEMBRANES - FILTER & IMPERMEABLE

- Manufacturer: Contractor's choice.
    - Product reference: Contractor's choice.

498 GRANULAR SUB-BASE MATERIAL

- Standard: To Highways Agency Volume 1, 'Specification for Highway Works', Type 1 Unbound mixtures for sub-base.
- Recycled content: Contractor's choice.

13.3 EXECUTION

610 STRIPPING OUT

- Extent of stripping out: As drawings 14576-HOP-EN-GF-DR-C-501&502.
- Exposed ends of existing drainage to be abandoned: Seal with concrete.

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

- Type of subsoil: REFER TO SITE INVESTIGATION REPORT.
- 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: Contractor's choice.
    - Sizes: To Water Industry Specification WIS 4-08-02 (as amended by WIS 4-08-02A, 2008).
- 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

- Type of subsoil: REFER TO SITE INVESTIGATION REPORT.
- Blinding:
    - Material: Concrete.
    - 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: Concrete.
  - 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 precut 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: Two nominal 45° bends.
    - Radius to centreline of pipe (minimum): 200 mm.
- Height of invert of horizontal drain at base of stack below centreline of lowest branch pipe (minimum): 750 mm.
- Bedding: Do not impair flexibility of pipe couplings.
    - Material: Concrete.

699 CONNECTIONS TO SEWERS
- General: Connect new pipework to existing adopted sewers to the requirements of the adopting authority or its agent.

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.

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.

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.

732 TEMPORARY BRIDGES

- Trench bridges: As necessary to prevent construction traffic damaging pipes after backfilling.

734 INSTALLING ACCESS POINTS AND GULLIES

- Bedding:
  - Material: Concrete.
  - Thickness (minimum): 150 mm.
- Surround:
  - Material: Concrete.
  - Thickness (minimum): 150 mm.
  - Height: Full height.
- Backfilling:
  - Material: Not required.
  - 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.

741 INSTALLING INSPECTION CHAMBERS - PLASTICS

- Bedding:
  - Material: Concrete.
  - Thickness (minimum): 150 mm.
- Surround:
  - Material: Concrete.
  - Thickness (minimum): 150 mm.
  - Backfilling: Granular material - manufactured, size 4/10 to BS EN 13242, to 100 mm above crown of pipes, then selected fill.
  - Compaction: By hand in 100 mm layers.
- Concrete collar:
  - Material: Concrete.
  - Thickness (minimum): 200 mm.
  - Width (minimum): 200 mm.
- Seating: Brickwork as section F10.

743 INSTALLING CONCRETE MANHOLES

- Bases:
  - Material: Concrete.
  - Thickness (minimum): 225 mm.
- Surround:
  - Material: Concrete.
  - Thickness (minimum): 150 mm.
  - Height: Full height.
- Backfilling:
  - Material: Not required.
  - Compaction: By hand in 100 mm layers.

755 JOINTING CONCRETE MANHOLE CHAMBER SECTIONS

- Jointing and sealing: PROPRIETARY SEALANT.
- Inner joint surface: Trim surplus jointing material extruded into chamber and point neatly.

757 LAYING CONVENTIONAL CHANNELS, BRANCHES AND BENCHING

- Main channel: Bed solid in 1:3 cement:sand mortar.
    - Branches: Connect to main channel at or slightly above invert level, but not higher than half channel level, so that discharge flows smoothly in direction of main flow.
    - Branches greater than nominal size 150 mm: Connect the branch soffit level with the main drain soffit.
    - Connecting angles more than 45° to direction of flow: Use three-quarter section channel bends.
- Benching:
    - Material: Concrete.
    - 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: Concrete.
    - Application: Before benching concrete has set, and with dense smooth uniform finish.

759 LAYING PREFORMED PLASTICS CHANNELS, BRANCHES AND BENCHING

- Main channel: Bed solid in 1:3 cement:sand mortar.
    - Branches: Connect to main channel at or slightly above invert level, but not higher than half channel 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.
    - 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: Concrete.

    Application: Before benching concrete has set, and with dense smooth uniform finish.

773 INSTALLING ACCESS COVERS AND FRAMES

- Seating: Brickwork as section F10.
- Bedding and haunching of frames: Continuously.
    - Material: 1:3 cement:sand mortar.
    - 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; or
    - 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.

13.4 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 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.

903 TEMPORARY MEASURES

- Water used to stabilize tanks and the like during installation: Drain.

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: Contractor's choice.

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.

978 LIFTING KEYS

- Lifting keys: Supply suitable keys for each type of access cover.
    - Timing: At completion.

14.0 R17 SOAKAWAY, SEPTIC TANK AND SEWAGE TREATMENT UNITS

To be read with Preliminaries/ General Conditions

14.1 PRODUCTS

305 BELOW GROUND DRAINAGE SYSTEMS - PRODUCTS

- Products generally: As section R12.

315 MODULAR PLASTICS ATTENUATION UNITS

- Manufacturer: Submit proposals.
    - Product reference: Submit proposals.
- Unit size: Submit proposals.
- Attenuation tank capacity (minimum): AS DRAWING 14576-HOP-EN-GF-DR-C-501.

14.2 EXECUTION

605 BELOW GROUND DRAINAGE SYSTEMS - EXECUTION

- Execution generally: As section R12.

650 BACKFILLING WITH AS-DUG MATERIAL

- Material: As excavated from the trench.
- Placing and compaction: Maximum 300 mm thick layers, up to finished ground level. Compact each layer before placing the next.
- Heavy compactors: Do not use before there is 600 mm of material over pipes.