

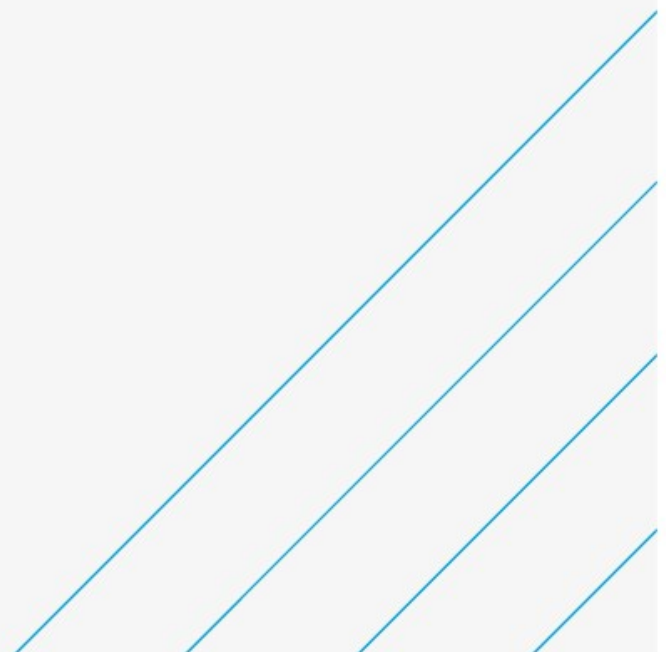
Elm Park School

Civil Engineering Specification

South Gloucestershire Council

03 November 2020

3437-ATK-ZZ-XX-SP-C-0001



Notice

This document and its contents have been prepared and are intended solely as information for South Gloucestershire Council and use in relation to Elm Park School.

Atkins Limited assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

Document history

Document title: Civil Engineering Specification

Document reference: 3437-ATK-ZZ-XX-SP-C-0001

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
Rev 1.0	For comment and review	JT	TF	RAS	RAS	17.11.20
P02	For information	JT	TF	RAS	RAS	07.12.20

Client signoff

Client	South Gloucestershire Council
Project	Elm Park School
Job number	5194198
Client signature/date	

Table of Contents

Title		Page
Q	Paving/Planting/Fencing/Site furniture	3
Q10	Kerbs/ edgings/ channels/ paving accessories	5
Q22	Asphalt roads/ pavings	9
R	Disposal systems	12
R12	Below ground drainage systems	14

Q

Paving/Planting/Fencing/Site furniture

Q10

Kerbs/ edgings/ channels/ paving accessories

Q10 Kerbs/ edgings/ channels/ paving accessories

TO BE READ WITH PRELIMINARIES/ GENERAL CONDITIONS.

TYPES OF KERBS/EDGINGS AND CHANNELS

112 See drawings.

LAYING

510 LAYING KERBS, EDGINGS AND CHANNELS

- Cutting: Neat, accurate and without spalling. Form neat junctions.
 - Long units (450 mm and over) minimum length after cutting: 300 mm.
 - Short units minimum length after cutting: The lower of one third of their original length or 50 mm.
- Bedding of units: Positioned true to line and levelled along top and front faces, in a mortar bed on accurately cast foundations or on a race of fresh concrete.
- Securing of units: After bedding has set, secured with a continuous haunching of concrete or on a race of fresh concrete with backing concrete cast monolithically.

520 ADVERSE WEATHER

- Conditions: Do not construct if the temperature is below 3°C on a falling thermometer or 1°C on a rising thermometer. Adequately protect foundations, bedding and haunching against frost and rapid drying by sun and wind.

530 CONCRETE FOR FOUNDATIONS, RACES AND HAUNCHING

- Standard: To BS 8500-2.
- Designated mix: Not less than GEN0 or Standard mix ST1.
- Workability: Very low.

540 CEMENT MORTAR BEDDING

- General: To section Z21.
- Mix (Portland cement:sand): 1:3.
 - Portland cement: Class CEM I 42.5 to BS EN 197-1.
 - Sand: to BS EN 12620, grade 0/4 or 0/2 (MP).
- Bed thickness: 12-40 mm.

570 CHANNELS

- Installation: To an even gradient, without ponding or backfall.
- Lowest points of channels: 6 mm above drainage outlets.

580 DRAINAGE CHANNEL SYSTEMS

- Installation: To an even gradient, without ponding or backfall. Commence laying from outlets.
- Silt and debris: Removed from entire system immediately before handover.
- Washing and detritus: Safely disposed without discharging into sewers or watercourses.

620 ACCURACY

- Deviations (maximum):
 - Level: ± 6 mm.
 - Horizontal and vertical alignment: 3 mm in 3 m.

640 TOOLED MORTAR JOINTS

- Jointing: Ends of units buttered with bedding mortar as laying proceeds. Joints completely filled and tooled to a neat flush profile.
 - Joint width: 6 mm.

Q22

Asphalt roads/ pavings

Q22 Asphalt roads/ pavings

To be read with Preliminaries/ General conditions.

TYPES OF PAVING

127 See Drawings

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.

250 ABUTMENTS

- Vertical edges of manholes, gullies, kerbs and other abutments: Clean and paint with a thin uniform coating of hot applied 40/60 paving grade bitumen .
- Finishing: Tamp surface around projections.
 - Level: Flush or not more than 3 mm above projections.

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: Machine laid, 25 mm.
 - Binder course: Machine laid, 13 mm.
 - Surface course: 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: Bond coat.
Application rate: 0.15-0.25 kg/m².
Accuracy: Uniform, without puddles.
 - Finishing: Allow emulsion to break completely before applying surface.

COMPLETION

390 DOCUMENTATION

- Standard: BS EN 13108-1.
 - Declaration of conformity: Submit.
- Number of copies: 2.
- Submission: Two weeks prior to date when Contractor expects work to be complete.

R

Disposal systems

R12

Below ground drainage systems

R12 Below ground drainage systems

To be read with Preliminaries/ General conditions.

GENERAL

- 110 BELOW GROUND DRAINAGE SYSTEMS Roof and Hard External Areas
- Surface water and rainwater drainage sources: Channel drains. Rainwater downpipes non-siphonic).
 - Foul drainage sources:
 - Sanitary appliances;
 - Floor drains; and
 - Discharge stack and branch pipes.
 - Land drainage sources: Below ground pipelines from land drainage.
 - Pressure relief drainage sources: None.
 - Pipes, bends and junctions:
 - Clay - flexible joints;
 - Plastics - structured wall; and
 - PVC-U - solid wall .
 - Accessories:
 - Access points ;
 - Connectors - saddle ;
 - Flexible couplings ;
 - Rodding points ; and
 - Warning marker tapes .
 - Manholes, inspection chambers, traps, and separators:
 - Inspection chambers - plastics ;
 - Manholes and inspection chambers - concrete .
 - Accessories:
 - Manhole channels and branches - conventional ;
 - Sealing for concrete manholes - bituminous strips..
 - Disposal: To outfalls and To storage tanks .
 - Accessories - general:
 - Access covers and frames; and
 - Concrete.
- 122 SOAKAWAY SYSTEMS - See Drawings

SYSTEM PERFORMANCE

PRODUCTS

- 329 PIPES, BENDS AND JUNCTIONS - SUPPLY
- Pipes and fittings: From same manufacturer for each pipeline.

- 336 PIPES, BENDS AND JUNCTIONS - CLAY - FLEXIBLE JOINTS FOUL WATER DRAINAGE
- Material and standard: Vitrified clay to BS EN 295-1, Kitemark certified.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Sizes: DN 100.
 - Crushing strength (minimum): FN 40.
 - Jointing type: Polypropylene sleeve.
- 344 PIPES, BENDS AND JUNCTIONS - PLASTICS -STRUCTURED WALL - SURFACE WATER 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: -.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Recycled content: Contractor's choice.
 - Sizes: DN 150.
 - Jointing type: Spigot and socket.
- 346 PIPES, BENDS AND JUNCTIONS - PVC-U - SOLID WALL - FOUL DRAINAGE
- Standard: BS EN 1401-1 with flexible joints.
 - Class: SN4 or SN8.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Recycled content: 0% (minimum) to BS EN ISO 14021.
 - Sizes: As per drawing .
 -
- 359 FLEXIBLE COUPLINGS
- Standard: To BS EN 295-4 or WIS 04-41-01 and Kitemark certified, or Agrément certified.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- 371 RODDING POINTS foul and surface
- 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 and plastic.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Sizes:
 - DN 100;
 - DN 110; and
 - DN 150.

379 WARNING MARKER TAPES - FOUL DRAINAGE

- Type: Heavy gauge polyethylene.
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Colour: Red with black lettering.
- Widths: 150 mm.
- Message: FOUL SEWER BELOW.
- Wire detection aid: Required.

379A WARNING MARKER TAPES - SURFACE WATER DRAINAGE

- Type: Heavy gauge polyethylene.
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Colour: White with black lettering.
- Widths: 150 mm.
- Message: SURFACE WATER DRAIN BELOW.
- Wire detection aid: Required.

401 INSPECTION CHAMBERS - PLASTICS FOUL DRAINAGE - SEE DRAWINGS

- Standard: To BS 7158 or BS EN 13598-1, or Agrément certified.
- Diameter: 600 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: C250.

401A INSPECTION CHAMBERS - PLASTICS FOUL DRAINAGE- SEE DRAWINGS

- Standard: To BS 7158 or BS EN 13598-1, 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: C250.
-

407 MANHOLES AND INSPECTION CHAMBERS - CONCRETE - SEE DRAWINGS

- 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: DN 1200.
- Cement type and content: To BS 5911-3 and BS EN 1917 and Kitemark certified; or to BS 5911-4 and BS EN 1917.
- Chamber sections:
 - Product reference: Contractor's choice.
 - Jointing type: Bituminous strips.
- Cover slabs:
 - Product reference: Contractor's choice.
 - Thickness: 175 mm.
 - Loading grades to BS EN 124: C250.
 - Openings: To suit access covers.
- Steps: Required in chambers over 900 mm deep.

•
•
•

•
•
•
•
•
•
•
•

439 MANHOLE STEPS TO ALL FULL ACCESS MANHOLES

- Standard: To BS EN 13101.
- Type: B.
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Material: Galvanized steel.

EXECUTION

- 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.
- 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.
- 657 CLASS F BEDDING TO PIPES, BENDS AND JUNCTIONS - CLAY
- Type of subsoil: Clay, sandy clay - firm .
 - Granular material: Contractor's choice.
 - Pipe sizes DN 100 and DN 150: Size 4/10.
 - Pipe sizes DN 225 and DN 300: Size 4/10 or 10/20.
 - Pipe sizes DN 375-500: Size 10/20.
 - Pipe sizes DN 600 and above: Size 10/20 or 20/40.
 - 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 thickness by 100 mm.
 - Pipes: Dig slightly into bedding, rest uniformly on barrels and adjust to line and gradient.
 - Initial testing before backfilling: Not required.
 - 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.

663 CLASS P SUPPORT TO PIPES, BENDS AND JUNCTIONS - PVC-U-SOLID WALL

- Type of subsoil: Clay, sandy clay - stiff.
- Granular material: Contractor's 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.
- Bedding:
 - Material: Granular, compacted over full width of trench.
 - Thickness (minimum): 100 mm.
- Pipes: Dig slightly into bedding, rest uniformly on barrels and adjust to line and gradient.
- Initial testing before placing support: Not required.
- Support:
 - Material: Granular.
 - Depth: To slightly above crown of pipe.
 - Compaction: By hand.
- Backfilling:
 - Material and depth: Protective cushion of selected fill to 300 mm above crown of pipe; or Additional granular material, to 100 mm above crown of pipe.
 - Compaction: By hand in 100 mm layers.

678 CLASS Z SURROUND to below service ducts

- Type of subsoil: clay, sandy clay - Firm.
- 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: Not 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.

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: Nominal 90° rest 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): 450 mm.
- Bedding: Do not impair flexibility of pipe couplings.
 - Material: Concrete (general).

693 DIRECT CONNECTION OF GROUND FLOOR WCS TO DRAINS

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

695 BACKDROP PIPES OUTSIDE MANHOLE WALLS

- Excavation beneath backdrop pipe: Backfill.
 - Material: concrete.
- Pipe encasement:
 - Material: concrete.
 - Thickness (minimum): 150 mm.

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.

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.

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.

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'.

728 LAYING WARNING MARKER TAPES

- 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.

736 INSTALLING RODDING POINTS

- Bedding and surround:
 - Material: Concrete (general).
 - Thickness (minimum): 100 mm
- Permissible deviation in level of external covers and gratings: +0 to -6 mm.

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.

911 TESTING AND INSPECTION

- Dates for testing and inspection: Give notice.
 - Period of notice: 7 days.

- 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: contractors 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.
- 971B **CCTV INSPECTION OF PRIVATE PIPELINES:**
- General: Carry out and record internal inspection using CCTV equipment.
- Locations to be inspected: [foul, surface water and land drains].
Illumination: Of adequate intensity.
Recording: Provide continuous position recording, still photographs and stopping of the camera at any point.
 - Copy of videotape recording: Submit. Components: Surface water storage tanks.
 - Tests: -Method: -