

DRAINAGE - DESIGN STANDARDS

1.

DRAINAGE SYSTEMS TO REMAIN PRIVATE SHALL BE DESIGNED AND INSTALLED TO MEET THE REQUIREMENTS OF BS EN 752 , BUILDING REGULATION DOCUMENT H AND NHBC STANDARDS.
2.

DRAINAGE SYSTEMS TO BE ADOPTED UNDER S104 WATER INDUSTRY ACT (WIA) 1991 MUST BE DESIGNED AND INSTALLED TO MEET THE REQUIREMENTS OF DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL & SURFACE WATER SEWERS OFFERED FOR ADOPTION APPROVED CURRENT VERSION.
3.

SUSTAINABLE DRAINAGE SYSTEMS (SUDS) MUST BE DESIGNED, INSTALLED AND MAINTAINED TO MEET THE REQUIREMENTS OF THE NATIONAL STANDARDS FOR SUDS. IN THE INTERIM PERIOD BEFORE THE RELEASE OF THIS NEW DESIGN STANDARD SUDS MUST MEET THE DESIGN AND MAINTENANCE REQUIREMENTS OF THE APPROPRIATE SUDS APPROVING BODY (SAB) WHERE THE SAB HAS NO DESIGN STANDARD AVAILABLE SUDS MUST BE DESIGNED IN ACCORDANCE WITH CIRIA REPORT C697 THE SUDS MANUAL 2015.
4.

UNLESS OTHERWISE SHOWN MINIMUM PIPE SIZES AND GRADIENTS FOR DRAINAGE SYSTEMS OUTSIDE BUILDINGS SHALL BE:

FOUL WATER:

<=10 DWELLINGS MIN 1 WC CONNECTED - 100 DIA @ 1:80

>=10 DWELLINGS - 150 DIA @1:150

SURFACE WATER:

CONSULT WITH PROJECT MANAGER
5.

WHERE NEW BRANCH CONNECTIONS ARE MADE WITHIN TRADITIONAL BENCHED CHAMBERS, THE WHOLE OF THE BENCHING ON THAT SIDE IS TO BE REMOVED AND RE-BENCHED.
6.

DRAINS TO BE ABANDONED SHALL BE HIGH PRESSURE JETTED AND FILLED WITH CLASS G3 GROUT OR REMOVED COMPLETELY AND BENCHING MADE GOOD IN EXISTING MANHOLES.
7.

PIPES OF DIFFERENT DIAMETERS TO BE LAID SOFFIT TO SOFFIT.
8.

RAINWATER DOWN PIPES CONNECTED DIRECT TO A DRAIN MUST INCORPORATE A RODDING ACCESS FITTING ABOVE GROUND LEVEL.
9.

DRAINS RUNS TO BE FLUSHED THROUGH AND DEBRIS REMOVED PRIOR TO FINAL TESTING AND HANDOVER.
10.

REMOVABLE RODDING POINT TO BE PROVIDED AT THE BASE OF ALL RAINWATER DOWN PIPES IF NO ADJACENT UNDERGROUND RODDING POINT IS BEING INSTALLED.
11.

WHERE DRAIN TO DRAIN/SEWER CONNECTIONS ARE MADE THESE SHALL BE VIA 45 DEGREE OBLIQUE JUNCTIONS.

SPECIFICATION NOTES

DRAINAGE - MATERIALS AND WORKMANSHIP

1.

ALL WORKS WHICH ARE SUBJECT TO THE REQUIREMENTS IMPOSED BY SCHEDULE 1 TO THE BUILDING REGULATIONS SHOULD, IN ACCORDANCE WITH REGULATION 7, BE CARRIED OUT WITH PROPER MATERIALS AND IN A WORKMANLIKE MANNER. WORKMANSHIP SHOULD BE IN ACCORDANCE WITH BS 8000 WORKMANSHIP ON BUILDING SITES PART 14: CODE OF PRACTICE FOR BELOW GROUND DRAINAGE.
2.

ALL WORKS TO BE ADOPTED UNDER S104 WIA 1991 SHALL BE IN UNDERTAKEN IN ACCORDANCE WITH DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL & SURFACE WATER SEWERS OFFERED FOR ADOPTION APPROVED CURRENT VERSION.

CONCRETE

1.

STANDARD CONCRETE MIXES SHALL BE IN ACCORDANCE WITH BS EN 206-1 AND BS 8500 TABLES A.13, A.14, AND A.15 WITH A 20MM NOMINAL MAXIMUM SIZE AGGREGATE AND A SLUMP CLASS S2 FOR A TARGET 70MM.
2.

ALL IN SITU CONCRETE SHALL BE STANDARD MIX GEN3 UNLESS OTHERWISE STATED.
3.

ALL STRUCTURAL CONCRETE SHALL BE C28/35 UNLESS OTHERWISE STATED.
4.

THE CONCRETE DESIGN SULPHATE CLASS AND CHEMICAL CLASS SHALL BE TO BS 8500 AND EN 206-1 FOR THE APPROPRIATE GROUND CONDITIONS. SEE GEOTECHNICAL ENGINEERS REPORT.
5.

ALL CEMENT SHALL BE PORTLAND [CEM1] COMPLYING WITH THE PROVISIONS OF BS EN197-1.

MORTAR - CLASS M1 OR CAT.1.2 = 1½/3 [CEMENT:LIME:SAND]

CEMENT GROUT - CLASS G3 = 1:10 [CEMENT:SAND]

MANHOLES AND INSPECTION CHAMBERS

1.

PRECAST CHAMBERS TO BE IN ACCORDANCE WITH BS EN 1917.
2.

POLYPROPYLENE CHAMBERS TO BE IN ACCORDANCE WITH BS EN 13598.
3.

CLAY BRICKS, CALCIUM SILICATE BRICKS AND PRECAST CONCRETE MASONRY UNITS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 771.
4.

MORTAR SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 998.
5.

DUCTILE IRON COVERS AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 124 AND BE OF A NON-ROCKING , NON VENTILATING TYPE. LOAD CLASS SELECTION GUIDE:

• CLASS A15 AREAS INACCESSIBLE TO MOTOR VEHICLES

• CLASS B125 FOOTWAY / PEDESTRIAN AREAS/DRIVEWAYS

• CLASS D250 GULLY GRATINGS ADJACENT KERB LINES

• CLASS D400 CARRIAGEWAYS

• CLASS E600 AREAS SUBJECT TO HIGH WHEEL LOADS

• CLASS F900 AREAS SUBJECT TO PARTICULARLY HIGH LOADS

PIPES AND FITTINGS

1.

GRAVITY PIPES AND FITTINGS FOR UNDERGROUND SEWERAGE SHALL COMPLY WITH THE RELEVANT STANDARDS:

• VITRIFIED CLAY BS EN 295-1

• DUCTILE IRON BS EN 598

• PVC-U BS 4680 & BS EN 1401

• THERMOPLASTIC STRUCTURED WALL PIPES BS EN 13476-1 & WIS-35-01

• CONCRETE BS EN 1916 & BS 5911-1

NOTE PVC-U & THERMOPLASTIC PIPES WHICH WILL BE ADOPTED MUST BE ABLE TO RESIST JETTING PRESSURES OF 2,600 PSI.
2.

PRESSURE PIPES AND FITTINGS FOR UNDERGROUND SEWERAGE SHALL COMPLY WITH THE RELEVANT STANDARDS;

• DUCTILE IRON BS EN 598

• POLYETHYLENE BS EN 13244-2 & -3 [COLOUR BLACK]

MARKER TAPE TO BE RED PVC AND SHALL BE PRINTED WITH THE WORDS "PRESSURE SEWER" IN BOLD CAPITAL LETTERS ALONG ITS LENGTH AND SHALL INCORPORATE A CORROSION RESISTANT TRACING SYSTEM FOR NON-METALLIC PIPES.
3.

PIPES STRENGTH CLASSES TO BE:

• VITRIFIED CLAY PIPES: 40 KN/m (100-225 mm DIA)

• CONCRETE PIPES: CLASS C120 (300-600 mm DIA)

• PVC-U: SN8

PIPE BEDDING, SURROUND AND BACKFILL

1.

IMPORTED GRANULAR MATERIAL SHALL COMPLY WITH BS EN 1610:1998 SECTION 5.3.3.1.
2.

BEDDING AND SURROUND MATERIAL TO BE EITHER 10mm SINGLE SIZED FOR PIPES UP TO 300 DIA AND 14mm SINGLE SIZED FOR PIPES >300 TO 600 DIA OR GRADED 20mm DOWN PRIMARY GRANULAR MATERIAL OR RECYCLED AGGREGATE MATERIAL TO BRE DIGEST 433 CLASS RCA [II] OR RCA [III] WITH A COMPACTION FRACTION VALUE <0.2.
3.

SELECTED BACKFILL MATERIAL SHOULD BE READILY COMPACTABLE, FREE FROM VEGETABLE MATTER, FROZEN MATERIAL, EXCLUDE LARGE PIECES OF CLAY >100mm AND STONES >40mm IN SIZE.
4.

BACKFILL MATERIAL SHALL BE SELECTED AS DUG MATERIAL IN SOFT LANDSCAPED AREAS AND TYPE 1 GRANULAR SUB BASE MATERIAL TO SHW CLAUSE 803 IN HARD LANDSCAPED AREAS, COMPACTED IN LAYERS NOT EXCEEDING 250MM IN DEPTH. NO MECHANICAL COMPACTION SHOULD BE USED UNTIL THE FIRST 300mm LAYER HAS BEEN PLACED.

CHANNEL DRAINS

1.

CHANNEL DRAINS SHALL BE THE FOLLOWING TYPE OR SIMILAR APPROVED, INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS:

PEDESTRIAN AREAS - ACO HEXADRAIN

DRIVEWAYS - ACO MD100

CARRIAGEWAYS - ACO MD100

CAR PARKS - ACO MD100

ALL OUTLETS TO BE VIA A PROPRIETARY SUMP UNIT.
- POLLUTION PREVENTION
1.

THE CONTRACTOR'S ATTENTION IS DRAWN TO THE CONTROL OF POLLUTION PROVISIONS IN THE WATER RESOURCES ACT 1991. HE SHALL TAKE ALL NECESSARY PRECAUTIONS TO ENSURE THAT NO POLLUTING DISCHARGE EITHER SOLID OR LIQUID IS MADE TO ANY WATERCOURSE OR TO UNDERGROUND STRATA AND THAT ANY WORK CARRIED OUT IN A WATERCOURSE SHALL BE REMOVED IMMEDIATELY IT IS SAFE TO DO SO.
- EARTHWORKS/LANDSCAPING
1.

THE CONTRACTOR SHALL ENSURE ALL SURFACES OF THE EMBANKMENT ARE WELL COMPACTED AND FORMATION LEVELS FIRM. ANY SOFT SPOTS SHALL BE COMPACTED AND FILLED WITH SELECTED SITE WON MATERIAL DEPOSITED IN LAYERS NOT EXCEEDING 250mm UN-COMPACTED THICKNESS.

2.

COMPACTION OF FILL MATERIAL SHALL COMPLY WITH CLAUSE 612 OF THE SPECIFICATION FOR HIGHWAY WORKS (SHW).

3.

SURFACES TO BE SOWN WITH GRASS SEED SHALL BE REDUCED TO A FINE TILTH AND CLEARED OF STONES AND EXTRANEOUS MATERIAL GREATER THAN 50mm IN SIZE. THE SEED SHALL BE SOWN IN THE MOST FAVORABLE SEASON, EVENLY DISTRIBUTED AND APPLIED AT A RATE OF NOT LESS THAN THE QUANTITIES LISTED BELOW:

LEVEL SURFACE - 6g/m²

SLOPING SURFACE - 10g/m²

4.

ALL AREAS TO BE TOP SOILED SHALL BE DE-COMPACTED BY RIPPING TO A DEPTH OF 100MM PRIOR TO TOPSOIL PLACEMENT.

5.

REINSTATEMENT OPTIONS SHALL GENERALLY COMPLY WITH BS4428.

6.

THE GRASS MIX SHALL BE A TESTED BLEND OF NAMED VARIETIES AND CERTIFICATES OF PURITY AND GERMINATION SHALL BE PROVIDED. THE BLEND SHALL CONSIST OF THE FOLLOWING MIX:

MIXTURE LOW MAINTENANCE - NORMAL SITES

CREeping RED FESCUE - 70%

SMOOTH STALKED MEADOW GRASS - 20%

CREeping BENT - 10%

SEED MIXTURES SHALL BE DRESSED AND INCLUDE A PROPRIETARY BIRD REPELLANT.
- GEOCELLULAR SOAKAWAY STRUCTURES
1.

MODULAR GEOCELLULAR SOAKAWAY STRUCTURES MUST HAVE BRITISH BOARD OF AGREEMENT (BBA) TECHNICAL APPROVAL FOR CONSTRUCTION AND MUST MEET THE STRUCTURAL DESIGN REQUIREMENTS SET OUT IN CIRIA REPORT C737 'STRUCTURAL DESIGN OF MODULAR GEOCELLULAR DRAINAGE TANKS'.

2.

GEOCELLULAR SOAKAWAY UNITS SHALL BE: AQUACELL 'ECO', 'CORE R' & PLUS R LAID ON 100MM THICK COARSE SAND, WRAPPED IN PROTECTIVE NON WOVEN GEOTEXTILE TERRAM 1000 OR SIMILAR APPROVED. MINIMUM LAPS TO BE 300mm. BACKFILL BETWEEN TRENCH WALLS AND AQUACELL UNITS WITH A MINIMUM 100mm OF COARSE SAND OR CLASS B1 SELECTED GRANULAR MATERIAL. LAY 100mm THICK COARSE SAND OVER GEOTEXTILE AND COMPACT. REMAINING EXCAVATED AREAS TO BE BACKFILLED WITH DP TYPE 1 GRANULAR MATERIAL IN ACCORDANCE WITH SHW VOL 1 CLAUSE 803 UNDER TRAFFICKED AREAS OR SELECTED AS DUG MATERIAL UNDER SOFT LANDSCAPED AREAS. GEOCELLULAR UNITS TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

3.

ALTERNATIVE GEOCELLULAR SOAKAWAY UNITS MAY BE ACCEPTABLE SUBJECT TO REVIEW BY THE PROJECT MANAGER.
- GEOTEXTILE TERRAM 1000 OR SIMILAR APPROVED TO BE INSTALLED STRICTLY WITH MANUFACTURERS GUIDELINES.
1.

GEOTEXTILES MAY BE USED BETWEEN THE SUBGRADE OR CAPPING AND THE SUB-BASE.

2.

THE GEOTEXTILE SHOULD FUNCTION AS A FILTER AND MUST BE INSTALLED ACCORDING TO THE MANUFACTURER'S REQUIREMENTS.

3.

THE NON-WOVEN GEOTEXTILE SHOULD BE MANUFACTURED FROM A SUITABLE POLYETHYLENE OR POLYPROPYLENE FILAMENT ABLE TO WITHSTAND NATURALLY OCCURRING CHEMICAL AND MICROBIAL EFFECTS.

4.

TERRAM STANDARD GEOTEXTILES ARE SUPPLIED HAVING MET INTERVAL QUALITY REQUIREMENTS IN ACCORDANCE WITH OUR QUALITY MANAGEMENT SYSTEM WHICH IS CERTIFIED TO BS EN ISO 9001:2015.

5.

EACH ROLL SHALL HAVE AT LEAST ONE IDENTIFICATION LABEL WITH ROLL NUMBER AND PRODUCT TYPE IN ACCORDANCE WITH BS EN ISO 10320 (BSI, 1999) AND CARRY A CE MARK.

6.

ALL VEHICLES SHOULD BE PREVENTED FROM TRAFFICKING DIRECTLY OVER THE MATERIAL AND THE MATERIAL SHOULD BE PROTECTED FROM ULTRAVIOLET LIGHT.

7.

GEOTEXTILES: MINIMUM SPECIFICATIONS:

7.1. MECHANICAL:

• THICKNESS @ 2kPa ≥ 1.1MM IN ACCORDANCE WITH BS EN ISO 9863-1

• TENSILE STRENGTH ≥ 8.0 KN/M IN ACCORDANCE WITH BS EN ISO 10319

• TENSILE ELONGATION ≥ 8.0 KN/M IN ACCORDANCE WITH BS EN ISO 10319

• CBR PUNCTURE RESISTANCE ≥ 1,500 N IN ACCORDANCE WITH BS EN ISO 12236

• CONE DROP ≤ 38 MM IN ACCORDANCE WITH BS EN ISO 13433

8.1. HYDRAULIC:

• PORE SIZE (MEAN AOS) ≤ 90 µM IN ACCORDANCE WITH BS EN ISO 12956

• WATER PERMEABILITY (H50) ≥ 90 LM/S IN ACCORDANCE WITH BS EN ISO 11068

8.1. DURABILITY:

• WEATHERING (UV EXPOSURE) >30 DAYS IN ACCORDANCE WITH BS EN 1224

• COMBINED AGEING 100 YEARS IN ACCORDANCE WITH EN ISO 13438

Notes:

1. DO NOT SCALE FROM THIS DRAWING.

2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THIS PROJECT.

A	TO DISCHARGE DRAINAGE CONDITION	SBR	CJM	07.04.25
Rev	Description	Drm	Chk	Date

BdR

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Client

OPEN ARCHITECTURE

Project

LAND AT BRIMSOLE FARM,
BRIMSTONE HILL, MEOPHAM,
GRAVESEND, KENT, DA13 0BN

Drawing

DRAINAGE SPECIFICATION NOTES

FOR APPROVAL

Scale @ A1	Date	Drawn by	Checked
-	07.04.25	SBR	CJM
Job No.	Org. No.	Rev	
25-0040	C10500	A	