



**PERSIMMON HOMES
NORTH LITTLEHAMPTON - PHASE 2
FITZALAN LINK ROAD,
LITTLEHAMPTON, WEST SUSSEX**

**S38/278 AGREEMENT HIGHWAY WORKS
SPECIFICATION**

MARCH 2016

REVISION P1

Ref: PHF-MB-S278-GF-SP-D-01

the journey is the reward

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Project Code:	A/PHFITZ.2
Prepared by:	AB
Approved by:	TPM
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Summary of Revisions

Rev P1 - First Issue

Preamble to the Specification

- 1 The Specification referred to in the Tender shall be the 'Specification for Highway Works', published by the Stationery Office (formerly HMSO) as Volume 1 of the Manual of Contract Documents for Highway Works, as modified and extended by the following:
 - (i) Appendix 0/1: Contract-specific Additional, Substitute and Cancelled Clauses, Tables and Figures;
 - (ii) Appendix 0/2: Contract-specific minor alterations to existing Clauses, Tables and Figures;
 - (iii) The Numbered Appendices listed in Appendix 0/3;
 - (iv) Appendix 0/5: Special national alterations of the Overseeing Organisation of Scotland, Wales or Northern Ireland. Appendix 0/4 contains a list of the Drawings.
- 2 The relevant publication date of each page of the Specification for Highway Works is given in the Schedule of Pages and Relevant Publication Dates.
- 3 An Additional Clause as indicated by a suffix 'A' in Appendix 0/5 is an alteration originating from the Overseeing Organisation of Scotland, Wales or Northern Ireland. An Additional Clause as indicated by a suffix 'AR' in Appendix 0/1 is a Contract-specific alteration.
- 4 A Substitute Clause, as indicated by the suffix 'S' in Appendix 0/5 is an alteration originating from the Overseeing Organisation of Scotland, Wales or Northern Ireland. A Substitute Clause as indicated by a suffix 'SR' in Appendix 0/1 is a Contract-specific alteration.
- 5 A Cancelled Clause as indicated by a suffix 'C' in Appendix 0/5 is an alteration originating from the Overseeing Organisation of Scotland, Wales or Northern Ireland. A Cancelled Clause indicated by a suffix 'CR' in Appendix 0/1 is a Contract-specific alteration.
- 6 Insofar as any of the Numbered Appendices may conflict or be inconsistent with any provision of the Specification for Highway Works the Numbered Appendices shall always prevail. Additionally, Numbered Appendices 0/1 and 0/2 shall take precedence over Numbered Appendix 0/5.
- 7 Any reference in the Contract to a Clause number or Appendix shall be deemed to refer to the corresponding Substitute Clause number or Appendix listed in Appendix 0/1, 0/2 or 0/5. 37 Amendment – November 2005
- 8 Where a Clause is altered any original Table/Figure referred to in the Clause shall apply unless the Table/ Figure is also altered. Where a Table/Figure is altered any reference in a Clause to the original Table/Figure shall apply to the altered Table/Figure.
- 9 Where a Clause in the Specification relates to work goods or materials which are not required for the Works it shall be deemed not to apply.
- 10 Any Appendix referred to in the Specification which is not used shall be deemed not to apply.
- 11 Where a Clause in the Specification is prefixed by an # this indicates that this particular Clause has a substitute National Alteration for one or more of the Overseeing Organisations of Scotland, Wales or Northern Ireland. Substitute or additional National Clauses shall be used within countries to which they specifically apply and they are deemed to replace corresponding Clauses in the main text of the Specification as appropriate. The substitute National Clauses are located at the end of the relevant Series together with the additional National Clauses of the Overseeing Organisations.

(12/14) **TABLE 0/1 SCHEDULE OF PAGES AND RELEVANT PUBLICATION DATES**

Series/Appendix	Page Number	Publication Date
000	1 to 3	May 2014
000	4 to 8F	December 2014
100	1 to 2, 4 to 9, 12 to 29F, WF1, N2 to N11F	May 2014
100	3, 10 to 11, N1	December 2014
200	1, 3F	May 2001
200	2	May 2004
300	1	May 2001
300	4	November 2002
300	2 to 3, 5 to 6F	May 2008
400	1 to 6, 8, 10 to 13F	November 2007
400	7, 9	November 2008
500	23 to 24, 26	November 2004
500	28F	May 2005
500	3, 22, N1F	May 2006
500	2, 5, 27	November 2006
500	6, 25	November 2007
500	1, 4, 7 to 21	November 2009
600	33	November 2003
600	2, 27 to 28, 30 to 32, 34 to 36, N1	November 2005
600	25 to 26	November 2006
600	42 to 49, 51 to 68F	November 2007
600	37, 50	November 2008
600	1, 3 to 24, 29, 38 to 41, S1 to S3F, N2 to N4F	November 2009
700	2 to 3, 5 to 6, N1, N3 to N5F	November 2006
700	33 to 34F	November 2007
700	4, N2	August 2008
700	1, 7 to 32F	November 2009
800	1 to 25F	November 2009
900	2 to 5, 9 to 22, 24 to 26, 28 to 67F	August 2008
900	1, 6 to 8, S1F	November 2008
900	23, 27	May 2009
1000	3, 5 to 6	November 2005
1000	1 to 2, 4, 7 to 15, 19 to 33F	May 2006
1000	16 to 18	November 2006
1100	1, 4F	November 2004
1100	2, N1F	November 2006
1100	3	August 2008
1200	5	May 2001
1200	2 to 3, W1F	August 2003
1200	1, 14 to 16F	May 2004
1200	4, 9 to 11, 13	May 2005
1200	12	November 2006
1200	6 to 7, N1 to N4F	November 2007
1200	8	May 2008

(12/14) **TABLE 0/1 SCHEDULE OF PAGES AND RELEVANT PUBLICATION DATES (Cond.)**

Series/Appendix	Page Number	Publication Date
1300	N2F	November 2003
1300	3 to 4	November 2004
1300	1, 5 to 10, 12F	November 2005
1300	2, 11 and N1	May 2006
1400	2, N1F	May 2001
1400	1, 3 to 9F	May 2006
1500	7	May 2001
1500	2	February 2003
1500	3 to 4, 8 to 11, 13	November 2004
1500	1, 5 to 6, 12, 14 to 17F	November 2006
1600	1, 4 to 5, 9, 15, 17 to 18, 24 to 26, 29 to 31, 35, 38, 49F	March 1998
1600	2, 6 to 8, 10 to 14, 16, 19, 27 to 28, 32 to 34, 36 to 37, 39 to 42, 44 to 48	November 2003
1600	3, 20 to 23, 43	November 2005
1700	1 to 27F	December 2014
1800	1 to 35F	August 2014
1900	1 to 35F, 81 to 82F	August 2014
2000	1, 3 to 4F	May 2001
2000	2	November 2004
2100	1, 4F	March 1998
2100	2	November 2003
2100	3	November 2005
2300	1	March 1998
2300	2 to 3F	May 2001
2400	1, 4, 7F	May 2005
2400	2	May 2006
2400	3, 5 to 6	May 2008
2500	1	May 2001
2500	2, 8, 11F	November 2003
2500	10	November 2004
2500	6 to 7, 9	May 2005
2500	5	May 2006
2500	3 to 4	November 2006
2600	1	March 1998
2600	2 to 4	November 2003
2600	5	November 2004
2600	6	May 2005
2600	7F	November 2006
3000	4 to 7, 10, 12 to 17, 19, 22 to 27F	May 2001
3000	20	November 2004
3000	2 to 3	May 2006
3000	8 to 9, 11, 18, 21	May 2008

(12/14) **TABLE 0/1 SCHEDULE OF PAGES AND RELEVANT PUBLICATION DATES (Cont.)**

Series/Appendix	Page Number	Publication Date
5000	1, 4 to 19F, S1F	May 2005
5000	2 to 3	November 2008
Appendix A	1 to 4F	May 2014
Appendix B	1 to 3F	May 2014
Appendix C	1 to 2F	May 2014
#Appendix D	1F	May 2014
Appendix D (NI)	N1F	May 2014
Appendix E	1F	May 2014
Appendix F	1 to 52F	December 2014
Appendix G	Not used	
Appendix H	1	May 2004
Appendix H	2	November 2005
Appendix H	3	November 2006
Appendix H	4 to 9F	November 2008

Appendix 0/1 - Contract Specific Additional, Substitute and Cancelled Clauses, Tables and Figures Included in the Contract

List of Additional Clauses, Tables and Figures		
Clause No (etc.)	Title	Written on following Page No.
NONE		
List of Substitute Clauses, Tables and Figures		
Clause No (etc.)	Title	Written on following Page No.
NONE		
List of Cancelled Clauses, Tables and Figures		
Clause No (etc.)	Title	Written on following Page No.
NONE		

Appendix 0/2 - Contract Specific Minor Alterations to Existing Clauses, Tables and Figures Included in the Contract

Clause No (etc.)	Alterations to be made
<u>Appendix F</u>	
Series 1200	1. DEPARTMENT OF TRANSPORT; DEPARTMENT OF ENVIRONMENT, TRANSPORT AND THE REGIONS; SCOTTISH DEVELOPMENT DEPARTMENT; THE SCOTTISH OFFICE; WELSH OFFICE; AND DEPARTMENT OF THE ENVIRONMENT FOR NORTHERN ISLAND PUBLICATIONS. Remove "Chapter 7. The Design of Traffic Signs 1997" And Replace with "Chapter 7. The Design of Traffic Signs 2003" Add at the end of section (i) list: "Chapter 5 – Road Markings 2003"

Appendix 0/3 - List of Numbered Appendices Referred to in the Specification and included in the Contract

Appendix 0/3 is comprised of two lists, A and B, of Numbered Appendices as follows:

List 'A' is a complete list of the numbered appendices referred to in the Specification for Highway Works with those not adopted marked 'Not used'. Those identified by the letters T or C shall be completed by the Tenderer or Contractor respectively.

List 'A'

(05/14) List of Numbered Appendices Referred to in the Specification for Highway works

Page No.	Completed By	Appx. No.	Title
			<u>INTRODUCTION</u>
		0/1	Contract-specific, Additional, Substitute and Cancelled Clauses, Tables and Figures Included in the Contract
		0/2	Contract Specific Minor Alterations to Existing Clauses, Tables and Figures Included in the Contract
		0/3	List of contract specific Numbered Appendices Referred to in the Specification and included in the Contract
	Not used	0/4	List of drawings Included in the Contract
		0/5	Special National Alterations of the Overseeing Organisations of Scotland/Wales/Northern Ireland
			<u>PRELIMINARIES</u>
		1/1	Temporary Accommodation and Equipment for the Overseeing Organisation
	Not used	1/2	Vehicles for the Overseeing Organisation
	Not used	1/3	Radio Communication System for the Overseeing Organisation
		1/4	Working and Fabrication Drawings
		1/5	Testing to be carried Out by the Contractor
		1/6	Supply and Delivery of Samples to the Overseeing Organisation
		1/7	Site Extent and Limitations on Use
		1/8	Operatives for the Overseeing Organisation
		1/9	Control of Noise and Vibration
	Not used	1/10	Permanent Works to be Designed by the Contractor
	Not used	1/11	Temporary Works Design
		1/12	Setting Out and Existing Ground Levels
		1/13	Programme of Works
	Not used	1/14	Payment Applications
		1/15	Accommodation Works
		1/16	Privately and Publicly Owned Services and Supplies
		1/17	Traffic Safety and Management
		1/18	Temporary Highways for Traffic
		1/19	Routeing of Vehicles
	Not used	1/20#	Recovery Vehicles and Operations for Breakdowns
		1/21	Information Boards
		1/22	Progress Photographs
		1/23	Risks to Health and Safety
	Not used	1/24	Quality Management System

Page No.	Completed By	Appx. No.	Title
	Not used	1/25	Temporary Closed Circuit Television (CCTV) System for the Monitoring of Traffic
	Not used	1/27	Temporary Automatic Speed Camera System for the Enforcement of Mandatory Speed Limits at Road Works (TASCAR)
			<u>SITE CLEARANCE</u>
	Not used	2/1	List of buildings, etc. to be Demolished or Partially Demolished
		2/2	Filling of Trenches and Pipes
		2/3	Retention of Material Arising from Site Clearance
		2/4	Explosives and Blasting
	Not used	2/5	Hazardous Materials
			<u>FENCING</u>
		3/1	Fencing, Gates and Stiles
			<u>ROAD RESTRAINT SYSTEMS (VEHICLE AND PEDESTRIAN)</u>
	Not used	4/1	Road Restraint Systems (Vehicle and Pedestrian)
	Not used	4/2	Information Required to demonstrate Compliance of Road Restraint Systems to BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 and DD ENV 1317-4: 2002
			<u>DRAINAGE AND SERVICE DUCTS</u>
		5/2	Service Duct Requirements
	Not used	5/3	Surface Water Channels and Drainage Channel Blocks
	Not used	5/4	Fin drains and Narrow Filter Drains
	Not used	5/5	Combined Drainage and Kerb System
	Not used	5/6	Linear Drainage Channel Systems
	Not used	5/7	Thermoplastics Structural Wall Pipes and Fittings
			<u>EARTHWORKS</u>
		6/1	Requirements for Acceptability and Testing etc. of Earthworks Materials
		6/2	Requirements for Dealing with Class U1B and Class U2 Unacceptable Materials
		6/3	Requirements for Excavation, Deposition, Compaction (Other than Dynamic Compaction)
	Not used	6/4	Requirements for Class 3 Material
	Not used	6/5	Geotextiles Used to Separate Earthworks Materials
	Not used	6/6	Fill to Structures and Fill Above Structural Foundations
		6/7	Sub-Formation and Capping and Preparation and Surface Treatment of Formation
		6/8	Topsoiling
	Not used	6/9	Earthwork Environmental Bunds, Landscape Areas, Strengthened Embankments
	Not used	6/10	Ground Anchorages, Crib Walling and Gabions
	Not used	6/11	Swallow Holes and Other Naturally Occurring Cavities and Disused Mine Workings
	Not used	6/12	Instrumentation and Monitoring
	Not used	6/13	Ground Improvement

Page No.	Completed By	Appx. No.	Title
	Not used	6/14	Limiting Values for Pollution of Controlled Waters
	Not used	6/15	Limiting Values for Harm to Human Health and the Environment (11/04)
			<u>ROAD PAVEMENTS – GENERAL</u>
		7/1	Permitted Pavement Options (Schedules 1, 2, 3, 4 and 5)
		7/2	Excavation, Trimming and Reinstatement of Existing Surfaces
	Not used	7/3	Surface Dressing – Performance Specification (Sheets 1, 2 and 3)
		7/4	Bond Coats, Tack Coats and Other Bituminous Sprays (Sheets 1, 2 and Binder Data Sheet)
	Not used	7/5	In Situ Recycling – The Remix and Repave Processes
		7/6	Breaking Up or Perforation of Existing Pavement
	Not used	7/7	Slurry Surfacing Incorporating Microsurfacing (Sheets 1, 2 and 3)
	Not used	7/8	Not Used
		7/9	Cold-Milling (Planing) of Bituminous Bound Flexible Pavement
	Not used	7/10	Not used
	Not used	7/11	Overband and Inlaid Crack Sealing Systems
	Not used	7/12	Arrester Beds
	Not used	7/13	Saw-Cut Crack and Seal Bituminous Overlays on Existing Jointed Concrete Pavements
	Not used	7/14	Preparation of Jointed Concrete Pavements Prior to Overlaying and Saw-Cut and Seal of the Bituminous Overlay (11/03)
	Not used	7/15	Saw-Cut, Crack and Seal Existing Jointed Reinforced Concrete Pavements (11/03)
	Not used	7/16	Cracking and Sealing of Existing Jointed Unreinforced Concrete Pavements and CBM Bases
	Not used	7/17	Cracking Plant and Equipment Progress Record
	Not used	7/18	Site Specific Details and Requirements for Cold Recycled Bitumen Bound Material
	Not used	7/19	Site Specific Details and Requirements for Recycled Cement Bound Material
	Not used	7/20	Not used
	Not used	7/21	Surface Dressing – Recipe Specification (Sheets 1, 2 and Binder Data Sheet)
	Not used	7/22	Repairs to Potholes
			<u>ROAD PAVEMENTS – CONCRETE AND CEMENT BOUND MATERIALS</u>
	Not used	10/1	Plant and Equipment for the Construction of Exposed Aggregate Concrete Surface
			<u>KERBS, FOOTWAYS AND PAVED AREAS</u>
		11/1	Kerbs, Footways and Paved Areas
	Not used	11/2	Access Steps
			<u>TRAFFIC SIGNS</u>
		12/1#	Traffic Signs: General
	Not used	12/2	Traffic Signs: Marker Posts

Page No.	Completed By	Appx. No.	Title
			<u>TRAFFIC SIGNS (Continued)</u>
	Not used	12/3	Traffic Signs: Road Markings and Studs
	Not used	12/4	Traffic Signs: Cones, Cylinders, FTD's and Other Traffic Delineators
	Not used	12/5	Traffic Signs: Traffic Signals
	Not used	12/6	Traffic Signs: Special Sign Requirements on Gantries
			<u>ROAD LIGHTING COLUMNS AND BRACKETS, CCTV MASTS AND CANTILEVER MASTS</u>
		13/1#	Information to be Provided When Specifying Lighting Columns and Brackets
		13/2	(Specification for Highway Works) Typical Lighting Column and Bracket Data Sheets 1 and 2
		13/3	Instructions for Completion of Lighting Column and Bracket Data Sheets
	Not used	13/4	Information to be Provided When Specifying CCTV Masts
	Not used	13/5	(Specification for Highway Works) Typical CCTV Mast Data Sheet
	Not used	13/6	Instructions for Completion of CCTV Mast Sheets
	Not used	13/7#	Information to be Provided When Specifying Cantilever Masts
	Not used	13/8	(Specification for Highway Works) Typical Cantilever Masts Data Sheets 1 and 2
	Not used	13/9	Instructions for Completion of Cantilever Masts Data Sheets
			<u>ELECTRICAL WORK FOR ROAD LIGHTING AND TRAFFIC SIGNS</u>
		14/1	Site records
		14/2	Location of Lighting Units and Feeder Pillars
		14/3	Temporary Lighting
		14/4	Electrical Equipment for Road Lighting
	Not used	14/5	Electrical Equipment for Traffic Signs
			<u>MOTORWAY COMMUNICATIONS</u>
	Not used	15/1	Motorway Communications
	Not used	15/2	Cable Duct Requirements
			<u>PILING AND EMBEDDED RETAINING WALLS</u>
	Not used	16/1	General Requirements for Piling and Embedded Retaining Walls
	Not used	16/2	Precast Reinforced and Prestressed Concrete Piles and Precast Reinforced Concrete Segmental Piles
	Not used	16/3	Bored Cast-in-Place Piles
	Not used	16/4	Bored Piles Constructed using Continuous Flight Augers and Concrete or Grout Injection through Hollow Auger Stems
	Not used	16/5	Driven Cast-in-Place Piles

Page No.	Completed By	Appx. No.	Title
	Not used	16/6	Steel Bearing Piles
	Not used	16/7	Reduction of Friction on Piles
	Not used	16/8	Non-Destructive Methods for Testing Piles
	Not used	16/9	Static Load Testing of Piles
	Not used	16/10	Diaphragm Walls
	Not used	16/11	Hard/Hard Secant Pile Walls
	Not used	16/12	Hard/Soft Secant Pile Walls
	Not used	16/13	Contiguous Bored Pile Walls
	Not used	16/14	King Post Walls
	Not used	16/15	Steel Sheet Piles
	Not used	16/16	Integrity Testing of Wall Elements
	Not used	16/17	Instrumentation for Piles and Embedded Walls
	Not used	16/18	Support Fluids
			<u>STRUCTURAL CONCRETE</u>
	Not used	17/1	Schedule for the Specification of Designed Concrete
	Not used	17/2	Not used
	Not used	17/3	Concrete – Surface Finishes
	Not used	17/4	Concrete – General
	Not used	17/5	Buried Concrete
	Not used	17/6	Grouting and Duct Systems for Post-tensioned Tendons
	Not used	17/7	Precast concrete products
			<u>STRUCTURAL STEELWORK</u>
	Not used	18/1	Requirements for Structural Steelwork
			<u>PROTECTION OF STEELWORK AGAINST CORROSION</u>
	Not used	19/1	(Specification for Highway Works) Form HA/P1 (New Works) Paint System Sheet Requirements for Other Work
	Not used	19/2	Requirements for Other Work
	Not used	19/3	(Specification for Highway Works) Form HA/P2 Paint Data Sheet
	Not used	19/4#	(Specification for Highway Works) Form HA/P3 Paint Sample Despatch List: Sheets 1 and 2
	Not used	19/5	General Requirements
			<u>WATERPROOFING FOR CONCRETE STRUCTURES</u>
	Not used	20/1	Waterproofing for Concrete Structures
			<u>BRIDGE BEARINGS</u>
	Not used	21/1	Bridge Bearing Schedule
	Not used	22/1	Not Used
			<u>BRIDGE EXPANSION JOINTS AND SEALING OF GAPS</u>
	Not used	23/1	Bridge Deck Expansion Joints Schedule
	Not used	23/2	Sealing of Gaps Schedule (Other than in Bridge Deck Expansion Joints)
			<u>BRICKWORK, BLOCKWORK AND STONWORK</u>
		24/1	Brickwork, Blockwork and Stonework
			<u>SPECIAL STRUCTURES</u>
	Not used	25/1	Requirements for Corrugated Steel Buried Structures
	Not used	25/2	Requirements for Reinforced Soil and Anchored Earth Structures

Page No.	Completed By	Appx. No.	Title
	Not used	25/3	Requirements for Pocket – Type and Grouted – Cavity Reinforced Brickwork Retaining Wall Structures
	Not used	25/4	Environmental Barriers
	Not used	25/5	Requirements of Buried Rigid Pipes for Drainage Structures
			<u>MISCELLANEOUS</u>
	Not used	26/1	Ancillary Concrete
	Not used	26/2	Bedding Mortar
	Not used	26/3	Cored Thermoplastic Node Markers
			<u>LANDSCAPE AND ECOLOGY</u>
	Not used	30/1	General, sheets 1, 2 and 3
	Not used	30/2	Weed Control
	Not used	30/3	Control of Rabbits and Deer
	Not used	30/4	Ground Preparation
		30/5	Grass Seeding, Wildflower Seeding and Turfing
	Not used	30/6	Planting, sheets 1 and 2
	Not used	30/7	Grass, Bulbs and Wildflower Maintenance
	Not used	30/8	Watering
	Not used	30/9	Establishment Maintenance for Planting
	Not used	30/10	Maintenance of Established Trees and Shrubs
	Not used	30/11	Management of Waterbodies
	Not used	30/12	Special Ecological Measures
			<u>MAINTENANCE PAINTING OF STEELWORK</u>
	Not used	50/1	(Specification for Highway Works) Form HA/P1 (Maintenance) Paint System Sheet
	Not used	50/2	Requirements for Other Work
	Not used	50/3	(Specification for Highway Works) Form HA/P2 Paint Data Sheet
	Not used	50/4#	(Specification for Highway Works) Form HA/P3 Paint Sample Despatch List: Sheets 1 and 2
	Not used	50/5	General Requirements

List 'B'

List of Contract Specific Numbered Appendices Devised for the Contract

Page No	Appendix No.	Appendix Title
-	-	None

Appendix 0/4 - List of Drawings Included in the Contract

Contract Specific – Mayer Brown Limited Drawings

<u>Drawing No</u>	<u>Title</u>	<u>Scale</u>	<u>Size</u>
PHF-MB-S278-GF-DR-D-208-01	Topographical Survey Drawing	1:250	A0
PHF-MB-S278-GF-DR-D-208-02	Topographical Survey Drawing	1:250	A0
PHF-MB-S278-GF-DR-D-209-01	Site Clearance Drawing (1 of 2)	1:250	A0
PHF-MB-S278-GF-DR-D-209-02	Site Clearance Drawing (2 of 2)	1:250	A0
PHF-MB-S278-GF-DR-D-210-01	General Arrangement Drawing (1 of 2)	1:250	A0
PHF-MB-S278-GF-DR-D-210-02	General Arrangement Drawing (2 of 2)	1:250	A0
PHF-MB-S278-GF-DR-D-211-01	Construction Treatments Drawing (1 of 2)	1:250	A0
PHF-MB-S278-GF-DR-D-211-02	Construction Treatments Drawing (2 of 2)	1:250	A0
PHF-MB-S278-GF-DR-D-212-01	Drainage Drawing (1 of 3)	1:250	A0
PHF-MB-S278-GF-DR-D-212-02	Drainage Drawing (2 of 3)	1:250	A0
PHF-MB-S278-GF-DR-D-212-03	Drainage Drawing (3 of 3)	1:250	A0
PHF-MB-S278-GF-DR-D-219-01	String Labels Drawings (1 of 2)	1:250	A0
PHF-MB-S278-GF-DR-D-219-02	String Labels Drawings (2 of 2)	1:250	A0
PHF-MB-S278-GF-DR-D-220	Longitudinal Sections Along MCL0 and MCL1	Varies	A0
PHF-MB-S278-GF-DR-D-221	Cross Sections along MCL0 (1 of 2)	H = 1:200 V = 1:100	A0
PHF-MB-S278-GF-DR-D-222	Cross Sections along MCL0 (2 of 2)	H = 1:200 V = 1:100	A0

Contract Specific – MK Surveys (Existing Statutory Undertakers Drawings)

<u>Drawing No</u>	<u>Title</u>	<u>Scale</u>	<u>Size</u>
19945 – Sheet 9	Targeted Utility Survey – Sheet 9	1:200	A0
19945 – Sheet 10	Targeted Utility Survey – Sheet 10	1:200	A0

Contract Specific – SSE Street Lighting Drawings Drawings)

<u>Drawing No</u>	<u>Title</u>	<u>Scale</u>	<u>Size</u>
SSE-976262-SL-DR-001	Street Lighting Layout Drawing Sheet 1 of 2	1:500	A1
SSE-976262-SL-DR-002	Street Lighting Layout Drawing Sheet 2 of 2	1:500	A1

Standard Details (Supplied) – West Sussex County Council

<u>Drawing No.</u>	<u>Title</u>	<u>Scale</u>	<u>Size</u>
S278/38/01	Alternative Methods of Laying Kerbs	As shown	A3
S278/38/02	Approved Kerb Type Selection Sheet 1	As shown	A3
S278/38/03	Approved Kerb Type Selection Sheet 2	As shown	A3
S278/38/04	Footway / Cycleway Type 1 and 2	As shown	A3
S278/38/09	Service Margins	As shown	A3
S278/38/10	Preferred Arrangement of Services within Public Highway	As shown	A3
S278/38/11	Drainage – Gully A – Pre-Cast Concrete	As shown	A3
S278/38/12	Drainage – Precast Concrete Ring Soakaway	As shown	A3
S278/38/13	Drainage – Type B Catchpit	As shown	A3
S278/38/14	Vortex Flow Control Type B Manhole	As shown	A3
S278/38/17	Street Furniture Bollard	As shown	A3
S278/38/18	Street Furniture – Tactile Crossings	As shown	A3
S278/38/19	Street Furniture – Refuge Island	As shown	A3
S278/38/20	Carriageway – Tie-in Options	As shown	A3
S278/38/21	Carriageway – Flexible Specification	As shown	A3

Standard Details (Supplied) – Mayer Brown Limited

<u>Drawing No.</u>	<u>Title</u>	<u>Scale</u>	<u>Size</u>
PHF-MB-S278-GF-DR-D-F/01	Standard Details Drawing 1 of 5	As shown	A1
PHF-MB-S278-GF-DR-D-F/02	Standard Details Drawing 2 of 5	As shown	A1
PHF-MB-S278-GF-DR-D-F/03	Standard Details Drawing 3 of 5	As shown	A1
PHF-MB-S278-GF-DR-D-F/04	Standard Details Drawing 4 of 5	As shown	A1
PHF-MB-S278-GF-DR-D-F/05	Standard Details Drawing 5 of 5	As shown	A1

Standard Details (Supplied) – TMP

<u>Drawing No.</u>	<u>Title</u>	<u>Scale</u>	<u>Size</u>
558022-000002001	Heritage Solalite Bollards	NTS	A4

Standard Details (Supplied) – WYG

<u>Drawing No.</u>	<u>Title</u>	<u>Scale</u>	<u>Size</u>
-	Acoustic Fence Detail	NTS	A4

Standard Details (Not Supplied) – Manual of Contract Documents for Highway Works HCD's

<u>Drawing No.</u>	<u>Title</u>	<u>Scale</u>	<u>Size</u>
F1	Surface Water Drains – Trench and Bedding Details	NTS	A4
I2	Duct Trench Cross Sections and Details of Mandrell	NTS	A4

Appendix 1/1 - Temporary Accommodation and Equipment for Overseeing Organisation

Accommodation Required

An adequate desk, chair and filing cabinet(s) and associated space within a secure section of the Contractor's Site offices will be required for one Resident Engineer throughout the course of the works. Suitable power supply for a computer etc will be required. Adequate parking and welfare facilities etc shall be made available on site for use by the Resident and Visiting Engineers (including the Highway Authority) as may be required during the course of the works.

Appendix 1/4 - Working and Fabrication Drawings

The Contractor shall provide detailed working and fabrication drawings for the following aspects of the Works, in accordance with Clause 104:

Series	Description of Work
100	Traffic Management
300	Temporary Fencing
1200	Traffic Signs
1300/1400	Road Lighting and Cabling

Appendix 1/5 - Testing to be carried out by the Contractor

Notes:

- 1 **The Contractor is advised to agree the exact testing regime with the Engineer/Highway Authority in writing prior to commencement of the works.**
- 2 Unless otherwise stated above, all sampling and testing in this Appendix shall be by the Contractor.
- 3 Tests comparable to those specified in this Appendix will be necessary for any equivalent work, goods or materials proposed by the Contractor (See sub-Clause 105.4).
- 4 (N) indicates that a UKAS or equivalent accredited laboratory sampling and test report or certificate is required.
- 5 Unless otherwise shown in this Appendix tests for work, goods or materials as scheduled under any one Clause are required for all such work, goods or materials in the Works.
- 6 Cube strength tests are not required for concrete complying with Clause 2602.
- 7 Unless otherwise shown in this Appendix test certificates for work, goods or materials as scheduled under any one Clause are required for all such work, goods or materials in the Works.
- 8 All tests highlighted on the following list must be carried out as required by the works. All other tests shall be required as requested from the Engineer/Highway Authority.
- 9 The Contractor should note that surface course surface regularity testing (Clause 702) is included in this Appendix / Schedule.

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 300					
306	Permanent Fencing				Quality management scheme applies
	Concrete components	Cover to reinforcement	1 per consignment (maximum 1 per 100 components) (BS 1722)		[Tests/samples should not normally be required]
308	Gates and stiles				Quality management scheme applies
	Reinforced concrete posts	Cover to reinforcement	1 per consignment (maximum 1 per 100 components) (BS 3470)		[Tests/Samples should not normally be required]
308 & 311	Preservation of Timber	Full sapwood penetration	As required in sub-Clause 311.2(v)	Required for each batch	Quality management scheme applied
Series 400					
402	Welding	Welding procedures (manufacturers tests)	(Every seven years)		Quality management scheme applies
		Welder qualification (manufacturers tests)	As required in sub clause 402.6 (iii)		
		Production testing (Manufacturers tests)	As required in sub clause 402.6 (iv)		
	Welded joints	Destructive testing	[See sub clauses 402.6 (v) and 402.6 (vi)]		
403	Anchorage and attachment systems for use in drilled holes	Ultimate tensile load (Manufacturers test)		Required	To provide well attested and documented evidence [See NG403.15]
404	Anchorage in drilled holes	Loading test on site	As required in Appendix 4/1		
	Post foundations				[See NG 404.3]

Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
Series 400 (continued)						
406	Vehicle parapets				Required (BS6779-1 1998AAmd . No. 14290, 21 March 2003))	Quality management scheme applies
408	Welding		Welding procedures (manufacturers tests)			[(N) See NG408]
			Welder qualification (manufacturers tests)			
			Production testing (Manufacturers tests)			
	Welded joints	Destructive testing				
409	Vehicle parapet posts		Production testing as specified in BS 6779-1 1998 (Amd No. 14290, 21 March 2003) (Manufacturers tests)		Required	Certification in accordance with Clause 409 is required
410	Anchorages in drilled holes		Loading test on site	[As required]	required	Anchorages should hold a current BBA HAPAS Roads and Bridges Certificate (or fully equivalent scheme) conforming to the specification
Series 500						
501	Pipes for Drainage and Service ducts					Product certification applies [Note 1 Additional manufacturers tests are provided for in the relevant BS but should not normally be required.] [Note 2. Certificates are provided for in the relevant BS but should not normally be required except for pipes which are not quality marked by a UKAS or equivalent accredited body listed in Appendix B.]
	Vitrified clay		[See note 1]			
	Concrete PC/SRC	Not exceeding 900mm dia	[See note 1]		[See note 2]	
	Concrete Prestressed					
	Iron-cast					
	Iron Ductile				[See note 2]	
	PVC-U					

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 500 (continued)					
	GRP	(Manufacturers tests)		Required (AASHTO)	
	Plastics. See Table 5/1				
	Corrugated steel				
	Corrugated steel bitumen protection				
	Not exceeding 900mm dia				
	Other materials			Required	BBA certification (or equivalent) applies
503	Pipe bedding	Grading and fines content	1 per week (min of 3)	required	[Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of BS EN 13242. Appropriate tests/samples for the resistance to freezing and thawing (magnesium sulfate soundness) should be scheduled where required, NG 803.4]
		Water-soluble sulphate (WS) content (N)	5 per source *		[Minimum to allow for natural variability of sulphur compounds]
		Oxidisable sulfides (OS) content and total potential sulphate (TPS) content (N)	5 per source		
		Resistance to fragmentation (N)	1 per source *		[LA category]
	Filter medium backfill	Plastic index (N)	1 per source *	Required	[Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of BS EN 13242 and Annex D of BS EN 13285]

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 500 (continued)					
		Resistance to Fragmentation (N)	1 per source *		[Appropriate tests/samples for the resistance to freezing and thawing (magnesium sulfate) should be scheduled where required, NG 803.4]
		Water-soluble sulphate (WS) content (N)	5 per source		[Minimum to allow for natural variability of sulfur compounds]
		Oxidisable sulfides (OS) content and total potential sulphate (TPS) content (N)	5 per source		
		Grading and fines content	1 per week		[Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of BS EN 13242 and Annex D of BS EN 13285]
		Permeability (N)	1 per source *		
506	Sealing existing drains				[Appropriate tests/samples should be scheduled where not included under other Clauses]
	Concrete				
	Grout				
507	Chambers				
	Precast concrete				Product certification scheme applies
	Corrugated galvanised steel	(Manufacturers tests)		Required	Product certification scheme applies
	Manhole steps				
	Steel fitments				
	Covers, grates and frames				Product certification scheme applies
	Cover bolts				Quality management scheme applies
508	Gullies and pipe junction				Product certification scheme applies
	Precast concrete				
	Clay				
	Cast iron and steel				

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 500 (continued)					
509	Watertightness of joints	Air test	All pipelines with watertight joints [As required in Appendix 5/1 for partly watertight joints]	Required	
512	Backfill to pipe bays	Grading	1 per 50 tonnes (min of 3)	Required	[Appropriate tests/samples for the resistance to freezing and thawing (Magnesium sulfate soundness) should be scheduled where required, NG 803.4]
		Water-soluble sulfate (WS) content (N)	5 per source*		Minimum to allow for natural variability of sulfur compounds
		Oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	5 per source*		
513	Permeable backing to earth retaining structures	Plastic Index (N)	1 per source*	Required	[Appropriate tests/samples for the resistance to freezing and thawing (magnesium sulfate soundness) should be scheduled where required, NG 803.4]
		Water-soluble sulfate (WS) content (N)	5 per source	Required	[Minimum to allow for natural variability of sulfur compounds]
		Oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	5 per source		
		Resistance to fragmentation (N)	1 per source*		
		Grading	1 per 200 tonnes (min of 3)*		
		Permeability (N)	1 per source*		
	Precast hollow concrete blocks	(Manufacturers tests)		Required	

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 500 (continued)					
514	Fin Drains	(Manufacturers tests)		Required	BBA certification (or equivalent) applies
515	Narrow filter drains				
	Geotextile, pipes and fittings	(Manufacturers tests)		Required	BBA certification (or equivalent) applies
	Granular fill	Plastic Index (N)	1 per source*		
		Resistance to fragmentation (N)			
		Water-soluble sulfate (WS) content (N)	5 per source		[Minimum to allow for natural variability of sulfur compounds]
		Oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	5 per source		
		Grading and fines content	1 per week (min of 3)		[Results of routine control tests from factory production control system operated by the producer to be provided – see Annex C of BS EN 13242]
		Permeability (N)	1 per source*		
516	Combined drainage and kerb system	Load test	A minimum of 1 test and not less than 1 test per 1000m for each type and source	Required	Certification that the systems comply with Clause 516 is required
517	Linear drainage systems	Load test	A minimum of 1 test and not less than 1 test per 1000m for each type and source	Required	Certification that the system comply with Clause 517 is required
518	Thermoplastics structured wall pipes and fittings	(Manufacturers tests)		Required	BBA certification (or equivalent) applies

Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments		
Series 600								
601, 631 to 637, 640	Acceptable material				Required	[For recycled aggregate, see sub-clauses 601.12 and 601.18]		
	Class	General Description						
	1	General granular fill					Grading/uniformity coefficient	Twice a week*
							Mc/MCV (N)	2 per 1000m3 up to max of 5 per day*
							SMC of chalk (N)	Twice a week*
		1C only	Resistance to fragmentation (N)	Weekly*	[LA category]			
	Class	General Description						
	2	General cohesive fill	Grading	Twice a week*	Required	[Cross-reference should be made to any requirements in Appendix 6/1]		
				Mc/MCV/PL Undrained shear strength (N)	2 per 1000m3 up to max of 5 per day*			
				SMC of chalk (N)	Twice a week*			
			Bulk density (pfa) (N)	2 per 1000m3 up to max of 5 per day				
			3	General chalk fill			mc (N)	2 per 1000m3 up to max of 5 per day*
							SMC (N)	Daily*
	4	Landscape fill	Grading/mc/MCV (N)	Daily*	Required	[LA category but not for Class 6F4 and 6F5]		
	5	Topsoil	Grading	Daily*				
	6	Selected granular fill	Grading/uniformity coefficient	1 per 400 tonnes*				
			PI/LL (N)	Daily*				
			Resistance to fragmentation (N)	Weekly for on-site material*				
			SMC (N)	Weekly*				
			Omc/mc, mc or MCV (N)	1 per 400 tonnes*				
			Organic matter/water soluble sulfate (WS) (N)	Weekly*				
			Oxidisable sulfides (OS) and total potential sulfate (TPS) content (N)	Weekly*				
			Resistivity (N)	[As required]				
		Undrained and drained shear parameters (N)	[As required]	[Cross-reference should be made to any requirements in App 6/1]				

Series 600 (continued)

	6F4 and 6F5		Size designation and overall grading category	1 per week*		<i>[results of routine control tests from the factory production control system operated by the producer to be provided for Class 6F4 and Class 6F5 – see Annex C of BS EN 13242 and Annex D of BS EN 13285]</i>
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Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments		
Series 600 (continued)								
	Class	General Description						
	6F4 and 6F5		Maximum fines and oversize categories	1 per week*	Required			
			Volume stability of blast furnace slag	6 monthly				
			Volume stability of steel (BOF and EAF) slag	6 monthly				
			Other aggregate requirements	Annex C of BS EN 13242				
			Laboratory dry density and optimum water content					
			Water content					
	7	Selected cohesive fill	Grading /mc/MCV/bulk density (N)	1 per 400 tonnes*				
			SMC of chalk (N)	Twice a week*				
			PI/LL (N)	Daily*				
			Organic matter/water soluble sulfate (WS) (N)	Twice a week* or daily where sulfates are expected				
			Oxidisable sulfides (OS) and total potential sulfate (TPS) content (N)	Twice a week* or daily where sulfates are expected				
			pH/chloride ion content (N)	Weekly*				
			Resistivity (N)	[As required]				
			Undrained and drained shear parameters (N)	[As required]				
			Permeability (N)	[As required]				
			8	Miscellaneous fill			Mc/MCV (N)	Daily*
			9	Stabilised materials			Pulverisation	1 per lane width per 200m length*
		mc/MCV (N)						

Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
Series 600 (continued)						
	Class	General Description				
		Bearing Ratio (N)			Required	
	Pulverised fuel ash		Chemical analysis	1 per consignment*		[As appropriate to properties stated in Table 6/1 or Appendix 6/1]
	Furnace bottom ash		Grading	1 per 300 tonnes*		
	Fill adjacent to cementitious material or metallic items		Water-soluble sulfate (WS) content, oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	1 per 400 tonnes or per location if less than 400 tonnes*		[At least 5 tests per source for sulfur compounds over the course of the contract in accordance with TRL Report 447, tests 1-5]
602	Earthworks material beneath surface of a road or paved central reserve		Frost heave (N)		Required	
	(i) Off site source			1 every four months*		
	(ii) On site source			As required		
609 621	Geotextiles		Tensile load	1 per 400 square metres*	Required	[requirements should be in Appendix 6/5 or 6/9 as appropriate]
			Permeability			
			Pore size			
612	Compaction of fills				Required	
		Method compaction	Field dry density (N)	[As required]		††
		End product compaction	Optimum mc (2.5kg rammer/vibrating hammer method) (N)	Each class or sub-class of material*		†
			Field dry density (N)	1 per 400 tonnes*		†
614	Cement stabilisation to form capping		Rate of spread of cement	1 per 500 square metres of lime spread*	Required	
615 641 643	Lime stabilisation to form capping		Rate of spread of cement	1 per 500 square metres of lime spread*	Required	
			Available lime content	Each source of lime weekly during stabilisation operation*		†

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 600 (continued)					
622 638 639	Earthworks for reinforced soil and anchored earth structures	Redox potential	5 locations within the affected area*	Required	†
	Drainage layers	Grading Chemical analysis	1 per 400 tonnes*		
	Reinforcing elements	Coeff. Of friction	Each type of element with each type of fill*		
	Anchor elements	Adhesion			
624	Ground anchorages	Proof loading	As required in Appendix 6/10	Required	†
626	Gabions			Required	
	Fill	Grading 10% fine values (N)	1 per 400 tonnes*		
	Geomesh	<i>[As appropriate to properties stated in Appendix 6/10]</i>			
	PVC coated wire		1 per 400 square metres*	Required (ASTM G23)	
642	Earthworks materials for corrugated steel buried structures	Constrained soil modulus (M*)	3 on each side of each structure*	Required	
Series 700					
710	Constituent materials in recycled aggregate	Quality control	Checks are to be carried out by the Contractor in accordance with the procedure set down in 'Quality Control – Production of Recycled Aggregate' and with those in this Clause	Required	The quality control procedure should be in accordance with the 'Quality Control – Production of Recycled Aggregates' published by Waste and Resources Action Programme is available from WRAP website, http://www.wrap.org.uk The results of all quality control checks shall be delivered promptly to the Overseeing Organisation on request.
711	Overbanding and inlaid crack sealing systems			Required	BBA certification (or equivalent) applies

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 800					
801 803 804 805 806	General requirements for unbound mixtures for adjacent to cement bound materials, concrete pavements, structures or products	Water-soluble sulfate (WS) content (N)	1 per 400 tonnes or per location if less than 400 tonnes*	Required	<i>[Minimum to allow for natural vulnerability of sulfur compound]</i>
		Oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	1 per 400 tonnes or per location if less than 400 tonnes*		
	Unbound mixtures beneath surface of a road or paved central reserve	Frost heave (N)	1 per source*		<i>[Results of routine control tests from the factory production control system operated by the producer to be provided - see Annex C of BS EN 13242]</i>
		Grading and fines content	1 per week*		
		Plastic Index (N)			
		Resistance to fragmentation (N)	6 monthly*		<i>[LA category]</i>
		Resistance to wear-micro-Deval test			<i>[Where required. See NG 801.9]</i>
		Resistance to freezing and thawing (magnesium sulfate soundness) (N)	1 per source*		<i>[Where required- See NG 803.4]</i>
		Water absorption (N)	<i>[As required]</i>		<i>[See NG 801.10]</i>
		Volume stability of blast furnace slag	6 monthly		
		Volume stability of steel (BOF and EAF) slags	6 monthly		
		CBR (N)	1 per source and then monthly*		
		OMC/mc (N)	<i>[As required]</i>		<i>[Declared values from the factory production control system operated by the producer- see Annex D of BS EN 13285]</i>
		Density (N)	<i>[As required]</i>		
		Water absorption (N)	<i>[as required]</i>		<i>[See NG 801.10]</i>

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900					
901, 925, 937, 938 943	Aggregates for bituminous materials			Required	National quality management sector scheme apply.
		Resistance to fragmentation (hardness)	Resistance to fragmentation (N)		
		Resistance to freezing and thawing (durability)	Soundness (N)		[Where required – See NG901.2]
			Water absorption (N)		[as required]
		Cleanness	Sieve test (mass passing 0.063mm sieve) (N)		Washing and sieving method to be used
		Shape	Flakiness index (N)		
		Blastfurnace slag	Bulk density (N)		[BS EN 1097 – 3]
			Soundness (N)		
			Dicalcium silicate disintegration (N)		[These are for air-cooled blastfurnace slag]
			Iron disintegration (N)		
		Steel slag	Bulk density		
			Volume stability (N)		
		Coarse aggregate for surface course	Resistance to polishing (PSV) (N)		
			Resistance to surface abrasion (AAV) (N)		
	Binders for bituminous materials	Penetration (N)	1 per 750 tonnes*	Required	National quality management sector scheme apply. Modified binders should have a BBA HAPAS Roads and Bridges Certificate. In the event that no such certificates have been issued, then in the interim, only modified binders undergoing BBA assessment should be considered for approval by the Overseeing Organisation. [More frequent tests/samples should be scheduled for modified binders.]
		Softening point (N)	1 per 750 tonnes*		
		[Other BS EN tests]	[As required]		

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900 (continued)					
903 to 907, 909 to 912, 914, 916, 925, 926, 929, 937, 938, 942, 943, 946 to 948	Bituminous mixtures	Grading (N)	For Audit Test purpose only		National quality management sector schemes apply.
		Binder Content (N)			
929	Base and Binder Course Macadams	In situ air void content (N)	[As required]	Required	
		Refusal air void content (N) (PRD Test)			
		Binder volume (N)			
		Grading (N)			
		Binder Content (N)			
911	Rolled asphalt surface course (design mix)	Stability value (N)	1 per source*	Required	National quality management sector schemes apply
		Flow value (N)			
		Density (N)			
915	Coated chippings	Grading (N)	1 per stockpile*	Required	Not required for coated chippings for surface dressing to Clause 919
		Binder content (N)	1 per stockpile*		
		Flakiness index (N)	1 per source*		
		Resistance to polishing (PSV) (N)	1 per source*		
		Resistance to surface abrasion (AAV) (N)	1 per source*		
		Hot sand test (N)	1 per source*		
		Rate of spread (N)	[As required]		
921	Surface macrotexture	Bs EN 13036-1 Volumetric Patch Technique (N)	BS EN 13036-1	Required	

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900 (continued)					
924	High Friction surfaces	Quality control checks	As required in sub-clause 924.5	Required	BBA HAPAS Roads and Bridges certification (or equivalent) applies
		System coverage	As required in Clause 924.6		
	Aggregate	Resistance to polishing (PSV) (N)	1 per source* and as required for coated chippings in sub-Clause 915.3	Required	
937	Stone mastic asphalt (SMA) binder course and regulating course			Required	National quality management sector schemes apply.
		Binder drainage test	In accordance with DD232 : 1996		
938	Porous asphalt surface course				National quality management sector schemes apply.
		Relative hydraulic conductivity	In acc. With Clause 938		
		Modified binder storage stability	In acc. With Clause 941		Modified binders should have a BBA HAPAS Roads and Bridges Certificate. In the event that no such Certificates have been issued, then the interim, only modified binders undergoing BBA assessment should be considered for approval by the Overseeing Organisation.
		Binder drainage test	In acc. With DD 232 : 1996		
942	Thin surface course systems				National quality management sector schemes apply. BBA certification (or equivalent) applies.
		Binder drainage test	DD 232 : 1996		

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900 (continued)					
943	Rolled asphalt surface course (performance-related design mix)		[As required]	Required	National quality management sector schemes apply.
		Grading (N)			
		Binder Content (N)			
		Density (N)			
		Wheel-tracking rate (N)			
		Wheel-tracking rut depth (N)			
		Air voids content			
944	Performance-specified base				National quality management sector schemes apply.
918	Slurry surfacing incorporating microsurfacing				
		Binder			Modified binders should have a BBA HAPAS Roads and Bridges Certificate. In the event that no such Certificates have been issued, then the interim, only modified binders undergoing BBA assessment should be considered for approval by the Overseeing Organisation.
		Product Identification	Per product per source	Required	Tests are expected to be repeated every two years
		Vialit cohesion	Per product per source	Required	Tests are expected to be repeated every two years
		Rate of spread	For each machine	Required	Not more than 6 weeks prior to start of work
		Penetration at 25 deg and 5 deg. Celcius (N)	Every manufacture batch		Manufacturers QA test results may be submitted
		Aggregates			
		Flakiness index (N)	1 per source	Required	[Less than 6 months prior to work]
		Resistance to polishing (AAV) (N)	Source approval	Required	[Less than 6 months prior to work]
		Resistance to surface abrasion (AAV) (N)	Source approval	Required	[Less than 6 months prior to work]
		Grading (N)	1 per 200 tonnes	Required	
	System	TAIT or BBA/HAPAS		Required	

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 900 (continued)						
920	Bond coats, tack coats and other bituminous sprays					
		Binder	Product identification	1 per product per source	Required	Tests are expected to be repeated every two years
			Vialit cohesion	1 per product per source	Required	Tests are expected to be repeated every two years
			Accuracy of spread	1 for each binder and sprayer per month	Required	Not more than 6 weeks prior to start of work and one per month
			Rate of spread	1 per week		
			Penetration at 25 deg and 5 deg. celcius	Every manufactur e batch		Manufacturers QA test results may be submitted
919 922	Surface Dressing				National quality management sector schemes apply.	
		Binder				Modified binders should have a BBA HAPAS Roads and Bridges Certificate. In the event that no such Certificates have been issued, then in the interim, only modified binders undergoing BBA assessment should be the Overseeing Organisation.
			Product Identification	1 per product per source	Required	Tests are expected to be repeated every two years
			Vialit cohesion (N)	1 per product per source	Required	Tests are expected to be repeated every two years
			Accuracy of spread	1 for each binder sprayer per week	Required	Not more than 6 weeks prior to start of work and one per week
			Rate of spread	Every 1000 linear metres initially		Frequency reduced to daily after 3 satisfactory results, but not less than 1 test per lane per site

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900 (continued)					
		Penetration at 25 deg and 5 deg celcius	Every batch		For cut back binder as supplied, manufacturers QA viscosity test results may be submitted.
	Chippings	Resistance to (PSV) polishing (N)	Source approval	Required	[Less than 6 months prior to work]
		Resistance to abrasion (AAV) (N)	Source approval	Required	[Less than 6 months prior to work]
		Grading (N)	1 per 200 tonnes	Required	
		Binder content (N)			
		Flakiness index (N)			
		Accuracy of spread (N)			
		Rate of spread	Every 500 linear metres initially		Frequency to be reduced to daily after 3 satisfactory results, but not less than 1 test per lane per site
	System	TAIT or BBA/HAPAS			
	Rollers	Spray bars working	Before works starts and daily during works		
950	Depressions				BBA HAPAS Roads and Bridges certification (or equivalent) applies
Series 1000					
1001 1030 1044	Cement			Required	Quality management and product certification schemes apply
	Portland cement CEM I				Tests and test certificates are required
	Portland blastfurnace cement				
	Blastfurnace cement CEM III/A				
	Portland pfa cement CEM II/B-V				
	Pozzolanic cement CEM IV/A			Required (BS 6610)	
	Portland cement with microsilica			Required	BBA Roads and Bridges Certificate required for microsilica

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1000 (continued)					
	Pulverised-fuel ash			Required	Tests and test certificates are required. Product certification schemes apply to pfa and slag
	Ground granulated blast furnace slag				
	Admixtures				
	Mixing water	Sulfate content (N)	Monthly		
	Aggregates	Resistance to freezing and thawing – magnesium sulfate soundness (N)	1 per source*	Required	[Where required – See NG 1001.20. Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of BS EN 13242]
		Water absorption (N)	[As required]		
		Flakiness index (N)	Monthly*		
		Shell content (N)	1 per source*		
		Resistance to fragmentation (N)	6 monthly		
		Resistance to polishing (PSV) (N)	1 per source*		
		Resistance to abrasion (N)	1 per source*		
		Grading and fines content (N)	1 per week per source*		
		Chloride content (N)	Weekly or as otherwise agreed (1 per source for CBM Aggregates)		
		Total sulfur (TS) and acid-soluble sulfate (AS) content (N)	Every 6 months		
	Flint course aggregate containing white flints	Water absorption (N)	3 per source thereafter weekly	Required	[At least 5 per source for sulfur compounds]
		Acid-soluble material (N)	Monthly*		
		Bulk Density (N)	Every 6 months		
		Dicalcium silicate disintegration (N)	Every 6 months		
	Sand (ie fine aggregate)				Not required for CBM Aggregate [See BS EN 12620, clause 4.7 and Annex D]
	Blastfurnace slag				[These are for air-cooled blastfurnace slag]

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1000 (continued)					
		Iron disintegration (N)	Every 6 month		<i>[At least 5 per source for compounds]</i>
		Total sulfur (TS) and acid-soluble sulfate (AS) content (N)	Every 6 months		
	Pulverised-fuel ash			Required (BS 3892-2)	
1002 1003 1004 1044	Pavement concrete	Air content test (N)	As required in Table 10/10	Required	Product certification scheme applies
		Density (N)	As required in Table 10/10		
		Strength (N)	As required in Table 10/10		
1005	Consistence (workability)	Degree of Compactability (Compaction Index) (N)	As required in Table 10/10	required	<i>[See also sub-clause 1005.2]</i>
		Vebe (N)			
		Slump (N)			
1011 1012	Dowel bars Tie bars				
	Dowel bars and supporting cradles	Load test	1 per arrangement*		<i>[See also sub-clauses 1011.5-7].</i>
	Sheathed dowel bars	Bond stress	4 bars		
	Cranked tie bars (coated)	Bend test	4 bars*		
		Salt fog cabinet	4 bars*		
1015	Joint filler board	Weathering test	3 per source	Required	Normally undertaken by manufacturer
		Compression and recovery	4 per source		
		Extrusion	1 per source		
	Cork filler board	Immersion in water	2 per source		
		Immersion in water	2 per source		
1016 1017	Applied sealants			Required (BS 2499) (BS 5212: Part 1 and BS 5212: Part 2) (BS 4254)	
		Initial penetration	1 per 1000m or 1 per day		

		Resilience	1 per 1000m or 1 per day			
Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 1000 (continued)						
	Compression seals			Required (ASTM D2628) (BS 2752) (BS 4443: Part 4, Method 10 and BS EN ISO 2440) (BS EN ISO 1856) (BS 903: Part A16 or BS ISO 1817)		
		Compression set	1 per type of seal*			
		Immersion in oil	1 per type of seal*			
	Self expanding cork seal	Tests specific in Clause 1017	1 per type of seal*			
1026 1044	Surface macrotexture	BS EN 13036-1 Volumetric patch Technique (N)	1 per day (set of 10)*	Required		
1027	Aluminised curing compound	Efficiency Index	1 per source*	Required		
1030	Wet lean concrete	Density	As required in Table 10/10	Required		
		Cube strength (N)				
1043	Foamed Concrete	Cube strength (N)	2 cubers per 12m3	Required		
Series 1100						
#1101	Precast concrete kerbs, channels, edgings and quadrants	Bending strength	Minimum of 8 per 1000 units of each product (BS EN 1340)	Required		
1102	In situ asphalt kerbs	Grading	1 test per 500 metres laid*	Required	[See BS 5931 for materials for in situ asphalt kerbs]	
		Binder content				
1104	Precast concrete flags	Bending strength	Minimum of 8 per 1000m2 units of each product (BS EN 1339)	Required		
	Bedding	Granular material				
		Mortar				
					[Appropriate tests/samples should be scheduled where not included under other Clauses]	

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1000 (continued)					
1107	Concrete block paving	Compressive strength	Minimum of 8 per 1000m2 units of each product (BS EN 1338)	Required	
1108	Clay pavers	Bending strength	Minimum of 8 per 1000m2 units of each product (BS EN 1344)	Required	
		Skid resistance	Minimum of 8 per 1000m2 units of each product (BS EN 1344)		
Series 1200					
1202	Permanent traffic signs			Required <i>[Where considered appropriate]</i>	Quality management scheme applies. Certification that the traffic sign is capable of passing the tests in BS 873: Part 1 is required
1207	Anchorage in drilled holes to supports of traffic signs	Loading test on site	<i>[As required]</i>		
1210	Holding down bolts and anchorages to bases of permanent bollards			Required <i>[Where considered appropriate]</i>	Certification that the holding down bolts and anchorages are capable of complying with the performance requirements of BS 873: part 3 is required
1212	Road markings				National quality management sector scheme applies. Procedures are given in BS EN 1824
		Tests specified in BS EN 1824		Required	
1214	Permanent traffic cones and traffic cylinders			Required	Certification that permanent traffic cones and cylinders have been tested and comply with BS EN 13422 is required

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1200 (continued)					
		Tests specified in BS 873: Part 8	2 of each size and category / type*		† [Where required]
	Flat traffic delineators			Required	Certification that FTD's have been tested and comply with Clause 1214 is required
		Test specific in Appendix 12/4	[As require]		† [Where required]
	Other traffic delineators			Required	Certification that delineators have been tested and comply with Clause 1214 is required
		Test specific in Appendix 12/4	[As require]		† [Where required]
	Temporary cones, cylinders, FTD's and other delineator			Required	Certification that at least 1 in 500 of any batch of cones, cylinders, FTD's and other delineators to be used in the Temporary Works have passed the tests in Clause 1214 as appropriate is required
1217	Traffic signals				Quality management scheme applies. Statutory type approval of equipment applies
	Cables				[Special sample tests to BS 6346 should be scheduled where appropriate] Product certification scheme applies
	Controllers [Other equipment]	Test specified in Appendix 12/5	Each controller before delivery to Site and again after installation		

Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
Series 1200 (continued)						
		Cabling	Tests a, b, c, e, f, g, h, j as defined in sub clause 1424.2	Each traffic signal installation	Required	Certification that the installation complies with BS7671 (the IEE Wiring Regulations) is required
1218	Detector loops	Cable			Required	Certification that completed cables comply with specification TR 2029 is required
		Epoxy resin			Required <i>[Where considered appropriate]</i>	Certification that the epoxy resin complies with specification MCH 1540 is required
		Feeder cable			Required	Certification that completed cable comply with specification TR 2031 is required
		Joints	Pull test (4 kgf)	Each crimp		
		Installation	Series resistance	Each loop		Certification in accordance with specification MCH 1540 is required
			Insulation resistance			
			Inductance			
		Series 1300				
1305	Anchorage for use in drilled holes		Tensile load (Manufacturers tests)		Required	To provide well attested and documented evidence
1306	Anchorage in drilled holes to columns and masts with flange plates		Loading test on site	<i>[As required]</i>		†
1310	Welding		Welding procedures (Manufacturers tests)	(Every seven years)		Quality management scheme applies
			Welder qualification (Manufacturers tests)	(Sub-clauses 1310.1 and 1310.2 (7.1.3))		
			Production testing (Manufacturers tests)	(Sub-clauses 1310.1 and 1310.2 (7.1.4))		
			Destructive testing	<i>[See sub-clause 1310.1 and 1310.2 (7.1.5)]</i>		

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1300 (continued)					
	Welded joints				†† [(N) See NG 1310]
1313	GFRP laminates	Loss on ignition	1 per 50 production columns		[See sub-clauses 1313.10-17]
		Colour fastness	1 per batch		
		Electric strength			
		Water absorption			
		Impact strength			
1314	Brackets for laminated GFRP lighting columns			Required	
	Polyurethane foam	Bulk density	1 per batch		
		Surface hardness	2 per batch		
		Apparent bulk density			
		Impact strength			
		Flexural stress			
Series 1400					
1421	Cable				[Special sample tests to BS 6346 or BS 5467, according to the cable used, should be scheduled where appropriate] Product certification scheme applies
1424	Lighting Units	Tests specified in Clause 1424	Each unit	Required	† Product certification scheme applies. Certification that the installation complies with BS7671 (the IEE Wiring Regulations) is required
	Networks	Tests specified in Clause 1424	Each network	Required	† Certification that the installation complies with BS7671 (the IEE Wiring Regulations) is required
Series 1500					
1506	Copper communications cable			Required	Certification that each completed cable complies with specification TR 2150 or TR 2158, as appropriate, is required

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1500 (continued)					
	Optical fibre communications cable			Required	Certification that each completed cable complies with specification TR 2151 or TR 2159, as appropriate, is required
	Coaxial communications				Certification that each completed cable complies with specification TR 2152 or TR 2160, as appropriate, is required
	Energy cable			Required	Certification that each completed cable complies with specification TR 2153 or TR 2161, as appropriate, is required
1513	Cable Joint Enclosures	Test specified in Clause 1513.12	Each CJE	Required	† Certification that the CJE satisfies the air pressure test is required
1518	Coaxial and copper communications and power cable	Test specified in specification MCG 1022 or MCG 1099, as appropriate	Each cable (Stage 1) As required in Appendix 15/1 (Stage 2)		† Results to be reported in accordance with MCG 1022 or MCG 1099, as appropriate
	Optical fibre communications cable	Test specified in specification MCG 1055 or MCG 1099, as appropriate	Each cable (Stage 1) As required in Appendix 15/1 (Stage 2)		† Results to be reported in accordance with MCG 1055 or MCG 1099, as appropriate
1522	Motorway System				
	Steel posts			Required (BS 6323)	
1526	Electrical Installations	Tests specified in BS 7671	Each Installation	Required	† Certification that the installation complies with BS7671 (the IEE Wiring Regulations) is required

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1500 (continued)					
1530	Cable ducts	Tests specified in BS EN 50086-1 and BS EN 50086-2-4	Each supplier	Required	Current British Board of Agreement Certificate is required
1533	Cable ducts				
	Mandrel test	Test specified in Clause 1533	Each duct	Required	† Certificate that each length of duct between chambers satisfies the Mandrel test is required
	Air test	Test specified in Clause 1533	Each duct	Required	† Certificate that each length of duct between chambers satisfies the Air test is required
Series 1600					
1601	Soil samples In situ soil tests			Required	<i>[Appropriate soil tests should be scheduled where required]</i>
1602 to 1606 1610 to 1615	Concrete Grout Reinforcement Prestressing Steelwork Welding Protection against corrosion			Required	<i>[Appropriate tests/samples should be scheduled where not included under other Clauses/Series]</i>
1606	Coatings for protection against corrosion	Adhesion	As required in Appendix 16/6		
1607	Reduction of friction on piles				<i>[Particular requirements detailed in Appendix 16/7 should be scheduled]</i>
1608 1616	Integrity testing Dynamic testing				<i>[particular requirements detailed in Appendix 16/8 or 16/16 should be scheduled]</i>
1609	Static load testing of piles			Required	<i>[Testing of preliminary piles should be scheduled in Appendix 1/5 Particular requirements detailed in Appendix 16/9 should be scheduled]</i>

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1600 (continued)					
1612	Self hardening slurry mixes				[Particular requirements detailed in Appendix 16/12 should be scheduled]
1617	Instrumentation				[Particular requirements detailed in Appendix 16/18 should be scheduled]
Series 1700					
1702 1704	Cement types as stated in sub-Clause 1702.1			Required	Certificate to be provided monthly* for each type of cement Quality management and product certification schemes apply
	Cements (all types)	Chloride content	Monthly*		Tests to be carried out by the manufacturer and results included on the test certificates required above
	Pulverised –fuel ash	Sulfate content	Monthly*		
	Ground granulated blastfurnace slag	Acid-soluble alkali content	Daily (PC) Weekly (pfa ggbs)		
	Aggregates	Grading and fines content	1 per week (per source)		Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex H of BS EN 12620 Product certification scheme applies
		Shell content (N)	Monthly*		
		Flakiness index (N)	Monthly*		
		Resistance to fragmentation (N)	Every 6 months		
		Drying shrinkage (N)	1 per 5 years		
		Chloride content (N)	1 per week or as otherwise agreed		
		Sulfate content (N)	Yearly		
		Blastfurnace slag	Bulk density (N)	Every 6 months	

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1700 (continued)					
		Stability (N)	Every 6 months		
		Sulfur content (N)	Every 6 months		
	Water	Tests specified in BS EN 1008	<i>[As required]</i>		
		Chloride content	Monthly*		
		Sulfate content	Monthly*		
		Acid-soluble alkali content	Weekly*		
	Admixtures	Chloride content	1 per consignment	Required (BS 934-2)	<i>[See sub-Clause 1702.3]</i>
		Sulfate content	1 per consignment	Required	
		Acid-soluble alkali content	1 per consignment		
1707	Concrete	Cube strength (N)	Prestressed concrete- two cubes from 12m3 or 2 batches whichever represents the lesser volume	Required	Contractor to cast and test sufficient additional cubes to demonstrate cube strength before transfer †
			Reinforced concrete- two cubes from 24m3 or 4 batches whichever represents the lesser volume		
			Mass concrete- two cubes from 50m3 or 50 batches whichever represents the lesser volume		<i>[See also Table NG 17/1]</i>
			Additional cubes for special purposes		<i>[tests/samples should be scheduled as required See NG 1707.6]</i>

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1700 (continued)					
		Cube strength-identity testing as described in Appendix 17/4 (N)	2 cubes from each of two samples of each batch		<i>[requirements should be given in Appendix 17/4 as appropriate] [See sub-Clause 1707.2 and Appendix 1/6]</i>
		Density	<i>[As required]</i>		<i>[Requirements should be given in Appendix 17/1 as appropriate]</i>
		Modulus of elasticity			
	Fresh concrete	Consistence (slump or compacting factor or Vebe) (N)	Each batch	Required	<i>[See sub-Clause 1707.2]</i>
		Air content	Each batch		
		Cement content	<i>[as required]</i>		
		Water/cement ratio			
1709	Silane			Required for each delivery	Certification that the silane complies with Clause 1709 is required
		Refractive Index	Three samples		<i>[See sub-Clause 1709.2 (ii)]</i>
		Trial panels, where required in the Contract			<i>[See sub-Clause 1709.8]</i>
1710	Concrete packing Mortar packing Epoxy resin bonding agent				<i>[Appropriate tests/samples should be scheduled]</i>
	Precast concrete manufactured off site	Cube strength (Manufacturers tests)			Contractor to make available records of tests by the manufacturer
1711	Grouting and Duct Systems for Post-tensioned tendons				CARES scheme for supply and Installation of Post-tensioned systems in concrete structures or an equivalent scheme is required Quality management and product certification schemes for cement apply
		Full scale trials, where required in the Contract			See sub-Clause 1711.1 and Appendix 17/6
		Air pressure tests			See sub-Clause 1711.3 and Appendix 17/6

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 1700 (continued)						
		Duct assembly verification tests			See sub-Clause 1711.3 and Appendix 17/6	
		Wall thickness of ducts after tensioning			See sub-Clause 1711.3 and Appendix 17/6 Contractor should provide evidence of testing	
		Fluidity	See Table 17/14		See sub-Clause 1711.8 and sub-Clause 1711.9 and table 17/15	
		Bleeding				
		Volume change				
		Cube strength				
		Sieve				
		Sedimentation				
	Admixtures			Required	Quality management and product certification schemes apply Data on their suitability, including previous experience should be made available. See sub-Clause 1711.10	
	1712	Reinforcement				Product certification scheme applies
	Steel bars	Required (BS 4449)				
	Steel wire	Required (BS 4482)				
Steel fabric	Required (BS 4483)					
Stainless steel	Required (BS 6744)					
1713	Fabricated reinforcement			Required	Certification that fabricated reinforcement complies with the routine inspection/testing requirements of BS 8666 is not covered by a product certification scheme listed in Appendix B	

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1700 (continued)					
1716	Reinforcement jointing systems	Permanent elongation Characteristic strength (Manufacturers tests)		Required for each type of connection	BBA Roads and Bridges certificate or CARES certificate of product assessment or fully equivalent scheme apply
1717	Reinforcement metal arc welding	Welding procedure approval (BS 7123)	As required in BS 7123		[Where tests in addition to those specified in BS 7123 (tensile test and macroetch test) are required full details should be scheduled] Tests should be carried out by an independent testing body specified in BS 8666
		Welder approval (BS 7123)			
1718	Prestressing tendons				
	Steel wire				
	Steel bar				
	Seven-wire strand				
	Prestressing steel (all types)	Proof load Breaking load Elongation Ductility Relaxation Modulus of elasticity	[as required]		†
	Super strand to BS 5896 or other than lowest strength 3-7mm dia wires to BS 5896	0.1% proof load Breaking load	Each reel		†
1724	Post-tensioning anchorages	Tests in accordance with BS 4447 (Manufacturers tests)			Contractor to make available records of tests by the manufacturer
1726	Stainless steel bar			Required (BS 6744)	
1727	Inspection and testing of structures and components				[Tests should be scheduled as appropriate and requirements given in Appendix 17/4]

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1800					
1801 1803	Structural steels to BS EN 10025-1 to -4 and BS EN 10025-6, BS EN 10210			Required	[Give type of document required] Options as appropriate should be listed in Appendix 18/1]
	Structural steels to BS 7668			Required (BS 7668)	[Options B26-B36 as appropriate should be listed in Appendix 18/1]
	Stainless steels to BS 970; BS EN 10084, BS EN 10087 And BS EN 10095			Required (BS 970, BS EN 10084, BS EN 10087 and BS EN 10095.)	[Intercrystalline corrosion test should be scheduled where required]
	Stainless steel to BS EN 10029, BS EN 10048, BS EN 10051, BS EN 10258, BS EN 10259			Required (BS EN 1029, BS EN 10048, BS EN 10051, BS EN 10258 and BS EN 10259)	[State condition of material if not softened condition. Give information required for test certificate as BS EN 10029; BS EN 10048; BS EN 10051; BS EN 10258; BS EN 10259]
	Steel plate	Ultrasonic testing	[As required]		[See guidance clause 3.1.4 of BS 5400: Part 6]
	Bolts, nuts and washers				Quality management scheme applies
	All types except high strength friction grip	Test specified in BS 4395: Part 2	As required in BS 4395: Part 2		
	High strength friction grip	Test specified in BS 4395: Part 1 or Part 2	As required in BS 4395: Part 1 or Part 2		[tests/samples for the optional tests provided for in BS 4395: Parts 1 and 2 should be scheduled where required]
	Tension Control Bolts	Test specified in JSS II-09-1996 or BS 4395	As required in JSS II-09-1996 or BS 4395		
	Welding electrodes				
	Covered steel			Required (BS EN 499)	

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 1800 (continued)						
	Wire			Required (BS EN 756; BS EN 760)		
	Welding	Welding procedures	Tests specified in BS EN ISO 15614-1	As required in BS EN ISO 15614-1 and Appendix 18/1	Results to be reported in accordance with Annex A of BS EN ISO 15614-1	
		Welder qualification	Tests specified in BS EN 287: Part 1	As required in BS EN 287: Part 1 for each welder		Certificate to be in accordance with Annex B of BS EN 287: Part 1
		Butt weld 'Run-off' plates	Destructive tests specified in BS 5400: Part 6	As required in BS 5400: Part 6	[Full details should be scheduled. See clause 5.5.2 of BS 5400: Part 6 and its guidance clauses]	
		Butt welds and adjacent area of steelwork	Non-destructive tests using methods to be agreed	As required in BS 5400: Part 6		[Full details should be scheduled]
		Fillet welds	Non-destructive tests	[As required]		
		Flame cutting and shearing	Test to demonstrate procedures comply with BS 5400: Part 6 and Appendix 18/1	As required in Appendix 18/1		
		Stud shear connectors	Fixing (BS 5400: Part 6)			
			Bending (BS 5400: Part 6)			
		Series 1900				
1903	Abrasives	Grading	[As required]		†† [See NG 1903]	
		Hardness				
1909	Galvanised coatings	Tests specified in BS EN ISO 1461	[As required]			
	Aluminium and zinc spray coatings	Tests specified in BS EN ISO 22063	[As required]		Areas to be tested to be in accordance with Clause 1910	
		Aluminium coating material		Required (BS EN 1301-1)		
		Zinc coating material		Required (BS EN 1179)		

Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
Series 1900 (continued)						
	Sherardized coatings		Tests specified in BS 4921	[As required]		[Sampling procedure and any special adhesion requirements including test method should be scheduled]
	Zinc electroplated coatings		Tests specified in BS 3382: Part 2	[As required]		
	Plating to high strength friction grip and tension control bolts					[Special tests to detect hydrogen embrittlement should be scheduled where required]
1910	Metal spray coatings		Tensile test specified in BS EN 22063	[As required]		†
			Grid test specified in BS EN 22063	[As required]		†
#1911 1911S E	Paints					
		'A' and 'B' Samples	Specific gravity	[See Clauses # 1911 and 1911 SE]		†† [See NG 1911] Samples will be selected in accordance with Clauses 1911 and 1911SE] [See Clauses#1912 and 1912SE]
			Colour match			
			Composition			
			Application characteristics			
Series 2000						
2003	Permitted waterproofing systems		[As required-See NG 2003]			Registration and BBA Roads and Bridges Agreement certification apply
	Additional bituminous protection		Tests specified in BS 594: Part 1	1 per 15 tonnes*		Sampling to comply with BS 594:Part 1
		Stability value	Test specified in BS 598: Part 107	1 per 15 tonnes*		
2004	Tar		Tests specified in BS 76	1 per source*		Sampling to comply with BS 76
	Cut back bitumen		Tests specified in BS 3690: part 1	1 per source*		Sampling to comply with BS 3690:Part 1 [The viscosity test is normally sufficient]
Series 2100						
2101	Bridge bearings					
		Elastomeric bearings	Hardness	[as required]	Required (BS5400:S ection 9.2)	

Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
Series 2400						
			Tensile strength	[As required]	Required (BS5400:Section 9.2)	[tests/samples should be scheduled only where tests are required on samples cut from a finished bearing]
			Elongation			
			Ageing			
			Compression set			
			Ozone resistance			
		Complete bearings	Tests specified in Appendix 21/1	As required in Appendix 21/1		
2401	Masonry cement				Required (BS EN 413-1)	Quality management scheme applies [see also clause 7.1 and the national annex NB of BS EN 413-1]
Chloride content			Monthly*	Required	Test to be carried out by the manufacturer and results included on the test certificate	
2402	Sand				Required per consignment (BS EN 13139)	
2403	Mortar admixtures				Required (BS EN 934-3)	
2405	Lime				Required (BS EN 459-1)	
2406/2417	Bricks					[tests samples (in accordance with BS EN 771-1/TRL Report 447) should be scheduled as required]
Clay			(Soluble salt content Efflorescence Compressive strength Water absorption Initial rate of suction) (BS EN 771-1/TRL Report 447)			
Calcium silicate						
Concrete						
2407	Blocks					
		Concrete			Required (BS 6073-1/BS EN 772-2)	

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2400 (continued)					
2408	Reconstituted stone				<i>[Tests/samples (in accordance with BS 6457) should be scheduled as required]</i>
2410 2411	Stainless steel				
	Wire/fabric			Required (BS EN 10088-1)	
	Bars			Required (BS 6744)	
	Ready mixed mortars			Required (BS 4721)	
	Mortars	Tests specified in Appendix A1 of BS EN 10521-1	1 set of tests per mix*		
Series 2500					
2501	Materials for corrugated steel buried structures exceeding 900mm clear span or internal diameter				Type approval applies
	Steel components			Required as appropriate to the standard or specification listed in the type approval Certificate	BBA Roads and Bridges Certification applies
	Zinc coating				
	Protective coating				
	Paved invert system				
2502	Materials for reinforcing elements, prefabricated facing and capping units, and washers				BBA Roads and Bridges Certification applies
	Carbon steel strip			Required (BS 1449: Part 1.1 or BS EN 10025-1 and BS EN 10025-2)	Silicon content and mechanical properties to be stated on the certificate
	Stainless steel strip			Required (BS EN 10029, 10048, 10051, 10258 and 10259)	Mechanical properties to be stated on the certificate

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2400 (continued)					
	Reinforcing bar for anchor elements			Required (BS 4449)	Tests scheduled under Clauses 1717 and 1909 are required for welding and galvanising of anchor elements
	Materials for fasteners				
	Stainless steel			Required (BS EN 10088-1) (BS EN ISO 3506-1 and 3506-2)	
	Bolts, screws and nuts				Tests scheduled under Clause 1909 are required for hot dip galvanizing
2503	Materials for pocket type reinforced brickwork retaining wall structures				
	Clay bricks	(Soluble salt content Efflorescence Compressive strength Water absorption Initial rate of suction) BS 3921/TRL Report 447) (N)	1 set of tests per type of brick*		<i>[Soluble salt content – sulfate shall be determined in accordance with test No 2 in TRL report 447]</i> <i>[random sampling to BS 3921 to be employed]</i>
2504	Environmental barriers				Quality management scheme applies <i>[Appropriate tests/samples should be scheduled under other Clauses]</i>
	Timber				
	Concrete				
	Steel				
	Brickwork				
	Other materials				
	Barriers	Sound absorption Sound Insulation	As required in Appendix 25/4		<i>[See NG 2504 14-17]</i>
	Post foundations	Loading test on site	As required in Appendix 25/4		<i>[See NG 2504.12]</i>

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2400 (continued)					
2505, 2506	Drainage structures/buried rigid pipes for drainage structures Pipes for drains and culverts having diameters or clear span exceeding 900mm				
	Vitrified clay	[see Note 1]			Product certification scheme applies [Note 1. Additional manufacturers tests are provided for in the relevant BS but should not normally be required]
	Concrete PC/SRC	(Manufactures test)			See sub-Clause 2506.28
	Iron	[see Note 2]			[Note 2. Certificates are provided for in the relevant BS but should not normally be required except for pipes which are not quality marked by a UKAS or equivalent accredited body listed in Appendix B of SHW.]
	Corrugated steel	(Manufacturers test)			Type Approval Certificate and BBA Roads and Bridge Certificate apply
Series 2600					
2601	Bedding mortar materials			Required for each batch	Certification in accordance with Clause 2601 is required
	Bedding mortar	Flow cone test	Each batch		† laboratory tests
		Flow between glass plates			
		Compressive strength			
		Expansion test			
		Water absorption			
		Elastic stability	1 per source		
		Flow cone test Compressive strength	Each load		Site control tests
2604	Plastic coating to fencing post, gates and ancillaries			Required (BS 1722: Part 16) applicator is required	Certification by powder manufacturer and coating
2607	Granolithic concrete				Testing to be in accordance with Clauses 1702, 1703, 1707 and 1710

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 3000					
3001	General				Inspection Report as Required in Appendix 30/1
3005	Grass seeding, Wildflower seeding and turfing	Rate of spread of fertilizer	1 per 1000 square metres*		
		Rate of spread of seeding	1 per 1000 square metres*		††
		Chemical analysis of fertilizer	1 per source*		
		Grass seed germination and purity (Official Seed Testing Station tests)	1 per source and mix variety*	Required prior to sowing	†
Series 5000					
5003	Abrasives	Grading	[As required]		†† [see # NG 5003]
		Hardness			
5005	Aluminium and zinc spray coatings	Tests specified in BS EN 22063	[As required]		Areas to be tested in accordance with Clause 5006
	Aluminium coating material			Required (BS EN 1301-1)	
	Zinc coating material			Required (BS EN 1179)	
	Sherardized coatings	Tests specific in BS 4921	[As required]		[Sampling procedure and any special adhesion requirements including test method should be scheduled]
	Zinc electroplated coatings	Tests specified in BS 3382: Part 2	[As required]		
	Planting to high strength grip and tension control bolts				[Special tests to detect hydrogen embrittlement should be scheduled where required]
5006	Metal spray coatings	Tensile test specified in BS EN 22063	[As required]		†
		Grid test specified in BS EN 22063	[As required]		†

Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
Series 5000 (continued)						
# 5007 5007S E	Paints					
		'A' and 'B' Samples	Specific Gravity	[see Clauses #5007 and 5007SE]		†† [see NG #5007] Samples will be selected in accordance with Clauses #5007 and 5007SE
		Colour match				
		Composition				[see Clauses #5009 and 5009SE]
		Application characteristics				

Key

- † Indicates a requirement in SHW for the test to be carried out by the Contractor; such tests should therefore be scheduled in Appendix 1/5.
- †† Indicates a statement in SHW that the test may/will be carried out under the direction of the Overseeing Organisation; samples for such tests should therefore be required in Appendix 1/6.
- * Indicates that the frequency of testing is given for general guidance and is only indicative of the frequency that may be appropriate (i.e. no frequency is given in the SHW or reference documents). Where materials are known to be marginal or if initial test results show them to be such, the frequency of testing should be increased. Conversely where material properties are consistently in excess of specified minimum requirements or well below specified maximum limits, then the frequency of testing should be reduced.
- (N) Indicates that a UKAS or equivalent accredited laboratory sampling and test report or certificate is required.

Appendix 1/6 - Supply and Delivery of Samples to the Engineer

1. All testing required is to be carried out by the Contractor to the satisfaction of the Highway Authority.

Appendix 1/7 - Site Extent and Limitations on Use

1. Extent of the Site

- a) The extent of the site is indicated on the drawings.
- b) The site includes the following areas:

Part of the carriageway, footway and verges of Fitzalan Link and part of the development site

2. Limitations on Use

- a) Work on the existing carriageways is to be restricted where possible to ensure that free flowing traffic conditions are maintained at all times.
- b) The use of temporary traffic signals will only be permitted with the advance written permission of the Highway Authority.
- c) For the purposes of work on the existing carriageways, permitted hours of working are provided in Appendix 1/17.
- d) Access is to be maintained at all times to properties adjacent to the works, unless otherwise agreed with the owner and occupier of those properties.
- e) The Contractor shall obtain the written approval of the Highway Authority to the siting of all huts, equipment, stacks or heaps within the highway boundary. On completion of the works, the huts, equipment etc. shall be removed and the sites made good to the satisfaction of the Highway Authority.
- f) The Contractor shall at all times keep all roads, street, private entrances, verges, cycle tracks, paths, footways, drains and sewers in the area of the works in a safe, and passable state. All waste or superfluous material on the site shall be cleared away by the developer as the works progress.

Appendix 1/8 - Operatives for the Engineer

1. During periodic inspections of the works by the Engineer, the Contractor shall make available on request the services of a survey operative (chainman) for the purpose of assisting in checking measurements.

Appendix 1/9 - Control of Noise and Vibration

1. The Contractor shall obtain the noise control requirements from the Local Planning Authority.
2. The Contractor shall comply with the general recommendations set out in BS5228 Noise Control on Construction and Open sites.
3. All compressors shall be 'sound reduced' models fitted with properly lined and sealed acoustic covers which shall be kept closed when the machines are in use, and all ancillary pneumatic percussive tools shall be fitted with mufflers or silencers of the type recommended by the manufacturer.
4. All vehicles and mechanical plant used for the purpose of the works shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order so that extraneous noise from mechanical vibrations, squeaking, hissing, etc. shall be reduced to a minimum.
5. The Contractor shall take all steps necessary to limit vibration caused by plant and machinery used on site. In particular, no machine which uses a system of dropping a heavy weight, whether power assisted or by gravity, on the surface of paving or foundation will be permitted for the purpose of breaking up.
6. Machines in intermittent use shall be shut down in the intervening periods between work or throttled down to a minimum.
7. Compliance with this Appendix shall not relieve the Contractor of any of his other obligations and liabilities under the Contract or requirements of the Planning Consent for the development.
8. Any works requiring the breaking out of any carriageway or other hard material using any form of percussion tool, pneumatic and/or hydraulic, (excluding cold milling and saw cutting) will not be permitted between 18:00 and 08:00 hours, on any day (after 13:30 on Saturday) or at any time on a Sunday. Working hours as described in Appendix 1/17 will also apply.

Appendix 1/12 - Setting Out and Existing Ground Levels

1. The information given below will be available for inspection during the Tender Period at:

Mayer Brown Limited
Lion House
Oriental Road
Woking
Surrey GU22 8AR Tel: 01483 750508

and will be supplied to the Contractor at the commencement of the Works.

2. The method of setting-out shall be related to a system of co-ordinated survey markers. Existing survey stations are as indicated on the setting out drawings.
3. Details of existing levels are indicated on the existing survey drawing.
4. All setting-out is to be verified with the Engineer prior to the commencement of any kerb or edging works.
5. Vertical profile of finished roads will be achieved by extension of existing long and crossfalls and additional level information provided in the form of MX Printouts and information on the setting out drawings.
6. Specific requirements for setting out Survey and Geometrical Information:
 - a) As soon as practicable after taking possession of the Site, the Contractor shall check the accuracy of the Bench Marks and immediately notify the Engineer of any discrepancies.
 - b) The Contractor shall not disturb or remove any Bench Mark except with the prior approval of the Engineer, and shall take all necessary precautions to maintain the stability of Bench Marks until such time as they are no longer required.
 - c) The Contractor shall carefully establish additional setting-out stations and Works Bench Marks, at locations approved by the Engineer, as may be necessary from time to time for the proper setting out of the Works.
 - d) The Contractor shall set out parts of the Works at such times as he may be directed by the Engineer to enable Public Utilities Undertakers, Local Authorities or other Statutory Bodies to carry out temporary or permanent alterations to their mains, services or other apparatus.
 - e) Should any setting out mark, station, peg or other apparatus however established be disturbed during the course of the works the Contractor shall suspend the activity, operatives or machinery responsible until such time as it has been replaced to the satisfaction of the Engineer.

Appendix 1/13 - Programme of Works

1. The Contractor shall provide the programme in the form of a Network Diagram/Bar Chart produced as a result of a 'critical path analysis' and must abide by the constraints below. It shall show the level of detail appropriate to each stage of the Works and all activities and restraints, each of which shall be given a short title. All events shall be numbered with earliest and latest event dates.

At the time of presentation of the Programme the Contractor shall also provide a general description of the arrangements and methods of construction.

2. Schedule of Constraints

- a) Work to Privately and Publicly owned services and supplies - see Appendix 1/16.
- b) Traffic safety and management including notice requirements and restricted working hours - with reference to Appendix 1/7 and 1/17.
- c) Restrictions arising from the use of substances hazardous to health - refer to Appendix 1/23.
- d) Restrictions arising from the control of noise or vibration - refer to Appendix 1/9.
- e) Trials and demonstrations in advance of main construction.
- f) Permanent lane markings and edge of carriageway markings shall be constructed prior to re-opening of carriageways unless otherwise agreed by the Engineer. If the Engineer agrees that carriageway markings should not be relaid by the end of a particular day/night's work the Contractor shall prior to opening of traffic either
 - i) erect and maintain appropriate Chapter 8 signing to the Engineer's approval and maintain such signs until permanent road markings are constructed;
 - or
 - ii) construct temporary road markings to the Engineer's approval. Such markings shall be completely removed prior to construction of permanent road markings (all as per Traffic Signs Manual Chapter 8, Clause 3.3)

3. The level of detail should be set not less than the following:

Level 1

Within 21 days after the acceptance of Tender and any subsequent revision, or as may be requested by the Engineer

- (i) Earthworks-each cutting and embankment.
- (ii) Roadworks
 - (a) Fencing
 - (b) Site clearance
 - (c) Topsoil strip
 - (d) Drainage, foul and surface water (pre-earthworks and second stage)
 - (e) Subbase
 - (f) Base
 - (g) Binder course
 - (h) Surface course
 - (i) Street lighting
 - (j) Traffic signing
 - (k) Traffic Signals
 - (l) Retaining structures
- (iii) Major privately and publicly owned services and supplies.
- (iv) Traffic management measures including operation of site accesses, plant crossings and temporary diversions for traffic.

Level 2

Further breakdown of items and other details as may be required.

4. The Contractor shall allow in his programme for a Pre-start meeting with the Engineer and the Highway Authority at least 6 weeks prior to commencement.

Appendix 1/15 - Accommodation Works

1. No specific accommodation works outside the highway boundaries are identified. However, the Contractor is required to make good any access or footway serving an adjacent property due to the alteration of kerblines, carriageway or footway.
2. Similarly, any damage caused by the actions of the Contractor to boundary fences/walls/hedges of properties adjacent to the works is to be made good.

Appendix 1/16 - Privately and Publicly Owned Services and Supplies

1. The Contractor shall make arrangements with the Statutory Undertakers and others concerned, for the co-ordination of his work with any work which needs to be done by them or their contractors concurrently with the Works. Compliance with the periods of notice given in this Appendix does not relieve the Contractor of his obligations.
2. Private services to individual properties have not generally been listed or shown on the Drawings. The Contractor shall make arrangements with the Statutory Undertakers and others concerned for the phasing of all necessary disconnections and diversion of private services affected by the Works.
3. Disconnected apparatus shall be removed by the Contractor only with the prior consent of the Authority concerned.
4. The names, addresses and telephone numbers of the affected authorities serving in the locality are listed below.

Name

Address

Contact/Tel.No

5. Services and Supplies Affected by the Works are as indicated on Technical and Development Services (Southern) Ltd's drawings and documents. A summary of the protection / diversion works are as follows:

<u>Authority/Description of Works</u>	<u>Group</u>	<u>Notice required to commence</u>	<u>Time for completion</u>
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The above information is given as a guide only. Discussions with the statutory undertakers is ongoing and further liaison will be required throughout the construction process to establish the actual effect on the existing apparatus.

- A - Work expected to be completed before the commencement of the Works.
- B - Work required in the Contract which does not require prior work by the Contractor.
- C - Work required in the Contract which does require prior work by the Contractor.
- D - Work expected to be under construction at the commencement of the Works.
- E - Work to be wholly undertaken by the Contractor.

6. Services and Supplies Affected by the Works are being dealt with by Technical and Development Services (Southern) Ltd. Please refer to their drawings and documents for full details of existing and proposed Statutory Undertakers' apparatus.

Appendix 1/17 - Traffic Safety and Management

1. Definitions

- a) **Traffic Management Operation:** A Traffic Management Operation consists of those activities necessary to assemble, alter and remove a traffic management system.
- b) **Traffic Management System:** A Traffic Management System is the method chosen to direct the traffic around the Works area and shall be lane closure as stated in the Contract.
- c) **Traffic Management Equipment:** Traffic Management Equipment consists of all signs and their covers, cones, cylinders, studs, barriers, road markings and lights including their supports and fixings and any cabling, piping joint connectors, gas/electricity supply or weighting down required for a Traffic Management System.

2. Responsibility for Traffic Management etc.

The Contractor is responsible for the Traffic Safety and Management and associated work as described in this Appendix.

3. Traffic Management Requirements

- i) The Contractor shall phase the Works so as to cause the minimum disruption to traffic and shall agree the phasing with the Highway Authority and the Police.
- ii) The Contractor shall produce drawings showing traffic management layouts including as appropriate:-
 - (a) Working area(s) (b) Safety zone(s) (c) Width of lanes
 - (d) Entrance and exit positions to works for site vehicles(e) Start of taper positions

The Contractor should allow 10 working days for the checking of his submissions by the Highway Authority.

- iii) Subject to approval by the Highway Authority, permitted hours of working on the public highway and within the site boundary are as follow:-

08:00 to 18:00 Monday to Friday inclusive
08:00 to 13:30 Saturdays
No works on Sundays / Public Holidays

Working on live carriageways will not be permitted during the following times (unless agreed in advance with the Highway Authority):

08:00 to 09:30 Monday to Friday inclusive
 16:00 to 18:00 Monday to Friday inclusive

Continued.....

iv) Implementation

- (a) The works will necessitate the setting up, alteration, and removal of Traffic Management Systems. Systems shall be based on the recommendations of Chapter 8 of the Traffic Signs Manual published by Her Majesty's Stationery Office and any setting up, alteration or removal of such a system shall be in accordance with the recommendations of the same document and any amendments thereof.
- (b) The Contractor shall supply, erect and remove all Traffic Management Equipment required for any Traffic Management System. All signs shall be covered when not in use.
- (c) The Contractor shall not commence any permanent works that will affect the public highway until the Traffic Management System is approved by the Police and Highway Authority and is fully operational.
- (d) The Contractor shall regularly inspect the Traffic Management System in operation at the time. Each part of the Traffic Management System shall be inspected at least once in every four hours. Any damaged or displaced Traffic Management Equipment shall be immediately reinstated. A written defects sheet together with details of remedial measures taken shall be compiled daily and submitted to the Highway Authority at weekly intervals. When major damage to the Traffic Management System occurs, e.g. in the event of a traffic accident, the Contractor shall make provision for any manpower necessary to reinstate the Traffic Management System.
- (e) Site vehicles are to be equipped with an amber flashing lamp. Hazard warning lights are not an acceptable alternative to a roof-mounted amber flashing lamp.
- (f) In addition to Clause 117.14 the roof-mounted amber flashing lamp shall be switched on when the vehicle is in the following situations:
 - a] during short term, low speed, mobile operations (e.g. vehicles engaged in surveillance of traffic management systems during maintenance operations);
 - b] whilst stationary adjacent to a trafficked lane;
 - c] whilst manoeuvring within a coned off area;
 - d] at any other time as instructed by the Highway Authority or the Police.

v) Traffic Safety and Control Officer

- (a) In order that all matters of traffic safety and control in relation to the control of traffic and the Works comply with the necessary requirements, the Contractor shall appoint a Traffic Safety and Control Officer. The Traffic Safety and Control Officer shall be a direct employee (and not a sub-contractor) who shall be entirely responsible for arranging and agreeing lane closures, liaison with the Highway Authority and the Police in all matters relating to traffic management, the management of traffic during periods of time when traffic restrictions are necessary and ensuring that all traffic management requirements are met, inspection and maintenance of all equipment as described and dealing with traffic in emergencies as specified, including notifying the police immediately of any accidents, emergencies, etc. The Contractor shall supply to the Highway Authority and Police the name and telephone number of the Traffic Safety and Control Officer.

- (b) The responsibilities of the Traffic Safety and Control Officer shall include liaison with the Highway Authority and Police concerning the following matters:-

1. Control of entry and exit to a temporary site
2. The safe working of plant, machinery and men within a temporary site.
3. Notifying the Contractor's Agent and the Highway Authority of any deterioration of safety precautions, including all traffic management and trafficked road surfaces.
4. Ensuring all personnel engaged on the Works are aware of the Contract requirements in respect of site safety.

vi) **Traffic Management Operations**

- (a) Each Traffic Management Operation shall be agreed with the Highway Authority as detailed on the drawings and shall include all equipment and activities necessary to set up, alter and maintain, remove the type(s) of Traffic Management System(s) employed in that operation, including all temporary signing and transportation of equipment to and from store (Employers or Contractors) to the temporary site.
- (b) The Highway Authority shall have the unqualified right to instruct workmen and /or sub-contractors on matters relating to traffic safety and control.
- (c) In the event of an accident or emergency occurring in the vicinity of the works, the Contractor shall, upon receipt of a written order by the Highway Authority, temporarily suspend his works and aid the Police as may be directed.
- (d) In the event of poor visibility due to fog or spray from vehicles the Highway Authority may, after consultation with the Police, withhold approval for the Contractor to set up, alter or remove a Traffic Management System until visibility is deemed, by the Police, to be suitable for the operations being carried out.
- (e) No vehicles are to utilise their white lights against the flow of traffic
- (f) The Contractor shall ensure that all his staff and those of his sub-contractors and any other personnel; who from time to time may visit the site, are aware of the requirements of Clause 117 and this Appendix. Particular attention is drawn to the requirements of Clause 117, sub-clause 18 with regard to high visibility clothing.
- (g) Non-essential vehicles, particularly private cars, shall not enter a coned off area.
- (h) During the hours of darkness the Contractor shall provide lighting which, to the satisfaction of the Highway Authority, is adequate for the work being carried out.

4. Ways affected by the Works

The Contractor must make due provision for the safety of pedestrians and cyclists crossing through or passing around the Works. All proposals to divert the route of a footway or bridleway during the course of the works must be agreed in advance with the Engineer and the Highway Authority.

It is the responsibility of the Contractor to make all necessary arrangements with the Highway Authority for Temporary Traffic Regulation Orders for the closure, partial closure or restriction of highways. The Contractor should expect an advertisement/notice period of 3 months to apply before a road closure can be effected.

Appendix 1/18 - Temporary Diversions of Traffic

1. The Contractor shall submit all proposals for the temporary diversion of vehicular traffic, cyclists and pedestrians to the Engineer for approval. The proposals shall be in the form of drawings to indicate the proposed diversion routes and shall include all traffic management measures required by Appendix 1/17 and Chapter 8 of the Traffic Signs Manual, as appropriate.
2. The Contractor should allow 20 working days for the checking of their submissions.
3. The Contractor must pay due regard to the times and constraints for carriageway restrictions and closures as detailed in Appendix 1/17, and the limitations on the use of the site as detailed in Appendix 1/7.
4. Access and egress from all properties adjacent to the works shall be maintained at all times unless otherwise agreed with the property occupiers and/or owners and approved by the Engineer.

Appendix 1/19 - Routeing of Vehicles

1. Permitted Access Routes To and From the Site

- a) The Contractor shall agree access routes to the site with the Engineer, Highway Authority and Police at the commencement of the Contract.

2. Movement of Machinery and Plant across Public Roads

- a) The Contractor shall be restricted from moving excavated material across public roads unless written authorisation has been obtained from the Highway Authority.
- b) Any plant crossing shall be set up to meet the requirements of Paragraph 2.3.8 of Chapter 8 of the Traffic Signs Manual, as a minimum, and to meet the requirements of the Police and the Highway Authority.
- c) The Contractor shall keep the crossing area in a safe condition at all times compatible with the status and use of the road/footway being crossed. Repairs and reinstatement shall be carried out promptly and be subject at all times to the satisfaction of the Highway Authority.
- d) The movement of machinery and plant of an isolated nature will be subject to any restriction which the Police or Highway Authority may impose. The Contractor shall take such action as is necessary to protect and maintain the surface of the highway crossed by plant.

Appendix 1/21 - Information Boards

1. Driver Information Signs

- a) The Contractor shall supply, erect, maintain and remove driver information signs as part of his traffic Safety and Management works in accordance with Appendix 1/17 and this Appendix.
- b) The Contractor shall ensure that all driver information signs are erected and positioned so as to expose the said sign's face to the approaching traffic at all times during the Works.
- c) Signs on Approach to Roadworks

Advance signs shall be provided as required by Chapter 8 of the Traffic signs Manual and as directed by the Highway Authority.

- d) Commencement Signs

The Contractor shall erect commencement signs adjacent to the highway at locations to be agreed with the Highway Authority. The sign shall be erected ten days prior to the Date for Commencement of the Works, or such other reduced period as agreed by the Engineer.

2. Advertisements

- a) The content and positioning of all of the Contractor's name boards and similar advertisements erected on the public highway by the Contractor or by any sub-contractor shall require the prior written approval of the Highway Authority.
- b) Advertisement signs shall comply with the Town and Country Planning (Control of Advertisements) Regulations 1992.
- c) Advertisement signs shall be removed no later than 7 days after the date of completion of the Works.

Appendix 1/22 - Progress Photographs

1. ***The contractor shall arrange for a photographic record of the site to be made at the commencement of the works and fortnightly thereafter.***
2. The photographs shall be taken with a digital camera by a competent photographer, who may be a member of the Contractor's staff. The photos shall be presented to the Engineer on a compact disk.
3. Photograph locations are to be agreed with the Engineer.
4. No aerial photographs are required.

Appendix 1/23 - Risks to Health and Safety

The Contractor is required to comply with all relevant Health and Safety legislation.

1 Details of known specific or extraordinary hazards or risks that would require particular or unusual precautions and would place limitations on the methods of working.

- a. The Designer is unaware of any specific or extraordinary hazards or risks that would require unusual precautions. However, the Contractor's attention is drawn to the Hazard and Risk Assessment and in particular the requirement to undertake excavations within the vicinity of live services.

2 Details of known required actions or precautions.

- a. Observe the requirements of HSG47 Avoiding danger from underground services.
- b. The Contractor shall contact the statutory undertakers as necessary to allow their apparatus to be located on site using suitable detection tools.
- c. Carefully hand dig trial holes to locate services as necessary.

3 Details of notifications required to and from the Overseeing Organisation or other parties.

The exact process and requirements relating to notifications varies from authority to authority. However, the following should be considered the minimum relevant to this project:

4 Details of any specific monitoring requirements and submission of records to the Overseeing Organisation.

- a. No specific monitoring has been identified at this stage.
- b. The Contractor shall be required to provide any information relating to the works required by the Principal Designer and/or Contractor for inclusion within the Health and Safety File. This may include the following:

- ✦ 'As Built' Drawings

- Drawings
- Details
- Signing schedules
- Specification Summary
- Schedule of materials used (Materials, source and/or supplier)
- Subcontractors used within The Works
- Technical Information
- Test Results
- Post Construction Surveys
- Schedule of operating and maintenance manuals
- Schedule of equipment with health and safety implications

- ✦ Operational Hazards and Method Statements

Detailed Design – Hazard Identification and Risk Assessment

Date : March 2016					Stage of Work : Tender / Detailed Design		
Hazard	People affected	Consequences	Severity	Likelihood	Risk Before	Risk Reduction Measures	Risk After
Public Accessing the Site	Public Operatives	Risk of injury	High	Med	Med	Advance warning signs. * Contractor to provide secure fencing. * Designated access/egress. * Pedestrian / vehicle routes to be provided. * Clear traffic management, direction and information signs. *	Low
Live Traffic	Operatives	Injury from impact	High	Low	Med	Contractor to observe and comply with approved Construction Stage Health & Safety Plan. * Provide cones and/or warning signs and other appropriate traffic management. * Agree traffic management schemes, including accommodation of adjacent traffic management schemes, where present. * Include requirements for routine inspections and maintenance of traffic management schemes. * Limit working in live carriageway as far as practicable. * Wear high visibility clothing. * Agree operating hours. * Maintain visibility splays as far as practicable. *	Low
	Public	Accidents to other road users -by unexpected movements by vehicle -by parking in inappropriate places	Med	Med	Med	Contractor to observe and comply with approved Construction Stage Health & Safety Plan. * Operatives to park vehicles off the carriageway away from the works. If on verge, leave 1.2m clearance to the edge of the carriageway, do not impair visibility. * Provide cones and/or warning signs and other appropriate traffic management. * Create rules for design and implementation of traffic management schemes, including accommodation of adjacent traffic management scheme. * Include requirements for routine inspections and maintenance of traffic management schemes. * Maintain visibility splays as far as practicable. *	Low
Open Trenches and Voids	Public Operatives	Injury from impact	Med	Med	Med	Fence off or Fully cover *	Low

Hazard	People affected	Consequences	Severity	Likelihood	Risk Before	Risk Reduction Measures	Risk After
Undermining of adjacent structures (including walls and existing carriageway)	Public Operatives	Injury from impact	Med	Med	Med	Works require excavation adjacent to existing boundary fences. Adjacent structure(s) to be examined and any defects visible recorded prior to excavation to ensure that excavations do not undermine foundations. *	Low
Surface water, mud and dust	Public Operatives	Slipping, tripping Secondary accidents	Med	Med	Med	Contractor to monitor dust levels on a continuous basis. * Sweepers or similar to be used to clean roads and paved areas as required. * All vehicles leaving site to be clean to avoid dirtying the public road. * Traffic management measures to be agreed and to be checked and maintained in a clean state at all times. *	Low
Existing Statutory Undertakers Plant and Apparatus (Including high voltage electricity cables)	Public Operatives	Damage to existing apparatus, Electric shock, Fire, Death	High	Med	Med	Design scheme to avoid necessity to expose or relocate plant. • Seek record plans and drawings from SU's for working adjacent to their plant and make available to Contractor. • (refer to stats record plans) Contact statutory authorities to enable them to locate plant routes by use of CAT scan etc and mark on site. * Carry out trial excavations by hand digging where necessary to locate underground services. •* Provide barriers and cordons where appropriate to restrict access. * Co-ordinate service works with all statutory undertakers in advance of commencement to ensure co-ordinated sequence of working. •*	Low
Noise and Vibration (including nuisance to public)	Public Operatives	Damage to/loss of hearing Ill health resulting from prolonged exposure to vibration tools	Med	Med	Med	Design scheme to minimise breakout of hard surfaces. • Limit choice of plant and machinery. • Where possible, contractor to employ machine mounted breakers and not hand held breakers. * Trained and competent operatives. * Methods of work to be chosen to reduce noise produced and reduce exposure of operatives to noise. * Equipment to be maintained in good working order. * Apply restrictions on working hours to socially acceptable times. * Use of suitable PPE. * Information training. * Provide barriers/cordons where appropriate. *	Low

Hazard	People affected	Consequences	Severity	Likelihood	Risk Before	Risk Reduction Measures	Risk After
Dust generated from dry cutting of kerbs / pavers	Public Operatives	Ill health to operators and general public	Med	High	Med	Trained and competent operatives. * Exposure to vibration to be minimised by rotating operations or choosing of alternative methods. * Cutting operations not to endanger passing vehicles or pedestrians. * Wet cutting of materials to minimize dust, guards to be fitted to cutting apparatus. * Use of suitable PPE. *	Low
Substances Hazardous to Health	Public Operatives	Causes of skin irritation, burns, or death. Explosions	High	Low	Med	Design to avoid substances known to be hazardous. • Use of adequate PPE. * Information training. *	Low
Slipping, tripping and falling	Public Operatives	Physical injury from impact	High	Low	Med	Design to avoid working at height. • Maintain level and even surfaces * Information training. *	Low
Storage Areas	Public Operatives	Physical injury from impact	Low	Low	Low	Contractor to agree suitable/unsuitable areas for storage of plant and materials with Overseeing Organisation. *	Low
Erection of Lighting Columns and Sign Posts	Public Operatives	Physical injury from equipment falling.	High	Med	Med	Define rules for support and slinging of items. * Restrict/control access to work locations during erection. * Provide barriers/cordons where appropriate. * Provide traffic management measures *	Low
Deep excavations	Operatives	Collapse/Falls	High	Med	Med	Design to avoid deep excavations where possible. • Define rules for working in or adjacent to trenches* Use suitable trench supports* A safe system of working is put in place and operated for the entire duration of the works. * Restrict/control access to work locations during removal. * Provide barriers/cordons where appropriate. * Provide traffic management measures if necessary* Work in pairs, where possible. * Daily visual inspection of shallow unsupported excavations. *	Low

Hazard	People affected	Consequences	Severity	Likeli-hood	Risk Before	Risk Reduction Measures	Risk After
Laying Bituminous Material	Operatives	Burns from hot material	Med	Low	Med	Only trained persons should be involved in these works and should wear appropriate PPE. *	Low
		Heat stress / fatigue from overexposure during hot weather	Low	Med	Low	Take regular breaks when working in hot weather and maintain fluid intake. *	Low
Road Markings	Operatives	Burns from hot material	Med	Low	Med	Only trained persons should be involved in these works and should wear appropriate PPE. *	Low
Concrete used for construction works (kerb bed and backing)	Operatives	Skin irritation from contact with concrete	Med	High	Med	Operatives undertaking these works to ensure that they are wearing appropriate PPE. *	Low

- Key
- Measures to avoid during design.
 - * Measures to control risk at source.

Appendix 2/2 - Filling of Trenches and Pipes

1. Existing gully pots to be abandoned where they are to be located within areas of new soft verge. Cover, frame and one course of brick shall be removed, connection sealed and gully pot filled with suitable granular material sufficient to enable topsoil and seeding to be placed.
2. Existing gully pots to be removed where they shall be located within areas of new carriageway. Redundant gully pot shall be broken out to at least formation level and the connection sealed as close to their discharge points as is practically possible, all to the satisfaction of the Highways Inspector.
3. Any abandoned/redundant pipes and chambers less than 1.0m deep that fall within the proposed adoptable highway shall be grubbed up and the void backfilled in layers up to formation level to the carriageway with selected granular material.
4. Any abandoned/redundant pipes and chambers more than 1.0m deep and greater than 375mm diameter that fall within the proposed adoptable highway shall be permanently filled with a grout of cement and pfa (or similar filler to the approval of the Engineer).
5. All redundant connections in existing manholes/chambers shall be sealed and the benching made good, all to the satisfaction of the Highway Inspector and utility company involved.
6. Redundant open drainage channels are to be cleared of debris and vegetation and then filled in accordance with Series 600 of SHW and Appendix 6/3.

Appendix 2/3 - Retention of Materials arising from Site Clearance

The Contractor shall provide new materials for the construction of the Permanent Works, except as detailed below:

1. Existing gully gratings and frames and manhole covers and frames to be raised/lowered/adjusted or replaced if deemed necessary by Highways Inspector, to suit new road, footway or verge levels as required.

Appendix 2/4 - Explosives and Blasting

1. Explosives shall **not** be used at any location on the site.
2. No burning of refuse, waste materials or vegetation shall be undertaken on the site in connection with the site clearance or construction of the development.

Appendix 3/1 - Fencing, Gates and Stiles

Temporary fencing

1. The Contractor is to agree with the owners/occupiers and the highway authority the extent of any temporary fencing to be provided at the boundary of the Works with adjacent properties.
2. The Contractor is to provide hoarding and security fencing as necessary to protect the permanent works, temporary works, accommodation works, third party properties abutting the site, site offices and compounds.
3. The Contractor shall submit to the highway authority details of the standard and location of temporary fencing to be provided during the course of the works. The Contractor should allow 10 days for the checking of his submissions by the highway authority.

Permanent fencing

1. For location and specification of proposed permanent fencing refer to the General Arrangement Drawings and WYG Acoustic Fence Detail.

Appendix 5/1 - Drainage Requirements

1. For locations and details of highway drainage refer to drawings numbered PHF-MB-S278-GF-DR-D-212-01, 02 and 03, Surface Water Manhole Schedule and associated standard details.

Surface Water Pipes

2. All pipes and fittings are to carry the relevant BS number and be kitemarked. Pipes shall be Clay, UPVC or Concrete in accordance with WSCC detail numbered S278/38/11.
3. The Contractor shall submit pipe strength calculations if so requested by the Engineer.

Bedding and Jointing

4. Pipe bedding to highway drainage to be Type Z when located under carriageway and Type T at all other times as indicated on WSCC detail numbered S278/38/11.
5. Pipework for road gully connections shall be 150mm diameter minimum. The minimum diameter for a highway surface water carrier sewers shall be 225mm diameter.

Filter Drains and Subsoil Drains

6. Filter drains and subsoil drains shall be installed to the line and level as shown on the approved drawings.
7. Filter drains shall be plastic in accordance with Table 5/1 of MCHW.
8. Filter drains shall be fully perforated and sleeved with a suitable geotextile sock in accordance with detail PHF-MB-S28-GF-DR-D-F/01.

Gullies and Connections

1. Gullies and connections shall be installed at the locations shown on the drawings unless otherwise agreed.
2. Gullies shall be constructed in accordance with WSCC detail numbered S278/38/11 and must be precast concrete unless agreed in writing with WSCC.
3. The internal diameter of gully pots shall be 450mm on all carriageways. Pots shall be 900mm deep with a 150mm diameter outlet and trapped.
4. Gully grating and frame shall be to BS EN124 Class D400 and hinged and have a minimum frame depth 100mm for 'B' Road and 150mm for 'A' Roads.

Catchpits

5. Catchpits shall be constructed in the locations and to the levels shown on the drawings and shall be precast concrete Catchpits for highway drainage in accordance with WSCC detail numbered S278/38/13.
6. Chamber covers and frames shall be ductile iron in accordance with BS EN 124 Class D400.

Testing / CCTV

1. If requested, it is the Contractor's responsibility to undertake pressure tests on completion of every drainage run between manholes/catchpits on pipes up to 750mm diameter and witnessed by the Highway Authority inspector.
2. If requested, the Contractor shall undertake a CCTV survey prior to completion certificate being signed off and issued. The sewerage shall be mechanically cleansed as directed by the Engineer.

Attenuation Crates

1. The scheme includes the provision of two attenuation crate systems. The location of the crate features are indicated on drawing PHF-MB-S278-GF-DR-D-212-03. For details refer to detail PHF-MB-S28-GF-DR-D-F/02. For details refer to the data sheet at the end of this document.

Petrol Interceptor

1. The scheme includes the provision of a Bypass Separator manufactured by SPELL. Model ref 345 C1/SC. The location of the crate features are indicated on drawing PHF-MB-S278-GF-DR-D-212-03. For details refer to the data sheet at the end of this document.

[illegible]

Appendix 5/2 - Service Duct Requirements

1. The locations of electrical ducts and drawpits are as indicated on the drawings.
2. Unless specified otherwise, drawpits shall be in accordance with WSCC requirements and/or statutory authority requirements.
3. Ducts for Statutory Undertakers and Service Companies shall be as indicated on the **Service Consultants drawings**. Ducts where necessary shall be supplied in the following colours, unless otherwise indicated :-

Water Company	blue
British Telecom	grey
Gas Company	yellow
Communication Company	White
Electricity	black
	Street Lighting Orange (Embossed with text 'STREET LIGHTING')
Road Signs	Orange (Embossed with text 'STREET LIGHTING' stamped at 1m intervals)

4. All ducts shall be 100mm diameter minimum and are to have a smooth internal bore; unless agreed otherwise with the appropriate SU, Service Company or Highways Inspector.
5. Duct materials are to be in accordance with Series 500 of SHW.

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Appendix 6/1 - Classification And Acceptability Of Earthworks Materials Requirements for Earthworks Materials

Class	General Material Description	Typical Use	Permitted Constituents (All subject to requirements of Clause 601 and Appendix 6/1)	Material Properties Required for acceptability (In addition to requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (see exceptions in previous column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
2A	Wet cohesive material	General fill	Any material, or combination of materials, other than chalk.	Grading	BS 1377: part 2	Table 6/2	Table 6/2	Table 6/4 Method 1
				plastic limit (PL)	BS 1377: part 2	-	-	
				mc	BS 1377: part 2	PL -4%	App 6/1	
				MCV	Clause 632	App 6/1	App 6/1	
				Undrained shear strength of remoulded material	Clause 632	App 6/1	App 6/1	
5A	Topsoil existing on site	Topsoiling	Topsoil or turf designated as Class 5A in the Contract	Grading	Clause 618	-	Clause 618	-
5B	Imported topsoil	Topsoiling	General purpose grade complying with BS 3882	-	-	-	-	-

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Class	General Material Description	Typical Use	Permitted Constituents (All subject to requirements of Clause 601 and Appendix 6/1)	Material Properties Required for acceptability (In addition to requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (see exceptions in previous column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
6F1	Selected granular material (fine grading)	Capping	Any material, or combination of materials - including recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar-bitumen binders, unburnt colliery spoil, argillaceous rock and chalk. Property (vi) in the next column shall not apply if the Class Ra (asphalt) content of any recycled aggregate is 20% or less.	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Table 6/4 Method 6
				(ii) optimum mc	BS 1377 : Part 4 (vibrating hammer method)	-	-	
				(iii) mc	BS 1377 : Part 2	Optimum mc – 2%-	Optimum mc	
				(iv) Los Angeles coefficient	Clause 635	-	60	
				(v) Class Ra (asphalt) content	Clause 710	-	50%	
				(vi) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%	
6F2	Selected granular material (coarse grading)	Capping	Any material, or combination of materials - including recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar-bitumen binders, unburnt colliery spoil and argillaceous rock. Property (i) in the next column shall not apply to chalk. Property (vi) in the next column shall not apply if the Class Ra (asphalt) content of any recycled aggregate is 20% or less.	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Table 6/4 Method 6
				(ii) optimum mc	BS 1377 : Part 4 (vibrating hammer method)	-	-	
				(iii) mc	BS 1377 : Part 2	Optimum mc – 2%-	Optimum mc	
				(iv) Los Angeles coefficient	Clause 635	-	50	
				(v) Class Ra (asphalt) content	Clause 710	-	50%	
				(vi) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%	

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Class	General Material Description	Typical Use	Permitted Constituents (All subject to requirements of Clause 601 and Appendix 6/1)	Material Properties Required for acceptability (In addition to requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (see exceptions in previous column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
6F4	Selected granular material (fine grading) - imported on to the Site	Capping	Unbound mixture complying with BS EN 13285. Any material, or combination of materials - including recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar-bitumen binders, unburnt colliery spoil, argillaceous rock and chalk. Property (x) in the next column shall not apply if the Class Ra (asphalt) content of any recycled aggregate is 20% or less.	(i) Size designation and overall grading category	BS EN 13285 - 0/31.5 and GE	Tab 6/5	Tab 6/5	Table 6/4 Method 6
				(ii) Maximum fines and oversize categories	BS EN 13285 - UF15 and OC75	Tab 6/5	Tab 6/5	
				(iii) Los Angeles coefficient	BS EN 13242 - LA60	-	60	
				(iv) Volume stability of blast furnace slag	BS EN 13242 - free from dicalcium silicate and iron disintegration	-	-	
				(v) Volume stability of steel (BOF) and EAF slag	BS EN 13242 - V ₅			
				(vi) Other aggregate requirements	BS EN 13242 - Category _{NR} (no requirement)			
				(vii) Laboratory dry density and optimum water content	BS EN 13285, clause 5.3 - declared values			
				(viii) Water content	BS EN 1097-5	Optimum wc - -2%	Optimum wc	
				(ix) Clas Ra (asphalt) content	Clause 710	-	50%	
				(x) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%	

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Class	General Material Description	Typical Use	Permitted Constituents (All subject to requirements of Clause 601 and Appendix 6/1)	Material Properties Required for acceptability (In addition to requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (see exceptions in previous column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
6F5	Selected granular material (coarse grading) - imported on to the Site		Unbound mixture complying with BS EN 13285. Any material, or combination of materials - including recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar-bitumen binders, unburnt colliery spoil, argillaceous rock and chalk. Property (x) in the next column shall not apply if the Class Ra (asphalt) content of any recycled aggregate is 20% or less.	(i) Size designation and overall grading category	BS EN 13285 - 0/80 and GE	Tab 6/5	Tab 6/5	Table 6/4 Method 6
				(ii) Maximum fines and oversize categories	BS EN 13285 - UF12 and OC75	Tab 6/5	Tab 6/5	
				(iii) Los Angeles Coefficient	BS EN 13242 - LA50	-	50	
				(iv) Volume stability of blast furnace slag	BS EN 13242 - free from dicalcium silicate and iron disintegration	-	-	
				(v) Volume stability of steel (BOF) and EAF) slag	BS EN 13242 - V5	-	-	
				(vi) Other aggregate requirements	BS EN 13242 - Category NR (no requirement)	-	-	
				(vii) Laboratory dry density and optimum water content	BS EN 13285, clause 5.3 - declared values	-	-	
				(viii) Water content	BS EN 1097-5	Optimum wc - -2%	Optimum wc	
				(ix) Clas Ra (asphalt) content	Clause 710	-	50%	
				(x) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%	

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Footnotes to Table 6/1

1. App = Appendix
2. Tab = Table
3. Where in the Acceptable Limits column reference is made to App 6/1, only those properties having limits ascribed to them in Appendix 6/1 shall apply. Where Appendix 6/1 gives limits for other properties not listed in this Table such limits shall also apply.
4. (05/04) Where BS 1377 : Part 2 is specified for mc, this shall mean BS 1377 : Part 2 or BS EN 1097-5 as appropriate.
5. Uniformity coefficient is defined as the ratio of the particle diameters D_{60} to D_{10} on the particle-size distribution curve, where:
 D_{60} = particle diameter at which 60% of the soil by weight is finer
 D_{10} = particle diameter at which 10% of the soil by weight is finer

Appendix 6/2 - Requirements For Dealing With Class U1B And Class U2 Unacceptable Materials

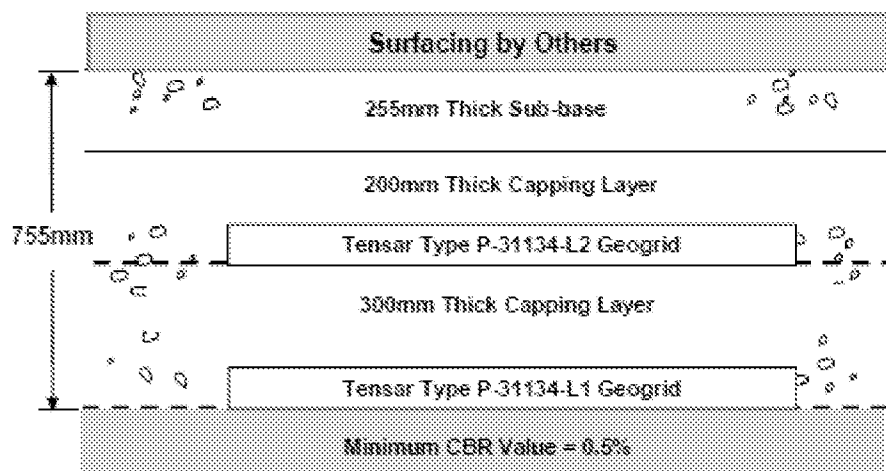
1. There are no known hazardous or contaminated Class U1B or Class U2 earthwork materials on the site.
2. If any Class U1B or Class U2 materials are identified these are to be removed and disposed off-site.
3. Any disposal of material off-site shall be undertaken by the Contractor in accordance with the requirements of the Waste Management Licensing Regulations 2005 and other legal requirements.
4. The Contractor should note that extensive ground investigations have been undertaken as part of the pre-construction investigations and is available for review.

Appendix 6/3 - Requirements For Excavation, Deposition, Compaction

1. The extent of excavation, cutting or filling is to be determined by reference to longitudinal section drawings and cross-section drawings.
2. Where fill materials to be placed against existing or regraded slopes, the existing or regraded slope is to be cut to benches not exceeding 0.6m in height prior to placing of fill.

Appendix 6/7 - Sub-Formation and Capping and Preparation and Surface Treatment of Formation

1. The Long Term CBR value is 0.5%. Therefore, capping material shall be based on a bespoke design as indicated on WSCC detail numbered S278/38/21. The roads on the Phase 1 works shall be classified as follows:
 - All roads - **Local Distributor**
2. Carriageway sub-base and capping layer thicknesses shall be based on the following Tensor design unless otherwise agreed:



3. No material within 450mm of the carriageway surface shall be frost susceptible.

Appendix 6/8 - Topsoiling

1. Unless otherwise agreed in the interest of encouraging species diversity, the Contractor shall use as much of the existing topsoil from the site as possible (Class 5A). The disposal and import of topsoil should be minimised.
2. All embankment slopes, cutting slopes and verges of the finished works are to have 150mm minimum of topsoil applied to them and grass seeded.
3. Imported Topsoil shall be Class 5B complying with the requirements of BS3882:2007. It shall be fertile medium loam free from any perennial weeds, weed seeds, contamination, coarse grass and stones, and levelled and raked to a fine tilth.

Appendix 7/1 - Permitted Pavement Options - Flexible, Flexible Composite and Surfacing for Rigid Composite Construction

Schedule 1: Permitted Pavement Options			
Location	Area	General Requirements	Permitted Pavement Option
All Areas	Carriageway	Schedule 2	LD1

Schedule 2: General Requirements		
Grid for checking surface levels of pavement courses	Longitudinal dimension:	10m max
	Transverse dimension	2m max
Surface regularity (As clause 702.5 Table 7/2)	Category of Road:	B
Interval for measurement of longitudinal regularity		Continuous
Interval for measurement of transverse regularity		5m

	All Other Areas Pavement Option [LD1]	
Pavement Layer	Material Ref.	Thickness (mm)
Surface Course	SC1	40
Binder Course	BC1	60
Base	RB1	150
Sub-Base	SB1	255
Capping	CP1	200*
Geogrid/ Geotextile	GG1	Tensar
Capping	CP1	300*
Geogrid/ Geotextile	GG1	Tensar
Total Thickness		1,005

Notes:-

* Capping thickness based on Long Term CBR Value of 0.5% and use of Tensar Geogrid Products

Schedule 4 - General Requirements For Construction Materials

- (i) General requirements are in accordance with the Specification for Highway Works.

903.24	Sealant shall be applied to the top surfaces of all base and binder course joints.
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Schedule 5 - Requirements For Construction Materials

Material Ref.	Clause	Description	Requirement
GG1	-	Geogrid	Tensar TriAx170 Geogrid or similar approved
SB1	803	Type 1 unbound mixture	Mixtures containing crushed coarse aggregate not permitted Minimum CBR value 30%
RB1	906	Dense Base Asphalt Concrete (Recipe Mixes)	BS EN 13108-1, PD 6691, BS 594987 AC 32 dense base 40/60 rec Binder Grade: 40/60 Aggregate Size: 32 Coarse Aggregate to be crushed rock or slag. Fine aggregate to exclude natural sand fines.
BC1	906	Dense Binder Course Asphalt Concrete (Recipe Mixes)	BS EN 13108-1, PD 6691, BS 594987 AC 20 dense binder 40/60 rec Binder Grade: 40/60 Aggregate Size: 20 Coarse Aggregate to be crushed rock or slag. Fine aggregate to exclude natural sand fines.
RC1	907	Regulating Course	As RB1 or BC1 as appropriate. Minimum thickness in accordance with BS594987 EN13108
SC1	910	Hot Rolled Asphalt (Recipe Mix)	BS EN 13108-4, PD 6691, BS 594987 HRA 30/14 F surf 40/60 Coated Chippings Nominal Size: 14/20mm pre-coated chippings Minimum PSV = 60 Maximum AAV = 14 Whether surface macrotexture measurement is required – Yes, <i>unless agreed otherwise with the Highway Authority.</i>

Schedule 6 Thin Surface Course Systems: Information To Be Provided By The Contractor

- (i) *Not used*

Schedule 7 Binder Data Requirements [911.2, 929.4, 937.9, 938.1, 943.5 And 943.8]

The following data shall be provided to the Overseeing Organisation as required in sub-Clauses 937.9, 938.1, 943.5 and 943.8 and for materials designed in accordance with 911, 929, 944 or 952 in respect of the proposed binder [note: all these Clauses cover materials that are designed by the supplier]. The data should not be more than 6 months old. A table in which the binder data may be recorded is given at the end of this section. For work carried out for the Highways Agency, a copy of all the data should be handed to the Overseeing Organisation, to be forwarded to: Pavement Engineering Team at Highways Agency, Bedford Office.

I. Binder Samples

Bituminous binders shall be sampled from the delivery according to BS EN 58. For modifiers blended with the other component materials of the mixture at the mixer a simulated binder shall be prepared. Such modifiers are generally less intimately mixed with the bitumen and less well dispersed throughout the mixture than when pre-blended. Evidence that the simulated binder offers the same performance as the binder produced when the modifier is added at the mixer shall be provided.

II. Penetration

Binder penetration at 25°C (BS EN 1426), 100g 5 secs and at 5°C 200g 60 secs, before and after hardening in the Rolling Thin Film Oven Test (RTFOT) in accordance with BS EN 12607-1, or alternatively, after RTFOT and Ageing in accordance with Clause 923.

III. Product Identification Test and Rheological Properties

Results for the binder(s) proposed shall comprise rheological data for each binder in the form of complex shear (stiffness) modulus (G^*) and phase angle (δ) determined in accordance with Clause 928 for binder as supplied, after RTFOT and Ageing in accordance with Clause 923.

IV. Storage Stability Test

All binders shall be stored strictly in accordance with the manufacturer's instructions. Polymer modified binders claimed to remain homogeneous in storage without agitation shall be tested for storage stability in the manner described in Clause 941. The mean of the differences in softening point between the top and bottom samples, of not less than five pairs of such samples shall not exceed 5°C. Manufacturers of pre-blended modified binders shall state what precautions are necessary to ensure that adequate homogeneity is maintained during storage.

V. Photomicrograph

A typical photomicrograph of the modified binder and binder using ultra-violet or other technique to provide maximum contrast of the polymer structure to the binder before modification shall be supplied together with details of sample preparation techniques.

VI. Cohesion

Vialit Pendulum cohesion test curve of the binder, in accordance with Clause 939 for the binder as supplied, after RTFOT and after RTFOT and Ageing in accordance with Clause 923.

VII. FRAASS Brittle Point

FRAASS brittle point measured using BS EN 12593 shall be provided on the binder as supplied, after RTFOT and Ageing in accordance with Clause 923.

Manufacturer of Binder	Product name		
Binder Type:		Batch Ref:	
Binder Source:			
Softening point difference in storage stability test			
Test	Supplied binder	After RTFOT	After Ageing
Penetration at 25°C 0,1mm (100g and 5 secs)			
Penetration at 5°C 0,1mm (200g and 60 secs)			
Vialit pendulum cohesion see Clause 939 maximum peak value J/cm ²	#	#	#
Product identification test Complex shear (stiffness) modulus (G*) and phase angle (α) data. See Clause 928	#	#	#
Fraass brittle point			
Other properties the Contractor considers useful			

Schedule 8 Mixture Data Requirements [919, 929, 944, 952 Or 953]

The following data should be provided to the Overseeing Organisation as required in sub-Clauses 937.9, 938.1, 943.5 and 943.8 and for materials designed in accordance with 911, 929, 944, 952 or 953 in respect of the proposed mixture as appropriate [note: all these Clauses cover materials that are designed by the supplier]. For work carried out for the Highways Agency, a copy of all the data should be handed to the Overseeing Organisation, to forwarded to: Pavement Engineering Team at Highways Agency, Bedford Office.

- I. Mixing and compaction temperatures**
Maximum and minimum mixing temperatures should be stated. Maximum and minimum compaction temperatures and any wind chill factor differing from conventional hot rolled asphalt utilizing unmodified bitumen shall be stated.
- II. Mix Sensitivity Analysis**
Wheel-tracking rate for the proposed mixture but with the binder content by mass increased above the target to the maximum binder content anticipated by the Contractor, but not more than + 0.6% above the target.
- III. Repeated Load Axial Test (RLAT) to DD 226 : 1996** (for correlation to performance in terms of deformation).
- IV Indirect Tensile Fatigue Test (ITFT) - after ageing, see LINK Protocol** (for correlation to performance in terms of fatigue)
- V Saturation Ageing Tensile Stiffness (SATS)**

Protection of Works from Weather, including Cold Weather Working

1. The Contractor shall take all necessary precautions to protect all works and materials which may be subject to damage or injury by inclement weather.
2. No material in a frozen condition shall be incorporated into the works, nor shall any materials be laid on a frozen surface.

Appendix 7/2 - Excavation, Trimming and Reinstatement of Existing Surfaces

1. General

- 1.1 Areas of construction are indicated on the construction treatment drawings.
- 1.2 Trenches across existing surfacing are required at the locations of new drainage connections, electrical and service ducts as shown on the construction areas, drainage and ducting and services drawings.
- 1.3 The existing pavement to receive overlay of new Surface Course is to be trimmed to a depth sufficient to allow a full depth of Surface Course to be provided as a minimum.
- 1.4 The machinery to be used shall be fitted with equipment for smoke and dust elimination.
- 1.5 The following methods for trimming of surface areas may be used:
- 1.6 Cold planing
- 1.7 The equipment shall be of an approved type and the Contractor shall provide details of the equipment he proposes to use to the Engineer for such approval.
- 1.8 The Contractor shall reinstate, to the approval of the Engineer, road surfaces damaged by excess cold planing.
- 1.9 The Contractor shall make suitable temporary ramps to make safe the following:-
 - run-on
 - run-off
 - raised longitudinal joints
 - covers and framesAll cold vertical joints shall be treated with hot poured pitch.
- 1.10 Surplus material shall be run to spoil in tips off-site, unless it can be re-used within the works or the on-site works.
- 1.11 Trench reinstatement shall be carried out in accordance with NRSWA HAUC Document or as agreed with the Highway Authority.
- 1.12 All cold vertical joints shall be treated with hot poured pitch.
- 1.13 When requested, a layout of the proposed joint pattern should be provided.

2. Surface course joints

- 2.1 All longitudinal and transverse joints in surface courses shall be made flush.
- 2.2 The following surface course joints shall be made by cutting back the edge to a vertical face that exposes the full thickness of the layer, discarding all loosened material and painting the vertical face completely with a thin uniform coating of hot applied 40/60 or 70/100 paving grade bitumen, or, if approved by the specifier, cold applied thixotropic bitumen emulsion of similar grade or polymer modified bitumen emulsion bond coat, before the adjacent width is laid:
 - a) all transverse joints;
 - b) joints where the asphalt abuts an existing surface; and
 - c) all longitudinal joints
- 2.3 Care should be taken to avoid surplus bitumen on the surface after the joint is made. The surface of the finished joint should not be painted because of the risk of skidding and slipping.

3. Joints in other courses

- 3.1 Joints in other courses (e.g. base and binder course) shall be treated in such a way as to ensure compaction and bonding as in 2 above for transverse joints;

Appendix 7/4 - Bond Coats, Tack Coats and Other Bituminous Sprays

The Contractor shall provide the following information with his tender, and/or prior to the commencement of the work for approval by the Highway Authority:

1. The product or products he proposes to use together with their data sheets, product identification data, cohesivity data as specified.
2. For each product, a copy of the BS EN ISO 9001 certificate showing the name of the manufacturer, the name of the certification body and the reference number and date of the certificate.
3. The spraying equipment proposed, and a test certificate.
4. The source or sources of blinding material proposed.
5. Contingency plans in the event of any breakdown.
6. The results of any other tests or other data the Contractor considers would assist the Overseeing Organisation in assessing the technical merit of the treatment such as:
 - (i) Tackiness test and/or trafficability time and methods of test.
 - (ii) Breaking time test results for different weather conditions and substrates.
 - (iii) Test results for bond to newly laid concrete

Binder Data Sheet – Appendix 7/4 (02/08)		Bond Coats, Tack Coats and Other Bituminous Sprays	
Manufacturer of Binder:		Product name:	
Binder type:		Batch no:	
Binder Grade (highlight as required)			
Conventional	Intermediate	Premium	Super-premium Non-tack Other
Binder	Source →	Recovered Binder	Recovered Binder after Ageing Test
	Test ↓	Recovered in accordance with Clause 955	Aged in accordance with Clause 955
Penetration at 25°C 0.1 mm (100g and 5 secs)			
Penetration at 5°C 0.1 mm (200g and 60 secs)			
Vialit pendulum cohesion see Clause 957 maximum peak value J/cm²		The Contractor shall attach a Report and graphical output to this schedule as specified in Clause 957.	The Contractor shall attach a Report and graphical output to this schedule as specified in Clause 957.
Product identification test. The provision of data for identification and ageing is optional for unmodified bituminous emulsions to BS 434 and for bitumen to BS EN 12591 and cutback bitumen to BS 3690. Complex shear (stiffness) modulus (G*) and phase angle (δ) data. See Clause 956.		The Contractor shall attach a Report and graphical output to this schedule as specified in Clause 956.	The Contractor shall attach a Report and graphical output to this schedule as specified in Clause 956.
Other properties the Contractor considers useful: Minimum Binder Content Binder temperature range for spray application Emulsion Properties and Viscosity Break time Breaking Agent type Weather limits - information from binder manufacturer: road or air temperatures; humidity; wind chill adjustment; tolerance of surface dampness; etc. Temperature max: Temperature min: Other:			

Appendix 7/6 - Breaking Up or Perforation of Existing Pavement

1. Breaking up of Existing Pavement

- 1.1 The existing pavement and hard areas shall be broken up as identified on the construction treatments drawing and disposed of off-site, unless it can be utilised within the works or in the on-site works.
- 1.2 Plant and equipment used for breaking up shall be of a type approved by the Engineer who may direct trials to be carried out to determine the suitability of the plant, equipment and method. The plant and equipment shall be of a type which has a crack propagation effect.
- 1.3 The full depth of all bituminous and sub-base material shall be broken up.
- 1.4 The Contractor shall take all necessary precautions to avoid damage to property, structures, drains, sewers and services.

2. Perforation of Existing Pavement

- 2.1 The existing pavement and hard areas shall be perforated in the areas identified on the construction areas drawing.
- 2.2 Plant and equipment used for perforating pavement shall be of a type approved by the Engineer who may direct trials to be carried out to determine the suitability of the plant, equipment and method. The plant and equipment shall be of a type which has a crack propagation effect.
- 2.3 The full depth of all bituminous and sub-base material shall be perforated, and the Engineer may direct any necessary trial holes be made to determine the depth.
- 2.4 Impervious structures, slabs, hardstanding areas etc, which are permitted to remain shall have holes to full depth made at uniform spacings to allow free drainage such that the total area of perforation shall not be less than 10% of the impervious area to be drained.
- 2.5 The Contractor shall take all necessary precautions to avoid damage to property, structures, drains, sewers and services.

Appendix 7/9 - Cold Milling (Planing) of Bituminous Bound Flexible Pavement

1. Information with regard to excavation and reinstatement of bituminous pavements is also in Appendix 7/2.
2. Areas of carriageway to have existing surfaces removed and replaced by new bituminous materials are indicated on the Construction Treatment drawings.
3. The existing pavement to receive overlay of new Surface Course is to be planed to a depth sufficient to allow the full depth of Surface Course to be provided as a minimum.
4. The machinery to be used shall be fitted with equipment for smoke and dust elimination.
5. The equipment shall be of an approved type and the Contractor shall provide details of the equipment he proposes to use to the Highway Authority for such approval.
6. The Contractor shall reinstate, to the approval of the Highway Authority, road surfaces damaged by excess cold planing.
7. The Contractor shall make suitable temporary ramps to make safe the following:-
 - run-on
 - run-off
 - raised longitudinal joints
 - covers and frames



Appendix 11/1 - Kerbs, Footways and Paved Areas

1 Kerbs

- 1.1 Proposed kerblines are indicated on the construction treatments drawing.
- 1.2 Location of kerb types are indicated on the construction treatment drawings and details of kerb types are indicated on WSCC details numbered S278/38/01, 02 and 03. The kerb types are as follows:

Kerb Type 1	125x255mm type HB2 precast concrete kerb to BS EN 1340:2003 Figure NA.1(d) laid with 125mm upstand with ST1 concrete bed and backing.
Kerb Type 2	125x150mm type BN precast concrete kerb laid flush (0 to 6mm) to Figure NA.1(a) of BS EN 1340:2003 with mix ST1 concrete bed and backing.
Kerb Type 3	50x150mm type EF precast concrete flat top edging to Figure NA.3(b) of BS EN 1340:2003 with mix ST1 concrete bed and backing.
Kerb Type 4	Linear Drainage Kerb System, in accordance with drawing numbered PHF-MB-S278-GF-DR-D-212-01, 02 and 03 and F03, F04 and F05.
Kerb Type 5	Bus Stop Kerb - 125x255mm type HB2 precast concrete kerb to BS EN 1340:2003 Figure NA.1(d) laid with 140mm upstand with ST1 concrete bed and backing.
Kerb Type 6	125x150mm type BN precast concrete kerb laid with 15mm upstand at roundabout runover area to Figure NA.1(a) of BS EN 1340:2003 with mix ST1 concrete bed and backing.

- 1.3 Kerb bed shall extend down to top of sub-base. Where top of sub-base is less than 150 from finished road surface the kerb shall extend into the sub-base and shall be a minimum thickness of 150 mm.

2 Paved Areas

- 2.1 Prior to commencement of laying, the formation shall be treated with an approved residual weedkiller. The Highway Inspector may request inclusion of a non-woven separation membrane to mitigate weed/root intrusion.
- 2.2 Flexible surfacing for footways and shared footway/cycleways shall be in general accordance with WSCC detail numbered S278/38/04 and material construction layers shall be as follows:

Surface Course	20mm thick, Asphalt Concrete (AC6 Dense Surf 100/150) to Clause 909 Aggregate type:-crushed rock or blast-furnace slag Nominal size:- 0/6 mm
Binder Course	50mm thick, Asphalt Concrete (AC20 Dense Bin 40/60 Rec) to Clause 906 Aggregate type:-crushed rock or blast-furnace slag Nominal size:- 0/20 mm
Sub-base	200mm thick, Type 1 sub-base material to Clause 803

3 Roundabout Runover Area

- 3.1 The roundabout runover area shall be constructed as full depth carriageway. Refer to Appendix 7/1.

- 4.1 All shared footway / cycleway surface courses are to be machine laid.
- 4.2 Tactile blister footway paving is to be provided at new pedestrian crossing points as indicated on the general arrangement drawings. All tactile paving layouts are to be in accordance with the Department of the Environment, Transport and the Regions 'Guidance on the use of Tactile Paving Surfaces', November 1998.
- 4.3 Corduroy hazard warning paving is to be provided at the interface of a footway and shared cycleway as indicated on the general arrangement drawings. All tactile paving layouts are to be in accordance with the Department of the Environment, Transport and the Regions 'Guidance on the use of Tactile Paving Surfaces', November 1998.
- 4.4 Tactile blister paving at uncontrolled crossings shall be buff coloured flags, size 400x400x65mm thick laid in accordance with WSCC detail S278/38/18.

Appendix 12/1 - Traffic Signs: General

1. New permanent traffic signs are indicated on the general arrangement drawings numbered PHF-MB-S278-GF-DR-D-210-01 and 02.
2. Steel posts, with a minimum 76mm outside diameter, shall comply, where applicable, with the requirements of BS4 and BS4848 and shall be manufactured from steel complying with the requirements of BS EN 10025 – 1:2004 as detailed in BS 8442:2006 and galvanised in accordance with the requirements of BS EN ISO 1461 “Hot Dip Galvanised Coatings on fabricated Iron and Steel Articles”, unless specifically requested otherwise by the Highway Authority.
3. Each post shall have a base plate (min 0.05 sq.m) and cap to prevent the ingress of water in accordance with the requirements of BS 8442:2006. All clips, screws, bolts, nuts and washers that come into contact with the sign shall be stainless steel.
4. Sign posts dimensions are to be sufficient to allow signs to be mounted with lateral clearances and mounting heights in accordance with the traffic signing schedule.
5. All clips used to fix sign faces to posts and lamp columns shall be of an anti-rotational type.
6. Temporary traffic signs to diagram 7014 shall be erected on a new traffic sign post, for the duration of three months, on approaches to the new works, as indicated on the traffic signing schedule. The temporary sign locations are to be agreed on site with the Engineer prior to erection. After 3 months the signs and posts shall be removed and the footway reinstated/made good.
7. All traffic signs to be mounted on street lighting columns to be installed with neoprene banding to protect the columns from damage.

Appendix 12/3 - Traffic Signs: Road Markings and Studs

1. Materials for road markings shall be selected from the following:
 - Screed thermoplastic
2. The above shall comply with the requirements of BS 3262 for “Superimposed Road Markings”.
3. The locations for permanent road markings are shown on the general arrangement drawing.
4. All road markings to be in accordance with The Traffic Signs Regulations and General Directions 2002 and Clause 1212.
5. Where existing road markings do not conform to new layout, they shall be removed by a method approved by the Engineer. Where reflecting road studs are also removed the hole remaining shall be reinstated with appropriate surfacing material.
6. Exact location of road markings and tie-ins to be agreed on site with the Engineer.
7. Road studs shall be ‘Halifax’ type and provided as indicated on the general arrangement drawing. All reflecting road studs shall comply with BS EN 1463 – 1 and Clause 1213.

Appendix 13/1 - Road Lighting Columns and Brackets

1. Street lighting columns shall be provided as indicated on SSE drawing SSE-976262-SL-DR-001 and SSE-96262-SL-DR-002 and shall be compatible with the lanterns specified in Appendix 14/4.
2. Erection of the steel column and the concrete surround diameter shall be in accordance with the manufacturer's recommendation for the ground / soil type. Access doors should face away from the oncoming traffic when positioning units in the footway or verge.
3. Planting depth and distance to the bottom of the door opening from finished ground level shall be in accordance with the manufacturer's recommendation. This shall be exact to achieve the correct mounting height above ground level and the correct cable depth.
4. Columns to be painted BS12C39 (Sherwood green).

Unit Numbering

5. All adoptable columns, illuminated signs, illuminated bollards and feeder pillars require to be numbered. Numbers will be allocated on approval of street lighting design where road names and / or extents are known. Water/weatherproof stick on numbers are permissible. Numbers to be fixed 2m above ground facing the carriageway. Numbering standard detail to be provided with approval.

Appendix 13/2: - (Specification for Highway Works) Typical Column and Bracket Data - Sheet 1

Name of Manufacture:

Column Reference No

Revision No

Date

NAME OF CONTRACT:

PART A General

Column nominal height

(m)

Acceptable positions of bracket arms relative to door position

Column material

Material design strength

(N/mm²)

No. of door openings

Door opening size - Height

(mm)

- Width

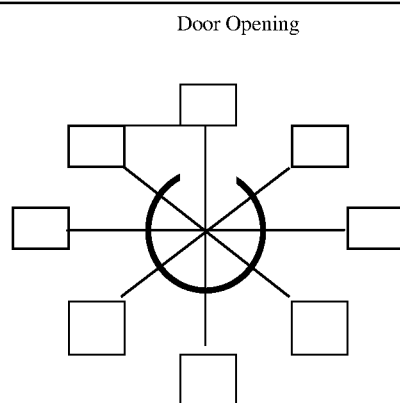
(mm)

Cross-section of base compartment

Height
(mm)

Width
(mm)

Depth
(mm)



Manufacturers drawing ref. No.

Corrosion protection (steel columns only) - basic system type (NG 1901)

Details of the signs and attachments allowed for in the design Area (mm²), Eccentricity (mm), Height

- additional sacrificial steel thickness, above that needed in the design, from the bottom of the column to at least 250 mm above the anticipated ground level

(mm)

PART B Foundation Data

Planted base

Planting depth

(m)

Standard Soil Type Factor G

630

390

230

Diameter of concrete surround (if any)

Flange base

Bolt hole centres

Hole diameter

Design load/bolt

(mm)

(mm)

(N)

Relevant forces and moments at Ground Level.

Line of action of max. moment relating to door opening

NOTE: For flange plates with slotted holes a diagram shall be included with this Data Sheet.

Appendix 13/2: - (Specification for Highway Works) Typical Column and Bracket Data - Sheet 2

PART C Acceptable Luminaires

Luminaire: Maximum Characteristics

Post Top
Column

		Standard K Factor (see BS 5649)				
		1.50	1.80	2.20	2.50	3.00
Luminaire Connection		Maximum windage area m ² for standard K factors				
Diameter	Length					

Single Arm
Bracket
Column:

Luminaire lever arm (mm)	
Due to wt. of luminaire	Due to Windage of luminaire

Bracket projection (m)	Ref No	Drawing No	Material		Luminaire Fixing Angle	Luminaire Connection		Luminaire Maximum Wt (kg)	Minimum Windage Area (m ²) for standard K factors				
			Grade	Design Strength (N/mm ²)		Diameter (mm)	Length (mm)						

Double Arm
Bracket
Column:

Luminaire lever arm (mm)	
Due to wt. of luminaire	Due to Windage of luminaire

Bracket projection (m)	Ref No	Drawing No	Material		Luminaire Fixing Angle	Luminaire Connection		Luminaire Maximum Wt (kg)	Minimum Windage Area (m ²) for standard K factors				
			Grade	Design Strength (N/mm ²)		Diameter (mm)	Length (mm)						

PART D Certification

It is certified that the information given in the Data Sheet has been obtained in accordance with the requirements of BS EN 40: Part1 and BS 5649 as implemented by Departmental Standard BD 26 and the Specifications.

Signed on Behalf of the Contractor.....

Date

Appendix 13/3 - Instructions for Completion of Lighting Column and Bracket Data Sheets

Data sheets shall be provided not later than 14 days after acceptance of tender.

General

1. When information is not required a dash shall be inserted in the appropriate boxes.
2. Where a Data Sheet is amended it shall be given a new revision number with a date.
3. The revision numbers shall be consecutive letters of the alphabet, commencing with "A".
4. The date of the revision shall agree with the date of the Contractor's signature.
5. The column, or bracket material shall be steel, aluminium, reinforced or pre-stressed concrete, glass fibre reinforced plastic or any other suitable material.
6. The material design strength shall be the minimum specified in the design. Where more than one material is used values for all materials shall be given.
7. All relevant entries shall be made on the Data Sheet before the document is certified by the Contractor.

Column Data

8. The column nominal height shall be selected from clause 2 or 3 of BS 5649: Part 2: 1978 as appropriate.
9. The number of door openings shall agree with the manufacturer's drawings.
10. The cross-section of the base compartment shall be indicated by a dimensioned diagram/sketch.
11. The acceptable positions of bracket arms relative to the door position shall be indicated on the diagram. Where all positions are acceptable the box noted "ANY" shall be ticked.
12. Where concrete is necessary around the planted base in accordance with sub-Clauses 1305.3 and 1305.4 the minimum diameter shall be entered.
13. For flange bases all forces and moments used in the design of the foundations, anchorages and attachment systems shall be given.
14. The corrosion protection system used on the column when new shall be recorded. Where additional steel is provided for sacrificial purposes the amount shall be recorded.
15. The signs and attachments surface area, eccentricity from the centre line of the column to the centre of area of the sign and height above ground level to the centre of area of the sign shall be stated.

Bracket Data

16. The luminaire lever arms, weight and maximum windage area quoted shall be based on the most adverse loading on the bracket when it is attached to any of the columns quoted in the compatible column sections.

(Note: The luminaire lever arms are the horizontal distances from the centre of gravity of the luminaire and, if applicable, the centroid of the windage surface area to the end of the bracket joint).

Appendix 14/1 - Site Records

1. The Contractor is responsible for preparing electrical record drawings for the Highway Authority.
2. The record information to be provided shall clearly show the position of all columns, signs, bollards, ducts, etc., as actually installed, together with all power cable including cable sizes, routes and lengths. The location of all buried cables shall be clearly shown by dimensions from fixed reference points at 20 metre intervals.
3. The Contractor shall supply the Highway Authority with a schedule in tabular form, indicating equipment addresses and the type of equipment installed at each address. The final layout of the schedule shall be agreed and approved by the Highway Authority.
4. Great importance is attached to the production of accurate records and the Engineer and Highway Authority will require to be satisfied that accurate records are being kept.
5. The Contractor shall supply the Highway Authority with a schedule, in tabular form, detailing from which drum of cable each individual cable was obtained, together with the actual installed length of cable and the final connected length, if this differs from the installed length.
6. The Contractor shall allow access for the Engineer to inspect the Contractor's site records information.
7. If required by the Highway Authority, at any period during the currency of the Contract, the Contractor shall provide interim record information to update the Highway Authority's records.
8. The Contractor shall submit final record information prior to issue of the Practical Completion Certificate.

Appendix 14/2 - Location of Lighting Units and Feeder Pillars

1. The position of new lighting units are as indicated on SSE drawing SSE-976262-SL-DR-001 and SSE-976262-SL-DR-002.

Appendix 14/3 - Temporary Lighting

1. Temporary lighting for traffic management during carriageway diversions will be provided by the Contractor wherever there is no existing lighting of an adequate standard. Temporary lighting will also be required where new sections of highway are opened to traffic before their permanent lighting systems are in operation.
2. The Contractor shall ensure that any temporary lighting provided does not cause glare to traffic users on highway nor annoyance to occupants of surrounding property.
3. Existing illuminated regulatory signs, where not part of a traffic signal installation, must be maintained either in their existing location or temporary locations and the same standard of illumination maintained by either existing or temporary lighting. This lighting is to be maintained until the relevant regulation ceases to be appropriate and may not be removed without the prior approval of the Engineer in writing.
4. The Contractor shall ensure that all existing road lighting remains in operation for as long as that road is open to traffic. Where electrical supplies to existing units are disconnected during the execution of the Works the Contractor shall provide and install temporary supply cables as directed by the Engineer.
5. The level of illumination of the existing trafficked carriageways shall be maintained at a level not lower than that existing until the date of the completion certificate for the whole of the works. New and temporary carriageway used for traffic during the course of the Contract shall be illuminated by temporary or permanent lighting to the standards detailed in paragraph 2 below.
6. If for any reason the Contractor supplies temporary lighting the standard of lighting shall not be lower than the standard provided by the permanent road lighting system, or BS 5489 parts 2 and 4 as appropriate, whichever is the greater.
7. The use of generators for temporary lighting will need to be agreed in advance with the highway authority. However, where generators are used to provide a temporary power supply to road lighting the Contractor shall appoint a member of his staff, who shall be identified and made known to the Engineer, to be responsible for the maintenance of the generators.
8. Where necessary the contractor shall provide protection to existing cables or install new diversion cables to maintain electrical supplies to luminaires. The Contractor shall give to the Engineer 2 weeks notice of the proposed date of any changes to the cable network and shall not proceed until arrangements for the switch over from existing to temporary cables has been agreed.
9. All generators shall be fitted with a fuel tank which has sufficient capacity to allow the generator to run continuously throughout the hours of darkness without requiring filling / topping up.
10. Where a temporary supply to lighting columns is achieved by means of catenary cable between the columns then the conducting cable shall be suspended from a steel support cable. The conductor cable shall be attached to the support cable at intervals of no greater than 1.0m. Columns that are to be retained shall not be drilled.
11. Where a temporary supply to lighting columns is achieved by means of surface run cables, the cables shall be steel wire armoured with additional mechanical protection, marked by street lighting marker tape and cones attached to the cable. Under no circumstances shall traffic drive over such cables without suitable mechanical protection. Lengths of damaged cable are to be replaced immediately.
12. Temporary cable networks shall be designed, installed and tested in compliance with BS 7671 and with the 1400 Series Clauses and Appendices of the Specification.
13. If the Contractor proposes to use either temporary lighting or temporary supplies then he must submit his proposals to the Engineer in writing not less than 5 days prior to the installation of the temporary lighting.

Appendix 14/4 - Electrical Equipment for Road Lighting

Street lighting shall be as indicated on SSE drawings numbered SSE-976262-SL-DR-001 and SSE-96262-SL-DR-002

1. Lantern and Lamps (Clause 1407 and 1408)

Lanterns shall be as indicated on the street lighting drawings and as indicated below:

Type of luminaire	Location	No of Units
Single Philips WRTL Luma R5 with 80 No. Cool White LED's	Fitzalan Link Road	Refer to dwgs

2. Ancillary Equipment

Control Gear

- Electronic dimmable ballast compatible with Mayflower CMS via DALI protocol.
- Luminaire is to be controlled via a Mayflower external node.
- One mayflower complete lighting control DALI sub-master unit to be installed to control nodes and link central management system. Contractor to liaise with Mayflower directly for advice on the best location for the sub-master.

Lantern Photocell

- All proposed units are to be fitted with electronic photo-electric control unit (PECU) configured to accord with WSCC specification.

3. Proposed Equipment - Illuminated Signs & Bollards

- Sign luminaires are to be Simmonsign signs LUA LED with low voltage HF electronic ballast for signs upto 750mm.
- Switch gear: Microstar

4. Centre Island Illuminated Beacons

- Beacons - Simmonsigns Post Top beacon 16 watt LEDT6 24 volt supply. Switch controls
- Switch controls - Mayflower Complete Lighting Control internal Node, base station in post base antenna on extended lead mounted in beacon. 24 hour operation.

5. Equipment Position

- The layout of equipment within lighting column bases shall be in accordance with the overseeing authorities' requirements and in accordance with the manufacture's recommendations.

3. Proposed Equipment – Electrical supply, Isolation and Wiring

Electrical Supply

- All Electrical supply to equipment should be undertaken in accordance with WSCC requirements.

Isolator

- All isolators to accord with WSCC requirements.

Internal Wiring

- All internal wiring to accord with WSCC requirements.

Appendix 26/1 - Concrete for Ancillary Purposes

The following concrete grades shall be used for ancillary purposes:-

<u>Purpose</u>	<u>Grade</u>
Bedding and backing to kerbing, edgings and channels	ST1
Footing to traffic sign	ST2
Footing to street lighting column	ST2
Bed and haunch to highway drain pipes (type Z)	ST4

Appendix 30/5 - Grass Seeding, Wild Flower Seeding and Turfing

1. All highway verges and margins including areas required for visibility shall be covered with a layer of topsoil (minimum 150mm deep) rolled and grass seeded.
2. Seeding shall be carried out in accordance with BS4428:1989 to a rate of spread to be approved by the Project Engineer.
3. Grass seed sowing shall be carried out during March/April or September.
4. The grass seed mix below is general purpose mix which is suitable for most highway locations. It shall be a tested mixture from an approved source and certificates of purity and germination shall be provided. Unless otherwise agreed by the Project Engineer, the mixture shall consist of the following:
 - 50% Esquire perennial ryegrass
 - 35% Samanta slender creeping red fescue
 - 10% Highland browntop bent
 - 5% Rivendel white clover
5. Alternative mixes may be presented to WSCC for approval.

Aquacell Prime Data Sheets

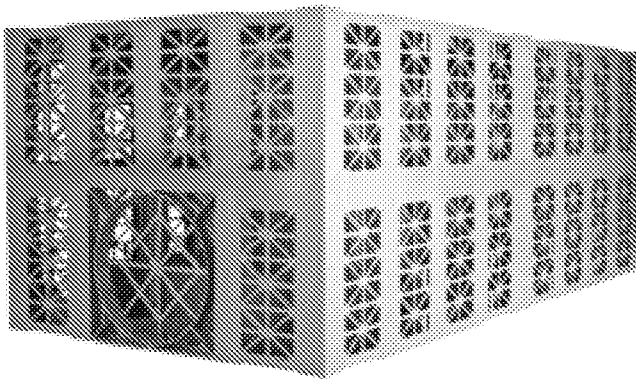
Product Details

AquaCell Prime

Application

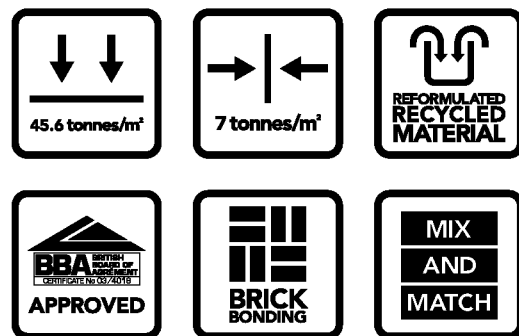
AquaCell Prime is manufactured from specially reformulated, recycled material. It is ideal for use in both shallow and deep applications, subject to either regular traffic loading – such as car parks (for vehicles up to 12 tonnes) or for landscape areas.

Typically AquaCell Prime is suitable for installations to a maximum depth of 3.70m (landscaped) and 3.45m (trafficked), to the base of the units from ground level, in best soil conditions.



Features and benefits

- ⊗ Manufactured from specially reformulated, recycled material
- ⊗ Suitable for both soakaway and attenuation applications
- ⊗ Suitable for use in areas subject to regular traffic loading, i.e. car parks
- ⊗ Proven vertical loading capacity of: 45.6 tonnes/m²
- ⊗ Proven lateral loading capacity of: 7 tonnes/m²
- ⊗ Grey in colour, for ease of identification from other AquaCell units
- ⊗ BBA approved – Certificate No 03/4018
- ⊗ Ideal for all types of projects including major attenuation and infiltration schemes



AquaCell Prime

Maximum installation depths (to base units)

Typical soil type	Typical angle of shearing resistance ϕ (°)	Maximum depth of installation – to base of units (m)			
		With groundwater at 1m below ground level and units wrapped in geomembrane		Without groundwater below base of units (normal case)	
		Trafficked areas (cars only) ⁽¹⁾	Non-trafficked areas	Trafficked areas (cars only) ⁽²⁾	Non-trafficked areas
Stiff over-consolidated clay (e.g. London clay)	24°	1.60	1.78	1.73	1.98
Normally consolidated silty, sandy clay (e.g. alluvium, made ground)	26°	1.75	1.78	2.01	2.27
Loose sand and gravel	30°	1.95	2.08	2.58	2.86
Medium dense sand and gravel	34°	2.04	2.16	2.98	3.24
Dense sand and gravel	38°	2.04	2.24	3.45	3.70

- (1) Loosening of dense sand or softening of clay by water can occur during installation. The designer should allow for any such likely effects when choosing an appropriate value of ϕ .
- (2) The design is very sensitive to small changes in the assumed value of ϕ , therefore, it should be confirmed by a chartered geotechnical engineer. In clay soils, it may be possible to utilise cohesion in some cases.
- (3) Applicable for car parks or other areas trafficked only by cars or occasional refuse collection trucks or similar vehicles (typically one per week).

Assumptions made are:

- ⊗ ground surface is horizontal
- ⊗ shear planes or other weaknesses are not present within the structure of the soil

Source: BBA

Spel Bypass Separator Data Sheets

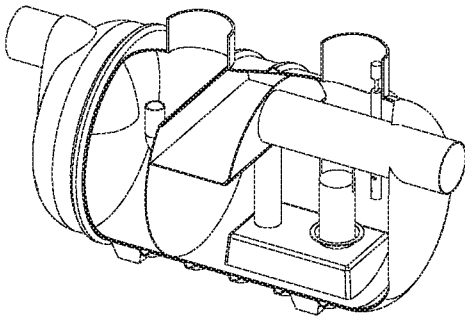
SPEL Stormceptor® by-pass separators 300 and 400 series, class 1 and 2 models

6.5

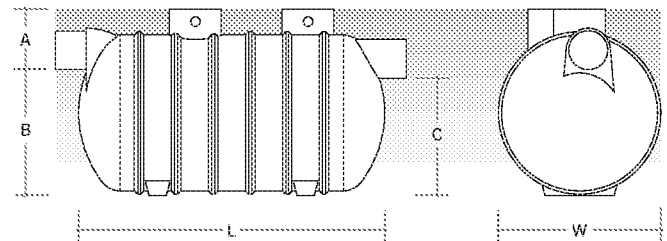
Compliant to the European Standard BS EN 858-1, the Environment Agency's Pollution Prevention Guidelines PPG3 and the Construction Products Regulations

Class 2 models available for 300 and 400 series – change C1 for C2 when quoting model reference.

Model	Nominal size (NSB)	Catchment area a (m²)	Oil storage (litres)	Silt storage (litres)	Overall length (mm) L	Overall diameter (mm) W	Inlet invert (mm) A	Base to inlet (mm) B	Base to outlet (mm) C	Max in/out pipe diameter (mm) for orientation		Number of access shafts diameter (mm)			
										type A-C	type D-I	450	600	750	900
318 C1/SC	18	10000	270	1800	3200	1875	700	1450	1350	450	600	-	2	-	-
320 C1/SC	20	11111	300	2000	3535	1875	700	1450	1350	450	600	-	2	-	-
325 C1/SC	25	13889	375	2500	4420	1875	700	1450	1350	450	600	-	2	-	-
330 C1/SC	30	16667	450	3000	5070	1875	700	1450	1350	450	600	-	-	1	1
340 C1/SC	40	22222	600	4000	7060	1875	740	1410	1310	450	600	-	1	1	-
345 C1/SC	45	25000	675	4500	7615	1875	740	1410	1310	450	600	-	1	1	-
350 C1/SC	50	27778	750	5000	8255	1875	740	1410	1310	450	600	-	1	1	-

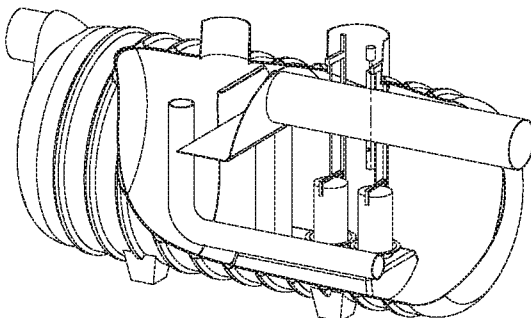


300 series

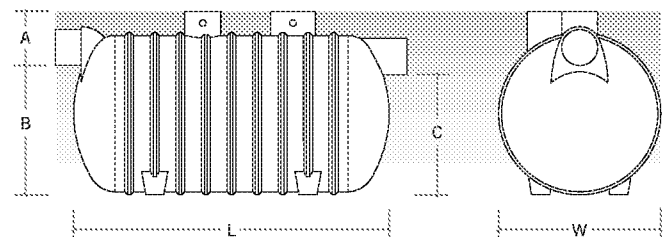


Model	Nominal size (NSB)	Catchment area a (m²)	Oil storage (litres)	Silt storage (litres)	Overall length (mm) L	Overall diameter (mm) W	Inlet invert (mm) A	Base to inlet (mm) B	Base to outlet (mm) C	Max in/out pipe diameter (mm) for orientation		Number of access shafts diameter (mm)			
										type A-C	type D-I	450	600	750	900
460 C1/SC	60	33333	900	6000	4400	2700	950	2100	2000	600	750	-	1	-	1
470 C1/SC	70	38889	1050	7000	5250	2700	950	2100	2000	600	750	-	1	-	1
480 C1/SC	80	44444	1200	8000	6170	2700	950	2100	2000	600	750	-	1	-	1
4100 C1/SC	100	55556	1500	10000	7400	2700	1100	1950	1850	750	900	-	1	-	1
4125 C1/SC	125	69444	1875	12500	9050	2700	1100	1950	1850	750	900	-	1	-	1
4150 C1/SC	150	83333	2250	15000	9950	2700	1100	1950	1850	750	900	-	-	-	2
4160 C1/SC	160	88889	2400	16000	11830	2700	1250	1800	1700	750	900	-	1	1	1

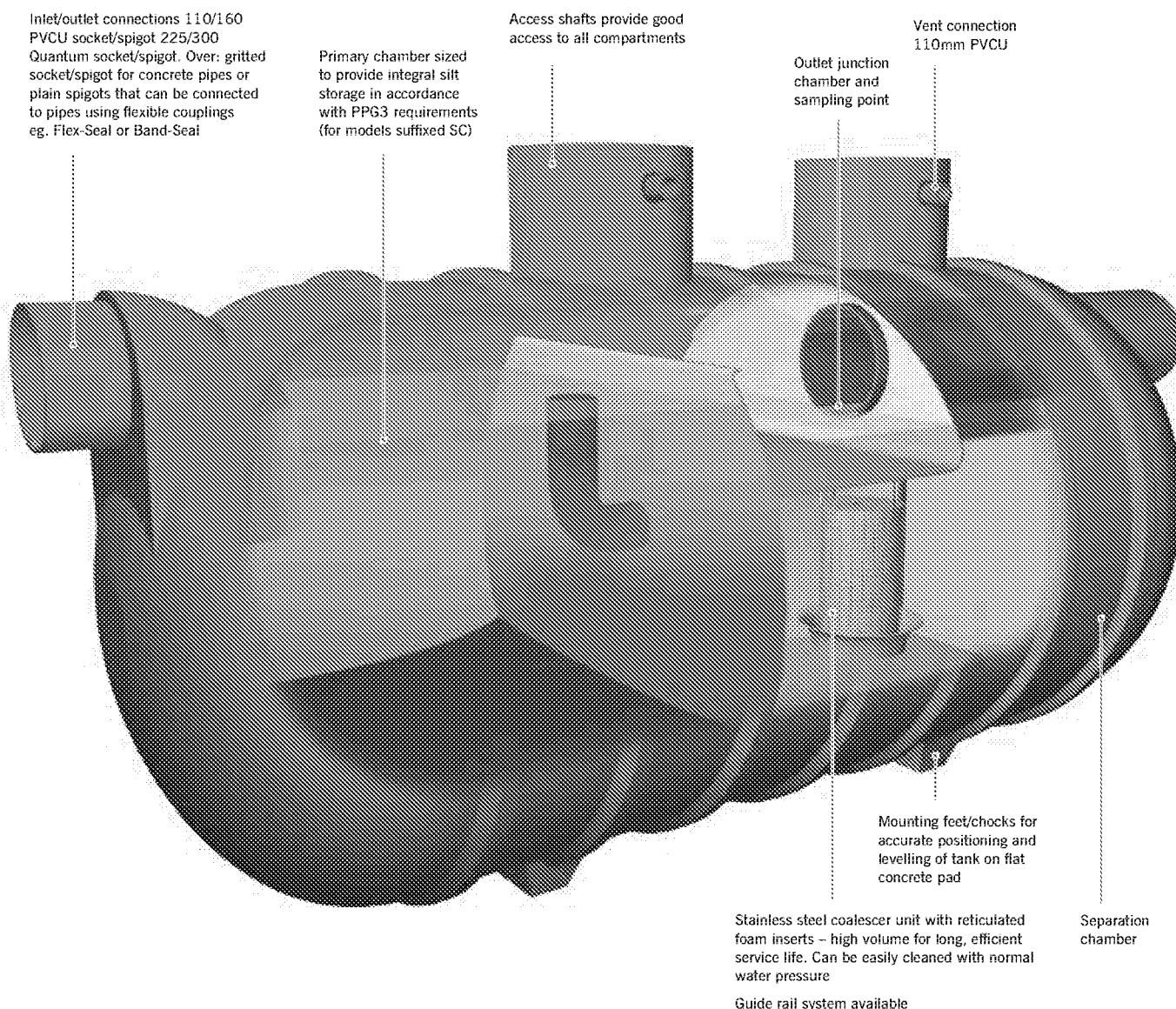
400 series – models without silt capacity are available if required – details on application.



400 series



Compliant to the European Standard BS EN 858-1, the Environment Agency's Pollution Prevention Guidelines PPG3 and the Construction Products Regulations.



The 'heart' of the SPEL Stormceptor is the unique long life, low maintenance coalescer unit which 'polishes' the final effluent AFTER 90% hydrocarbons of silt have been separated out.

The SPEL Stormceptor is a well proven high quality factory-made unit specially designed and fabricated to provide a very effective means of separating oil and other light liquids from stormwater drainage systems.

The SPEL Stormceptor was the first Environment Agency listed class 1 by-pass separator to BS EN 858-1:2002.

The SPEL Stormceptor has been used effectively throughout the UK and abroad since 1985. All sizes and types of development have been catered for, including industrial development sites, hypermarkets and airports. Areas of up to 30 hectares can be covered with a single unit.

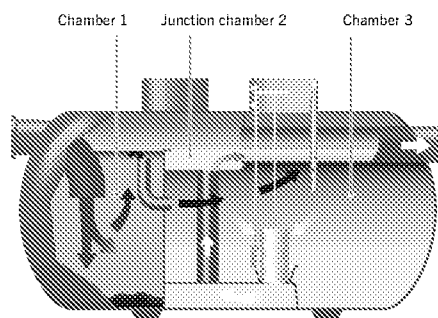
6.2 SPEL Stormceptor® by-pass separators

Operation



Protecting coastal waters

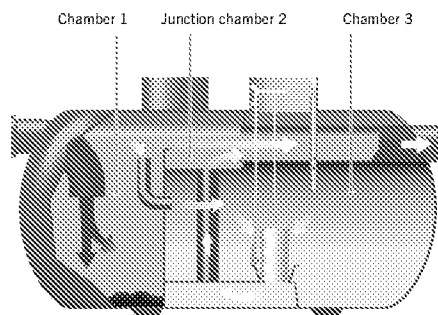
Surface water draining from runways at a busy RAF station in Anglesey is being treated by two SPEL Stormceptor class 1 by-pass separators.



Flows according to nominal size (NSB)

The polluted surface water first enters the primary chamber where silt settles out and is retained. The fuel, oil and other pollutants lighter than water, rise to the surface and are efficiently skimmed off and transferred to the separation chamber.

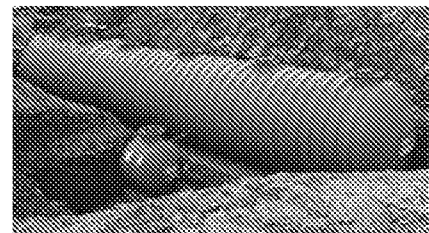
In normal conditions all the flow is through the separation chamber, where the quiescent conditions allow the pollutants to separate out efficiently. Water from the cleanest zone in the separation chamber flows through a coalescer unit, to remove smaller globules of oil, up to the junction chamber and thence to the outlet.



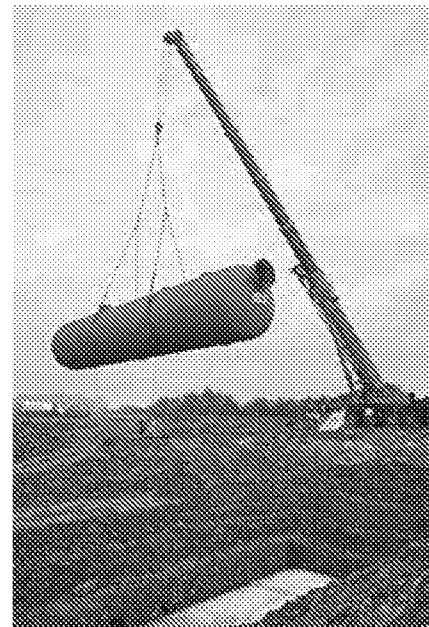
Storm flows above NSB

During a storm the level in the primary chamber rises and the stormwater passes over the weir into the junction chamber and to the outlet.

The design keeps the turbulence within the separation chamber to a minimum which avoids disturbing the contaminants retained.



The reclaimed former opencast coal site at Bermuda Park, Warwickshire. The main contractor – Tarmac Construction Midlands – has installed three SPEL 500 series Stormceptor by-pass separators with Econoskim fuel/oil skimming and separate fuel/oil containment facilities. These cater for an impermeable area of 68 acres.



Above and left:
SPEL Stormceptor series 600 class 1 by-pass separator for a catchment area of 30 hectares.

