



0700 SERIES APPENDICES

VOLUME 3: SPECIFICATION FOR THE WORKS

ENGINEERING AND CONSTRUCTION CONTRACT
(THIRD EDITION 2013)

Document Control Sheet

Project Title M62 J20 to J25 SMP – Advanced hard shoulder strengthening
Title Specification – 0700 Series Appendices
Doc Reference HE551534-WSP-HPV-SG-SP-CH-00700
Issue C01
Status A1 – CONSTRUCTION
Control Date SEPTEMBER 2019

Record of Issue

Issue	Status	Author	Date	Check	Date	Authorised	Date
C01	A1	█	Sept 19	DD	Sept 19	IDT	Sept 19

Distribution

Organisation	Contact	Copies	Approved
Highways England	█	1	

Amendment/Revisions

Revision	Date	Section	Page	Details	Amended By

INTRODUCTION

1. See drawing numbers HE551534-WSP-HPV-SG-DR-CH-00015 to 00021 inclusive for details of permitted pavement options.
2. Permitted Pavement Options are shown in Schedule 1.
3. General Requirements are specified in Schedule 2.
4. The Permitted Construction Materials are specified in Schedule 3.
5. General Requirements for Construction Materials are specified in Schedule 4.
6. Requirements for Construction Materials are specified in Schedule 5.
7. Thin Surface Course Systems: Information to be provided by the Contractor – Schedule 6.

APPENDIX 7/1: PERMITTED PAVEMENT OPTION

All designs are based on DMRB Volume 7 standards HD24/06 (Traffic), HD26/06 (Pavement Design), IAN 73/06 Rev 1 2009 (Foundation) and CD236 (PSV and AAV requirements).

1. PERMITTED PAVEMENT OPTIONS - SCHEDULE 1

(Refer to Drawings for locations of permitted pavement options)

Schedule 1: Permitted Pavement Options			
Drawing Ref.	Area	General Requirements	Permitted Pavement Options
HE551534-WSP-HPV-SG-DR-CH-00015	Westbound Carriageway – Hardshoulder 4700M62/482 + 880m Ch. 34,032 to 4700M62/483 + 21m Ch. 33,892	Schedule 2	Schedule 3
HE551534-WSP-HPV-SG-DR-CH-00017	Eastbound Carriageway – Hardshoulder 4700M62/328 + 42m Scheme Ch. 37,080 to 4700M62/328 + 800m Scheme Ch. 37,838	Schedule 2	Schedule 3

2. GENERAL REQUIREMENTS – SCHEDULE 2

Schedule 2: General Requirements		
Grid for Checking surface levels of pavement course (702.4)	Longitudinal dimension	10m
	Transverse dimension	2m
Surface regularity (702.5 Table 7/2)	Category of Road	A
Interval for measurement of longitudinal regularity (702.7)		Continuous along each wheel track in each lane for each 300m length or pro rata 75m
Interval for measurement of transverse regularity (702.8)		10 m
Whether measurement of surface texture is required:	Yes	

General Notes:

- (i) All surfaces will be treated with a bond coat prior to placing each successive asphalt course following procedures as recommended in SHW Clause 903.4. The application method of the bond coat is presented in SHW Clause 920.
- (ii) Any new construction joints shall be agreed with the supervisor.
- (iii) Joints in asphalt shall be cut in accordance with SHW Series 900 by one of the following methods:
 - Cutting wheel fitted to a roller when the surface course is warm.
 - Saw cutting when the surface course is cold.
 - Sealing of joints in asphalt: All vertical joint faces between existing and proposed bituminous materials shall be completely sealed in accordance with SHW clause 903 of the Specification for Highway Works and as shown in schedule 4.

3. PERMITTED CONSTRUCTION MATERIALS - SCHEDULE 3

Pavement Option: 1 – Hard Shoulder Resurfacing Option		
STATUS – Pavement Treatment Option 1 is currently omitted. Locations where this treatment is required will be subject to further analysis of the available Visual Condition Survey and agreed with the Overseeing Organisation.		
Pavement Layer	Material Ref:	Thickness (mm)
Surface Course	SC1	40
Total Asphalt Thickness		40mm

Pavement Option: 2 – For traffic loading >80MSA Hard Shoulder Reconstruction Option		
Pavement Layer	Material Ref:	Thickness (mm)
Surface Course	SC1	40
Binder Course	BC1	60
Base	B1	130
Base	B1	130
Total Asphalt Thickness		360mm
Foundation (Where Required- see Clause 5, Subgrade Requirements)	SB1	450mm

Pavement Option: 3 – For traffic loading >80MSA Hard Shoulder Structural Inlay Option		
Pavement Layer	Material Ref:	Thickness (mm)
Surface Course	SC1	40
Binder Course	BC1	60
Base	B1	80
Total Asphalt Thickness		180mm

4. REGULATING LAYERS

General Notes if regulating layers are required: -

- RG1: Use 6mm SMA mixture to clause 937 for regulating thickness 15 to 30mm (where required)
- RG2: Use 10mm SMA mixture to clause 937 for regulating thickness from 30 to 50mm (where required)

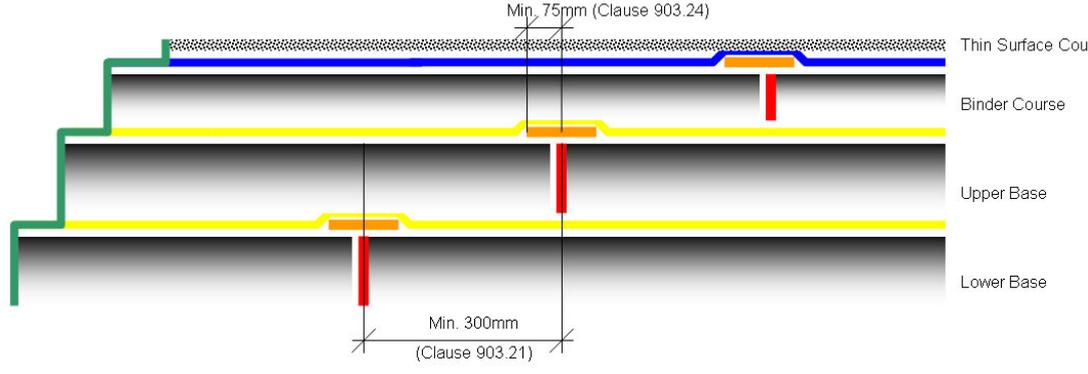
5. SUBGRADE REQUIREMENTS

In areas of full depth pavement treatment, the existing Hard shoulder varies in depth but is predominantly greater than 400mm in thickness. Where the pavement layers are less than the design requirement, the foundation may need to be exposed and reconstructed to provide a new class 2 foundation. Treatment of the foundation shall be as below.

Foundation Design		
Foundation design: one of the following options:		
A) Utilising any remaining existing intact bound layer(s), otherwise option B or C shall be implemented		
B) Utilising the existing foundation, after planing, the exposed layer shall be inspected, if the material is found to be equivalent to Type 1 properties, it shall be rolled at optimum moisture content and tested with the Light Weight Deflectometer (LWD) in accordance with the requirements stated in IAN 73/06 rev1 every 10m per lane. The LWD surface modulus shall be defined as the moving mean of five consecutive in-situ measurements at 80MPa with no individual value falling below 50MPa. If these are not achieved then option C shall be implemented.		
C) New foundation option, sub base only or sub base on capping layer		
Sub base only	SB1	450mm
Sub base	SB1	350mm
Capping	CP1	250mm

6. GENERAL REQUIREMENTS FOR CONSTRUCTION MATERIALS - SCHEDULE 4

Schedule 4: General Requirements for Construction Materials	
Clause	Requirement
801.2	Limiting distance for deposition of unbound mixtures shall be 500 mm
801.3	Limiting distance for deposition of unbound mixtures shall be 500 mm
801.7	Material shall be non-frost susceptible within 450 mm of finished surface
802.4	Unbound materials up to 225 mm compacted thickness can be spread in more than one layer for Pavement Options B1 and C1 only.
901.6	Requirements for resistance to fragmentation (hardness) as sub-Clause 901.6
901.7	Requirements for resistance to freezing and thawing (durability) as sub-Clause 901.7
901.8	Requirements for cleanness as sub-Clause 901.8
902.2	Requirements for reclaimed asphalt sub-clause 902.2
903.9	Hand placing permitted due to confined spaces as sub-Clause 903.9 (ii)
903.21	Requirements for positioning of longitudinal joints as sub-Clause 903.21
903.22 903.24 903.25	Prior to placing bituminous material on any new or existing bound substrate, a bond coat only [tack coats are no longer regarded as best practice, Ref BS EN 594987:2010, paragraph 3.2] shall be applied in accordance with Clauses 920 or 942 of the Specification for Highway Works (SHW), as clarified in the schematic below. Where the design incorporates a proprietary thin surface course system the bond coat shall be compatible with the requirements of the manufacturer’s system; and the joints treated with hot elastomeric polymer-modified bituminous binder to clause 903.22.

	 <p>Key to sealant/bond requirements:</p> <ul style="list-style-type: none"> — Faces of all cold upstanding edges to be treated with hot elastomeric polymer-modified bituminous binder (Clause 903.22) — Top surface of all base and binder course joints to be treated with hot elastomeric polymer-modified bituminous binder (Clause 903.24) — Top surface of all base layers to be treated with a bond coat (Clause 920) — Top surface of all binder course to be treated with a bond coat specific to the Thin Surface Course System (Clause 942) — Whole of freestanding edge to be treated with hot elastomeric polymer-modified bituminous binder (Clause 903.25)
<p>903.25</p>	<p>Sealant shall be applied to all freestanding edges of the finished pavement.</p>
<p>903.27</p>	<p>Requirements for PSV of temporary running surface (if required) as sub-Clause 903.27 for BC1.</p>

7. REQUIREMENTS FOR CONSTRUCTION MATERIALS - SCHEDULE 5

Schedule 5: Requirements for Construction Materials			
Material Ref	Clause	Description	Requirement
SC1	942	Thin Surface Course Systems	Overall Performance Guarantee period [942.3]: 5 Years
			Required declared PSV value [942.6 and NG 942.20]: 65 PSV
			Required maximum AAV value [942.6 and NG 942.20]: 12
			Aggregate resistance to fragmentation [942.6i]: LA_{30max}
			Aggregate Flakiness Index [942.6ii]: Fl_{20max}
			Maximum aggregate size [Table 9/9]: 14mm
			Mixture Type Classification and Minimum target design binder content [942.7 and Table 9/10]: minimum 5%
			Resistance to permanent deformation [942.8 and NG942.39]: Site Category A, Level 3
			Water Sensitivity Category [942.9]: ITSR_{min70}
			Traffic flow cv/l/d [NG942.11]: 5000+
			Minimum design thickness [942.13, Table 9/11 and NG 942.14]: 35mm
			Maximum design thickness [942.13, Table 9/11 and NG 942.14]: 50mm
			Whether the existing substrate surface shall be strengthened or regulated [942.14 and 942.15]: None Anticipated.
			Whether bond coat shall be applied in accordance with Clause 920 or Installation Method Statement [942.17]: Yes
			Whether surface macrotexture measurement is required [942.19]: Yes

Schedule 5: Requirements for Construction Materials			
Material Ref	Clause	Description	Requirement
			Initial Surface Macrotexture requirements [Table 9/12 and 9/13]: Min 1.3, Max 1.8, Average of 10 measurements 1.0mm (min)
			Retained Surface Macrotexture Requirements if not in accordance with Clause 942.20 and Table 9/14 [NG942.51]: 0.9mm
			Road/ Tyre noise level [942.34, Table 9/17, NG 942.36 and NG 942.37]: Level 2
BC1	929	Dense Base and Binder Course Asphalt Concrete (Designed mixtures)	Mixture designation [929.1]: AC 20 dense bin 40/60 des BS EN 13108-1 and PD6691 Annex B
			Whether void content at refusal is to be monitored in the permanent works [929.3]: Yes
			Resistance to permanent deformation classification [929.4 and PD 6691 Table D2]: Class 2
			Whether resistance to permanent deformation is to be monitored in the permanent works [929.5]: Yes
B1	929	Dense Base and Binder Course Asphalt Concrete (Designed mixtures)	Mixture designation [929.1]: AC 32 dense bin 40/60 des BS EN 13108-1 and PD6691 Annex B
			Whether void content at refusal is to be monitored in the permanent works [929.3]: Yes
			Resistance to permanent deformation classification [929.4 and PD 6691 Table D2]: Class 2
			Whether resistance to permanent deformation is to be monitored in the permanent works [929.5]: Yes
RG1	937	Mixture Designation [937.1]: SMA 6 bin 40/60	Mixture Designation [937.1]: SMA6 bin 40/60
			Resistance to permanent deformation classification [937.4 & 937.5]: Class 2, Table D.2 Clause D.7, PD 6691
			Whether resistance to permanent deformation is to be monitored in the permanent works [929.5]: No
RG2	937	Mixture Designation [937.1]: SMA 10 bin 40/60	Mixture Designation [937.1]: SMA10 bin 40/60
			Resistance to permanent deformation classification [937.4 & 937.5]: Class 2, Table D.2 Clause D.7, PD 6691
			Whether resistance to permanent deformation is to be monitored in the permanent works [929.5]: No
SB1	803	Type 1 Unbound Mixture	Mixtures containing crushed gravel coarse aggregate: Not permitted

APPENDIX 7/2: EXCAVATION, TRIMMING AND REINSTATEMENT OF EXISTING SURFACES

1. Existing underground services should be located (using a cable avoidance tool or similar) and protected as required during the works. Overground services should also have preventive measures in place for protection.
2. Locations and estimated areas where cold milling is required are given in Appendix 7/1 and Appendix 7/9 and on the Contract drawings.
3. The requirements for treating the faces of cold upstanding edges shall be as stated in Clause 903.22 and 903.24.
4. A joint visual inspection of the milled pavement surface should be undertaken by the Contractor and the Overseeing Organisation and any identified defects should be patched to the depth of that defect prior to the commencement of any resurfacing works.
5. No thin and debonded lenses of existing asphalt to be left in place after planing and if present, they shall be removed prior to laying new materials.
6. All “tie ins” to vertical faces shall be cut back into sound construction and ensure adequate access for compaction equipment.
7. After milling off existing asphalt surfaces, a walk-over survey shall be carried out to locate any cracks on the underlying pavement surface and any cracks having width of 1.0mm or greater should be sealed using a suitable HAPAS approved proprietary crack sealing system.
8. The Contractor shall take care that each crack is thoroughly cleaned as the milling process may fill the cracks with more debris
9. Proprietary systems that are used to treat cracks shall comply with the manufacturer's/supplier's recommendations.

APPENDIX 7/4: BOND COATS, TACK COATS AND OTHER BITUMINOUS SPRAYS

1. Bond coat is to be applied at the interface between all successive bituminous layers. This shall be applied by metered mechanical spraying equipment, spray tanker or spraying device integral with the paving machine - in accordance with BS 594987 Clause 5.5.2.
2. Before applying any bond coat, the previous layer must be clean and free from dust, leaves or other deleterious materials.
3. Before spraying is commenced, the surface shall be free of all loose material and standing water. All surface preparation shall be carried out in accordance with BS 594987 Clause 5.1.
4. Masking of street furniture, drop-kerbs, etc. shall be by self-adhesive masking material.
5. The rate of spread of bond coat shall be in accordance with HAPAS product certification and BS 594987 Clause 5.5.2.
6. Bond coat required for thin surfacing course materials, shall be in accordance with the British Board of Agreement HAPAS Roads and Bridges Certificate for the system.
7. Tack coats are not permitted.
8. This Appendix does not cover bituminous sprays prior to the application of thin surface course systems in which bond coats are an integral part of the system produced under BBA/HAPAS certification.

Information to be provided by the Contractor:

9. The Contractor shall provide the following information with his tender, or prior to the commencement of the work:
10. (11/04) The product or products he proposes to use together with their data sheets, product identification data, cohesivity data as specified. [920.2, 920.3, 920.4, 920.5] [Note to compiler: A suitable Sheet for the provision of binder data is attached to this Appendix, other layouts are permitted but all the required data should be supplied]
11. (11/04) 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.
12. The spraying equipment proposed, and a test certificate. [920.7, 920.9]
13. (08/08) The source or sources of blinding material proposed. [920.12]
14. Contingency plans in the event of any breakdown.
15. 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:
 - Tackiness test and/or trafficability time and methods of test.
 - Breaking time test results for different weather conditions and substrates.
16. (11/04) Test results for bond to newly laid concrete [eg. from a BBA/HAPAS certificate if available]. The data supplied should not be more than 6 months old

APPENDIX 7/4: BINDER DATA SHEET

Binder Data Sheet – Appendix 7/4 (08/08)		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	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 25oC dmm (100g and 5 secs)			
Penetration at 5oC dmm (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 BS434 and for bitumen and cut back 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 7/9: COLD MILLING (PLANING) OF BITUMINOUS BOUND FLEXIBLE PAVEMENTS

GENERAL

1. Areas to be planed shall be in accordance with Appendix 7/2.
2. Where the cold milling of bituminous bound flexible pavement is required, the area of carriageway to be milled shall be profile planed to the specified depths by a milling machine approved by the Designers Site Representative.
3. In accordance with Clause 709, 48 hours prior to planing, the Contractor shall carry out a check of the areas to locate any buried metal work within the layer to be planed. The check shall be carried out with electronic detection equipment suitable for the purpose.
4. The Contractor shall allow for working around drainage channels, chamber covers, gully gratings, expansion joints and the like by cutting out and removal of material by pneumatic tools or other suitable methods.
5. The edge of the area requiring cutting out by other suitable methods shall be saw cut back and the edges left neat, vertical and in straight lines.
6. Immediately after milling, surplus materials shall be removed by a machine of suitable and efficient design. The milled surface shall be swept and must be clean and dry, and free from ice, frost, loose aggregate, oil, grease, road salt and other loose materials prior to overlaying.
7. Where compressed air is used to clean dust, dirt and other debris from the prepared faces of existing concrete and bituminous pavement, which are otherwise ready for reinstatement, only oil-free compressed air shall be used and this shall be at a pressure of not less than 0.5 N/mm².
8. Tar bound materials have not been identified in the upper layers of the pavement. However, the contractor shall be responsible for its identification, classification and removal from site where encountered.

Schedule : Sweeping Areas Prior to Cold-milling	
Drawing No.	Location
HE551534-WSP-HPV-SG--DR-CH-00015	Westbound Carriageway – Hardshoulder 4700M62/482 + 880m Ch. 34,032 to 4700M62/483 + 21m Ch. 33,892
HE551534-WSP-HPV-SG--DR-CH-00017	Eastbound Carriageway – Hardshoulder 4700M62/328 + 42m Scheme Ch. 37,080 to 4700M62/328 + 800m Scheme Ch. 37,838