HAUC (UK)

HIGHWAY AUTHORITIES & UTILITIES COMMITTEE

HAUC(UK) Advice Note No. ANUK - 2014/04

Reinstatement of Micro-Trenches

This advice note on micro-trenching supplements the guidance document produced by the Department for Culture Media and Sport in November 2011, and is a reinstatement specification designed to support undertakers and authorities should they agree to adopt micro-trenching as part of an installation methodology.

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Reinstatement of Micro-Trenches

New Roads and Street Works Act 1991

OVER-ARCHING STATEMENT

This Advice Note only addresses the reinstatement requirements for micro-trenches where there is prior agreement between the undertaker and the street authority to adopt the use of micro-trenching as a Network Installation technique.

1 Background to Advice Note

1.1 Against a background of seeking to enable the market to deliver broadband across all parts of the country, the Department for Culture, Media and Sport (DCMS), published an advice note in November 2011 entitled *"Microtrenching and Street Works: An advice note for Local Authorities and Communications Providers"*. This is hereafter referred to as the 'DCMS Guidance document'.

1.2 The DCMS Guidance document made several recommendations. In relation to the Specification for Reinstatement of Openings in the Highway (hereafter the 'SROH'), it said:

"Recommendation 4: All stakeholders should agree, through bodies such as HAUC UK and other bodies such as UKCTA, along with relevant soils and materials experts, a specification that can be used in practice, before it is considered for inclusion in the statutory Specification for the Reinstatement of Openings in the Highway at the next available revision."

1.3 In 2012, HAUC (UK) charged the SROH Working Party to prepare such a specification.

2 Introduction to the Working Party proposals

2.1 The DCMS Guidance document significantly restricts the potential use of micro-trenching. Recommendations 2 and 3 state:

"Recommendation 2: Local and Highways Authorities should consider micro trenching as an acceptable method of installing communications cables…….as long as the proposed trench is within the bound layers and at least 175mm deep with a maximum permissible

depth of 250mm. Highways Authorities have the discretion to accept installations outside of these limits."

"Recommendation 3: Microtrenching should only be used in roads where there is a minimum of 325mm of bound construction. The position of trenches within the highway should be determined in consultation with the local highway authorities."

2.2 In reality, much of the UK road network has evolved over the last 50 to 65 years. Whilst modern designs for new roads may require bound construction depths in excess of the 325mm threshold figure, a significant majority of existing roads do not have total bound depths approaching that thickness.

2.3 The DCMS Guidance document noted that there were:

"……successful examples of microtrenching being deployed at a much shallower depth, such as those carried out by Vtesse Networks in Horsham, or by Tulloch Developments in the Shetland Isles. Where a road, especially in more rural areas, cannot be microtrenched to a depth of 175mm, we would encourage the communications provider and highways authorities to work together to determine whether a shallower depth would be appropriate. This is likely to depend on individual circumstances and should be considered on a case by case basis."

2.4 In recognition of this comment, and the opportunity offered by Recommendation 2, the Working Party prepared a further Specification. This second Specification explored the potential for the use of micro-trenches in thinner constructions, including footways and evolved highways, where granular materials may be encountered within the depth of the micro-trench. This second Specification is referred to as the 'Non-DCMS Specification'.

2.5 To summarise, this HAUC (UK) Advice Note includes two Specifications:

(i) Specification for the Excavation and Reinstatement of Micro-trenches in Asphalt Roads

[*The 'DCMS Specification', which conforms to Recommendation 3 of the DCMS Guidance document i.e. to limit the use of micro-trenches to wholly within bound construction of minimum thickness 325mm.]*

(ii) Specification for the Excavation and Reinstatement of Micro-Trenches in Shallow Construction (including Footways) and Evolved Highways

[The 'non-DCMS Specification']

3 Definition and Scope of Micro-Trenching for the purposes of this Advice Note

3.1 The DCMS Guidance document noted that:

> *"Microtrenching (or slot-cutting) is an innovative technique……in which fibre optic cable and sometimes conduits are laid into a slot-cut trench less than 20mm wide, and typically between 120-300mm deep……"*

3.2 The method of forming the slot, or micro-trench, has not been specifically addressed in the two Specifications, although it was contemplated that slots formed by disc-cutting (normally mechanical floor saws), or narrow (micro) trenches formed by rotary 'toothed' spinners were the most likely.

3.3 The two Micro-Trench Reinstatement Specifications encompass slots, or micro-trench widths up to 60mm wide.

3.4 For definition purposes, the two Specifications adopt the term Micro-Trench as encompassing either of the methods set out in Paragraph 3.2.

END

HAUC Specification for the Excavation and Reinstatement of Micro-Trenches in Asphalt Roads *(the "DCMS Specification")*

HAUC(UK) Advice Note 2014/04 refers

Introduction/Scope

1.1 This Specification is intended to supplement the Specification for Reinstatement of Openings in the Highway (SROH) 3rd Edition (England), although unlike the SROH, this Specification is non-statutory. It addresses the excavation and reinstatement of Micro-Trenches confined wholly within bound materials in asphalt roads. This is in accordance with the guidance entitled "Microtrenching and Street Works: An advice note for Local Authorities and Communications Providers", issued by Department for Culture, Media and Sport (DCMS) in November 2011.

1.2 For brevity, this Specification is referred to elsewhere as the "DCMS Specification".

1.3 Whilst this Specification does not address the type of apparatus installed in the micro-trench, it is expected that this could be:

(i) Mini-ducts, whether single or multiple (hereafter "duct"), or
(ii) Directly buried cables, whether single or multiple (hereafter "cable").

1.4 Following installation, ducts will subsequently have small diameter cables installed inside. These cable installation operations should not impact upon the reinstated micro-trench.

2. Excavation/Cleaning

2.1 Experience has shown that the method of cutting/excavation used for micro-trenching can have a significant impact on the ability to achieve an effective reinstatement. The greatest threat to effective reinstatement is the presence of excess moisture. For this reason a dry cutting process with a vacuum recovery system for the arisings is preferred. Wet cutting may be used but is likely to require significantly greater effort to clean and dry the slot to the standard necessary to ensure an effectively bonded reinstatement.

2.2 Slots shall be cut to the width of the duct to be accommodated plus 4mm, up to a maximum width of 60mm. For absolute clarity, trenches greater than 60mm are not considered to be 'Micro-Trenches'. Excavation and reinstatement of trenches greater than 60mm shall be in accordance with the SROH.

2.3 Cutting/Excavation operations:

2.3.1. The actual line of the micro-trench should be carefully planned in advance of cutting/excavation commencing. Consideration as to its proposed location relative to the wheel paths of both motor vehicles and motor cycles should be given.

2.3.2. Cutting should be undertaken in a single pass using a large diameter slot cutter with a minimum of 20 cutting teeth to ensure smooth operation.

2.3.3. After cutting to the required depth, the slot should be vacuum cleaned, or blasted clean using compressed air, as appropriate, to produce a clean and dry slot, substantially of uniform width and depth.

2.3.4. Where blasting is used appropriate measures must be introduced to prevent injury or damage from projectiles, especially in a live road environment.

2.4 Any large pieces of aggregate or agglomerations of aggregate protruding into the slot after vacuuming/blasting should either be prized free and removed, or hammered into the base of the slot, so that it does not interfere with installation of the duct/cable. This may be done using a percussive tool with a narrow tip.

2.5 All substrates should be clean, dry and free from contamination and plant growth and all loose materials should be removed before the duct/cable installation commences.

3. Installation of ducts/cables

3.1 Prior to duct/cable installation, a high density foam strip (approximately 10mm thick) shall be installed in the base of the slot.

3.2 The duct/cable is installed followed by a further high density foam strip of appropriate dimensions, which should be slightly wider than the slot itself, so that it holds the duct/cable firmly at the base of the slot.

3.3 The finished level of the duct/cable should not vary from the agreed depth by more than plus or minus 20mm. Where this finished depth tolerance is not achieved, As-Laid Records, which should be freely available, shall clearly show the extent of the shallow apparatus, together with an indication of the actual depth of cover, to within 10mm accuracy.

3.4 The duct/cable must incorporate a suitable tracer, often an integral metal wire, to facilitate easier detection/location, in the event that future highway maintenance works, such as further Surface Courses, surface dressing and the like, obliterate any evidence of the micro-trench at the surface.

4. Backfilling and Reinstatement

4.1 Once the duct/cable and locating strips have been installed, the remaining depth of the slot shall be reinstated using two courses of self-compacting, high modulus, thermosetting slot filling compound as detailed in Appendix A to this Specification.

4.2 The two courses shall comprise:

(i) Course 1 – Indicator Infill material (Material 1)
(ii) Course 2 – Surface Infill material (Material 2)

4.3 Course 1 – Material 1:

(i) Material 1 shall be installed, using an appropriately shaped funnel or nozzle, so as to completely fill the void to within 15mm and 10mm of the finished surface level and to create an effective bond to both sides of the slot.

(ii) Material 1 is to be coloured yellow to act as an indicator layer to help prevent future works in the road resulting in damage to the services installed in the micro-trench.

4.4 Course 2 – Material 2:

(i) Material 2 (asphalt grey in colour) shall be installed above course 1, using an appropriately shaped shoe, to completely fill the remaining void, to restore the surface profile and to form an over-band seal onto the asphalt surface each side.
(ii) The over-banding element of Course 2 shall be no more than 3mm thick. The width of the finished reinstatement shall be the slot width plus 20mm either side up to a maximum overall width of 100mm.
(iii) Prior to setting, Course 2 shall be over scattered by a 3mm dry, dust free, hard stone aggregate (with a minimum initial PSV of 60) in order to provide early life skid resistance and texture depth.

4.5 Both Materials 1 and 2 are to be made of the same base resin material and be 100% compatible with each other.

5. Subsequent Excavation and Reinstatement by Others

5.1. The following sub-paragraphs provide guidance to other undertakers or street authorities where their subsequent excavations expose Ducts/Cables originally installed in accordance with this DCMS Specification.

5.1.1. During subsequent excavation, it is expected that the original reinstatement materials above the Ducts/Cables [Materials 1 and 2 as per main paragraph 4] will be removed.

5.1.2. The exposed Duct/Cable will require temporary support and protection in the same manner as any exposed service - a small amount of flexibility in the exposed Duct/Cable will have become available at the time of excavation.

5.1.3. It is recommended that the owner of the Duct/Cable should specify that the exposed length should be sleeved, at this point, inside split steel ducts.

5.1.4. These should be made freely available by the owner, and their use will provide:

- increased physical protection during these subsequent reinstatement operations;
- increased service traceability ahead of further re-excavation on future works;
- increased physical protection during the further re-excavation (as coloured Material 1 will not have been reinstated, under sub-paragraph 5.1.7 below).

5.1.5. Reinstatement of the subsequent excavation will require the careful deposition and compaction of lower layer granular materials, in a similar fashion to current practices when 'working-around' other existing services.

5.1.6. The small amount of flexibility in the exposed Duct/Cable is unlikely to allow the line and depth of the Duct/Cable to deviate greatly from its original As-Laid

position. As a result, some depth of Binder Course materials will require careful deposition and compaction, to the underside of the sleeved Duct/Cable.

5.1.7. In the same manner, the next lift of the Binder Course above the sleeved Duct/Cable will require careful deposition and compaction. However, with the added protection of the split steel ducts, normal compaction should be achieved, again in a similar fashion to current practices when 'working-around' other existing services in the bound Asphalt layers.

APPENDIX A

A1 Specification for Material 1

A1.1 Material 1 shall be a self-compacting, high modulus, thermosetting slot filling compound with a high tensile bond strength and good dimensional stability over the anticipated operating temperature range. The material shall be Yellow in colour.

A1.2 Material 1 may contain aggregate to reduce costs but must meet the following performance criteria:

• Material type	Thermoset resin
• Wheel tracking at 60°C	<1mm rut depth *3
• Tensile bond strength	>0.75 MPa *4
• Elongation	>150% *5
• Void Content	<1% *7

*3 Wheel tracking to BS 598 Part 110: 1996 at 60°C;
*4 Tensile bond tested to TRL 176 Appendix J – applies to Material 1, or where failure at a lower MPa level occurs, in the substrate itself;
*5 BS EN ISO 527-1 & 3:1996 – Plastics – determination of tensile properties;
*7 BS EN 12697-8:2003.

A2 Specification for Material 2

A2.1 Material 2 shall be a self-compacting, high modulus, thermosetting slot filling compound with a high tensile bond strength and good dimensional stability over the anticipated operating temperature range. It should be asphalt grey in colour.

A2.2 The infill material will contain an aggregate with a minimum PSV of 60 to provide long term skid resistance, and in addition shall be over scattered by a 3mm dry, dust free, hard stone aggregate (with a minimum PSV of 55) in order to provide early life skid resistance. As the over-banding can be up to 100mm wide, it is important that the material surface has an effective texture depth appropriate for the road surface, in order to reduce the risk of skidding. *[BBA/HAPAS Guidelines for the Assessment and Certification of Crack Sealing Systems for Highways set out the requirements for over-band materials up to 200mm wide. Thermoset resins have been approved by HAPAS up to this width]*

For roads surfaced with Hot Rolled Asphalt (HRA) with coated chippings, the undertaker should consult with the highway authority in respect of the overband material reproducing the texture depth.

A2.3 Material 2 must meet the following performance criteria:

• Initial skid resistance on application	>60 SRV [*1]
• Retained skid resistance	>50 SRV [*1]
• Spread rate	<1.5mm [*2]
• Material type	Thermoset resin
• Wheel tracking at 60°C	<1mm rut depth [*3]
• Tensile bond strength	>0.75 MPa [*4]
• Elongation	>150% [*5]
• Initial texture depth	>1.5mm [*6]
• Void Content	<1% [*7]

[*1] Skid resistance (SRV) will be determined by the pendulum method in accordance with BS EN 13036-4: 2003 using the narrow slider with measurements on scale C;
[*2] Spread rate measured after wheel tracking at 60°C;
[*3] Wheel tracking to BS 598 Part 110: 1996 at 60°C;
[*4] Tensile bond tested to TRL 176 Appendix J – applies to Material 2, or where failure at a lower MPa level occurs, in the substrate itself;
[*5] BS EN ISO 527-1 & 3:1996 – Plastics – determination of tensile properties;
[*6] Determined by the draft linear sand patch test;
[*7] BS EN 12697-8:2003.

A3 General

A3.1 Until such time as appropriate BBA/HAPAS requirements can be developed, compliance with these specifications must be proven by externally validated test results from a suitable UKAS accredited laboratory. All materials should have a track record of at least 2 years in a highway environment under heavy traffic load or, where this is not available, evidence of similar performance undertaken at a suitably certificated accelerated pavement test facility.

A3.2 Additionally, where trials in one highway authority area are offered as evidence for acceptance in another highway authority, the principles set out for Alternative Reinstatement Materials (ARMs) trials should similarly apply – see in particular Sections A9.2.5.1(9) of the SROH.

Finalised AMR 16th May 2014 [final SROH WP Comments added to post-Consultation review Document Version]

HAUC Specification for the Excavation and Reinstatement of Micro-Trenches in Shallow Construction and Evolved Highways *(the "Non-DCMS Specification")*

HAUC(UK) Advice Notice 2014/04 refers

Introduction/Scope

1.5 A Specification to supplement the Specification for Reinstatement of Openings in the Highway 3rd Edition (England) (hereafter the '*SROH*'), has been produced to addresses the excavation and reinstatement of micro-trenches confined wholly within bound materials in asphalt roads. This was produced in accordance with the guidance entitled "Microtrenching and Street Works: An advice note for Local Authorities and Communications Providers", issued by Department for Culture, Media and Sport (DCMS) in November 2011 (hereafter the '*DCMS Guidance document*').

1.6 That Specification (hereafter referred to as the '*DCMS Specification*') is aimed at the excavation and reinstatement of micro-trenches confined wholly within bound materials, thereby meeting the requirements of the DCMS Guidance document. Unlike the SROH, the DCMS Specification is non-statutory.

1.7 The DCMS Guidance document significantly restricts the use of micro-trenching. Recommendations 2 and 3 state:

> *"Recommendation 2: Local and Highways Authorities should consider micro trenching as an acceptable method of installing communications cables, subject to the caveats and conditions above, as long as the proposed trench is within the bound layers and at least 175mm deep with a maximum permissible depth of 250mm. Highways Authorities have the discretion to accept installations outside of these limits."*

> *"Recommendation 3: Microtrenching should only be used in roads where there is a minimum of 325mm of bound construction. The position of trenches within the highway should be determined in consultation with the local highway authorities."*

1.8 However, much of the UK road network has evolved over the last 50 to 65 years. Whilst modern designs for new roads may require bound construction depths in excess of the 325mm threshold figure, a significant majority of existing roads do not have total bound depths approaching that thickness.

1.9 In recognition of the opportunity offered by Recommendation 2, this supplementary Specification (hereafter referred to as the 'Non-*DCMS Specification*') explores the potential for the excavation and reinstatement of micro-trenches in thinner constructions, including footways and evolved highways, where granular materials may be encountered within the depth of the micro-trench. In the same manner as the DCMS Specification, this Non-DCMS Specification is also non-statutory

1.10 This Non-DCMS Specification does not address the type of apparatus installed in the micro-trench, but it is expected that this could be:

(iii) Mini-ducts, whether single or multiple (hereafter "duct"), or
(iv) Directly buried cables, whether single or multiple (hereafter "cable").

1.11 Following installation, ducts will subsequently have small diameter cables installed inside. These cable installation operations should not impact upon the reinstated micro-trench.

2. Excavation/Cleaning

2.6 Experience has shown that the method of cutting/excavation used for micro-trenching can have a significant impact on the ability to achieve an effective reinstatement. The greatest threat to effective reinstatement is the presence of excess moisture. For this reason a dry cutting process with a vacuum recovery system for the arisings is preferred. Wet cutting may be used but is likely to require significantly greater effort to clean and dry the slot to the standard necessary to ensure an effectively bonded reinstatement.

2.7 Slots shall be cut to the width of the duct(s) to be accommodated plus 4mm, up to a maximum width of 60mm. For absolute clarity, trenches greater than 60mm are not considered to be 'Micro-Trenches'. Excavation and reinstatement of trenches greater than 60mm shall be in accordance with the SROH.

2.8 Cutting/excavation operations:

2.3.5. The actual line of the micro-trench should be carefully planned in advance of cutting/excavation commencing. Consideration as to its proposed location relative to the wheel paths of both motor vehicles and motor cycles should be given.

2.3.6. Cutting should be undertaken in a single pass using a large diameter slot cutter with a minimum of 20 cutting teeth to ensure smooth operation.

2.3.7. After cutting to the required depth, the slot should be vacuum cleaned, or blasted clean using compressed air, as appropriate, to produce a clean and dry slot, substantially of uniform width and depth.

2.3.8. Where blasting is used appropriate measures must be introduced to prevent injury or damage from projectiles, especially in a live road environment.

2.9 Any large pieces of aggregate or agglomerations of aggregate protruding into the slot after vacuuming/blasting should either be prized free and removed, or hammered into the base of the slot, so that it does not interfere with installation of the duct/cable. This may be done using a percussive tool with a narrow tip.

2.10 Where the action of cutting and/or clearing the micro-trench causes *significant vertical* or *lateral disruption* to the surrounding surface, the process shall revert to traditional excavation and reinstatement methods set out in the SROH.

2.11 *Significant vertical disruption* means that the existing surface should not be raised or depressed by more than plus or minus 6mm, in line with S2.2.1 (As Laid Profile) of the SROH. It is not considered necessary to prescribe a limit for *lateral disruption* as the requirements of S6.5.2.1 (Edge Regularity) of the SROH will prevail. However, the frequency of lateral disruptions should be monitored to determine their significance, as set out in Paragraph 2.4 above.

2.12 All substrates should be clean, dry and free from contamination and plant growth and all loose materials should be removed before duct/cable installation commences.

3. Installation of ducts/cables

3.5 The duct/cable shall be installed in the base of the slot and held in place using:

(i) clips, or
(ii) plugs of high density foam, or
(iii) other suitable means, as agreed with the highway authority

3.6 The finished level of the duct/cable should not vary from the agreed depth by more than plus or minus 20mm. Where this finished depth tolerance is not achieved, As-Laid Records, which should be freely available, shall clearly show the extent of the shallow apparatus, together with an indication of the actual depth of cover, to within 10mm accuracy.

3.7 The duct/cable must incorporate a suitable tracer, often an integral metal wire, to facilitate easier detection/location, in the event that future highway maintenance works, such as further Surface Courses, surface dressing and the like, obliterate any evidence of the micro-trench at the surface.

4. Backfilling and Reinstatement

4.6 Once the duct/cable and locating strips have been installed, the remaining depth of the slot shall be reinstated using three courses.

4.7 The three courses shall comprise:

(iii) Course 1 – granular aggregate
(iv) Course 2 – Indicator Infill material (Material 1)
(v) Course 3 – Surface Infill material (Material 2)

[Materials 1 and 2 are self-compacting, high modulus, thermosetting slot filling compound as detailed in Appendix A to this Specification.]

4.8 Course 1 – Granular Aggregate

(i) Any exposed granular layers and associated undercutting/voiding shall be reinstated using a dried, free-flowing (effectively self compacting) 1-3mm aggregate, which should extend to the top of the existing granular layer. Suitable recycled materials will be permissible.
(ii) The aggregate is to be vibrated into place using appropriate compaction equipment. A vibrating plate to which has been attached a block or blocks of steel of dimensions appropriate to the width of trench and depth to the top of Course 1 may be used for this purpose. [See Picture 1 for typical example]
(iii) If excessive settlement of the granular aggregate takes place during vibration, such that voids form below the underside of the foot of the vibrating equipment, the aggregate shall be topped up and re-vibrated as appropriate

Picture 1 - Modified Vibrating Plate

4.9 Course 2 – Material 1

(iii) Material 1 shall be installed, using an appropriately shaped funnel or nozzle, so as to completely fill the void to within 15mm and 10mm of the finished surface level and to create an effective bond to both sides of the slot.

(iv) Material 1 is to be coloured yellow to act as an indicator layer to help prevent future works in the road resulting in damage to the services installed in the micro-trench.

4.10 Course 3 – Material 2:

(iv) Material 2 (asphalt grey in colour) shall be installed above course 1, using an appropriately shaped shoe, to completely fill the remaining void, to restore the surface profile and to form an over-band seal onto the asphalt surface each side.

(v) The over-banding element of Course 3 shall be no more than 3mm thick. The width of the finished reinstatement shall be the slot width plus 20mm either side up to a maximum overall width of 100mm.

(vi) Prior to setting, Course 3 shall be over scattered by a 3mm dry, dust free, hard stone aggregate (with a minimum initial PSV of 60) in order to provide early life skid resistance and texture depth.

4.11 Both Materials 1 and 2 are to be made of the same base resin material and be 100% compatible with each other.

5. Subsequent Excavation and Reinstatement by Others

5.2. The following sub-paragraphs provide guidance to other undertakers or street authorities where their subsequent excavations expose Ducts/Cables originally installed in accordance with this Non-DCMS Specification.

5.1.1. During subsequent excavation, it is expected that the original reinstatement materials above the Ducts/Cables [Materials 1 and 2 as per main paragraph 4] will be removed.

5.1.2. The exposed Duct/Cable will require temporary support and protection in the same manner as any exposed service - a small amount of flexibility in the exposed Duct/Cable will have become available at the time of excavation.

5.1.3. It is recommended that the owner of the Duct/Cable should specify that the exposed length should be sleeved, at this point, inside split steel ducts.

5.1.4. These should be made freely available by the owner, and their use will provide:

- increased physical protection during these subsequent reinstatement operations;
- increased service traceability ahead of further re-excavation on future works;
- increased physical protection during the further re-excavation (as coloured Material 1 will not have been reinstated, under sub-paragraph 5.1.7 below).

5.1.5. Reinstatement of the subsequent excavation will require the careful deposition and compaction of lower layer granular materials, in a similar fashion to current practices when 'working-around' other existing services.

5.1.6. The small amount of flexibility in the exposed Duct/Cable is unlikely to allow the line and depth of the Duct/Cable to deviate greatly from its original As-Laid position. As a result, some depth of Binder Course materials will require careful deposition and compaction, to the underside of the sleeved Duct/Cable.

5.1.7. In the same manner, the next lift of the Binder Course above the sleeved Duct/Cable will require careful deposition and compaction. However, with the added protection of the split steel ducts, normal compaction should be achieved,

again in a similar fashion to current practices when 'working-around' other existing services in the bound Asphalt layers.

APPENDIX A

A1 Specification for Material 1

A1.1 Material 1 shall be a self-compacting, high modulus, thermosetting slot filling compound with a high tensile bond strength and good dimensional stability over the anticipated operating temperature range. The material shall be Yellow in colour.

A1.2 Material 1 may contain aggregate to reduce costs but must meet the following performance criteria:

• Material type	Thermoset resin
• Wheel tracking at 60°C	<1mm rut depth *3
• Tensile bond strength	>0.75 MPa *4
• Elongation	>150% *5
• Void Content	<1% *7

*3 Wheel tracking to BS 598 Part 110: 1996 at 60°C;
*4 Tensile bond tested to TRL 176 Appendix J – applies to Material 1, or where failure at a lower MPa level occurs, in the substrate itself;
*5 BS EN ISO 527-1 & 3:1996 – Plastics – determination of tensile properties;
*7 BS EN 12697-8:2003.

A2 Specification for Material 2

A2.1 Material 2 shall be a self-compacting, high modulus, thermosetting slot filling compound with a high tensile bond strength and good dimensional stability over the anticipated operating temperature range. It should be asphalt grey in colour.

A2.2 The infill material will contain an aggregate with a minimum PSV of 60 to provide long term skid resistance, and in addition shall be over scattered by a 3mm dry, dust free, hard stone aggregate (with a minimum PSV of 55) in order to provide early life skid resistance. As the over-banding can be up to 100mm wide, it is important that the material surface has an effective texture depth appropriate for the road surface, in order to reduce the risk of skidding. *[BBA/HAPAS Guidelines for the Assessment and Certification of Crack Sealing Systems for Highways set out the requirements for over-band materials up to 200mm wide. Thermoset resins have been approved by HAPAS up to this width]*

For roads surfaced with Hot Rolled Asphalt (HRA) with coated chippings, the Undertaker should consult with the Highway Authority in respect of the overband material reproducing the texture depth.

A2.3 Material 2 must meet the following performance criteria:

• Initial skid resistance on application	>60 SRV *1
• Retained skid resistance	>50 SRV *1

• Spread rate	<1.5mm [*2]
• Material type	Thermoset resin
• Wheel tracking at 60°C	<1mm rut depth [*3]
• Tensile bond strength	>0.75 MPa [*4]
• Elongation	>150% [*5]
• Initial texture depth	>1.5mm [*6]
• Void Content	<1% [*7]

[*1] Skid resistance (SRV) will be determined by the pendulum method in accordance with BS EN 13036-4: 2003 using the narrow slider with measurements on scale C;
[*2] Spread rate measured after wheel tracking at 60°C;
[*3] Wheel tracking to BS 598 Part 110: 1996 at 60°C;
[*4] Tensile bond tested to TRL 176 Appendix J – applies to Material 2, or where failure at a lower MPa level occurs, in the substrate itself;
[*5] BS EN ISO 527-1 & 3:1996 – Plastics – determination of tensile properties;
[*6] Determined by the draft linear sand patch test;
[*7] BS EN 12697-8:2003.

A3 General

A3.1 Until such time as appropriate BBA/HAPAS requirements can be developed, compliance with these specifications must be proven by externally validated test results from a suitable UKAS accredited laboratory. All materials should have a track record of at least 2 years in a highway environment under heavy traffic load or, where this is not available, evidence of similar performance undertaken at a suitably certificated accelerated pavement test facility.

A3.2 Additionally, where trials in one highway authority area are offered as evidence for acceptance in another highway authority, the principles set out for Alternative Reinstatement Materials (ARMs) trials should similarly apply – see in particular Sections A9.2.5.1(9) of the SROH.

Finalised AMR 16th May 2014 [final SROH WP Comments added to post-Consultation review Document Version]