Leicestershire Highway Design Guide

Materials Palettes (Surfacing)

Code of Practice for Developer and Third-Party Works

Introduction

These Materials Palettes provide the requirements on the choice and use of materials for surfacing of highway within new developments and should be read in conjunction with LHDG Materials and Construction (see main consultation page) and the council's Specification for Highway Works. The document avoids the detail regarding tolerance and other workmanship issues and concentrates on the specifics of the materials themselves with the focus being on sustainability, maintainability, and appearance.

The enhanced materials are included with the aim of being sustainable in how they are sourced, have lower initial and life cycle embodied CO_2e, have a record of longevity in service and the ease of ongoing maintenance.

Any additional costs for enhanced materials will normally be a matter for discussion and negotiation during the consultation process for each individual scheme, subject to agreement that higher levels of enhancement will not impose an unreasonable burden of future maintenance on the county council. Where costs for enhanced materials are more than the agreed costs the developer or district council may be required to pay a commuted sum contribution to cover future maintenance.

Exemptions

Any deviation from the standard or enhanced palettes must be submitted to the Highways Asset Management Team for review. Upon review, the Highways Asset Management Team may at their discretion refer the decision for approval to the Highways Asset Management Strategy Board for approval.

Exemptions will only be considered in exceptional circumstances and the submission for approval must detail and demonstrate:

- A whole life reduction on carbon footprint;
- A whole life reduction in maintenance and operation costs;
- A clear maintenance strategy/manual detailing how repairs will be made by maintaining authority and statutory undertakers;
- An evidenced method for calculating quantities of material to be stored for future maintenance through the whole life of the schemes (i.e., if the scheme is designed for 40 years an evidence plan on the quantity of material required of 40 years' worth of maintenance must be provided);
- Contractual agreements (i.e., bond) are in place to ensure storage of materials (at the scheme promoter's cost) for the duration of the scheme design, and how these materials will be made readily available to the maintaining authority and statutory undertakers;
- Clear and precise extents and details of materials must be provided to the Highways Asset Management team so that this can be updated on the National Street Gazetteer under the 'Special Engineering Difficulty' designation.

Standard Materials Palette

Leicestershire County Council's standard palette of surfacing materials is made up of the following:

These materials are easily available within the local supply chain, have a history of successful use in Leicestershire and are easily maintainable.

- Close Graded Asphalt Concrete
- Stone Mastic Asphalt
- High Stone Content Hot Rolled Asphalt
- Chipped Hot Rolled Asphalt
- Thin Surface Course Systems
- Dense Asphalt Concrete
- Precast Concrete Blocks
- Precast Concrete Kerbs
- Precast Concrete Tactile Paving Slabs

Each material data sheet should be studied, with particular focus on any application restrictions. Any application of a material in a situation that is restricted will be classed as an enhanced material and as such will attract a commuted sum for the additional maintenance burden placed upon the authority.

Material	Close Graded Asphalt Concrete
Type and Finish	AC 10 close surf 100/150 (See Specification Appendix 7/1 Material Ref. SC11) Standard material has no pigmentation/colour to any mixture component.
Application	Carriageway surface course
Application restrictions	Permitted for use only on low traffic residential access roads/ways and shared surface residential accesses.
Design considerations	Polished stone value (PSV) as per LCC's Carriageway – Skidding Resistance Procedure and aggregate abrasion value (AAV) requirements as per CD 236. Minimum PSV = 55 Maximum AAV = 16 Warm Mix Asphalt (WMA) permitted in accordance with CL908 and only to be laid in the period from April to October.
Aesthetic considerations	Standard 'black-top' finish
Size considerations	10mm nominal aggregate size, nominal thickness 40mm.
Specification	LCC specification, LCC Carriageway – Skidding Resistance Procedure, BS 594987, SHW CL902, SHW CL908, SHW CL912, DMRB CD236, BS EN 13108-1, PD 6691.
Maintenance requirements	Expected design life = 10 to 15 years
Sourcing and availability	Available locally through the Leicestershire supply chain.
Sustainability considerations	Future availability of natural resources (bitumen and aggregate). High energy requirements to extract, mix, transport and compact. Reclaimed asphalt permitted in the mixture. Warm Mix Asphalt (WMA) permitted.

Material	Stone Mastic Asphalt
Type and Finish	SMA 10 surf 40/60 (Specification Appendix 7/1 Material Ref. SC2) Standard material has no pigmentation/colour to any mixture component.
Application	Carriageway surface course
Application restrictions	Permitted for use on residential access roads/ways. Suitable for roads up to 40mph. May also meet the texture depth requirements of roundabouts on high-speed roads.
Design considerations	Polished stone value (PSV) as per LCC's Carriageway – Skidding Resistance Procedure and aggregate abrasion value (AAV) requirements as per CD 236. Minimum PSV = 55 Maximum AAV = 16 Grit may need to be applied at some locations to enhance early life skidding resistance.
Aesthetic considerations	Standard 'black-top' finish.
Size considerations	10mm nominal aggregate size, nominal thickness 40mm.
Specification	LCC specification, LCC CL971AR & CL972AR, LCC Carriageway – Skidding Resistance Procedure, SHW CL902, DMRB CD 236, BS 594987, BS EN 13108-5, PD 6691.
Maintenance requirements	Expected design life = 10 to 15 years
Sourcing and availability	Available locally through the Leicestershire supply chain.
Sustainability considerations	Future availability of natural resources (bitumen and aggregate). High energy requirements to extract, mix, transport and compact. Reclaimed asphalt permitted in the mixture. Warm Mix Asphalt (WMA) not permitted by SHW CL908.

Material	High Stone Content Hot Rolled Asphalt
Type and Finish	HRA 55/10 F surf 40/60 des (Specification Appendix 7/1 Material Ref. SC7) HRA 55/10 F surf 100/150 des (Specification Appendix 7/1 Material Ref. SC8) Standard material has no pigmentation/colour to any mixture component.
Application	Carriageway surface course (40/60 bitumen grade, Material Ref. SC7) Footway surface course on industrial access roads (100/150 bitumen grade, Material Ref. SC8)
Application restrictions	Permitted for use on residential access roads/ways and low speed (≤30mph) high stress locations such as junctions with tight radii, mini roundabouts, and parking areas.
Design considerations	Polished stone value (PSV) as per LCC's Carriageway – Skidding Resistance Procedure and aggregate abrasion value (AAV) requirements as per CD 236. Minimum PSV = 55 Maximum AAV = 16
Aesthetic considerations	Standard 'black-top' finish.
Size considerations	10mm nominal aggregate size, nominal thickness 40mm.
Specification	LCC specification, LCC Carriageway – Skidding Resistance Procedure, BS 594987, SHW CL902, SHW CL911, DMRB CD 236, BS EN 13108-4, PD 6691.
Maintenance requirements	Expected design life = 15 to 20 years
Sourcing and availability	Available locally through the Leicestershire supply chain.
Sustainability considerations	Future availability of natural resources (bitumen, aggregate (inc. sand)). High energy requirements to extract, mix, transport and compact. Reclaimed asphalt permitted in the mixture. Warm Mix Asphalt (WMA) not permitted by SHW CL908.

Material	Chipped Hot Rolled Asphalt
Type and Finish	HRA 35/14 F surf 40/60 des with 14/20 mm pre-coated chippings (Specification Appendix 7/1 Material Ref. SC6) Standard material has no pigmentation/colour to any mixture component.
Application	Carriageway surface course
Application restrictions	Permitted for use on industrial access roads, classified roads, and other heavily trafficked roads. At high stress locations such as major junctions and roundabouts where chip loss can occur, an alternative material may be required. Some heavily trafficked roads may require the use of a performance-related design mixture. Bridge decks are likely to require chipped HRA to provide a more impermeable surface material. Development works on existing classified roads will likely require the use of chipped HRA. Narrow roads with insufficient space for a chipper may preclude the use of HRA.
Design considerations	Polished stone value (PSV) as per LCC's Carriageway – Skidding Resistance Procedure and aggregate abrasion value (AAV) requirements as per CD 236. Minimum PSV = 55 Maximum AAV = 14
Aesthetic considerations	Standard "black-top" finish
Size considerations	14mm nominal aggregate size, nominal thickness 50mm.
Specification	LCC specification, LCC Carriageway – Skidding Resistance Procedure, BS 594987, SHW CL902, SHW CL911, DMRB CD 236, BS EN 13108-4, PD 6691.
Maintenance requirements	Expected design life = 15 to 20 years
Sourcing and availability	Available locally through the Leicestershire supply chain.
Sustainability considerations	Future availability of natural resources (bitumen, aggregate (inc. sand)). High energy requirements to extract, mix, transport and compact. Reclaimed asphalt permitted in the mixture. Warm Mix Asphalt (WMA) not permitted by CL908.

Material	Thin Surface Course Systems
Type and Finish	High performance polymer modified bitumen asphalt to SHW clause 942, carrying a BBA HAPAS certificate and 5-year guarantee. Standard material has no pigmentation/colour to any mixture component.
Application	Carriageway surface course
Application restrictions	Suitable for roads of all types and speed limits, with no upper limit on traffic level. May be used as an alternative to chipped HRA.
Design considerations	Polished stone value (PSV) as per LCC's Carriageway – Skidding Resistance Procedure and AAV requirements as per CD 236. Minimum PSV = 55 Maximum AAV = 16 Warm Mix Asphalt (WMA) where permitted by manufacturer. 'Dense' mixtures offer improved impermeability benefits, care must be taken to ensure the texture depth is appropriate for the classification and speed of road. In high-risk locations an additional surface treatment may be required to provide enhanced skid resistance. Non-cl942/BBA HAPAS accredited proprietary PMB materials may be considered on a site-by-site basis.
Aesthetic considerations	Standard 'black-top' finish.
Size considerations	Typically, 10mm nominal aggregate size, minimum layer thickness as per cl942.
Specification	LCC specification, SHW CL942, BBA HAPAS accreditation, CD 236, BS 594987, BS EN 13108-1, BS EN 13108-5, PD 6691. The requirement for a 5-year guarantee will require a full CL942 appendix 7/1 specification for each scheme to be provided to the supplier to obtain a guarantee. The specification and guarantee information must be provided to LCC, although LCC will not take on responsibility for enforcing guarantee claims.
Maintenance requirements	Expected design life = 10 to 15 years
Sourcing and availability	Available locally through the Leicestershire supply chain.
Sustainability considerations	Future availability of natural resources (bitumen and aggregate). High energy requirements to extract, mix, transport and compact.

Material	Thin Surface Course Systems
	Reclaimed Asphalt permitted in the mixture. Warm Mix Asphalt permitted if allowed by manufacturer.

Material	Dense Asphalt Concrete
Type and Finish	AC 6 dense surf 100/150 (Specification Appendix 7/1 Material Ref. SC12) Standard material has no pigmentation/colour to any mixture component.
Application	Footway and cycleway surface course
Application restrictions	Permitted for use on residential footways, cycleways, and other non-carriageway paved areas. May be used in town centre and public realm footway improvement works. Not intended for use on industrial access road footways. Must not be used in carriageways.
Design considerations	Polished stone value (PSV) as per LCC specification. Minimum PSV = 55 Maximum AAV = 16
Aesthetic considerations	Standard 'black-top' finish.
Size considerations	6mm nominal aggregate size, minimum thickness 20mm.
Specification	LCC specification, SHW CL902, SHW CL909, DMRB CD 239, BS 594987, BS EN 13108-1, PD 6691.
Maintenance requirements	Expected design life = 10 years
Sourcing and availability	Available locally through the Leicestershire supply chain.
Sustainability considerations	Future availability of natural resources (bitumen and aggregate). High energy requirements to extract, mix, transport and compact. Reclaimed asphalt permitted in the mixture. Warm Mix Asphalt (WMA) not permitted by CL908.
Material	Precast Concrete Blocks
Type and Finish	Standard 200mm x 100mm “type R” blocks in grey, buff, red, or brindle with normal surface texture. ‘Tegula’ type concrete blocks may be permitted but are considered enhanced materials. All details here apply to their use although dimensions, colours, and laying pattern may vary.
Application	Carriageway speed tables, shared surfaces, and footways.

Material	Dense Asphalt Concrete
Application restrictions	Carriageway speed tables and shared surface on residential access roads/ways. Not intended for general residential footway use. Other locations such as town centre and public realm improvement projects require prior agreement with LCC. May be used as a safety margin adjacent to carriageway on cycleways and combined footway/cycleway, refer to standard drawing SD/1100/14. Must not be used on industrial access road carriageways and footways.
Design considerations	Carriageway and shared surface construction depths as detailed in Road Pavement section of the LHDG. In all other situations designed in accordance with BS EN 7533-101. Due consideration given to longitudinal gradients and rainfall intensity and impact on sand laying course. Consideration needs to be given in the structural design for the effects of any channelisation, dynamic loading, or future potential vehicle overrun. Unpolished slip/skid resistance value (USRV) = 45 minimum. Where there is a slope, the minimum USRV should be increased by 1 unit for every 1% of gradient. Edge restraints should be provided at the perimeter of concrete block pavements and at the interface between areas of different pavement construction types. Intermediate restraints should be incorporated at intervals on steep slopes. Blocks must be non-porous.
Aesthetic considerations	Permitted colours are grey, buff, red, and brindle. Other colours may be used to match existing, with prior agreement with LCC. Blocks shall typically be laid to a herringbone pattern, 90 degrees herringbone in footways and 45 degrees herringbone in carriageways. Blocks should be through coloured/homogenous concrete to allow both faces to be used. Concrete blocks with decorative or tumbled finishes, different colours or decorative textures are considered enhanced materials and require prior discussion and agreement with LCC.
Size considerations	Dimensions: (L x W x D) 100mm x 200mm x 80mm* *80mm blocks for use in carriageway, 60mm blocks for use in footway
Specification	LCC specification, SHW CL1107, BS EN 1338, BS EN 7533-101, BS 7533-3.
Maintenance requirements	Expected design life = 20 years In areas subject to mechanical sweeping an elastomeric sealer should be

Material	Dense Asphalt Concrete
	applied to stabilise the jointing material.
Sourcing and availability	Widely available and long-term availability is assured.
Sustainability considerations	Use of standardised units supports local recycling agenda. Fully engineered and manufactured under controlled conditions to deliver a consistent product with predictable performance characteristics. Low environmental impact in comparison with imported materials.

Material	Precast Concrete Kerbs
Type and Finish	British Standard precast concrete kerbs produced by hydraulic pressing. Standard grey concrete finish with a plain texture. Includes the following standard profiles and types: • Bullnosed • Half battered • 45° splayed • Dropper • Transition • Angles • Quadrants • Radius • Edging Additionally, non-British Standard kerbs are also permitted and not considered enhance materials. However, the proposed specification must be approved by LCC: • Cycle demarcation • Cycle segregation • Bus stop • Safety / high containment (e.g. Trief) The following types of kerbs are excluded from the standard palette of materials: • Combined kerb and drainage unit
Application	Provision of edge restraint to road pavements and footways/cycleways. Demarcation and segregation of different highway modes.
Application restrictions	45° splayed kerbs shall normally only be used on rural roads with grass verges, and not where footways and/or cycleways are present. Consideration needs to be given to likelihood of verge parking and the use of half battered kerbs as a deterrent and to reduce the likelihood of damage to the soft verge. At dropped crossings for pedestrians and cyclists, kerbs shall be laid flush, normally in accordance with LCC standard drawing SD/1100/8 (Flush Dropped Crossing – Type B).
Design considerations	Any radius 12m or less shall use radius kerbs. For radius greater than 12m and less than 21m the kerbs shall be the exact radius or 600mm straights. Unless specified otherwise the following upstand / kerb face shall be provided, refer to standard drawings for further information: • Standard/full height = 125mm • Vehicular accesses = 25mm • Pedestrian and cycle crossings = 0-6mm • Bus stop = 180mm Footway/cycleway demarcation kerbs shall comply with the principles of LTN 1/20, be precast concrete units, provide adequate detectable separation for the visually impaired, and not be hazardous to cyclists. Example kerbs include splay kerbs, 30° “Bristol” kerbs, trapezoidal blocks, and half-battered kerbs laid on their backs. Site constraints may preclude the use of certain

Material	Precast Concrete Kerbs
	kerb types.
Aesthetic considerations	Utilitarian look. Natural stone or reproductions are available but are considered enhanced materials.
Size considerations	British Standard units are available in 914mm and 609mm in length. Lengths vary for radius and non-British Standard units.
Specification	LCC specification and standard drawings, SHW CL1101, BS EN 1340, BS EN 7533-101, BS 7533-6, BS 8500-2, LTN 1/20
Maintenance requirements	Expected design life = 20+ years
Sourcing and availability	Widely available and long-term availability is assured.
Sustainability considerations	Use of standardised units supports local recycling agenda. Fully engineered and manufactured under controlled conditions to deliver a consistent product with predictable performance characteristics. Low environmental impact in comparison with imported materials.

Material	Precast Concrete Tactile Paving Slabs
Type and Finish	Standard 400mm or 450mm square tactile blister paving slabs in buff or red colour.
Application	Footways at controlled/signalised and uncontrolled crossing points.
Application restrictions	Red colour only to be used at controlled/signalised crossings, buff colour to be used at uncontrolled crossings. Other types of tactile paving such as corduroy, ladder, and tramline surfaces may be permitted to warn of other hazards and on cycle ways as advised in the Department for Transport's Guidance on the Use of Tactile Paving Surfaces.
Design considerations	'Blister' surface to be 5mm high spherical domes with flattened top. Preferred gradient is 5% (1 in 20) for new construction, on existing footways the gradients should not exceed 8% (1 in 12). Precast concrete edgings to be used as a restraint along all free edges.
Aesthetic considerations	Red colour only to be used at controlled/signalised crossings, buff colour to be used at uncontrolled crossings. The surface surrounding tactile paving should be a different colour to provide a visual contrast to visually impaired people.
Size considerations	Dimensions: (L x W x D) 400mm x 400mm x 65mm, or 450mm x 450mm x 70mm
Specification	LCC specification and standard drawings, Department for Transport – Guidance on the Use of Tactile Paving Surfaces, SHW CL1104, BS EN 1339, PD CEN/TS 15209
Maintenance requirements	Expected design life = 20 years
Sourcing and availability	Widely available and long-term availability is assured.
Sustainability considerations	Use of standardised units supports local recycling agenda. Fully engineered and manufactured under controlled conditions to deliver a consistent product with predictable performance characteristics.

Enhanced Materials Palette

The Department for Transport's Manual for Streets advocates that:

"One way of enabling designers to achieve local distinctiveness without causing excessive maintenance costs will be for highway authorities to develop a limited palette of special materials and street furniture. Such materials and components, and their typical application, could, for example, be set out in local design guidance and be adopted as a Supplementary Planning Document."

In line with this DfT guidance the enhanced palette of materials has therefore also been developed to better balance the desire for local distinctiveness with sustainability, performance and on-going maintenance.

Leicestershire County Council's enhanced palette of surfacing materials is made up of the following:

- Coloured Close Graded Asphalt Concrete
- Coloured Stone Mastic Asphalt
- Coloured Chipped Hot Rolled Asphalt
- Coloured Dense Asphalt Concrete
- Coloured Surface Treatment
- High Friction Surfacing
- Precast Concrete Slabs
- Natural Stone Slabs
- Stone Reproduction Kerbs
- Natural Stone Kerbs

Material	Coloured Close Graded Asphalt Concrete
Type and Finish	AC 10 close surf 100/150 (Specification Appendix 7/1 Material Ref. SC11) Enhanced material uses pigmented binders and/or pigmented/decorative aggregates.
Application	Carriageway surface course
Application restrictions	Coloured surfacing must only be used with prior agreement with LCC. Coloured surfacing should be red with the precise colour type agreed with LCC. Suitable for use at the locations detailed in the 'standard palette' asphalt concrete but should only be used in areas of prestige or to meet specific aesthetic requirements.
Design considerations	Polished stone value (PSV) as per LCC's Carriageway – Skidding Resistance Procedure and aggregate abrasion value (AAV) requirements as per CD 236. Minimum PSV = 55 Maximum AAV = 16 Warm Mix Asphalt (WMA) permitted in accordance with cl908 and only to be laid in the period from April to October.
Aesthetic considerations	Colour to be agreed with LCC. If a pigmented binder is used, the binder film covering the aggregates will wear away over time under the action of traffic. Consideration therefore needs to be given to the type/colour of the aggregates to ensure continuity of long-term visual affect. Careful consideration must be given if using red surfacing in the vicinity of controlled pedestrian crossings where red tactile paving is used due to the reduced visual contrast between the two. Refer to Department for Transport's Guidance on the Use of Tactile Paving Surfaces for further guidance.
Size considerations	10mm nominal aggregate size, nominal thickness 40mm
Specification	LCC specification, LCC Carriageway – Skidding Resistance Procedure, SHW CL902, SHW CL908, SHW CL912, DMRB CD236, BS 594987, BS EN 13108-1, PD 6691.
Maintenance requirements	Expected design life = 10 to 15 years Specialist reinstatement required after utility and highway maintenance work. Installer must provide LCC information pertaining to sourcing the material, aggregate, and binder manufacturer and type.

Material	Coloured Close Graded Asphalt Concrete
Sourcing and availability	Available locally through Leicestershire supply chain, however aggregates and bitumen/binder normally hauled in specifically for the mixture. Specialist aggregates are often hauled long distances.
Sustainability considerations	Future availability of natural resources (bitumen and aggregate). High energy requirements to extract, mix, transport and compact. Additional processes to produce and incorporate pigmentation. Coloured binders and pigmented/decorative aggregates may need to be transported greater distances. Reclaimed Asphalt permitted in the mixture (if suitable). Warm Mix Asphalt (WMA) permitted.

Material	Coloured Stone Mastic Asphalt
Type and Finish	SMA 10 surf 40/60 (Specification Appendix 7/1 Material Ref. SC2) Enhanced material uses pigmented binders and/or pigmented/decorative aggregates.
Application	Carriageway surface course
Application restrictions	Coloured surfacing must only be used with prior agreement with LCC. Coloured surfacing should be red with the precise colour type agreed with LCC. Suitable for use at the locations detailed in the 'standard palette' SMA but should only be used in areas of prestige or to meet specific aesthetic requirements.
Design considerations	Polished stone value (PSV) as per LCC's Carriageway – Skidding Resistance Procedure and aggregate abrasion value (AAV) requirements as per CD 236. Minimum PSV = 55 Maximum AAV = 16 Grit may need to be applied at some locations to enhance early life skidding resistance.
Aesthetic considerations	Colour to be agreed with LCC. If a pigmented binder is used, the binder film covering the aggregates will wear away over time under the action of traffic. Consideration therefore needs to be given to the type/colour of the aggregates to ensure continuity of long-term visual affect. Careful consideration must be given if using red surfacing in the vicinity of controlled pedestrian crossings where red tactile paving is used due to the reduced visual contrast between the two. Refer to Department for Transport's Guidance on the Use of Tactile Paving Surfaces for further guidance.
Size considerations	10mm nominal aggregate size, nominal thickness 40mm
Specification	LCC specification, LCC CL971AR & CL972AR, LCC's Carriageway – Skidding Resistance Procedure, SHW CL902, DMRB CD 236, BS 594987, BS EN 13108-5, PD 6691.
Maintenance requirements	Expected design life = 10 to 15 years Specialist reinstatement required after utility and highway maintenance work. Installer must provide LCC information pertaining to sourcing the material, aggregate, and binder manufacturer and type.

Material	Coloured Stone Mastic Asphalt
Sourcing and availability	Available locally through the Leicestershire supply chain for production, however aggregates and bitumen/binder normally hauled in specifically for the mixture. Specialist aggregates are often hauled long distances.
Sustainability considerations	Future availability of natural resources (bitumen and aggregate). High energy requirements to extract, mix, transport and compact. Additional processes to produce and incorporate pigmentation. Coloured binders and pigmented/decorative aggregates may need to be transported greater distances. Reclaimed Asphalt permitted in the mixture (if suitable). Warm Mix Asphalt (WMA) not permitted by CL908.

Material	Coloured Chipped Hot Rolled Asphalt
Type and Finish	HRA 35/14 F surf 40/60 des with 14/20 pre-coated chippings (LHDG Part 4 Table MC5 and Specification Appendix 7/1 Material Ref. SC6) Enhanced materials use coloured chippings.
Application	Carriageway surface course
Application restrictions	Coloured surfacing must only be used with prior agreement with LCC. Coloured surfacing should be red with the precise colour type agreed with LCC. Suitable for use at the locations detailed in the 'standard palette' chipped hot rolled asphalt but should only be used in areas of prestige or to meet specific aesthetic requirements.
Design considerations	Polished stone value (PSV) as per LCC's Carriageway – Skidding Resistance Procedure and aggregate abrasion value (AAV) requirements as per CD236. Minimum PSV = 55 Maximum AAV = 14
Aesthetic considerations	Colour to be agreed with LCC. Careful consideration must be given if using red surfacing in the vicinity of controlled pedestrian crossings where red tactile paving is used due to the reduced visual contrast between the two. Refer to Department for Transport's Guidance on the Use of Tactile Paving Surfaces for further guidance.
Size considerations	14mm nominal aggregate size, nominal thickness 50mm.
Specification	LCC specification, LCC Carriageway – Skidding Resistance Procedure, SHW CL902, SHW CL911, DMRB CD 236, BS 594987, BS EN 13108-4, PD 6691.
Maintenance requirements	Expected design life = 15 to 20 years Specialist reinstatement required after utility and highway maintenance work. Installer must provide LCC information pertaining to sourcing the material, aggregate, and binder manufacturer and type.
Sourcing and availability	Standard HRA material is available locally through Leicestershire supply chain, however coloured chippings are likely to be sourced elsewhere nationally.
Sustainability considerations	Future availability of natural resources (bitumen, aggregate (inc. sand)). High energy requirements to extract, mix, transport and compact. Coloured chippings will likely need to be transported greater distances. Reclaimed Asphalt Permitted in the mixture. Warm Mix Asphalt (WMA) NOT permitted by CL908.

Material	Coloured Dense Graded Asphalt Concrete
Type and Finish	AC 6 dense surf 100/150 (Specification Appendix 7/1 Material Ref. SC12) Enhanced material uses pigmented binders and/or pigmented/decorative aggregates.
Application	Cycleway surface course
Application restrictions	Coloured surfacing must only be used with prior agreement with LCC. Coloured surfacing should be red with the precise colour type agreed with LCC. For use on cycleways segregated from the carriageway by a kerb line, typically only at junctions, crossing points, pinch points, and where there is potential for conflict between road users. Must not be used for 'on-road' cycle lanes.
Design considerations	Polished stone value (PSV) as per LCC specification. Minimum PSV = 55 Maximum AAV = 16 All surface course materials for cycleways and combined footway/cycleways shall be machine laid.
Aesthetic considerations	Colour must be red, exact colour hue to be agreed with LCC. Care must be taken when specifying the colour when matching existing to ensure a consistent colour can be achieved. If a pigmented binder is used, the binder film covering the aggregates will wear away over time under the action of traffic. Consideration therefore needs to be given to the type/colour of the aggregates to ensure continuity of long-term visual affect. Careful consideration must be given if using red surfacing in the vicinity of controlled pedestrian crossings where red tactile paving is used due to the reduced visual contrast between the two. Refer to Department for Transport's Guidance on the Use of Tactile Paving Surfaces for further guidance.
Size considerations	6mm nominal size material, minimum thickness 20mm
Specification	LCC specification, SHW CL902, SHW CL909, DMRB CD 239, BS 594987, BS EN 13108-1, PD 6691.
Maintenance requirements	Expected design life = 10 years Specialist reinstatement required after utility and highway maintenance work. Installer must provide LCC information pertaining to sourcing the material, aggregate, and binder manufacturer and type.
Sourcing and availability	Available locally through the Leicestershire supply chain.

Material	Coloured Dense Graded Asphalt Concrete
Sustainability considerations	Future availability of natural resources (bitumen and aggregate). High energy requirements to extract, mix, transport and compact. Additional processes to produce and incorporate pigmentation. Coloured binders and pigmented/decorative aggregates may need to be transported greater distances. Reclaimed Asphalt Permitted in the mixture (if suitable). Warm Mix Asphalt (WMA) not permitted by CL908.

Material	Coloured Surface Treatment
Type and Finish	Cold applied coloured surface treatment
Application	Carriageway and cycleway surface
Application restrictions	Coloured surfacing must only be used with prior agreement with LCC. Coloured surfacing should be red with the precise colour type agreed with LCC. For use on cycle infrastructure within the carriageway at junctions and road crossings where there is potential for conflict between road users. Not intended for cycle lanes on the carriageway adjacent to the running lanes that are only segregated by a white line, bollards, or similar feature. May be permitted on segregated cycleways where the use of coloured asphalt materials is impractical, with prior agreement by LCC.
Design considerations	Must be durable to withstand trafficking, methyl-methacrylate (MMA) based materials are preferred due to their improved durability. Adequate slip/skid resistance must be provided, minimum 55 SRV/PSV. The material should be UV stable. Due consideration must be given to the substrate on to which the coloured surface treatment is being applied, the substrate must be free from any damage to maximise the service life of the coloured surface treatment. It's expected that coloured surface treatments will only be applied to new surfaces. The time between laying the new substrate and coloured surfacing must be in accordance with the manufacturer's instructions. On surfaces with excessive texture depth, an additional void filler coat may be required prior. High friction surfacing must not be used solely because a coloured surface is required.
Aesthetic considerations	Colour must be red, exact colour hue to be agreed with LCC. Careful consideration must be given if using red surface treatments in the vicinity of controlled pedestrian crossings where red tactile paving is used due to the reduced visual contrast between the two. Refer to Department for Transport's Guidance on the Use of Tactile Paving Surfaces for further guidance.
Size considerations	Varies from product to product, maximum nominal 1-3mm graded aggregate.
Specification	Product specifications vary from product to product so must be agreed with LCC. Material should adhere to any relevant British Standards.

Material	Coloured Surface Treatment
	BBA/HAPAS accreditation is preferred but may not be available for these types of materials.
Maintenance requirements	Expected design life = 12 years Specialist reinstatement required after utility and highway maintenance work. Installer must provide LCC information pertaining to sourcing the material.
Sourcing and availability	Expected to be available through local and national suppliers, however products are typically proprietary and expensive.
Sustainability considerations	Future availability of resources. High-cost material for a relatively short design-life.

Material	High Friction Surfacing (HFS)
Type and Finish	Cold applied BBA HAPAS classification Type 1 with calcined bauxite aggregate (LCC Specification Appendix 7/1 Material Ref. HFS1)
Application	Carriageway surface treatment
Application restrictions	Permitted for use at high-risk sites such as approaches to signal-controlled junctions, roundabouts, and pedestrian crossings, only when specified by LCC. Hot applied HFS typically not permitted due to shorter service life. Must not be used solely because a coloured surface is required.
Design considerations	Reference should always be made to LCC's Carriageway – Skidding Resistance Procedure for guidance on the use of HFS. Minimum PSV = 70 Maximum AAV = 4 Due consideration must be given to the substrate on to which the HFS is being applied, the substrate must be free from any defects and damage to maximise the service life of the HFS. It's expected that HFS will only be applied to newly surfaced roads. The time between laying the new substrate and HFS must be in accordance with HFS manufacturers guidelines.
Aesthetic considerations	Colour may be grey or buff. Must not be used solely because a coloured surface is required.
Size considerations	Nominal 1-3mm graded aggregate.
Specification	LCC specification, LCC Carriageway – Skidding Resistance Procedure, SHW CL924, BBA/HAPAS accreditation, RSTA ADEPT Code of Practice for High Friction Surfacing.
Maintenance requirements	Expected design life = 12 years
Sourcing and availability	Although available through local supply chain, the calcined bauxite aggregates used in HFS cannot be sourced nationally and requires importing from abroad.

Material	High Friction Surfacing (HFS)
Sustainability considerations	Future availability of resources (calcined bauxite) High energy requirements to extract, transport and import. Limited opportunity for carbon reduction initiatives due to nature of constituent materials. High-cost material for a relatively short design-life.

Material	Precast Concrete Slabs
Type and Finish	Standard 450mm square paving slabs in grey, buff, or natural colour, and textured surface finish.
Application	Footways and other pedestrian areas in town centre and public realm improvement projects.
Application restrictions	Not intended for general footway use on residential or industrial access road/ways, unless used to match existing. Must not be used on carriageways and cycleways. Footways and pedestrian areas where heavy vehicle over-run will occur shall be constructed on a bound base. If significant heavy vehicle overrun is anticipated regularly then alternative surfacing material should be used. Slabs should not be used on pavements subject to dynamic loading (e.g. traffic calming or barrel deliveries). High point loads from outriggers such as those from MEWPs used for street lighting maintenance can also cause failure, the base design needs to consider such loads.
Design considerations	The level of anticipated vehicle overrun must be considered. Pavement construction to be designed in accordance with DMRB CD 239, or BS EN 7533-4 and BS EN 7533-101 in all other situations not covered by CD 239. Unpolished slip resistance value (USRV) (pedestrian use only) = 40 minimum. Unpolished skid resistance value (USRV) (vehicle use) = 45 minimum. Where there is a slope, the minimum USRV should be increased by 1 unit for every 1% of gradient. Edge restraints should be provided at the perimeter of concrete slab pavements and at the interface between areas of different pavement construction types. Intermediate restraints should be incorporated at intervals on steep slopes. Where over-running by vehicles is anticipated, a broken bond laying pattern such as stretcher bond should be used. Larger slabs are not permitted due to difficulties laying, manual handling implications, and higher susceptibility to damage by vehicle overrun. Slabs must be non-porous.
Aesthetic considerations	Permitted colours are grey, buff, or natural, in a textured finish. Other colours, and surface finishes may be used to match existing, with prior agreement with LCC. Careful consideration must be given when using buff slabs in the vicinity of uncontrolled pedestrian crossings where buff tactile paving is used due to the reduced visual contrast between the two. refer to Department for Transport's Guidance on the Use of Tactile Paving Surfaces for further guidance.

Material	Precast Concrete Slabs
Size considerations	Dimensions (L x W x D): 450mm x 450mm x 70mm. Other dimensions may be used to match existing, with prior agreement with LCC.
Specification	LCC Specification, SHW CL1104, DMRB CD 239, BS EN 1339, BS 7533-101, BS 7533-4.
Maintenance requirements	Expected design life = 20 years In areas subject to mechanical sweeping an elastomeric sealer should be applied to stabilise the jointing material.
Sourcing and availability	Widely available and long-term availability is assured.
Sustainability considerations	Use of standardised units supports local recycling agenda. Fully engineered and manufactured under controlled conditions to deliver a consistent product with predictable performance characteristics. Long service life if installed to a high standard. Low environmental impact in comparison with imported materials. 100% recyclable.

Material	Natural Stone Slabs
Type and Finish	Standard 450mm square yorkstone, granite, and sandstone paving slabs in various colours and surface finishes.
Application	Footways and other pedestrian areas in town centre and public realm improvement projects.
Application restrictions	The preferred material for paving slabs is precast concrete due to the higher maintenance requirements of natural stone. Natural stone slabs will normally only be permitted in locations to match existing natural stone paved areas. Granite and sandstone should be particularly avoided due to sustainability concerns as they are often imported from overseas. All locations must have prior agreement with LCC. Not intended for general footway use on residential or industrial access road/ways, unless used to match existing. Must not be used on carriageways and cycleways. Footways where heavy vehicle overrun will occur shall be constructed on a bound base. If significant heavy vehicle overrun is anticipated regularly then alternative surfacing material should be used. Slabs should not be used on pavements subject to dynamic loading (e.g. traffic calming or barrel deliveries). High point loads from outriggers such as those from MEWPs used for street lighting maintenance can also cause failure, the base design needs to consider such loads.
Design considerations	The level of anticipated vehicle overrun must be considered. Pavement construction to be designed in accordance with DMRB CD 239, or BS EN 7533-4 and BS EN 7533-101 in all other situations not covered by CD 239. Unpolished slip/skid resistance value (USRV) = 45 minimum. Where there is a slope, the minimum USRV should be increased by 1 unit for every 1% of gradient. Edge restraints should be provided at the perimeter of concrete slab pavements and at the interface between areas of different pavement construction types. Intermediate restraints should be incorporated at intervals on steep slopes. Where over-running by vehicles is anticipated, a broken bond laying pattern such as stretcher bond should be used. The use of large slabs should be restricted due to difficulties laying, manual handling implications, and higher susceptibility to damage by vehicle overrun. Consideration must be given to water absorption to improve resistance to staining and organic growth which can reduce slip/skid resistance. Maximum water absorption shall be in accordance with BS 7533-101. A

Material	Natural Stone Slabs
	sealant may be required in some locations to provide an adequate level of water absorbency.
Aesthetic considerations	Natural yorkstone, granite, and sandstone colours. Carefully selected natural stone can be more sympathetic to local surroundings. Future replacement of isolated areas may result in poor matching of stone due to inconsistency of supply.
Size considerations	Standard 450mm x 450mm x 70mm dimensions should be used to ensure a consistent approach locally and to facilitate future replacement. Other dimensions, colours, and surface finishes may be used to match existing, with prior agreement with LCC.
Specification	SHW 1104, DMRB CD 239, BS EN 1341, BS EN 7533-101, BS 7533-4.
Maintenance requirements	Expected design life = 20 years Retexturing and joint sealant replacement may be required periodically. Natural stone surfaces may require regular protection through applied surface coating/sealant.
Sourcing and availability	Natural stone products, in particular granite and sandstone, are often sourced from overseas. This has sustainability issues in addition to issues of sourcing any replacement units in the future. Locally or nationally sourced materials should be used whenever possible. Future maintenance can be an issue as individual units are usually not available, so must be obtained in larger quantities. Specific colours and sizes may also be difficult to obtain.
Sustainability considerations	Future availability of resources. High energy requirements to extract, transport and import. Limited opportunity for carbon reduction initiatives due to nature of constituent materials. Lower environmental impact if nationally sourced materials are used in comparison with imported materials. Long service life if laid well.

Material	Stone Reproduction Kerbs
Type and Finish	Precast concrete kerbs produced by hydraulic pressing, with a textured surface to provide a natural-stone-look finish, in natural and grey colours. Often known as 'conservation kerbs'.
Application	Provision of edge restraint to road pavements and footways/cycleways.
Application restrictions	Town centre/public realm improvement works and conservation areas, with prior agreement by LCC. Must not be used for general use.
Design considerations	Precast concrete British Standard kerb design considerations apply. Unpolished slip/skid resistance value (USRV) = 45 minimum.
Aesthetic considerations	Permitted colours are natural and grey. If specified correctly can be more sympathetic to local surroundings, particularly in conservation areas. Future replacement of isolated areas may result in poor matching of stone due to inconsistency of supply.
Size considerations	Available in British Standard and non-British Standard kerb dimensions and profiles. Non-standard kerb widths include 145mm, 255mm, and 290mm, lengths vary depending on kerb type.
Specification	LCC specification, SHW CL1101, BS EN 1340, BS EN 7533-101, BS 7533-6, BS 8500-2, LTN 1/20.
Maintenance requirements	Expected design life = 20 years Textured kerbs that are overridden or in heavily pedestrianised zones may require retexturing to retain adequate slip/skid resistance.
Sourcing and availability	Expected to be widely available long-term. Future maintenance can be an issue as individual units are usually not available, so must be obtained in larger quantities. Consideration should be given to using standard palette materials where availability is more assured for ad-hoc repairs/maintenance due to continual use.
Sustainability considerations	Use of standardised units supports local recycling agenda.

Material	Stone Reproduction Kerbs
	Fully engineered and manufactured under controlled conditions to deliver a consistent product with predictable performance characteristics. Products may utilise recycled materials and can be recycled themselves.

Material	Natural Stone Kerbs
Type and Finish	Granite and sandstone in various colours with a textured or blasted finish.
Application	Provision of edge restraint to road pavements and footways/cycleways.
Application restrictions	The preferred material for this type of application is precast concrete 'stone reproduction' kerbs. Town centre/public realm improvement works and conservation areas, with prior agreement by LCC. Must not be used for general use.
Design considerations	Precast concrete British Standard kerb design considerations apply. Unpolished slip/skid resistance value (USRV) = 45 minimum.
Aesthetic considerations	Natural granite and sandstone colours. Carefully selected natural stone can be more sympathetic to local surroundings. Future replacement of isolated areas may result in poor matching of stone due to inconsistency of supply.
Size considerations	Typically only available in non-British Standard dimensions and profiles. Dimensions and profiles should be as close as possible to those of precast concrete British Standard or 'stone reproduction' kerbs.
Specification	SHW 1101, BS EN 1343, BS EN 7533-101, BS 7533-6, BS 8500-2.
Maintenance requirements	Expected design life = 20 years Textured kerbs that are overridden or in heavily pedestrianised zones may require retexturing to retain adequate slip/skid resistance. Natural stone surfaces may require regular protection through applied surface coating/sealant.
Sourcing and availability	Natural stone products, in particular granite and sandstone, are often sourced from overseas. This has sustainability issues in addition to issues of sourcing any replacement units in the future. Locally or nationally sourced materials should be used whenever possible. Future maintenance can be an issue as individual units may not available, so must be obtained in larger quantities. Consideration should be given to using standard palette materials where availability is more assured for ad-

Material	Natural Stone Kerbs
	hoc repairs/maintenance due to continual use.
Sustainability considerations	Future availability of resources. High energy requirements to extract, transport and import. Limited opportunity for carbon reduction initiatives due to nature of constituent materials. Lower environmental impact if nationally sourced materials are used in comparison with imported materials. Long service life if laid well.