Leicestershire County Council

Carriageway - Skidding Resistance Procedure

Status: Approved

Team: Network Data and Intelligence

Date: 4th February 2025

Approved by

Highways and Transport Commissioner

Contents

1. Document Control

1.1 Document revision and amendments

This document has been developed by the Network Data and Intelligence team, Environment and Transport Department and will be reviewed every 3 years.

Version number	Developed / Amend by:	Approved by:	Date of approval:
1.9(2)	Senior Asset Programme Manager	Highways & Transport Commissioner	23/12/2021
2.0	Asset Management Specialist	Highways & Transport Commissioner	25/03/2025

N.B. The suffix denotes an in-year amendment, rather than a revision of the whole document.

2. Table of Amendments

2.1 Table of Amendments

Page no.	Version	Amendment	Date
	2.0	Revision to the entire document, to include new internal risk-based approach, data analysis methods and minor changes to the site investigation report	Jan 2025

Minor amendment between versions

Page no.	Version	Amendment	Date

3. Introduction

3.1 Purpose of this document

This document has been produced by Leicestershire County Council's Environment and Transport Department, in its role as the local highway authority. This procedure documents our approach to managing skidding resistance. But also serves as a guide, for anyone specifying skidding resistance requirements of the carriageway surface, on Leicestershire's local road network.

The objective of this Skidding Resistance procedure is to:

- Facilitate the safe travel of highway user across the County
- Ensure that a risk-based approach for skidding resistance is developed and managed
- Enable the County Council to robustly defend against third-party claims relating to skidding, or incidents relating to loss of control
- Contribute towards the reduction in the number of Killed, or Seriously Injured (KSI) casualties due to skid-related, or loss of control type collisions on the County Council's road network
- Ensure the County Council adheres to its duty of care under the Highways Act 1980 relating to carriageway skidding resistance
- Ensure the County Council has adequate defence in a Corporate Manslaughter case, as either the Highway Authority, or its Chief Officer

To achieve this, we will:

- Formalise and review processes for monitoring skidding resistance across the Council's defined skid network
- Identify sites using skid resistance survey methods where further investigation is required
- Use collision data to identify potentially high-risk sites
- Undertake a prioritised approach to identifying site and the site investigations
- Recommend appropriate actions to mitigate risks where reasonably practicable
- Prioritise Skid deficient sites as part of our annual programme of works, this will enable the development of a programme of capital remedial works that focus on reducing risks wherever the severity is found to be highest.

3.2 Background

The Sideway-force Coefficient Routine Investigation Machine (SCRIM) Surveys have been used by most highway authorities across the UK for more than 50 years, and it is currently the Authority's preferred method of testing carriageway skidding resistance across our defined skid network. It has been part of our Annual skidding resistance survey, since 2019. Prior to this, Grip tester surveys were used to assess the skid characteristics of the Authority's roads.

The Authority procures the professional services of a survey contractor to undertake the SCRIM survey. The SCRIM survey vehicle should be calibrated annually, to meet acceptable accreditation standards before carrying out any surveys on our defined skid network.

Grip tester surveys are most commonly used by most Authorities for surveying individual road collision investigation sites that are not located on the defined skid network. Griptester surveys are carried out in

conjunction with traffic collision investigations and are not generally used for surveying the whole of the authority's defined network.

The Authority may still decide to carry out Griptester surveys, but this is usually only in relation to localised collision site investigations, where the collision involved skidding, or where the level of skidding resistance may be questionable. This is because it is a quicker and a more convenient survey method to deploy for smaller site lengths, but it takes quite a lot of manual effort to process the data and produce the associated outputs and reports.

This document also highlights changes to our procedures to reflect the recommendations contained within National Highways (formerly Highway's England) guidance document, the Design Manual for Roads and Bridges (DMRB) Volume 7, Section 3, part 1, CS 228 Skidding Resistance. These changes have been in place since April 2019. National Highway's document GG101 (note 2) further clarified that their documentation can be used as guidance by Local Authorities, but that it is principally aimed at Motorway and Trunk road agency organisations where IL's, road speeds and the availability of funding are generally much higher than for Local Authority road networks.

CS 228 is predominantly the same as its predecessor, with the main difference being the introduction of a Strategic Network specific crash model. CS 228HE stipulates that these models only apply to the Motorways and Trunk roads managed by National Highways and their overseeing organisations. Guidance for producing a similar crash model for Local Authority use is not currently available.

The use of other skid testing measurement tools such as the static pendulum skid testing will not be used as an indicator of skidding resistance on Leicestershire's road network.

Leicestershire County Council is responsible for maintaining 4,350km (2,703 miles) of road network according to the Department for Transport Statistics (rdl0202 report).

Due to resource restraints, it is not possible for the authority to undertake a full-scale skid survey on every road in Leicestershire annually. Therefore, roads that are inspected on a monthly frequency by our Highway Inspectors, are considered the highest level of importance, and are within our capacity to survey and carry out site investigations (where necessary) within reasonable timescales.

Our defined skid network presently consists of **716kms (445 miles)** of roads, which are subject to an annual skidding resistance survey. Refer to Appendix B.

Skidding resistance is an important property or the road surface which contributes towards the safety of highway users, particularly in damp, or wet road conditions. During the lifespan of a road, the road surface can lose some of its characteristics associated with grip. Effective maintenance of the highway network includes the requirement to systematically monitor the skid resistance of the road surface. Well-Managed Highway Infrastructure Code of Practice 2016 (WMHI), recommends that authorities develop and follow a risk-based approach, so that the level of skidding resistance across the network is maintained to an appropriate standard.

This procedure document considers a risk-based Asset Management approach to managing skidding resistance (8. Our Risk-Based Approach).

Therefore CS 228 has generally been used as a reference; to form the basis for Leicestershire County Council's Skidding Resistance procedure and adapt our document to better reflect local needs and our requirements for setting IL's, site investigations and the use of slippery road traffic signs.

The broad principles of CS 228 and therefore the County Council's procedures are as follows:

Where remedial treatment is deemed to be of benefit, sites will be prioritised using a risk-based approach and inserted into a work programme for action within the resources and budget available.

- Skid resistance surveys will be undertaken annually on defined parts of the highway network which are referred to as the defined SCRIM network.

- The defined skid network will be assigned IL's depending on a range of factors, such as the current speed restrictions and consider the geometry of the road

- Skid resistance data for an individual section of road (a site) will be examined and compared against its Investigatory Level within the County Council's Geographical Information System (GIS), and using a risk-based approach we will identify any potential risks that may be associated to each skid site

- The desk top study will identify the potential risks where the skid resistance falls at, or below the investigatory level, combined with a range of other risk factors that will be taken into consideration at each site (as shown in the Appendices), including any relevant collisions from the previous 3-year period

- The output from the desk top study will produce a prioritised list of sites, collating both collision and non-collision sites with low skid resistance and these will be scored, to prioritise sites that pose the greatest risk allowing them to be investigated on-site first.

The primary focus of the site investigation will be on addressing any skidding, or texture related deficiencies and not specifically to carry out a road traffic collision investigation. Any detailed road traffic collision investigations will be carried out separately by our Traffic and Safety team.

- A list of sites will be prioritised and programmed for a site investigation to determine whether remedial treatment is appropriate. Depending on the level of resources available, it may not always be practical to inspect all of these potential sites. But where this is the case, we shall inspect the highest priority sites first, and lower priority sites shall be rolled into the following year's site investigations and then prioritised accordingly.

- Any information gathered from the site investigations, such as visible debris from collision, or visible drainage issues, overhanging vegetation, etc. will be recorded in our Highway Management System (HMS) and used to produce a works instruction, which may be raised to address any immediate issues.

The above principles will be applied on an ongoing basis, so that skid resistance across the defined highway network is continually reviewed, monitored, and managed appropriately.

The term "skidding resistance" used in this document, refers to the frictional properties of a road surface, between the tyre and the surface of the road. This is measured using a specified device, under standardised conditions. SCRIM testing is carried out on controlled wetted surfaces, unless stated otherwise, as the skidding resistance of a surface will be substantially lower than when the same surface is dry.

Skid resistance measurements are used as an assessment of a road surface's level of grip and as an indication of the potential need for further investigation, based on known acceptable limits. However, it should be noted it does not represent the definitive grip available to a road user making a particular type of manoeuvre, at a particular time, and at a particular speed.

Leicestershire County Council do not currently measure the level of skidding resistance of the non-defined carriageway network, footways, or cycle ways.

Roundabouts can also be problematical to survey; this is because the weight of the vehicle can roll around the axis of the vehicle as it negotiates the roundabout, placing more pressure onto the test wheel and this effect has the potential to cause adverse test readings to occur. For this reason, we review the test results from roundabouts with an element of caution, especially with mini roundabouts.

4. Responsibilities

4.1 Legal Responsibilities

The County Council has a statutory duty under Section 41 of the Highways Act to maintain highways that are maintainable at public expense. Although the formal management of highway skidding resistance is not a specified legal requirement, it is considered good practice and it supports the aims and objectives set out in the Council's Highway Infrastructure Asset Management Plan (HIAMP), Risk Management Strategy and other road safety documents.

Section 58 of the Highways Act 1980 provides the ability to form a statutory defence to counter legal actions for negligence. The County Council must be able to prove in a court of law that it has taken:

'such care as is in all the circumstances reasonably required, to secure that part of the highway to which the action relates was not dangerous for traffic'. When considering a third-party legal action against the Council the Court will consider such factors as:

- The character of the highway and the traffic which was reasonably to be expected to use it
- The standard of maintenance appropriate for a highway of that character and used by such traffic
- The state of repair in which a reasonable person would have expected to find the highway
- Whether the County Council knew, or could reasonably have been expected to know, that the condition of the part of the highway to which the action relates was likely to cause danger to users of the highway
- Whether the County Council could reasonably have been expected to repair that part of the highway before the cause of action arose

Section 58 of The Highways Act 1980 does not stipulate the standard of maintenance applicable to the highway.

It is accepted by the Courts that different standards of maintenance are applicable to the road network; this is related to vehicle and pedestrian usage as well as speeds of the vehicles using the highway. The Court are aware that it would be unrealistic for the County Council to monitor and maintain adequate levels of skidding resistance on the whole road network, as this would not be deemed "reasonably practicable".

It is essential that a suitably structured procedure is implemented, and adequate levels of skidding resistance are maintained within reasonable expectations as outlined in the Highways Act 1980.

4.2 Roles and Responsibilities

This section sets out the various roles and responsibilities for the management of Skidding Resistance.

The annual Skid Resistance Survey Programme will be procured through a specialist accredited SCRIM contractor.

In terms of Skidding Resistance, the following Leicestershire County Council teams are responsible for the following: -

The Environment and Transport Department's – Network Data and Intelligence Team are responsible for:

- Management, development, implementation, and regular review of the Skidding Resistance procedure and reviewing associated Quality Management processes
- Review of the site categories and IL's to be applied to the PMS and update procedure documents. This review will be undertaken over a 3-year period
- Assignment of site categories and IL's, so that the Environment and Transport's Network Data & Intelligence team can apply these values to the digitised Pavement Management Network for cross-referencing against the skid resistance survey data
- Reviewing existing staff competence levels of all staff working on the skidding processes and arranging skills training where necessary
- Assessing whether procedures can be improved and making recommendations to the Asset Management Project Board
- Review the collision data associated with each skid site to begin the initial prioritisation for site investigations
- Manage the processing and scoring of data to produce a prioritised list for site investigations, and following the site investigation, include any identified features into the prioritisation process to produce a remedial works programme
- Validating road traffic collision reports on behalf of Leicestershire Police against the Department for Transport's STATS 19/20/21 specifications
- Administration and provision of road traffic collision data for internal and external purposes, including skid resistance analysis
- The procurement and subsequent management of skid resistance surveys with contractors
- Processing, analysis and review of skid resistance data received from the surveying contractor
- Making changes to the digitised network, within the PMS to amend the IL's where the physical road geometry has changed on-site
- Amending the existing IL's on the digitised road network in accordance with alterations to the IL's within this document
- Apply road categories and associated IL's to new road sections
- Liaison with other Council departments of any issues affecting the site(s), which may be contributory to skid resistance issues
- Continually improve the approach to support a risk-based approach to managing skidding resistance sites
- Conducting Annual appraisals of their team, identifying existing skills and training needs.

The Environment and Transport Department's - Traffic and Safety Team are responsible for:

- Changes to the layout of the existing road markings
- Alteration to the geometry of the road to minimise the potential for collisions etc, such as: junction layout improvements, changes to road markings, traffic calming and pedestrian crossing etc
- Investigation into road collision data to determine remedial measures to make the road safer for users
- Network Data and Intelligence collaborate with the Traffic and Safety team, so that they are aware of the chosen sites, in case they already have works planned for the same location
- Conducting Annual appraisals of their team, identifying existing skills and training needs.

The Environment and Transport Department's - Commercial & Business Support Team is responsible for:

- Making arrangement so that site investigations can be conducted safely on-site
- Carrying out the site investigations in a prioritised and timely manner following a risk-based approach
- Recording on-site observations and findings from site investigations
- Maintaining the appropriate records of all site investigations and associated documents
- Liaison with Highway Control team (H&T Operations) for the erection, maintenance and removal of temporary slippery road signs where necessary
- Liaising with the Traffic and Signals Team (D&G Network Management) and the Highway Control Team for the erection, relocation of existing, or the decommissioning of old permanent slippery road signs
- Providing a prioritised risk-based list of sites that would benefit from maintenance works
- Using engineering judgement to make informed decisions about how a prioritised list is integrated into the overall highways annual and forward works programmes
- Liaise with the Network Data and Intelligence team (D&G Commissioning) if the Investigation Level is considered to be incorrect for the road category
- Identify and report locations for erection, or decommissioning of temporary slippery road warning signs on-site
- Identify and report to Highways Control team for refreshing of any existing road markings on the carriageway in relation to a skid site
- To develop appropriate remedial treatments and projects for future programmes of work using appropriate materials
- Conducting Annual appraisals of their team, identifying existing skills and training needs. Notify the Network Data and Intelligence team (D&G Commissioning) of any Skid related training needs.

4.3 Alignment with our Asset Management Policy

This is Leicestershire County Council's carriageway skidding resistance procedure document, which was first published in 2014 and completely revised in Dec 2019 and is reviewed at 3 yearly intervals. Any interim amendments are documented in the 'table of amendments' and denoted with a suffix.

This procedure document forms an important part of our risk management processes relating to skidding resistance of our carriageway skid network (hereto referred to as the defined skid network) and therefore the risk element of this document aligns with our Highway Asset Management Policy, this is our overarching departmental policy, which is in turn aligned to our strategic Corporate objectives highlighted in Leicestershire County Council's Strategic Plan 2022-26.

5. The Defined Network

For the purposes of this procedure, the defined skidding resistance network comprises of all principal classified A and classified B roads and other important roads that align with our monthly highway inspections and our Resilient Network. The defined skid network is shown in (Appendix B).

This list is regularly updated by the Network Data and Intelligence Team and can be amended by consultation with the team.

5.1 The Annual Skidding Resistance Survey

The level of skidding resistance of a road surface varies as the season's change, with the lowest values generally being recorded during the summer months, due to the accumulation of detritus, oil and other substances on the road surface. Some of these are washed away naturally during a heavy rainfall. Therefore, it is necessary to calculate an average skid resistance value taking seasonal changes to the road surface into account throughout the seasons.

Routine measurements of skid resistance shall be made using Sideway-force Coefficient Routine Investigation Machines (SCRIM) and processed by the Survey Contractor to derive Characteristic Skid Coefficient (CSC) values. The CSC is an estimate of the underlying skid resistance level once the effects of any seasonal variations have been calculated.

The current Survey Contractor will arrange for surveys to be undertaken to capture the CSC values this is determined using the Single Annual Skid Survey (SASS) approach as highlighted in CS 228.

The SASS approach takes account of seasonal variations. The Local Mean Summer Coefficient (LMSC) shall be determined for the current survey. The LMSC is the average of all valid 10m sub-sections in the locality in the current year.

The low values of Skidding Resistance on its own is not necessarily a hazard, other factors must be considered, such as the history of any road traffic collision information relating to the site and the prevailing road conditions. For example: a collision may have occurred because of mud being present on the road surface at the time of the incident, which may no longer be present. Skidding may have occurred, but not due to the physical characteristics of the road itself. Therefore, no remedial works would be necessary, unless mud was still present.

The data loading and processing is followed by a desk-top exercise using a risk-based approach and engineering judgement, to evaluate overall risks. This includes but is not exclusive to:

- the severity of the CSC below the investigatory level
- the severity of the road surface texture, as measured by SCANNER (Surface Course Assessment of National Network of Roads) survey
- the existing speed restrictions
- the current road geometry (for example: approaches to signalised pedestrian crossings, roundabouts etc)
- whether the site is located near significant infrastructure (Hospitals, schools, places of worship etc)
- The importance of the road in relation to the carriageway hierarchy
- the number and severity of collisions which may have occurred within the vicinity of the site over the previous three-year period

  Collisions information is recorded by the Police in accordance with STATS 19 collision requirements. Careful consideration will be given to the possible causation factors involved with each collision in relation to each skid site. This is not to ascertain any remedial measures for the collision site, but rather to determine whether skidding, or loss of control took place during any of the collisions.

5.2 Roads that are not part of the defined network

Routine annual SCRIM surveys will only be undertaken on roads that have been identified as being part of the defined skidding resistance network.

On other roads that are not part of the defined network, site specific testing may be carried out using Griptester surveys in relation to any third-party personal injury collisions where skidding may have occurred, or where damage to highways assets is regularly occurring. Surveys may also be undertaken where customers have raised concerns about the skidding characteristics of a specific road, where resources allow.

Under these circumstances, testing will only be undertaken in the absence of any historic data, following the assessment of any existing data held in our PMS and after a competent person undertakes a road surface site investigation of the site.

6. Investigatory Levels

6.1 A review of Investigatory Levels

Investigatory Level's (IL's) will be regularly reviewed over a 3-year rolling period,

But also, when: -

- The SCRIM results indicate that a section lies below the current IL value and the site investigation provides information that suggests the current IL may be inappropriate
- changes are made to the current defined network or existing road geometry.

We will not change the IL's merely because of the number of injury incidents have increased as recommended by CS 228, as this would be too labour intensive for our current level of resources.

Collision data analysis is currently managed by the Environment and Transport Network Data and Intelligence team. If the site is identified as being at, or below the IL value then a desk-top study will be undertaken to cross-reference the skid site data with collision data and texture data and a review of the types of collisions that have occurred, also whether skidding may have been a contributing factor.

6.2 Objectives for reviewing the Investigatory Levels

The objectives will be to determine:

- whether the current IL value is appropriate
- whether the extent of the area covered by the IL is sufficient
- to check that the locations of the approaches to pedestrian crossing etc. correlate to the physical asset location. This is done by cross-referencing the sites with aerial photos, or using traffic signs to identify the position of gradients, sharp bends etc, within a Geographical Information System (GIS)
- to check that the entire length of the defined network has an appropriate IL
- to pinpoint where the road geometry may have been modified, for example: where a traffic scheme has introduced a new roundabout.

6.3 The Procedure

The review will be led by a competent, trained member of staff from the Network Data and Intelligence Team. The following information will be obtained as a minimum: -

- The latest IL's from the Pavement Management System, or where roads are not part of our defined skidding resistance network the Characteristic Skid Coefficient (CSC) will be used in conjunction with any skid survey data
- Any changes that have taken place within the site area, surfacing materials, or road layout e.g. the installation of traffic signals, pedestrian crossings or roundabouts
- Any relevant local factors such as non-injury collisions, complaints or repeated reports of damage
- Details of all collisions, their severity and the number of collisions within the proximity of each skid site.

Our site investigation levels are based on National Highways standards the Design Manual for Roads and Bridges Volume 7, Section 3, Part 1 Table 4.1:

Site Category and definition		IL for CSC data (Skid data speed corrected to 50km/h and seasonally corrected)							
		0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65
A	Motorway **(Not Applicable),** these are not LCC's responsibility, they are the responsibility of National Highways or their Managing Agents								
B	Non-event dual carriageway with one-way traffic		✓						
C	Non-event single carriageway with two-way traffic			✓					
Q	Approaches to and across minor and major junctions, approaches to roundabouts and traffic signals **(for roads with speed limits below 50mph)** (see note 5 also see note 8)				✓				
	Approaches to and across minor and major junctions, approaches to roundabouts and traffic signals **(for roads with speed limits of 50mph or above)** (see note 5 also see note 8)					✓			
K	Approaches to pedestrian crossings, traffic signals and other high-risk situations **(for roads with speed limits below 50mph)** (see note 5 also see note 8)					✓			
	Approaches to pedestrian crossings, traffic signals and other high-risk situations **(for roads with speed limits of 50mph or above)** (see note 5 also see note 8)						✓		
R	Roundabout				✓				
G1	Gradient 5-10% longer than 50m (see note 6)				✓				
G2	Gradient >10% longer than 50m (see note 6)					✓			
S1	Bend radius <500m – dual carriageway with one-way traffic (see note 7)				✓				
S2	Bend radius <500m – single carriageway with two-way traffic (see note 7)					✓			

Table 1. – Site Investigation Levels adopted by LCC (refer to corresponding notes below)

Notes applicable:

The grey boxes in Table 1 above, highlight the recommended values suggested by National Highways in CS 228. National Highways suggest that if the Highway Authority should deviate outside of the grey boxes, they must justify why they have chosen alternative values. This justification is likely to involve the collection of any scientific evidence used to support any such decisions.

The tick marks in Table 1 confirm which values are currently being used by Leicestershire County Council. As shown above, these all fall within the grey boxes. The lower values have been selected because our traffic volumes and some speed limits are generally expected to be lower than those found on the National Highways network.

1. The mean CSC should be calculated against the IL, this is calculated for the appropriate sub-section length
2. Leicestershire County Council does not use averaging lengths like National Highways do to determine their skid sites. We find this a less accurate method for our risk-based approach (refer to 12. Appendix A.).
3. As part of site investigation, individual values within each length should be examined and the significance of any values that are substantially lower than the mean value assessed

4. The above table is a replica of Table 4.1 shown in the Design Manual for Roads and Bridges CS 228. The tick marks highlight the Investigation Levels that Leicestershire County Council have selected to use as recommended by CS 228.

   National Highways suggested that the values relating to lighter boxes could be used where traffic flow is light. We have decided against taking this approach as it would overly complicate the Pavement Management process. But by highlighting the IL's that we have chosen shows that we are still using values that are within the CS 228 recommended grey boxes.

Notes applicable to specific site categories:

5. ILs for site categories Q and K are based on the 50m approach to the feature and, in the case of approach to junctions, through to the extent of the junction. The approach length shall be extended when the speed limit is at, or greater than 50mph. On roads where 20mph restrictions are in place, the risk of skidding at this speed is considered negligible, therefore skidding resistance testing will not be required at these locations.

   On roads with a speed limit exceeding 50mph the Investigatory Level should be increased to 0.50 for category Q sites and 0.55 for Category K sites.

6. Categories G1 and G2 should not be applied to uphill gradients on carriageways with one-way traffic.
7. Categories S1 and S2 should be applied only to bends with a speed limit of 50 mph or above, except if the radius of the bend is <100m, where the S1 and S2 categories shall be applied at all speeds.
8. CS 228 clarifies major junctions as being where traffic has a permanent right of way, and minor junction are where the traffic is required to give way.

6.4 Road Resurfacing Polished Stone Values

Table 1.1 must not be confused with the National Highways tables used for selecting which Polished Stone Value (for skidding resistance) should be used in conjunction with road resurfacing treatments and large-scale patching works within the County boundary.

Leicestershire County Council officers will refer to the following values in table 1.1 below, in relation to designing carriageway maintenance schemes, unless they are designing roads adjoining the strategic network on behalf of National Highways. In this situation National Highways guidance will prevail.

National Highway's overseeing organisations will refer to the Design Manual for Roads and Bridges, vol 7, Section 5, part 1 CD 236 tables 3.2a and 3.2b in this situation.

Site Category and definition		IL	**Target Polished Stone Value** for given IL, traffic level and type of site					
		Traffic (cv/lane/day) at design life	**0 - 100**	**101 - 250**	**251 - 500**	**501 – 1000**	**1001 - 3000**	**3001+**
		Traffic Category	H/G	F	E	D	C/B	B/A
		NRSWA Road Type	4	3	3	2	1	1
A	Motorway **(Not Applicable),** these are not LCC's remit, they are the responsibility of National Highways or their Overseeing Agents	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	Non-event dual carriageway with one-way traffic	0.35	50	50	50	50	55	60
C	Non-event single carriageway with two-way traffic	0.40	50	50	55	60	63	63+
Q	Approaches to and across minor and major junctions, approaches to roundabouts and traffic signals **(for roads with speed limits below 50mph)**	0.45	55	55	60	63+	63+	65+
	Approaches to and across minor and major junctions, approaches to roundabouts and traffic signals **(for roads with a speed limit of 50mph and above)**	0.50	55	60	60	63+	65+	65+
K	Approaches to pedestrian crossings and other high-risk situations signals **(for roads with speed limits below 50mph)**	0.50	55	60	63+	63+	65+	65+
	Approaches to pedestrian crossings and other high-risk situations **(for roads with a speed limit of 50mph and above)**	0.55	60	65	65	65+	65+	65+
R	Roundabout	0.45	50	55	60	60	60	63+
G1	Gradient 5-10% longer than 50m	0.45	55	55	55	60	63+	63+
G2	Gradient >10% longer than 50m	0.50	60	60	60	63+	63+	63+
S1	Bend radius <500m – dual carriageway with one-way traffic	0.45	50	55	55	55	60	63+
S2	Bend radius <500m – single carriageway with two-way traffic **(for roads with a speed limit of 50mph and above)** (See note 7)	0.50	60	63+	63+	63+	65+	65+

Table 1.1 - Polished Stone Values for carriageway resurfacing treatments

National Highways suite of documents have been referred to for guidance in developing the table above. The Polished Stone Values selected in Table 1.1 have been chosen because they relate to locally sourced materials, which means a lower carbon footprint and are regularly used by our Highway Framework Contractors.

Notes:

1. A High Friction Surface Treatment shall not be used solely because a coloured road surface is required.
2. The (+) plus sign in the above table signifies that a higher PSV may be used if the actual value (i.e., 63) cannot be obtained from local quarries, so if 63 is not available, a 65 or higher PSV maybe be chosen instead.
3. Table 1.1 Polished Stone Values shall be applied to ALL sites on the Defined Skid Resistance Network for the treatment of all new roads, surface dressing, carriageway resurfacing and carriageway maintenance works requiring full carriageway width works greater then 15m in length. It shall also apply for the same treatments to all sites with a speed limit greater than 30mph on the Non-Defined Skid Resistance Network. Sites on the Non-Defined Skid Resistance Network with a speed limit of 30mph or less, are considered to be generally low risk sites where a standard 55PSV material shall be used unless specific collision reduction measures are recommended. For maintenance works requiring full carriageway width works less than 15m in length on either the Defined or Non-Defined Skid Resistance Network, the overall effect of the works is not expected to have a significant effect on the overall level of skid resistance provided by the carriageway and a standard 55PSV material shall be used unless specific collision reduction measures are recommended.
4. However, although the skidding requirements may vary along a site, the use of different aggregates of varying PSV on the different lengths of the site may generally be considered impractical. Particularly with regard to applying a surface dressing treatment. In this situation, the engineer should decide the most appropriate PSV for the site as a whole; but may consider resurfacing individual sections of the road where a higher PSV may be required. For example: on sharp bends, or on the approaches to pedestrian crossings.
5. In Table 1.1 the range of Commercial vehicles (0 – 3001) has been derived from the highest count found on Leicestershire County roads (during 2023), of 2,918 commercial vehicles per lane per day, so this has been used as a comparison against National Highways ranges as published in CS 228. This has means we were able to streamline the above table to suit Leicestershire's current volume of traffic.
6. It is not normal practice to provide a binder course, or base course layer with a PSV higher than a 55PSV. Therefore, no temporary planed surface shall be left open to traffic to travel over at high traffic speeds. In this situation, traffic speed should be restricted to a maximum 40mph through-out the duration of the works, by using of appropriate traffic management signing, lighting and guarding in accordance with the latest Traffic Signs Regulations and General Directions manual (TSRGD). For two-lane high-speed roads, it may be necessary to slow vehicle speeds by closing one lane and using a chicane type system on the approach to the site.
7. For Bends with a radius <500m Single carriageways with two-way traffic, but where the speed limit is below 50mph the relevant PSV value for roundabouts will apply.

Competent engineering judgement shall be used on all surfacing, resurfacing and surface dressing sites to determine the appropriate PSV for each location, such as outside schools and other high-risk areas, as part of the engineer's assessment.

A PSV50 can be used for dual-carriageway non-event sections, where no other categories exist within the extents of the sites, such as minor and major junctions etc.

Any deviation from this document shall require approval from the Head of Service, Highways & Transport Commissioning, Environment and Transport (as Asset Manager).

6.5 The length of approach to features

Table 2 below, shows the required length of treatments for approaches to/and across both major and minor junctions, controlled crossing and approaches to roundabouts compared with the 85th percentile speeds of traffic. This method shall apply to the following categories Q, K and R for establishing the length of surface treatment that is necessary for each approach.

85th Percentile approach speed (mph)	25	30	35	40	45	50
Length of Target PSV treatment (m)	40	50	65	80	80	80

Table 2. – Length of Surface Treatment on Approaches.

The extents and type of remedial action will be decided by a competent, trained officer following the site investigation. Engineering judgement will be used for gradients and bends <500m which will usually involve applying a higher PSV throughout the extent of the hazard.

6.6 High Friction Surface Treatments (HFST)

Historically, approaches to controlled crossings, roundabouts and traffic signals were required to have an application of High Friction Surface Treatment to increase the skidding resistance level to 68+ Polished Stone Value.

The aggregate used in High Friction Surface Treatment is traditionally Calcined Bauxite mixed with a resin binder. Aggregates with this level of skidding resistance cannot be sourced locally and must be imported from Countries such as China, or India. This dramatically increases the overall costs for this type of treatment and dramatically increases our Carbon footprint, because the materials would need to be imported.

This type of application is usually a thin layer of screed mixed with a Calcined Bauxite aggregate applied to the surface of the road (either hot or cold-applied treatment). In addition to being expensive to lay, the Road Surface Treatment Association undertook research into this treatment and found that HFST generally wears off within 3 – 5 years depending on traffic volumes, through the braking and turning actions of the traffic travelling over it. The requirements for a 63+ PSV may in many circumstances be higher than is necessary in some locations, for example in urban areas where the speed limit is below 50mph.

Therefore, we will only apply High Friction Treatment Surfacing where it is deemed an essential requirement. The use of High Friction Surface Treatment requires an element of engineering judgement to determine whether it should be utilised. Other factors should be considered for example:

- the prevailing speed limit
- the proximity to schools
- the locations of junctions
- approaching/around sharp bends
- pedestrian crossings
- downhill gradient and other potential high-risk sites.

If several potential hazards are within close proximity, consideration should be given by the engineer as to whether the same higher PSV should be applied throughout the site.

Rather than using a HFST, a higher PSV aggregate may be selected during the design stage and incorporated into the road surface courses. This can provide a more than adequate skidding resistance for the site, whilst lasting throughout the lifespan of the road surface.

This minimises construction timescales, and long-term maintenance costs, and minimises the use of scarce natural resources, reduces carbon emissions from transporting aggregates from abroad and

therefore provides a much more suitable and sustainable alternative treatment. During the maintenance and design processes our Engineers will refer to table 1.1 above to establish the required level of skidding resistance, based on the volume of traffic using the site.

When an existing site is found to have worn HFST, but the SCRIM survey confirms that an adequate level of skidding resistance is still being provided by the underlying road surface. We will continue to monitor the site on an annual basis but choose not to replace the HFST, unless our historic collision data shows the number of road traffic collisions have increased over the preceding 3-year period.

7. Slippery road warning signs

7.1 Criteria for erecting Slippery Road Signs

When a site has been assessed and remedial measures have been established to repair a skidding resistance issue, these remedial works should be incorporated into the appropriate annual Capital works programme.

All sites will be prioritised following our risk-based approach described in Chapter 8.

Slippery roads signs will not routinely be erected on the approaches to a slippery road site, because road traffic collisions generally involve a variety of other factors, so we do not erect slippery road signs solely because the level of skidding resistance is below the required investigatory level. However, if a competent engineer decides that the site may pose a significant danger to highway users, then slippery road signs shall be erected to warn approaching motorists of the hazard. These signs will be erected and maintained for vehicles approaching the site.

Once the treatment has been carried out to rectify any problems and the engineer is satisfied with the outcome of the remedial measures, then the slippery road signs may be taken down and removed from site or relocated to be used at another skid related site.

The latest version of The Traffic Signs Regulations and General Directions manual should be referred to, relating to road traffic sign requirements.

7.2 Early Life Skidding Resistance of Road Surfaces

This section relates to newly laid asphalt material and the presence of a film of bitumen, which is used to adhere the aggregate to the asphalt layer. Research carried out by the Transport Research Laboratory (TRL) in their report PPR060[1] has shown that this bitumen coating can present a problem relating to the skidding resistance properties of the road surface, which can pose an initial risk to road users until the bitumen coating has scrubbed off with the movements of traffic. However, the finding of the report states that the risk of an increase in collisions due to the presence of this binder coating is relatively small.

National Highways design manual suggests that asphalt surfacing materials exhibit different skid resistance properties in the initial period after laying compared with the same surfacing's that have been exposed to traffic for a period of time.

CS 228 states that: *"it is assumed that the surface will have reached an equilibrium state one year after opening to traffic*". This will allow time for the bitumen coating to wear off thus exposing the aggregate that provides the desired level of skidding resistance.

In 2024, the Network Data and Intelligence team carried out a study comparing SCRIM results before and after the completion of resurfacing works at certain locations across the County in 2019, 2020 and 2021. The results demonstrated that adequate grip was available immediately after the works had been completed. The majority of the sites that had been selected showed an overall improvement in skidding resistance by up to 11% in the first year, and a further 16% improvement the year after.

[1] PPR060 - The early life skid resistance of asphalt surfaces, TRL publication 2005, PG Roe, R Lagarde-Forest

This demonstrates that early life skidding resistance does not currently appear to be an issue with the schemes being undertaken across the county.

The impact of resurfacing schemes on skid resistance will continue to be reviewed [annually as part of our scheme monitoring processes]. Therefore, permanent slippery road signs will not be erect in relation to new carriageway resurfacing works, because early life skidding resistance is not considered to be an issue within the boundary of Leicestershire.

7.2 Horses and Highway Surfacing

Some new surfacing materials have been found to be more slippery by riders of horses. This has led to the British Horse Society and the Association of Directors of Environment, Economy, Planning & Transport (ADEPT) to specifically produce a series of guidance documents for both horse riders and the Local Highway Authority, to ensure horses remained safe on the highway.

The document is: CSS/British Horse Society ENG 03/05[2]

The guidance document included recommendations for the newly laid surface to have:

- an application of grit applied during the construction process, on specific roads that were likely to be used by horse riders near riding stables or racecourses
- or to have a High Friction Surface Treatment applied to the new road surface, especially on gradients
- or to abrade the new surface with a retexturing machine to remove the bitumen coating from the surface of the chippings
- Notify nearby stables that works are taking place in that area, so horse riders can anticipate that the surface may be slippery

Other recommendations were aimed at the owners of the horse to:

- ensure that their horse was properly shod
- Proceed to ride with caution on any new road surfaces
- If the horse's shoes were thin, or loose then the rider should avoid using that road until the horse's shoes had been correctly fitted by a farrier

[2] Horses and highway surfacing - County Surveyor Society/British Horse Society – Eng 03/05 2006

8. Our Risk-Based Approach

8.1 Desktop study

Once the skid data has been received from our survey contractor, an annual desktop study will commence. This forms the first stage of our risk-based approach. We will conduct our risk-based approach in accordance with the recommendations from "Well-Managed Highway Infrastructure" code of practice 2016. The approach we are adopting helps us identify the lowest values on the skid survey results which pose the highest risk across the county. This involves targeting a number of factors to be considered, such as:

- Identifying road categories (IL's) where the CSC values are the lowest
- Road geometry, such as approaches to junctions, sharp bends etc
- Current speed restrictions are highest
- Where texture data from SCANNER surveys are lowest (unless the road surface exhibits a negative texture, such as Stone Mastic Asphalt surface)
- Assessing associated details relating to any collisions
- The locations of any nearby infrastructure, where people are more likely to congregate, such as schools, hospitals, community centres, places of worship, shopping centres etc.

The reason for adopting this approach, is because a combination of these factors identify vulnerable areas where the risk could potentially be higher. The key aim with the desktop study, is to identify and address any skidding resistance of the road surface, and not to conduct a specific collision investigation enquiry. Any collision investigations will be carried out separately by a competent collision investigator from our Traffic and Safety team.

As part of our desk-top study the authority no longer considers the specific details of each collision. such as a loss of control, or whether skidding occurred, this can be obtained from the collision record. This is information which is recorded by the police officer at the time that the incident was reported. However, we have noted that more recently the Police appear to have limited resources to attend slight injury collisions, and therefore much of the detail is recorded by other means, this has resulted in less accuracy of the collision data. The incident may also have occurred as a result of driver behaviour, (such as intoxication from alcohol, or drugs) which may have had a detrimental effect on the factors involved in the collision, and not solely because of insufficient skidding resistance.

We do not know the exact factors which may have caused the collision, during the desk-top study we are not investigating each site because of an individual or multiple collision. But because of the risk-factors relating to the skidding deficiency. However, we are interested in the number of collisions that occurred within the site extent and the severity of those collision(s) and these are the factors that are used to score each site.

The collision data is gathered from the preceding three-year period within a reasonable stopping distance of each skid site. The stopping distances obtained from the 'Highway code' have been used to determine whether each collision is within the reasonable range of each skid site.

Records shall be retained to demonstrate when the site was identified, when the site investigation was carried out, and any subsequent findings from that investigation. The parameters from the site investigation will also be scored and used to prioritise the Skidding Resistance schemes for inclusion in our Annual Capital Programme.

8.2 Texture Depths

The defined network consists of roads that are also surveyed using SCANNER surveys, (Surface Condition Assessment of the National NEtwork of Roads). This type of survey uses lasers to scan the road surface and collects detailed information about the surface condition of the road.

One element of this survey assesses the Sensor Measured Texture Depth (SMTD). Refer to DMRB CS229 or the latest revision. https://www.standardsforhighways.co.uk/dmrb/

Changes in the Texture Depth of the road surface can indicate a potential loss of skid resistance, or some other mode of surface failure, (e.g. Fretting resulting in a high Texture Depths) or indicate fatting-up of the road surface (where heated summer temperatures cause the bitumen to melt during hot weather).

This results in a loss of texture depth as the aggregate is pressed into the bitumen, or the hot bitumen is forced through the aggregate by the weight of the vehicles passing over the road surface. The percentage length of the texture depth reading will also be used for each site during the desk-top exercise.

8.3 Skidding Resistance vs Road Texture depth

There is very little correlation between loss of skidding resistance and a loss of texture, because although fatting-up may be present on a road surface the road may still offer sufficient skidding resistance (TRL report 367[3]). However, the presence of low texture depths may be a significant contributing factor to reduction of grip in wet weather conditions.

Low texture depths may also be a factor of chipping loss (fretting) specifically on Hot Rolled Asphalt sites. When considering texture depths against Skidding Resistance an average texture depth less than 0.8 is used to identify low texture.

Therefore, in these circumstances a site inspection is essential to determine that appropriate corrective measures are employed.

For new highway development sites, we expect the Developer to follow our Design Guidance and provide a minimum road surface texture depth of 1.2. In terms of PSV table 1.1 should be referred to and appropriate engineering judgement used for all types of road surfaces and will require Leicestershire County Council's approval.

[3] High and low speed skidding resistance: the influence of texture depth. TRL report 367 PG Roe, AR Parry and HE Viner 1998

9. Site Investigations

9.1 Skidding analysis timeline

Figure 1 below is an example of the timescales that are involved. From the time of the initial survey to capture skid data, desktop study, detailed analysis, site investigation phase, prioritisation, remedial treatment and annual review processes. But due to the priority of other high-risk defects the remedial skid work may be lower priority than other non-skid related sites, this may result in the skid site remaining on the programme for longer than shown in the diagram below.

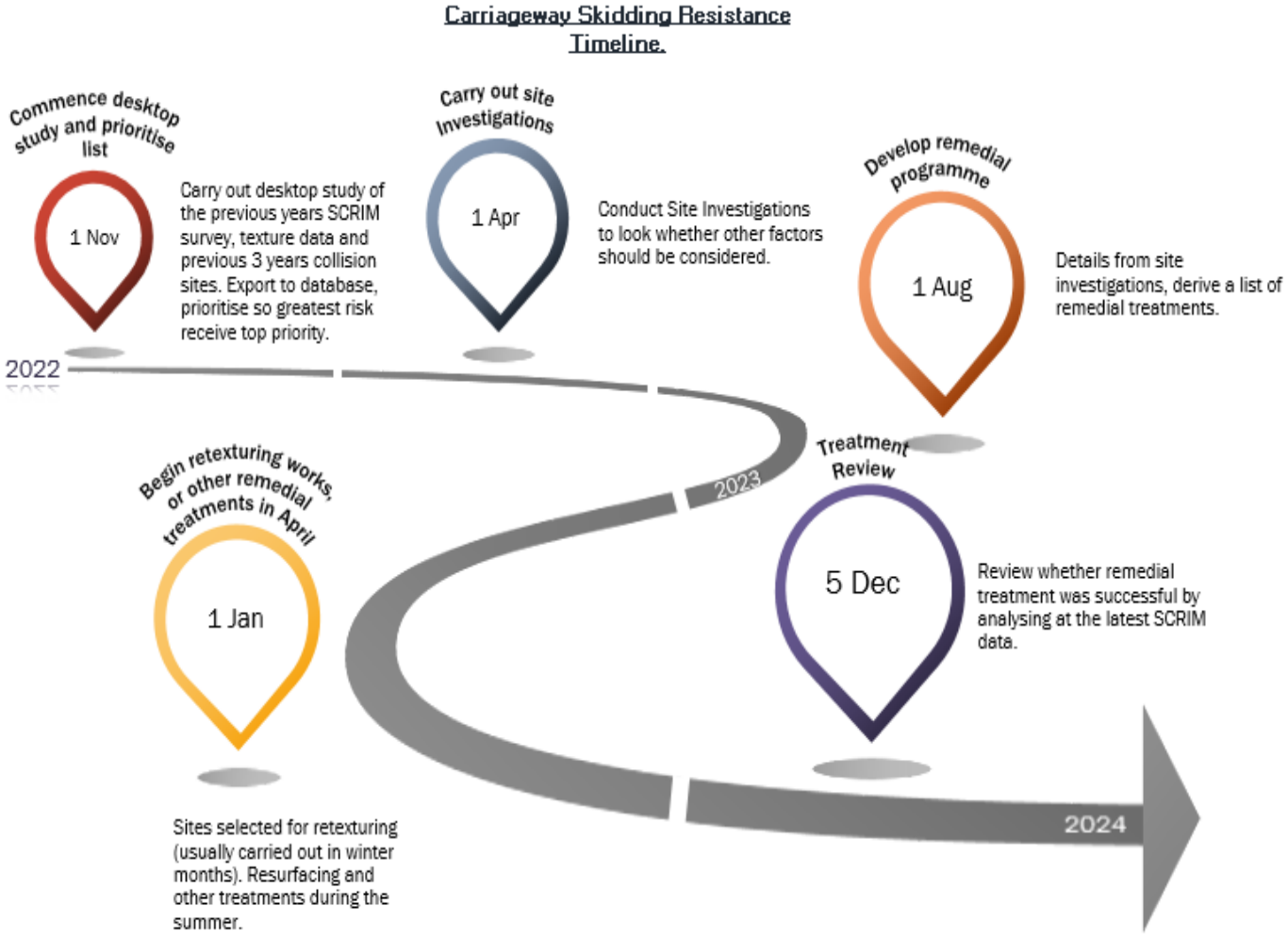


Figure 1.

9.2 Desktop study

The initial desk-top study is carried out using a Geographical Information System (GIS).

The process is as follows:

Upload the latest collision data from the previous three years, the most recent skid data from the SCRIM surveys and unweighted texture data from the most recent SCANNER survey. This combination of data is manually assessed, and the data is linked together to create each site. The data is exported to an external database. Parameters within the database are set so that it provides a weighted score to measure the severity and prioritisation of each site. These are based on:

- the severity of the skid value below the investigatory level

- the severity of the texture depth reading below 0.8
- the number of collisions and their severity
- the current speed restriction

A desk-top study will be overseen by a trained and qualified member of staff.

9.3 Visual Investigations on-site

Once the desktop study is complete, the individual sites for investigation are illustrated in a series of PDF maps showing the site extents and mapped position. This electronic file is shared with the engineers carrying out the site investigations, so they can provide a site report linked to each site.

The number of site for investigation required will be re-assessed each year, as part of our 3 yearly review of this procedure and amended accordingly. But we aim to carry out around of 100 site investigations each year, where reasonably practicable, depending on suitable weather conditions and the availability of sufficient resources.

By undertaking a site investigation, each visual factor will be considered recording observations that could potentially be detrimental to each site. Each of these observations will be scored to provide an overall rating for each site and will generate a final prioritised list for remedial works. An example of the form is shown in Appendix A.

The aim of this site investigation is to record all visual observations of:

- characteristics of the road, bends, steep gradients/cross-falls
- identify any changes to road geometry, junctions, pedestrian crossing etc
- environmental factors, overgrown hedgerow, low hanging tree branches etc
- existing overall pavement condition
- any apparent hazards
- the existing speed limit
- any standing surface water, ponding
- any defects, potholes, fatting-up, chipping loss, rutting, texture depths etc
- assess current drainage conditions
- whether there is evidence of any incidents/collisions etc
- take other risk characteristics into account, schools, hospitals, shopping precincts, community centres, or whether roads appear to be used by horse riders etc
- the date the site investigation was undertaken
- site ID/section reference.

The Site investigations will be undertaken by a senior engineer or overseen by a senior engineer who is experienced in monitoring skidding resistance and familiar with carrying out site investigations relating to SCRIM. Each site will be investigated to collect all visual observations from a checklist on the spreadsheet. This information is retained as a record of the date of each investigation, and the observations that were made during the time of the site investigation. The details will be scanned into a shared folder for future reference.

Any data that has been recorded on the spreadsheet will be transferred to the relevant shared folder, so that the Asset Management Team can add additional site information to the database, as a supplementary scoring mechanism.

Once the site investigations have been completed and the data has been processed, the following procedures will be undertaken:

1. All sites where slippery road signs are considered necessary, will be recorded onto the Highway Management System (HMS) within one-month from the completion of the final site investigation and passed onto the relevant team to affect a repair.

2. Any remedial works required to remedy the existing hazard shall be prioritised and added to the future capital programme (within 3-months of the final site investigation).

10. Procedure Statement

10.1 *What we will do…*

- Ensure that staff authorised involved in assessing skidding resistance parameters, surveys, desk top studies and on-site investigations are competent, or led by an officer who has been trained and therefore competent to make the appropriate decisions
- Where reasonably possible, we will arrange for annual skidding resistance survey data to be collected. This will be done using a specialist survey contractor using a calibrated and accredited survey vehicle, and surveyed in a timely manner within the seasonal survey window
- When the specialist contractor submits their data, we will check data quality, reliability, appropriateness and completeness in accordance with recommendation 10 of the Code of Practice *"Well-Managed Highway Infrastructure 2016"*
- We will review and monitor our carriageway skidding resistance results annually and from this data, we will identify sites that are at, or below the required Investigatory Level (IL) for each specified category. These results will be compared against the previous 3-year collision data. This will be from collision data that has been reported to us by the Police in relation to STATS 19
- From this information and our historic records, we will determine where to undertake our detailed site investigations
- We will determine whether to carry out remedial works to improve the skidding resistance characteristics of the road, to monitor the site, or consider whether other reasons may have a contributing factor and record our follow-up actions
- We will establish a programme of works using our risk-based approach and plan to minimise the risk to road users, as far as is reasonably practicable given our limited resources and financial constraints
- We shall determine whether sites require advanced warning signs to be erected, to warn approaching motorists of the potential hazard
- We shall determine which sites require remedial works and produce a prioritised risk-based list of sites within three-months of the completion of all site investigations
- Site investigations will be prioritised based on the level of risk, if there are too many sites for us to visit given our current level of resources, any sites not investigated will roll into the following year's survey for investigation
- We will retain a register of details relating to our site investigations and record any follow-up actions
- We will liaise with our Traffic and Safety team to resolve any known issues that may require changes to our digitised network, so it matches the existing road layout and obtain up to date collision data from them
- We will review, update and amend the IL's relating to skidding resistance at least every three-years

- We will arrange for the removal of permanent slippery road signs where they are no longer required, to minimise street clutter. This is in accordance with recommendation 36 of the Code of Practice *"Well-Managed Highway Infrastructure"*
- This document will be reviewed and updated at least every three-years and published on the County Council's web site
- We will liaise with our Insurance and Legal teams to ensure any changes to our Policies and Procedures are in accordance with statutory and legal requirements and in turn will help support defence of third party claims where appropriate.

10.2 *How will we know we have made a difference…?*

- We will obtain data that will be reliable, good quality and will be consistent with previous survey data (after the initial first year of the survey)
- The severity of the sites that are identified as being below the required skidding resistance level and which may have experienced skidding collisions, will begin to reduce
- We will have an auditable approach to managing our skidding resistance process, in accordance with our Quality Management System (QMS)
- We will be able to defend the County Council against legal action from third party personal injury/collision claims, where we have acted in accordance of sections 41 and 58 of the Highways Act 1980.
- Where the engineer considers the site to be a particular hazard to highway users, Slippery Road Signs will be erected to warn approaching motorists
- We will begin to see a reduction in severity of the sites that are found to be below the required Investigatory Level. Providing a safer, sustainable road network for all highway users
- We will retain good quality detailed records and will have an effective programme for remedial repairs, relating to potential slippery road conditions
- Closer liaison between other departments and collaboration with our neighbouring Highway Authorities, which will help resolve highway issues promptly
- Our skidding resistance IL's will be regularly checked and updated in-line with our Quality Management System in accordance with other recommendations
- Our retention of skid resistance data will be up to date, improve data reliability, and all actions from site investigations will be recorded
- By taking this approach, our roads will become safer for highway users, sustainable and operational.

11. Performance

11.1 Performance Management

The performance of our overall skidding resistance procedure will be reviewed by Environment and Transports Departmental Management Team (DMT) to ascertain that each stage is performing to the desired function, in accordance with this document and our overall Asset Management function.

11.2 Performance Monitoring

The number of sites identified as having low levels of skidding resistance is critical in terms of our roads being safe for highway users.

We will prioritise our site investigations and remedial treatments of our defined skidding resistance network based on the site locations, using our risk-based approach and priority scoring, including the final scores from the site investigations.

The quantity of sites that we are able to carry out remedial treatments on, may vary each year. This will depend on the availability of funding for the appropriate remedial treatment.

We will monitor the number of site investigations carried out on the road network, to ensure they have been conducted within six months of the completion of the desktop study. We will also check that any deficient sites that have not been prioritised for treatment, will be added to a future programme of works.

12. Appendix A.

12.1 The desktop scoring mechanism

	LOWER RISK →									INCREASED RISK
Category	A	C	G1	G2	B	S1	S2	Q	R	K
Description	Motorway (Not Applicable), these are not LCC's responsibility, they are the responsibility of National Highways or their Managing Agents	Non-event single carriageway with two-way traffic	Gradient 5-10% longer than 50m	Gradient >10% longer than 50m	Non-event dual carriageway with one-way traffic	Bend radius <500m – dual carriageway with one-way traffic	Bend radius <500m – single carriageway with two-way traffic	Approaches to & across minor & major junctions, approaches to roundabouts & traffic signals	Roundabouts	Approaches to pedestrian crossings, traffic signals & other high-risk situations
I/L	N/A	0.4	0.45	0.5	0.35	0.45	0.5	0.45	0.45	0.55
Score	0	1	2	3	4	5	6	7	8	9

	LOWER RISK →					INCREASED RISK
Speed Restriction	20	30	40	50	60	70
Score	0	2	4	6	8	10

SCRIM	LOWER RISK →					INCREASED RISK
Functional Deficiency	>0	<=0 but >-0.05	<=-0.05 but >-0.1	<=-0.1 but >-0.2	<=-0.2 but >-0.3	<=-0.3+
Score	0	1	2	3	4	5

Texture	LOWER RISK →			INCREASED RISK
Functional Deficiency	>0.8	<=0.8 but >0.3	<=0.3	
Score	0	1	2	

Collision	LOWER RISK →		INCREASED RISK
Number of collisions	No collisions	Less than 3 collisions	More than 3 collisions
Score	0	1	5

Collision	LOWER RISK →		INCREASED RISK
Severity of collisions	Slight	Severe	Fatality
Score	1	2	5

Scoring mechanism example

Factors	Option	Scoring mechanism example
Category	Q	7
Speed Restriction	30mph	2
SCRIM overall percentage deficiency score	93	9.3
Texture Overall percentage deficiency score	80	8
Collision number		5
Collision severity		5
Scores carried forward	Score	36.3

The above hypothetical example site scored 36.3, out of a possible maximum 49

12.2 Calculating the percentage length deficiency score for scrim

Scrim data is generally captured in measured lengths of 10 metres unless the end subsection length is shorter than 10 metres. Using the mechanism above we calculate the deficiency score based on the actual score, for example if the 10m subsection has a reading of -0.12 the score for the 10m length would be 3. We compare this value with the worst-case scenario score, which would score a maximum value of 5 :

Deficiency score = $\frac{3}{5}$ 0.6 or 60%

We can add all of the deficiency scores together for each overall site length, this allows us to compare long length sites against shorter ones. The percentage value for the total site length is divided by 10 (the subsection length), to create a site score with a maximum value of 10. So, in the example shown above the overall site score has been calculated as 93 which is divided by 10 to produce a site score of 9.3. This allows us to add all of the other potential high-risk values together to produce an overall score value. This enables us to prioritise a list of potentially high-risk sites, for on-site investigation.

A wide range of factors are considered during our desktop study. Any of these factors may contribute to the overall risk score for each site. This enables us to develop and prioritise a list of sites for further investigation, based on the desktop study total risk score. The site investigation scores are later added to these, to provide an overall score for remedial work prioritisation. However, the site score may not be applicable in circumstances where the works have already taken place on site. So, any sites on the list that have been identified by the SCRIM survey after remedial works have taken place and been completed, will then be removed from the final list.

In terms of collision severity, the most severe collision relating to the site dictates the collision score. So, for example, if there were 3 slight accidents and a fatality, the score of the fatality will dominate and the score will be 5.

The number of collisions will be based on whether there have been more/or less than 3 collisions within the site extents, these collisions need to be relevant to the site. One example of this: if the skid site was located on a northbound section from a roundabout, but the collision occurred heading southbound going away from the skid site, it would be considered not relevant to the skid site.

The simplicity of the scoring mechanism, allows us to revisit the same site length in the future. To enable us to compare changes in potential risks at any given time.

12.3 Site Investigation report

Site Investigations will be undertaken to gather visual information about each site.

We use hand-held devices for our Site Investigations, so a user-friendly version of the spreadsheet shown below will be used. This will allow engineers to record their site observations against each site on the spreadsheet. Once each site has been entered onto the database, the related data will be saved to a shared folder for reference later.

These observations will validate whether remedial works are necessary and allows each observation to be scored and a final list to be produced and prioritised. This provides greater clarity as to which sites need remedial treatment and what type of treatment(s) might be required. This will also provide a full audit trail of our actions and each site record will be stored electronically.

Site Investigation questions and scoring mechanism

Site Investigation

	LOWER RISK → INCREASED RISK		
Nearby Infrastructure	Low no. of people: no significant infrastructure nearby	Moderate no. of people: the vicinity of Industrial estate, individual shops, or business premises	High no. of people congregating, i.e. Schools, hospitals, doctors surgery, village hall, places of worship etc
Score	0	3	5

	LOWER RISK → INCREASED RISK	
>=25% loss of HFS within the wheel paths/braking zone?	No	Yes
Score	0	1

	LOWER RISK → INCREASED RISK		
Does the site exhibit Fatting/Polishing/Minor Fretting within the wheel paths/ braking zone?	No (<15%)	Yes (15-75%)	Yes (>75%)
Score	0	1	2

	LOWER RISK → INCREASED RISK	
Is there Deformation/Pushing of Material (Entire Area)?	No	Yes
Score	0	1

	LOWER RISK → INCREASED RISK		
Does the site Exhibit Major Fretting within the Surface Course (Entire Area)?	No	Yes (25%)	Yes (>25%)
Score	0	1	2

Scores carried forward	Score	36.3
Infrastructure	High	5
Loss of HFS	Yes	1
Fatting/polishing	No (<15%)	0
Deformation / pushing	No	0
Fretting	Yes (25%)	1

	LOWER RISK → INCREASED RISK	
Is there evidence of standing water NOT drainage related? (i.e. Rutting/Settlement)	No	Yes
Score	0	1

	LOWER RISK → INCREASED RISK	
Is there evidence of past patching repairs/ pothole fillings?	No	Yes
Score	0	1

	LOWER RISK → INCREASED RISK	
Is Queuing/ Standing traffic likely at any time? (including Peak hours)	No	Yes
Score	0	1

	LOWER RISK → INCREASED RISK	
Is there presence of Lay-bys or other access (i.e. property/field access)?	No	Yes
Score	0	1

	LOWER RISK → INCREASED RISK	
Is there poor advance visibility? (Cannot see event from 100m in either direction/ Complicated Turning/ Sudden stopping)	No	Yes
Score	0	1

Standing water	No	0
Patching/Pothole repairs	No	0
Queing	No	0
Layby's	No	0
Visibility	Yes	1

	LOWER RISK → INCREASED RISK		
Is there evidence of cracking/ minor surface defects?	No	Yes	
Score	0	1	

	LOWER RISK → INCREASED RISK		
Does the site have shared use? (i.e. bus or cycle lane)	No	Yes	
Score	0	2	

	LOWER RISK → INCREASED RISK		
Other factors (e.g. schools/pedestrian crossings/local amenities/speed cameras etc.)	No	Yes	
Score	0	2	

	LOWER RISK → INCREASED RISK	
Are Road Markings i.e. stop lines, clearly visible? (due to wear not leaves, etc)	Yes	No

	LOWER RISK → INCREASED RISK		
Are Road Signs clear, visible and easily understood?	Yes	Np (Sign needs maintenance)	No (Sign obstructed)

Cracking / minor surface defects	Yes	1
Bus / Cycle lanes	Yes	2
Ped crossing etc	Yes	2
	For info	
	For info	

	LOWER RISK → INCREASED RISK				
Majority surface type?	HFS/HRA/SD/Micro/SMA/Asphalt Concrete/Concrete/Other				For info
	LOWER RISK → INCREASED RISK				
Is there Contamination (e.g. Detritus) on the road surface?	No/Detritus/Oil/Soil/Sand/Other				For info
	LOWER RISK → INCREASED RISK				
Is there evidence of crash damage or heavy braking (i.e. Skid marks)?	No	Yes			For info
	LOWER RISK → INCREASED RISK				
Is there presence of existing slippery road signs?	Yes	No			For info
	LOWER RISK → INCREASED RISK				
Is there presence of Traffic Signal Induction Loops?	No	Yes			For info
	LOWER RISK → INCREASED RISK				
Is there sufficient space? (i.e. lane width >2.7m No Damaged Kerbs present)	Yes	No			For info

	LOWER RISK → INCREASED RISK			
Is there evidence of defective Road Studs? (i.e. missing/damaged/low)	No	Yes	For info	

	LOWER RISK → INCREASED RISK			
Is there evidence of joint sealing / overbanding?	No	Yes	For info	

	LOWER RISK → INCREASED RISK			
Is there a presence of chevron signs?	No	Yes	For info	

	Total score	13
Maximum score		49.3
Score percentage		70%

This allows us to calculate how deficient the overall site currently is, compared to it's possible worst case scenario.

Max site inv score = 21

Total maximum acheivable score 70 = 100%

**Deficiency & collision information are automatically collated for each site and are not specific on-site detailed Inspection question and responses*

12.4 Skid Site Prioritisation

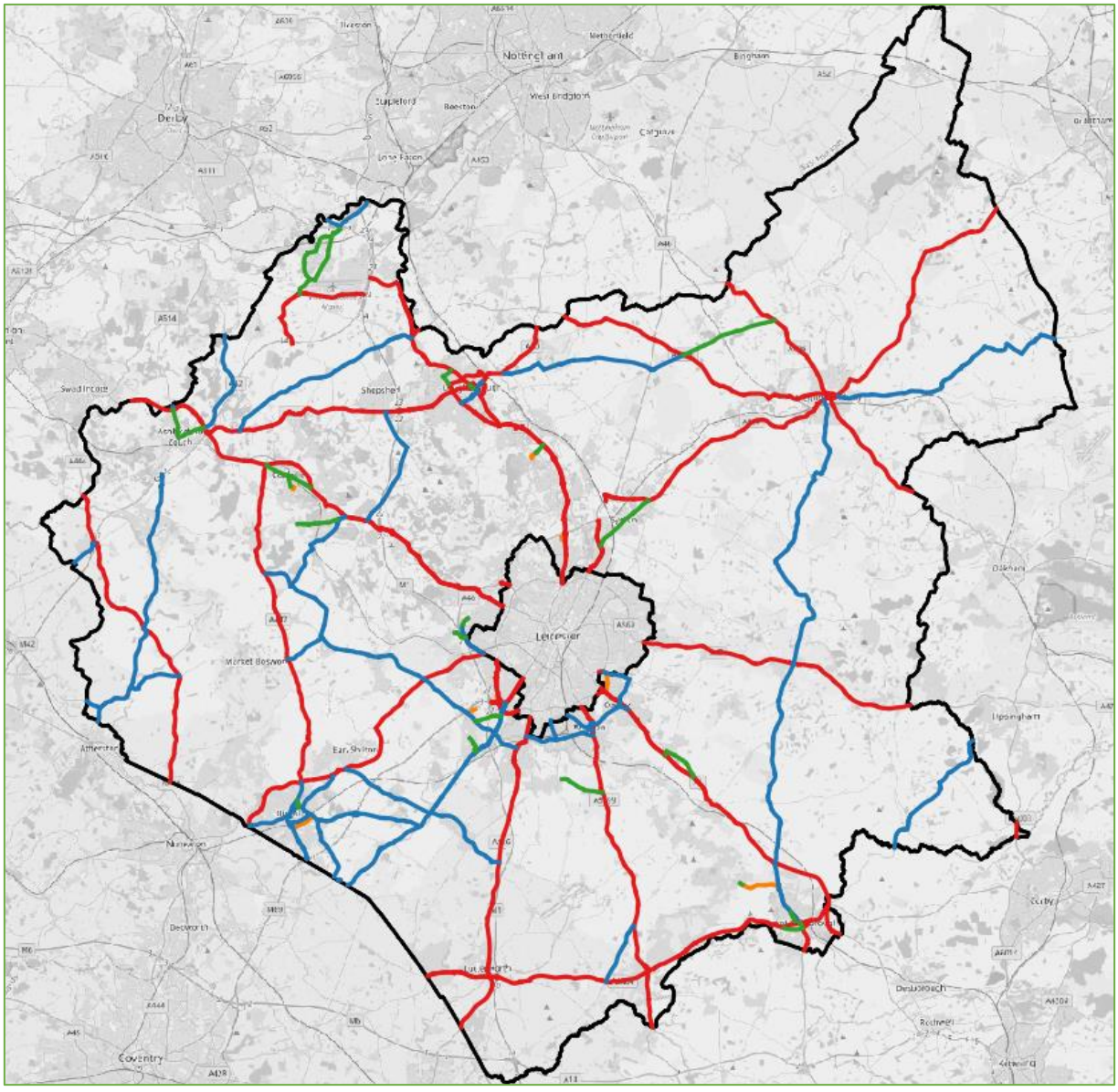
The results from each site visit are input into the database and this automatically compiles a prioritised list. The list is used to develop the future year's programme of works. This programme is then submitted to the Capital Programme Board for approval, alongside our other high risk capital infrastructure projects.

The quantity of sites being approved for remedial repair being undertaken each year will depend on the level of funding allocated by the Department for Transport, and the severity of risks highlighted by and relating to other assets that we have in our responsibility.

13. Appendix B

13.1 Skidding Resistance Road Network

The map below shows which classified ‘A’, ‘B’, ‘C’ and some unclassified roads are currently part of the defined skidding resistance survey network. The roads that have been selected for skid testing, are all important roads that are included in our monthly highway inspection routes.



Defined Skid Network

Key

Principal A roads =

Classified B roads =

Classified C roads =

Unclassified U roads =

County Boundary =

14. References

- Leicestershire County Council Highway Asset Management Policy (HAMP)
- Leicestershire County Council Highway Asset Management Strategy (HAMS)
- Leicestershire County Council Highway Infrastructure Asset Management Plan (HIAMP)
- Design Manual for Roads and Bridges, TSO, London
- CS 228 Skid Resistance (Volume 7, Section 3, Part 1)
- Road Surface Treatment Association / XAIS guidance documents for Local Authorities on:
  - Road Skid Resistance Policy / Strategy 2018 (Replaced with LASR Guidance 2021)
  - Skidding Resistance Procedure 2018 (Replaced with LASR Guidance 2021)
- Design Manual for Roads and Bridges, vol 7, Section 5, part 1 CD 236 tables 3.2a and 3.2b
- Well-Managed Highway Infrastructure code of practice 2016
- Interim Advice Note Ian 49/13 (Superseded by CS 228) Use of Warning Signs for New Asphalt Road Surfaces (Volume 7, Section 5)
- Interim Advice Note 98/07 (Superseded by CS 228) Guidance for HA Service Providers on implementing the Skid Resistance Policy (HD28/04)
- Transport Research Laboratory Report - High and low speed skidding resistance: the influence of texture depth 1998 TRL Report 367 – Published by TRL
- Transport Research Laboratory report – The early life skid resistance of asphalt surfaces TRL Report PPR060, published by TRL.
- Department for Transport STATS 19 and 20 (2011)
- ENG 03/05 British Horse Society/ADEPT publication – Horses and Highway Surfacing