Skidding Resistance Strategy

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Contents

1. Introduction

This document highlights changes to our procedures to reflect the recommendations contained in the Highways England's guidance document, the Design Manual for Roads and Bridges (DMRB) Volume 7, Section 3, part 1, CS 228 Skidding Resistance and these changes will be implemented from April 2022. Highways England's documentation can be used as guidance by Local Authorities but is principally aimed at Motorway and Trunk road agencies therefore Investigatory Levels, road speeds and availability of funding is generally lower than those available for the Strategic Motorway/trunk road network.

CS 228 (previously HD 28/15) is predominantly the same as its predecessor, with the main difference being the removal of Annex 7 from their document. This was removed because highways England are now using crash models in their processes and it stipulates that these models only apply to the Motorways and Trunk roads managed by Highways England's overseeing organisations. A similar crash model for Local Authority use is not currently available.

Skid resistance is an important aspect of highway maintenance, particularly in damp or wet conditions. The maintenance of adequate levels of skidding resistance of the road surface over the course of a roads' life span is important and contributes significantly to the principles of network safety.

2. Aims and Objectives

The aims and objectives of this strategy document are:

- To ensure Durham County Council adheres to its duty of care under the Highways Act 1980.

- To define those parts of the adopted highway network that will be subjected to an annual skidding resistance survey.

- To adopt a set of skidding resistance investigatory levels comparable to those specified by DMRB CS228 and 'Well Managed Highway Infrastructure: A Code of Practice' published in October 2016' that will be assigned to the defined network.

- To analyse data obtained from the annual surveys in order to identify sites for further investigation and incorporate into the annual highway maintenance works programme.

- To identify and investigate deficient sites using skid resistance survey methods for further investigation.

- To determine the most cost effective treatment needed to improve skid resistance levels and to prioritise sites for remedial treatment within available resources. Budgeting and programming issues will influence when treatments are carried out.

3. Roles and Responsibilities

3.1 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 legal requirement, it is considered good practice and it supports the aims and objectives set out in the Council's Transport Asset Management Plan (TAMP), Highway Maintenance Plan 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".

The development of this document is to provide a suitably structured procedure is implemented for the highway under its care and adequate levels of skidding resistance are maintained within reasonable expectations as outlined in the Highways Act 1980.

Importantly, this procedure document will provide documentary evidence of the County Council's approach to the management of skidding resistance of its roads.

3.2 Roles and Responsibilities

The Councils Highway Asset Management Team and in particular the Highways Asset Manager are responsible for the procurement of surveys, analysis and interpretation of results, site investigations, ordering of works and monitoring of works.

The Highway Asset Manager is responsible for overseeing the strategy and will nominate persons who will be responsible for the following:

- Management, development, implementation and regular review of the Skid Resistance strategy.

- Procurement and subsequent management of skid resistance surveys with contractors.

- Assignment of site categories and investigatory levels on the road network subject to skid resistance surveys.

- Processing, analysis and review of skid resistance data received from the survey contractor.

- Review of the site categories and investigatory levels for the road network subject to skid resistance surveys. This review will be undertaken every three years.

- Maintaining the appropriate records of site visits and associated documents.

- Provide a prioritised list of sites that would benefit from improvement works and making informed decisions about how these are integrated into the annual highways forward works programme.

4. Survey Network

The network to be surveyed will be defined on the principles of carriageway hierarchy as set out in 'Well Managed Highway Infrastructure: A Code of Practice' and replicated below:

Network Hierarchy - Carriageways			
Category	**Title**	**Description**	**Detailed Description**
1	Motorway	Limited access – motorway regulations apply	Routes for fast moving long distance traffic. Fully grade separated and restriction on use. (Within County Durham all motorways and trunk roads are maintained by the Highways Agency).
2	Strategic Route	Trunk and some Principal 'A' class roads between Primary Destinations	Routes for fast moving long distance traffic with little frontage access or pedestrian traffic. Speed limits are usually in excess of 40mph and there are few junctions. Pedestrian crossings are either segregated or controlled and parked cars are generally prohibited.
3a	Main Distributor	Major Urban Network and Inter-Primary Links Short-medium distance traffic	Routes between strategic routes and linking urban centres to the strategic network with limited frontage access. In urban areas speed limits are usually 40mph or less, parking is restricted at peak times and there are positive measures for pedestrian safety.
3b	Secondary Distributor	B and C class roads and some unclassified urban routes carrying bus, HGV and local traffic with frontage access and frequent junctions	In residential and other built up areas these roads have 20 or 30 mph speed limits and very high levels of pedestrian activity with some crossing facilities including zebra crossings. On-street parking is generally unrestricted except for safety reasons. In rural area these roads link the larger villages, bus routes and HGV generators to the Strategic and Main Distributor Network.
4a	Link Road	Roads linking between the Main and Secondary Distributor Network with frontage access and	In rural areas these roads link the smaller villages to the distributor roads. They are of varying width and not always capable of carrying two-way traffic. In urban areas they are residential or industrial inter-connecting roads with 30 mph speed limits, random

		frequent junctions	pedestrian movements and uncontrolled parking.
4b	Local Access Road	Roads serving limited numbers of properties carrying only access traffic	In rural areas these roads serve small settlements and provide access to individual properties and land. They are often only single lane width and unsuitable for HGVs. In urban areas they are often residential loop roads or cul-de-sacs.
5	Minor Road	Little used roads serving very limited numbers of properties	Locally defined roads

The total highway network within County Durham stands at approximately 3,815km. The network to be routinely surveyed for skidding resistance will be most of the carriageways that fall within the hierarchy categories 2 and 3a as defined above, and the resilient network (All Category 1 motorways within the County are maintained by agents on behalf of the Highways Agency and as such do not form part of this strategy).

This equates to approximately 846km of carriageway which when surveyed in both directions gives a total lane survey length of 1692km (where a road has small sections of category 3b/4a or 4b carriageway sandwiched between category 2/3a sections then it may be deemed appropriate to test the 3b sections to provide a complete survey for that road and conversely where a road has small sections of category 2/3a carriageway sandwiched between predominately category 3b/4a/4b carriageway then it may not be possible to deploy the survey machine onto these sections).

In general, this equates to the carriageways shown in Appendix A of this document.

5. Method of 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 on the road surface. Therefore, it is necessary to calculate an average skid resistance value taking seasonal changes to the road surface into account.

Skid resistance is not constant and is influence by various factors such as test speed, temperature, weather conditions and also long-term effects such as

seasonal weather variations or change of traffic flows. With this in mind measurements of road skid resistance shall be carried out annually between the dates of 1st May – 30th September. Measurements shall not be undertaken where the air temperature is below 5ºC. The survey operator shall maintain a record of weather conditions that could influence the survey results, such as heavy rainfall and strong winds.

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.

Our 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 yearly variation and therefore the calculations are affected by maintenance carried out in the last three years. The local equilibrium correction factor (LECF) is the correction factor that shall be used within each locality to bring the current year data to a level consistent with the long-term average. The Local Equilibrium SC (LESC) shall be determined to represent the average skid resistance level for the locality over recent years if a length of road has been resurfaced within the last four years then that length should be excluded from the LECF calculation. 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 survey.

The survey contractor will supply a list of road sections that are excluded from the survey with reason for that exclusion. This will be reported back to the council giving reasons why, which could include traffic calming schemes, width, height or weight restrictions, 20mph zones or road layouts where it is not possible or safe to maintain the survey speed.

Once the data has been loaded and checked the seasonally corrected CSC values shall be determined.

6. Site Categorisation and Investigatory Levels

Each road defined in Appendix A as being subject to annual skid resistance testing will be categorised and assigned an Investigatory Level (IL) in accordance with the guidance given in CS 228. This information is retained and kept in the office files.

As a result of Durham County Council’s surveys being undertaken on some low speed roads, Table 4.2 of CS 228 has been amended as follows.

Site Category	Definition	Investigatory Level at 50km/h			
		0.35	0.40	0.45	0.50
A	Motorway (**Not Applicable**)				
B	Non – event carriageway	✓			
C	Non-event carriageway with two-way traffic		✓		
Q	Approaches to and across minor and major junctions and approaches to roundabouts and Traffic Signals, gradient 5-10% longer than 50m, bend radius <500m – carriageway with one-way traffic			✓	
K	Approaches to pedestrian crossings and other high-risk situations				✓
R	Roundabouts			✓	
G1	Gradient 5-10% longer than 50m			✓	
G2	Gradient> 10% longer than 50m				✓
S1	Bend radius <500m – dual carriageway with one-way traffic			✓	
S2	Bend radius<500m – carriageway with two-way traffic				✓

Notes applicable to all;

1. The IL should be compared with the mean CSC, calculated for the appropriate length.
2. The averaging length is normally 100m or the length of a feature if it is shorter, except for roundabouts, where the averaging length is 10m.
3. Residual lengths less than 50% of complete averaging length may be attached to the penultimate full averaging length, providing the site category is the same.
4. As part of the site investigation, individual values within each averaging length should be examined and the significance of any values substantially lower than the mean value assessed.

Notes applicable to specific sites:

5. Investigatory levels and averaging lengths for site categories Q and K are based on 50m approach to the feature but shall be extended when justified by local site characteristics.
6. Categories for gradients should not be applied to uphill gradients on carriageways with one-way traffic.
7. Investigatory levels for site category R are based on 10m lengths.

Categories for bends must not be applied to bends with a speed limit of below 50mph.

After selecting a Site Category, the appropriate IL is assigned.

If more than one Site Category is appropriate, then the Site Category with the highest recommended IL will be selected.

A review of ILs will be undertaken in the following circumstances;

- After three years has elapsed since the last review.
- When survey results indicate that a section lies at or below the current IL and the site investigations procedure is invoked.
- Following significant changes to the highway network, for example, changes to the road layout, such as new traffic lights and pedestrian crossings and changes to speed restrictions.
- As a result of site specific RTC investigations into an abnormal cluster of accidents.

Any changes to the ILs will be documented in the forms at Appendix B.

7. Site investigation

All sites where the measured CSC is at or below the IL shall be investigated. Investigations shall be undertaken in two stages: an initial investigation, as described in CS 228 section 5, to check the date and assess the need for a detailed investigation and, secondly, a detailed investigation to assess justification and priority for treatment, as described in CS 228 section 6.

Initially, the priority for investigations will be as detailed for remedial works in Section 8 but this priority can change as further information is forthcoming.

The objectives of the site investigation are;

- To determine whether a surface treatment is justified to reduce the risk of wet skidding accidents.
- To determine whether some other form of action is required.
- To determine whether the site should be kept under review.
- To determine whether the Investigatory level is appropriate. If the Investigatory level is not appropriate, it should be amended.
- To determine any correlation between areas at or below IL and wet skidding accidents sites.

When deciding if a surface treatment is to be used or not, the flow chart show in Appendix C should be followed.

The results of the investigations and any actions arising should be recorded on the form shown at Appendix D.

8. Remedial Actions and Priorities

Slippery road warning signs are erected as a matter of urgency to warn road users of sites where the skid resistance is substantially low. Those sites will have a deficiency <=-0.2, be longer than 50m and there have been 3 or more wet skidding accidents. The sign and supplementary plates used shall comply with the Traffic Signs Regulations and General Directions and Chapter 4 of the Traffic Signs Manual.

The use of warning signs shall be recorded this will include the erection and removal of the signs, including the works issued and the inventory.

Signs and supplementary plates should be removed as soon as they are no longer required either as a result of remedial action and/or due to skidding resistance levels returning to an acceptable level.

Where skidding resistance levels are 0.10 below IL (for a minimum length of 20m) and there are clear indications that improving the condition of the surfacing will significantly reduce the risk of accidents, then remedial treatment shall be banded by range below investigatory level and then prioritised by category as follows:

Band	Range	Description
A	>0.20	Skid resistance level is 0.20 units lower than assigned IL
B	0.10 – 0.20	Skid resistance level is between 0.10 and 0.20 units lower than the assigned IL
C	0.05 – 0.10	Skid resistance level is between 0.05 and 0.10 units lower than the assigned IL
D	< 0.05	Skid resistance level is lower than 0.05 units lower than the assigned IL

Priority	Site Category	Site Description
1	K	Approaches to pedestrian crossings and other high risk situations
2	G	Gradient greater than 10% longer than 50m
3	Q	Approaches to and across minor and major junction, approaches to roundabout, approaches to Traffic

		Signals (no pedestrian phase), bends radius < 500m (single or dual carriageway), gradients up to 10%.
4	Q	Approaches to and across minor and major junction, approaches to roundabout, approaches to Traffic Signals (no pedestrian phase), bends, gradients up to 10%. Within 30mph or lower speed limits.
5	R	Roundabouts
6	C	Single carriageway non-event
7	B	Dual carriageway non-event

The prioritisation of sites requiring detailed investigation is achieved using a scoring system as shown in Appendix E.

9. The Use of High Friction Surfaces

High Friction Surfaces should be used as a last resort solution where ILs cannot be achieved by a combination of conventional aggregates and texture depth.

Based on the guidance given in ADEPT Advice Note – *The Use of High Friction Surfaces (2017),* High Friction Surfaces should only be used on high-risk sites, generally defined as requiring an IL of 0.5 or above.

Those sites with an IL of 0.50 and below that require surface treatment will be able to achieve these levels using a combination of conventional aggregates and texture depth.

These include:

- Approaches to major junctions, approaches to roundabouts and traffic signals.
- Approaches to pedestrian crossings and other high-risk situations.
- Gradient >10% longer than 50m.
- Bend radius <500m – carriageway with two-way traffic

The use of High Friction surfaces should therefore be specifically limited to individual high-risk sites where wet skid RTC's have occurred. The application of HFS may only be approved by the Strategic Highways Manager and the Strategic Traffic Manager. Where a Section/Team within Durham County Council, other than Strategic Highways, determines that the use of HFS is required on road safety grounds, the site investigation and justification for such a measure should be sent to the Strategic Highways Manager and the Strategic Traffic Manager for joint approval before application.

The approaches to high-risk pedestrian crossings, use of High Friction Surfacing should be thought of as the last option rather than the first.

The main issue is to understand the cause of RTC's and whether speed, geometry, camber or other factors are involved before making the surfacing decision. To assist in this process an investigation template is available within CS 228 to establish the cause of RTC's occurring at the site. Initial consideration should be given to making the site safer by:

- Amending the geometry of the road layout with road markings.
- Highlighting the hazard with signage.
- Removing the hazard.

Once a decision to use High Friction Surfacing has been made the site will need to be assessed and the course of treatment determined. The most common situations will involve:

- Existing High Friction Surfacing on approaches to high-risk site is planed off and replaced. This option is only suitable for sites where the surface course underneath the High Friction Surface does not exhibit any signs of structural deterioration.
- Existing High Friction Surfacing and surface course on approaches to a high-risk site is planed off and replaced. This option is necessary for sites where the surface course is exhibiting signs of structural deterioration.
- New surface course on approach to high-risk site requires application of High Friction Surfacing in order to exceed the IL.

Guidance states that it is recommended that new surfacing should be left exposed for a minimum of 15 days before laying a cold High Friction Surfacing but hot applied High Friction Surfacing can be laid immediately. However, it must be remembered that applying a High Friction Surfacing against the contractor's recommendations may invalidate the product's guarantee.

Guidance on choosing the most suitable High Friction Surfacing product and process for a given site must be sought from approved contractors at the design stage.

In conclusion the following is a list of Dos' and Don'ts when considering the use of High Friction Surfacing:

- Do understand the cause of RTC's before applying a High Friction Surfacing.

- Do consider altering road geometry, road markings, signage and other measures before considering the application of High Friction Surfacing.

- Do use High Friction Surfaces sparingly. High Friction Surfaces may encourage drivers to rely on the additional grip and consequently increase their approach speeds.

- Do not use High Friction Surfaces on surfaces that are showing signs of failure.

- Do wait at least 15 days before laying cold applied High Friction Surfacing on new surface courses and always seek the guidance of the contractor to ensure this does not affect the certification process and guarantee.

- Do not lay in the rain or on damp surfaces, especially when using polyurethane systems.

- Do try to lay thermosetting materials within the May to September window, hot applied thermoplastics are not as sensitive. Some materials can be modified by the manufacturer to suit ‘winter’ conditions.

- Do always use Clause 924 HAPAS material and Clause 924 approved contractors to lay the product.

- Do ensure the type rating for the Clause 924 is correct for the site. If in doubt always use Type 1.

- Do always ask the contractor ‘is my surface suitable for your process’.

- Do agree with the contractor a ‘hand over period’ to establish who is responsible for aftercare and any future sweeping requirements.

Appendix A – Roads to be Tested

Road No	Start Location	End Location
A1018	A19 Slip Road	County Boundary (Sunderland)
A1052	A183 Houghton Gate	County Boundary (Sunderland)
A1086	A19 Slip Road	County Boundary (Hartlepool)
A167	County Boundary (Darlington)	A1(M) Blind Lane
A167	A693 (North Lodge)	County Boundary (Gateshead)
A177	County Boundary (Stockton)	A689 Sedgefield
A177	A689 Sands Hall	A688 Metal Bridge
A177	A1(M) Bowburn	A167 Cock ‘o’ the North
A179	A19 Overbridge Sheraton	County Boundary (Hartlepool)
A181	Gilesgate	A19 Wellfield
A182	B1283/A19 Rbt Easington	County Boundary (Sunderland)
A182	A19 Murton	North Terrace Rbt (Seaham)
A183	A1(M) Blind Lane	County Boundary (Sunderland)
A6072	County Boundary (Darlington)	A688 Tindale Crescent
A6076	A691 Lanchester	A693 Annfield Plain
A6076	A693 Stanley	County Boundary (Gateshead)
A67	A66 Bowes	County Boundary (Darlington)
A68	County Boundary (Darlington)	County Boundary (Northumberland)
A688	A67 Barnard Castle	A181 Byers Garth
A689	County Boundary (Cumbria)	A688 South Church
A689	A688 Coundon Gate	County Boundary (Hartlepool)
A690	A689 Crook	County Boundary (Sunderland)
A691	A694 Shotley Bridge	A692 Villa Real
A691	A692 Leadgate	A690 Milburngate
A692	A68 Castleside	County Boundary (Gateshead)
A693	A692	A1(M) Blind Lane
A694	A691 Shotley Bridge	County Boundary (Gateshead)
B1198	A177 Shincliffe	A181 Sherburn House
B1278	A177 Sedgefield	A181 Wheatley Hill
B1279	A181 Thornley	B1280 Shotton
B1280	A19 Sheraton	A182 South Hetton
B1281	A19 Castle Eden	A1086 Blackhall
B1283	A181 Sherburn	A1086 Horden
B1284	A167 Chester Le Street	A1052 Fencehouses
B1285	County Boundary (Sunderland)	A1018 Seaham Grange
B1287	B1285 Dalton	County Boundary (Sunderland)
B1320	A19 Peterlee	A1086 Horden
B1404	County Boundary (Sunderland)	B1285 Seaton
B1404	B1285 Seaham	B1287 Seaham
B1432	A1086 Easington	B1283 Easington
B1432	B1283 Easington	A19 Murton
B6168	A693/A6076 Annfield Plain	A692 Tantobie
B6173	A6076 Stanley	A692 Pickering Nook
B6277	B6286 Middleton in Teesdale	BBA Romaldkirk

B6278	A67 Barnard Castle	B6282 Eggleston
B6282	B6277 Middleton in Teesdale	B6278 Eggleston
B6282	District Boundary – Toft Hill	C35 Shildon
B6284	B6282 Etherley Lane	A689 Newton Cap
B6286	A689 Toronto	A690 Willington
B6288	B6287 Kirk Merrington	A167 Croxdale
B6290	A167 Chester Le Street	A693 North Lodge
B6291	A1(M) Bowburn	A181 Thornley
B6296	C86 Drover Road	A691 Lanchester
B6298	A689 Crook	A690 Crook
B6298	A690 Crook	B6299 Billy Row
B6300	A690 Meadowfield	A167 Croxdale
B6301	A68 Tow Law	B6296 Lanchester
B6302	C18a Esh Winning	A690 Stonebridge
B6308	A692 Delves Lane	B6310 Medomsley
B6309	B6308 Medomsley	A694 Ebchester
B6310	A694 Shotley Bridge	A692 Burnopfield
B6312	A691 Witton Gilbert	A167 Plawsworth
B6313	B6532 Craghead	A167 Chester Le Street
B6314	B6310 Burnopfield	County Boundary (Gateshead)
B6322	B6308 Consett	A691 Blackhill
B6443	A167 Aycliffe School	A167 Aycliffe Ind Est
B6444	District Boundary (Heighington)	A167 Aycliffe Village
B6532	A691 County Hall	A693 Stanley
C10	A692 Leadgate	B6308 Medomsley
C10	A6076 Maiden Law	A691 Langley Park
C100	A167 Sniperley	A167 Pity Me
C10a	A692 Rbt Consett	A692 Leadgate
C11	B6168 Annfield Plain	A693 South Moor
C11	A693 Oxhill	C91 Waldridge
C113	A689 Leasingthorne	B6287 Kirk Merrington
C12	B6532 Rbt Framwellgate Moor	C12a Low Cocken
C124	A692 Pickering Nook	B6310 Burnopfield
C128	B6168 Harelaw	A692 Dipton
C12a	A177 Bowburn	A688 Low Cassop
C12a	A688/A181 Byers Garth	A690 Rainton Gate
C12a	C8b Leamside	C12 Low Cocken
C13	A690 Gilesgate	Unc 27.6 Carrville
C130	A688/A6076 West Auckland	A688/A689 South Church
C145	B1320 Peterlee	A1086 Littlethorpe
C146	C44 (Barnard Castle)	C165 (Rokeby Grange)
C147	B6444 Aycliffe	C35 Middridge
C15	B1280 Shotton Colliery	A19 Peterlee
C152	A688 Binchester	B6288 Tudhoe
C16a	C58a Delves	A692/B6308 Consett
C183	C184 Chester Le Street	C5 Pelton
C184	A167 Chester Le Street	A693 North Lodge
C186	A1(M) Blind Lane	County Boundary (Gateshead)

C187	A167 Aycliffe Village	B6444 Aycliffe Village
C188	A689 Toronto	C130 Bishop Auckland
C22	A19 Hutton Henry	B1281 Castle Eden
C23	A177 Coxhoe	A689 Old Acres Lodge
C30a	A688 Evenwood Gate	B6282 Toft Hill
C34	A688	B6282 South Church
C34	B6282 South Church	B6443 Aycliffe
C35	A6072 Shildon	C34 Cobblers Hall
C35	C34 Cobblers Hall	A689 Rushyford
C37	County Boundary (Stockton)	A689 Bradbury
C37	A689 Bradbury	C36 Chilton Lane
C37	C26 Ferryhill	C24 Metal Bridge
C38	County Boundary (Stockton)	C37 Mordon
C38	C37 Mordon	A689 Sands Hall
C38	A689 Sands Hall	B1278 Sedgefield
C38	C38 Sedgefield	A689 Sedgefield
C42	B6282 Butterknowle	A688 West Auckland
C5	C4 Pelton	County Boundary (Gateshead)
C58a	A691 Woodside	C16a Delves
C59	A690 Rainton Gate	County Boundary (Sunderland)
C62	C17 Quebec	A691 Langley Park
C65	B1279 Thornley	C60 Ludworth
C67	Unc 35.14 Cornforth	A177 Cornforth
C67	B6291 Coxhoe	C22 Kelloe
C69	C26 Ferryhill	C24 Cornforth
C85	C4 High Urpeth	C5 Low Urpeth
C8a	B1284 Waterhouses	C8b Morton Grange
C8b	C12a Leamside	C8a Morton Grange
C91	Osborne Rd, Chester Le Street	A167 Chester Le Street
C93	B6282 Etherley Grange	A689 High Grange
C94	B6313 Chester Le Street	C5 Newfield
C95	B6299 Tanners Hall	A690 Brancepeth
C95	EBA Spennymoor	B6288 North Close
C96	A688 Binchester	A690 Willington
C98	A690 Stonebridge	A690 New Elvet
C98a	A690 Crossgate	C98 New Inn
C98b	A177 Whinney Hill	C98 Dunelm